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1996

25500. Möller, E. (1996): Die Libellen des Kreises Herford (Insecta: Odonata). Bericht des Naturwissenschaftlichen Vereins für Bielefeld und Umgegend 37: 179-204. (in German with English summary) ["Thirty dragonfly species have been recorded in the Herford district (Detmold administrative region, North Rhine-Westphalia, Germany). They belong to the following families: Calopterygidae (1), Lestidae (4), Platycnemididae (1), Coenagrionidae (9), Aeshnidae (4), Gomphidae (1), Corduliidae (1), and Libellulidae (9). Species that prefer open, sparsely vegetated water bodies and riparian zones have clearly declined in recent years. A major reason for this is likely the near-complete absence of recent gravel pits with diverse water features. Most dragonfly species of eutrophic small bodies of water are common and widespread. The sparse occurrence of Calopteryx splendens is likely due to the moderate to poor water quality of most sections of flowing water. The following species have only been recorded once to three times or at one to three locations within the district: Lestes barbarus, Lestes dryas, Platycnemis pennipes, Ischnura pumilio, Erythromma najas, E. viridulum, Coenagrion pulchellum, Cercion lindenii, Brachytron pratense, Gomphus pulchellus, Cordulia aenea, Sympetrum pedemontanum. Lestes barbarus was only found in 1983. The record of Sympetrum pedemontanum in August 1983 was only the second to fourth in Westphalia. The first observation of Gomphus pulchellus dates back to 1996. Overall, the current dragonfly fauna of the Herford district can be characterized as species-poor." (Author/Google translate)] Address: Möller, E., Biologiezentrum Bustedt, Gutsweg, 32120 Hiddenhausen, Germany

1998

25501. Hirata, M. (1998): Some dragonfly larvae collected from Mt. Taisetsu. Sylvicola 16: 33-35. (in Japanese, with English summary) ["Five species of dragonfly larvae, referable to 4 families were collected from Mt. Taisetsu in July, 1997. Among them an occurrence of Somatochlora alpestris at an altitude of 1700 m is highlighted." Leucorrhinia orientalis, Aeshna juncea, Enallagma boreale, S. alpestris. Aeshna crenata.] Address: Hirata, M., 1-11-15, Futagatai dormitory, Futagatai, Shi, Tokyo 085

1999

25502. Altmoos, M.; Mothes-Wagner, U.; Wagner, G. (1999): Lebensraum für Kauz & Co. Faunistisches Zielartenkonzept für die Region Burgwald. Naturkundliche Jahresberichte Marburg-Biedenkopf 17/18: 9-42. (in German) [This Faunistic target species concept for the Burgwald region in Hessen, Germany includes many references to Odonata.] Address: http://www.hgon-mr.de/downloads/artikelzielarten.-pdf

25503. Cham, S. (1999): Dragonflies. Bedfordshire Naturalist 53: 51-52. ["Heavy precipitation in the first half of April resulted in extensive flooding along the Great Ouse valley and its tributaries. It was the highest flooding for 150 years and reported to be the highest April rainfall on record. At Felrnersham the waters reached the lakes in the nature reserve. The exact effects of flooding on dragonflies are unknown but it could lead to a redistribution oflarvae which are entering the final stages of development. Most likely affected are species that would be emerging at the end of April and early May. In the case of Felrnersham NR water levels were at their highest during May and June for many years. This will provide additional breeding areas for dragonflies. Between mid February and early March there were a number of reported sightings of dragonflies on the wing at this exceptionally early time. These sightings coincided with a period of very mild weather, southerly winds and initially the arrival of Sahara dust. Most of the brief descriptions which accompanied these sightings were inconclusive when viewed in isolation. However, a few were highly suggestive and combined with the weather conditions at the time it would appear that there was a large scale arrival of a North African species, Hemianax ephippiger. A large blue-brown dragonfly was reported from a garden below Blows Downs during February. Although the dragonfly was not caught, this sighting coincided with this influx and was almost certainly Hemianax ephippiger. Pyrrhosoma nymphula, was on the wing in Dorset in the last week of April and recorded in Epping Forest and Milton Keynes in the first weekend of May. In Bedfordshire it was not reported until the middle of May. The weather in May was variable but some extended warm spells proved good for dragonflies. The first half of June was cold and wet and little activity was noted. One of the coldest June days ever was recorded. July proved equally variable with very little in the way of dragonfly activity for most of the month. It was particularly surprising to find Calopteryx splendens, still emerging in the second half of July. Poor weather persisted. September was cool and wet with some late species still on wing. October and November continued to be wet and cold and no late sightings were made. Despite an overall poor year for dragonflies, two new species for the county were recorded; one a migrant and one a probable breeding species. Libellula fulva, was recorded at the two pits next to the A45 at Little Barford. This represents the first confirmed record for the county and the first for over 100 years. It is very easy to mistake Orthetrum cancellatum for this species with which it is often found. The new Bedfordshire colony is spread over several lakes and the River Great Ouse and extends

over the county boundary into Huntingdonshire (VC31). About 6 or 7 adult males were observed on the Bedfordshire side resting on emergent and bankside vegetation. They were seen to clash with males of O. cancellatum and Libellula quadrimaculata. A follow up visit on 28th June further recorded males and females, along with a pair in cop. Later in the year nearly fully grown larvae were found in the river confirming that this is indeed a breeding population. Brachytron pratense, range expansion continues both in Bedfordshire and Hertfordshire, where it was recorded at new sites. In the county it was again recorded from Felmersham during first week of May. Exuviae were found at several places indicating that it is now widespread throughout the site. At Priory Park several males were seen patrolling the margins of several of the Finger Lakes. A female was observed ovipositing in the dead floating stems of Schoenoplectus sp. It then flew up to catch a Coenagrion puella and settled in a tree to consume it. Recorded for the first time at Girtford Gravel Pit during a survey for the Ivel Valley Project. Recorded again at Bromham Lake NR by Peter Almond. Errol Newman reports that several were caught in mist nets set out for bird ringing at Priory Park. Recorded at the pits next to the A45 near Little Barford and at Chawston Pit. Recorded at the gravel pit next to the railway line at Radwell. This trend is expected to continue. Platycnemis pennipes, continues its range expansion along the River Ivel and River Flit. An unconfirmed sighting was made as far down as Flitwick sewage works. Aeshna grandis: at Marston Thrift ponds during August a female was seen to break off from egg-laying to capture a male Sympetrum striolatum. Whilst perched she consumed the entire abdomen before flying off after being disturbed. The unfortunate Darter was still alive and managed to hold on to its perch for nearly 1.5 hours before perishing. A few days later the same observation was made but this time the Darter was caught by a male Aeshna cyanea."

2001

25504. Dana, D. (2001): Small red-eyed damselfly Erythromma viridulum (Charpentier 1840): A new species of Odonata for the Isle of Wight. Proc. Isle of Wight nat. Hist. Archaeol. Soc. 17: 22-24. (in English) [E. viridulum was first discovered on the Island at four farm reservoirs, the two at Marvel Farm, Stone Farm and Parsonage Farm Peat Pond all in late July 2000. Further exploration during August revealed six more sites across the Island from Shorwell to St. Helens. Counts ranged from one or two to 80+ individuals on the pond at Marsh House, Brading. The paper includes records of Sympetrum fonscolombii (Atherfield 20th July 2000), Crocothemis erythraea (Lake 28th September 1997) and Orthetrum coerulescens (without date).] Address: Dana, D., 38 Yarborough Road, Wroxall, Isle of Wight. PO38 3EA, UK

2002

25505. Cheverton, J.M. (2002): Odonata records for 2001. Proc. Isle of Wight nat. Hist. Archaeol. Soc 18: 13-15. (in English) [UK; Records of 26 odonate species are documented.] Address: not stated

25506. Coupry, Y. (2002): Observation d'une attaque d'Anax imperator Leach, 1815 sur Cordulegaster boltonii (Donovan, 1807). Martinia 18: 146. (in French) [Verbatim: "On July 24, 2002, I conducted a field survey at a site I had already explored two years prior. While I hadn't yet noted it that day, a Anax imperator flew over the area at a low altitude (1.5 m). After a few minutes, it swooped straight up into the sky. There, 6-8 m above the ground, it latched onto another dragonfly. Witnessing this, I simply assumed it was mating. But it wasn't: the two dragonflies, now locked together, dropped to the tall grass with a loud rustling of wings. A few seconds later, as I was heading towards the landing point with my net in hand, A. imperator took flight and began circling above the vegetation, remaining within the area where it could still find the other dragonfly. It was only when I was in the immediate vicinity of this spot that the Anax moved away. Looking in the grass, I spotted the other dragonfly: a Cordulegaster boltonii. After carefully picking up the individual — a female — I was astonished to find that its right eye was damaged, as well as both of its right wings, the fourth wingtip torn behind the leading edge, not far from their base. The poor female Cordulegaster was never able to fly again due to the state of her wings. This site is located in the Sillé-le-Guillaume state forest, in the Sarthe department, in the commune of Saint-Rémi-de-Sillé. It consists of a small clearing, about fifty meters from an old quarry that is now flooded. The day was hot, and the dragonflies were very active." (Author/Google translate)]

2004

25507. Mayer, J. (2004): Libellen und Bachrenaturierungen. Untersuchungen zur Reaktion von Libellen (Odonata) auf Bachrenaturierungen in den baden-württembergischen Naturräumen Oberrheingraben und Neckar-Tauberland. Diplomarbeit. Universität Stuttgart: 80 pp. + 50 pp. Anhang. (in German) ["Dragonflies react strongly to structural changes in water bodies due to their specific habitat requirements during the larval and adult stages. For this reason, they are good indicators of the structural condition of a water body and for monitoring the success of river restoration projects. To examine the response of dragonflies to changes in water body structure parameters within a natural context, six water bodies in the northern and central Upper Rhine Graben and 12 water bodies in the Neckar-Tauberland region were identified, each with both a restored and an unrestored control section. A river structure mapping and assessment of the naturalness of the structural parameters were carried out at each section of all water bodies using the method of LAWA (2000). Furthermore, a dragonfly survey was conducted. The dragonfly faunas of the studied water body sections are evaluated using a scheme developed specifically for this study. This assessment framework incorporates the representation of expected dragonfly species, their rarity, stenotopy (the proportion of adults of species typical of flowing waters to the total population), and an abundance value. The resulting assessment of the dragonfly communities and the assessment of the structural parameters are subsequently linked. The legal situation, the guiding principles of flowing water structure mapping, and the potential flowing water dragonfly fauna at the investigated watercourse types are presented as fundamental principles. The data analysis reveals significant regional differences in the response of dragonfly communities to flowing water restoration. For example, the dragonfly communities found in the Upper Rhine Graben are highly dependent on a mosaic-like substrate structure and insufficient shading of the watercourse. In the Neckar-Tauber region, however, the dragonfly communities respond positively to the increasing naturalness of the riparian zone. The dragonfly communities found here are significantly more shade-tolerant than those in the Upper Rhine Graben. This leads to different recommendations for dragonfly-friendly stream restoration, depending on the specific natural environment. The important role of both structural and faunal guidelines in restoration measures is highlighted. It is recommended that, prior to any intervention,

a faunal guideline be developed analogously to the structural guideline. This ensures that the potentially occurring species of a stream catchment area can be optimally supported during the restoration project and that any potential damage to existing populations can be avoided. Many published guidelines for the near-natural structure of a stream lack sunny sections that were created in the original landscape by beaver activity or a high water table. The significance of different structural guidelines for dragonflies is discussed." (Author/Google translate) Availabe at: https://www.researchgate.net/publication/350975332_Libellen_und_Bachrenaturierungen_Untersuchungen_zur_ Reaktion_von_Libellen_Odonata_auf_Bachrenaturierungen_in_den_baden-wurttembergischen_Naturraumen_Oberrheingraben_und_-Neckar-Tauberland] Address: Mayer, J., Dorfstr. 57, 73061 Ebersbach-Roßwälden, Germany. Email: Johannes_D_Mayer@-web.de

25508. Salomon, S. (2004): Untersuchungen zur Entwicklung des Landschaftsgartens Aggerbogen zum Standort ökologischer Vielfalt unter der Nutzung als außerschulischer Lernort. Dissertation. Rheinische Friedrich-Wilhelms-Universität Bonn: 231 pp. ["The aim of this thesis is to document and analyze the development of a floodplain area that was formerly used intensively for agriculture and leisure activities 10 years after the renaturation from various points of view. Due to the availability of floristic and faunistic data from a site assessment before the renaturation, ecological comparisons and conclusions about the regenerative capacity of nature in this area could be drawn. An important part of this was the influence of an extracurricular learning center set up on the site, which works in the area of environmental education and nature conservation in the landscape protection area "Landschaftsgarten Aggerbogen", which was created in 1991, and helped shape the development of the site. The question is discussed to what extent nature can be regenerated after a relatively short period of time, what direct influence the extracurricular learning location has on the natural succession of the terrain and to what extent the continuous anthropogenic interventions influence the biodiversity. The basis of the work was the mapping of the vascular plants and the recording of the fauna of small mammals, birds, reptiles, amphibians, dragonflies, grasshoppers, moths and ground beetles in the renatured floodplain area in the years 2000, 2001 and 2002. From the period before the renaturation (1989) there were recording data of the vascular plants, birds, amphibians, dragonflies, grasshoppers and butterflies for the entire area before. The investigation area - the Aggeraue near Wahlscheid - was restructured at great expense in the early 1990s by the city of Lohmar with the support of the state of North Rhine-Westphalia based on the original landscape. Based on the terrain situation, a flood trough, an access to a oxbow lake, a pond and a periodically wet trough were created and new plantings were carried out according to site-specific aspects, with the aim of ecologically upgrading the area. The planting supplemented existing stocks and led to a reforestation of the soft wood floodplain with native trees. Meadows and extensively used pastures continued to make up the largest part of the area even after the renaturation, since the open floodplain character was to be preserved. The comparative study of the current and former condition of the Agger floodplain has made the ecological upgrading of the area clear. The area became demonstrably more structured as a result of the differentiated measures, with the planting of site-appropriate groups of trees and the planting of various hedges with herb and flower-rich borders breaking up the previously existing monotony of the meadows and green areas intensively used as pasture. By reducing the amount of grass cuttings to once or twice a year and by omitting any form of fertilization, the flowering plants also spread much more widely. As a result, plant diversity has increased by around 80% overall since 1989, although rarer plant species that are classified as endangered in the current Red List (Jedicke 1997) have also returned. The comparative investigations of the individual areas (flora lists in the appendix) document the different course of the natural succession of the vegetation depending on the terrain situation and thus enable a more differentiated assessment of the development of the floodplain area from a botanical point of view. The comparison of the faunistic data from the investigations before (1989) and after the renaturation (2001/2002) showed - also taking into account the non-direct comparability due to different investigation methods and times - overall also a significant increase in species diversity. The current records show an increase in dragonfly species from 2 to 17 species, and in grasshopper species from 5 to at least 12 species. In terms of avifaunology, the extensively used meadows and more differentiated structures of the terrain led to an increase in the population of breeding birds from 17 to 32 different species. While in 1989, before the renaturation, only a very small population of common frogs could be detected as the only amphibian species in the study area, this population increased many times over until 2001, with 3 additional amphibian species being recorded. Only in the case of butterflies was there no increase in the number of species from the 19 at that time, probably a result of the unfavorable weather conditions of recent years. The faunistic surveys carried out for the first time revealed a population of 30 different ground beetle species, 124 moth species and 10 small mammal species that are native to the Aggerbogen landscape garden. The analysis of ground beetles and moths clearly showed that although rare, site-typical species of habitats characterized by floodplains are represented, widespread species that are less susceptible to disturbance dominate. The establishment of a nature school in the 16-hectare Aggerbogen landscape garden created from the Agger floodplain has had a further lasting impact on the ecological diversity of the area. In addition to extracurricular environmental education for children, young people and adults, the nature school also offers instructions for practical nature conservation, which visitors can implement on site. In this way, further, small-scale structural elements were created (Benjeshecke, dry stone wall, pile of stones, willow structures), which on the one hand offer various animal species additional opportunities for retreat and on the other hand enable the participants to experience different facets of nature. In addition to the positive aspect for the site's biocenosis, this reciprocal relationship also resulted in lasting insights for the visitors. The nature school has gained important importance as an educational institution beyond the borders of Lohmar, which benefits from the increased ecological diversity with the use of the landscape garden as a teaching area. However, the investigations have also shown that there are limits to the ability of nature to regenerate in the Aggerbogen landscape garden, since the pressure to recover on the site is still a significant stress factor. In the summer months in particular, there is a clear tension between the needs of those seeking relaxation and the concerns of nature conservation. This conflict of use requires the development of alternative development concepts for the further development of the site, which meet the requirements of nature conservation and landscape protection on the one hand and the demands of those seeking relaxation on the other. A gradual development in the direction of near-natural alluvial forest with the corresponding faunistic diversity has taken place, the potential for further ecological improvements is given under certain framework conditions. The actual significance of the Aggerbogen

landscape garden currently lies in the combination of the increasing ecological diversity that is occurring there and the educational mediator role between man and nature, which is also becoming increasingly important. It has become a visual object of practical nature conservation and sustainable environmental education work." (Author) Odonata are treated in Chapter 4.6.] Address: https://bonndoc.ulb.uni-bonn.de/-xmlui/handle/20.500.11811/2270

2007

25509. Wang, C.; Gao, X.; Liu, Y.; Zhang, Z.-W. (2007): Effects of wetland vegetations on ecological distribution of Odonata species in Beijing, China. Acta Ecologica Sinica 27(2): 516-525. (in Chinese, with English summary) ["This paper demonstrates the relationship between wetland vegetation and the ecological distribution of dragonflies in the Beijing area. It also comments on the conservation of dragonflies and their habitats. Field studies were carried out between May 2001 and August 2004 to study the diversity of dragonflies in the area. A total of 36 species of Odonata were reported, belonging to 26 genera and six families. The characteristics and diversity of wet land vegetation were also studied by sampling 296 quadrats at 17 randomly selected plots representing different wetland types in Beijing including rivers, reservoirs, lakes and montane streams. Information was collected regarding dragonfly species and encounter rate and also composition of aquatic plants, coverage of floating-leaved aquatic plants, phreatophytes, submergent aquatic plants and emergent aquatic plants. The G-F index and G leason richness index were used to assess the diversity of wetland plants. By employing the Two-way Indicator Species Analysis (TWINSPAN) and Canonical Correspondence Analysis (CCA), the 17 plots were divided into four groups, each of which supported different dragonflies and may and thus shed light on habitat preferences. CCA ordination demonstrated that the richness of aquatic plants and the integrality of wet lands vegetation communities played the most significant roles. It suggested aquatic plants may supply habitat for dragonflies in their foraging, emergence, copulation and oviposition. Results of an assessment of key ecological factors of wetland vegetation show that coverage of floating- leaved aquatic plants is the most important s ing le factor affecting the distribution of Odonata species. Other factors are coverage of phreatophytes (G leason richness index), coverage of sub-emergent aquatic plants (G-F index), and coverage of emergent aquatic plants. Wetland vegetation, richness of aquatic plants and integrality of wet lands vegetation communities have profound effects on the ecological distribution of dragonflies in the Beijing area. However, the construction of urban wetlands involves the clearing of aquatic plants and the introduction of exotic plants into water bodies. Therefore, the integrality of wet lands vegetation should be preserved and managed." (Authors)] Address: Wang, C., College of Life Sciences, Beijing Normal Univ., Beijing 100875, China

2011

25510. Santana, S.E.; Geipel, I.; Dumont, E.R.; Kalka, M.B.; Kalko, E.K.V. (2011): All you can eat: high performance capacity and plasticity in the common big-eared bat, Micronycteris microtis (Chiroptera: Phyllostomidae). PLoS One 6(12): e28584. https://doi.org/10.1371/journal.pone.0028584 PMID: 22164308: 7 pp. (in English) [Panama "Ecological specialization and resource partitioning are expected to be particularly high in the species-rich communities of tropical vertebrates, yet many species have broader ecological niches than expected. In Neotropical ecosystems, Neotropical leaf-nosed bats (Phyllostomidae) are one of the most ecologically and functionally diverse vertebrate clades. Resource partitioning in phyllostomids might be achieved through differences in the ability to find and process food. We selected Micronycteris microtis, a very small (5–7 g) animalivorous phyllostomid, to explore whether broad resource use is associated with specific morphological, behavioral and performance traits within the phyllostomid radiation. We documented processing of natural prey and measured bite force in free-ranging M. microtis and other sympatric phyllostomids. We found that M. microtis had a remarkably broad diet for prey size and hardness. For the first time, we also report the consumption of vertebrates (lizards), which makes M. microtis the smallest carnivorous bat reported to date. Compared to other phyllostomids, M. microtis had the highest bite force for its size and cranial shape and high performance plasticity. Bite force and cranial shape appear to have evolved rapidly in the M. microtis lineage. High performance capacity and high efficiency in finding motionless prey might be key traits that allow M. microtis, and perhaps other species, to successfully co-exist with other gleaning bats." (Authors)] Address: Santana, Sharlene, Center for Society & Genetics & Dept of Ecology & Evolutionary Biology, University of California Los Angeles, Los Angeles, California, USA. Email: sesantana@ucla.edu

25511. Yamadai, S.; Iwakiri J.; Tatiyama, R. (2011): Studies on benthic fauna in some rivers of the northern Miyazaki Prefecture, southern Kyushu, Japan. Miyazaki Prefectural Museum Research Bulletin 31: 5-21. (in Japanese, with English title) ["Environmental surveys, water quality analyses, and benthic surveys were conducted in the upper, middle, and lower reaches of the Gokase River, which flows through northern Miyazaki Prefecture, and the midstream of the Iwaiko River. Results showed that the water quality at each site was generally clear and clean. The total number of benthic animal species and total number of individuals was high, and ASPT values were also high. Furthermore, compared to the results of a survey conducted by the Miyazaki Prefectural Institute of Health and Environment in May 1993 (Iwakiri, 1993), the total number of benthic animal species and total number of individuals, as well as ASPT values, had increased, and water quality had improved. Overall, these findings suggest that both rivers maintain excellent river environments." (Authors/Google translate) The following odonate taxa are listed: Calopteryx cornelia, Mnais pruinosa pruinosa, Sieboldius albardae, Davidius sp., Sinictinogomphus clavatus, Melligomphus viridicostus, and Asiagomphus yayeyamensis] Address: Yamadai, S., IMiyazaki Prefectural Mus. of Nature & History, 2-4-4 Jingu, Miyazaki City, Miyazaki, 880-0053, Japan

2012

25512. Gourmand, A.-L.; Vanappelghem, C.; Jeanmougin, M. (2012): Bilan 2011 du Suivi Temporel des libellules en France. Programme coordonné par la Société Française d'Odonatologie, l'Office Pour les Insectes et leur Environnement, le Conservatoire d'espaces naturels du Nord et du Pas-de-Calais et le Muséum national d'Histoire naturelle. Dans le cadre du Plan national d'actions en faveur des odonates et du programme Vigie-Nature: 25 pp. (in French) ["5. Perspectives: Towards a European Index: Other European countries, such as the Netherlands and England, have implemented national monitoring programs for dragonflies and damselflies (Odonata) based on a standardized protocol involving repeated 100-meter transects throughout the year. Dutch Butterfly Conservation has been leading such a

program since 1999. Initial trends were obtained after 5 to 10 years of monitoring (a longer period than for butterflies), as dragonflies and damselflies exhibit significant interannual variations and high mobility. In 2009, the 450 transects monitored across the country yielded trends for 44 dragonfly and damselfly species. Trends could not be identified for 15 species that were either infrequent or difficult to detect. To overcome this problem, more transects would be needed, but the number of observers is at its maximum, given the constraints of the protocol. The Dutch natural history database contains 1 million Odonata records. A new line of research was therefore based on the analysis of opportunistic Odonata data collected in the Netherlands (van Strien, 2010). By selecting comprehensive, time-repeated inventory data and using the site occupancy analysis method (Royle & Kery, 2007; Royle & Dorazio, 2011 STELI Report – Temporal Monitoring of Dragonflies in France SfO-Opie-MNHN-CEN Nord-Pas-de-Calais 2008), the population trends obtained from standardized surveys could be correlated with detection probability data. This same analysis was performed for the species Calopteryx splendens using data from five countries: The Netherlands, England, Ireland, France, and Belgium. The results indicate an overall positive trend for this species (van Strien et al., 2012) and validate the value of this type of "inventory" data for calculating such trends. However, not all countries have a database as comprehensive as that of the Netherlands, which explains the inclusion of a certain degree of standardization in the STELI protocol to compensate for this data gap. These analyses give us full confidence in the STELI protocol, which is based on this concept (repeated inventory data) and allows for the optimization of data quality through counting data and knowledge of observation pressure. Thus, with a view to European collaboration, a European index of dragonfly and damselfly population trends could be developed by adopting a common protocol framework and by leveraging historical data from different countries." (Authors-/Google translate)] Address: https://libellules.pnaopie.fr/wp-content/uploads/2023/09/Rapport-STELI-2012.pdf

25513. GRETIA (2012): Plan national d'actions en faveur des odonates: Déclinaison Pays de la Loire (2012-2015). Rapport pour la DREAL Pays de la Loire: 203 pp. (in French) [https://www.pays-de-la-loire.developpement-durable.gouv.fr/IMG/pdf/Gretia_2012_declinaison-PNA-Odonates-PDL_2012-2015.pdf]

25514. Livory, A.; Sagot, P.; Scolan, P.; Lacolley, E. (coord.) (2012): L'Atlas des Libellules du département de la Manche. Les Dossiers de Manche-Nature 9: 192 pp. ["This book is the result of an investigation that lasted over 10 years. Coordinated by experienced entomologists, it mobilized more than 100 people, mostly amateurs, but also various naturalist associations. All publications relating to Odonata and numerous internal reports were consulted. In total, this collective work represents a significant amount of labor: travel to the most remote areas of the department, often difficult surveys in wet meadows, peat bogs, and along the banks of rivers and ponds, delicate identification in the field, painstaking processing of often disparate data, creation of maps by municipality, systematic photography of all species, writing of the final text, and formatting. This work was entirely voluntary; its sole motivation was a passion for nature, the desire to share knowledge about it, and the wish to better protect it. Completely dependent on wetlands for their reproduction, dragonflies are insects particularly threatened by drainage, pollution, the disappearance of ponds, river canalization, excessive maintenance of bodies of water, and even climate change. It was therefore crucial, indeed urgent, to inventory them and define the status and requirements of each species. Thanks to this book, we now know that more than 50 species inhabit our department, utilizing all types of freshwater and even brackish water. Approximately 300 photographs allow for their identification and reveal their habitats. All species are mapped, and nearly every municipality in the Manche department was visited during more than 12 years of research. To preserve this exceptional natural heritage, we must first understand it. This rigorous yet engaging book will undoubtedly help you do just that!" (Publisher/Google translate)]

25515. Takahashi, S.; Watanabe, K.; Takemon, Y.; Omura, T. (2012): Delineation of habitat structure in rivers using a high precision GPS for conservation of species diversity of invertebrate communities. Ecology and Civil Engineering 15(1): 121-130. (in Japanese, with English summary) ["Spatial structures of 7 types of aquatic habitat at the reach scale were delineated using a high precision Global Position System (GPS) in 3 dam-impacted and 6 reference riverrine reaches in Miyagi Prefecture, Japan. Taxonomic and functional compositions of quantitative benthic invertebrate samples were also investigated. Out of the three dams, two indicated decreased levels of habitat diversity indexes (S, a, and E) at the outlet reaches due to reduced sediment supply and reduced hydraulic variation through dam-operation; but one dam connected to meandering outlet reach did not. Percentage of total area of lentic habitats (i. e., backwater and isolated pool) at the dam-impacted reaches (mean= 1.5%) was significantly lower than reference reaches (mean=5.5%). The taxon richness, abundance of swimmers, predators [including not specified Odonata], attachers and crawlers increased with the percentage of lentic habitat area ($P<0.05$, $n=9$), which suggests that lentic habitats contribute to maintain species diversity and the functional groups at the reach scale. Our data indicated a high application potential of the GPS-based evaluation of habitat structure for biodiversity conservation in rivers." (Authors)] Address: Takahashi, S., Tech. Div., Tohoku Univ., Aoba-yama, 6-6-06, Sendai, Miyagi 980-8579, Japan

2013

25516. Doucet, G.; Ruffoni, A.; Gomez, S.; Varanguin, N. (2013): Déclinaison régionale du plan national d'actions en faveur des Odonates - Bourgogne - 2013-2017. DREAL Bourgogne / Conservatoire d'Espaces Naturels de Bourgogne / Société d'Histoire Naturelle d'Autun: 96 pp. (in French) [https://odonates.pnaopie.fr/wp-content/uploads/2010/12/D%c3%a9-clinaison-r%c3%a9gionale-du-PNA-en-faveur- des-Odonates-Bourgogne-2013-2017.pdf] Address: Doucet, G., 22, rue de la Grette, 25000 Besançon, France. Email: guillaume.doucet-@yahoo.fr

25517. Duquef, Y. (2013): Diagnostic pour la déclinaison picarde du plan national d'actions Odonates. Picardie-Nature: 77pp. (in French) [Coenagrion mercuriale, Oxygastra curtisii, Leucorrhinia caudalis, L. pectoralis, L. rubicunda, Lestes dryas, L. virens, Isoaeschna isoceles, Onychogomphus forcipatus, Cordulegaster bidentata, Somatochlora flavomaculata, Epitheca bimaculata, Sympetrum danae] Address: http://www.-donnees.picardie.developpement-durable.gouv.fr/IMG/File/-patnat/PNA/PRA_Odonates.pdf

25518. Gourmand, A.-L.; Vanappelghem, C. (2013): Bilan 2012 du suivi Temporel des libellules en France Quels sont les paramètres qui influent l'estimation des probabilités d'occupation des sites et de détection des espèces d'odonates? Programme coordonné par la Société Française d'Odonatologie, l'Office Pour les Insectes et leur Environnement, le

Conservatoire d'espaces naturels du Nord et du Pas-de-Calais et le Muséum national d'Histoire naturelle. Dans le cadre du Plan national d'actions en faveur des odonates et du programme Vigie-Nature: 32 pp. (in French) ["6. Conclusion and Perspectives The STELI project is beginning to gain momentum. The number of sites and participants is increasing, and more and more networks of stakeholders are joining the program. The new momentum generated in the Upper Normandy region, with a significant number of sites proposed for STELI, provided an opportunity to test the observer effect for some of the species considered. This effect proved to have little impact on the estimation of the indices. While this calculation will need to be repeated for rarer species when the dataset size allows, this initial approach is, at first glance, quite encouraging. The challenge of the analyses during this second year of fieldwork was to test whether the covariates collected by observers prior to the surveys are usable and relevant for calculating the indices. The covariates that proved most influential for calculating the occupancy rate are primarily related to the structure of the aquatic habitat. While most estimates are consistent with current knowledge of the species, this was not the case for *Pyrrhosoma nymphula*, known to lay eggs in aquatic vegetation, but for which the results were contradictory. This analysis will need to be repeated with the 2013 data to identify the reason. Survey time is an important factor in estimating the probability of detection for species with particular detectability, such as *Chalcolestes viridis viridis*, whose hunting sites are located in vegetation, or *Anax imperator*, which is not very territorial. While this factor has little influence for common species, it will clearly play a role for less abundant species. However, we will only be able to quantify it once sufficient data is available for these species to perform the calculations. Overall, these results are encouraging for the future, even if they need to be further explored and expanded, particularly with a more diverse dataset in terms of monitored habitats, such as flowing water environments or grassland and peatland habitats, which are currently under-monitored within the STELI framework. Also, even if it is not very motivating for observers, habitats less favorable to Odonata will need to be included in the program, because to demonstrate the benefits of a habitat type for Odonata, it is necessary to highlight the opposite. 2014 should mark a turning point for STELI. After several years of testing the protocol, a data entry website will be available, allowing for both smoother data entry and the ability to retrieve existing data. The same will apply to coordinators within a given territory, who will be able to download data collected by observers in their network. These new features are accompanied by two data analysis tutorials: the first is a tutorial for learning how to use the Presence software to calculate site occupancy rates and species detection probabilities; the second is for conducting power tests with the SODA software on a local dataset to determine if the number of monitored sites is sufficient to detect species trends. This will allow observers and coordinators to independently use their data in local analyses and compare results at different scales, including national and local. In parallel, the international collaborations that initiated STELI in 2010 culminated in a collective publication in early 2013 (Van Strien A. et al., 2013), comparing the population trends of Calopteryx splendens in five European countries (the Netherlands, Ireland, Great Britain, Belgium, and France) using the "site occupancy" method employed for STELI, based on repeated presence/absence survey data since 1990. The results indicate that this species is generally increasing, although the trend is very slight. This highly successful and promising example suggests numerous possibilities for monitoring Odonata within various interconnected networks at multiple geographical scales, ranging from local to European." (Authors/Google translate)] Address: http://-www.old.gretia.org/dossiers_liens/nosact/pna_odonates/-Docs%20Odonates%20BN/Docs%20STELI/Rapport-bilan-STELI-2012.pdf

2014

25519. Iorio, E. (2014): Eléments de doctrine régionale pour la prise en compte des odonates dans le cadre des études réglementaires. Rapport GRETIA pour la DREAL Basse-Normandie, l'Europe et l'Agence de l'Eau Seine-Normandie: 22 pp. [https://odonates.pnaopie.fr/wp-content/uploads/2013/-01/GC2.8_Prise_en_compte_odonates_etudes_dimpact.-pdf] Address: Iorio, E., chargé d'études au Groupe d'étude des Invertébrés Armoricains (GRETIA) - Antenne Pays-de-la-Loire – 5 rue Général Leclerc – 44390 Nort-sur-Erdre, France. Email: e.iorio@gretia.org

25520. Tsai, Y.-C. (2014): Investigation of steady forward flight and sharp turning mechanism of damselfly. MSc thesis, Department of Mechanical Engineering College of Engineering National Taiwan University: 65 pp. (in Chinese, with English summary) ["This study used the common Taiwanese damselflies, the Chinese and slender-breasted damselflies, as experimental species. Placed in a specially designed, narrow, transparent acrylic observation chamber, the damselflies were observed as they rapidly transitioned from forward flight to backward flight, attempting to avoid the surrounding walls. High-speed cameras were used to capture the damselflies' wingbeats and body pitch movements during turns. Two-dimensional PIV technology was used to visualize the flow field, identifying key kinematic parameters and constraints affecting turns. By comparing wingbeat kinematics with flow field vortex interactions, the damselflies' unique turning strategies were summarized. Results revealed that damselflies employ two distinct turning patterns across different Reynolds Anzahl (Reynolds Anzahl) number ranges: a reciprocating rapid turn at low Reynolds numbers (50-300) and a partial acceleration (+70-75%) at 200-700 (<300). Furthermore, as the Reynolds number increases, the damselfly's Strouhal Anzahl number (ca. 0.2, von Taylor (2003)) can be considered the optimal operating point for energy efficiency in maneuvering flight. Flow field analysis shows that during stable forward flight, the damselfly's forewing leading-edge vortex (LEV) dissipates slowly. During the transition from upstroke to downstroke, it remains in a narrow region behind the forewing and above the hindwing, where it merges with the hindwing leading-edge vortex, increasing its strength to a maximum flight frequency of 160 1/s. This mechanism also provides sufficient lift during the hovering phase during rapid maneuvers. The damselfly kinematic parameters obtained in this study can be used to develop micro-aircraft with greater maneuverability potential, with the goal of improving energy efficiency." (Author/Google translate) Address: not stated

2015

25521. Goto, M.; Suzuki, Y.; Nagahata, Y.; Umetsu, K.; Igarashi, K.; Kiritani, K. (2015): The food habits of three species of crows in Shonai, Yamagata Prefecture, Japan, based on pellet analysis. Japanese Journal of Ornithology 64(2): 207-218. (in Japanese, with English summary) ["Three species of crows, Carrion Crow Corvus corone, Large-billed Crow C. macrorhynchos and Rook C. frugilegus (a migratory winter visitor) often roost together in Shonai, Yamagata Prefecture, Japan. In order to help understand how these closely related crow species are able to live together in the same locality, we investigated their food habits by DNA analysis of

their pellets. Pellets were collected from beneath roosts for analysis of their DNA and species contents. The percentages of three food groups: (a) invertebrates, (b) plants and (c)'others'found in pellets were as follows: Carrion Crow (a) 77.1, (b) 82.1, (c) 10.6; Large-billed Crow (a) 43.9, (b) 73.8, (c) 47.2, and Rook (a) 17.1, (b) 97.6, (c) 0. Carrion Crow pellets contained such organisms as ground wandering arthropods, herbaceous plant fruit seeds, and small herbivorous insects inhabiting paddy fields or wetland edges. These organisms typically occur close to the ground surface. Organisms inhabiting paddy fields were detected in Carrion Crow pellets throughout the year. In addition, they included items such as fruit seeds and insects that occur in tree crowns. In contrast, Large-billed Crow pellets were found to contain items typically found in trees, urban areas and garbage, whereas Rook pellets included mainly residual post-harvest rice grains derived from paddy fields. We conclude that although the diets of these three crow species overlap partially, Carrion and Large-billed Crows segregate based on feeding sites. There was an overlap between the feeding sites of Carrion Crow and Rook, but only when residual postharvest rice grains in paddy fields were abundant. Such dietary preferences and differences in foraging habitats may allow the co-existence of these three species within the same locality. ... Invertebrates (Electronic Appendix 1) The invertebrates included one genus of the gastropod Gastropoda and one species of the isopod Isopoda, with the rest belonging to the Insecta class. The insect classes detected were Odonata, Mantodea, Orthoptera, Hemiptera, Coleoptera, Diptera, and Hymenoptera. These are divided according to habitat into 1) aquatic animals, 2) ground-wandering arthropods, 3) phytophagous scarab beetles, and 4) other insect classes, as shown below. Note that the insect classes are adults unless otherwise noted. (1) Aquatic animals: Bellamya spp. (opercula), larvae (nymphs) of Libellulidae spp., … were detected in pellets from carrion crows. All except for the rice grasshopper were detected in summer. On the other hand, no aquatic invertebrates were detected in pellets from large-billed crows, except for the rice grasshopper. The rice grasshopper was detected at high rates in both carrion crows (74.5% and 66.7%) in autumn, but no significant difference was observed between the two species of crows. In winter and spring, the rice grasshopper was detected in small numbers (1.5–6.7%) of pellets from three species of crows, including the rook. The rice grasshopper egg cases were detected only in the carrion crows in summer and winter–spring." (Authors)] Address: Goto, M., Faculty of Agriculture, Yamagata University, 23–1 Wakaba, Tsuruoka, Yamagata 997–8555, Japan. E-mail: mgoto@tds1.tr.yamagata-u.ac.jp

25522. Houard, X.; Ferrand, M. (2015): Utilisation du protocole STELI dans le cadre d'un inventaire initial des Odonates avec diagnostic écologique: l'exemple du parc départemental du Sausset. Martinia 31(2): 53-72. (in French, with English summary) ["The use of the STELI protocol for an initial survey of Odonata with ecological diagnosis: the example of the Sausset urban park (Seine-Saint-Denis department). – This paper deals with the implementation and the use of the results of the so called STELI protocol, which has been used during three consecutive years for the survey of the Odonata of an urban park in the vicinity of Paris (Seine-Saint-Denis department). We show the benefits of such an approach for a conservation manager: improvement of the odonatological knowledge, assessment of the conservation value of the species and understanding of the functioning of the surveyed aquatic habitats. We also highlight some resulting recommendations for the conservation and the restoration of the aquatic habitats of the site, such as the management of water levels, the maintenance of riparian vegetation or the regulation of invasive species." (Authors)] Address: Houard, X., Office pour les insectes et leur environnement, BP 30, 78041 Guyancourt cedex, France. Email: xavier.houard@insectes.org

2016

25523. Herbrecht, F. (2016): Rapport d'activités 2015 de l'animation de la déclinaison du PNA odonates en Pays de la Loire. Rapport GRETIA pour la DREAL Pays de la Loire: 18 pp. (in French) [https://www.pays-de-la-loire.developpement-durable.gouv.fr/IMG/pdf/herbrecht_2016_rapport-activites-animation-p na-odonates-2015_gretia.pdf] Address: Herbrecht, F., Groupe d'Etude des Invertébrés Armoricains (GRETIA) (Antenne des Pays de la Loire – 5, rue du Général Leclerc - 44390 Nort-sur-Erdre, France

25524. Sansault, E.; Baeta, R. (2016): Inventaires faunistiques sur l'Espace Naturel Sensible des Rouchoux. Odonates et éphémères. Association Naturaliste d'Étude et de Protection des Écosystèmes CAUDALIS: 14 pp. (in French) [https://www.anepe-caudalis.fr/wa_files/CAUDALIS_CR_-Rouchoux_2016.pdf] Address: Baeta, R., Animateur du Plan régional d'actions en faveur des Odonates en Centre-Val de Loire, association naturaliste d'étude et de protection des écosystèmes "Caudalis", 1 rue de la Mairie 37520 La Riche - Courriel, France. E-maiul: renaud.baeta@anepe-caudalis.fr

2017

25525. Baeta, R. (2017): Animation de la déclinaison régionale du Plan National d'Actions en faveur des Odonates en Région Centre Val de Loire. Rapport d'activités 2016. Association Naturaliste d'Etude et de Protection des Ecosystèmes, Mars 2017: 18pp. (in French) [https://www.anepe-caudalis.fr/wa_files/Rapport_AnimationPRAO_2016.pdf] Address: Baeta, R., Animateur du Plan régional d'actions en faveur des Odonates en Centre-Val de Loire, association naturaliste d'étude et de protection des écosystèmes "Caudalis", 1 rue de la Mairie 37520 La Riche - Courriel, France. E-maiul: renaud.baeta@anepe-caudalis.fr

25526. Torii, T.; Tanida, K.; Yamamoto, Y. (2017): Some records of fresh water benthic invertebrates from Okinawa Island, Ryukyu Islands, Japan. Biology of Inland Waters 32: 5-23. (in Japanese, with English summary) ["We investigated the fresh water benthic macro invertebrate fauna at 6 sites in Okinawa Island, Okinawa Prefecture. A total of 134 species belonging to 69 families and 118 genera were recognized, of which 89 species were identified to the species-level, whereas remaining 45 species could only be narrowed down to the genus- or family- levels. Two alien species and 13 endangered species were confirmed inhabiting at the surveyed sites. Specimens mentioned in this article will be deposited at Osaka Museum of Natural History." (Authors) The following odonate species are treated: Pseudagrion pilidorsum, Matrona basilaris japonica, Atrocalopteryx atrata, Asiagomphus amamiettsis okinawanus, Stylogomphus tyukyuamis asatoi, Atrocalopteryx atrata, Macromia kubokaija, Acisoma panorpoides, Nannophya pygmaea, Crocothemis servilia servilia, Diplacodes trivialis, Orthetrum sabina sabina, and Pantala flavescens.] Address: Torii, T. Idea Consultant Inc., 1334-5 Riemon, Yaizu City, Shizuoka, 425-0084, Japan Email: ttakaaki@ideacon.co.jp

25527. Wang, M. (2017): [Male Orange-spotted Dragonfly;

Brachydiplax chalybea flavovittata Ris 1911]. Science Museum Bulletin 351: 1 p- (in Chinese) ["A group of insects is quite remarkable—they possess a slender abdomen like a human's, two pairs of transparent wings, and robust chewing mouthparts. Have I got it right? They possess powerful legs, including those of damselflies and dragonflies. Known as the “lords of the air”, they dominate aerial realms. These carnivorous insects prey on mosquito and grasshopper larvae as nymphs (water striders), consuming small fish and aquatic insects. and small fish. Adults are adept flyers, preying on butterflies, moths, mosquitoes, and flies whilst in flight. They also consume relatives or close kin. The English name ‘dragonfly’ aptly reflects their fierce nature. However, they assist in eliminating numerous mosquitoes and other pests, hence dragonflies are classified as beneficial insects. Approximately 156 species of dragonflies can be observed in Taiwan, including 14 endemic species and 14 species from the subfamily Aeshninae. In the museum's outdoor courtyard, several common dragonfly species can often be spotted. Examples include the purple-red dragonfly, the pine dragonfly, the thick-winged dragonfly, the dwarf dragonfly, the thin-winged dragonfly, the variable dragonfly, and the scarlet dragonfly. One species possesses particularly distinctive external features (¦1), perched upon lotus (Nelumbo nucifera) flowers. They may have been absent previously or simply overlooked. Only since last year have we observed them, and existing literature on Taiwanese dragonflies lacks records of the spotted dragonfly. Let us now begin to recognise the orange-spotted dragonfly! Spotted Dragonfly (Brachythemis rufa) • Males approximately 3.4 to 3.8 centimetres • Head H-shaped — resembling human eyes • Upper section dark red • Lower section greenish-brown • On the forehead of the face «The mature fruit of the watercress has a more pronounced powdery coating, which is less evident when unripe. Consequently, the fruit does not exhibit white powder. The thin fruit skin is often covered with a layer of white powder, also known as “old frost”. This is neither mould nor pesticide residue, but a natural wax layer. It serves no function in preserving the fruit. So what purpose does this white powder on the fruit serve? This is a question worth exploring. The abdomen exhibits a dark bluish-grey base, with powdered sections displaying a pale blue hue. The terminal half lacks powder, appearing blue-black. Observation of the male orange-spotted dragonfly's abdomen reveals that applying potassium water to the powdered areas produces several H-shaped water marks (H5). Once the moisture evaporates, the original state should be restored. The male Orange-spotted Dragonfly closely resembles the Japanese Dragonfly in appearance. Both possess transparent wings. The white powder appears pale blue, not dark blue-black. Both lack transparent wings, making them easily confused. However, they can be distinguished by the male orange-spotted dragonfly's dark red eyes, greenish-yellow markings, distinct yellow patterns, and orange-brown colouration near the wing bases. To observe the Five-spotted Dragonfly in the HWttH region, the optimal period is from September to October. Due to the temperate climate in central Taiwan, specimens were still observed flying in mid-December last year in Taichung City. Next, locate suitable habitats. As they avoid water's edge, seek ponds with lotus or water lily plants. Search diligently; numbers remain fairly common, predominantly males. You may wonder: have females been observed? Indeed, male orange-spotted dragonflies have been recorded. Though their numbers remain scarce. The most intriguing discovery lies in their diverse forms. Future observations will reveal distinct variations in their appearance." Translated with DeepL.com (free version)] Address: https://libknowledge.nmns.edu.tw/nmns/lib/PDF/106/351/8.pdf

2018

25528. Leprêtre, A.; Létienne, H. (2018): II. Les odonates. Parc du Marquenterre. Saison 2016-2017. Bulletin annuel Parc Ornithologique 2 (nouvelle série): 18-21. (in French) [“In conclusion, additional net surveys would have enabled us to look for other species such as Sympetrum fonscolombii or S. vulgatum. Note 2017: This year, the status of the S. meridionale has changed: from a species rarely seen on the site, 2017 saw the sighting of several individuals in late spring. It can probably be considered ‘uncommon’ in the future. A new species was also added to the list of odonates in the Park, with the observation of a female Gomphus pulchellus in spring during a ringing session. This is the only record we have: it is probably an erratic individual passing through the site. Translated with DeepL.com (free version)] Address: https://www.marquenterrenature.fr/wp-content/uploads/2018/08/bulletin-annuel-2016-2017-VF.pdf

2019

25529. Alvial, I.E.; Vargas, H.A.; Marinov, M.; Esquivel, C.; Araya, J.; Araya-Donoso, R.; Vila, I.; Veliz, D. (2019): Isolation on a remote island: genetic and morphological differentiation of a cosmopolitan odonate. Heredity 122(6): 893-905. (in English) ["Although low levels of genetic structure are expected in highly widespread species, geographical and/or ecological factors can limit species distributions and promote population structure and morphological differentiation. In order to determine the effects of geographical isolation on population genetic structure and wing morphology, 281 individuals of the cosmopolitan odonate Pantala flavescens were collected from four Continental (Central and South America) and five insular sites (Polynesian islands and the Maldives). COI sequences and eight microsatellite loci were used to characterize genetic diversity and genetic structure between and within locations. Linear and geometric morphometry were used to evaluate differences in the size and shape of wings. Genetic analysis showed a global genetic difference between the continental and insular sites. American locations did not show genetic structure, even in locations separated by a distance of 5000 km. Easter Island showed the lowest values of genetic diversity (mainly mitochondrial diversity) and the highest values of genetic differences compared to other insular and continental sites. Individuals from Easter Island showed smaller forewings, a different abdomen length to thorax length ratio, and a different configuration of anal loop in the hindwings. Thus, the greater isolation, smaller area, and young geological age seem to have determined the genetic and morphological differences in P. flavescens of Easter Island, where selection could promote a loss of migratory behavior and may improve other life history traits, such as reproduction. This work provides new insight into how microevolutionary processes operate in isolated populations of cosmopolitan species." (Authors)] Address: Alvial, Ingrid, Facultad de Ciencias and Instituto de Ecología y Biodiversidad (IEB), Universidad de Chile, Santiago, Chile. E-mail: ingrid.alvial@gmail.com

25530. Association les Écologistes de l'Euzière (2019): Suivi des populations d’odonates patrimoniaux sur le site Natura 2000 « Gorges de l’Hérault ». https://libellules.pnaopie.fr/-wp-content/uploads/2025/09/2018CCVHPDGodonates20-190123.pdf: 175 pp. ["5. Conclusion This study validated and implemented a monitoring protocol for the four dragonfly species targeted as a priority by Natura 2000. This protocol is designed for a maximum of six days of fieldwork, including the participation of volunteers. Following this first year of implementation, improvements are already needed. While

monitoring must be carried out under the same conditions (same budget, same time, same number of people), it is recommended that habitat characterization be performed with the same personnel throughout the study to avoid observer bias between different visits. It would be crucial to increase sampling efforts by conducting more visits to the Hérault River. The relatively low density of the target species and the difficulty in finding their exuviae result in a very limited amount of data, making it impossible to track population trends. Increasing the time spent in the field improves the likelihood of detecting adults and exuviae. It is also important to emphasize that the absence of any observed exuviae or imago does not necessarily mean that the species is absent. The surveys conducted in 2018 nevertheless allowed for the updating of observational data and increased knowledge of the local ecological requirements of the four target species, as well as other more common dragonflies. These surveys helped to clarify, albeit partially, the location of the four species within the Natura 2000 site "Gorges de l'Hérault". The limited sampling effort, over a short period, did not allow for the detection of the most cryptic species: Macromia splendens. However, the majority of sites appear to be suitable for the species, with variations in the submerged substrate and current that may be more or less favorable. No highly unfavorable areas were identified within the river sections surveyed. Furthermore, it is important to emphasize that only a tiny fraction of the watercourses were sampled compared to their total length. Specifically, a 250-meter stretch was sampled on the Verdus River, which has a total length of approximately 8.7 km; a 250-meter stretch was sampled on the Avèze River, which has a total length of 2.7 km; and 750 meters were sampled on the Hérault River, which has a total length of approximately 53 km within the Natura 2000 site. The surveys also allowed for the identification of certain forms of degradation affecting the aquatic and terrestrial habitats of dragonflies. These threats are sometimes difficult to assess or even quantify and likely have significant cumulative impacts on Odonata across all waterways: pumping, reservoirs, invasive plants along the banks, introduced crayfish, rising temperatures, stocking, and wakes caused by canoeing. Furthermore, it is important to note that canoeing takes place during the dragonfly breeding and emergence season. The effects of this activity, such as increased wakes and trampling of the banks, have a difficult-to-quantify impact on dragonfly and damselfly populations. More in-depth and highly targeted studies could allow for a better assessment of the impacts induced by this tourist pressure. However, some very localized management actions have been proposed, such as: - felling box elder maples (girdling is recommended) and replacing them with alders to promote root systems and better bank stabilization (this action could be generalized to the entire river within the Natura 2000 site to have a real impact on dragonfly and damselfly); - occasional clearing/mowing of the banks (leaving patches of vegetation) to promote sunlight reaching the watercourse; - raising awareness among owners of existing pumping pipes; - suggesting to owners of adjacent gardens that they leave a grassy strip along the bank to create feeding, resting, and maturation areas for Coenagrion mercuriale; - cleaning certain banks (presence of waste); - monitoring and adapting bank maintenance; - installing awareness signs. It is advisable to implement awareness campaigns about Odonata, at a minimum targeting local elected officials and riparian landowners, to promote river and bank management practices that are more aligned with the conservation of these species, and therefore with the conservation of other species present in these same habitats. These actions are more easily applicable to tributaries than to the Hérault River, as access is more difficult along the latter's banks. Depending on the measures implemented, monitoring of the work should be considered. Non-intervention is also a management approach that can be implemented when the environment is in an acceptable state of conservation or when natural processes can lead, without direct human intervention, to the desired state. It can then be assumed that continuing this work will enrich this management plan. Indeed, additional observational data are needed to clarify the threats and management recommendations. This monitoring is therefore necessary to gather feedback on the measures implemented." (Authors/Google Translate).] Address: Association les Écologistes de l'Euzière, Domaine de Restinclières, 34 730 Prades-le-Lez, France

2020

25531. Baeta, R. (2020): Animation de la déclinaison régionale du Plan National d'Actions en faveur des Odonates en Région Centre Val de Loire. Rapport d'animation 2019. Association Naturaliste d'Etude et de Protection des Ecosystèmes: 95 pp. (in French) [https://www.anepe-caudalis.fr/wa_files/-Rapport_AnimationPRAO_2019.pdf] Address: Baeta, R., Animateur du Plan régional d'actions en faveur des Odonates en Centre-Val de Loire, association naturaliste d'étude et de protection des écosystèmes "Caudalis", 1 rue de la Mairie 37520 La Riche - Courriel, France. E-maiul: renaud.baeta@-anepe-caudalis.fr

25532. Baldwin, J.R. (2020): Odonata, Isle of Wight, 2019. Proc. Isle of Wight Nat. Hist. Archaeol. Soc. 34 (pub 2020): 93-94. (in English) ["The 2019 recording season was a notable one for Odonata. It was the longest recorded flight season for this group for the Isle of Wight, with the first and last record spanning February to November. Strangely it was the same species which produced the first and last records, the migrant species Anax ephippiger on 23rd February and 14th November respectively. The first sighting of a resident species was Pyrrhosoma nymphula, on 10th April, 11 days earlier than in 2018. The combination of a dry winter and hot weather during the early summer resulted in some ponds having either very low water levels or being completely dry. It remains to be seen if this will have an adverse effect on some species as there was a similar situation in 2018. Despite the new addition of A. ephippiger there was still only 24 species of Odonata recorded in 2019, the same total as in 2017 and 2018. Unfortunately, no reports were received for Cordulia aenea for the first time since 2015. This was possibly due to the combination of this species having a 1 -2year life cycle before emerging, meaning it might not appear at some sites every year, and not all of the known sites being covered." (Author)] Address: Baldwin, J.: Email: wightdragonflies@-gmail.com

25533. Chandran, J.J.; Chandran, V. (2020): Introduction to Odonata. With identification keys for dragonflies & damselflies found in Kerala. Version 2.0. Published by Society for Odonate Studies, Reg. No: KTM/TC/8/2019, Kuzhimattom PO, Kottayam, Kerala – 686533, India: 386 pp. (in English) [https://dn790002.ca.archive.org/0/items/introduction-to-odonata-2/Introduction%20to%20Odonata%202.pdf]

25534. Cuellar-Cardozo, J. A.; Castro-Rebolledo, M. I.; Jaramillo, M.A. (2020): Diversidad y composición de Odonata asociadas con diferentes condiciones de la vegetación riparia a lo largo de un arroyo en Paicol-Huila, Colombia. Actualidades Biológicas 42(113): 1-11. (in Spanish, with English summary) ["The fragmentation of aquatic and riparian environments has damaged diversity into ecosystems. These injuries are pronounced in areas as tropical dry forests in

Colombia, which are endangered zones that could be disappear in few years. In this situation, diversity and composition in Odonata insects, which are influenced by abiotic factors, could be excellent tools for understanding environmental status. Thus, we aim to observe changes in Odonata diversity and composition in different riparian vegetation during a year, along a stream from a remnant of dry forest. At the same time, we hypothesize that there are differences in Odonata diversity and composition. To take this, we sampled Odonata, larvae and adults, and environmental variables in four sampling stations, with different riparian vegetation during a year. We collected a total of 272 specimens corresponding to 16 species. In one hand, we noted variations in Odonata composition, showed in species records and similarity index. In other hand, we do not observe differences in Odonata diversity. Lastly, we approve in part our hypothesis exposing only Odonata composition changes with riparian vegetation, during sampling year." (Authors) Coryphaeschna viriditas, Hetaerina caja, Hetaerina occisa, Acanthagrion kennedii, Argia cupraurea, Argia fissa, Argia oculata, Enallagma novaehispaniae, Dythemis nigra, Elasmothemis cannacrioides, Erythrodiplax castanea, Elga leptostyla, Libellula herculea, Macrothemis hemichlora, Perithemis mooma, Erpetogomphus sabaleticus] Address: Cuellar-Cardozo, J. A., Bioprospección y Biodiversidad Colombiana, Universidad La Salle, Bogotá. Colombia. Email: josecuellar1094@gmail.com

25535. Jose, J. (2020): Introduction to Odonata. With identification keys for dragonflies & damselflies found in Kerala. Version 1.0. Published by Society for Odonate Studies, Reg. No: KTM/TC/8/2019, Kuzhimattom PO, Kottayam, Kerala – 686533, India: 214 pp. (in English) [https://ia802801.us.archive.org/27/items/odonata_kerala/Introduction%20to%20Odonata.pdf] Address: Jose, J., Society for Odonate Studies, Vellooparampil, Kuzhimattom PO, Kottayam, Kerala 686533, India

25536. Lamouille–Hébert, M. (2020): Plan d'actions départemental pour la conservation des Odonates rares et menacés de Haute-Savoie (2021-2025). France nature environnement Haute-Savoie: 134 p.- (in French) [Conservation measures for the following species are treated in detail, while the focus is set on Coenagrion mercuriale: C. mercuriale, Oxygastra curtisii, Sympetrum depressiusculum, Lestes dryas, Lestes sponsa et Sympetrum flaveolum, Leucorrhinia albifrons, Aeshna caerulea, Aeshna juncea, Coenagrion hastulatum, Leucorrhinia dubia, Somatochlora alpestris et Somatochlora arctica, Coenagrion pulchellum, Sympetrum vulgatum, Ceriagrion tenellum, Nehalennia speciosa, Sympecma paedisca, Aeshna subarctica, Leucorrhinia caudalis, Leucorrhinia pectoralis, Ophiogomphus cecilia, Stylurus flavipes, and Sympetrum pedemontanum.] Address: https://www.fne-aura.org/uploads/2020/12/plan_action_odonates_fnebis.pdf

25537. Puech, L.; Cerclet, S.; Dupont, V.; Berry, T.; Sellier, Y. (2020): Rapport du suivi 2019 des exuvies d'Odonates sur la Réserve naturelle du Pinail. Édité par GEREPI Vouneuil-sur-Vienne, France: 37pp. (in French) ["The Pinail Nature Reserve is home to 51 species of Odonates out of the 93 present in France. This study extends and clarifies a follow-up conducted since 1992 on Anisoptera exuvias from 60 sample ponds. A new protocol was drawn up in 2019 as part of the setting up of a "water-biodiversity-climate" observatory to homogenise and complete the data from the various Odonate monitoring studies. The surveys covered 27 ponds in this batch, also taking into account Zygoptera exuviae. The main objective of this study is to monitor and assess the conservation status of Odonate populations with particular attention to five species of concern at the site (Lestes sponsa, Isoaeschna isoceles, Somatochlora flavomaculata, Leucorrhinia pectoralis and L. caudalis). The second objective is to determine the biotic and abiotic factors that structure these populations and explain the presence or absence of the species. A total of 3122 exuviae were identified, 53% of which were Zygoptera and 10% leucorrhine. Populations of L. caudalis on the reserve appear to have better reproductive success than populations of L. pectoralis, of which account less than one-third leucorrhine exuvia." (Authors).] Address: https://libellules.pnaopie.fr/wp-content/uploads/2023/07/Rsultats_exuvies_Odonates_2019_RNNPinailVF-1.pdf

2021

25538. Jiang, S.; Hu, Y.; Li, Q.; Wang, H.; Lin, Y.; Zhou, X.; Liu, Q. (2021): The noise reduction characteristics of microstructure of dragonfly wing leading vein. Applied Sciences 11, 2970. doi:10.3390/app11072970: 13 pp. (in English) ["Dragonfly wings have many excellent functions, such as superhydrophobic, fatigue resistance, anti-reflection, etc. However, there are few reports on the low noise flight of dragonfly wings. For this reason, the microgeometry of dragonfly wings was studied in this paper to reveal the mechanism of low-noise flight of dragonfly leading veins. The micromorphology of dragonfly wings was observed by scanning electron microscopy [Pantala flavescens]. It was found that the leading-edge veins of dragonfly wings have a triangular prism-like serrated structure, which has been proven to have the effect of improving aeroacoustics. According to the principle of scale law of flying organisms, a bionic model with the leading-edge microstructure of dragonfly's front wing was established, and computational fluid dynamics (CFD) analysis of serration bionic microstructure was carried out. The effects of geometric parameters, such as height, width and overall amplification factor of microstructure on aeroacoustics were obtained. The distribution of pressure fluctuation on the surface of the bionic wing was also analyzed in this paper. It was found that the serrated microstructure can significantly suppress the noise generation in the mid-frequency band. Finally, wind tunnel tests were simulated using a designed low-noise rotating test platform. The test results confirmed that the serration microstructure has certain noise-reduction characteristics." (Authors)] Address: Jiang, S., Key Laboratory of CNC Equipment Reliability, Ministry of Education, School of Mechanical & Aerospace Engineering, Jilin Univ. Changchun 130022, China. Email: jlujiangshan@163.com

25539. Lafont, V.-A.; Rodriguez, J.P.; Soustelle, C. (2021): Inventaire des espèces d'odonates d'intérêt communautaire et de leurs espèces compagnes- Site Natura 2000 « Vallée du Galeizon » - Synthèse et analyse des données 2017 à 2019. Syndicat des Hautes Vallées Cévenoles: 90 pp. (in French) ["Conclusion: This study has contributed to a remarkable improvement in our knowledge of a group that was previously very poorly understood in the Natura 2000 site 'Vallée du Galeizon'. The available data has more than doubled; the composition and autochthonous nature of the communities present on the site's watercourses have been defined very precisely; and finally, the distribution map of the main heritage species has been well established. In addition to improving knowledge of the odonates of the Natura 2000 site, this study also contributes to a better overall understanding of the riparian ecosystem within the site. This group is closely dependent on the morphology and hydrological functioning of watercourses, as well as on the ecological functionality of associated environments (riparian forests, open environments,

etc.). Studying them therefore provides us with information on the state of these ecosystems. It will, of course, be necessary to compare this study with others conducted in the area in order to better understand the overall functioning of rivers and odonate populations. Aware of the need for close partnership between all local stakeholders to better address these ecological issues, the Syndicat des Hautes Vallées Cévenoles is committed to strengthening links between all stakeholders and promoting networking. It therefore hopes that this study will mark the starting point for a concerted regional initiative in favour of ecosystems." (Authors/DeepL)] Address: https://-www.naturedugard.org/doc/faune/2020_etude_odonates_-galeizon_SHVC_rapport_final_VF_130121_intern et.pdf

25540. Rodriguez, J.P.; Lafont, V.-A.; Soustelle, C. (2021): Inventaire des espèces d'odonates d'intérêt communautaire et de leurs espèces compagnes- Site Natura 2000 « Haute-Cèze » - Synthèse et analyse des données 2017 à 2019. Syndicat des Hautes Vallées Cévenoles: 81pp. (in French) ["Conclusion: This study has significantly improved our understanding of a previously poorly understood group of dragonflies and damselflies within the Natura 2000 site of the Upper Cèze. The available data has more than doubled; the composition and native status of the species present on the site's watercourses have been precisely defined; and finally, the distribution map of the main heritage species has been accurately established. In addition to improving our knowledge of the Odonata of the Natura 2000 site, this study also contributes to a better overall understanding of the riparian ecosystem within the site, thus providing a solid foundation for guiding conservation efforts. Indeed, this group is closely dependent on the morphology and hydrological functioning of the watercourses, as well as the ecological functionality of the associated habitats (riparian forests, open areas, etc.). Their study therefore provides us with information on the state of these ecosystems. It will, of course, be necessary to compare this study with the many studies already underway in the upper Cèze watershed, in order to better understand the overall functioning of its rivers. The Syndicat des Hautes Vallées Cévenoles (High Cévennes Valleys Syndicate), aware of the need for close collaboration among all local stakeholders to better address these ecological issues, is committed to strengthening ties with all relevant parties and fostering networking among them. It hopes that this study will serve as the starting point for a coordinated regional approach to the ecosystems associated with our rivers." (Authors/Google translate)] Address: https://www.naturedugard.org/doc/faune/-2020_etude_odonates_HauteCeze_SHVC_rapport_final_-VF_130121_int ernet.pdf

25541. Vandeweghe, R.; Houard, X.; Monsavoir, A. (2021): Rapport du suivi des populations de l'Agrion de Mercure et diagnostic de l'état de conservation des habitats sur la zone Natura 2000 « Vallée de l'Epte francilienne et ses affluents » Val d'Oise - 95. Office pour les insectes et leur environnement – Conseil départemental du Val d'Oise. Rapport d'étude: 48 pp. + annexes-["Conclusion: The 2020 surveys allowed us to update observation data on C. mercuriale and to identify C. mercuriale habitats within the Natura 2000 site. They also provided an overview of population status and connectivity. The evolution of C. mercuriale habitats shows an overall degradation across the Natura 2000 area. While population densities remain satisfactory, the numbers recorded appear lower than those observed in 2014. Nevertheless, some highly functional sites are still present. This observation indicates an overall degradation that must be addressed to prevent a long-term decline of C. mercuriale within the Natura 2000 area. To this end, an action strategy must be implemented through the development of the future management plan. These actions will be divided into three areas: conservation management; habitat restoration; and reconnection of population cores. Awareness-raising will accompany each action. In addition to this monitoring, an improvement in knowledge about the Odonata of the Natura 2000 site was carried out, with 23 species observed (Appendix 2)." (Authors/Google translate)] Address: https://libellules.pnaopie.fr/suivi-des-populations-de-lagrion-de-mercure-et-diagnostic-de-letat-de-conservation-des -habitats-sur-la-zone-natura-2000-vallee-de-lepte-francilienne-et-ses-affluents/

2022

25542. Falk, H. (2022): Tümpel für Amphibien, Libellen & Co.. Schutzgemeinschaft Ammersee. Jahresbericht 2022: 43-46. (in German) ["According to M. Layritz, the following rather common dragonfly species regularly occur at the ponds: Calopteryx splendens (rather rare), damselflies such Platycnemis pennipes, Pyrrhosona nymphula and Ischnura elegans, Libellula depressa, Sympetrum vulgatum, S. danae, and Aeshna cyanea." (Author)] Address: https://www.schutzgemeinschaft-ammersee.de/wp/wp-content/uploads/2023/04/11_-Tuempel-fuer-Amphibien-Libellen-Co.pdf

25543. Fu, F.; Wei, H.Y.; Chang, Y.T.; Wang, B.X.; Chen, K. (2022): Elevational patterns of life history and ecological trait diversity of aquatic insects in the middle of the Lancang River: The effects of climate and land use variables. Biodiversity Science 30, 21332. doi: 10.17520/biods.2021332.: 12 pp, Suppl. (in Chinese, with English summary) ["Aims: Species respond to environmental changes through functional traits. Exploring the elevational pattern of community functional trait diversity is an important aspect in understanding the spatial distribution and formation mechanisms of biodiversity. Climate change and land use are important factors that affect stream ecosystems, their biodiversity, and community assembly. However, there is still a lack of systematic studies on the elevational distribution of functional trait diversity of aquatic insect assemblage under the effects of climate and land use variables. Methods: We collected aquatic insect community data from 56 stream sites along elevational gradients ranging between 1,000–3,000 m in 2016 and 2018 in the middle of the Lancang River Basin, Yunnan Province, China. We then utilized a linear or quadratic regression model to explore and compare the elevational patterns of life history (voltinism, development, and adult life span) and ecological traits (trophic habit, habit, and thermal preference) diversity indices. Then, we used random forest model to analyze the effects of climatic and land use variables on the diversity of life history and ecological traits of aquatic insect assemblages. Results: Of all life history traits, diversity of semivoltine, nonseasonal, slow seasonal, and long adult life span demonstrated significantly U-shaped elevational patterns. While diversity of fast seasonal, and very short adult life span exhibited significantly hump-shaped elevational patterns, and short adult life span diversity demonstrated a significantly increasing elevational pattern. Of all ecological traits, thermal preference diversity displayed no significant pattern along the elevation gradient. Diversity of clinger and sprawler exhibited a significantly increasing pattern and a U-shaped elevational pattern, while diversity of collector-filter, herbivore, and predator exhibited significantly increasing, decreasing, and U-shaped elevational patterns, respectively. Random forest models revealed that variation of life history trait diversity explained by climate and land use variables were higher than that in ecological trait diversity, with annual mean temperature and percentage of agriculture area as common key factors.

Conclusion: In summary, the elevational patterns of functional trait diversity in aquatic insect assemblage differed between life history and ecological trait diversity, in which differences are driven by different natural and human disturbance gradients. These results can provide theoretical supports for aquatic biodiversity maintenance and conservation in the Lancang River Basin." (Authors) (Odonate) taxa are treated at genus level.] Address: Chen, K., Laboratory of Insect Taxonomy & Aquatic Insects, Department of Entomology, College of Plant Protection, Nanjing Agricultural University, Nanjing 210095, China. Email: kai.chen@njau.edu.cn

25544. Fukuhara, H.; Kimura, N.; Nagasaka, M.; Nohara, S. (2022): The effects of flooding on shore aquatic invertebrates of pools at the Kamitashiro in the Ozegahara mire II -summer survey. Low Temperature Science 80: 421-437. (in Japanese, with English summary) ["Surveys of the shore aquatic invertebrates were conducted at 23 pools of the Kamitashiro at the Ozegahara mire (altitude; about 1,400 m, length; 6 km, width; 2 km, area; 7.6 km²) in summer (July, 2018) to estimate the possibility of influences of floods on them. Characteristic taxa habituating at high latitude and cool condition area were found in this mire. Possibility of the lowering the relative densities of total animals (except Cryptostigmata), Cryptostigmata, Hydrachnellae, Odonata and Diptera, Chironomidae and Ceratopogonidae in Diptera were suggested after heavy flooding over the mire. Direct flowing out of animals from pools and disturbance of shores may result in lowering of densities of these animals. Relationships between the life cycle strategies of the animals and the effect of flooding were discussed." (Authors) The following odonate taxa are listed: Lestes sponsa, Ischnura asiatica, Coenagrion lanceolatum, Coenagrionidae not det., Aeshna crenata, Aeshna not det., Aeshnidae not det., Trigomphus melampus, Gomphidae not det., Cordulia amurensis, Corduliidae not det., Nannophya pygmaea, Sympetrum speciosum speciosum, Sympetrum not det., Leucorrhinia dubia orientalis, Libellulidae not det.] Address: Fukuhara, H., Kahokugata Lake Research Institute, Tsubata-machi, Kahoku-gun, Ishikawa 929-0342, Japan. Email: fusaka.f.haruo@gmail.com

25545. Lecoffre, L. (2022): Plan d'Actions Agrion de Mercure (Coenagrion mercuriale) dans le Vexin partie Oise. Conservatoire d'Espaces Naturels des Hauts-de-France: 121 pp. + annexes - (in French) ["VI. Conclusion: This study of C. mercuriale populations in the Vexin region (Oise department) has allowed us to: - Establish a current status of populations at known sites; 9 of the 10 historical sites still host Mercury Bluets, and the only one that had disappeared was located on the Cudron River, where a single individual was observed in 2010. - Discover new sites. Indeed, 14 new sites have been added to the 9 known sites, mainly on the Troesne River. Although the entire river could not be surveyed due to accessibility and time constraints, the distribution of the sites suggests that the Mercury Bluet is present on the Troesne almost continuously. 36 - Estimate the number of C. mercuriale present on the studied watercourses. After two visits to each station, separated by approximately one month, around 520 male C. mercuriale were recorded on the three watercourses. - Describe the habitats of the stations in the Vexin region, Oise department. Each surveyed station was the subject of a description of certain environmental parameters, compiled into a characterization sheet. - Relate certain environmental parameters to the density of C. mercuriale recorded at each station. Although no significant results were found, trends appear to be emerging, consistent with existing literature on the subject. - Propose management measures adapted to each station. A local action plan was drawn up, with the following objectives: improving knowledge about C. mercuriale in the area, maintaining known and discovered populations, and developing these populations and improving connectivity. To this end, 21 action plans were developed, and these actions were detailed in 23 station fact sheets, each with its own associated map. The aim is to propose approaches to reconnecting populations. These approaches are both local (between stations and waterways) and larger-scale, connecting major adjacent population centers (Epte, Vexin Thelle). Following this study, work will be carried out, and it will be crucial to conduct regular monitoring to gain a true understanding of the impact of this work on the populations. This will allow for a more reflective assessment of the actions and identify which are most effective. To this end, a follow-up internship could be implemented five years later to reassess the population levels and identify new populations in strategic locations, particularly near the Sablons inter-municipal community. This internship could also be an opportunity to conduct a CMR protocol on the Moulin Baudet plain, allowing us to assess the effectiveness of the current method for counting individuals per station and to better understand the dynamics at play. Regarding habitat characterization, a more in-depth study focused solely on this topic could be implemented, perhaps during an internship, to determine which habitat parameters most impact C. mercuriale in the Vexin Oise region. This study, this time independent of the search for new stations, could go further by conducting a multivariate analysis of environmental parameters, as was done using a GLM (Global Monitoring Laboratory) in a similar study in the Nord-Pas-de-Calais region. In the coming years, the implementation of this work and management measures will provide opportunities to collaborate with other organizations such as the SMBE (Syndicat Mixte du Bassin de l'Eau et de l'Eau) and Picardie Nature, and to strengthen these relationships. Finally, the completion of this study will allow for better communication about this species in the Vexin Oise region and raise awareness among the public and local stakeholders about its preservation." (Author/Google translate)] Address: https://irpn.drealnpdc.fr/wp-content/uploads/2023/04/PlandActions-2022-2031-Agrion-de-Mercure-Vexin-Oise.pdf

25546. Nationalpark Eifel (2022): 2022. Leistungsbericht. Wald, Wasser, Wildnis. Herausgeber: Nationalparkverwaltung Eifel, Urftseestr. 34, 53937 Schleiden-Gemünd: 114 pp. (in German) ["The upper reaches and headwaters of small streams were specifically searched for Cordulegaster boltonii and C. bidentata. C. bidentata has not yet been recorded in the national park. However, the numerous small streams and headwaters in the Kermeter meet its habitat requirements. C. boltonii has been regularly recorded as resident in the National Park. This year, neither species could be found. The absence of C. boltonii can be explained by the significant displacement of the aquatic substrate caused by the 2021 floods. In the southern part of the national park, Coenagrion hastulatum, which is threatened with extinction in North Rhine-Westphalia, was last recorded as resident in June 2019. Due to its high risk, the still water was regularly monitored to ensure its presence. The numerous dry summers and the natural process of siltation have led to a steady decrease in the water surface area. From 2020 onwards, C. hastulatum was no longer recorded. No evidence of C. hastulatum was found this year either. The extreme drought this year meant that by mid-May (May 18, 2022) only about 20 percent of the water surface of the Döppelskaul pond remained, so the occurrence of C. hastulatum at this location within the Eifel National Park must be classified as extinct." (Author/Google translate)] Address: https://www.nationalpark-eifel.de/cache/dl-Leistungsbericht-2022-387afc73cd692c0c34f2438ffceedd0d.pdf

25547. Adamovich, B.V.; Makarevich, O.A.; Karatayev, A.Y.; Rudstam, L.G.; Kovalevskaya, R.Z.; Baturina, M.A.; Zhukova, T.V. (2023): Temporal and spatial distribution of macrozoobenthos in three lakes of different trophic states: a case study of the Narochianskie lakes (Belarus). Hydrobiologia 851: 1335-1351. (in English) ["We used macrozoobenthos data (abundance, biomass, and community structure) spanning 69 years including annual surveys from 1997 to 2016 in three connected lakes with different trophic states located in the north-west of Belarus (lakes Naroch, Myastro, and Batorino) to investigate the relationships between Carlson's trophic state indices (TSI) and macrozoobenthos. We studied the response of the macrozoobenthos both over time and by depth zone. We found that there is an inverse relationship between lake productivity as measured by chlorophyll-based TSI and macrozoobenthos abundance and biomass both when comparing the three Narochianskie lakes and in the long-term dynamics within each lake. Lake-wide and littoral zone benthic biomass decreased significantly with increasing trophic state. Macrozoobenthos community structure also differed among lakes, with Chironomidae dominating in the most productive lake (Batorino), Chironomidae and Mollusca dominating in Lake Myastro, which had an intermediate trophic state, and Mollusca dominating in the lake with the lowest TSI (Naroch). We found significant differences both in the average benthos biomass and in the composition of macrozoobenthos between the profundal (silt and lack of macrophytes) and littoral zones (presence of macrophytes) within each lake. We argue that bottom substrates, macrophytes, and dreissenid mussels were more important for macrozoobenthos than trophic state in these lakes. Several benthic invertebrate taxa differed among lakes and are potential indicators of trophic state." (Authors) The supplementary material Appendix S7: Table S6 includes 15 odonate taxa.] Address: Adamovich, B.V., Faculty of Biology, Belarusian State University, Minsk, Belarus

25548. British Dragonfly Society (2023): White-legged Damselfly Investigation final report. British Dragonfly Society; https://british-dragonflies.org.uk/recording/white-legged-damselfly-investigation/: 90 pp. (in English) ["The White-legged Damselfly Investigation ran for five years from 2018-2022; its aim was to produce an up-to-date map of the distribution of Platycnemis pennipes in Britain using data collected by members of the public as part of a simple citizen science project. The project also used this data to investigate overall species trends and examine changes in distribution on a Vice County level. The project report supports the findings of the State of Dragonflies 2021 analysis (Taylor et al, 2021) which reported that P. pennipes significantly increased in occupancy (geographical area within which a species is found) between 1970 and 2019 and, as a result, is not currently a species of conservation concern. However, the project report also illustrated the species' dynamic shifts in distribution on a Vice County level, with different wetland sites being simultaneously abandoned and colonised. These observations are thought to reflect both the species' ability to utilise a range of lotic and lentic wetlands as well as its capacity to disperse in order to colonise new wetland sites. The apparent loss of P. pennipes from certain wetland sites likely indicates the habitat is no longer suitable for the species to breed; this raises concerns that the variables reducing habitat suitability may also be reducing overall ecosystem health and the wetlands' suitability for other aquatic species of conservation concern. Further research is needed to confirm P. pennipes have been lost from the wetland sites highlighted in this report and to identify the causes of local extinction. Further quantitative research is required to identify the variables that determine habitat suitability for P. pennipes; the results of which can be used to guide future wetland management." (Authors)] Address: https://british-dragonflies.org.uk/wp-content/uploads/2023/12/White-legged-Damselfly-Report-final.pdf

25549. Ferraille, T.; Kerbiriou, C.; Bigard, C.; Claireau, F.; Thompson, J.D. (2023): Integrating biodiversity assessments into local conservation planning: the importance of assessing suitable data sources. Peer Community Journal, 3: e98: 21 pp. (in English) ["Strategic Environmental Assessment (SEA) of land-use planning is a fundamental tool to minimize environmental impacts of artificialization. In this context, Systematic Conservation Planning (SCP) tools based on Species Distribution Models (SDM) are frequently used for the elaboration of spatially exhaustive biodiversity diagnostics. Despite the paradigm of "garbage in - garbage out" that emphasises the importance of testing the suitability of data for SDM and priority conservation areas, the assessment of database sources remains relatively rare. In addition, the lack of practical recommendations for the use of open-access databases by SEA stakeholders remains a problem. The aim of this study is to explore the quality of data sources that can be used in SEA to assess priority conservation areas in SEA. The study used data for nine taxonomic groups (commonly used in inventories for environmental impact assessment) and three databases available to SEA stakeholders. Three local administrative entities in very different socio-ecological contexts were used to examine three main issues: (i) the suitability of local versus regional or country databases for assessing conservation priorities, (ii) differences among taxonomic groups or territories in terms of the suitability of databases, (iii) the importance of the quality of databases for the application of SDM to assess priority conservation areas. Our study provides several clear messages for potential users of open-access databases. First, the need for prudence in the interpretation of biodiversity maps. Second, the collection of individual databases at the country scale is necessary to complete local data and ensure the suitability of SDM in a local context. Third, a data driven approach can lead to the use of notably different species communities to identify priority conservation areas when compared to the community in the original database. Finally, we propose a workflow to guide SEA stakeholders through the process of data rationalization and use in conservation planning." (Authors) The set of data includes Odonata.] Address: Ferraille, T., CEFE, Université de Montpellier, CNRS, EPHE, IRD, Montpellier, France. Email: thibaut.ferraille@gmail.com

25550. Holly, F. (2023): Die Sumpf-Heidelibelle (Sympetrum depressiusculum). Aktueller Fundbericht und Libellensteckbrief. Ein ganz besonderer Libellenfund im Landkreis. LBV-Report 2023 - Kreisgruppe Aichach-Friedberg: 5-9. (in German) [Brief Report of a record of S. depressiusculum on a compensation area near Merching, Aichach-Friedberg, Bayern, Germany.] Address: https://sa0e76b775810b3a8.jimcontent.com/download/version/1735917300/module/12140932628/name/LBV-Rep ort-2023.pdf

25551. ODONAT Grand Est (coord.) (2023): Liste rouge des Odonates du Grand Est. Collection «Les Listes rouges des espèces menacées du Grand Est - Volet faune». ODONAT Grand Est, Strasbourg: 20 pp. (in French) ["Analysis of Results: Seventy species were assessed. Fifteen were added to the regional red list, representing 22%. This proportion is quite close to the assessments in neighboring regions (25% in Franche-Comté, 22% in Île-de-France), and significantly higher than the national red list (13%). All species listed on

the national red list and present in the Grand Est region are also on the regional red list. Leucorrhinia rubicunda, recorded in the peat bogs of Bitche in the 19th century, is regionally extinct, although rare occasional sightings of stray adults have been recorded in recent times. Only one species is considered Critically Endangered, presumed extinct: Coenagrion ornatum. Indeed, no evidence of recent reproduction has confirmed the current existence of a permanent population on the French side, in the only border area (Bas-Rhin/Rhineland-Palatinate) where the species is still known (edges of the Bienwald massif). Two-thirds of threatened species are categorized as Vulnerable. The contraction of regional ranges is one of the main criteria observed, as is the case for Coenagrion pulchellum, which is also declining throughout France. For the range of boreal-montane tyrphophilous species, it is possible that the decline of certain species at low-altitude sites (even protected ones) is caused, at least in part, by climate change. The peatlands of the Southern and Northern Vosges (and to a lesser extent the French Ardennes), as well as the Rhine and its marshy tributaries remaining in its former floodplain, host the majority of Vulnerable and Endangered species. A few species, however, have a less restricted distribution (Lestes virens, Lestes dryas, Coenagrion pulchellum) but exhibit widely dispersed populations in a few departments. Fifteen species are classified as Near Threatened, based on various criteria: local but minor declines; restricted ranges; widespread species associated with uncommon, increasingly rare, or particularly sensitive specialized habitats; and species experiencing severe population fluctuations due to hydrological cycles (particularly an increased frequency of drought). The proportion of species with no detected threats is overwhelmingly large (39 taxa, or 57%). These are often relatively adaptable species, thriving in a wide range of aquatic habitats or large areas (rivers, ponds, lakes), and therefore less marginally affected by the recurring destruction of small wetlands. Some species are also showing signs of northward expansion. Furthermore, habitat fragmentation can be considered less severe than for other insect orders, due to the high colonizing capacity of Odonata. Nevertheless, this situation is sometimes more nuanced, and for several species, empirical observations by field naturalists suggest their possible decline, at least locally, as is the case with Pyrrhosoma nymphula in the Champagne region. However, it is difficult to quantify these phenomena precisely: for these species, still widespread in the Grand Est region, increased monitoring is therefore desirable. Finally, Sympetrum flaveolum and Anax ephippiger do not have known established populations in Grand Est: due to their irregular appearances by means of migratory individuals, these two species are categorized as occasional." (Authors)Google translate] Address: https://-www.odonat-grandest.fr/telechargements/Listes_rouges/-Liste_rouge_Grand_Est_ODONATES_livret.pdf

25552. Wildermuth, H. (2023): Auf der Suche nach Somatochlora borisi in Griechisch Thrakien. Entomo Helvetica 16: 240-247. (in German) [Report of a journey of members from the Entomological Societies Bern and Zürich between 21.-29. May 2022 to the historical region of Thrace, in the border region of southeastern Bulgaria, northeastern Greece, and European Türkiye.] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

2024

25553. Alfarisyi, A. (2024): Nature Reserve and Wildlife Sanctuary Division, Tanjung Kelayang Reserve. The Nature Report Tanjung Kelayang Reserve 05: 217 pp. (in English) [The book gives a comprehensive overview of the coastline kerangas forest, rewilding project initiatives, observed animal behavior, and biodiversity discoveries. Information on Odonata are given on pages 35-36: "The obelisk posture in dragonflies. Behavioral adaptations for heat management and territorial signaling", and on pages 125-140: Odonata. The dragonfly genera: Amphicnemis kuiperi, Diplacodes trivialis, Tyriobapta kueckenthali, Brachydiplax chalybea, Agrionoptera insignis, Orchithemis pulcherrima, and Risiophlebia dohrni are introduced in details. The pdf can be downloaded at: https://drive.google.-com/file/d/1pXvpbEFuBSHtxNhbOzX-7mwYFtmhC-AE/v-iew?usp=sharing] Address: Alfarisyi, A., Jalan Murai Perum Guru, No: A/144, Rt/Rw: 30/10, Desa Perawas, Kecamatan Tanjung Pandan, Kabupaten Belitung, 33413, Indondsia

25554. Bacha, B.; Minz, S.; Sahoo, D. (2024): Odonata diversity in Sambalpur University, Odisha. Indian Journal of Entomology Online published Ref. No. e24019: 4 pp. (in English) ["The present study was carried out at the Sambalpur University, located in the western part of Odisha, India. The survey was from January to December 2022. A total of 39 Odonata species were identified under eight families: Libellulidae, Coenagrionidae, Aeshnidae, Gomphidae, Calopterygidae Chlorocyphidae, Lestidae and Platycnemididae and 26 genera. Libellulidae was the most abundant, followed by Coenagrionidae. The seasonal observation shows that higher species abundance is observed in the wet season than in the dry season." (Authors)] Address: Bacha, B., School of Life Sciences, Department of Earth Science, Sambalpur Univ., Jyoti Vihar, Burla, Sambalpur 768019, Odisha, India. Email: basudev.bacha18@gmail.com

25555. Busmachiu, G.; Minzat, C. (2024): Libellule (Insecta: Odonata) din Republica Moldova. Ghid. Universitatea de Stat din Moldova, Institutul de Zoologie. – Chisinau: 100 pp. (in Romanian) ["The work includes a description of the biology and ecology of 55 species of dragonflies, 47 of which have already been confirmed in the Republic of Moldova, and the presence of 8 other species is possible on the territory of the country. Dragonflies are a group of insects that are extremely important for the functioning of ecosystems, being a good indicator of the state of their health. The drying of wetlands, the degradation and pollution of water bodies leads to a reduction in the number of dragonflies, and, consequently, to the development of a large number of hematophagous insects, such as mosquitoes, carriers of dangerous diseases such as malaria, various fevers (Dengue, yellow, Zika, West Nile), equine encephalitis, etc., in regions with a tropical climate, and more recently, following global warming, even in regions with a temperate climate. The guide is addressed to a wide circle of readers: entomologists, biologists, ecologists, teachers from university and pre-university educational institutions, pupils, students passionate about nature and insects. The work was published within the subprogram "Evaluation of the structure and functioning of the animal world and aquatic ecosystems under the influence of biotic and abiotic factors in the context of ensuring ecological security and population well-being" 010701." (Authors/Google translate)] Address: https://zoology.usm.md/sites/default/files/2025-01/Busmachiu%20G%20si%20Munjiu%20O_Ghid%202024_-Lib elulele_compressed.pdf

25556. Dasmodak, S.; Paramanik, S.; Mukherjee, S.; Paramanik, M. (2024): Food chain contamination by neonicotinoids — A matter of concern. In: Singh, R., Singh, V.K., Kumar, A., Tripathi, S., Bhadouria, R. (eds) Neonicotinoids in the Environment. Sustainable Landscape Planning and Natural Resources Management. Springer, Cham. https://doi.-org/10.1007/978-3-031-45343-49: 111-124. (in English)

["Neonicotinoids, often abbreviated as neonics, represent a group of insecticides that possess neuro-active properties and share a chemical resemblance to nicotine. It acts by disrupting the cholinergic impulses of the insect nervous system. A large proportion of applied neonicotinoids remain as residues in soil or waterbodies, which may be because of their systemic nature, notable water solubility, and long half-lives. These insecticides can reach the food chain through multiple routes, including treated crops, adulterated seeds, contaminated soil and water, and surface runoff, as well as via exposed organisms. As the plants absorb the chemicals and/or the contaminated organisms are consumed, neonicotinoids disperse and accumulate throughout the food chain and environment, potentially impacting diverse organisms within the ecosystem, including human health. Numerous beneficial arthropods at the primary consumer level, like bees, bumblebees, wasps, hoverflies, etc., become contaminated by neonicotinoids from the farmland system. Soil-dwelling organisms like earthworms, molluscs, etc., as well as aquatic insects like Daphnia, chironomid larvae, mayfly and dragonfly nymphs, etc., can also be affected by these insecticides. From these primary consumers, neonicotinoids propagate to top consumers like reptiles, birds, and mammals. As a consequence, organisms of different trophic levels suffer from sub-lethal to lethal effects, leading to potential disruptions in the entire ecosystem's stability. Addressing this issue requires regulatory authorities and farmers to embrace sustainable and eco-friendly alternatives, mitigating the impact of neonicotinoids on the delicate balance of the food chain and the environment. This chapter delves into how neonicotinoids contaminate and spread throughout the food chain, and their impact on ecosystems and biodiversity, and emphasizes regulatory measures to reduce contamination." (Authors)] Address: Paramanik, M., Vector Biology & Environmental Monitoring Research Units, Entomology Laboratory, Department of Animal Science, Kazi Nazrul University, Asansol, Paschim Bardhaman, West Bengal, 713340, India

25557. Donnelly, T.W.; Marinov, M. (2024): The Fijian genus Nesobasis Selys, 1891 Part 2: Revision in comparison to Nikoulabasis Ferguson et al., 2023 with particular emphasis on Vanua Levu, Taveuni, Koro and erection of 10 new species and one subspecies (Odonata: Coenagrionidae). Megataxa 14(1): 1-256. (in English) ["The present monograph reviews all the available material collected as specimens presently classified under two genera Nesobasis Selys, 1891 and Nikoulabasis Ferguson et al., 2023. It was initially planned as a second part of the taxonomic study published by Donnelly (1990) on Nesobasis from the so-called Southern islands of Fiji (Viti Levu, Ovalau and Kadavu), however, the time passed between the two parts resulted in many new additions to the fauna of the whole of the archipelago. The taxonomic and nomenclature changes required us to incorporate old records from the first part in Donnelly (1990), add unpublished data and summarize all available information in the present monograph. Our results suggest that is it plausible to erect 10 new hypotheses at species level (Nesobasis albistigma sp. nov., Nesobasis auricularis sp. nov., Nesobasis latistyla sp. nov., Nesobasis polhemusi sp. nov., Nesobasis rubra sp. nov., Nesobasis seidenbuschi sp. nov., Nesobasis tillyardi sp. nov., Nesobasis viridis sp. nov., Nikoulabasis crassa sp. nov., Nikoulabasis furcifer sp. nov.) and one at subspecies level (Nikoulabasis furcifer perlmani ssp. nov.) which brings the total of the known species (all members are endemic to Fiji) up to 28 (Nesobasis) and 10 (Nikoulabasis). Further we describe (by opposition) the opposite sexes of Nesobasis pedata Donnelly, 1990 and N. caerulecaudata Donnelly, 1990 (both females), suggest a probable new ergotaxonomy for the two genera and propose future studies to evaluate the status of taxa hypothesized at the moment as separate: N. caerulecaudata—N. longistyla Selys, 1891 as well as Nikoulabasis comosa (Tillyard, 1924)—N. heteroneura (Tillyard, 1924)." (Authors)] Address: Marinov, M., Biosecurity Surveillance & Incursion Investigation Plant Health Team, Ministry for Primary Industries, 14 Sir William Pickering Drive, Christchurch 8544, New Zealand Email: milen.marinov@mpi.govt.nz

25558. Gerber, R.; Piscart, C.; Roussel, J.-M.; Bergerot, B. (2024): Morphology-based classification of the flying capacities of aquatic insects: A first attempt. Current Zoology 70(5): 607-617. (in English) ["Flight is a key feature of the reproduction and dispersal of emerging aquatic insects. However, morphological measurements of insect flight are mostly available for terrestrial taxa and dragonflies, while aquatic insects have been poorly investigated. We analyzed seven flight-related morphological parameters of 32 taxa belonging to five orders of emerging aquatic insects (Ephemeroptera, Trichoptera, Plecoptera, Diptera, and Megaloptera) with different life history traits related to flight (dispersal strategy, voltinism, adult lifespan, and swarming behavior). After correcting for allometry, we used an a priori-free approach to cluster the individuals according to their flight-related morphology. Then, we explored the levels of agreement between these clusters, taxonomy, and several life history traits of the taxa. All orders were scattered among several clusters, suggesting a large range of flight capacities, particularly for Diptera. We found swarming taxa in each cluster, showing that morphological adaptations to swarming are not identical in all aquatic insects. The clusters did not match the expected dispersal capacity of the taxa as derived from the literature or databases. Heavy wide-winged insects notably gathered taxa traditionally described as good or weak dispersers. Flight capacities based on morphology partly matched with the taxonomy and life-history traits of aquatic insect imagoes. Other parameters such as flight propensity, energy stores, and wing kinematics should help refine their flying and dispersal capacity." (Authors) The paper includes few references to Odonata.] Address: Bergerota, B., Univ. Rennes, CNRS, ECOBIO - UMR 6553, 35042 Rennes, France. Email: benjamin.bergerot@univ-rennes.fr

25559. Hegde, N. (2024): Landscape features, cultural practices, values and biodiversity patterns of sacred swamps in the Western Ghats, India. Inauguraldissertation zur Erlangung des akademischen Grades eines Doktors der Naturwissenschaften (Dr. rer. nat.) der Mathematisch-Naturwissenschaftlichen Fakultat der Universitat Greifswald. (in English) ["Sacred areas are the oldest form of habitat protection and contribute to biodiversity conservation. Freshwater swamps are tree-covered wetlands, marshy areas with a high-water table and slow runoff occurring on flat terrain around streams in climax evergreen forests. While sacred groves have received considerable scholarly attention, little is known about sacred freshwater swamps. Sacred swamps are dedicated to worship deities through long-term commitment and traditional laws and practices. With studies conducted in one of the global biodiversity hotspots, the Central Western Ghats, India, this thesis aims to advance our knowledge of the socio-ecological phenomenon of sacred swamps. It is based on a multi-layered approach that analyses the distinct physical, ecological as well as socio-cultural aspects of sacred freshwater swamps and then uses the results to explore in a participatory manner the role of these swamps for nature and livelihood protection. The thesis tests the conjecture that sacred swamps have physical features that distinguish them from non-sacred swamps. The thesis further compares plant species composition, floristic structure, diversity, and the occurrence

of amphibians, Odonata [20 species are listed on page 60] and birds between sacred and non-sacred swamps. It presents the rituals and rules that define the socio-cultural features of sacred swamps, and addresses the ecological, socio-cultural and economic valuation of the swamps with special attention to the overlaps and differences of valuation among different stakeholder groups living with and around the swamps. In a final step of the study, the results of these physical, ecological and socio-cultural explorations were presented at four workshops, where the stakeholder groups were invited to participate in a visioning exercise that identified the role of sacred swamps for nature conservation and livelihood protection. 110 swamps in the district of Uttara Kannada, Central Western Ghats, were exploratively mapped after which ten sacred and ten non sacred swamps with similar sizes were selected for more intensive study. The systematic comparison showed that sacred swamps differ distinctly from non-sacred swamps: a) physically: sacred swamps are significantly smaller, shorter in length and more compact than non-sacred swamps, b) ecologically: the biodiversity and canopy cover of sacred swamps is significantly higher than of non-sacred swamps, and c) socially: their distance from tar roads, mud roads, commercial orchards and human settlements is significantly smaller than that of non-sacred swamps. The sacred swamps also have a higher surrounding population density than non-sacred swamps. This shows that preferentially swamps close to human infrastructure have been declared as sacred, probably to regulate provisioning of ecosystem services. Our research revealed that more species occur in sacred than in non-sacred swamps (122 tree species from 99 genera and 58 families in the sacred against 83 species from 72 genera and 47 families in the non-sacred swamps). Stem density and average basal area are higher in the sacred swamps and sacred swamps have slightly more endemic plant species (28%) when compared to non-sacred swamps (23%). Significant differences exist in the Shannon index of diversity (species diversity) of amphibians (H=2.749) and birds (H=3.097) between sacred and non-sacred swamps, with t (194) = 3.929, p=0.001 and t (37) = 2.140, p= 0.039, respectively. Also, the number of individuals of critically endangered amphibian species from the IUCN Red list (Nyctibatrachus dattatreyaensis, Pseudophilautus amboli and Micrixalus kottigeharensis) is higher in the sacred swamps. While we find a variety of deities associated with the sacred swamps, the practices associated with sacred swamp status and management are essentially the same across belief groups and limit harvest and resource extraction in the sacred swamp areas. Extra-ordinary rituals around annual festivals (re)-establish the shared status of the sacred place and provide meaning and effect to everyday rules of sacred swamp management via a self-regulating, invisible fence. We identified six major value categories (hydrological, religious, biodiversity, recreational, utilitarian and social), and labelled them in such a way that participants could understand and score them. Results of the scoring exercise showed substantial differences between the scores assigned to the values associated with sacred swamps by the various stakeholders. Across all stakeholder groups, the hydrological value of sacred swamps was highly appreciated. The visioning workshops allowed linking results on physical, ecological and socio-cultural aspects of swamps to the development of location-specific, desirable suggestions drawn on traditional knowledge of species and landscapes. The approach promoted development of action plans in response to the challenges that tropical forests and freshwater swamps are facing. The workshops also showed limits of the approach, since not all stakeholder groups belong to the same community of faith. This suggests that faith-based governance of sacred swamps can benefit from the emphasis on faith-independent, ecological, socio-cultural and economic values to foster a dialogue around sacred swamps and their importance for livelihoods and nature conservation." (Author)] Address: https://epub.ub.uni-greifswald.de/frontdoor/index/index/start/1/rows/10/sortfield/score/sortorder/desc/searchtype/ simple/query/Hegde/author_facetfq/Hegde%2C+Narasimha/docId/10983

25560. Huet, C. (2024): Compte-rendu du suivi des populations d'Odonates de la Directive Habitats Faune Flore Zone Spéciale de Conservation FR7300952 « Gorges de l'Aveyron, causses proches et vallée de la Vère » Session 2024. En partenariat avec l'OPIE Midi-Pyrénées, MTDA, 172 Avenue du Maréchal Leclerc, 33600 Bègles, France: 24 pp. (in French) ["As part of the management of the Special Area of Conservation FR7300952 "Gorges de l'Aveyron, nearby limestone plateaus and Vère valley", a standardized monitoring program was initiated in 2018 and has continued annually. Its aim is to provide standardized quantitative data on the populations of the three species listed in the Habitats Directive identified on the site. These are standardized surveys conducted along sections of the Vère River, targeting Oxygastra curtisii, Macromia splendens, and Gomphus graslinii, and secondarily other Anisoptera species found in the stream community: Boyeria irene, Onychogomphus uncatus and O. forcipatus, Gomphus vulgatissimus), and Somatochlora metallica." (Authors/Google translate)] Address: https://libellules.pnaopie.fr/wp-content/uploads/2025/10/HUET_2024_CR_inventaires_Odonates_la_Vere_N2000_ Gorges_Aveyron.pdf

25561. Kipping, J. (2024): Naturschutzfachliches Monitoring zum Wassertouristischen Nutzungskonzept Leipziger Neuseenland. Erfassung ausgewählter Lebensraumtypen und Arten. Monitoring-Durchgang 2023. Auftraggeber: Amt für Stadtgrün und Gewässer, Abt. Gewässerentwicklung, Prager Straße 118- 136, 04317 Leipzig. Auftragnehmer: Institut für Vegetationskunde und Landschaftsökologie, IVL, H. Schott & Partner, Landschaftsökologen, Hinrichsenstr. 23, 04105 Leipzig: 213 pp. (in German) [https://gruenerring-leipzig.de/wp-content/uploads/2024/10/naturschutzfachliches-monitoring-2023-endbericht.pdf. Odonata on pages 73-115] Address: Kipping, J., BioCart Ökologische Gutachten, Leipzig, Germany. Email: biocartkipping@web.de

25562. Orliac, N.; Itrac-Bruneau, R.; Brugger, M. (2024): Les Lestidés de Bourgogne-Franche-Comté - Fiche technique d'aide à la gestion et à l'entretien des biotopes & clé de détermination. Conservatoire botanique national de Franche-Comté – Observatoire régional des Invertébrés & Société d'histoire naturelle d'Autun - Observatoire de la faune de Bourgogne: 12 pp. (in French) ["Six species of Lestidae are present in Bourgogne-Franche-Comté: Chalcolestes viridis, Lestes barbarus, L. dryas, L. sponsa, L. virens, and Sympecma fusca. All frequent the region's stagnant to slow-moving bodies of water. Among them, L. sponsa has "national priority" status due to the observed decline in its range and is included in the National Action Plan for Dragonflies and Damselflies. In the Bourgogne-Franche-Comté regional division, two other threatened species are considered to be of "regional priority": L. dryas and L. virens. These three taxa are therefore the subject of particular attention in the regional territory in order to preserve existing populations." (Authors/Google translate)] Address: https://libellules.pnaopie.fr/wp-content/uploads/2024-/04/558_Fiches-Technique-Lestes_2023-_WEBvf.pdf

25563. Prieto-Rodado, O.J.; Prieto-Rodado, N.S.; Prieto-Rodado, J.L.; Prieto-Rodado, A. (2024): Estructura ecológica de la comunidad de macroinvertebrados acuáticos asociados a una querbrada de bosque seco tropical afluente del Río

Bache (Huila, Colombia). Boletín de la Sociedad Zoológica del Uruguay 33(2): e33.2.2: 16 pp. (in Spanish, with English summary) ["Ecological structure of the community of aquatic macroinvertebrates associated with a tropical dry forest stream, affluent of the Bache river (Huila, Colombia). The tropical dry forests have a complex environmental dynamic that considerably impacts the structure of biological communities. In aquatic ecosystems, these dynamics can influence macroinvertebrates, key organisms in nutrient cycling and bioindicators of the ecological quality of water. Our research focused on evaluating the changes in the composition and diversity of aquatic macroinvertebrates in the El Neme stream (Huila, Colombia), considering the climatic disparity and the physicochemical quality of the water. We collected hydrobiological samples, recorded of hydrological and physicochemical data at five sampling stations along the stream for eight consecutive months. Data was analyzed using descriptive statistics, diversity indices and ordination analysis. Our results showed that the official weather seasons had little influence on the composition of macroinvertebrates, however, the monthly fluctuation of precipitation did influence the richness and abundance of the community. The orders Coleoptera, Diptera, Ephemeroptera, Hemiptera, Odonata and Trichoptera were not affected by environmental disturbances and were present continuously during all sampling months. Finally, these orders were more closely related to total dissolved solids, conductivity and water temperature." (Authors) Taxa are treated at genus level: Hetaerina, Argia, Epigomphus, Phyllogomphoides, Brechmorhoga, Dythemis, and Libellula.] Address: Prieto-Rodado, O.J., Grupo de Biotecnología y Medio Ambiente, Univ. INCCA de Colombia. Email: priet.scar@gmail.com

25564. Rademacher H.; Fahrenholz, A.; Buchwald, R. (2024): Populationsentwicklung von Coenagrion mercuriale am Stemweder Berg, Nordrhein-Westfalen, seit 2018 - starke Rückgänge und partielle Erholung (Odonata: Coenagrionidae). Libellula Supplement 17 - Festschrift zum 75. Geburtstag von Reinhard Jödicke: 109-127. (in German, with English summary) ["Population trends of C. mercuriale at the Stemweder Berg, North Rhine-Westphalia, Germany, since 2018 – strong declines and partial recovery – C. mercuriale has been known from northeastern North Rhine-Westphalia for almost 40 years. The Minden-Lübbecke district was previously considered to have one of the largest populations of the species in North Rhine-Westphalia. In 2019 and 2020, severe declines in C. mercuriale populations were noted due to low precipitation in the summer months, resulting in and early drying-up of water bodies. As part of the FFH-monitoring, the two ditch systems Tiefenriede and Ilwede/Barlage were examined in 2023. C. mercuriale was found in both ditch systems. In the Tiefenriede sub-area, the population is mainly found in a few ditches that have partially dried out in recent years. A slight increase in the number of individuals was observed in other ditches of this sub-area. The maximum number of individuals found in a ditch was 77 imagines. In the Ilwede/Barlage sub-area, in ditches where there had been high abundances in previous years, the number of individuals had strongly declined. On the other hand, the abundance of the species in a few ditches in the sub-area Ilwede/Barlage increased, exhibiting the highest abundance in the whole study area with a maximum of 314 imagines. C. ornatum, which was known from both ditch systems, could no longer be found. The intensive agricultural use of adjacent areas and the low water levels continue to present the greatest threats to C. mercuriale." (Authors)] Address: Fahrenholz, A., Brinkstr. 26, 17489 Greifswald, Gemany. Email: arnefahrenholz@posteo.de

25565. Suhonen, J.; Ilvonen, J.J. (2024): Viherukonkorento (Aeshna viridis) Suomessa. Nykytilanne, inventointi ja seurantaa. - The greenhawker in Finland – current situation, inventory and monitoring. Suomen ympäristökeskuksen raportteja 45: 67 pp. (in Finnish, with Swedish and English summaries) ["A. viridis is a rare dragonfly species that is protected and has been assessed as endangered in Finland. Without a permission from the Centres for Economic Development, Transport and the Environment (ELY Centres), individuals of the species must not be disturbed, caught or moved to new areas, and it is forbidden to harm or destroy their breeding and resting sites. The distribution of A. viridis in Finland is very patchy and the distances between populations are large, due to the species' strict habitat requirements. The species only occurs in lush and neutral water bodies where water soldier (Stratiotes aloides) is present. A. viridis females lay their eggs almost exclusively on the leaves of water soldiers. Larvae living in the rosettes of the water soldier plants are protected from predation by fish and other dragonfly species. A. viridis can be inventoried by examining the water soldier vegetations and searching for adults, larvae, and larval skins, or by taking an eDNA water sample from S. aloides vegetation. The first stage of an inventory is the survey of S. aloides plants. A. viridis is most likely to be found in large and healthy S. aloides patches. The largest rosettes are selected from these populations for two reasons: they are the most likely to contain green hawker larvae, and they contain the biggest number of them. The rosettes are lifted out of the water, the dragonfly larvae found in them are identified, measured, and counted, and the rosette is weighed. Finally, the larvae and rosettes are carefully released back into the same S. aloides patch. S. aloides, and hence A. viridis as well, suffers from eutrophication, darkening of the waters and various waterway development projects. During waterway construction, S. aloides patches can be weakened or destroyed, e.g. by dredging, which can also lead to reducing the reproduction possibilities of A. viridis. S. aloides growths can be revived or restored locally by clearing more potential habitat by dredging or removing surrounding plant material. Wide and dense S. aloides populations should be preferred in the protection of A. viridis, because they produce the greatest number of A. viridis individuals. As the last means of protection, it is possible to consider relocating S. aloides patches and A. viridis larvae in them to a new site, either within the same water body or within the same drainage area that is suitable for the plant. However, relocating the plant is subject to permission and it must be carefully documented. A. viridis is rare in Finland and very susceptible to environmental changes. Its reproduction success is strictly linked to the quantity and quality of the S. aloides plant hence the future of the species is uncertain. In the future, a comprehensive survey of S. aloides and A. viridis should be carried out, which would also consider the genetic diversity of A. viridis. Moreover, a management and monitoring plan should be drawn up for the most valuable sites of S. aloides and A. viridis." (Authors)] Address: https://helda.helsinki.fi/items/99406128-6918-4fa0-b4bb-9c1ec9c10083

25566. Tiwari, S.; Chandel, S. (2024): Computational study on the effect of initial pitch angle on dragonfly hovering performance. Aerospace Systems 8: 633-643. (in English) ["A numerical analysis has been conducted to study the role of hindfoil initial pitch angle on aerodynamic performance of dragonfly hovering flight. The inclined oscillation of two elliptic airfoils with tandem arrangment at Re = 157 is analysed using 2D numerical simulation. The pitch amplitude (am) is kept constant for both foils and hindfoil initial pitch angle (a_{Oh}) is varied from 15° to 75° for three different phase oscillations: φ — 0°, 90° and 180°. The results indicate, for a_{Oh} < 45°, the

lower a_{Oh} reduces total lift for all phase differences. It occurs due to the detrimental wake capture and downward dipole jet encountered by hindfoil during downstroke, resulting in less hindfoil Cy. However, for a_{Oh} > 45°, lift enhancement of up to 46% is observed with increase in a0h during φ = 180°. Also, the higher thrust is obtained during lower a0h and it reduces with increase in a_{Oh}." (Authors)] Address: Tiwari, S., Dept Mechanical Engineering, Defence Institute of Advanced Technology (DU), Girinagar, Pune, Maharashtra, 411025, India

25567. Weihrauch, F.; Martens, A. (2024): Hommage an Reinhard Jödicke. Libellula Supplement 17: 1-5. (in German) [Introduction to the Festschrift in honor of Reinhard Jödicke.] Address: Weihrauch, F., Jägerstr. 21A, D-85283 Wolnzach, Germany. E-mail: Florian.Weihrauch@t-online.de

25568. White III, H.B.; Brighton, J.D.; Cheicante, R.; Gillespie, J.H.; Hubick, W.J.; Lake, R.W.; Moore, M.C.; Orr, Richard; R.A.; Roble, S.M.; White Jr., J.F. (2024): Status of Odonata on the Delmarva Peninsula. Bulletin of American Odonatology 13(4): 27-57. (in English, with Spanish summary) ["Since 2010, when 129 Odonata species were known from the Delmarva Peninsula, the authors and others have continued annual field surveys to update faunal records. Discovery of nine previously unrecorded species brings the total to 138 (44 Zygoptera, 94 Anisoptera). In this update we provide a more detailed status of the newly observed and rarer species of the Delmarva Peninsula. Included are the distributions of many of the more common species with additional information about rare, uncommon, and vagrant species that have been vetted from photographic observations submitted to iNaturalist, Odonata Central, and the Maryland Biodiversity Project. Here we report the species currently known from the Delmarva Peninsula and summarize notable records, with observations and expected species up to the end of the 2023 field season." (Authors)] Address: White, III, H.B., Emeritus Prof. of Biochemistry, Univ. of Delaware, USA. Email: halwhite@udel

2025

25569. Abia, H.; Dhafir, F.; Masrianih; Febriani, V. I.; Bustamin; Trianto, M. (2025): Keanekaragaman Jenis Serangga di Perkebunan Kakao Desa Sejahtera Kecamatan Palolo Kabupaten Sigi. Bioscientist: Jurnal Ilmiah Biologi 13(4): 2990-2998. (in Indonesian, with English summary) ["This research aims to determine the level of insect species diversity in the cocoa plantations of Sejahtera village, Palolo subdistrict, Sigi regency. The study was conducted on November 25–26 2025, using a quantitative descriptive method. Insect sampling was carried out using pitfall traps, light traps, sweeping nets, and hand collection techniques at three observation stations: areas around settlements, areas around rivers, and highland areas. The data obtained were analyzed using the Shannon–Wiener diversity index (H'). The results showed that a total of 223 insects were found consisting of 17 species, 12 families, and 8 orders. Insect species found include Oberea atropunctata, Amata prepuncta, Leptosia nina, Valanga nigricornis, Ischnura hastata [sic !], Dorcus parallelipipedus [sic!], Utetheisa pulchella [sic !], Amphiareus obscuriceps, Nyctemera baulus, Xysticus sp., Leptogenys diminuta, Oecophylla smaragdina, Diceroprocta vitripennis, Melanitis phedima, Calobatina geometra [sic], Eurema sp., and Solenopsis sp. The overall insect species diversity index value is H' = 2.37 which is classified as moderate. The results of this study are expected to provide basic information for communities and farmers in understanding the existence and role of insects, so that they can support more effective and sustainable cocoa plantation management." (Authors) A first sight on listed species indicates that most of them, may be: all, are misidentifications.] Address: Dhafir, Fatma, Program Studi Pendidikan Biologi, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Tadulako, Palu, Indonesia. Email: fatmahdhavir-@gmail.comReceived:

25570. Amirullah; Suriana; Ariska, I.; Nurul ilmi, A. (2025): [Diversity of dragonflies (Odonata spp.) in the Mangolo Nature Park around the Kea-Kea campsite, Ulunggolaka village, Latambaga district, Kolaka prefecture, Southeast Sulawesi]. Bioprospek 17(2): 51-61. (in Indonesian) ["This study aims to determine the diversity, evenness, and dominance of dragonfly species in the Mangolo Nature Tourism Park area around the Kea-Kea Campground. The study was conducted using field observation techniques through exploration around the river and forest areas. Data analysis used the Shannon–Wiener diversity index (H'), evenness index (E'), and dominance index (D'). The results showed that 15 dragonfly species were found. The diversity index (H') value around the river was 1.14, while in the forest area it was 0.88; both values are classified as low diversity (H' = 2). The evenness index (E') around the river was 0.48 and in the forest area was 0.45, indicating that the dragonfly community in both habitats is classified as a stressed community (0 < E' = 0.5). The dominance index (D') value of dragonflies around the river flow was 0.46 and included in the low dominance category (0 < D' = 0.5), while in the forest area the dominance index value was 0.62 and included in the medium dominance category (0.5 < D' = 0.75). The difference in index values indicates that habitat conditions influence the structure of the dragonfly community, especially related to water availability and the characteristics of the aquatic environment." (Authors/Google translate)] Address: Amirullah, Program Studi Biologi, Fakultas Matematika dan Ilmu Pengetahuan Alam, Universitas Halu Oleo, Jalan H.E.A. Mokodompit, Kota Kendari, Sulawesi Tenggara, Indonesia – 93561, Indonesia. Email: annisanurulilmi@fmipa.-unmul.ac.id

25571. Anamika; Kumari, V.; Meena, S. (2025): Spatial distribution and relative abundance of aquatic entomofauna in Man Sagar Lake, Jaipur. International Journal of Entomology Research 10(7): 192-201. (in English) ["Aquatic entomofauna are important bioindicators for monitoring freshwater ecosystem health due to their ecological sensitivity and functional roles. The present study aimed to assess the spatial distribution and relative abundance of aquatic insect communities across four distinct sites of Man Sagar Lake, Jaipur. Sampling was conducted using standardized entomological techniques targeting diverse microhabitats, and identification was performed using established taxonomic keys. Relative abundance at the family level was calculated using Microsoft Excel, and multivariate analyses including Bray–Curtis similarity and chord diagram visualization were carried out using PAST software (version 4.03). A total of 28 species and 12 insect families representing four major orders, viz., Odonata, Hemiptera, Coleoptera, and Diptera were recorded. Site 2 exhibited the highest abundance, contributing 65% of the total individuals, predominantly represented by families like Gerridae, Libellulidae, and Coenagrionidae. Followed by Site 4 and Site 3 accounting for 22% and 9%, respectively and Site 1 recorded the lowest (4%) representation across most families. It was also recorded that families such as Libellulidae, Gerridae, and Chironomidae were widely distributed, while Aeshnidae and Hydrophilidae were restricted to specific sites. The chord diagram showed strong species-site associations in Site 2, while Sites 1 and 3 exhibited limited connectivity, suggesting reduced diversity. Bray–Curtis analysis confirmed that Sites 2 and 4 shared the highest similarity, while Site 1 was

most dissimilar from Site 2. Site 2 demonstrated high species diversity, low dominance, even distribution of individuals and elevated species richness, as reflected by favorable Shannon, Simpson, Evenness, and Margalef indices. The presence of sensitive families, Aeshnidae, Coenagrionidae, and Dytiscidae further indicated ecological stability and optimal habitat conditions. In contrast, Site 1 exhibited low species diversity, high dominance, and uneven distribution, with elevated Dominance and Berger–Parker indices. The community was overwhelmingly composed of pollution-tolerant Dipterans families like Chironomidae and Culicidae, reflecting severe ecological degradation due to eutrophication and anthropogenic stress. The study highlighted significant spatial variability in aquatic insect distribution and emphasized their value in ecological assessment and freshwater habitat monitoring in urban lake systems." (Authors)] Address: Kumari, V., Dept of Zoology, Univ. of Rajasthan, Jaipur, Rajasthan, India

25572. Archibald, S.B.; Evans, J.E.; Mathewes, R.W.; Cannings, R.A. (2025): The early Eocene Swauka ypresiana n. gen. n. sp., the oldest gossamerwing damselfly (Odonata, Epallagidae, Epallaginae) and first fossil insect described from the Swauk Formation of central Washington, U.S.A.. Journal of Paleontology 98(6): 1048-1052. (in English) ["We describe Swauka ypresiana n. gen. n. sp., the second fossil gossamerwing damselfly (Odonata, Zygoptera, Epallagidae, Epallaginae) and its oldest occurrence. It is the first fossil insect reported from the Swauk Formation of central Washington State, U.S.A. It was recovered from the “Sandstone facies of Swauk Pass,” a fluvial unit, immediately below the Silver Pass Volcanic Member of the Swauk Formation, which has a U–Pb zircon CA-ID-TIMS age of 51.364 ± 0.029 Ma. The host deposits probably represent mud-dominated floodplain lake or oxbow lake environments." (Authors)] Address: Archibald, S.B., Beaty Biodiversity Museum, Univ. of British Columbia, 2212 Main Mall, Vancouver, Vancouver, BC, Canada, BC, V6T 1Z4. Email: sba48@sfu.ca

25573. Arianti, O.F. (2025): Dragonfly (Odonata) diversity and ecological indicators across riparian habitats of the Segara Kenjeran River, Surabaya. Tropical Animals 1(1): 20-25. (in English) ["Urbanization and habitat fragmentation threaten biodiversity and contribute to ecological imbalance, particularly in freshwater ecosystems. Odonata, which are highly sensitive to environmental changes, serve as reliable indicators of aquatic ecosystem health. However, research on Odonata diversity in urban rivers remains limited, including in Surabaya. This study aims to determine dragonfly species diversity and identify habitat-related factors influencing their distribution along the Segara Kenjeran River. A quantitative ecological survey was conducted at three observation stations with differing habitat characteristics. Data were collected using the Visual Encounter Survey technique, enabling direct identification and counting of individuals in the field. Sampling took place from October to November 2022 under similar weather conditions to reduce environmental variability. The three stations were selected based on variations in vegetation structure, shading, canopy cover, and riverbank conditions. Station 3 exhibited the highest species diversity and abundance, while Station 1 had the lowest. Dominant species across all stations included Orthetrum sabina and Pantala flavescens, both known for broad ecological tolerance. Environmental measurements showed that dissolved oxygen (DO) levels were highest at Station 3, whereas biochemical oxygen demand (BOD) was lowest, indicating better water quality. These results align with dragonfly preference for well-oxygenated habitats. Shannon Wiener diversity indices confirmed the observed patterns, highlighting more stable ecological conditions at Station 3. Overall, the Segara Kenjeran River supports moderate Odonata diversity, shaped by environmental factors such as DO levels, vegetation, and water flow. Continued monitoring is recommended to track ecological changes in this urban river system." (Author)] Address: Arianti, O.F., Dept of Biology, Faculty of Science and Technology, State Islamic University of Sunan Ampel Surabaya - 60237, Indonesia

25574. Bacal, S.; Busmachiu, G.; Minzat, C.; Veringa, T. (2025): Contributions to the knowledge of Insecta (Coleoptera, Odonata, Hymenoptera) from the Orhei National Park. Conferinta stiintifica nationala cu participare internationala Integrare prin Cercetare si Inovare, dedicata Zilei Internationale a Stiintei pentru Pace si Dezvoltare, 6-7 noiembrie 2025: 199-207. (in Romanian, with English summary) [Moldavia "The paper presents the results of the study of species diversity of orders Coleoptera, Odonata, Hymenoptera from natural ecosystems in the Orhei National Park. A total of 59 insect species were collected during the spring-summer period of 2025, between them 34 species of Coleoptera, 10 species of Odonata and 15 species of Hymenoptera from the localities Butuceni, Ivancea, Mana, Tiganesti, Trebujeni and Vatici. The list of species is included and data of collection and locality are specified." (Authors) Coenagrion puella, C. pulchellum, Ischnura elegans, Erythromma viridulum, Platycnemis pennipes, Anax imperator, Orthetrum cancellatum, Crocothemis erythraea, Calopteryx splendens] Address: Bacal, Svetlana, Universitatea de Stat din Moldova, Inst. de Zoologie, Chisinau, Republica Moldova. Email: svetabacal@yahoo.com

25575. Baeta, R.; Willmes, M. (coord.) (2025): Plan régional d’actions en faveur des « libellules » 2025-2035 – Agir pour la préservation des Odonates menacés et de leurs habitats. Association naturaliste d’étude et de protection des écosystèmes CAUDALIS – Direction régionale de l’environnement, de l’aménagement et du logement Centre – Val de Loire: 82 pp. (in French) [https://libellules.pnaopie.fr/wp-content/uploads/2025/02/PRA_Lib_CVL_VF.pdf] Address: Baeta, R., Animateur du Plan régional d’actions en faveur des Odonates en Centre-Val de Loire, association naturaliste d’étude et de protection des écosystèmes “Caudalis”, 1 rue de la Mairie 37520 La Riche - Courriel, France. E-maiul: renaud.baeta@anepe-caudalis.fr

25576. Balmer Odgaard, F.; Kjarbo, P.V.; Poorjam, A.H.; Hechmi, K.; Monteiro Luciano, R.; Krebs, N. (2025): Automated insect detection and biomass monitoring via AI and electrical field sensor technology. Scientific Reports 15: 29858: 14 pp. (in English) ["Insects, vital for ecosystem stability, are declining globally necessitating improved monitoring methods. Trap-based approaches are labor-intensive, invasive, and limited in scope. This study therefore presents a novel, automated, non-invasive insect monitoring system that detects atmospheric electrical field modulations caused by flying insects. In-field sensors monitor insect activity and biomass without physical trapping, using differential electric field measurements and convolutional neural networks for detection and wing-beat frequency analysis. Furthermore, a biomass algorithm that estimates taxon-specific weights is introduced. To validate this method, paired sensor and Townes Malaise trap deployments were conducted at two sites in a Danish nature reserve. Results showed moderate to strong correlations between sensors and traps, particularly at one site (Spearman’s ñ = 0.725 for counts; 0.644 for biomass), supporting the method’s viability. A discrepancy in biomass estimates between methods, greater than that of counts, suggests the need for further refinement of the sensor’s biomass

estimation. For inter-method consistency, sensor-sensor correlations (ñ = 0.758 for counts; 0.867 for biomass) exceeded Malaise-Malaise correlations (ñ = 0.597 for counts; 0.641 for biomass), though not significantly so (P = 0.304 for counts; P = 0.057 for biomass). Overall, the study concludes that while further work is needed, this innovative approach shows promise for future insect monitoring and ecological research." (Authors) The Supplementary Material includes Odonata.] Address: Balmer Odgaard, Freja, FaunaPhotonics, Oceanvej 1, 2150 Copenhagen, Denmark. Email: frod@faunaphotonics.com

25577. Battistella, S.; Bello, L.; Uboni, C. (2025): Dragonflies (Insecta: Odonata) of two glacial lakes and new data for Trithemis annulata in the north-eastern part of Italy. Boll. Soc. Entomol. Ital. 157(3): 101-110. (in English, with Italian summary) ["A survey of Odonata was carried out in the north-eastern part of Italy, in the Friuli Venezia Giulia region. Sampling sites included two glacial lakes of ancient origin, Ragogna Lake and Cornino Lake. Aiming for a general overview of the species composition, sampling effort was conducted between May 2020 and April 2021. A total of 30 species of Odonata were collected, belonging to 17 genera and 8 families. The most representative family was Aeshnidae (31%), while Calopterygidae and Libellulidae each comprise 15%, and Lestidae, Coenagrionidae, Platycnemididae, Cordulegastridae, and Corduliidae each comprise 8% of the total number of species. The most important result was the finding of 16 individuals of Trithemis annulata, a newly recorded species for Friuli Venezia Giulia and for the whole Northeast Italy, representing one of the most northeastern data for the species worldwide." (Authors)] Address: Battistella, Silvia, Dept of Life Sciences, Univ. of Trieste, Italy. Email: battiste@units.it

25578. Behera, S.K.; Routray, R.K.; Mohanta, R.; Nayak, S. (2025): Assessing aquatic ecosystem integrity through Odonata diversity: Insights from Devkund, Simlipal Biosphere Reserve. International Journal of Science, Architecture, Technology, and Environment 2(12): 779-788. (in English) ["Odonates serve as vital bioindicators of freshwater health due to their sensitivity to environmental shifts. This study assessed aquatic ecosystem integrity in the Devkund region of Simlipal Biosphere Reserve, Odisha, from September 2023 to March 2025. Using scan sampling, 23 species across 7 families were identified, dominated by Libellulidae and Coenagrionidae. Diversity metrics revealed high ecological stability, with the Shannon Index (H') peaking at 3.01 in September and Simpson's Index (1-D) reaching 0.946. Species richness and evenness (J' = 0.96) were highest during the monsoon and post-monsoon phases, correlating with optimal hydrological conditions and dense emergent vegetation. These seasonal fluctuations underscore the dependency of odonate assemblages on riparian integrity and water availability. The findings indicate that Devkund maintains a heterogeneous and undisturbed freshwater habitat, functioning as a critical microhabitat within the Eastern Ghats. The presence of specialized taxa like Caconeura ramburi and Pseudagrion microcephalum highlights the site's biogeographic importance. This study reinforces the use of Odonata as sentinel taxa for monitoring ecosystem health and prioritizing conservation strategies in protected riparian corridors." (Authors)] Address: Behera, S.K., Lecturer in Zoology R.D.S. Degree Mahavidyalaya, Kundabai, Mayurbhanj, Odisha, India. Email: subb92@gmail.com

25579. Biswas, D.; Deuti, K. (2025): Breeding ecology, feeding of nestlings and nestling development of the Collared Kingfisher (Todiramphus chloris) in the Indian Sundarbans. Rivista Italiana di Ornitologia - Research in Ornithology (RIO) 95(1): 29-38. (in English, with Italian summary) ["Although commonly occurring in many of the mangrove and coastal areas of the world, the breeding habits, nesting behavior, feeding, and development of nestlings of the Collared Kingfisher had never been studied before. Our observations on the nesting behavior of this specialized bird shed light on the unique breeding habits of this species. This study was conducted in the Indian Sundarbans, from April to July 2023, by selecting one particular nest-hole at Gosaba Island on an Avicennia alba tree trunk 1.5 meters above the ground. During the middle of May, four eggs were laid, which hatched after 18 days in early June, giving birth to four blind, naked, pink-colored chicks. The development of the chicks was divided into eight stages: neonatal stage, eye-opening stage, growth stage, tail development stage, eye color changing stage, juvenile stage, collar development stage, and fledgling stage. The total time for the chicks to fly took 33 days from hatching. During this period, parents fed them on crabs (70.5%), mudskippers and small fishes (12.2%), insects (11.5%), polychaetes (1.9%), reptiles and amphibians (1.9%), shrimps (1.1%), and mollusks (0.8%). Feeding observations were made for four hours (5:30-9:30 am) in the morning and two hours (4:30-6:30 pm) in the evening, and chicks were fed more food items (hourly) in the mornings than in the evenings. The adults preferred to collect these food items mostly from the muddy substratum near the nest, but at the time of high tide or after heavy rain, they preferred to collect food (like insects, mole crickets, dragonflies, etc.) from agricultural land opposite to the nesting site. However, the effect of low and high tides on the hunting activity of parents was found to be insignificant. This study in the Indian Sundarbans provides comparatively more detailed information on the nesting ecology of the species than studies made earlier in India, Bangladesh, the United Arab Emirates, and the Fiji Islands." (Authors)] Address: Deuti, K., Zool. Survey of India, FPS Building, Indian Museum Complex, Kolkata, West Bengal, India. Email: kaushikdeuti@gmail.com

25580. Borkenstein, A.; Jödicke, A. (2025): Multifunctional mandibles – an as yet overlooked aspect in Odonata? Notulae odonatologicae 10(5): 190-194. (in English) ["A teneral Leucorrhinia rubicunda was photographed biting into its perch, a rush stem, shortly after its maiden flight. To our knowledge, the literature provides no immediate explanation for this behaviour. The documented case might therefore be anecdotal, representing an isolated incident which eludes general interpretation. However, within the broader context of mandibular function in insects, it may well be of relevance beyond this individual case, even pointing towards hitherto overlooked behaviour in Odonata. The photograph might show the functional testing of mandibles during the hardening process, roughly comparable to the whirring of wings just before maiden flight. An alternative interpretation of the photographed behaviour is that it provides an improved grip on the perch in response to strong winds. Such assumptions raise the question of whether the observed bite might be an obligatory part of the behavioural repertoire of teneral odonates." (Authors)] Address: Borkenstein, Angelika, Lebensborner Weg 5, 26419 Schortens, Germany. E-mail: AngelikaBorkenstein@t-online.de

25581. Bourrel, J. (2025): Etude des populations de Macromia splendens, Oxygastra curtisii et Gomphus graslinii sur deux sites Natura 2000 des Hautes Vallées Cévenoles. Master 2 Biodiversité, Ecologie et Evolution, Parcours conservation de la biodiversité (Anne´e 2024 / 2025): 64 pp. (in French, with English summary) ["This internship was carried out within the Natura 2000 system and the framework of the National Action Plan for Odonates, with a particular focus on monitoring

three species of community interest: O. curtisii, M. splendens, and G. graslinii. The main objective was to improve knowledge of their distribution, abundance, and the environmental factors influencing their presence, through a standardized exuviae collection protocol implemented on two Natura 2000 sites. The work involved compiling and harmonizing several years of data, followed by statistical analyses to assess population dynamics. Generalized Linear Mixed Models (GLMMs) were used to link species presence/absence and abundance to environmental variables (substrate, vegetation, hydromorphological conditions). The results revealed relatively stable population trends and species-specific ecological preferences, confirming the importance of riparian microhabitat diversity for their persistence. This internship also highlighted the importance of standardized protocols and long-term time series in order to better understand demographic trends." (Author)] Address: https://libellules.pnaopie.fr-/wp-content/uploads/2025/11/2025_BOURREL_J_etude_-pop_M-splendes_O-curtisii_G -graslinii_N2000_Htes-Vallees-Cevenoles.pdf

25582. Boutifard, V. (2025): Suivi odonates - Bilan de campagne 2024 sur cinq marais doux agricoles du littoral atlantique. Domaine expérimental de Saint-Laurent-de-la-Prée. 2025. ffhal-04985524f. Nouvelle-Aquitaine. Tetrae. Transition en Territoires de l'Agriculture, l'Alimentation et l'Environnement. INRA0: 42 pp. (in French, with English summary) ["The monitoring of odonates in the Atlantic coastal agricultural freshwater marshes, conducted as part of the MAVI Tetrae project (Maintenir les marais vivants face au changement climatique), aims to gather knowledge on the impact of water management on fauna and flora. During this first year, 22 species of odonates were recorded across five agricultural freshwater marshes, with a dominance of Ischnura elegans. This data collection marks the beginning of a three-year monitoring program, with the objective of tracking biodiversity changes and gaining a better understanding of the effects of management practices on ecosystems." (Author)] Address: https://hal.science/hal-04985524/document

25583. Brito, B.U. de (2025): Espécies especialistas, generalistas e raras de Odonata (Insecta), em igarapés da Floresta Nacional de Carajás, Amazônia. Dissertação (Mestrado em Biodiversidade e Conservação) - Campus Universitário de Altamira, Universidade Federal do Pará, Altamira: V + 26 pp. (in Spanish, with English summary) ["Aquatic ecosystems are constantly affected by various anthropogenic activities. The deforestation of riparian vegetation in streams for the cultivation of short- or long-cycle monocultures, pastures, urbanization, mining, among others, alters the environment. These changes directly impact aquatic insect communities, such as those of the order Odonata, which exhibit high sensitivity to environmental changes, especially the suborder Zygoptera, which has a higher number of specialist species in preserved areas compared to the suborder Anisoptera. Our objective was to assess the occurrence of generalist, specialist, and rare Odonata species in streams inside and outside the Carajás National Forest (FLONA). The collection was conducted in 21 streams located in the region inside and outside FLONA Carajás, in October 2022 and September 2023. In each stream, a 100-meter section was defined and subdivided into 20 segments of 5 meters each. Specimens were captured using entomological nets (sweep nets) between 10:00 AM and 2:00 PM. The specimens were stored in the field in parchment paper envelopes until they arrived at the laboratory. After identification, they were added to the collection of the Ecology Laboratory (LABECO) at the Federal University of Pará – UFPA, Altamira Campus. The Habitat Integrity Index (HII) was applied in all streams to assess the level of physical integrity of these environments. To evaluate species occurrence, we performed two data analyses: The Multinomial Species Classification Test (CLAM) and simple linear regression, using the R environment. We collected 605 specimens, belonging to eight families, 30 genera, and 71 species. Our study found that only species from the Zygoptera were classified as specialists in environments both inside and outside the forest, as well as generalists in habitat use. The habitat integrity index negatively influenced the richness of rare species. Species from the Zygoptera are usually more present in environments with higher integrity due to their eco-physiology. Rare species may be at greater risk of extinction due to their low abundance. Therefore, the removal of vegetation tends to harm species with specialist behavior in more intact areas, in addition to having a negative effect on species classified as rare." (Author)] Address: https://repositorio.ufpa.br/server/api/core/bitstreams/9d24-760c-0b0f-4ce4-baa8-bdf7b3c62648/content

25584. Busmachiu, G. (2025): New record of Odonata (Insecta) in the Plaiul Fagului Reserve, Republic of Moldova. Oltenia, Studii si Comunicari Seria Stiintele Naturii 41(1): 75-78. (in English) [Records of Aeshna cyanea, Cordulia aenea, Isoaeschna isoceles and Sympecma fusca observed during spring-summer of 2024 are documented. A. cyanea increases the list of Moldovan odonate species to 47. Records of Anax imperator and Leucorrhinia pectoralis listed in the 3th edition of the Red Book (2015) also have been recorded.] Address: Busmachiu, Galina, Institute of Zoology, State University of Moldova. Email: danavirlan3@gmail.com

25585. Carassou, L.; Vildier, M.; Lobry, J.; Lebreton, B.; Savoye, N.; Kohler, M.; Bons, S.; Lepage, M.; Blanchet, H.; Cabral, H. (2025): Aquatic food webs in restored marshes: a stable-isotope approach in the Gironde estuary (SW France). Restoration Ecology 33(5), e70071: 14 pp. (in English) ["Intertidal marshes are important habitats for nekton. However, historical draining and dyking hampered European coastal wetlands. Marsh restoration is therefore critical not only to improve their capacity to protect coastal lines but also to rehabilitate their ecological functionalities. The benefits of intertidal marsh restoration for nekton community composition and feeding ecology are examined in a case study within the largest macrotidal estuary in Western Europe (Gironde). The structure and functioning of nekton food webs are addressed using stable isotopes of carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$). $\delta^{13}C$ values of suspended particulate matter illustrated the influence of the tidal connectivity with the adjacent estuary in restored habitats. $\delta^{15}N$ values of nekton and its resources evidenced little difference in food-web complexity, but spatial or seasonal variations for some resources and consumers, related to a combination of temporal and tidal effects. The European eel (Anguilla anguilla) and the introduced freshwater topmouth gudgeon (Pseudorasbora parva) dominated food webs in the fully and partially connected marsh habitats, respectively. The isotopic niche and diet composition of A. anguilla also varied between habitats, as did the diet of other nekton species (Chelon ramada and Palaemon longirostris). This study informs the rehabilitation process of important functionalities of restored aquatic habitats for nekton." (Authors) The list of taxa includes "Odonata larvae" in the supplementary material.] Address: Carassou, Laure, INRAE, UR EABX, 50 Avenue de Verdun, 33612, Cestas, France. Email laure.-carassou@inrae.fr

25586. Chovanec, A. (2025): Photographic documentation of an unguarded oviposition in the Large Red Damselfly,

Pyrrhosoma nymphula (Sulzer, 1776) (Odonata: Coenagrionidae). Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen 77: 92-95. (in English, with German summary) ["This short note photographically documents and discusses an unguarded oviposition of P. nymphula. The observation took place on 29.V.2025 in Lower Austria." (Author)] Address: Chovanec, A., Krotenbachgasse 68, 2345 Brunn am Gebirge, Austria. Email: andreas.chovanec@bml.gv.at

25587. Chovanec, A.; Mayer, M. (2025): Record of a male-male tandem formation of the Banded Demoiselle, Calopteryx splendens (Harris, 1780) (Odonata: Zygoptera). Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen 77: 85-91. (in English, with German summary) ["The observation of a male-male tandem of C. splendens is documented. In the discussion, special emphasis is placed on the explanation of the curved abdomen of the seized male. The record was made at the lower reach of the River Traisen (Lower Austria) on 19.VI.2024." (Authors)] Address: Chovanec, A., Krotenbachgasse 68, 2345 Brunn am Gebirge, Austria. Email: andreas.chovanec@bml.gv.at

25588. Courteille, T.; Vivier A. (2025): Création et restauration des mares en France. Définitions, fonctionnement et techniques d'intervention. Office Français de la Biodiversité. Paris: 105p + annexes (in French) ["The creation and restoration of ponds are frequent and long-standing ecological actions in a wide variety of environments (agricultural, forest, urban, etc.) to meet objectives related to biodiversity, climate change adaptation, and educational purposes for raising awareness about nature. The European regulation on nature restoration mentions pond restoration in Annex VII for the three types of environments previously cited, as a measure to be implemented. Within the framework of the 4th National Wetlands Plan (2022-2026), the Ministry of Ecology commissioned the National Society for the Protection of Nature (SNPN) to develop a national action strategy for ponds. In 2023, the SNPN partnered with the national association of elected officials from river basins to lead the Ponds and Alluvial Valleys Cluster, in order to revitalize national collaboration among stakeholders involved in pond conservation. Ponds benefit from various exchange and transfer structures implemented at the local level by certain Regional Nature Reserves (CEN), Regional Natural Parks (PNR), Permanent Centers for Environmental Initiatives (CPIE), associations within the France Nature Environment Federation, Hunting Federations (FDC), and through monitoring and evaluation programs such as the "Wetlands, Assessment, Observation" (MHéO) approach or the Calls for Expressions of Interest (AMI) on the effectiveness of Natura 2000 management measures, led by Patrinat. A wide range of stakeholders are leading projects to create and/or restore ponds: associations, local authorities, businesses, individuals, etc., which can be partially funded by grants and, more recently, by the various calls for projects issued by the French Biodiversity Agency (OFB) concerning ecological restoration. The projects proposed within this framework revealed shortcomings in terms of justifying actions, defining objectives, techniques used, and reflecting on work already carried out, sometimes for decades, in the same areas, as well as on its success. In a context where the implementation of restoration measures is set to expand under the impetus of European regulations and national plans, how can the success of these initiatives be ensured? Which techniques are effective, and how can actions be made sustainable? What are the needs in terms of scientific, technical, and research support? How can these strategies be deployed to improve their effectiveness in support of the future national restoration plan and in the context of climate change? The objective of this work is therefore multifaceted: it aims to establish a framework for reflection and methodological proposals for the restoration and/or creation of ponds, which all stakeholders – local authorities, consulting firms, managers, etc. – can adopt. This document is not a comprehensive guide, as it does not prescribe a single method to be implemented. On the contrary, drawing on existing literature, he proposes several ways to design the restoration/creation of ponds, depending on the local context and established objectives." (Authors)] Address: https://hal.science/hal-05329490

25589. Danilovic, M.; Ercoli, F.; Maguire, I.; Füreder, L. (2025): Trophic plasticity and invasive success: dynamic feeding strategies of the signal crayfish in Croatian rivers. Journal of Freshwater Ecology, 40:1, 2528650, DOI: 10.1080/0270-5060.2025.2528650: 22 pp. (in English) ["The invasive signal crayfish (Pacifastacus leniusculus), a species of high concern in European freshwaters, represents a substantial threat to native crayfish species and freshwater ecosystems. Its widest distribution in Croatia is observed in the lowland Drava River and the karstic Korana River, where signal crayfish populations have occurred for over a decade. Populations of native noble crayfish and narrow-clawed crayfish have been completely displaced in the long-term invaded sites at both rivers, while drastic reduction of native crayfish has been observed at the active invasion fronts of the Korana River. As the signal crayfish continues to invade new freshwater sections, we aimed to evaluate its diet and trophic niche to assess its trophic dynamics across various invasion stages. We sampled signal crayfish and its major potential food sources at invasion core sites at Drava and Korana Rivers, as well as the active invasion front of the Korana River. Samples were analysed on their stable carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) isotopes to evaluate the signal crayfish food source preferences and trophic niche widths. Our results indicate that its diet preferences and trophic niche are highly dynamic and vary with invasion stage and local environmental conditions. In the Drava River, signal crayfish showed a strong preference for animal-based food sources, coupled with a wide trophic niche width and low intraspecific competition. At Korana River invasion core, high crayfish densities were associated with a contracted trophic niche, and a predominant reliance on periphyton. In contrast a broader trophic niche at the invasion front was observed showing a more generalist feeding strategy. Additionally, potential predation on the native narrow-clawed crayfish was observed. Our findings highlight the trophic plasticity and adaptability of the signal crayfish, explaining its invasive success, and provide a broader understanding of invasive species dynamics in European freshwaters." (Authors) The diet includes not further specified Odonata larvae.] Address: Danilovic, M., Univ. of Innsbruck, Faculty of Biology, Department of Ecology, River and Conservation, Technikerstrasse 25, 6020-Innsbruck, Austria. Email: Milan.Danilovic@student.uibk.ac.at

25590. Delgado, T. M.A.; García, C.K.S. (2025): Macroinvertebrados acuáticos como bioindicadores de calidad de agua en las microcuencas del cantón 24 de Mayo. Thesis, Carrera de la Ingeneria Ambiental, Universidad Estatal del Sur de Manabi, Faculdad de Ciencias Naturales y de la Agricultura: 87 pp. (in Spanish, with English summary) [Ecuador; "The present study to evaluate the water quality in the micro-watersheds of the 24 Mayo canton using aquatic macroinvertebrates as bioindicators. The study was conducted at eight monitoring stations located upstream and downstream of the Sucre River during the dry season. Macroinvertebrates were collected manually using sieves, forceps, and substrate scraping techniques, and were preserved in

70% alcohol for subsequent identification with the aid of a digital microscope. The most predominant taxa identified were Veliidae, which represented the most abundant family (80 individuals) followed by Libellulidae (51). In contrast families such as Baetidae showed as very low in abundance, indicating alterations in the ecosystem. The Biological Monitoring Working Party index (BMWP/COL) was used to evaluate the ecological quality of the water based on the response of macroinvertebrate families to different levels of contamination. This index allowed for the interpretation of the environmental status of the micro-watersheds, showing that upstream stations obtained the highest scores, whereas downstream stations, affected by domestic wastewater discharges and agricultural activities, recorded low scores corresponding to moderately contaminated or critical water conditions. Physicochemical parameters reflected a progressive deterioration of the water resource. In less disturbed areas, dissolved oxygen levels remained within ranges close to those established by the TULSMA regulations (Book VI, Annex 1), while in downstream areas a decrease in dissolved oxygen was observed, accompanied by increases in conductivity and turbidity. Likewise, the Shannon-Wiener diversity index showed low values at most stations, indicating severe contamination in much of the river. Only station E6 reached a value corresponding to moderate contamination. Overall, the results demonstrated that water quality in the evaluated micro-watersheds exhibits a deterioration gradient from upstream to downstream, conforming that aquatic macroinvertebrates are effective bioindicators for assessing environmental impacts associated with human anthropogenic activities." (Authors) (Odonate) taxa are treated at family level.] Address: https://repositorio.-unesum.edu.ec/bitstream/53000/8896/1/Delgado%20Tumbaco%20Marco%20Alexander%20- %20Garc%c3%ada%20Cede%c3%b1o%20Karla%20Sadira.pdf

25591. Deux-Sèvres Nature Environnement; Ligue pour la Protection des Oiseaux; Les Naturalistes Vendéens; Conseil Départemental de Vendée et Parc naturel régional du Marais poitevin (2025): Suivi et Évolution des communautés d'odonates du Marais poitevin, 2024 – 5ème année. Parc naturel régional du Marais poitevin, Coulon: 59 pp. (in French) ["A fifth monitoring session for Odonata was conducted in 2024 in the Marais Poitevin. This monitoring, which began in 2012, is part of the Marais Poitevin Natural Heritage Observatory. The protocol involves surveying 35 transects, 28 of which were surveyed in each session. In 2024, only one of the 35 transects could not be visited due to overgrown vegetation. These 500-meter-long transects are covered in round trips, taking one hour, with four passes during the dragonfly and damselfly season, from the beginning of May to the end of August. Of the 54 known Odonata species in the Marais Poitevin, only Lestes macrostigma was not observed during these five years of monitoring. However, a new species has been added to the collection: Trithemis annulata, a southern species indicative of climate change. In 2024, 45 dragonfly species were observed during the monitoring period, with an average species richness of 8.76 species per transect. This collection, as in 2021, appears to be unrepresentative of the diversity present in a marsh habitat, according to the community integrity indicator obtained using the LigérO calculator. However, this indicator seems unreliable given the low autochthonous index calculated in 2024. These results are understandable given the size of the wetland studied, which spans three departments. Therefore, its collection cannot be compared to a departmental species list or a specific habitat typology, not to mention a portion of the Marais Poitevin. While species richness is significantly higher in the wet valley bottom compared to the wet, dried-out, and intermediate marsh areas, a decrease in species richness is observed for transects in the intermediate and dried-out marsh areas. A similar, but not statistically significant, trend is observed for those in the wet valley bottom. Four species have not been re-observed since 2015: Coenagrion pulchellum, Lestes virens, Aeshna cyanea, and Orthetrum brunneum. Boyeria irene has not been re-observed has not been re-observed since 2018. Ten species show significant population dynamics, notably a sharp decline in the Blue-eyed, Green-bodied Damselfly on the transects of the Natural Heritage Observatory (OPN). Some species, such as Enallagma cyathigerum, Coenagrion scitulum, and Lestes virens, show a less pronounced but still significant decline. Others still need monitoring, as their negative trends could become significant during future monitoring sessions. These include Brachytron pratense, Coenagrion mercuriale, and Onychogomphus forcipatus. Finally, two species appear to be expanding: Aeshna mixta and Cordulia aenea, but the latter remains anecdotal given the small number of transects involved and the fact that only males are present. Continuing this study in the coming years will allow us to continue monitoring the evolutionary trends of the plant communities and species within the Marais Poitevin." (Authors/Google translate)] Address: https://biodiversite.parc-marais-poitevin.-fr/wp-content/uploads/2025/02/rapport_odonates_2024.pdf

25592. Dijkstra, K.-D. B. (2025): Dragonflies and damselflies of the world - A guide to their diversity. Princeton University Press: 256 pp. (in English) ["Airily dancing over rivers and ponds, the thousands of colourful odonate species that cohabit on our planet may seem of little importance. Few life forms, however, convey the condition of the most limiting resource on land and life's most bountiful environment as well as they can: while the adults are exceptional aerial hunters, their nymphs are all confined to freshwater. Dragonflies and Damselflies of the World showcases their beauty and diversity while shedding light on how they evolved into the vital symbols of planetary health we celebrate today. - Features stunning colour photos of hundreds of species. - Characterizes all families and major subgroups. - Explores how their unique features and behaviour led to today's variety. - Shows how we contribute to their popularization and protection." (Publisher)]

25593. Dobovišek, M. (2025): A new record of wandering glider Pantala flavescens (Fabricius, 1798) (Odonata: Libellulidae) in Croatia. Natura Sloveniae 27(2): 24-25. (in English, with Slovene summary) ["In Europe, the cosmopolitan P. flavescens is scarce. Along the Adriatic coast, only two records, from Montenegro in 1972 and from Croatia in 2010, have been known so far. On 30. 7. 2025, a female of the species was observed in the canteen of Božava Hotel on the island Dugi otok in Dalmatia. This represents only the second record of the species for Croatia." (Author)] Address: Dobovišek, Mitja, Cesta Alojza Travna 19, SI-4270 Jesenice, Slovenia. Email: mitjadobovisek006@gmail.com

25594. Fahrenholz, A. (2025): Eine Fang-Wiederfang-Studie von Orthetrum brunneum und O. coerulescens am Stemweder Berg, Nordrhein-Westfalen (Odonata: Libellulidae). Libellula 44(3/4): 145-166. (in German, with English summary) ["A mark-recapture study of Orthetrum brunneum and O. coerulescens at the Stemweder Berg, North Rhine-Westphalia, Germany (Odonata: Libellulidae) – In the summer of 2022, a capture-mark-recapture study of O. brunneum and O. coerulescens was performed in a total of 4,000 m stretch of drainage ditches. The study was carried out in the municipality Stemwede, North Rhine-Westphalia, in a landscape dominated by agriculture. Additionally, all Odonata in the examined ditches were recorded. In total, 761 adults of both

Orthetrum spp. were marked individually, 13 belonged to O. brunneum and 748 to O. coerulescens. Approximately a third (32.2%) of the marked O. coerulescens males were resighted at least once, the rate was considerably lower for females (3.3%). Six individuals of O. coerulescens were seen over seven kilometres away from their marking locality, the maximum distance of a resighting was 8.44 km. Given the low individual numbers of O. brunneum, the results and discussion primarily focused on O. coerulescens. During the study, low precipitation and high temperatures led to significant drying of some areas, including whole ditches. The differences in abundances and migration were linked to the drying out. The highest abundances of O. coerulescens were recorded in the ditches with constant water flow. Migrations not only occurred due to the dry conditions as there is additional evidence for inverse density-dependent movement in O. coerulescens. Decreasing habitat quality combined with the population density seem to be the main factors for migrations of adult O. coerulescens. In total 23 odonate species were recorded in the study area. Potential risks and the value of drainage ditches as secondary habitats for dragonflies and damselflies were discussed. The population sizes of the Orthetrum spp. differed strongly, the population size of O. coerulescens in 2022 was seen as important on a regional scale." (Author)] Address: Fahrenholz, A., Brinkstr. 26, 17489 Greifswald, Gemany. Email: arnefahrenholz@posteo.de

25595. Fang, R.; Liu, P.; Zheng, D. (2025): Abrohemeroscopus yuanjiawaensis sp. nov. (Odonata: Anisoptera: Hemeroscopidae) from the late Jehol Biota of western Liaoning, northeastern China and its biogeographical implications. Historical Biology 38(2): 377-381. (in English) ["The Hemeroscopidae Pritykina 1977 is a dragonfly family widely distributed in the Lower Cretaceous terrestrial strata of East Asia and Transbaikalia. However, the diversity is relatively low with only three genera and species previously recorded. In the present study, a new hemeroscopid dragonfly, Abrohemeroscopus yuanjiawaensis sp. nov. is described from the Lower Cretaceous Jiufotang Formation (yields the late Jehol Biota) of Chaoyang City, western Liaoning, northeastern China. Abrohemeroscopus yuanjiawaensissp. nov. differs from the type species (Abrohemeroscopus mengi Ren, Liu & Cheng 2003) in the pterostigma covering four cells, the oblique vein 'O' being four and a half cells distal of base of RP2 and the anal loop subdivided into nine cells. This discovery indicates that the genus Abrohemeroscopus Ren, Liu & Cheng 2003 is a typical dragonfly genus of the late Jehol entomofauna in western Liaoning." (Authors)] Address: Zheng, D., State Key Laboratory of Palaeobiology & Stratigraphy, Nanjing Institute of Geology and Palaeontology and Center for Excellence in Life and Paleoenvironment, Chinese Academy of Sciences, Nanjing, China. Email: drzheng@nigpas.ac.cn

25596. Fekete, J.; Várbíró, G.; Szeles, J.; Bozóki, T.; Pernecker, B.; Csabai, Z.; Boda, P. (2025): Prolonged flow intermittency undermines the habitat potential of forested landscapes for a stream-dwelling dragonfly. Ecological Entomology 50(6): 1148-1158. (in English) ["1. Understanding how land use and variability of the hydrological regime jointly shape species distributions is essential for the conservation of aquatic insects in increasingly intermittent streams. 2. We investigated how flow intermittency influences the relationship between land use and the occurrence probability of Cordulegaster heros in a drying river network. 3. Field surveys were conducted at 42 stream sites in southwestern Hungary over a two-year period. We combined species presence–absence data with land use variables and hydrological proxies. Statistical analyses included decision tree modelling and binomial generalised linear models. 4. C. heros was associated with forested landscapes and absent from sites with prolonged zero-flow periods or high agricultural land use. Occurrence probability declined markedly when forest cover was low or when dry periods were extended in duration. 5. Although C. heros larvae can tolerate short-term drying by burrowing into sediments, prolonged flow intermittency and reduced landscape connectivity may limit both survival and recolonisation. Our findings underscore the need for conservation strategies that jointly address land use and hydrological conditions to counter the rising flow intermittency expected with ongoing climate change." (Authors)] Address: Boda, P., HUN-REN Centre for Ecological Research, Institute of Aquatic Ecology, Bem square 18/c, Debrecen, 4029-Hungary. Email: boda.pal@ecolres.hu

25597. Ferreras-Romero, M.; García-Rojas, A.M. (2025): Aportaciones al conocimiento de los anisópteros (Insecta: Odonata) del parque natural Los Alcornocales (Cádiz – Málaga), sur de España - Contributions to knowledge of the Anisoptera (Insecta: Odonata) from Los Alcornocales Natural Park (Cadiz - Malaga), southern Spain. Rev. Soc. Gad. Hist. Nat. XIX: 35-37. (in Spanish, with English summary) ["Exuviae belonging to four Anisoptera semivoline species [Boyeria irene, Onychogomphus uncatus, Cordulegaster boltonii, Oxygastra curtisii] were collected from three 'gargantas' of the Sierra del Aljibe (Los Alcornocales Natural Park). B. irene females display a relalitively high proportion (22%) of form typica. A new breeding locality of O. curtisii was found." (Authors)] Address: Ferreras-Romero, M., C/ Gerona 9, 41003 Sevilla, Spain

25598. Ganeswari, C.; Rajendran, P. (2025): Diversity and seasonal variation of odonates in selected wetlands of Madurai District. International Journal of Ecology and Environmental Sciences 51(5): 531-542. (in English) ["This study was conducted in the wetlands of the Madurai district to elucidate the diversity, distribution, and seasonal dynamics of Odonate species. Employing the fixed area transect method and the visual encounter survey method for fieldwork, the research identified 28 Odonate species, consisting of 19 dragonflies and 9 damselflies across five families. The dominant families observed included Libellulidae, Coenagrionidae, and Gomphidae, with the Anisoptera prevailing over Zygoptera. Areas such as Kovil Papakudi and Vandiyur displayed high diversity, while Thenkarai and Avaniyapuram had lower counts, influenced by significant factors such as reduced vegetation cover and pollution. Seasonal variations revealed that the monsoon season showcased the highest diversity, particularly in October, which aligns with the reproductive behaviours of Indian Odonate species. Crucial factors affecting Odonate diversity included temperature, precipitation patterns, declining water levels, and vegetation. Preserving aquatic habitats has emerged as a vital strategy for safeguarding these species. The findings provide valuable insights for conservation efforts and emphasize the need for habitat restoration in the wetland ecosystem of the Madurai district." (Authors)] Address: Ganeswari, C., Dept of Zoology & Research Centre, Lady Doak College, Madurai Lady Doak College affiliated to The Madurai Kamaraj Univ., Madurai, 625002, Tamil Nadu, India. Email: ganeswarichandrasekaran@gmail.com

25599. García Cañal, J.A.; Cabana, M.; Sánchez Jardón, G. (2025): Primeras citas de Trithemis annulata (Palisot de Beauvois, 1807) (Odonata: Libellulidae) en Asturias (norte de España). Arquivos Entomolóxicos 33: 39-42. (in Spanish, with English summary) ["First records of Trithemis annulata (Palisot de Beauvois, 1807) (Odonata: Libellulidae) in Asturias (North Spain). The first confirmed records of T. annulata in

Asturias are presented, with observations from 2018 at La Granda reservoir (Gozón) and from 2024 at Grandas de Salime reservoir. With these records, the number of Odonata species in the Principality rises to 49." (Authors)] Address: García Cañal, J.A., c/ Rivero, 87, 5ºD. E-33402 Avilés (Asturias), Spain. Email: luancopin@gmail.com

25600. García-Pozuelo-Ramos, C. (2025): Anomalías morfocromáticas observadas en odonatos (Insecta, Odonata) de La Sagra (Toledo, España central) durante el periodo 2019-2024 - Morphochromatic anomalies observed in odonates (Insecta, Odonata) from La Sagra (Toledo, central Spain) in the period 2019-2024. Boletín de la Asociación Española de Entomología 49(3-4): 275-287. (in Spanish, with English summary) ["This paper describes the 17 morphochromatic anomalies found in 16 individuals (cases) of odonates. They were obtained while sampling in the La Sagra region (Toledo, central Spain) between 2019 and 2024. In five of the cases wing anomalies were found. The abdomen was affected in nine cases. Most or all of the cases affecting wings and abdomen could be teratoses. In three other cases, eye anomalies were observed. Two of them were dyschromias, possibly teratoses, with no known origin and in the third one possible injuries were observed." (Author) The following species are documented: Coenagrion scitulum, Enallagma cyathigerum, Ischnura elegans, I. graellsi, Platycnemis latipes, Calopteryx xanthostoma, Selysiothemis nigra, Anax parthenope, Sympetrum fonscolombii, and Orthetrum cancellatum.] Address: García-Pozuelo-Ramos, C., SEACAM Sociedad Entomológica y Ambiental de Castilla-La Mancha. pkymp@yahoo.es

25601. Gebhardt, N.; Rudischer, S.; Bernolle, D.; Ittner, L. (2025): Handlungsempfehlungen für Moorschutzpraktikerinnen und -praktiker im Umgang mit geschützten Arten - Aquatisch gebundene Arten. Herausgeber: Bayerisches Landesamt für Umwelt (LfU), Bürgermeister-Ulrich-Str. 160, 86179 Augsburg, Germany: 59 pp. (in German) ["This guideline for dealing with protected, aquatic species is aimed at peatland conservation practitioners in Bavaria. Intact peatlands are highly relevant due to their diverse functions for climate, water, and species conservation. However, over the last century, they were extensively drained for agricultural and forestry purposes, as well as for peat extraction. Since drained peatlands are sometimes used as secondary habitats for non-peatland species, rewetting can overlap with species conservation and thus lead to conflicting objectives. The guideline aims to demonstrate various options for dealing with these conflicting objectives and includes recommendations for the following species: Unio crassus agg., Misgurnus fossilis, Pelobates fuscus, Coenagrion ornatum, and Coenagrion mercuriale. How implementation might look in practice is explained using the practical example of the Upper Bavarian Donaumoos region with appropriate solution approaches." (Authors/Google translate)] Address: https://www.bestellen.bayern.de/application/eshop_app000000?SID=1676974904&ACTIONxSESSxSHOWPIC(BILDxKEY:%27lfu_nat_00486%27,BILDxCLASS:%27Artikel%27,BILDxTYPE:%27PDF%27)

25602. Gieser, J.T.; Schirmel, J.; Entling, M.H. (2025): Quality of habitats in and around urban streams are important determinants of Odonata conservation. Global Ecology and Conservation 64, e03993: 12 pp. (in English) ["Urbanization is a key driver of freshwater biodiversity loss, yet the promotion of blue-green infrastructure in cities offers the potential for local species mitigation. The restoration of urban watercourses and their riparian areas could particularly benefit species inhabiting aquatic-terrestrial interfaces, such as Odonata. This study assessed Odonata diversity and assemblage composition across eight cities in southwest Germany, comparing stream sections in rural versus urban areas. Within cities, terrestrial and aquatic habitat quality was varied in a factorial design. Adult Odonata were recorded during section walks, and exuviae were sampled along riverbanks throughout 2024. In total, we observed adults of 16 species, with successful larval development confirmed by the presence of exuviae for seven species. Rural stream sections hosted 1.6 times more adult species than urban ones; however, urban sections with both high terrestrial and aquatic habitat quality supported species assemblages comparable to those of rural sections. Terrestrial habitat quality had a significant positive effect on both exuviae and adult species richness, with more than 1.5 times as many species present in high- compared to low-quality habitats. Furthermore, sections with high terrestrial habitat quality and those with high aquatic habitat quality each supported more than twice the number of adult individuals relative to their lower-quality counterparts. Our findings highlight the considerable potential of urban streams to support freshwater biodiversity. Effective conservation requires simultaneous improvement of both aquatic and terrestrial habitat quality, underscoring their joint importance in urban river restoration and planning. ... A total of 395 exuviae from seven species were collected (Tab. S3). The most numerous species were Calopteryx splendens (123) and Calopteryx virgo (80), followed by Platycnemis pennipes (65), which was, however, found only on a single reference site. Concerning adults, 1,464 individuals from 16 species were observed (Tab. S3). In accordance with the collected exuviae, C. splendens (592), C. virgo (533), and P. pennipes (141) had the highest numbers. Reproductive behavior (i.e., mating or oviposition) was observed in 28 individuals in urban sections and 118 individuals in rural sections. Out of 13 Odonata species observed as adults in cities, six were also present as exuviae (C. splendens, C. virgo, Cordulegaster boltonii, Ischnura elegans, O. forcipatus, O. cecilia), indicating reproductive success in urban areas. Two species were found that are under special protection in Germany. One, Onychogomphus forcipatus, is currently listed as “Near Threatened” on the German Red List (Ott et al., 2021). The second, O. cecilia, is currently “Least Concern” (Ott et al., 2021) but is listed in Appendix II of the Habitats Directive (92/43/EWG). Given that only five O. forcipatus adults and 55 O. cecilia adults were observed, the abundance of exuviae was relatively high (13 and 43, respectively)." (Authors)] Address: Gieser, Julia, Institute for Environmental Sciences, University of Kaiserslautern-Landau (RPTU), Fortstr. 7, 76829 Landau in der Pfalz, Germany. Email: julia.gieser@rptu.de

25603. Gonçalves, M.; Hamada, N.; da Silva, E.C.; Juen, L.; Brasil, L.S. (2025): Seasonal variation of Zygoptera (Odonata) assemblages in preserved streams of Central Amazonia. International Journal of Tropical Insect 45: 2379-2390. (in English) ["In the tropics, where seasonality is primarily governed by rainfall patterns, transitions between the dry (summer) and wet (winter) seasons play a central role in regulating ecological processes and species interactions. This study investigated how these seasonal transitions influence Zygoptera assemblages in streams of the Adolpho Ducke Forest Reserve. Using standardized sampling methods, we compared assemblages between the winter (June 2023) and summer (March 2024) seasons. A total of 295 individuals were collected, representing 20 species across 12 genera. Species richness showed little variation between summer (12 species) and winter (13 species); however, notable differences in species composition were observed between seasons. We recorded four generalist species occurring

throughout the year and five seasonal specialists, two associated with summer and three with winter. These results indicate that Amazonian seasonality promotes the reorganization of aquatic assemblages through species-specific responses to seasonal climatic variation, rather than through changes in overall species richness. Our findings emphasize the importance of incorporating seasonal dynamics into biodiversity assessments of tropical freshwater ecosystems and underscore the critical role of protected forest areas in understanding and conserving biodiversity baselines, which remain largely underexplored in tropical regions." (Authors)] Address: Gonçalves, M., Programa de Pós-graduação em Zoologia (PPGZOOL), Universidade Federal do Pará (UFPA), Belém, PA, Brasil. Email: myckey.eco@gmail.com

25604. Gonçalves, M.; Cruz da Silva, E.; Juen, L.; Brasil, L.; Hamada, N. (2025): Variação sazonal de assembleias de Zygoptera (Odonata) em riachos preservados da Amazônia Central. Anais do Curso de Entomologia na Amazônia VI: 21. (in Portuguese) [Verbatim/Google translate: Seasonality, marked by variations in precipitation and temperature, exerts a strong influence on ecological processes, especially in tropical regions such as the Amazon, where transitions between dry (summer) and rainy (winter) seasons shape the dynamics of ecosystems. This study evaluated how these seasonal variations affect Zygoptera assemblages in streams of the Adolpho Ducke Forest Reserve, in Central Amazonia. Fifteen streams were sampled during the summer (June 2023) and fifteen during the winter (March 2024), using entomological nets in 100-meter stretches, with 60 minutes of sampling effort per point. Specimens were identified and analyzed using species accumulation curves, PERMANOVA, PERMDISP, and the CLAM method. A total of 295 individuals were recorded, distributed among 20 species and 12 genera. Species richness was similar between seasons (12 in summer and 13 in winter), indicating that local diversity remains relatively stable throughout the seasonal cycle. However, community composition varied significantly between seasons (PERMANOVA, $R^2 = 0.156$; $p = 0.001$), with four species exclusive to summer and five to winter. Dispersal analysis (PERMDISP, $F = 0.316$; $p = 0.579$) did not indicate differences in community heterogeneity between periods, suggesting that spatial variability remains constant. Species classification revealed four generalists, eight rare species, and five seasonal specialists: Argia meioura and Dicterias atrosanguinea associated with summer, and Argia indicatrix, Chalcopteryx scintillans, and Phasmoneura exigua associated with winter. These results indicate that seasonality in the Amazon acts as an environmental filter that reorganizes the composition of assemblages without altering local richness. The stability in dispersal possibly reflects the resilience provided by forest preservation. This study reinforces the importance of considering seasonal variation in the assessment of biodiversity in tropical aquatic ecosystems and highlights the fundamental role of protected areas in maintaining local ecological dynamics.] Address: Juen, L., Programa de Pós-graduação em Ecologia, Univ. Federal do Pará (UFPA), Av. Perimetral, 1, Belém, Pará 66077-830, Brazil. Email: leandrojuen@ufpa.br

25605. Gonçalves Prata, E.; Seabra, L.B.; Vinicius Neres-Lima, V.; Montag, L.F.; Freitas, T.M. (2025): Diet composition and isotopic analysis unveil trophic dynamics of a fish in a controlled flood pulse area of the Amazonia. Hydrobiologia 852: 689-703. (in English) ["We assessed the impact of a modified flood pulse on the trophic ecology of Ilisha amazonica by analyzing diet and resource assimilation through stable isotope analysis ($\delta^{13}C$ and $\delta^{15}N$). Collections were conducted monthly between December 2020 and November 2021 in the Xingu River, Amazon. Stomach and muscle tissue were extracted for analysis, and both allochthonous and autochthonous resources were collected. Stomach contents of 247 specimens were analyzed and identified [inclung "Odonata" or Zygoptera in the supplementary material). The water flow regime influenced the consumption of aquatic insects, as well as the trophic niche breadth and feeding intensity of I. amazonica. Based on isotopic composition, the primary carbon sources in the species' diet originated autochthonous items, and the species exhibited a higher trophic position during the flood period. These results highlight the influence of the flood pulse, in a reduced flow environment, on the trophic dynamics of I. amazonica. Our results emphasize the importance of comprehending the interplay between consumers and resources, in areas with human influence, where impacts are practically unknown." (Authors)] Address: Gonçalves Prata, E., Laboratório de Ecologia e Conservação, Universidade Federal do Pará, Rua augusto Corrêa 01, Guamá, Belém, PA, 66075-110, Brazil

25606. Gopalakrishnan, S.; Jagatheeswari, J.; Nandhini, M. (2025): Assessing the impact of environmental factors on Andipalayam Lake's insect biodiversity. Journal of Zoological Research 1(3): 8-22. (in English) ["Andipalayam Lake, a freshwater body located in Tiruppur, Tamil Nadu, plays a significant role in sustaining the local ecosystem, particularly through its diverse insect populations. This study aims to document and analyze the insect biodiversity present in and around Andipalayam Lake, focusing on the ecological roles these species play in maintaining the lake's health. Insects are key components of aquatic ecosystems, contributing to processes such as pollination and nutrient cycling and serving as prey for higher trophic levels. Despite their ecological importance, studies on the insect biodiversity of Andipalayam Lake have been limited, prompting the need for an extensive survey. This research employed a combination of sweep nets, pitfall traps, and light traps to collect insect species over a year, covering various seasons to capture population dynamics and seasonal variations. Water quality parameters, such as temperature, pH, and dissolved oxygen, were monitored to assess their influence on insect diversity. The study identified over 38 species of insects from diverse orders, including Odonata, Diptera, Coleoptera, and Hemiptera. Seasonal variations were observed, with higher species richness during the monsoon period due to increased vegetation and moisture levels. The most abundant species were found to belong to Diptera and Coleoptera, indicating their adaptability to fluctuating water levels. Environmental factors such as pollution from nearby agricultural runoff and urban development were found to negatively affect insect diversity, with a notable decline in sensitive species during periods of increased contamination." (Authors) Taxa are treated at family level.] Address: Gopalakrishnan, S., Research Scholar in Zoology, Chikkanna Government Arts College Tiruppur, Tiruppur, Tamil Nadu 641602, India

25607. Haque, M.T.; Paul, S.; Khan, M.K. (2025): Heatwaves reduce mating frequency in an aquatic insect. Biology Open (2025) 14(8): bio062091: 5 pp. (in English)) ["Heatwaves are becoming more frequent and intense across the globe due to global warming. Heatwaves - unusual daytime and nighttime high temperatures over three consecutive days - can disrupt physiological functions of organisms, reducing fitness. Insects are stressed because of the increasing frequency and intensity of temperature extremes. While many studies have focused on insect behaviour during heatwaves in laboratory settings, the impact of natural heatwaves in the wild remains understudied. Here, we investigated the impact of natural heatwaves on mating behaviour, flight activity,

and local abundance in Xanthagrion erythroneurum. We found that damselfly mating frequency decreased, while flight number and net population abundance remained unchanged during natural heatwaves. The decreased mating frequency may suggest a sex-specific decoupling of mate-searching efforts under thermal stress. Heatwave driven disruptions in mating behaviours and the occurrence of more frequent and acute heatwaves in the future may have long-term consequences for damselfly populations. Our results provide crucial data of the behaviour of thermally sensitive insects to heatwaves, which could assist in developing effective conservation strategies for maintaining biodiversity in a warming world." (Authors)] Address: Khan, M.K., Dept of Applied Bioscience, Macquarie University, North Ryde 2109, Australia. Email: bmbkawsar@gmail.com

25608. Haque, M.T.; Paul, S.; Herberstein, M.E.; Khan, M.K. (2025): A parasitic or mutualistic conundrum: can symbiotic protists increase thermal tolerance in a semi-aquatic insect? R. Soc. Open Sci. 12: 251061. https://doi.org/10.1098/rsos.-251061: 6 pp. (in English) ["Rising temperatures and frequent heatwaves pose a major threat to ectotherms due to their reliance on environmental temperature for physiological processes. Thermal tolerance, the ability to withstand varying temperature, determines how effectively and efficiently individuals can survive under extreme conditions. Host–microbial symbiotic interactions can influence thermal tolerance in insects; however, we have limited information especially for some endosymbionts such as gregarines, a group of apicomplexan endoparasites, which are commonly found in the guts of many aquatic and terrestrial insects. Gregarines are often considered parasitic, while a few recent studies have shown beneficial effects on hosts. Here, we tested the impact of gregarines on thermal tolerance in Ischnura heterosticta. We found that damselflies naturally infected with gregarines had higher thermal tolerance than damselflies without gregarine infections. Our findings provide evidence in support of gregarines as an endosymbiont of I. heterosticta. Our study indicates that gregarine endosymbionts may assist damselfly and possibly other semi-aquatic insects to sustain extreme heat and highlights the importance of understanding host–symbiont interactions in the context of climate change and species conservation." (Authors)] Address: Md Kawsar Khan, Applied BioScience, Macquarie University, Sydney, New South Wales, Australia. Email: kawsar.khan@mq.edu.au

25609. Henkens, R.J.H.G.; Cormont, A.; van Swaay, C.; Wamelink, G.W.W. (2025): Klimaatverandering en de natuurdoelen: Uitdagingen, maar ook handvatten voor herstel. Landschap: tijdschrift voor landschapsecologie en milieukunde 42(2): 96-103. (in Dutch, with English summary) ["Climate change and the nature goals: Climate change challenges nature policy, but also offers tools for recovery: Climate change is already causing significant shifts in ecosystems, notably through changes in species composition. Long-term monitoring data from the Dutch Network for Ecological Monitoring (NEM) reveal a consistent pattern: species with a preference for warmer conditions are becoming more prevalent, while cold-adapted species are increasingly at risk. This trend is evident across several species groups, such as dragonflies, butterflies, and breeding birds, and is captured by indicators like the Community Temperature Index (CTI) and the Multi-Species Indicator (MSI). These developments have major implications for biodiversity conservation in the Netherlands. Many current conservation targets, including those defined under the Birds and Habitats Directives (VHR) and safeguarded through the Natura 2000 network, may become increasingly difficult or even impossible to achieve. Some target species may disappear due to climate-induced habitat unsuitability, while other-more heat-tolerant-species may arrive or expand. To respond effectively, climate adaptation strategies must focus on restoring ecological resilience. Key measures include enhancing habitat heterogeneity, improving landscape connectivity, and restoring natural hydrological regimes. For mobile species, functional ecological corridors are essential to enable range shifts in response to changing climatic conditions. Moreover, strategic spatial planning, including transboundary coordination, is necessary to support such adaptation efforts and safeguard biodiversity in the long term." (Authors) The study includes data from breeding birds, butterflies, moths, and dragonflies.] Address: Henkens, R., Wageningen Environmental Research, Droevendaalsesteeg 3, 6708 PB Wageningen, Netherlands. Email: rene.henkens@wur.nl

25610. Herndon, J. M. (2025): Geophysical circumstances enabling giant dragonfly flight in the Carboniferous and Permian periods. European Journal of Applied Sciences 13(5): 203-209. (in English) ["For more than a century there has been controversy as to the circumstances during the Carboniferous and Permian periods which made flight possible for giant dragonflies. Higher air density and elevated oxygen levels have been suggested, however, increased metabolic rates would lead to heat-exchange problems. Recently, Alan E. R. Cannell concluded from engineering investigations that higher air density, in the range 1.5-1.6 bar, would aid in thermal regulation, which would as well enhance flight aerodynamics. Contrary to plate tectonics, my new indivisible geoscience paradigm, Whole-Earth Decompression Dynamics, leads in a logical, causally-related manner to higher air density during the time giant dragonflies flourished. Even within the limitations of these simple calculations, the results suggest that during the Carboniferous and Permian periods only about half of the surface area comprising deep-ocean basins had opened." (Author)] Address: Herndon, J.M., Transdyne Corporation, Dewees Island, SC USA

25611. Herrera, C.; Leza, M.; Jurado-Rivera, J.A. (2025): Assessing predation pressure of Vespa velutina on local fauna through DNA metabarcoding. Journal of Zoology 326(4): 329-338. (in English) ["The invasive yellow-legged hornet (Vespa velutina nigrithorax Buysson, 1905) is a social hymenopteran native to Asia and an invasive species in Europe. This species poses a significant threat to local ecosystems and economies across Europe due to its predation on a wide range of insects, mainly honeybees. Despite its presence on the European continent for nearly 20 years, there is limited information about its trophic spectrum. This study aims to unravel the qualitative prey spectrum of V. velutina within the local entomofauna using DNA metabarcoding tools. Meconium samples were collected from yellow-legged hornet nests removed in Mallorca (Balearic Islands, Spain) and DNA barcodes were amplified and sequenced using an arthropod-specific mitochondrial cytochrome c oxidase subunit I (COI) primer set. Results showed that a fraction of the detected diet is unique to each nest and revealed a preference for Apidae, Calliphoridae, Vespidae, Muscidae, and Sarcophagidae insect prey. The study also identified the potential impacts of V. velutina on local insect populations with diverse functional roles, highlighting the ecological implications of this invasive species. The implementation of advanced molecular techniques allowed us to assess the dietary diversity of V. velutina and its potential role in shaping local entomofaunal communities. This research enhances our understanding of predator–prey interactions in invaded ecosystems and underscores the importance of DNA metabarcoding tools for studying the foraging

behavior of invasive species.... Notably, our results identify the Odonata order [Zygoptera and Gomphidae] as prey for V. velutina for the first time." (Authors)] Address: Leza, Mar, Department of Biology (Zoology), University of the Balearic Islands, Ctra. Valldemossa km 7.5, Palma, Balearic Islands, Spain. Email: mar.leza@uib.es

25612. Herrero Herán, J.; Sanchis Carles, M.J.; Evangelio Pinach, J.M. (2025): Nuevos registros de libélulas (Insecta: Odonata) y aproximación al listado odonatológico del paisaje protegido de la Serra del Maigmó y Serra del Sit (Alacant, sureste de España). Nemus 15: 297-307. (in Spanish, with English summary) ["New records of dragonflies (Insecta: Odonata) and approximation to the odontological list of the Protected Landscape of the Serra del Maigmó and Serra del Sit (Alacant, southeastern Spain) - This work presents the first study on Odonata from the Protected Landscape of Serra del Maigmó and Serra del Sit, along five localities near its perimeter (Alicante, southeastern Spain), based on records collected from August 5, 2012 to August 6, 2024. Likewise, the provisional Odonata list of the Protected Landscape is prepared, which currently amounts to 24 species. Among the most interesting, due to their scarcity in the province of Alicante, are Coenagrion mercuriale, C. caerulescens, Lestes virens or Libellula depressa." (Authors)] Address: Herrero Herán, J., Partida Las Tiesas, 266, 03400, Villena, Alacant, Spain. Email: gorkaupa@gmail.com

25613. Hou, D.; Gu, T.; Tan, B.; Zhong, Z. (2025): Bioinspired aerodynamic enhancements: Optimizing cambered airfoils through dragonfly wing corrugations and resilin. Engineering Research Express 7(4): (in English) ["The dynamic camber formation based on corrugation-resilin interactions at vein joints in dragonfly wing [Pantala flavescens] is proposed and the mechanism in optimizing aerodynamic performance via cross-sectional morphing is investigated. The results demonstrate that airfoils with dynamic camber can enhance both the aerodynamic forces and thrust efficiency compared to rigid ones, under a certain phase difference of 240°-270° relative to the flapping motion. Their deformation patterns throughout one flapping cycle closely align with those observed in insects. Further analysis on camber positions reveals that leading-edge camber (around 20% chord) boosts lift by up to 84%, while trailing-edge camber (around 60%-80% chord) enhances thrust by up to 107%. It is concluded that camber deformation enabled by corrugation and resilin-bearing vein joints is an adaptive optimization for aerodynamics in dragonflies. The findings provide valuable insights for the Flapping-wing Micro Air Vehicle (FMAV), particularly those featuring actively deformable airfoils." (Authors)] Address: Hou, D., Dept of Mechanical Engineering, Shanghai Maritime Univ., Shanghai 201306, P.R. China. Email: dhou@shmtu.edu.cn

25614. Hrivnak Lehká, Z.; Ujcik, M.; Petrovicova, K.; Landgraf, V. (2025): Dragonflies (Odonata) at selected sites in the Podunajská nížina lowland. Entomofauna carpathica 37(2): 153-164. (in Slovak, with English summary) ["The structure of dragonfly communities was investigated at 15 locations in the Podunajská nížina lowland (SW Slovakia). Adult dragonflies and exuviae were sampled from June to July 2024 and from May to September 2025. A total of 850 individuals belonging to 24 species were recorded (15 species of Anisoptera and 9 species of Zygoptera). Eudominant species were Ischnura elegans, Chalcolestes viridis/parvidens, and Platycnemis pennipes. Vulnerable species were represented by Brachytron pratense and Anax parthenope. The highest dragonfly diversity was recorded at the Žitavský luh wetland and the lowest at the Parížske mociare wetland. Among all studied locations, Stará Nitra near the Apálsky ostrov island reserve and the floodplain meadow near the Alúvium Žitavy wetland reserve harbored the dragonfly communities with the highest equitability. The dragonfly community at the Parížske mociare wetland exhibited the lowest equitability. The results of the study suggest the great importance of the wetlands situated at the Podunajská nížina lowland for the conservation of dragonfly communities." (Authors)] Address: Hrivnak Lehká, Zuzana, Univerzita Konštantína Filozofa v Nitre, Fakulta prírodných vied a informatiky, Katedra zoológie a antropológie, Trieda Andreja Hlinku 1, 949 01 Nitra, Slovakia. Email: lehkazuzana00@gmail.com

25615. Izzat-Husna, M.; Ahmad, A.A. (2025): Odonata (Class Insecta) of Sungkai Wildlife Reserve, Perak, Malaysia. Journal of Wildlife and Parks, 29: 23-30. (in English) ["Protected areas need to be continuously monitored for their flora and fauna for the ecosystem management and conservation purposes. Odonata is a good bio-indicator for habitat monitoring; they are ecologically conspicuous and sensitive to environmental changes. A two-day survey was done at Sungkai Wildlife Reserve (SWR), Perak in June 2014 to record the odonate diversity of the areas. 21 species from seven families were collected, namely Libellulidae with seven species, Protoneuridae and Chlorocyphidae (four species each), Calopterygidae and Euphaeidae (two species each), and Platycnemididae and Coenagrionidae with a single species respectively. Despite the short collection period, this area showed a rich odonate fauna but further survey is needed to obtain a complete picture. The results formed the first checklist of odonate fauna here and may serve as baseline information for future research towards habitat monitoring, conservation and management of SWR." (Authors)] Address: Ahmad, A., School of Marine & Environmental Sciences, Universiti Malaysia Terengganu, 21030 Kuala Terengganu, Terengganu, Malaysia. Email: amirrudin@umt.edu.my

25616. Juen, J.; Sala Michelan, T.; Akama, A.; Biondi Fares, A.L.; Andrade, A.L.; Cunha, E.J.; Geraldo de Carvalho, F.; Salvador, G.; Brasil, L.; Calvão, L.; Amado, L.L.; Barreira Mendonça, M.; Louback-Franco, N.; Ligeiro, R.; Pereira Mendes, T.; Begot, T.O.; Montag, L.; Fernandes Carrijo, T.F. (2025): Capítulo 4: O Componente Aquático. In: Floresta amazônica: biodiversidade e restauração florestal em Paragominas. Publisher: Liquida BRC: 76-99. (in Portuguese) ["The Aquatic Component of the Amazon: Far Beyond the Great Rivers The Amazon harbors the largest network of freshwater systems on the planet, but its aquatic biodiversity extends far beyond its major rivers. In this chapter, we explore the central role of Amazonian igarapés, small watercourses that represent approximately 90% of the linear extent of the basin and support one of the greatest biological diversities in the world. We present an integrated view of water quality, physical habitat, and aquatic biodiversity, showing how hydrological, physicochemical factors, and the integrity of riparian vegetation shape the structure and functioning of these ecosystems. The chapter gathers evidence of how changes in land use, such as deforestation, agriculture, and mining, affect fundamental ecological processes, from energy flow to the composition of biological communities. This text addresses, in a didactic and applied manner, the main aquatic groups of the region, including aquatic macrophytes, macroinvertebrates (with emphasis on aquatic insects that are bioindicators of the orders Ephemeroptera, Plecoptera, Trichoptera, Odonata, and Heteroptera), and fish, highlighting their ecological functions, trophic interactions, and sensitivity to environmental changes. The text also discusses the use of environmental integrity indices and biomonitoring strategies,

connecting science, environmental management, and conservation. By integrating ecological data, examples from Eastern Amazonia, and an accessible approach, this chapter demonstrates why the conservation of streams is essential for regional biodiversity, but also for water quality, climate stability, and human well-being. Essential reading for researchers, students, environmental managers, and all those interested in understanding the complex web of life that sustains Amazonian aquatic ecosystems." (Authors) The paper includes many references to Odonata.] Address: Juen, L., Programa de Pós-graduação em Ecologia, Universidade Federal do Pará (UFPA), Av. Perimetral, 1, Belém, Pará 66077-830, Brazil. Email: leandrojuen@ufpa.br

25617. Kehar, G.R.; Shaikh, A.M.; Panhwar, W.A.; Solangi, N.; Kehar, N.A.; Soomro, F.; Lashari, S.A.; Hussain, S.F.; Wassan, S.A. (2025): A comprehensive assessment of the species diversity and ecological distribution of the dragonfly family Libellulidae in Taluka Garhi Khairo, District Jacobabad, Sindh, Pakistan. Pure and Applied Biology 14(3): 980-990. (in English) ["The family Libellulidae is a large and diverse family of dragonflies, its members are commonly known as chasers, darters, skimmers. or perchers. Within the order Odonata, this dragonfly family is the most well-known and extensively dispersed. with more than 900 species found all over the world. Dragonflies are found mostly in temperate, tropical, and subtropical regions. Strong and nimble, the Libellulidae family of dragonflies can perform intricate and quick flight maneuvers. They frequently patrol their territory over bodies of water or perch on plants. They are usually found close to bodies of still or slowly flowing water, like lakes, ponds, marshes, and slow-moving rivers. When they reach adulthood, they become predators and eat mostly small flying insects like flies, aphids, grasshoppers, and mosquitoes as well as other small invertebrates. Although their sizes vary. most species fall between 2 and 5 centimeters (cm) in length. Many species exhibit striking colors, with males often displaying more intense colors than females. Colors can vary from red and yellow to blue and green. Libellulidae are important predators and prey in their environments. This research has been carried out to investigate and record the diversity of Libellulidae dragonflies in Taluka Garhi Kliairo where the available data is little. Field surveys were conducted in 2021 across various sites within the study area to collect samples. A total of 320 specimens from the Family Libellulidae were collected, representing approximately 8 species and 4 genera. The identified species included Orthetrum cancellatum, O. chrysis, O. sabina, O. pruinosum neglectum, Pantala flavescens, Acisoma panorpoides, Crocothemis nigrifrons and C. servilia. Dragonflies are extremely agile fliers who play an important role in environments, notably as natural biological control agents by feeding on nuisance insects. The findings offer societies and scientific communities a better comprehension of the ecological significance of the dragonflies as natural regulators of pests and bioindicators of fresh waters of a healthy environment, which is useful to integrated pest management, biodiversity Conservation, and environmental monitoring. According to the findings of this study, Garhi Khairo sustains a diversified and abundant population of dragonflies. The study offers a baseline to future ecological, biodiversity and Conservation studies in the region." (Authors)] Address: Hussain, S.F., Inst. of Microbiology, Shah Abdul Latif Univ., Khairpur Mir's. Sindh, Pakistan. Email: fiaz.shah@salu.edu.pk

25618. Kheam, S.; Neav, S.; Sue, S.; Son, C.; Tat, D.; Uk, O.; Phauk, S. (2025): Insect diversity in Cambodian stamps: a philatelic and historical perspective. International Journal of Tropical Insect Science 45: 2671-2679. (in German) ["Art serves as a powerful medium in biodiversity conservation by integrating scientific knowledge with cultural expression and public engagement. Postage stamps, as a visual and widely accessible form of communication, offer a unique platform to highlight insect diversity and promote conservation awareness. This study systematically examines the diversity, publication trends, and accuracy of insect-themed postage stamps issued in Cambodia between 1969 and 2024. A total of 316 insect-themed stamps were documented from four major philatelic sources including Colnect, Stampworld, Masakazu, and Patrice, featuring 119 species across 94 genera, 25 families, and 7 insect orders. The majority of depictions belonged to Lepidoptera (52.8%) and Coleoptera (41.5%), with Coccinella septempunctata being the most frequently featured species (7.3%). However, only 27 species (22.7%) had confirmed records in Cambodia, indicating that most featured insects are non-native. Stamp issuance was minimal prior to 1980 and entirely absent during the conflict-ridden 1970s, but increased markedly during the Vietnamese administration (1979–1992), peaking in the 1990s. Several taxonomic inaccuracies were observed, including misspelled scientific names and incorrect classifications. These findings underscore the role of insectthemed stamps as reflections of national identity, cultural heritage, and biodiversity representation. It also highlights the importance of accurate taxonomic representation to enhance their educational and conservation value." (Authors) Two Odonata stamps figure Aeshna sp. and Calopteryx splendens.] Address: Kheam, S., Dept Biology, Fac. Science, Royal Uni. of Phnom Penh, Phnom Penh, Cambodia. Email: kheam.sokha@rupp.edu.kh

25619. Kiran, P.; Ajith, V.; Raj, D. (2025): Diversity of Odonata in Baby John Memorial Government College Campus Chavara Kollam, Kerala: A preliminary assessment and conservation implications. Eco. Env. & Cons. 31(4): 1720-1725. (in English) ["This study aimed to record and analyze the diversity of odonates in the BJM College campus, a 14-hectare area located in Chavara, Kollam, India. The research was conducted in the area where individual sightings were recognized and documented using suitable field guides. 18 odonate species were recorded in the study area, comprising 10 dragonflies and 8 damselflies from 3 families. Amid this diversity, a greater number of families Libellulidae and Coenagrionidae were observed in the orders Anisoptera and Zygoptera, respectively. The species richness (R), Shannon-Wiener diversity (H'), evenness (E), and Simpson's diversity (1/D) values calculated were 3.34, 2.48, 0.98, and 10.90 respectively, while the two groups exhibit vertical niche segregation. The baseline data presented here serve as the foundation for evidence-based conservation suggestions." (Authors)] Address: Raj, D., Department of Zoology, S.N. College, Kollam Kerala India. Email: dhanuraj6@gmail.com

25620. Kosterin, O.E.; Vshivtseva, E.I.; Blinov, A.G. (2025): What was known as Rhyothemis variegata (Linnaeus, 1763) and R. phyllis (Sulzer, 1776) (Odonata, Libellulidae) are the same species. Zootaxa 5725(4): 567-582. (in English) ["Rhyothemis variegata (Linnaeus, 1763) and R. phyllis (Sulzer, 1776) are conspicuous, widespread and well-known species described in 18th century, the former by Linnaeus himself. They are considered broadly co-occurring in south-east Asia, with the former extending to the Indian subcontinent and the latter to Sundaland and Oceania. They are assumed to strongly differ in wing coloration, however this concerns females only, while the differences in males were characterised by Ris (1913) and Fraser (1936) as subtle. This circumstance is scarcely known to people interested in dragonflies, so that many of them got an impression that in the regions where both species co-

occur, R. variegata is represented by females only. No structural difference between these two species has ever been reported. Fifteen years ago the first author supposed that the dragonflies associated with these two species names in fact represent the same biological species. Here, this statement is proved by sequencing two molecular markers, the mitochondrial COI gene fragment and the nuclear histone H3–H4 region, from eight females collected in the same swarm in Cambodia and classified to four distinct phenotypes, of which one formally corresponds to R. phyllis and three to R. variegata. The sequences were nearly identical: only three positions in COI and four (one with a two nucleotide indel) in the histone H3–H4 region (ca 0.5% of positions in both cases) were variable, without correspondence to phenotypes. Two specimens of R. variegata from Western Ghats of India shared the same haplotypes. Analysis of the COI sequences from GenBank proved the same near identity and the lack of correspondence to identifications as R. phyllis or R. variegata. Based on this, R. phyllis is claimed to be a junior subjective synonym of R. variegata. The nominotypical subspecies of the former is re-attributed to the latter as Rhyothemis variegata phyllis comb. nov., while validity of other subspecies earlier proposed under R. phyllis is left for further studies." (Authors)] Address: Kosterin, O.E, Institute of Cytology & Genetics SB RAS, Acad. Lavrentyev ave. 10, Novosibirsk, 630090, Russia; Novosibirsk State University, Pirogova str. 2, Novosibirsk, 630090, Russia

25621. Kota, T.; Nagayama, S.; Nishihiro, J.; Nakamura, K.; Kayaba, Y. (2025): Complementary functions of created wetlands along river channels and rice paddies in floodplain biodiversity conservation. Nature-Based Solutions 6, 100190: 13 pp. (in English) ["The creation of wetlands along river channels, or inter-levee floodplain wetlands (ILWs), increases the cross-sectional area of rivers for flood control and is an effective nature-based solution (NbS) that is expected to achieve both flood control and biodiversity conservation in floodplains in riverine areas in Japan. To clarify the differences in habitat functions between ILWs and rice paddy fields, we surveyed the species assemblage and habitat usage of aquatic animal assemblages in ILWs and nearby rice paddies in the Nobi Plain of central Japan. Rana japonica bred in the ILWs, and taxon numbers of Odonata larvae and aquatic Hemiptera were greater in ILWs than in rice paddies. Fish taxa were also more abundant in the ILWs. ILWs were characterized mainly by taxa with a preference for permanent water bodies in their life history, whereas Dryophytes japonicus, Pelophylax porosus brevipodus, and Fejervarya kawamurai inhabited and bred mainly in the rice paddies, and the number of taxa of aquatic Coleoptera was also higher. The assemblages in the rice paddies were characterized by pioneer taxa with a preference for temporary waters as their primary breeding sites. Our results show that the creation of ILWs for flood control and the maintenance of rice paddies could help to conserve the original floodplain biodiversity through the complementarity of these different wetland types." (Authors) The following odonate taxa are listed: Lestes sp., Calopteryginae sp., Pseudocopera annulata, Paracercion calamorum calamorum, Ischnura sp., Aeschnophlebia anisoptera, Sieboldius albardae, Davidius nanus, Anisogomphus maacki, Asiagomphus melaenops, Sympetrum risi risi, Pseudothemis zonata, Deielia phaon, Orthetrum albistylum speciosum, and Orthetrum sp. (early instar).] Address: Kota, T., Water Environment Research Group, Public Works, Research Institute, 1-6 Minamihara, Tsukuba, Ibaraki 305-8516, Japan. Email: tawa.kota@nies.go.jp

25622. Kulijer, D.; Kogovšek, P.; Tivadar, N. (2025): The spread of Trithemis annulata (Palisot de Beauvois, 1807) (Odonata: Libellulidae) in the western part of the Balkan Peninsula. Natura Croatica 34(2): 337-348. (in English, with Croatian summary) ["T. annulata is a widespread Afrotropical species that substantially expanded its range in Mediterranean Europe in the second part of 20th century and most recently in the West Balkan region. A field study was carried out from June to September 2024 in the southern parts of Bosnia and Herzegovina and the Neretva River delta in Croatia in order to investigate the species presence in this area. During the survey, T. annulata was found at 14 locations, seven in each country. The observations from Bosnia and Herzegovina represent the first record of this species for the country. It was found in a wide variety of habitats, both lentic and lotic, including lakes, reservoirs, rivers, larger ponds and canals. Considering that at several of these locations, the species was not found during surveys in 2022 and 2023, it most likely spread to this area recently. Additionally, two observations of T. annulata from North Macedonia that were found in the online databases Observation and iNaturalist represent the first documented reports for this country. These findings represent a substantial increase in species range and abundance in the region. The species' distribution and spread in the Balkan Peninsula is also outlined and discussed." (Authors)] Address: Kulijer, D., National Museum of Bosnia and Herzegovina, Zmaja od Bosne 3, 71000 Sarajevo, Bosnia and Herzegovina. Email: dejan.kulijer@gmail.com

25623. Lebedeva, A.A.; Voronin, M.Yu.; Tkacheva, A.A. (2025): Species composition of macrozoobenthos of water bodies of the Khvalynsky National Park (Saratov Region, Russia). Prirodnye sistemy i resursy [Natural Systems and Resources] 15(1): 36-45. (in Russian, With English summary) [In 2021–2022, a benthic survey was conducted in eight small water bodies within the protected and recreational zones of the Khvalynsky National Park (Saratov region): the Blagodatny spring, a pond near the Solnechnaya Polyana tourist complex, Losinoye Lake, the Bely Klyuch pond, the Yeleshnikovsky pond, a small temporary water body, the Balalayka pond, and the Steklyashka pond. A total of 76 hydrobiont taxa were recorded. The list of species includes Aeshna juncea, Calopteryx virgo, Ischnura pumilio. Libellula quadrimaculata, Platycnemis pennipes, and Sympetrum flaveolum.] Address: Voronin, M.Yu., N.G. Chernyshevsky Saratov National Research State University, Saratov, Russian Federation

25624. Leku, T.L. (2025): Evaluation of chemical water quality and macroinvertebrates biodiversity in the Obili aquaculture unit –Yaounde (Cameroon). Universal Journal of Life and Environmental Sciences 7: 68-93. (in English, with French summary) ["The study evaluated water quality and macroinvertebrate biodiversity in four (04) fish ponds at the Obili Aquaculture Unit, Centre Region of Cameroon, from June 2022 to November 2022. Monthly sampling was carried out, measuring physico-chemical parameters according to Rodier's guidelines and collecting benthic macroinvertebrates using a multihabitat approach. Results indicated poorly oxygenated, slightly acidic water conditions, which are unfavorable for aquatic species production, along with low levels of organic pollution indicators such as nitrates, orthophosphates, and nitrites. A total of 532 macroinvertebrates were identified, spanning two phyla, two classes, six orders, and ten families. Insects dominated the community, comprising 51.7% relative abundance across four orders and eight families, followed by Gastropoda, which accounted for 48.3% relative abundance across two orders and two families. Spatial-temporal analysis revealed the presence of pollution-tolerant taxa, including Lestidae, Thiaridae, and Lymnaeidae, indicating

excessive organic pollution. Diversity indices (Shannon-Weaver and Pielou's equitability) reflected low taxa diversity, caused by unfavorable conditions for pollution-sensitive species. Hilsenhoff's Biotic Index confirmed significant organic pollution across all ponds. The Global Biotic Numeric Index (GBNI) indicated poor water quality in the fish ponds, while Sörensen's similarity coefficient (>50%) showed high similarity among ponds. Finally, the study suggests promoting macroinvertebrate cultivation as a viable alternative to fishmeal in aquaculture feed." (Authors)] Address: Email: tangemlucasleku@gmail.com

25625. Li, K.; Chen, H.; Sun, R.; Qi, X.; Li, X.; Li, J.; Jin, S.; Xiao, H. (2025): Odonata wing-inspired multifunctional wood adhesives: Synergistic integration of high-strength bonding, flame retardancy, and mold resistance. Colloids and Surfaces A: Physicochemical and Engineering Aspects 724, 137503: (in English) ["Sustainable biomass adhesives are an ideal alternative to traditional non-renewable and environmentally unfriendly formaldehyde-based adhesives. However, insufficient mechanical properties and anti-mold activity severely limit their practical application in complex environments. Inspired by the microstructural features of dragonfly wing, a high-strength and mildew resistant soy protein (SP)-based adhesive is developed. Specifically, the surface of boron nitride (BN) nanosheets were functionalized by 3-aminophenylboronic acid (AB) and polyphenolic gallic acid (GA) to improve the dispersibility and interfacial interactions in the SP matrix. The engineered AB@GA-BN nanohybrids serve as rigid nervure structures to promote stress transfer and delay crack propagation. Additionally, the incorporation of zinc ions into the SP matrix not only further enhanced the cohesion of the adhesive through metal coordination and electrostatic interactions, but also imparted the desired anti-mildew activity. As a result, the wet adhesive strength of the resultant composites reaches 1.17MPa, which is considerably increased by 108.9% compared with the unmodified sample. The prepared adhesive exhibits comprehensively enhanced thermal stability, flame retardancy, and mold resistance. This work provides a bionic design strategy for developing high-performance bio-based materials in the fields of multifunctional hydrogels, composite films, and adhesives." (Authors)] Address: Jin, S., Co-Innovation Center of Efficient Processing and Utilization of Forest Resources and International Innovation Center for Forest Chemicals and Materials, Nanjing Forestry University, Nanjing 210037, China. Email: jinsc@njfu.edu.cn

25626. Liu, Z.; Zhang, H.; Zhou, T.; Tan, Y.; Han, B. (2025): A dataset on the checklist and geographical distributions of Odonata from Guangdong, China. Biodiversity Science 33(10): 25348: 6 pp. (in Chinese, with English summary) ["Odonata, one of the most ancient lineages of aquatic insects, is highly sensitive to environmental change and serves as a crucial link between aquatic and terrestrial ecosystems. As such, it plays an important role in biodiversity research and ecological monitoring and is widely recognized as a key indicator group for assessing ecosystem health and guiding conservation efforts. Guangdong Province is one of China's biodiversity hotspots for Odonata. However, systematic surveys of the region's Odonata diversity remain limited, largely because comprehensive species distribution data are lacking, which hinders effective conservation planning. To address this gap, we compiled a comprehensive checklist and geographic distribution dataset of Odonata for Guangdong Province, based on long-term field surveys, literature review, and multi-source database integration. The dataset covers records from 1980 to 2024 and documents 261 species across 115 genera and 19 families, including 180 Anisoptera and 81 Zygoptera species. At the family level, Libellulidae (24.14%), Gomphidae (19.54%), Aeshnidae (13.03%), Coenagrionidae (8.81%) and Macromiidae (5.75%) were the most species-rich. The dataset integrates IUCN Red List status information for 149 Odonata species, with Endangered (EN), Vulnerable (VU), and Near Threatened (NT) species accounting for 2.01%, 5.37%, and 2.68% respectively. With its high spatial resolution, this dataset enables identification of insect diversity hotspots and provides a foundation for long-term monitoring and conservation assessment. The accompanying species checklist constitutes a key resource for characterizing the biogeographic structure of insect assemblages in South China and for providing baseline information to guide the establishment of Nanling National Park." (Authors)] Address: Han Boping: Email: tbphan@126.com

25627. Lohr, M. (2025): Bestimmungsschlüssel für die Exuvien der Libellen Deutschlands (Odonata). Libellula Supplement 18: 1-96. (in German, with English summary) ["Determination key of German damselfly and dragonfly exuviae (Odonata) – An identification key for the exuviae and final-instar larvae of all 82 Odonata species recorded in Germany to date is presented. The introduction describes methods and search strategies for collecting exuviae, presents phenological aspects being important for exuviae surveys, and introduces methods for recording exuviae. Information is given on the storage, transport and shipping of exuviae and the preservation of larvae. Materials and procedures for the preparation and identification of exuviae and larvae are described. The terminology used in the key to describe the morphological features of exuviae and larvae is given by presenting figures and a glossary. In the main section the determination key for exuviae of all 82 Odonata species recorded in Germany is presented. The breakdown is done down to the species level, except for the following species and species pairs, as no reliable distinctive features are known for them so far: Coenagrion puella/C. pulchellum and Sympecma fusca/S. paedisca, as well as Sympetrum meridionale, whose distinguishing features from S. sanguineum and S. striolatum are not yet sufficiently known. The key baises on the currently known and published distinctive features for exuviae and final-instar larvae, focusing on differentiation characteristics that have proven to be robust and reliable and are also easily recognisable for beginners in exuviae identification." (Author)] Address: Lohr, M., FH Lippe und Höxter, Fachgebiet Tierökologie und Landschaftsökologie, An der Wilhelmshöhe 44, D-37671 Höxter, Germany. E-mail: mlohr@fh-luh.de

25628. Lubembe, S.I.; Walumona, J.R.; Hyangya, B.L.; Kulimushi, J.-D.L.; Shamamba, G.A.; Hounsounou, B.H.R.; Maluzi, I.; Ngayirwa, S. (2025): Effects of Nile Tilapia fish cage farming on macroinvertebrate communities in Lake Kivu, Democratic Republic of the Congo. Hydrobiology 110(2): 117-134. (in English) ["This study analysed how macroinvertebrate communities in Lake Kivu responded to Nile tilapia cage farming. Macroinvertebrates were collected at two sampling stations impacted by fish farms and a control station without fish farming, and physicochemical variables were measured in situ. Water samples were analysed in the laboratory for nutrients and chlorophyll-a. Only turbidity, water transparency, dissolved oxygen, and phosphate significantly differed between the three stations. Three macroinvertebrate phyla (Arthropoda, Mollusca, and Annelida), nine orders (Gastropoda, Diptera, Decapoda, Annelida, Odonata, Ephemeroptera, Coleoptera, Heteroptera, and Hemiptera), and 37 families were identified. Three groups, Diptera, Gastropoda, and Odonata, were abundant and dominated both cage and control stations. Predators, collector-gatherers, and scavengers were more

dominant than scrapers and shredders. The composition of macroinvertebrate communities significantly differed between the three stations, but not between the fish cage and control stations. Moreover, there were no significant seasonal differences in community composition. Accordingly, cage farming does not yet seem to pose a threat to Lake Kivu's ecological condition. Nonetheless, we recommend frequent monitoring of water and sediment quality to detect early signals and avoid fish farms impacting the ecosystem health of the lake." (Authors)] Address: Lubembe, Sharon Indasi, Département de Biologie, Section: Hydrobiologie, Université Officielle de Bukavu, Bukavu, Democratic Republic of the Congo. Email: shalubembe97@gmail.com

25629. Mátl, M. (2025): Third known locality of Nehalennia speciosa (Odonata) in the Czech Republic discovered at a revitalized peat bog in the Bohemian Forest. Silva Gabreta 31: 59-66. (in English) ["In 2024, the third known locality of the Critically Endangered (CR) damselfly N. speciosa in the Czech Republic was discovered. The species was recorded at the revitalized post-excavation Soumarský Most peat bog, marking its first documented occurrence in the Bohemian Forest National Park. During two field visits, a total of 11 imagines were observed, indicating potential establishment. This finding significantly expands the known distribution of N. speciosa in the Czech Republic and highlights the importance of revitalized post-excavation peat bogs as habitats for biodiversity conservation. Conservation and further research on the population, such as mark–recapture studies, are recommended." (Author)] Address: Mátl, M., Agronomická fakulta, Mendelova univerzita v Brne, Zemedelská 1665/1, 61300 Brno, Czech Republic. Email: matyasmatl@seznam.cz

25630. Mauser, K.M.; Paudel, S.; Sigmund, O.; Entling, M.H.; Ott, J.; Brühl, C.A. (2025): Effects of chemical and hydrological stress on the wing morphology of a damselfly. Environmental Entomology 54(6): 1335-1347. (in English) ["Odonata are exposed to various anthropogenic stressors in the aquatic-terrestrial ecosystem, which can affect their development and fitness. The symmetry of their wings, shaped during the aquatic larval stage, can serve as an indicator of environmental stress during development. Recent advances in computer-vision now provide the opportunity to standardize and enhance the precision of 2D assessments of entire wings, including many structural parameters, enabling a more reliable comparison of the effects of multiple anthropogenic stressors. We investigated the effect of 3 anthropogenic stressors on the fluctuating wing asymmetry of Coenagrion puella: (i) Exposure to the agricultural insecticide chlorantraniliprole in a climate chamber experiment, (ii) alteration of the aquatic community with the mosquito control agent Bti (Bacillus thuringiensis israelensis), and (iii) altered hydrological regimes, both of which were applied in a floodplain mesocosm experiment in a full 2-factorial design. We found changes in wing size and several asymmetry parameters in response to the insecticide and altered hydrological regimes, whereas Bti treatment increased the number of cells in front wings. Our results show that damselflies' wing morphology and symmetry can be affected by anthropogenically induced stress in aquatic ecosystems. The intensity of stressor effects varied across treatments, with altered hydrology causing the strongest changes in wing size and asymmetry." (Authors)] Address: Mauser, K.M., iES Landau, Institute for Environmental Sciences, University of Kaiserslautern-Landau, Fortstr. 7, 76829 Landau, Germany. Email: ken.mauser@rptu.de

25631. Merino-Sainz, I.; Albero, R.M.; Trapero-Quintana, A.D. (2025): Primer registro de depredación de un opilión (Phalangium opilio) sobre un odonato (Orthetrum cancellatum) en el sureste de la península ibérica. Revista Ibérica de Aracnología 47: 182-184. (in Spanish, with English summary) ["We report, for the first time, a case of predation by a female Phalangium opilio Linnaeus, 1758 (Arachnida, Opiliones, Phalangidae) on an emerging Orthetrum cancellatum, observed in an irrigation pond in Villena, Alicante (Spain) [between 7:15 and 8:00 AM on June 12, 2009]. This observation expands the known trophic spectrum of the group, as until now there were no records of harvestmen feeding on odonates. Furthermore, it highlights the remarkable diversity of both prey and feeding strategies within the group, reporting the first documented case of P. opilio predation in the Iberian Peninsula." (Authors)] Address: Merino-Sainz, I., Bº Robasil, 39479-Vioño de Piélagos (Cantabria); Spain Email: izaskunmerino82@gmail.com

25632. Mogali, S.M.; Shanbhag, B.A.; Saidapur, S.K. (2025): Microhyla ornata tadpoles consider active and chase predators (Hoplobatrachus tigerinus tadpoles) as more dangerous than sit-and-wait predators (larvae of Pantala flavescens): an empirical study. Acta zoologica bulgarica 77(4): 495-502. (in English) ["The behavioral responses of Microhyla ornata tadpoles to chemical cues of co-existing sit-and-wait (Pantala flavescens larvae) and active chasing (Hoplobatrachus tigerinus carnivorous tadpoles) predators were studied in the laboratory. The predator's kairomones (water conditioned by a starved predator) and kairomones combined with diet-derived metabolites (excreta containing chemical cues from conspecific prey consumption) were used to simulate predation threat. M. ornata tadpoles did not exhibit behavioural responses to kairomones from the sit-and-wait predator, P. flavescens. However, when exposed to excreta from P. flavescens that had consumed conspecific prey, tadpoles reduced swimming movements and time spent swimming while increasing burst numbers and speed. Interestingly, tadpoles exhibited a similar but stronger response, reduced swimming activity and increased burst speed, to both kairomones and dietary cues from the active-chasing predator, H. tigerinus. These results indicate that M. ornata tadpoles perceive H. tigerinus as a greater predation threat than P. flavescens, likely due to hunting strategy. This study, highlights how tadpoles can differentiate between predator types and adjust their defense behaviors accordingly." (Authors)] Address: Mogali, S.M., Dept Zoology, Karnatak University. Dharwad-580 003, Karnataka State, India. E-mail: santoshmogali@rediffmail.com

25633. Moulin, N.; Deknuydt, F.; Dumbardon-Martial, E.; Dusoulier, F.; Lemaire, J.-M.; Ramage, T.; Touroult, J. (2025): Inventaire entomologique de la canopée et du sous-bois de deux forêts hygrophiles sur Basse Terre. Maître d'ouvrage: Pret de la Région Guadeloupe. Direction de l'Environnement, de l'Aménagement et du Logement: 57 pp. (in French) ["The entomofauna of two hygrophilous forest sectors in Basse-Terre (Guadeloupe) was inventoried in March 2024: Morne Mazeau (Deshaies/Sainte-Rose) in the north, and Chutes Moreau (Goyave) in the south. The sampling system is similar to that implemented during a recent study on the northern and northeastern slopes of Mount Pelée in Martinique in 2022 (light traps, aerial interception traps, Malaises, and active search), over a single season (the end of Lent) and primarily targeted the canopy level. In total, the dataset includes 653 observations made during 39 collection events, and 285 arthropod taxa (insects and arachnids, at the taxonomic level of the species or morphospecies) were determined by a group of approximately ten specialists. The entomological survey corresponds in part to that expected in hygrophilous forest areas. The richness of endemic species

is lower than in other comparable studies in Guadeloupe or Martinique. We identified five key ZNIEFF species at Morne Mazeau and only one at Moreau Falls. However, unprecedented observations of insects were made in the canopy, such as an individual of Chloronia antilliensis and a young Paraprisopus antillarum at the top of a tree at Morne Mazeau, the whitish morph of the Cocytius antaeus hawkmoth, and young Thesprotiella insularis at 27 m above sea level at Moreau Falls. This study, based on canopy access using the L'Epiphyte platform, had never been conducted before in Guadeloupe. It represents an initial assessment for future canopy surveys in this area. The distributions of many species could then be updated as part of improving their knowledge. The determinations made for this study will complement the taxonomic reference system for insects in Guadeloupe (TAXREF) of several species known from other islands or the American continent, and not yet reported from Guadeloupe." (Authors/Google translate) The study includes a record of Triacanthagyna caribbea.] Address: https://www.researchgate.net/publication/39538098-2_Inventaire_entomologique_de_la_canopee_et_du_sous-boi s_de_deux_forets_hygrophiles_de_Basse-Terre_Guadeloupe

25634. Munoz, L.D.T. (2025): Diversidad de macroinvertebrados acuáticos y parámetros físicos y químicos en ecosistemas páramolénticos, caso de Laguna Sánchez y Siete Lagunas, Cauca, Colombia. PhD thesis, Trabajo de investigación presentado para el cumplimiento parcial de los requisitos del título de ecólogo, Faculty of Sciences, University of Popayán: 43 pp. (in Spanish, with English summary) ["The diversity of aquatic macroinvertebrates was characterized in Laguna Sánchez, located within the Puracé National Natural Park, and Siete Lagunas, in the northern influence zone of this protected area. Both sites are situated in páramo ecosystems in the department of Cauca, southwestern Colombia. This analysis allowed for the evaluation of the macroinvertebrate community and its relationship with the ecological conditions of the water, providing key information for the conservation and management of these ecosystems, benefiting environmental entities, researchers, and local communities. Sampling was conducted in May and July 2024, evaluating physicochemical parameters and the taxonomic composition of these lentic ecosystems. A total of 716 individuals were identified, distributed across 20 genera, with a predominance of Macropelopini, Pentyaneura, and Harnischia (Chironomidae, Diptera), Aeshna, Probezzia sp1 (Ceratopogonidae, Diptera), Helobdella (Glossiphoniidae, Hirudinea), Tubifex (Tibificidae, Oligochaeta), and Callibaetis (Baetidae, Ephemeroptera), collectively representing 94% of the total abundance. Ecological indices indicated higher diversity and evenness in Laguna Sánchez, associated with its habitat heterogeneity, whereas Siete Lagunas exhibited communities dominated by species adapted to homogeneous environments with higher organic loads. Most of the studied physicochemical parameter values were characteristic of oligotrophic, high-altitude ecosystems. However, temperature, oxygen saturation, and phosphate levels reflected conditions typical of eutrophic ecosystems. The results highlight the relevance of macroinvertebrates and physicochemical parameters as bioindicators, emphasizing the importance of conserving these vulnerable habitats in the face of anthropogenic pressures and climate change. This study provides a crucial baseline for their monitoring and sustainable management." (Author) The study includes a record of Aeshna marchali.] Address: https://fupvirtual.edu.co/repositorio/files/original/-6e713c9cc4ee178e23d5ea00b0d6892ca871bff7.pdf

25635. Navya, E.; Aruna, S.; Duraimurugan, P. (2025): Diversity and abundance of insect fauna in groundnut at IIOR-Narkhoda farm of Southern Telangana Zone, Telangana, India. Journal of Entomological Research 49(3): 570-574. (in English) ["Present research is aimed to determine key diversity indices, including the Shannon-Weiner diversity index, Margalef species richness index, Pielou's evenness index, Simpson diversity index, and the relative abundance of species, genera, and families from various insect orders. A total of 6,306 insects belonging to 13 orders, 57 families, 78 genera, and 91 species were recorded using different trapping methods. Hemiptera emerged as the most dominant order, comprising 28.75% of the total insect population and representing 18 species, while Thysanoptera accounted for 20.52%. Diptera exhibited the highest Shannon-Weiner diversity index (H = 2.108), species richness (R = 1.615), and Simpson diversity index (1-D = 0.853). Odonata demonstrated the highest evenness (e = 0.991)." (Authors)] Address: Navya, E., Indian Institute of Oilseeds Research (IIOR-Narkhoda farm), Professor Jayashankar Telangana Agricultural University, Rajendranagar - 500 030, Telangana, India

25636. Norqobilova, Z.B.; Raxmatullayev, A.Yu.; Davronov, B.O. (2025): Taxonomic descriptions of the Libellulidae family representatives identified in the Kashkadaryo region. Biological Sciences of Kazakhstan No. 2, 2025: 34-39. (in English, with Kazakh and Russian summaries) ["Between 2020 and 2024, a comprehensive study was conducted in the Kashkadarya region to investigate the distribution and taxonomic composition of dragonflies belonging to the family Libellulidae, which falls under the Anisoptera. The main objective of this research was to analyze the presence and diversity of species within this family across various aquatic and semi-aquatic habitats in the region. The study included a systematic analysis of the species found, with an emphasis on their classification at the subfamily and genus levels. As a result of this research, nine species of Libellulidae were identified in the studied area. These species were distributed across three subfamilies and three genera, reflecting the taxonomic richness of the region's dragonfly fauna. The analysis showed that one species belonged to the subfamily Libellulinae Rambur, 1842. Four species were identified within the genus Orthetrum Newman, 1833, one species belonged to the genus Crocothemis Brauer, 1868, and four species were assigned to the genus Sympetrum Newman, 1833. This research not only highlights the diversity of the Libellulidae family in the Kashkadarya region but also contributes to the broader understanding of Odonata distribution in Central Asia. Given the ecological significance of dragonflies as bioindicators of freshwater ecosystem health, the findings of this study are valuable for biodiversity monitoring, conservation planning, and the sustainable management of aquatic habitats. The identification of these species and their classification enhances our taxonomic knowledge of regional entomofauna and provides a scientific basis for further ecological and environmental assessments." (Authors)] Address: Davronov, B.O., Karshi State Univ., Karshi, Uzbekistan. Email: davronov-68@mail.ru

25637. Oldak, K.A. (2025): Dragonflies and damselflies (Insecta: Odonata) of Sphagnum bog at Maliszew (East-Central Poland). Inland Water Biology 18(2): 267-275. (in English) ["A Sphagnum bog located near the Maliszew (east-central Poland) was studied in 2022–2023. Direct observations of imagines were carried out and exuviae were collected. The material collected consisted of 735 exuviae. Among the collected exuviae, about 71.56% were Leucorrhinia pectoralis. The exuviae of Libellula quadrimaculata Linnaeus, 1758 and representatives of the genus Coenagrion Kirby, 1890, including C. puella, also contributed to a relatively large proportion of the material. 22 species of dragonflies were found,

representing approximately 29.73% of the Polish odonatofauna. 14 species were considered autochthonous or likely autochthonous. Among all species found, eurytopes were the predominant ecological element, while tyrphobionts and tyrphophiles predominated among autochthonous and probably autochthonous species. Among the recorded species there are also five “umbrella species” for Sphagnum bogs. A reproductive local population of Nehalennia speciosa, which is vulnerable (VU) to extinction worldwide and endangered (EN) in Poland, was discovered. The value of biocenosis naturalness qualitative index for Sphagnum bogs was 4.23. In light of the literature data, this value is relatively high, suggesting the naturalness of the boggy complex is largely preserved. The studied Sphagnum bog should be considered a relatively valuable area on a Polish scale in terms of dragonfly conservation." (Author)] Address: Oldak, K.A., Dept of Zoology and Nature Protection, Maria Curie-Sklodowska University, 20-033, Lublin, Poland

25638. Oyama, N.; Wakita, K. (2025): Fossil-insect assemblages and sedimentary environments of the Upper Triassic Momonoki Formation, Mine Group, southwest Japan. J. Geol. Soc. Japan 131(1): 475-488. (in Japanese, with English summary) ["The Upper Triassic Momonoki Formation in the Mine Group, which is exposed in Mine City, Yamaguchi, Japan, contains horizons that are rich in fossil insect remains. We investigated these horizons at four localities in Ominé, Mine, based on stratigraphic, sedimentary facies, taphonomic, and entomofaunal composition analyses. The studied section of the Momonoki Formation can be divided into the following three lithostratigraphic units, in ascending stratigraphic order: fluvial conglomerate (Unit 1), lacustrine or back-marsh mudstone (Unit 2), and alternating fluvial sandstone and mudstone (Unit 3). The layers containing insect fossils, found primarily in Unit 2, consist of black, parallel-laminated mudstones characteristic of a muddy lacustrine and back-marsh facies. Most of the insect remains from the Momonoki Formation are isolated terrestrial insect wings, whereas aquatic insects (larval stage) are rare. Other small fossils (<5 cm in length), including plants fragments, bivalves, and fish scales with fine charcoal grains, were recovered from the insect-bearing layers. In contrast, Unit 3, which is composed of fine- to coarsegrained sandstone, contains large plant fossils (>10 cm in length) but yields few insect remains. These observations suggest that the terrestrial insects in the Momonoki Formation were allochthonous and transported by rivers into lacustrine environments that were unsuited for aquatic insects. The frequent rainfall during the Carnian pluvial episode (CPE), possibly coupled with increased sediment influx following wildfires, likely promoted the transport and rapid burial of terrestrial insect remains in lacustrine settings. These findings demonstrate that the Momonoki Formation is an exceptional record of Triassic insect taphonomy and paleoenvironmental dynamics in East Asia." (Authors) Dragonflies are represented by only a few individuals.] Address: Oyama, N., Dept of Dinosaur Paleontology & Geology, Faculty of Dinosaur Paleontology, Fukui Prefectural University, 4-1-1 Matsuoka, Eiheiji, Fukui 910-1195, Japan. Email: oyama@g.fpu.a

25639. Papazian, M.; Coache, A.; Rainon, B. (2025): Contribution à la connaissance des Odonates de l'Afrique occidentale. 3. Présene de sept nouvelle espèces et confirmation de la présence de trois espèces au Bénin (Odonata Aeshnidae et Libellulidae). L'Entomologiste 81(3): 169-194. (in French) ["Contribution to the knowledge of the Odonates of West Africa 3. Presence of seven new species and confirmation of the presence of three species in Benin (Odonata Aeshnidae and Libellulidae). The examination of a collection resulting from nearly fifteen years of surveys carried out by two of the co-authors (AC and BR) on the territory of Benin, from the south of the country, characterized by its flooded forests, to the north dominated by the savannah allows us to complete the odonatofauna of this country with seven species: two Aeshnidae, Gynacantha bullata Karsch, 1891 and Gynacantha sextans McLachlan, 1896, and five Libellulidae: Aethiothemis incongruens (Karsch, 1893), Aethiothemis palustris Martin, 1912, Aethiothemis solitaria Ris in Martin, 1908, Orthetrum microstigma Ris, 1911, a species suspected by Dijkstra [2025], and Orthetrum sabina (Drury, 1770), which was the subject of an anticipated publication [Papazian et al., 2021]. Furthermore, we confirm the presence of three newly inventoried Libellulidae [Tchibozo & Maes, 2025]: Hadrothemis camarensis (Kirby, 1889), citation based on a female collected in 1990, Tramea limbata (Desjardins, 1832) and Trithemis kalula Kirby, 1900, citations based on a single photo." (Authors)] Address: Author deceased

25640. Parr, A.J. (2025): Migratory and dispersive dragonflies in Britain: Report for 2024. Journal of the British Dragonfly Society 41(1): 109-119. (in English) ["The early part of the 2024 migrant dragonfly season was relatively subdued. There were, for instance, no spring influxes of Anax ephippiger and Sympetrum fonscolombii experienced one of its poorest spring and early summer seasons since becoming a regular migrant to Britain back in the mid-1990s. The apparent low levels of general immigration did, however, provide an opportunity to assess the strength of local resident populations of species such as Anax parthenope and Aeshna affinis, both of which currently occur in Britain both as migrants and residents. Such resident populations, particularly of A. parthenope, appear to be thriving. Immigration and internal dispersal intensified during the latter half of July and early August as hot weather set in. Aeshna isoceles had already resumed its recent pattern of suddenly appearing in unexpected locations, but high summer saw records from areas as far apart as Cornwall and Yorkshire. This period also saw the dragonfly highlight of the year, namely the discovery of a group of Crocothemis erythraea, including at least one female, near Crossways in Dorset during late July. Individuals remained at the site for several weeks, with oviposition observed on multiple occasions. These sightings raise hopes for the establishment of a self-sustaining breeding colony; indeed, it is not inconceivable that an established colony is already present, its initial foundation having gone unnoticed. Other notable records during high summer included a small influx of Ischnura pumilio onto the east Kent coast. During autumn, small numbers of second-generation Sympetrum fonscolombii appeared in coastal southeastern England, likely reflecting immigration from the near Continent. The year concluded with a modest influx of Anax ephippiger in December. ... Three non-native species of Odonata were recorded from Britain as ‘accidental introductions’ during 2024, with most individuals found emerging from indoor tropical aquariums. The species noted were Ischnura senegalensis (Rambur), with at least two records; Orthetrum sabina (Drury), with one record; and Crocothemis servilia (Drury), also with one record – this last individual being discovered outdoors on a house wall." (Author)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St Edmunds, Suffolk, IP29 5BX, UK

25641. Patterson, C.; Brennan, A.; Cowling, H.; González-Rodríguez, A.; Grether, G.F.; Mendoza Cuenca, L.; Springer, M.; Vega-Sánchez, Y.M.; Drury, J. (2025): Spatiotemporal dynamics of non-ecological speciation in Rubyspot damselflies (Hetaerina spp.). Molecular Ecology 34(12), e17797: 16 pp. (in English) ["Non-ecological speciation is a common mode

of speciation, which occurs when allopatric lineages diverge in the absence of pronounced ecological differences. Yet, relative to other speciation mechanisms, non-ecological speciation remains understudied. Numerous damselfly clades are characterised as non-adaptive radiations (the result of several rounds of non-ecological speciation without subsequent divergence), but there are few damselfly lineages for which we have a detailed understanding of the spatiotemporal dynamics of divergence. Recent phylogeographic analyses demonstrate that Hetaerina americana sensu lato actually comprise at least two cryptic lineages that coexist sympatrically across most of Mexico. To broaden our understanding of the dynamics of diversification to other rubyspot lineages, we investigated the phylogeographic history of Hetaerina titia using genomic data collected across Central and North America. Unexpectedly, we found evidence of reproductive isolation between the highly genetically differentiated Pacific and Atlantic lineages of H. titia in a narrow secondary contact zone on the Isthmus of Tehuantepec, Mexico. We then fit models of historical demography to both H. americana sensu lato and H. titia to place these comparisons in a temporal context. Our findings indicate that Pacific and Atlantic lineages of H. titia split more recently than the broadly sympatric lineages within H. americana sensu lato, supporting key assumptions of the non-ecological speciation model and demonstrating that these two pairs of sister lineages are at different stages of the speciation cycle." (Authors)] Address: Patterson, C., Dept Biosciences, Durham Univ., Durham, UK. Email: christophepatterson@outlook.com

25642. Pawar, A.A.; Ranjan, K.S.; Roy, A.; Saha, S. (2025): Investigating the effect of forewing-hindwing phasing on the flowfield of a tethered Pantala flavescens. In: Arun, K.R., Rajesh, G., Arakeri, J.H., Kothadia, H. (eds) Proceedings of Fluid Mechanics and Fluid Power (FMFP) 2023, Vol. 5. FMFP 2023. Lecture Notes in Mechanical Engineering. Springer, Singapore. https://doi.org/10.1007/978-981-97-7759-445: 559-570. (in English) ["Bio-inspired aerodynamics is an evolving subject with great potential to offer solutions for complex engineering problems, and this is heavily reflected in some engineering feats of the past few decades. One such probable inspiration is dragonflies; they can perform maneuvers beyond present-day aerial vehicles' capabilities and serve as an excellent inspiration for UAVs. Dragonflies are highly accomplished fliers because they engage a complex ensemble of parameters that govern their wing kinematics. Observing the subtle changes in the wing kinematics and understanding its effects on the flowfield will give an insight into the influence of these wing kinematics on the aerodynamic behavior. The present study shows vortex structures in the near field of a tethered Pantala flavescens, captured using high-speed Schlieren imaging. Cycle-averaged velocity fields obtained using the physics-based optical flow illustrate two scenarios distinguished by the changes in the nearfield region having different phase differences and stroke-plane inclinations. The changes in the momentum jet in the wake show how wing kinematics play a role in influencing the aerodynamics of a dragonfly to engage in different flight modes." (Authors)] Address: Pawar, A.A., Dept Aerospace Engineering, Indian Inst. of Tech. Kharagpur, Kharagpur, West Bengal, 721302, India

25643. Pereira, J.L.; de Carvalho, F.G.; Calvão, L.B.; Juen, L. (2025): Checklist of Odonata species (Insecta) from Pará State, Brazil. Biota Neotropica 25(1): e20251758: 18 pp. (in English, with Portuguese summary) [" The Amazon is home to most of the Earth's biodiversity, but comprehensive data on actual diversity, including species checklists, are still incomplete for most taxonomic groups. The order Odonata is composed of predatory aquatic insects which, due to their sensitivity to environmental changes, are used as bioindicators of environmental quality. In Brazil, 862 Odonata species have been recorded, distributed in 146 genera and 15 families, despite only 30% of the Brazilian territory has been studied for this group. The aim of this study is to fill some information gaps on the biodiversity of Odonata species in the state of Pará, in the Amazon biome. Occurrence records were obtained through primary data, including specimens deposited in the invertebrate collections of the Federal University of Pará (UFPA) and the Emílio Goeldi Museum of Pará (MPEG), as well as literature records and online databases. Information was collected on the distribution of 282 species, covering 11 families in 75 genera, including six new records for the state: L. aculeatum Santos, 1965 for the suborder Zygoptera and G. gracilis; A. trameiformis Kirby; M. atra; M. tibialis and T. cophysa for the Anisoptera. The Pará state biodiversity still has Linnean and Wallacean gaps, mainly in places difficult to access or remote areas far from universities or research institutions. These areas still require additional sampling, as the current efforts have not been sufficient to accurately capture the true local biodiversity. As a result, many species are at risk of becoming extinct before they have even been described or their conservation status assessed. At the same time, the state continues to show high rates of transformation and loss of natural habitats, indicating the urgency of investing in research and teaching activities, as well as conservation actions to enable the preservation of the diversity of Odonata in the state of Pará." (Authors)] Address: Pereira, J.L, Universidade Federal do Pará, Programa de Pós-Graduação em Ecologia, Belém, PA, Brasil. Email: jlbio@hotmail.com

25644. Pierini, S.E.; Adjad, F.; Bauso, J.; Imhof, A.; Piña, C.I.; Simoncini, M.S. (2025): Dietary patterns of Yacare in the wetlands of Corrientes, Argentina. Journal of Zoology 327(3): 292-301. (in English) ["We investigated the feeding habits and dietary patterns of Yacare (Caiman yacare) in freshwater wetlands located in the province of Corrientes, Argentina, with a focus on how these habits relate to the size of the caiman. A total of 39 caimans were classified into different groups based on their total length, including hatchlings (Class I), juveniles (Class II), and adults (Class III and IV). Stomach contents were obtained through gastric lavage. Insects (Coleoptera, Orthoptera, Odonata, and Hemiptera), mollusks (Pomacea sp.), and freshwater crustaceans (Pseudopalaemon sp. and Trichodactylus sp.) were the most common prey, while reptiles, fish, and birds were less frequently consumed. Remains of aquatic plants such as Pistia sp., Azolla sp., and Elodea sp. were also found. Prey diversity and diet composition were similar across the size classes of caimans. As the size of C. yacare increased, smaller prey were not excluded in order to consume larger prey. Larger caimans had larger Pomacea sp. opercula in their stomachs, potentially linked to morphological constraints, such as the limitation in jaw opening. Our findings suggest that Caiman yacare incorporates a variety of prey into its feeding behavior, and there is no abrupt change in dietary pattern as the caimans grow in size." (Authors)] Address: Simoncini, Melina S., Centro de Investigación Científica y de Transferencia Tecnológica a la Producción – CICYTTP/CONICET/Prov. ER/UADER, España 149, E3105BWA Diamante, Entre Ríos, Argentina. Email: melinasimoncini@conicet.gov.ar

25645. Pires, M.M.; Wommer, G.; Sganzerla, C.; Sahlén, G.; Périco, E. (2025): Exotic tree plantations drive reduction in morphological variation of damselfly species in the southern Brazilian Atlantic Forest. Journal of Insect Conservation 29(3), 49: 14 pp. (in English) ["Forest conversion may exert multiple selective pressures and lead to morphological differences

among organisms. Despite considerable research on morphological responses to forest loss, gaps remain regarding the effects of practices such as forestry on insect morphology. Here, we compared the intraspecific morphological variation in Acanthagrion lancea and Telebasis carmesina between mixed-ombrophilous forests (MOF) and tree plantations in the Brazilian Atlantic Forest. We assessed body shape (head and thorax width, abdominal length) and wing morphology traits (area and aspect ratio) and predicted that trait variability would be reduced in plantations. In both species, trait variation patterns differed between forest types and were lower in plantations. Specific traits also differed between forest types: A. lancea showed wider thoraces, longer abdomens and larger wing areas in MOF, while T. carmesina showed higher wing area and aspect ratio in plantations. Differences in damselfly morphological variability are likely the outcome of limited plant diversity and altered microclimate conditions in plantations. Implications for insect conservation: Tree plantations, by simplifying habitat structure, favor the occurrence of damselfly populations with reduced morphological diversity. This reduction not only reflects a loss of ecological adaptability but may also compromise key ecosystem processes at the water-land interface. To ensure effective conservation of forest aquatic insects, restoration efforts should prioritize re-establishing the structural complexity of riparian habitats, including diverse understory and canopy layers. Enhancing habitat heterogeneity supports greater morphological and functional diversity, ultimately sustaining critical ecosystem services such as nutrient cycling, energy transfer, and food web stability." (Authors)] Address: Marques Pires, M., Laboratório de Ecologia e Evolução, Programa de Pós-Graduação em Ambiente e Desenvolvimento, Universidade do Vale do Taquari (UNIVATES), Avelino Tallini Av. 171, Universitário, Lajeado, RS, 95914-014, Brazil

25646. Popova, O.N.; Kharitonov, A.Yu. (2025): Ecology and biology of Enallagma cyathigerum (Charpentier, 1840) (Odonata) under unstable water conditions in the south of Western Siberia. Siberian Ecological Journal 32(1): 66-85. (in Russian, with English summary) ["As a result of many years of research in the Barabinsk forest-steppe, the peculiarities of ecology and biology of E. cyathigerum were revealed. The species lives in all permanent reservoirs. rivers, river channels, lakes and ponds, where its most numerous populations have been identified, and also inhabits temporary reservoirs, surviving in them during periods of drying out due to the egg phase. Biotopic preferences were found in the choice of habitat: the larvae live only in non-reed hydrocenoses, which is associated with the ecological standards of the species. In the last 20 years, there has been a decrease in the number of E. cyathigerum, despite the increase in humidity in the region, which we associate with the consequences of climate warming. weather disasters in the summer, an increase in air temperature and, accordingly, water in reservoirs, leading to a deterioration in the hydrology of reservoirs and suffocation of aquatic organisms. A study of the development of E. cyathigerum on Kargat River and Fadikha Lake in 2004.2006 revealed a one-year life cycle of a species that has a different population structure on a river and lake associated with their different hydrological and temperature regimes. The species population on the Kargat River was unified in all 3 years, on Lake Fadikha in high-water 2004 it was unified, and in low-water 2006 it was divided into 2 seasonal groups. summer with wintering larvae and summer-autumn with wintering eggs. Such a complication of the population structure on Lake Fadikha in 2006 was the result of an increase in water temperature (as a result of an increase in the average daily air temperature and a decrease in the water level in the lake), and is a kind of “adjustment” of the species to the deterioration of habitat conditions in the low-water period: eggs are present in the lake almost all year round (wintering and non-wintering) and the larvae have different ages, and imagoes fly on land from spring to autumn. This adaptive feature of E. cyathigerum may partly explain its relatively high abundance, eurybiont and large range - almost the entire Palearctic." (Authors) For the English version of the paper see OAS 24888.] Address: Popova, Olga, Institute of Systematics and Ecology of Animals, Siberian Branch of Russian Academy of Sciences 11, Frunze str., Novosibirsk, 630091, Russia. Email: popova.2012@yandex.ru

25647. Poyntz-Wright, I.P.; Harrison, X.A.; Johnson, A.; Zappala, S.; Tyler, C.R. (2025): Identifying freshwater invertebrate taxa susceptible to AChE-acting pesticides? Environmental Pollution 363(2), 125217: 11 pp. (in English) ["Globally pesticide use has been associated with negative impacts on riverine invertebrate communities, but chronic exposure effects to most specific groups of pesticides are not well understood. In this paper, we sought to identify invertebrate species most vulnerable to effects of AChE-acting pesticides in UK rivers for potential application in environmental monitoring. We did this using a combination of the conservation of molecular target for AChE-acting pesticides (identified using the SeqAPass tool), laboratory-based toxicity data, and both biological traits and life history information. We then applied this information to assess for evidence of impacts on these riverine invertebrate communities in the Anglian region of England where there is high pesticide use. Sensitive genera to AChE-acting pesticides included Aedes, Anopheles, Cloeon, Ischnura, and the tolerant genera were Culex, Daphnia, Lymnaea. Using the UK Environment Agency’s biota monitoring data spanning over period of 28 years (1984 – 2011) we evidence absence of the taxa most sensitive to AChE-acting pesticides (Ischnura, Aedes and Anopheles) but presence of AChE pesticide tolerant taxa (Lymnaea) at riverine sites in the Anglian region with high AChE pesticide use... For AChE-acting pesticides, Ischnura was the most sensitive genus, whereas Lymnaea was the least sensitive genus." (Authors)] Address: Poyntz-Wright, I.P., Biosciences, Geoffrey Pope Building, University of Exeter, Stocker Road, Exeter, EX4 4QD, UK. Email: ipp203@exeter.ac.uk

25648. Pozdeev, I.V.; Bezmaternykh, V.V. (2025): Comparative analysis of structure in benthic invertebrates communities of the upper (Riverine) parts of reservoirs in the Kama River cascade. Inland Water Biology 18: 121-136. (in English) ["A comparative analysis of the taxonomic and trophic structures of benthic invertebrate communities was carried out based on the results of collections in the riverine sections of the Kama (2012), Votkinsk (2010) and Nizhnekamsk (2015) reservoirs. A species list is given, and trends in benthic fauna changes down the cascade are shown: its depletion at the species and generic levels, a decrease in the proportion of mayflies, stoneflies, and caddisflies, the absolute and relative species richness of chironomids, as well as the proportion of Tanytarsini, and an increase in the relative species richness of mollusks and crustaceans. The main quantitative trend of changes was an increase in the absolute and relative biomass of filter feeders and scrapers, gastropods and large bivalves, in the riverine sections of reservoirs downstream the cascade." (Authors) The list of species includes Somatochlora flavomaculata, Gomphus vulgatissimus, and Leucorrhinia pectoralis.] Address: Pozdeev, I.V., St. Petersburg Research Center, Russian Academy of Sciences, St. Petersburg, Russia

25649. Prayoga, R.P. (2025): Keanekaragaman Ordo Odonata di Kawasan Wisata Benjor Pine Camp Ground Desa Benjor Kecamatan Tumpang Kabupaten Malang Resha Pramudya Maharani Retna Duhita, Didik Wahyudi - Diversity of the Odonata order in Benjor Pine Camp Ground Tourism Area, Benjor Village, Tumpang District, Malang Regency. Program Studi Biologi, Fakultas Sains dan Teknologi, Universitas Islam Negeri, Maulana Malik Ibrahim Malang, Indonesia: 95 pp. (in Indonesian, with English and Arbaian summaries) ["The presence of Odonata is closely associated with aquatic ecosystems, making this group an important component in maintaining food chain balance and serving as organisms that reflect water quality conditions. However, there is currently no specific information addressing the diversity of the order Odonata in the Benjor Pine Camp Ground Tourist Area, Benjor Village. This study aims to assess the diversity of dragonflies in the Benjor Pine Camp Ground Tourist Area, Benjor Village, Tumpang District, Malang Regency. The study employed the Visual Encounter Survey (VES) method and purposive sampling to determine the research sites. Observations were conducted in three replicates during the dry season, starting in June 2025, between 08:00 and 14:00 WIB. Sampling was carried out across three locations: coffee plantations, forest areas, and aquatic habitats. The results recorded a total of 159 individuals belonging to 7 genera, 4 families, and 2 suborders, with the genus Vestalis being the most abundant, comprising 44 individuals. The Shannon–Wiener diversity index (H') indicated a moderate level of diversity with a value of 1.854, while the Margalef species richness index showed a low category with a value of 1.184. The Pielou evenness index was categorized as high with a value of 0.912, and the Simpson dominance index indicated low dominance with a value of 0.171. Measured abiotic parameters, including air temperature (21.3–25.07 °C), relative humidity (64.2–83.63%), wind speed (0.2–0.6 m/s), and light intensity (374–1078 lux). Correlation analysis showed that temperature with Euphaea was strongly correlated, humidity with vestalis was strongly correlated, wind speed was strongly correlated with Zygonyx and light intensity was strongly correlated with Euphaea." (Author)] Address: http://etheses.uin-malang.ac.id/82979/2/210602110123.pdf

25650. Pu, S.Y.; Lu, J.-S.; Tao, X.-L.; Li, Z.-F.; Wang, Y.-N.; Zhang, H.-M.; Lu, X. (2025): The Odonata of China: a data-driven, open-access resource for biodiversity research and conservation. Database, Volume 2025, 2025, baaf077, https://doi.org/10.1093/database/baaf077: 8 pp. (in English) ["Odonata are among the most ancient winged insects, with over 900 species recorded in China, representing the highest global diversity. However, the lack of a centralized database integrating morphological, ecological, and multiomics data has hindered large-scale research and conservation efforts. We present Odonata of China (http://dragonflies.kiz.ac.cn), a comprehensive database compiling taxonomic, biogeographic, phenotypic, and multiomics data for 820 species across 3 suborders, 22 families, and 172 genera. The database features advanced search modules (direct, phylogenetic, and map-based), genomic and transcriptomic data for 20 representative families, and high-resolution images. The platform is constructed based on mainstream open-source technologies, ensuring scalability and reproducibility. Odonata of China provides a critical resource for evolutionary biology, conservation, and ecological studies. By integrating heterogeneous data types and leveraging modern technologies, this database bridges a significant gap in invertebrate biodiversity informatics and supports global initiatives to monitor insect declines.] Address: Lu, X., Kunming Inst. of Zoology, Chinese Academy of Sciences, 17 Longxin Road, Panlong District, Kunming, Yunnan 650201, China. Email: xuemeilu@mail.kiz.ac.cn

25651. Rahmadhani, S.E.; Salsabila, S.; Andrianto, R.; Rosyida, S.H.; Ainia, Q.; Dewangga, A.; Setyawan, D. (2025): Invasion dynamics and elevational range expansion of insects in tropical agricultural landscapes of Wonosobo, Central Java, Indonesia. Nusantara Bioscience 17(2): 355-374. (in English) ["Biological invasions in tropical mountain agroecosystems are increasingly reported, yet the processes driving elevational range expansion of invasive insects remain poorly understood. This study examined invasion dynamics and elevational range expansion of insects across a gradient of lowland to highland agricultural landscapes in Wonosobo District, Central Java, Indonesia. Using a targeted sampling approach, we quantified invasion intensity with the Relative Invasiveness Index (RII) and elevational expansion with the Altitudinal Expansion Index (AEI). Functional feeding group composition and environmental drivers were further analyzed to evaluate invasion-related community reorganization. A total of 692 insect individuals were recorded, of which 295 individuals (42.6%) belonged to nine invasive or potentially invasive taxa. RII values were lowest at lowland (13.2%), highest at mid-elevation (53.6%), and moderately high at highland sites (48.7%). In contrast, AEI was only positive in highland systems (mean AEI = 45.7%; range: 38.7- 59.6%), where upslope expansion was detected in saprophagous Diptera, with Leucostoma simplex showing the highest elevational shift (up to 856 m above historically documented limits). Functional composition shifted from herbivore-dominated assemblages at low elevation to predator-dominated at mid-elevation and saprophage-detritivore-dominated at high elevation, indicating functional homogenization under increasing invasion pressure. Canonical Correspondence Analysis revealed that elevation and light intensity were the primary drivers of upslope expansion, while temperature and wind exposure influenced invasion dominance. These findings demonstrate that elevational gradients in tropical agricultural landscapes function as invasion filters rather than biodiversity gradients, with mid-elevation systems acting as transitional invasion hotspots and highland systems representing high-risk zones for invasion- driven functional simplification. The study highlights the need for elevation-specific invasion risk zoning and early intervention strategies to mitigate emerging invasion threats in tropical mountain agroecosystems." (Authors) Crocothemis servilia and Pantala flavescens are classified as "Potentially invasive".] Address: Setyawan, D., Dept Environmental Science, Fac. Mathematics & Natural Sciences, Universitas Sebelas Maret. Jl. Ir. Sutami 36A, Surakarta 57126, Central Java, Indonesia. Email: volatileoils@gmail.com

25652. Ramos-Merino, T.L.; Suárez-Tovar, C.M. (2025): Coloration in Argia damselflies of Central Mexico responds to changes in herbaceous vegetation. Insect Conservation & Diversity 18(4): 593-603. (in English) ["The increase in urban lands and the vegetation loss implies changes in the colour of the background and in the incident light in natural environments, which in turn could cause changes in the coloration of individuals. In insects, body coloration can respond to different selection forces and play an important role in thermoregulation, intraspecific communication, mate selection, territory defence and camouflage. Changes in body lightness of damselflies [Argia extranea, A. tarascana, A. anceps, A. plana] were measured through 19 sites in the State of Morelos (Central Mexico). Each of the sites had a different degree of urbanisation and a different percentage of native vegetation. We found a significant relationship between body lightness of individuals and the percentage of herbaceous vegetation

from each of the sampled sites: the higher the percentage of herbaceous vegetation, the brighter the insect. Our results give an idea of how changes in the immediate natural environment that an organism primarily inhabits can generate changes in individual traits. These changes could potentially affect the survival and fitness of individuals." (Authors)] Address: Ramos-Merino, Teresa, Laboratorio de Ecología de Insectos en el Antropoceno, Instituto de Ecología, Universidad Nacional Autónoma de México, México City, Mexico

25653. Rasmussen, J.F.; Martens, A. (2025): First record of Forcipomyia paludis (Diptera: Ceratopogonidae) on Odonata wings on the island of Bornholm, Denmark, with a review of the species on European islands. Libellula 44(1/2): 123-126. (in English, with Danish and German summaries) ["On 24 June 2023 females of the biting midge F. paludis were photographed sitting on the wings of a male Cordulia aenea at the lake Bastemose, Bornholm, Denmark. A brief overview of island records in the Baltic Sea and other European islands is given." (Authors)] Address: Martens, A., Inst. Biol., Univ. of Education Karlsruhe, Bismarckstr. 10, 76133 Karlsruhe, Germany. Email: andreas.martens@ph-karlsruhe.de

25654. Reichholf, J. (2025): Prachtlibellen an Auwaldgewässern: Was bestimmt Vorkommen und Häufigkeit? Mitt. Zool. Ges. Braunau 14(2): 95-104. (in German, with English summary) ["Changes in the abundance of Calopteryx virgo and C. splendens were monitored from 2012 to 2024 by counting flying adults at a stream in the riparian forest along the Inn River near Alzgern/Altötting and at the lower Alz River near its confluence with the Inn. The differences were so great that normal fluctuations in abundance could not be the cause. The inclusion of special events that had affected the stream or the Alz established clarifying connections with flooding (2013), the twice dredging of the stream in late autumn 2015 and 2023, and the Genamin poison accident in Gendorf in March 2012. Figures 6 & 7 clearly show the after-effects. Dredging obviously represents a disproportionately greater, unnatural intervention than natural flooding with its clearing effect." (Author/DeepL)] Address: Email: reichholf-jh@gmx.de

25655. Reyes, J.C.; Meléndez, J.M. (2025): First confirmed records of Anax concolor (Odonata: Aeshnidae) in Peru, with notes on its habitat and behavior. Argia 37(3): 59-61. (in English) ["We present the first documented records of A. concolor for Peru, based on individuals we observed and specimens we collected at two distinct locations. On 11-XII- 2015, JMM collected two male specimens of A. concolor from a natural pool in Don Bosco (11.18400° S, 75.35687° W, 1445 m elev). ... On 25-IV- 2025, JCR observed three individuals of a very large dragonfly—previously unrecorded in the Pisco Playa coastal wetland ecosystem (MINAM 2019)—flying around a pond (13.71322° S, 76.22034° W, 2 m elev). This site lies in the Ica Department, within the Desert biogeographic province (sensu Morrone 2014)." (Authors)] Address: Reyes, J.C.: julioplodon@yahoo.com

25656. Ribeiro, C.; Geraldo de Carvalho, F.; Roque, F.; Simaika, J.P.; Neiss, U.G.; Santos, L.R.; Barbosa-Santos, F.M.; Silva, K.T.; Rodrigues, M.E. (2025): Dragonflies (Odonata) as bioindicators of the sustainability of agroforestry systems in the Atlantic Forest. Aquatic Sciences 87(2), 49: 14 pp. (in English) ["Anthropogenic activities constitute a major threat to the physical and ecological integrity of freshwater ecosystems. Among the various anthropogenic impacts, alterations in land use and occupation patterns stand out as key drivers of aquatic ecosystem degradation and loss. In this context, agroforestry systems stand out among various land uses as an alternative for reducing environmental impacts. This study evaluated the integrity of streams in the Atlantic Forest under different land use types and their effects on dragonfly larval assemblages. Dragonfly larvae were collected in native forests, pastures, and cocoa cultivation areas, known locally as Cabruca (an agroforestry system in which Atlantic Forest trees are partially preserved, and cacao is planted in the understory). Our results revealed a difference in genus richness among the studied areas, with Cabruca areas showing higher richness and pasture areas exhibiting lower richness. We also observed variations in species composition, with native areas displaying a more homogeneous composition and pasture areas exhibiting a more heterogeneous composition. In addition, our results indicated that dragonfly larvae can serve as excellent indicators of sustainable cultivation areas. Although Cabruca areas represent a model of sustainable agriculture with the potential to contribute to biodiversity preservation, this study emphasizes that such areas cannot fully replace native habitats, reiterating the importance of conserving the remaining forests and their biodiversity." (Authors)] Address: Rodrigues, M.E., Universidade Estadual Do Sudoeste da Bahia (UESB), Vitória da Conquista, Bahia, Brazil

25657. Roucourt Cezário, R.; Datto-Liberato, F.H.; Lopez, V.M.; Muzón, J.; Lencioni, F.A. (2025): Redescription of Lestes quadristriatus Calvert, 1909 (Odonata: Zygoptera: Lestidae) with comments on the type series. Studies on Neotropical Fauna and Environment 60(3): 253-262. (in English) ["L. quadristriatus is redescribed based on type specimens as well as thirteen males and nine females collected from two locations in the Brazilian savannah: Uberaba and Corinto, Minas Gerais, Brazil. The species is characterized by distinctive cerci featuring a black lobe and a spined medial portion, along with a genital ligula that has four transverse ridges, the anterior of which is the largest. L. quadristriatus also exhibits a bicolored pterostigma, which is rare among its congeners. Finally, we present color plates of both males and females, along with photographs of live individuals." (Authors)] Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina. E-mail: muzon@ilpla.edu.ar

25658. Ruest, L. (2025): Liminal habitats: An investigation of stormwater management facilities in urban and suburban Kitchener-Waterloo. MSc thesis, Biology, University of Waterloo: 129 pp. (in English) ["Stormwater Management Ponds (SWMPs) are a tool to protect neighbourhoods from floods and collect pollutants before they enter the natural environment. Despite these facilities being infrastructure, they inadvertently become habitat for an array of taxa, notably macroinvertebrates. My research has three primary goals: to understand the language used in municipal documents to inform how SWMPs are viewed by the municipal governments in the Kitchener-Waterloo Region; to understand the broader implications of SWMP research; and to investigate the drivers of biodiversity in SWMPs. Firstly, I confirm that SWMPs are predominantly seen as pieces of infrastructure rather than habitat by the municipalities in the Kitchener-Waterloo region. Secondly, I found that SWMPs harbour similar levels of biodiversity compared to control ponds. The majority of the literature focuses on single-taxa investigations, predominantly those of odonates and plant diversity. Thirdly, I investigated biodiversity in SWMPs in the Kitchener-Waterloo area. I investigated the attributes of the ponds and discovered that turbidity and the surrounding land cover impact biodiversity within the ponds. Additionally, I found that facility type impacts biodiversity, where engineered wetlands harboured higher diversity and evenness of macroinvertebrate communities. I compared Kitchener-Waterloo's SWMPs to other lentic

systems across the province, finding that the macroinvertebrate communities in Kitchener-Waterloo's SWMPs are similar. Based on my research, I recommend implementing engineered wetlands in place of traditional wet ponds in urbanized areas. As well, I recommend municipalities incorporate biodiversity initiatives in their design manuals for SMWP infrastructure. Finally, I advocate for a re-signification of the SWMP and acknowledgement that SWMPs provide habitat in urban areas for macroinvertebrates." (Author) The study includes references to Odonata.] Address: https://uwspace.uwaterloo.ca/bitstreams/a52dc500-a36b-42bd-96d7-c21ad6ae599b/download

25659. Salah, M.; Baleela, R.; Ahmed, E.Y.; Isam, B.; Abdalla, A.; Masri, M.; Elfaki, E. (2025): Paragomphus alami sp. nov. (Odonata, Gomphidae): a new dragonfly species described from the White Nile River, Sudan. ZooKeys 1265: 159-174. (in English) ["Sudan's unique biogeographic position at the Afrotropical-Palearctic interface, coupled with the ecological gradient of the Nile River, fosters a diverse odonate fauna. Despite this, the genus Paragomphus Cowley, 1934 remains understudied in the region. This study describes Paragomphus alami sp. nov., a new species of Paragomphus from the White Nile floodplain in Sudan, based on integrated morphological and molecular evidence. Field surveys conducted between 2017 and 2022 documented adult populations across the Sudanese floodplains. Specimens were morphologically analysed using microscopy compared to congeners P. lacustris Karsch, 1890 and P. elpidius Ris, 1921. DNA barcoding (COI gene) was performed on two specimens, with maximum-likelihood phylogenetic reconstruction using 28 sequences of Paragomphus and related species in addition to an outgroup. Mean interspecific genetic distance was computed manually. Morphological comparisons with congeners revealed unique diagnostic traits in P. alami sp. nov., including short, thick cerci ending with a black tooth, and an epiproct that is noticeably shorter than those of P. lacustris and P. elpidius. The phylogenetic analysis revealed that P. alami forms a well-supported monophyletic clade (bootstrap value = 100%), which is corroborated by morphological evidence, and no observed intraspecific variation, which supports the recognition of this species as distinct; this was further supported by the mean interspecific distance of 12.34%. This discovery highlights Sudan's role as a biogeographic crossroads and the need for further research of Odonata in the region. Habitat sensitivity highlights conservation urgency. The species seasonal emergence, habitat specificity, and sensitivity to deforestation underscore its conservation importance." (Authors)] Address: Elfaki, Esra, Environment, Natural Resources and Desertification Research Institute, National Center for Research (NCR), Khartoum, Sudan. Email: esraelfaki87@gmail.com

25660. Samways, M.J.; Córdoba-Aguilar, A.; Deacon, C.; Alves-Martins, F.; Baird, I.R.C.; Barmentlo, S.H.; Brasil, L.S.; Bried, J.T.; Clausnitzer, V.; Cordero-Rivera, A.; Datto-Liberato, F.H.; De Knijf, G.; Dolný, A.; Futahashi, R.; Guillermo-Ferreira, R.; Hassall, C.; Juen, L.; Khelifa, R.; Lozano, F.; Muzón, J.; Sahlén, G.; Sánchez Herrera, M.; Simaika, J.P.; Stoks, R.; Suárez-Tovar, C.M.; Suhling, F.; Tsubaki, Y.; Vilenica, M. (2025): Scientists' warning on the need for greater inclusion of dragonflies in global conservation. Insect Conservation and Diversity 18(4): 465-484. (in English) ["Odonata are ancient and familiar insects with a deep and strong cultural association with humans. They have an aquatic larval stage and an aerial adult stage, meaning that they respond to ecological conditions in both freshwater and the adjacent land surface. Currently, 16% of dragonflies are threatened. Overall, they face several threats, especially habitat loss, landscape transformation, pollution, altered hydrology, spread of invasive alien species, as well as certain geographic-specific threats. Overarching these threats, which can be interactive with each other, is the issue of global climate change and attendant extreme weather events. While many localised and habitat specialist species are under extreme threat, some other dragonfly species, mostly habitat generalists, benefit from certain moderate human activities, especially the creation of high-quality artificial ponds. As well-researched insects, dragonflies play an important role in the protection of freshwater and riparian ecosystems. Dragonfly assemblages have great value as sentinels of both deteriorating environmental conditions and ecosystem recovery following restoration. While similar findings on both threats and conservation actions are emerging across the world, certain ecosystems require targeted approaches. Above all, dragonflies must be included more widely in general biodiversity conservation activities and policies. Overall, dragonflies are important targets, tools and model organisms for conservation action, and they can act as potential surrogates for other taxa that also depend on high water and riparian zone quality. While research has paved the way to address these challenges, including the use of new technologies, we now urge that dragonflies be included more strongly in policy and management associated with both freshwater and adjacent terrestrial realms. This inclusion is especially effective as dragonflies have great appeal to a diverse community of people from odonatologists (citizen and professional) through to policymakers and managers, all of whom can employ dragonflies to contribute more to freshwater-associated conservation. Finally, we propose an action plan focusing on five action points that address opportunities, and we suggest where dragonflies can play a greater role in freshwater/riparian zone conservation more widely across the world." (Authors)] Address: Deacon, C., Dept of Conservation Ecology & Entomology, Stellenbosch Univ., Matieland 7602, South Africa. Email: charldeacon@sun.ac.za

25661. Sánchez, A.B.; Conesa García, M.Á. (2025): First record of a breeding population of Pseudagrion sublacteum (Karsch, 1893) (Odonata, Coenagrionidae) on the Iberian Peninsula. Boletín de la Asociación Española de Entomología 49(3-4): 443-445. (in English) ["The article presents the first record of a breeding population of P. sublacteum, an African-origin dragonfly species, in the Iberian Peninsula. This species, which had previously been documented in Morocco and other regions, was observed for the first time in Europe on June 6, 2025, in the Guadiaro River, near Málaga. Subsequently, the existence of a breeding population was confirmed in the Guadalete River, Cádiz, where multiple individuals and breeding activities were recorded. This finding increases the number of dragonfly species in the peninsula to 82, suggesting a possible expansion of Zygoptera species in the region." (Authors) September 24, 2025, Guadalete River (36°44'34.8"N 5°49'01.2"W, Cádiz, Spain] Address: Sánchez, A.B., Asociación Odonatológica de Andalucía, Spain. Email: arturo.libelula@gmail.com

25662. Sanllorente, O.; Blanco-Urdillo, E.; Sánchez-Tójar, A.; Ibáñez-Álamo, J.D. (2025): A systematic review and meta-analysis on urban arthropod diversity. Insect Conservation and Diversity 18(4): 447-464. (in English) ["Urbanization is rapidly expanding at the global level, a phenomenon often reported to exert negative effects on biodiversity. However, many important knowledge gaps about the effect of urbanization on biodiversity remain, posing important conservation challenges. This is especially true for certain taxonomic groups like arthropods, despite being the most diverse and abundant animal group on Earth. Here, we conduct an exhaustive systematic

literature review and meta-analysis to assess whether and how urbanization is negatively associated with arthropod diversity. We explored potential geographic, temporal and taxonomic biases in the availability of evidence. In addition, we make use of meta-analysis of variance to investigate whether urban areas across the world show similar patterns of arthropod diversity change. Our results support previous studies; urbanization and arthropod diversity are negatively associated. However, not all arthropod groups seem to respond similarly (e.g., Odonata) potentially suggesting the importance of implementing taxa-specific conservation actions in urban areas. On the other hand, our meta-analysis of variance showed higher variance in arthropod diversity in urban compared to non-urban habitats, suggesting great potential for the implementation of certain city conservation practices or attributes to promote arthropod communities. Last, we identified several key taxonomic and geographic biases that require additional scientific attention as well as strong evidence for negative-effects publication bias in the literature. Our results highlight the importance of urban ecology research for helping design more diverse urban ecosystems." (Authors)] Address: Sanllorente, Olivia, Depto de Zoología, Fac. de Ciencias, Univ. de Granada, Avda. Fuentenueva s/n, 18071 Granada, Spain. Email: oli@ugr.es

25663. Sato, S.; Jinguji, H. (2025): Understanding the impact of global warming induced by climate change on adult Sympetrum frequens. Abstracts of the 74th Annual Meeting of the Japanese Society of Irrigation, Drainage and Rural Engineering, 2025: 237-238. (in Japanese, with English title) [Verbatim/Google translate: 1. Introduction: S. frequens ... is a common species found in rice paddies. Males turn reddish, becoming a slightly yellowish crimson red as they mature, while females remain unchanged. After hatching from eggs in rice paddies or wetlands in early spring, they spend their larval stage in the water on flatlands. In early summer, they fly from the plains and migrate to high mountain altitudes, where they undergo reproductive diapause and mature. This migration to high altitudes is thought to be due to their inability to withstand the midsummer heat on the plains (Ueda 1998). In recent years, population declines of the common autumn darter have been reported (Nakanishi et al. 2024). While the impact of global warming has been identified, the exact mechanism remains unknown. Starr et al. (2019) investigated the impact of global warming on the ecology of Enallagma civile. The results revealed that egg hatching rates, larval survival rates, and larval size decreased with increasing water temperature. Jack et al. (2012) also investigated the body size response to temperature in 169 poikilothermic terrestrial and aquatic species. Their results revealed that increasing rearing water temperatures had a greater impact on body size in aquatic than terrestrial species. Specifically, for animals with a dry weight of approximately 100 mg, terrestrial species showed an average weight loss of 0.5% per 1°C increase in temperature, while aquatic species showed an average weight loss of 5%. However, these results were obtained from laboratory experiments and not from natural environments. Furthermore, previous studies have focused on dragonfly larvae other than those of the Rubiaceae genus, and no studies on adult dragonflies have been found. Therefore, in this study, we collected adult autumn darters in reproductive diapause at an altitude of 1,331 m and examined the effect of warming on adult size. The purpose of this study was to clarify the effects of global warming due to climate change on adult autumn darters. 2. Materials and Methods: Fifty adult S. frequens of each sex were collected from the Juhyo Plateau (38°09'06"N 140°24'38"E) on Mount Zao in Yamagata Prefecture over a five-year period from 2020 to 2024. The collection dates were September 15, 2020, August 27, 2021, August 20, 2022, August 22, 2023, and August 22 and 29, 2024. To allow the adults to excrete feces, the collected adults were wrapped alive in triangular paper and left at room temperature out of direct sunlight for 24 to 48 hours. They were then frozen and stored in a -20°C freezer (Nippon Freezer D-396HC). Subsequently, weight and morphological measurements were performed. Weight measurements were performed using an electronic balance (Sartorius CP2245). Sterile petri dishes were placed on the balance and weighed individually. For morphological measurements, adult insects were photographed with a single-lens reflex camera (RIKOH PENTAX KF BLACK 18-55WR KIT), and the images were analyzed using ImageJ software (version 1.54g, Java 1.8.0_345 64-bit). Body length, forewing length, hindwing length, and hindwing area were measured. Furthermore, relative forewing length (forewing length/body length) and relative hindwing length (hindwing length/body length) were calculated. For the analysis, we used R (4.4.2) to perform one-way analysis of variance and multiple comparisons, separating males and females, to compare morphology between collection years. As an indicator of warming due to climate change, we compiled the average temperature in Yamagata City using weather data published by the Japan Meteorological Agency. We used weather data from Yamagata City because we can infer that the autumn darters in reproductive diapause on the Rime Plateau are arriving from rice paddies in Yamagata City. We calculated the average daily temperatures for each day from May 1 to August 31, when S. frequens are estimated to be in their larval and adult stages. 3. Results and Discussion: Based on the weather data, the average temperatures for June-August in 2023 and 2024 were the highest compared to statistics over the past 100 years (see materials from the 207th RIHN seminar by Takashi Nakamura). Temperatures in Yamagata City from May to August also reached their highest levels over the five-year period, reaching 1.8°C higher in 2023 and 1.9°C higher in 2024 than the 30-year average from 1991 to 2010. Comparing body weight, the mean weight of females in 2023 and 2024 was significantly lower than in other years (Tukey HSD, $P < 0.001$). No significant differences were found in morphological comparisons of body length, forewing length, hindwing length, and hindwing area. However, relative forewing length and relative hindwing length were significantly smaller in 2024 than in 2020 for both sexes (Tukey HSD, $P < 0.01$). The results revealed that relative forewing and hindwing lengths were smaller in 2023 and 2024, when summer temperatures were high. Furthermore, Ancco et al. (2020) investigated the relationship between body size and territory formation rate in male Zenithoptera lanei and found that smaller individuals had lower territory formation rates than larger individuals. A decrease in territory formation rate may also lead to a decrease in mating success. Therefore, the population of S. frequens may also decline due to a decrease in body size caused by rising temperatures. Furthermore, s. frequens grow rapidly in rice paddies during their larval stage. Therefore, the impact of global warming can be more accurately examined by estimating the water temperature of the paddy field at the time rather than the air temperature and comparing it with morphology. References: (1) Ueda, T. (1988) Diversity of the life cycle of the autumn darter moth. Ishikawa Prefectural Agricultural College Research Report, Vol. 18, pp. 98-110. (2) Nakanishi, K., Yokomizo, H., Hayashi, T. (2024) Causal inference possible through an integrated approach: Did the autumn darter moth suddenly decline due to pesticides? Conservation Ecology Research.] Address: Sato, S., Fukushima Univ., Graduate School, Fac. of Food and Agricultural Sciences, Japan

25664. Simonsen, T.J.; Archibald, S.B.; Rasmussen, J.A.; Sylvestersen, R.L.; Olsen, K.; Ware, J.L. (2025): Danolestes

moelleri gen. et sp. nov., the first lestoid (Zygoptera: Odonata) from the early Ypresian Fur Formation of Denmark shows faunistic affinity to South America. Zootaxa 5739(1): 13-20. (in English) ["We describe Danolestes moelleri gen. et sp. nov., the first spreadwing damselfly (Odonata, Zygoptera, Lestoidea) known from the Danish earliest Eocene Fur Formation. The new taxon is placed in Lestoidea, and tentatively affiliated with Priscalestes and Promegalestes, two extinct genera known from Western Palearctic and South America respectively, highlighting the complex biogeographical affiliations of the Fur Formation biota. D. moelleri gen. et sp. nov. was preserved in a 'striated concretion' block from the Paleocene-Eocene Thermal Maximum (PETM) recovery phase. It is the second odonate and first zygopteran described from the PETM recovery phase of the Fur Formation." (Authors)] Address: Simonsen, T.J., Dept of Research & Collections, Natural History Mus. Aarhus, Wilhelm Meyers Allé 10, Aarhus, 8000 Aarhus C, Denmark

25665. Soares, A.; Carrapiço, T.; Barrocal, A. (2025): Pantala flavescens (Fabricius, 1798), new species for mainland Portugal (Odonata, Libellulidae). Arquivos Entomolóxicos 33: 333-336. (in Spanish, with English summary) ["P. flavescens was recorded in Quinta de Cima do Palácio do Marquês de Pombal (Oeiras, Lisbon), on the 18th and 19th of August 2025. Confirmed records of the species in mainland Portugal are compiled and the new occurrence is added." (Authors)] Address: Soares, A., Tagis – Centro de Conservação das Borboletas de Portugal. Rua das Portas de Évora, 3.7480-152 Avis, Portugal. Email: albano.apoidea@gmail.com

25666. Sysiak, M.; Baczynski, J.; Mikulski, A. (2025): The nonlinear effect of increasing cannibalistic predator density on heterospecific prey predation. Journal of Evolutionary Biology 39(2): 238-248. (in English) ["In cannibalistic interactions, the same chemical cue may signal either threat or hunting opportunity, depending on the receiver's perspective. In this study, we conducted a series of behavioral experiments to assess how varying concentrations of kairomones and alarm cues from injured conspecifics influence predation pressure that cannibalistic dragonfly larvae Brachytron pratense exert on heterospecific prey (Daphnia magna). Exposure to all chemical cue treatments increased larval mobility, but the response was non-linear: at low concentrations of conspecific cues, larvae displayed increased activity within refuges, leading to reduced hunting efficiency and prey consumption—suggesting a self-defensive behavioral response. In contrast, higher cue concentrations prompted more exploratory movement outside refuges without a corresponding increase in heterospecific prey capture. These findings suggest that B. pratense modulates foraging strategy in response to conspecific chemical cues, prioritizing cannibalistic interactions over heterospecific predation. This shift leads to density-dependent, nonlinear predation pressure and highlights the overlooked indirect effects of predator cannibalism on predator–prey interaction dynamics." (Authors)] Address: Sysiak, Monika, Department of Hydrobiology, Institute of Ecology, Faculty of Biology, Biological and Chemical Research Centre, University of Warsaw, Zwirki i Wigury 101, 02-089 Warsaw, Poland. Email: ma.sysiak@student.uw.edu.pl

25667. Tanczuk, A.; Kruk, Z.; Kuziora, P. (2025): Dysjunktywne stanowisko smaglca ogonokleszcza Onychogomphus forcipatus (Linneus, 1758) (Odonata: Gomphidae) na Wyżynie Lubelskiej i nowe dane z Kotliny Sandomierskie - Disjunctive site of Small Pincertail Onychogomphus forcipatus (Linnaeus, 1758) (Odonata: Gomphidae) on Lublin Upland and new records from Sandomierz Basin. Wiadomości Entomologiczne 45; online 1N: 1-3. (in Polish, with English summary) ["The authors present the new site of O. forcipatus from Zemborzycki Reservoir in Lublin (UTM: FB07, N 51.186467 E 22.543232). It is the first record of this species on the Lublin Upland. The site is located c. 150 km north from the more compact area of the Central Beskidian Piedmont and c. 60-100 km north from scattered sites in the Sandomierz Basin and the Roztocze. There are no optimal habitats for the reproduction of the species in the place of observation and in the vicinity. The recorded imago was probably a migrant or a part of a disjunctive population, yet undiscovered, on the Lublin Upland (perhaps in the upper course of Bystra River)." (Authors)] Address: Tanczuk, Agnieszka, Sekcja Odonatologiczna Polskiego Towarzystwa Entomologicznego, Katedra Zoologii i Ochrony Prodowiska, Wydzial Biologii i Biotechnologii Uniwersytetu Marii Curie-Sklodowskiej, ul. Akademicka 19, 20-033 Lublin, Poland. Email: atanczuk@gmail.com

25668. Theys, C.; Jorissen, S.; Janssens, L.; Tüzün, N.; Decaestecker, E.; Verheyen, J.; Stoks, R. (2025): The gut microbiome shapes latitudinal differences in host immunity and pathogen load in a damselfly. Journal of Animal Ecology 94(10): 2130-2145. (in English) ["Latitudinal patterns in fitness-related traits within species are receiving increased attention as these inform how high-latitude populations may evolve in response to global warming. The underlying mechanisms for these latitudinal trait patterns remain poorly understood, and recently the gut microbiome has been suggested to be a potentially important proximate driver of these patterns. We investigated the novel idea of whether the gut microbiome drives latitudinal differences in immune function and pathogen load. To test this idea, we performed a reciprocal gut microbiome transplant between slow-paced, high-latitude (southern Sweden) and fast-paced, low-latitude (southern France) populations of Ischnura elegans damselflies. The transplants were conducted in the laboratory between high- and low-latitude larvae, at both a colder and warmer thermal regime, whereafter larvae were exposed to Escherichia coli, a widespread pathogenic bacterium in aquatic ecosystems. During the experiment, larval mortality, growth rate, phenoloxidase (PO) level (a measure of immune function), E. coli burden (a measure of pathogen load) and the gut microbiome diversity (a-diversity) and community compositions (ß-diversity) were analysed. Exposure to the pathogen increased mortality, especially under warming. Our results confirmed latitude-associated thermal adaptation and a faster pace of life of the low-latitude larvae, which was associated with a lower immune function (lower activity of PO), consistent with previous findings and now showed this to be linked to a higher pathogen load (higher E. coli body burden). Moreover, our results provided the first experimental evidence that the gut microbiome causally contributed to latitudinal differences in the host's immune function and pathogen load. As latitudinal patterns in the microbiome are widespread, this may be an important yet ignored proximate driver of the latitudinal patterns in immune function and pathogen load." (Authors)] Address: Theys, Charlotte, Laboratory of Evolutionary Stress Ecology & Ecotoxicology, University of Leuven, Charles Deberiotstraat 32, 3000, Leuven, Belgium. Email: theys.charlotte@kuleuven.be

25669. Toulabi, S.; Banazadeh, A. (2025): Modeling and simulation of 18-degree-of-freedom flight dynamics of a dragonfly-inspired micro aerial vehicle considering quasi-steady aerodynamics. Sharif Mechanical Engineering Journal 41(2): 107-125. (in English) ["This study presents the dynamic modeling and simulation of an 18-degree-of-freedom (DOF) dragonfly-inspired micro aerial vehicle (MAV) with rigid wings, incorporating a quasi-steady aerodynamic framework. The model is developed using a multi-body dynamics approach,

in which the central body accounts for six DOFs and each of the four wings contributes three DOFs, capturing both translational and rotational motions. The full set of coupled nonlinear equations of motion is derived via the Newton–Euler method for the body and rigid wings, considering internal force and torque interactions among all components. Unsteady aerodynamic mechanisms—namely delayed stall, rotational lift, and added mass inertia—are integrated into the quasi-steady model to capture the dominant lift- and thrust-producing phenomena observed in flapping-wing flight. Empirical formulations, calibrated from prior insect flight experiments, are employed to determine aerodynamic force coefficients, which are then validated through dedicated experimental measurements. The resulting model enables accurate nonlinear simulation of both hovering flight and turning maneuvers, modes in which dragonflies achieve exceptional stability and agility through coordinated forewing–hindwing interactions. The aerodynamic coefficients and force profiles extracted from experiments are incorporated into the simulation to evaluate performance, with results showing strong agreement between predicted and measured aerodynamic loads. This consistency confirms the physical plausibility and predictive capability of the proposed framework. The novelty of this research lies in the integration of a detailed multi-body dynamics formulation with biologically inspired quasi-steady aerodynamics, producing a unified and experimentally validated model suitable for both dynamic analysis and control design. Beyond replicating key aerodynamic effects, the model provides a flexible tool for exploring the influence of wing kinematics, body–wing interaction forces, and aerodynamic parameters on overall flight performance. Such a framework serves as a robust foundation for future studies on stability augmentation, maneuvering control strategies, and the design optimization of bio-inspired MAVs. Ultimately, this work contributes to a deeper understanding of flapping-wing flight mechanics and offers practical insights for the development of high-agility, hover and turn-capable aerial systems." (Authors)] Address: Banazadeh, A., Dept of Aerospace Engineering, Sharif Univ. Technology, Iran. Email: banazadeh@sharif.edu

25670. Umar, A.; Bashir, A.I.; Sabiyal, K.M.; Abatcha, B.M.; Adagbo, A.P. (2025): Assessment of water quality parameters and aquatic insects' assemblages of Lake Alau, Borno State, Nigeria. Nigerian Journal of Science and Environment 23(3): 118-132. (in English) ["Freshwater environments, aquatic insects have become one of the most trustworthy categories of bioindicators. They are useful tools for biomonitoring because of their ease of collection, comparatively sedentary nature, and variable sensitivity to environmental changes This study assessed the ecological condition of Lake Alau, Borno State, Nigeria, by integrating physicochemical parameters with aquatic insect assemblage data. Statistical monitoring across the three sampling stations revealed that the physicochemical parameters varied spatially, with pH ranging from slightly acidic to neutral (6.7–7.4), dissolved oxygen levels from 4.2 mg/L at the inflow to 6.1 mg/L at the mid-lake, and comparatively elevated nitrate (12–22 mg/L) and phosphate (15–18 mg/L) concentrations. Although the variations in pH and dissolved oxygen were not statistically significant ($p>0.05$), the differences in nutrient concentrations (nitrate and phosphate) were significant ($p>0.05$), indicating nutrient enrichment and a potential risk of eutrophication. Electrical conductivity (280–400 µS/cm), total dissolved solids (150– 220 mg/L), and sulfate (22–35 mg/L) also showed spatial variation, with higher values at the inflow. A total of 1,246 aquatic insects from seven families were identified, dominated by Chironomidae (37.5%) and Culicidae (13.8%), while Odonata and Hemiptera contributed smaller proportions. Diversity peaked at the mid-lake station (Shannon 2.40; equitability 0.89), reflecting relatively stable conditions. The correlation analysis showed strong positive associations between dissolved oxygen and diversity indices, and strong negative correlations between nutrients and diversity, underscoring the influence of nutrient enrichment on community structure. Lake Alau is moderately impacted by anthropogenic pressures, with nutrient loading and low oxygen posing ecological stress. However, the presence of moderately sensitive taxa suggests resilience and recovery potential. Effective management should integrate routine physicochemical and biological monitoring, reduction of agricultural runoff, improved waste management, and sustainable fisheries regulation to safeguard the lake's ecological health and socio-economic functions." (Authors) Odonate taxa are treated at family level.] Address: Umar, A., Department of Fisheries Technology, Federal College of Freshwater Fisheries Technology Baga, P.M.B. 1060 Maiduguri, Borno State, Nigeria. Email: audamaturu@gmail.com

25671. van Gasteren, H.; Teunizen, M. (2025): Five military air bases meet the Basic Nature Quality Standard. De Levende Natuur 126(6): 231-236. (in Dutch, with external English summary) ["Recently the concept of Basic Nature Quality is developed in the Netherlands. The main aim of this concept is to keep common species common and wide-spread. The Royal Netherlands Air Force made an inventory of butterflies, dragonflies and bumblebees from April-September 2023-2024 on eight airbases using 15 minute-counts. All defined species were scored to measure the Basic Nature Quality and find out which pressure factors were important (based on presence/absence of species sensitive for specific pressure factors). From the results we conclude that common species are still common on five out of eight military airbases. Drought is the main pressure on these military airbases. ...Dragionflies: "On average, 86% of the basic species and 63% of the plus species were found at all air bases, and 5 (middle), with a 100% score for basic species at three of the eight air bases! De Kooy lacks basic species such as Sympetrum sanguineum, Aeshna grandis, and erythromma najas, and plus species are completely absent. Plus species thrive at Leeuwarden air base and most air bases in North Brabant, with a 100% score at De Peel. Local water features — fire ponds, ditches, or canals — play an important role for the dragonflies. Notable plus species are Sympetrum striolatum (common), Ischnura pumilio (at three of the six air bases located on sandy soil), and Coenagrion scitulum (nine). The latter occurs at all Brabant air bases and is even common at the air base in Woensdrecht. Sympetrum vulgatum, a plus species of sandy soils found throughout the Netherlands, is following Aglais urticae and has only been found at three of the six air bases. However, in Leeuwarden, it was the most common darter (331 individuals counted)." (Authors)] Address: van Gasteren, H., Ministerie van Defensie, Koninklijke Luchtmacht, The Netherlands. Email: jr.v.gasteren@mindef.nl

25672. Vdovina, O.N.; Bezmaternykh, D.M. (2025): Macrozoobenthos as an indicator of the ecological state of lakes in Altai Specially Protected Natural Areas. Inland Water Biology 18: 849-861. (in English) ["The quality of the aquatic environment in Altai Mountain lakes located in the territories of SPNAs of different categories is investigated. Using 12 metrics and biotic indices based on macrozoobenthos indicators (total biomass; number of species; Shannon species diversity indices; oligochaete; chironomid; D/Nex; %NCh + O; Ephemeroptera, Plecoptera, and Trichoptera (EPT); Ephemeroptera, Trichoptera, and Odonata (ETO) [no details on species composition are given]; Multimetric Macroinvertebrate

Index Flanders (MMIF); Biological Monitoring Working Party Index (BMWP); and the Average Score Per Taxon Index (ASPT)), the water quality of seven Altai lakes is assessed: Verkhnee Multinskoe, Poperechnoe, Aya, Koksha, Svetloe, Kolyvanskoe, and Beloe. Five lakes can be used as reference lakes for water bodies of this type. The multimetric BMWP and MMIF indices show similar results in most of the studied lakes, correlated with each other and with other benthic community metrics. The analysis of their relationship with hydrochemical and physical parameters of the environment allow us to identify the main indicators determining the ecological state of the water bodies. The positive influence of water salinity or components determining it are noted; moreover, the values of bioindication indices are related to the content of oxygen and nutrients." (Authors)] Address: Vdovina, O.N., Institute for Water and Environmental Problems, Siberian Branch, Russian Academy of Sciences, Barnaul, Russia

25673. Ware, J.; Abbott, J.; Abbott, K.; Beatty, C.D.; Bota-Sierra, C.A.; Büsse, S.; Cano-Cobos, Y.; Combey, R.; Ehlert, J.; Fomekong-Lontchi, J.; Frandsen, P.; Goodman, A.; Guralnick, R.; Juen, L.; Kalkman, V.J.; Kemabonta, K.; Kohli, M.; Lupiyaningdyah, P.; Newton, L.; Onsongo, V.; Pessacq, P.; Pinto, A.P.; Ferreira, R.G.; Salas, R.; Sanchez Herrera, M.; Sutherland, L.; Tennessen, K.; Tolman, E.; Uche Dike, R.; Wellenreuther, M.; Bybee, S. (2025): Odonata systematics: past, present, and future: a review of the phylogenetic works in Anisoptera (dragonflies). Insect Systematics and Diversity 9(4), 9: 31 pp. (in English) ["Odonata is an insect order that comprises ~6420 described species distributed among three suborders. Here we review the dragonflies, or Anisoptera, a suborder which has 10 described families, and forms a sister group relationship with the 'Anisozygoptera' [Epiprocta: Anisoptera + 'Anisozygoptera'], a paraphyletic grouping containing just one extant family and many extinct taxa. Dragonflies are charismatic, ancient, fast flying, predatory insects whose natural history is woven into the fabric of human culture. As objects of systematic study, their relative position in the insect tree of life relates to the origin of flight, of freshwater juvenile lifestyles, and the evolution of color and vision. In this paper, we will review the past, present, and future of Odonatology, highlighting the work being done all across the globe to revise and define the Anisoptera. In particular, we focus on 'problematic' areas in the tree, the Gomphidae and Libellulidae, with an emphasis on how taxon and data sampling are solving these problems in the current global work." (Authors)] Address: Ware, Jessica, Division of Invertebrate Zoology, American Museum of Natural History, 200 Central Park West, NY, NY, 10024, USA. Email: jware@amnh.org

25674. Wildermuth, H.; Wildermuth, S.; Roesti, C.; Roesti, D.; Kohl, S. (2025): Further contribution to the knowledge of the dragonfly fauna of Albania (Odonata) (2025). Libellula 44(1/2): 79-97. (in German, with English summary) ["On a nature and photo trip to southern Albania, 30 dragonfly species were recorded at 20 different locations. Onychogomphus forcipatus proved to be the most common species. Calopteryx splendens, C. virgo, Enallagma cyathigerum, Ischnura elegans, and Orthetrum cancellatum were also widespread. Species of which hitherto there have only been a few or single records in Albania were documented with one locality each: Lindenia tetraphylla, Cordulegaster heros, Orthetrum albistylum and Selysiothemis nigra, while the otherwise common Platycnemis pennipes was not recorded. The varying information on the individual species in the literature indicates how poor the knowledge of Albania's dragonfly fauna is. Further studies are needed regarding the conservation and the protection of rare species and their habitats in this country." (Authors)] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

25675. Willink, B.; Ho, T.A.T.; Svensson, E.I. (2025): Ecology and sexual conflict drive the macroevolutionary dynamics of female-limited color polymorphisms in damselflies. PNAS 122(36) e2503400122: 10 pp. (in English) ["When females benefit from reduced mating, they may evolve distinct genetic morphs, which decrease overall male mating success. In pond damselflies, female-limited color polymorphisms are maintained within populations by frequency-dependent selection, driven by sexual conflict over mating. Here, we show that female-limited polymorphisms typically evolve through the origin of a novel male-colored female morph, consistent with the hypothesis that such male-like females are male mimics. Moreover, female polymorphisms predictably evolve with environmental conditions that increase the densities of interacting adults and thus the intensity of sexual conflict. Sexual conflict over mating has been documented in many species, both in the field and in experimental studies. In pond damselflies (family Coenagrionidae), sexual conflict maintains female-limited color polymorphisms, with one female morph typically being a male mimic. However, it is not known whether sexual conflict can also explain the evolutionary origin of novel female morphs, and if so, what ecological factors play a role in this macroevolutionary transition, by modulating the strength of the conflict. Here, we use phylogenetic comparative methods to show that female color polymorphisms are more likely to evolve in temperate regions and open landscapes, whereas region and habitat shifts are independent of female-color states. We also show that these macroecological patterns are mediated by population densities at breeding sites. Temperate and open habitats are associated with female-polymorphic lineages because they harbor higher densities of adults, promoting more frequent encounters between females and males. Finally, we found that female-limited polymorphisms typically evolve from sexually dimorphic ancestors through the addition of a male-like female morph, consistent with the hypothesis of selection for male mimicry. We conclude that female color polymorphisms evolve in a predictable fashion and are likely driven by ecological conditions that increase the rate of premating interactions and thus the intensity of sexual conflict." (Authors)] Address: Willink, Beatriz, Dept of Entomology, Cornell University, Ithaca, NY 14853, USA. Email: beatriz.willink@cornell.edu

25676. Woo, M.P.; Detmer, T.M.; Montana E. Airey, M.E.; Jane, S.F.; Sax, D.F.; Dlugos, E.; Menard, E.G.; Torres-Dowdall, J.; McIntyre, P.B. (2025): Comparing influences of natural and artificial woody habitat on benthic macroinvertebrates in a north temperate lake. Hydrobiologia 853: 701-717. (in English) ["Littoral habitat is an important organizing force in lacustrine food webs. Modification of littoral habitat directly impacts aquatic macroinvertebrates, which are important vectors between basal resources and higher trophic levels. Lakeshore residential development is a pervasive phenomenon often characterized by the loss of coarse woody habitat (CWH) from lakes, and the construction of artificial wooden structures (docks and ramps). To characterize the effects of artificial wooden structures on macroinvertebrate spatial distributions, we surveyed assemblages across a lightly developed lake in New York's Adirondack Park. Using benthic sweeps and Hester-Dendy samplers, we sampled assemblages at both natural CWH and artificial wooden structures (boat ramps), and compared them to those in adjacent, non-woody areas. We found that both CWH and artificial wooden structures facilitated larger, more complex assemblages than non-woody areas. We additionally considered general shoreline characteristics, and

found only compositional effects on assemblages. We suggest that impacts on aquatic macroinvertebrates arise at a fine spatial scale, and find evidence that development associated CWH loss drives macroinvertebrate depletion. Although CWH and artificial wooden structures are unlikely to be equivalent at whole-lake scales, macroinvertebrate depletion may be functionally alleviated at fine scales by the construction of artificial wooden structures such as ramps." (Authors) The sampling includes "Coenagrionidae". In the supplemental material, odonate taxa are treated at genus level.] Address: Woo, M.P., Dept Ecology, Evolution, & Organismal Biology, Brown Univ., Providence, USA. Email: mattwoo892-@gmail.com

25677. Yu, X. (2025): Chinese Odonata application and observation manual (Chongqing Part). ISBN: 9787568952873: 264 pp. (in Chinese) [The book "provides a detailed introduction to the morphological characteristics, habits, habitats, and conservation value of 107 dragonfly species in the Chongqing area, offering abundant field observation data and beautiful photographs. The book also introduces the Dragonfly Biological Index (DBI), which can be used to assess the health of the ecological environment, making it a practical handbook for ecology enthusiasts, researchers, and nature observers." (Publisher)]

25678. Yurdakul, F.; Salur, A. (2025): Ecological assessment of Odonata larvae in Turkish wetlands: A case study from Tokat province. Munis Entomology & Zoology 20(2): 3369-3381. (in English) ["In this study, detailed sampling of Odonata larvae was conducted across 22 diverse localities spanning the Erbaa, Niksar, and Resadiye districts of Tokat province, with the aim of evaluating their faunistic characteristics and ecological relationships. Through extensive field collection efforts, researchers gathered a substantial dataset comprising 1,642 individual specimens. Subsequent taxonomic analysis and identification work revealed a rich diversity of odonates, encompassing 13 distinct genus distributed across 7 families, all of which were identified within a broader taxa group containing 18 species. Notably, this research represents the first documented occurrence of these larval specimens within the study area, making it a significant contribution to the region's biodiversity records. Throughout the text, detailed information is provided regarding the faunistic distribution of the collected specimens and the various habitat types in which they were found across the study region." (Authors)] Address: Yurdakul, F., Hitit Univ., Graduate Education Institute, Biology, Çorum, Türkiye. E-mail: yurdakulferhat89@gmail.com

25679. Zamziba, N.L.; Zainal, S.; Alwi, H.; Hasmi, N.A.; Aziz, R.A. (2025): Study the effects of water quality index value on the existence of aquatic insect families at Sungai Kampong Klewang, Royal Belum Perak. AIP Conf. Proc. 3322(1), 050004 (2025): 10 pp. (in English) ["River water quality deteriorates as economic activity and urbanization grows. Several aquatic insects are sensitive to changes in water pollution. Therefore, any changes in the water quality will affect their habitat, followed by reflecting the variations in the abundance of these insects. Hence, this study attempted to study the effects of the Water Quality Index (WQI) value on the existence of aquatic insect colonies at Sungai Kampung Klewang, Royal Belum Perak Malaysia. The Malaysian Department of Environment-Water Quality Index (DOE-WQI) was determined for the river of Kampung Klewang, while aquatic insects were captured using an aquatic net. Water and aquatic insects were sampled two times, and all measurements were performed in triplicate. The WQI's parameters studied consist of seven parameters, including temperature, pH, and dissolved oxygen (DO) for in-situ parameters. In contrast, the biochemical oxygen demand (BOD), chemical oxygen demand (COD), total suspended solids (TSS), and ammoniacal nitrogen (AN) were analyzed in the laboratory using basic protocols established by the 2005 guidelines of the American Public Health Association (APHA). The WQI formula was carried out to compute the findings. From the result obtained, the WQI value of Sungai Klewang is 80.05%, and it falls under Class II. This sampling point has a temperature of 24.03°C, pH value of 6.94, DO level of 74.53%, BOD level of 3.5 mg/L, COD level of 40.5 mg/L, TSS level of 16 mg/L and the AN level of 0.27 mg/L. In addition, a total of 263 individuals belonging to 6 orders, which are known as Hemiptera (85.2%) of the samples, followed by Ephemeroptera (4.6%), Coleoptera (4.2%), Odonata (3.4%), Plecoptera (2.3%) and Trichoptera (0.4%)." (Authors)] Address: Zainal, S., School of Chemical Engineering, College of Engineering, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia. Email: drsafari@uitm.edu.my

25680. Zhang, H.-m. (2025): Dragonflies and Damselflies of Yunnan (Vol.1). ISBN: 9787558755606: 564 pp. (in Chinese, Latin names) ["Dragonflies and Damselflies of Yunnan (Vol. 1) Currently, there are 6200 species of dragonflies worldwide, with over 1000 in China. Yunnan province alone boasts approximately 500 species, accounting for half of the national total. Some species are found only in Yunnan, such as the "beauty" of the order Odonata—the Black-winged Dragonfly. However, to date, there is no comprehensive book on Yunnan dragonflies; therefore, this book fills a gap in dragonfly research in our province. This set of books is divided into three volumes: Volume 1 contains 157 species, Volume 2 contains 159 species, and Volume 3 contains 140 species plus an index. For each dragonfly species, the author describes its morphological characteristics, length, habitat, distribution, and flight period, accompanied by ecological photographs to facilitate identification and reference. This volume is Volume 1." (Publisher)]

25681. Zulhariadi, M.; Nugroho, M.S.; Hidayani, N. (2025): Some new ecological aspects of the Lesser Sunda endemic Drepanosticta berlandi (Odonata: Zygoptera: Platystictidae). Makara Journal of Science 29(4): 482-489. (in English) ["D. berlandi is an endemic damselfly in the Lesser Sunda region of Indonesia, which was first recorded on Lombok Island in the 19th century. Albeit recognized for a century, information on its ecology is still lacking; hence, this study aims to reveal its distribution and habitat preferences. The research was conducted at the Tibu Ijo Waterfall tourist area in West Lombok Regency using line transects combined with field survey in the Kekait River and on footpaths on both sides of the river. Vegetation density, topography, and land survey temperature (LST) were measured at the sampling area using ArcGIS 10.4.1 software. Other environmental parameters (air temperature and humidity, CO_2 levels, light intensity, height, canopy cover, water temperature, pH, total dissolved solids (TDS), and electrical conductivity (EC)) were measured in situ. The results show that D. berlandi has a clumping distribution pattern in the elevation range of 60 to 220 m, preferring medium vegetation density and cool air temperatures (22–26 °C). Disturbances from human activities and environmental changes pose a significant threat to the D. berlandi population. Therefore, this species represents a bioindicator of environmental intactness, especially on the island of Lombok." (Authors)] Address: Zulhariadi, M., Biol. Education Dept, Universitas Islam Negeri Mataram, Mataram 83116, Indonesia. Email: ryadislam@gmail.com

25682. Zunnikah, Z.; Hadisusanto, S.; Nurjani, E. (2025):

Diversity of dragonflies (Odonata) as bioindicators of water quality in Mangkol river, Terak village, Simpang Katis subdistrict, Central Bangka regency. Bioma: Berkala Ilmiah Biologi 27(2): 60-67. (in English) ["Odonata can serve as bioindicators of environmental quality, especially water quality. The Mangkol River, located within Bukit Mangkol Grand Forest Park (Tahura), Terak Village, Central Bangka Regency, is a raw water source used by residents of Pangkalpinang City through the regional water company, Perumda Air Minum Tirta Pinang. While the river's upstream serves as a raw water source, illegal tin mining activities in the midstream and downstream sections have altered the river's condition, causing sedimentation and turbidity. This study aimed to examine dragonfly diversity as bioindicators of water quality in the Mangkol River. Dragonflies were observed using the cruising method and direct capture with insect nets, supplemented with water quality data measured in the field and laboratory. Dragonfly diversity comprised 2 families, 12 species, and a total of 104 individuals. The Family Biotic Index (FBI) indicated poor water quality at station 1 (6.90) and very poor quality at stations 2, 3, and 4 (9.00)." (Authors)] Address: Zunnikah, Z., Environmental Science, Graduate School, Universitas Gadjah Mada, Yogyakarta, Indonesia. Email: zunnikah@mail.ugm.ac.id

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25683. Abdennour, N.; Fraj, M.; Mansour, R.; Ghazouani, A.; Ismail, A.M.; El-Beltagi, H.S.; El-Mogy, M.M.; El-Ganainy, S.M.; Elmenofy, W.; Hajjar, M.J.; Joseph, S.V.; Attia, S. (2026): Evaluating the influence of trap type and crop phenological stage on insect population diversity in Mediterranean open-field tomatoes. Insects 2026, 17, 36: 22 pp. (in English) [Tunisia "We evaluated how different trap types and phenological stages of open-field tomato crops affect the diversity of insects belonging to the order Hymenoptera in southern Mediterranean conditions. We found that colored pan traps, especially the yellow ones, captured the highest diversity of insects, while Malaise traps captured fewer but different insect groups. Insect diversity was highest at the beginning of the crop cycle and during flowering and declined sharply at harvest. Pollinating insects belonging to the families Apidae, Halictidae, and Megachilidae were the most abundant during flowering, whereas parasitoid wasps belonging to the families Braconidae and Eulophidae were more commonly found during the fruit development stage. These results show that using a combination of trap types and considering the timing of crop development stage are essential to accurately monitor hymenopteran beneficial insect communities and to improve sustainable management of tomato agroecosystems.... A total of 1771 insects were collected during the survey, spanning 7 orders and 31 families. Among these, the order Hymenoptera had the highest count of families (25 families) and accounted for the largest share of insect individuals (1467 individuals). In contrast, the orders Neuroptera and Odonata exhibited lower counts of families (1 family each) and insect individuals (1 and 2 individuals, respectively) (Table 1)." (Authors)] Address: Abdennour, N., Laboratory of Bioaggressors & Integrated Pest Management in Agriculture (LR14AGR02), National Agronomic Institute of Tunisia (INAT), University of Carthage, 43 Avenue Charles Nicolle, Cité Mahrajène, Tunis 1082, Tunisia. Email: abdennournada11@gmail.com

25684. Abilash, H.R.; Sylvester, C. (2026): A record of interference predation during mating in Odonates. Zoo's Print 41(2): 20-22. (in English) [Sindhuvalli Lake (12.048° N; 76.693° E), Nanjangud, Mysuru District, Karnataka, India. 11 October 2025. Documentation of mature Brachythemis contaminata preying on a mating pair of Pseudagrion decorum.] Address: Abhilash, H., Mukthidhama Road, Hootagalli, Mysore, Karnataka 570018, India. Email: abhilash2787@gmail.com

25685. Ahmed, S.R.; Inam, M.I. (2026): Numerical investigation of the effect on modifying corrugated peak ratio of the dragonfly wing section. ICME 2025, 15th International Conference on Mechanical Engineering, 17-18 December 2025, BUET, Dhaka, Bangladesh: 6 pp. (in English) ["The design of the wings of the MAVs should be done in such a way that they can glide more. In general, the dragonfly's wings are capable of producing more lift than traditional wings at low Re. That's why it is suitable for the MAV's application. This research is a 2D numerical investigation of the effect of modification of the peak ratio of the pleated section of Aeshna cyanea in the gliding phase. The numerical analyses were conducted in Ansys Fluent at low Re 200, 1600, and 2400, where the MAVs typically fly, and at the angle of attack 0° to 30°. Also, the effect of the modification of the different peak ratios was analyzed, and the maximum coefficient of lift was obtained on the peak ratio 2.0 model. The effect of the peak ratio on the coefficient of drag and the flow field was also investigated." (Authors)] Address: Ahmed, S.R., Dept Mechanical Engineering, Khulna Univ. Engineering & Technology, Khulna-9203, Bangladesh. Email: syedridwanahmed21@gmail.com

25686. Alexandre, L.; Costa-Pereira, P. (2026): Social media highlights the overlooked impact of cats on arthropods. Insect Conservation and Diversity 19(2): 460-465. (in English) ["1. The severe impact of domestic cats on vertebrate biodiversity is unequivocal. How-ever, cats are generalist predators that also hunt various invertebrate taxa, yet we are still far from understanding the impacts of these predators on arthropod populations. Here, we analysed records from social media to explore which arthropods are most preyed upon algorithms of two online platforms, iStock and TikTok, we analysed >17,000 photos and videos, which yielded 550 records of predation events by domestic cats. We examined these images to identify the orders of arthropods most frequently preyed upon by cats. We compared our findings with data from a recent global synthesis of academic papers quantifying the diet of domestic cats. 3. In total, we recorded 14 distinct arthropod orders killed by domestic cats. Orthoptera was the most frequently preyed upon order, accounting for 20.7% of the records. Hemiptera (14.5%) and Blattodea (14.4%) were also commonly observed. Our data show that domestic cats hunt a surprisingly diverse range of arthropods in urban settings. 4. Overall, the data collected from social media showed similarities but also some differences compared to the general patterns found in the scientific literature on the diet of domestic cats. This finding emphasizes that these different data streams are not redundant; therefore, combining them can be an effective way to thoroughly document ecological interactions in urban environments. 5. Social media serves as a powerful and rapidly growing source of biodiversity data for ecologists and conservation biologists. Our study presents new records of arthropod predation by cats and highlights the diversity of invertebrate prey killed by domestic cats in urban settings. Together, these findings offer new insights into the neglected impacts of cats on arthropod populations." (Authors) Odonata accounted with 7,1% to the prey of domestic cats.] Address: Alexandre, Leticia, Instituto de Biologia, Universidade Estadual de Campinas, Campinas, Brazil. Email: alexandre.letc@gmail.com

25687. Alhinai, A.; Senkel, T. (2026): Numerical study into

the spanwise effects for the three-dimensional unsteady flow over a bio-inspired corrugated infinite wing at low Reynolds number. Biomimetics 11(2), 90; https://doi.org/10.3390/biomimetics11020090: 27 pp. (in English) ["Corrugated insect wings inspire biomimetic aerodynamic design, yet their behaviour at low and transitional Reynolds numbers remains not fully understood. This study presents a three-dimensional computational analysis of flow over an infinite corrugated wing across Reynolds numbers from 10 to 10,000 and angles of attack from -5 to 20°, with emphasis on spanwise effects. An expanded verification and validation procedure ensured numerical reliability. At the lowest Reynolds numbers, the flow is steady and largely two-dimensional, with localised recirculation zones. As Reynolds numbers or angles of attack increase, the flow transitions to periodic vortex shedding, and three-dimensional structures appear. At a Reynolds number of ten thousand, periodic shedding occurs at zero degree incidence, indicating a shift toward turbulent or bluff body-like behaviour. The examined corrugated profile does not exhibit a lift-to-drag benefit over smooth aerofoils in steady gliding, although root section corrugation helps delay separation in transitional regimes. This behaviour reflects mechanisms used by dragonflies to maintain stable gliding despite textured wings. By extending flow regime classification, the study identifies conditions where two-dimensional assumptions fail and highlights the influence of spanwise flow structures. These findings deepen understanding of insect wing aerodynamics and support biomimetic design of future wings." (Authors)] Address: Alhinai, A., School of Engineering & Built Environment, Sheffield Hallam University, Howard Street, Sheffield S1 1WB, UK. Email: a.alhinai@shu.ac.uk

25688. Anonymus (2026): Reinhard Jödicke - 1 July 1948 to 25 November 2025. Agrion 30(1): 4. (in English) [Verbatim: "On the 25th of November last year Reinhard Jödicke, one of the foremost German odonatologists passed away at the age of 77 years. He mainly published on Western Palaearctic dragonflies and damselflies but had a tremendous international impact through his work for International Journal of Odonatology. From 2001 to 2010 he served as Managing Editor of the journal during which 21 issues of the journal were made ready for publication. This included the special issue titled: Guardians of the watershed, published in 2004, which he co-edited with Viola Clausnitzer. It is still a great read and a valuable resource for all those interested in the conservation of odonates (Clausnitzer & Jödicke 2004). After his retirement as editor he remained active as a reviewer for various odontological journals and became a member of the editorial team of Notulae odonatologicae from 2018 onwards. He combined a passion for sound science with the ability to provide authors with positive feedback, helping many new authors to publish their first contributions. Those who are interested in European odonates probably know many of his publications. He was part of the editorial board (1991-2006) of Libellula, the journal of the GdO (Gesellschaft deutschsprachiger Odonatologen). During this period the journal became more internationally focused with the publication including special issues on the dragonflies and damselflies of Greece and Turkey. His long-term interest in the Iberian Peninsula (Spain and Portugal) resulted in the publication he edited, titled: Studies on Iberian Dragonflies (Jödicke 1996). However, most of his own publications are centered on species occurring in Europe with Lestidae and the genus Sympetrum taking a central place. He had a broad spectrum of interest including phenology, diurnal patterns, taxonomy and faunistics. On the European Lestidae he wrote a very thorough monograph, Die Binsenjungfern und Winterlibellen Europas (Jödicke 1997). His more recent publication showed that for people with a sharp and curious mind it is not needed to travel to far-away destinations in order to learn more about dragonflies and damselflies. A more detailed obituary with a full list of publications will be published later this year in Libellula."] Address: not stated

25689. Bakare, A.B.; Adu, B.W.; Ashamo, M.O.; Bankole, T.O. (2026): Influence of land use practices on water quality and Odonata dynamics in two rivers and adjacent wetlands in Akure, South West, Nigeria. Agrion 30(1): 25-32. (in English) ["Land use intensification and transformation driven by human activities like agriculture, urbanization, and industrialization pose significant threats to water quality and biodiversity. This study assesses the water quality and Odonata assemblages in two rivers with different land use patterns in Akure, Southwest Nigeria, informing conservation and management efforts in the study area. Most sites exhibit no significant seasonal variation in physicochemical characteristics ($p > 0.05$). The study recorded 1,536 Odonata individuals, comprising 6 families, 18 genera, and 31 species. Pseudagrion 'A' kersteni (335 individuals) is the most frequent species, while Pantala flavescens and Orthetrum chrysostigma were the least frequent. Notably, two female Lestinogomphus minutus, listed as Data Deficient on the IUCN Red List, were discovered. Stenotopic species presence suggests conservation can boost Odonata diversity in urban areas." (Authors)] Address: Bakare, A.B., Dept of Environmental Health Science, Federal University of Health Sciences, Ila-Orangun, Nigeria. Email: bakareayodeji54@gmail.com

25690. Benkheira, A.; Ouadah, N.; Aissa, M. (2026): Découverte d'Orthetrum ransonnetii (Brauer, 1865) dans l'oasis de M'Chouneche (wilaya de Biskra, Algérie) (Odonata: Libellulidae). Martinia 40(2): 4-9. (in French, with English summary) [Discovery of O. ransonnetii in the M'Chouneche oasis (wilaya de Biskra, Algérie) (34°55'03"N 5°58'44"E, May 2025.] Address: Benkheira, A., Rue du 20 août, 42040 Sidi Rached, Tipasa, Algeria. Email: benkheiraa@yahoo.f

25691. Bernard, R.; Daraz, B. (2026): Paragomphus sofiae sp. nov. — a new spotted species of Hooktail from Madagascar (Odonata: Anisoptera: Gomphidae). Zootaxa 5757(4): 357-368. (in English) ["Paragomphus Cowley, 1934 is a large palaeotropical dragonfly genus with four species previously described from Madagascar. The species identity of three of them requires confirmation, and only Paragomphus fritillarius (Selys, 1892) did not raise any taxonomical doubts. In this paper, a new species, Paragomphus sofiae sp. nov. from the Sofia River basin in lowlands of northern Madagascar, is described and compared to superficially very similar P. fritillarius. Identification of both species was possible only by comparing their hamules with the type specimens of P. fritillarius in the Selys' collection, because the literature contained neither illustrations nor detailed descriptions of its secondary genitalia. Regardless of the great similarity in the colour pattern, these species have turned out to be well-defined and differ by their notably distinct hamules and caudal appendages. They also seem to be spatially and ecologically separated: although both inhabit clearwater and sandy watercourses, P. sofiae has been recorded in open large, braided rivers so far and P. fritillarius in smaller rivers and streams. Considering the new knowledge of confusing interspecies similarity and species-specific hamules and cerci, all previous records of P. fritillarius require confirmation; the discovery of further species from the fritillarius-group is potentially possible." (Authors)] Address: Bernard, R., Lab. Nature Education & Conservation, Fac. Biol., Adam Mickiewicz Univ. in Pozna., Uniwersytetu Poznaskiego 6, 61-614 Poznan, Poland. Email: rbernard@amu.edu.pl

25692. Bodmer, H.M.; Murray, R.L.; Roslihuddin, M.; Toth, O.; McCauley, S.J. (2026): Urban freshwater salinization reshapes Erythemis simplicicollis (Odonata: Libellulidae) life history timing and predator–prey interactions. Environmental Entomology, 2026, 55, nvag011. DOI: https://doi.org/10.1093/ee/nvag011: 10 pp. (in English) ["As urban areas spread and winter road salt use increases, freshwater salinization has become an increasingly common threat facing aquatic organisms. Previous research has shown high salt exposure to have lethal and sublethal effects on aquatic macroinvertebrates. However, few studies have assessed how salt exposure during aquatic life stages may carry-over to affect terrestrial adults in semi-aquatic organisms. We used E simplicicollis dragonflies as a model organism with a biphasic life cycle to assess the impacts of freshwater salinization on aquatic larvae and the potential for carry-over effects. We used an experimental mesocosm approach to investigate the effects of salt pollution on larval size, foraging activity and immune health, and carry-over effects on adult immunity, morphology, and emergence timing. We found that although salt pollution did not impact E. simplicicollis larval size or immune system strength, it decreased larval foraging rates and accelerated adult emergence. However, we did not find carry-over effects of salt pollution on adult morphology or immune strength. At broader scales, the impacts of salt pollution on larval behavior and life history timing could alter interactions within freshwater food webs. In biphasic, semi-aquatic organisms, this may restructure terrestrial food webs, compounding changes in predator–prey interactions we observed in aquatic food webs. We highlight the need for further research on the sublethal effects of salt pollution on diverse aquatic taxa and across life history transitions to better predict the impacts of this common urban pollutant on freshwater ecosystems." (Authors)] Address: Bodmer, Hannah, Dept Biol., Univ. Toronto Mississauga, 3359 Mississauga Rd, Mississauga, ON L5L 1C6, Canada. Email: hannah.bodmer@mail.utoronto.ca

25693. Bota-Sierra, C.A. (2026): International Congress of Odonatology 2025 – Postcongress trip: from the Andes to the Orinoco plains and back. Agrion 30(1): 33-60. (in English) ["This is a brief report of the ICO 2025 post-congress tour in northeast Colombia. The story is illustrated with the beautiful photos taken by the group. A list of species is presented, highlighting new departmental records and one new record for Colombia. In total 84 species were recorded with Telebasis bastiaani being found new to the fauna of Colombia." (Author)] Address: Bota-Sierra, C.A., Grupo de Entomología Universidad de Antioquia (GEUA), Universidad de Antioquia, Medellín, Colombia. Email: cornelio.bota@udea.edu.co

25694. Breitkreutz, N.; Johansson, F. (2026): Potential effects of climate warming on density-dependent growth and mortality in a cannibalistic ectotherm (Sympetrum vulgatum: Odonata). Freshwater Biology 71: e70168: 10 pp. (in English) ["To better understand how climate warming affects population dynamics, empirical studies are needed that examine how temperature, density-dependent competition, and their interaction influence growth and mortality. In predatory aquatic invertebrates, such competition often manifests as cannibalism, making them valuable model systems for investigating complex ecological responses to environmental change. We conducted a laboratory experiment over 6 weeks to characterise the growth and mortality of larvae of Sympetrum vulgatum in response to intraspecific density (1, 2, 4 and 10 larvae per microcosm) and temperature (20°C and 26°C). We found strong negative density-dependent effects on both growth and survival. Cannibalism was the primary cause of mortality and thus the main factor influencing survival, whereas non-cannibalistic mortality was minimal. Temperature had a positive effect on growth but negatively impacted survival. A significant interaction between temperature and week indicated that the difference in growth rates between temperatures decreased over the experimental period. A significant three-way interaction among temperature, density, and time suggested that these factors influence growth rates in complex, dynamic ways. Interestingly, no three-way interaction was observed for cannibalism, indicating that this behaviour may be driven primarily by density rather than by temperature or time. Our results highlight the importance of density-dependent interactions, particularly cannibalism, in shaping population responses to environmental change. To improve predictions of responses to warming, models should incorporate both abiotic factors including temperature and biotic factors such as intraspecific competition. This might be especially crucial for predatory invertebrates including aquatic insects." (Authors)] Address: Johansson, F., Dept Ecology & Genetics, Animal Ecol. Program, Uppsala Univ., Uppsala, Sweden. Email: frank.johansson@ebc.uu.se

25695. Cardoso, P.; Baker, N.J.; Boieiro, M.; Bonte, D.; Borges, P.A.V.; Braby, M.F.; Branco, V.; Chobanov, D.; Correia, L.; Dalton, D.T.; Graça Mora, M.; Didham, R.K.; Forster, L.G.; Glatz, R.; Gorneau, J.A.; Hochkirch, A.; Kirse, A.; Lichtenberg, E.M.; Macías-Hernández, N.; Milicic, M.; Moir, M.; Moreno-García, P.; Neeßen, R.; Noriega, J.A.; Penick, C.; Perry, K.I.; Pryke, J.S.; Rego, C.; Roeder, K.A.; Saussure, S.; Shirey, V.M.; Sihvonen, P.; Svetnik, I.; Tarasov, S.; Trindade, P.; Welti, E.; Wong, M.K.L.; Scherber, C. (2026): Toward a global repository of insect traits (GRIT). Insect Conservation and Diversity 19(2): 253-267. (in English) ["The pace of biodiversity loss outstrips our ability to conserve Earth's most diverse group of named species—the insects. We increasingly rely on trait-based metrics to understand how insects respond to and affect their environment. Traits provide insights that aid conservation assessment and planning. Yet, we lack a centralised trait database for insects, hampering insights that could inform ecological research and conservation management planning. We propose the creation of the Global Repository of Insect Traits (GRIT). GRIT will cover all world regions, realms and insect taxa. It will provide open and FAIR access to comprehensive trait data compiled from both currently available and future datasets. This proposal is an open call for all to join a global network of collaborators in a collective effort to accelerate the compilation of insect trait data and increase the transparency of data sharing and accessibility in the field. We envision the use of state-of-the-art methods in trait acquisition and imputation to build computational tools that can extract and validate trait data from unstructured text, accelerating information availability by orders of magnitude. We anticipate the development of analytical tools that contribute to a governance structure, ensuring the long-term success of the database and extraction tools. Finally, we outline future opportunities and identify several research questions that could be readily answered once data are assembled. Recognising the numerous challenges inherent in this project, we invite a robust discussion on strategies to effectively address obstacles." (Authors)] Address: Cardoso, P., Centre for Ecology, Evolution & Environmental Changes (CE3C) & Global Change & Sustainability Institute (CHANGE), Faculdade de Ciências, Universidade de Lisboa, Lisboa, Portugal. Email: pedro.cardoso@helsinki.fi

25696. Chutia, P.; Sonowal, C. (2026): Assessing seasonal occurrence of odonates in the Joysagar Area, Sivasagar District, Assam, India. Uttar Pradesh Journal of Zoology 47(3): 166-178. (in English) ["The present paper deals with the study of seasonal occurrences of Odonate species in

the Joysagar area, Sivasagar district, Assam, India. The study was conducted from June, 2023 to May, 2025. Three sites were selected from the study area. A total of 26 species of Odonates i.e., 14 species of Anisoptera and 12 species of Zygoptera belonging to the Families Libellulidae, Coenagrionidae and Platycnemididae were recorded from the three study sites during the study period i.e., from June, 2023 to May, 2024 and June, 2024 to May, 2025, where the highest number of Odonate species and individuals were recorded from monsoon. Orthetrum sabina and Ceriagrion cerinorubellum were found to be the most abundant species in the study area during both the two years of study period. The current study also reveals that the Sørensen Similarity Coefficient ranges between the values 0.70-1.00 for Site 1, Site 2 and Site 3 between the study periods June, 2023 to May, 2024 and June, 2024 to May, 2025. Statistical analysis indicated a moderate positive correlation between average seasonal temperature and Odonate abundance in all of the three study sites. The current paper highlights that the population of Odonates are shaped by monsoonal patterns, underscoring their role as indicators of aquatic and terrestrial ecosystem integrity and a wide environmental stability." (Authors)] Address: Chutia, P., Department of Zoology, Sibsagar University, Sivasagar, Assam, India. Email: padmazachutia@gmail.com

25697. Corrêa, M.J.M.; Ceita, M.; Ditter, R.E.; Campos, M.; Weaving, H.; Goffinet, A.; Claire M. Egan, C.M.; Viegas, J.; Cornel, A.J.; Lanzaro, G.C.; Pinto, J. (2026): Aquatic macroinvertebrate diversity in mosquito larval habitats in São Tomé and Príncipe. PLoS One 21(1): e0339486. https://doi.org/-10.1371/journal.pone.0339486: 17 pp. (in English) ["Oceanic islands harbor unique aquatic ecosystems characterized by distinct macroinvertebrate communities that play vital roles in ecosystem functioning and stability. São Tomé and Príncipe islands (STP), located in the Gulf of Guinea, represent a model system where the primary malaria vector, Anopheles coluzzii, shares larval habitats with a diversity of aquatic taxa. Here, we evaluate macroinvertebrate diversity in permanent and temporary larval habitats typical of An. coluzzii in STP during the wet and dry seasons. We collected 5,208 macroinvertebrates belonging to eight classes, 15 orders, and 51 families. These included insects, crustaceans, spiders, annelid worms, springtails, and mollusks, with insects and crustaceans dominating collections. Diversity remained stable across the wet and dry seasons, but higher diversity was found in permanent habitats when compared to temporary habitats. We found 9 families (12% relative abundance) that included potential predators of mosquito vector larvae. Our results demonstrate that larval habitats of An. coluzzii support a dynamic community of aquatic macroinvertebrates. Establishing this ecological baseline is crucial for future assessments of community composition and for informing sustainable vector control management and biodiversity conservation on these islands." (Authors) Taxa - including Odonata - are treated at family level.] Address: Pinto, J., University of California Malaria Initiative, University of California Davis, Davis, California, USA. Email: JPinto@ihmt.unl.pt

25698. Cruz, G.M.; Monteles, J.S.; Brito, J.S.; Resende, B.O.; Hamada, N.; Martins, R.T.; Valente-Neto, F.; Faria, A.P.J.; Juen, L. (2026): Forest loss influences biomass distribution across trophic groups of Amazonian stream insects. Freshwater Biology 71: e70182: 13 pp. (in English) ["1. Changes in resource availability caused by deforestation can negatively impact freshwater ecosystems, with implications for trophic chains. We investigated both the direct and indirect effects of forest cover and allochthonous resource availability on the biomass distribution of larvae of aquatic insects (Ephemeroptera, Plecoptera, Trichoptera and Odonata, hereafter EPTO) in Amazonian streams. We hypothesized that (I) forest cover will be associated with greater availability of allochthonous resources; (II) forest cover will be associated with higher biomass of primary consumers both directly, via allochthonous inputs, and indirectly, by non-trophic mechanisms like improved habitat conditions; (III) these patterns are strongest for shredders and collectors and (IV) primary consumer biomass positively correlated with predator biomass, results in cascading trophic effects across higher trophic positions. 2. We sampled 135 streams across the Eastern Amazon. We used structural equation modelling (SEM) based on linear regression to assess the complex relationships among forest cover, resource availability, and biomass across different EPTO trophic groups. 3. Our results support our hypotheses, showing patterns of association both directly and indirectly between forest cover and resource availability, primary consumers and predators. Shredder and collector biomass were higher where resource availability was high, whereas filter feeders and scrapers exhibited a weaker response. Patterns of resource limitation on predators were weaker because larger predators tend to have a broader prey spectrum that includes organisms not examined in this study. 4. Deforestation is associated with changes in availability of allochthonous resources in streams, negatively affecting multiple trophic groups of aquatic insects through alterations in resource supply and key physical habitat features of streams. Our findings improve our understanding of the impact of human activities on aquatic biota and food chain dynamics within stream ecosystems. 5. Our results highlight that the responses of aquatic insects to deforestation differ among functional feeding groups and trophic levels, and these responses are more strongly associated with deforestation near streams. This multiscale pattern reflects the combined influence of changes in resource availability and stream microhabitat conditions. These findings highlight the key role of riparian vegetation in managing and conserving stream ecosystems given its strong influence on resource availability and microhabitat structure in human-modified landscapes." (Authors)] Address: Cruz, G.M., Programa de Pós-Graduação em Zoologia—PPGZOOL, Univ. Federal do Pará UFPA, Belém, Pará, Brazil. Email: gabrielcruz69-6963@gmail.com

25699. De Marchi, G. (2026): Intraspecific rather than interspecific drivers of female-limited polymorphism in Calopteryx splendens (Odonata: Calopterygidae). International Journal of Odonatology 29: 1-9. (in English) ["Female-limited colour polymorphism is widespread in Odonata, particularly in the Coenagrionidae, where it is determined by simple Mendelian inheritance. In contrast, female-limited colour polymorphism in Calopterygidae is restricted to some populations of the Palaearctic C. splendens complex, whose males have blue-spotted wings and females occur either as gynochromes with transparent wings or as androchromes with dark brown-spotted wings. A behavioural study in two river basins in southern Italy suggested that reduced harassment by males of the syntopic C. haemorrhoidalis might favour androchrome females, which could otherwise suffer increased predation due to their less cryptic coloration. However, the role of interspecific harassment in maintaining this polymorphism has not been further tested. Here, the results of three field surveys conducted in southern Italy in 2011, 2020, and 2021 are reported, expanding the known range of polymorphic C. splendens populations to 22 sites across seven river basins. Two distinct androchrome morphotypes were identified, differing in the extent of wing pigmentation: one widespread in the Basilicata and Campania regions and another restricted to the Crati river basin in the Calabria region. The

proportion of androchrome females was associated with the river basin and the density and proportion of conspecific males, not with the density or proportion of C. haemorrhoidalis males. Contrary to earlier behavioural evidence, these results suggest that female-limited polymorphism is not maintained by interspecific harassment but by intraspecific mechanisms such as male mimicry or frequency-dependent selection." (Author)] Address: De Marchi, G., Società Italiana di Scienze Naturali, Corso Venezia 55, Milano, Italy. Email: dromasardeola@gmail.com

25700. Dias-Oliveira, T.M.; Santos, J.C.; Koroiva, R.; Jacques, G.; Souza, M.M.de; Vilela, D.S. (2026): Hetaerina giselae sp. n. (Odonata: Calopterygidae) from Southeastern Brazil, with larval and adult diagnosis. International Journal of Odonatology 29: 10-18. (in English, with Portuguese summary) ["Hetaerina giselae sp. n. is described and illustrated based on specimens collected at Pico do Itambé State Park, Minas Gerais, Brazil. Integration of morphological and molecular data (COI) supports the recognition of the new species. The new species can be separated from its morphologically closest congeners, such as Hetaerina longipes Hagen in Selys, 1853, and Hetaerina westfalli Rácenis, 1968, by a combination of characters of the male anal appendages, female intersternite, and general anatomical features. In addition, we present the description of the larva, highlighting the main morphological differences that distinguish it from adults and other known larvae of the genus." (Authors)] Address: Dias-Oliveira, T.M., Graduate Program in Entomology, University of São Paulo, Ribeirão Preto, São Paulo, Brazil. Email: deoliveiratmd@gmail.com

25701. Dietzel, A.; Moretti, M.; Perrelet, K.; Cook, L.M. (2026): Urban heat exacerbates climatic risks to urban biodiversity. npj Urban Sustainability 6, 4: 12 pp. (in English) ["Urban climates typically exhibit high local variability and diverge markedly from mesoclimate conditions. Yet, urban microclimate data needed to assess the impacts of urban heat on biodiversity are lacking. We present a scalable modeling approach to generate high-resolution projections of urban bioclimatic conditions using Zurich, Switzerland, as a case study. We demonstrate that globally available land use and remote sensing data can effectively predict spatial patterns in urban bioclimatic conditions. Our findings show that mean annual temperatures can deviate by up to 2 °C from mesoclimate conditions, and that uncorrected mesoclimate data substantially underestimate risks to 182 species of amphibians, birds, butterflies, dragonflies, grasshoppers and trees. By the end of the century, up to half of these species are expected to exceed their climatic tolerance across all habitat patches. Our approach is transferable to cities globally using existing data, marking a major step forward for urban microclimate and biodiversity research." (Authors)] Address: Dietzel, A., Swiss Federal Institute of Aquatic Science & Technology (EAWAG), Switzerland. Email: andreas.dietzel@eawag.ch

25702. Echeverría-Progulakis, S.; Martínez-Eixarch, M.; Boinot, S.; Boix, D.; Carreras-Sempere, M.; Catala-Forner, M.; Expósito, A.; Giné, A.; Guivernau, M.; Jornet, L.; Llevat, R.; Noguerol Arias, J.; Sorribas, F. J.; Viñas, M.; Pérez-Méndez, N. (2026): Impact of climate change mitigation strategies in rice farming on agroecosystem multifunctionality. Journal of Applied Ecology, 63, e70303. https://doi.org/10.1111-/1365-2664.70303: 17 pp. (in English) [Ebro Delta, Spain; "1. Rice agroecosystems are important contributors to climate change through methane (CH_4) emissions, while also representing biodiversity hotspots and providing agroecosystem services (ES). Non-continuous flooding irrigation strategies have been globally implemented as climate change mitigation and adaptation practices in rice paddy fields as they decrease CH_4 emissions and water use. Although such effects have been widely studied, there is a knowledge gap regarding outcomes in terms of biodiversity and overall agroecosystem multifunctionality. 2. Here, we implemented a field-scale experiment to assess the effects of different irrigation strategies across a water use gradient (CON: continuous flooding; MSD: mid-season drainage; and AWD: alternate wetting and drying) on (i) the provision of ES (i.e. biodiversity conservation, regulating and provisioning services), (ii) overall agroecosystem multifunctionality and (iii) synergies or trade-offs among ES. 3. None of the irrigation strategies benefited most taxa or improve most regulating services. For instance, AWD generally benefited invertebrate diversity while reducing vertebrate abundances and grain yields. Both AWD and MSD decreased CH_4 emissions by approximately 80 kg C-CH_4 ha-1 but decreased soil carbon storage by 8.8%, when compared to continuously flooded fields. Consequently, all irrigation strategies exhibited a similar level of multifunctionality, although providing different services. Lastly, we did not find trade-offs or synergies between biodiversity conservation, regulating services and provisioning services. 4. Synthesis and applications. These results suggest that, from a landscape management perspective, implementing a single irrigation strategy at large spatial scales should be discouraged due to potential negative effects on particular sets of ES components. Conversely, a mosaic of irrigation strategies should be implemented, promoting ES components aligned with site-specific landscape management objectives." (Authors) The taxa studied are "Coleoptera, Hemiptera and Odonata".] Address: Echeverría-Progulakis, S., IRTA, Marine & Continental Waters Program, La Ràpita, Catalonia, Spain. Email: secheverriap@gmail.com

25703. Ehikhamele, I.E.; Ogbogu, S.S. (2026): Checklist of Odonata of Shasha Forest Reserve, southern Ife, Osun State, Nigeria. World Academy of Science, Engineering and Technology, International Journal of Biological and Ecological Engineering 20(2): 38-43. (in English) ["A biodiversity survey was conducted in Shasha Forest Reserve, Ife, southern Osun State, Nigeria, between May 2019 to April 2021 with a view to determining the nature of Odonata fauna of the forest. A total number of 1055 individuals of adult Odonata belonging to eight families (Aeshnidae, Calopterygidae, Chlorocyphidae, Coenagrionidae, Gomphidae, Lestidae, Libellulidae and Platycnemididae) were recorded. .... Libellulidae was the most abundant family, while Gomphidae was recorded as the least representative. No new species of Odonata was recorded. Most of the families reported were previously documented in the tropical region. Logging activities and human disturbance have been attributed to the nature of Odonata species in the forest. It is therefore recommended that logging should be restricted to designated areas of the forest and regulated by the Department of Forestry of Osun State Ministry of Agriculture and Natural Resources in conjunction with the Federal Ministry of Environment." (Authors)] Address: Ehikhamele, I.E., Dept of Zoology, Obafemi, Awolowo University, Ile-Ife 220005, Osun State, Nigeria. Email: ehizisaac@gmail.com

25704. Ferraz Ferreira, N.C.; Ribeiro dos Santos, C.; Elio Rodrigues, M. (2026): Diversidade de larvas de Odonata e a relaçao com a integridade do habitat na Bacia do Rio Catolé. Seminário de Iniciação Científica e Tecnológica [S. l.] 4: 1-7. (in Portuguese, with English summary) ["This study evaluated the diversity of Odonata larvae in the Catolé River basin and its relationship with the Habitat Integrity Index (HII). A total of 36 streams were sampled using a D-net and sieve,

resulting in the collection of 1,738 individuals distributed across 48 genera and 10 families. The most representative genera were Hetaerina, Dythemis, and Ischnura, with 629, 257, and 103 specimens, respectively. The analysis did not show a linear relationship between Shannon diversity and HII, indicating that areas with low integrity values also presented high diversity. Principal Coordinates Analysis (PCoA) revealed an overlap in genus composition between streams with low and medium HII, with only a few exclusive taxa in each condition. The absence of a consistent response may be related to the taxonomic level of identification, the simultaneous occurrence of sensitive and tolerant species within the same genera, and the limited gradient of habitat integrity sampled." (Authors)] Address: Ferraz Ferreira, Nívea Carolina, Graduanda em Ciências Biológicas, Universidade Estadual do Sudoeste da Bahia (UESB), Brasil

25705. Garcia Junior, M.D.N.; Damasceno, M. T. dos S. (2026): O uso de plataformas on-line no reconhecimento da distribuiçao da ordem Odonata no nordeste do Brazil. Revista DCS 23(86), e4211. https://doi.org/10.54899/dcs.v23i86.4211: 13 pp. (in Portuguese, with English summary) ["Odonata occurs practically worldwide, with around 900 species recorded in Brazil. Despite this high diversity, there are many gaps in knowledge about dragonflies in the country, for example in the northeast region. One way to minimize the lack of information is to use data available on online platforms such as iNaturalist. The records onthis platform can be used to identify the distribution of different groups, including the order Odonata. Thus, the present study aims to present an overview of the diversity of Odonata occurring in the states of Alagoas, Paraíba, Pernambuco, Piauí, and Rio Grande do Norte, based on images available on iNaturalist. In total, 64 species were identified across the five states, and Libellulidae (n=45), Coenagrionidae (n=10), and Aeshnidae (n=4) were the families with the highest number of identified species. The states of Paraíba and Pernambuco showed the greatest diversity of genera and species, while Piauí was the least diverse in terms of both genera and species. For the northeastern region of Brazil, just over 10% of the species found in the country have been recorded, demonstrating that knowledge of odonate diversity in the northeast is still very limited. However, the inclusion of new records on platforms like iNaturalist should help identify a greater number of species in northeastern Brazil, enabling a better understanding of the species in the region." (Authors)] Address: Garcia Junior, M.D.N., Doutor em Biodiversidade Tropical, Universidade Estadual do Amapá (UEAP), Macapá, Amapá, Brasil. Email: manoel.junior@ueap.edu.br

25706. Giusto, C.; Bellati, A.; Cerini, F.; Bellisario, B.; Canestrelli, D. (2026): Zoning effects on the community structure of freshwater benthic macroinvertebrates in a Mediterranean National Park (Central Apennine). Global Ecology and Conservation 67 e04128: 13 pp. (in English) ["Freshwater macroinvertebrates are a fundamental component of the world's biodiversity, which is Dataset link: Freshwater macroinvertebrates in globally declining, yet they remain largely overlooked in area-based conservation and restoration the Abruzzo, Lazio, and Molise national park efforts. Notably, the effectiveness of zoning within protected areas, a prominent tool for balancing (Central Apennines, Italy): family-level dataset from 16 riverine sites under a protection nature protection and human activities, is still substantially unexplored in the context of fresh water biodiversity conservation. In this study, we assessed for the first time the influence of gradient zonation on water chemistry, environmental variables, and patterns of freshwater macro Keywords: invertebrate diversity across a long-established protected area in Central Italy. We observed no Aquatic conservation significant differences among zones in terms of water parameters and canopy cover, and no Insects spatial correspondence between areas with higher biodiversity levels and integral protection Macrozoobenthos zones (IRs). However, the IR has a positive effect in restoring macroinvertebrate diversity Bioindication downstream of human disturbance. Indeed, taxonomic richness decreased (41 %) downstream Biodiversity drivers of human settlements, then increased (?46 %) downstream of the IR located just beyond the Protected area urban areas. Our research emphasizes that current zoning schemes within protected areas might completely overlook spatial patterns of variation in freshwater biodiversity. Yet, importantly, they also suggest that zoning schemes in terrestrial protected areas should adopt a strategic IR design, integrating species and habitat conservation targets with the exploitation of river auto depuration processes." Autors Odonata are treated at family level.] Address: Giusto, Chiara, Department of Ecology & Biology (DEB), University of Tuscia, Largo dell'Universit`a snc, 01100 Viterbo, Italy, Italy. Email: chiara.giusto@unitus.it

25707. Guillon, H. (2026): Un cas de cleptoparasitisme: Pseudagrion torridum Selys, 1876 prélevant une proie sur une toile d'araignée (Odonata: Coenagrionidae). Martinia 40(1): 1-3. (in French) ["A case of kleptoparasitism: Pseudagrion torridum Selys, 1876 taking a prey from a spider's web (Odonata: Coenagrionidae). Verbatim: On October 30, 2018, an hour before sunset (17:01) in the hazy atmosphere of a very hot late afternoon, I inventoried the Odonata on the western shore of Lake Langano in Ethiopia (7°35'29.856" N, 38°41'34.968" E, alt. 1585 m). Very few species were found to be present in the low grasses of a tiny peninsula: Brachythemis impartita, Agriocnemis inversa, Ischnura senegalensis, and a ... Pseudagrion torridum .... I observed this Pseudagrion twice attempting, unsuccessfully, to wrest an unidentified fly (possibly Culicidae) from the badly damaged web of a spider I hadn't noticed, despite another freshly wrapped prey. It succeeded on its third attempt. I was then able to follow it from place to place as it consumed its prey. Kleptoparasitism is a common and well-known phenomenon in the animal world, in most taxonomic groups (Iyengar, 2008), and particularly in many insects such as flies (Read, 1970), beetles (Trumbo, 1994), bees (Wuellner, 1999), and heteropterans (Kellen, 1959; Andersen, 1982). Numerous cases of Odonata consuming spiders taken from their webs are reported in the literature (Novelo-Gutiérrez & Ramírez, 2013), primarily Zygoptera. Some dragonflies specialize in this activity, notably the former Pseudostigmatidae such as Mecistogaster, which also consume prey immobilized on their webs (Rüppell & Fincke, 1989). However, reported cases of Odonata taking prey from a web are rare. Corbet (2004) mentions, for Ischnura elegans, an observation by Cham (1992) of an individual taking a black fly from a web: "It was an incredibly agile maneuver which could have easily led to a fatal end for the damselfly," and another by Parr & Parr (1996) where a female of this species repeatedly captures small dipterans trapped in the web; a Lestes virens is observed by Holuša (1998); an Ischnura elegans and an Enallagma cyathigerum by Fischer (2009) on abandoned webs. The frequency of this behavior is probably underestimated; Daffodils that perch with closed wings are primarily foragers, unlike most dragonflies that hunt in flight (Paulson, 2004). This foraging is sometimes so rapid that they appear to be flitting among foliage or grasses, when in fact they are very quickly collecting tiny insects. They are certainly capable of being just as fast for prey on a web, thus largely escaping observation. The low occurrence of this type of predation supports an opportunistic behavior, as described

by Fischer (2009). It is potentially more economical to snatch prey that is already immobilized rather than risk losing one's meal. The influence of prey scarcity has been demonstrated, at least for one passerine, Dicrurus adsimilis (Bechstein, 1794), by Flower et al. (2012). And indeed, at the end of the day, the quantity of active or visible insects is much lower, making it energetically worthwhile to go and obtain prey directly from a spider web, rather than wandering around in search of them, even if the danger is not zero for the dragonfly.] Address: Guillon, B., 202 les Hautes Roches, 49600 Beaupréau-en- Mauges, France. Email: benoit.guillon@wanadoo.fr

25708. Hacet, N.; Turgut, F.; Karagöz, H. (2026): First records of Forcipomyia paludis (Macfie, 1936) (Diptera: Ceratopogonidae), an ectoparasite on adult odonates, from Türkiye, Greece, and Albania. North-Western Journal of Zoology 22(1), e261301: 5 pp. (in English) ["The biting midge F. paludis is recorded for the first time from Türkiye, based on examined specimens. The species was found in four localities in the European part of the country during 2022 and 2023. Female ectoparasitic specimens were photographed considering their morphological characteristics. Two odonate species, Epallage fatime and Cordulegaster picta are reported here as new host records for F. paludis. Additionally, an examination of photographs in a naturalists' website archive revealed records of F. paludis from Greece (Crete) and Albania, constituting the first photographic evidence for these two countries." (Authors) Further species with mites parasitized are Caliaeschna microstigma, Orthetrum coerulescens, Selysiothemis nigra, Isoaeschna isoceles, Sympetrum fonscolombii, Anax parthenope] Address: Hacet, Nurten, Trakya University, Faculty of Science, Department of Biology, 22030 Edirne, Türkiye. Email: nurtenhacet@trakya.edu.tr

25709. Hadfield, R.K.; Jordan, S.; Polhemus, D.A.; Sutherland, L.N.; Peck, S.L.; Abbott, J.C.; Frandsen, P.B.; Guralnik, R.P.; Kalkman, V.J.; Ware, J.L.; Bybee, S.M. (2026): Diversification and evolution of Hawaiian Megalagrion damselflies (Pinapinao, Odonata: Coenagrionidae). Systematic Entomology 51(1), e70015: 24 pp. (in English) ["Hawai'i's pinapinao (Megalagrion McLachlan) comprises a radiation of 23 endemic damselfly species within Coenagrionidae. Despite being a unique study system for understanding geology's impacts on evolutionary processes among Odonata, the understanding of these damselflies' temporal, geographic and phylogenetic origins remains incomplete. Testing macroevolutionary hypotheses has been hampered by conflicting topologies. To resolve these uncertainties, we performed phylogenetic analyses including divergence time estimation with 90 nuclear loci (>50 kbp) and 2 mitochondrial loci (>1 kbp), sampling representatives from 37 genera within core Coenagrionidae and 90% of Megalagrion species, including multiple island populations. We used ancestral range estimations, diversification analyses, agent-based simulation modelling and ancestral state reconstruction to infer the group's origin and biogeography and assess traits' roles in diversification. Our findings indicate Megalagrion's ancestor diverged from core Coenagrionidae in the early Eocene (~51 MA) and diversified in the early Miocene (~19 MA), suggesting Megalagrion's MRCA predates Kaua'i's emergence by 7–21 MY. Diversification analyses suggest a low rate after Megalagrion diverged from Coenagrionidae followed by a sudden increase around 19 MA, and simulation modelling supports extinction playing a significant role. Extant Megalagrion diversity is largely explained by ecological diversification into at least five clades with distinct breeding habitats that likely evolved on Northwestern Hawaiian Islands that are now-sunken seamounts. Speciation continued as descendants dispersed to current Hawaiian Islands as islands emerged. Species breeding in seeps further diversified within the island of Kaua'i. Our results highlight including geologic changes over time in evolutionary studies and increase understanding of diversification patterns, biogeography and adaptive radiation on islands." (Authors)] Address: Hadfield, R.K., Bean Life Science Museum, Brigham Young Univ., 645 E1430 N, Provo, UT 84602, USA. Email: robert7hadfield@gmail.com

25710. Harabiš, P. (2026): Book Review: Samways, M.J. 2024: Conservation of dragonflies – Sentinels for freshwater conservation. CAB International, Wallingford, 560 pp. ISBN 978-1789248371. Price GBP 175.00 (hardback), GBP 55.00 (paperback), GBP 88.00 (eBook). European Journal of Entomology 123: 24. (in English) [Book review.] Address: Harabiš, H., Department of Ecology, Faculty of Environmental Sciences, Czech University of Life SciencesPrague, 16500 Prague, Czech Republic. Email: harabis@fzp.czu.cz

25711. Hasanto, R.P. (2026): Capung: Penjaga Sungai dan Danau dari Pencemaran - Dragonflies: Guardians of rivers and lakes from pollution. Jurnal Ilmiah Populer Inovasi-Sainsphere 1(1): 17-20. (in Indonesian, with English summary) ["This popular scientific article explores the role of dragonflies as indicators of river and lake water quality, highlighting ecological research findings from Indonesia and abroad. Dragonfly diversity has been shown to decline in waters polluted by domestic and agricultural waste, while riparian areas with healthy vegetation support higher species richness. A case study in West Nusa Tenggara, particularly at the Kerta Gangga Waterfall tourism site, illustrates how dragonflies can serve as local symbols that connect scientific knowledge with ecotourism and community education. Beyond their scientific significance, this article emphasizes the cultural value and popularization of dragonflies as “guardians of rivers and lakes,” raising public awareness of the importance of maintaining clean water ecosystems. Through a popular approach, dragonflies are not only viewed as beautiful insects but also as ecological icons relevant to society in efforts toward environmental conservation." (Author)] Address: Hasanto, R.P., Pranata Laboratorium Pendidikan, Universitas Islam Negeri Mataram, Jalan Gajah Mada Nomor 100 Jempong Baru Mataram, Indonesia. Email: RizkiprimadityaH@gmail.com

25712. Hidayah, A.D.K.; Susanto, R.A.; Khotimah, U.; Umayana, A.F.A.; Izzati, F.W.; Ithriyatina, P.; Nurhuda, F.; Putri, A.S.; Ulfa, A.; Ulum, M.M.; Noronhae, M.D.; Mercusiana, S. (2026): Indonesia Species Profile of Orthetrum chrysis (Odonata: Libellulidae). SSRS INABIODIV Species Profile and Information. Vol. 2: No. 0008. https://publishing.ssrs.or.id/ojs/index.php/ssrs-inabiodiv: 13 pp. (in English) [Information are compiled on Conservation Status, Overall distribution, Overview, Scientific Name, Synonyms, Common Name (Indonesia). Indonesia Local Name, Classification, Description, Ecology and Habitat, Distribution, Species Value (Ecological Value, Economic Value, Socio-Cultural Value), Threats, References] Corresponding Author: ameliahidayah@apps.ipb.ac.id

25713. Hill, M.; Wilson, R.; Uribe, L.; Reid, B.; Pedreros, P.; Wood, P.J.; Mathers, L.L. (2026): Patagonian deglaciation: aquatic macroinvertebrate biodiversity in proglacial and paraglacial ponds. Biodiversity and Conservation 35:47: 22 pp. (in English) [Chile "Glacier retreat is rapidly transforming cryospheric landscapes with new pond networks establishing in deglaciated landscapes. However, our understanding of the aquatic biodiversity within these rapidly evolving landscapes has been limited, especially in southern Patagonia despite having the largest temperate icefields globally. We examined

the aquatic macroinvertebrate diversity in paraglacial forest and proglacial ponds at the snout of the Exploradores Glacier (Southern Patagonia, Chile) and assessed the environmental factors influencing taxonomic richness and community composition. Alpha and estimated gamma diversity were significantly higher in periglacial forest ponds compared to proglacial ponds. Clear differences in macroinvertebrate community composition were recorded between paraglacial and proglacial ponds. Taxonomic turnover explained most of the variation in community composition with Trichoptera and Diptera taxa constituting a greater proportion of taxonomic richness in proglacial ponds, while Coleoptera and Hemiptera taxa represented a higher proportion of taxa in paraglacial forest than proglacial ponds. When taxa-environment relationships were examined, a significant negative association was recorded between dissolved oxygen and taxonomic richness. Sodium concentrations were also found to be negatively associated with LCBD. This study provides vital evidence that ponds formed naturally due to deglaciation can support a wide diversity of aquatic macroinvertebrates, and as glacial retreat continues and landscapes transition from glacial to paraglacial, pond habitats represent increasingly important freshwater habitats at the landscape scale. Future research is critical to advance understanding of proglacial and paraglacial pond networks to provide the underpinning information needed to raise awareness to support the conservation of these unique habitats. ... Odonata (total taxa: 3, proportion of total richness: 6%) constituted the greatest proportion of total taxonomic richness..." (Authors)] Address: Wilson, R., School of Applied Sciences, University of Huddersfield, Huddersfield HD1 3DH, UK. Email: r.wilson2@hud.ac.uk

25714. Hogreve, J.; Johansson, F.; Suhling, F. (2026): Temperature-driven shifts in foraging behaviour during larval development in a dragonfly. Scientific Reports 16, 5258: 12 pp. (in English) ["Predatory performance of dragonfly larvae is influenced by a multifaceted interplay of external factors such as temperature, prey density and interspecific competition, and life history traits like age and size. We investigated the relative impact of these factors and traits on the prey-capture behaviour of Sympetrum striolatum larvae i.e., the number of strikes, captures and capture success. The larvae were observed three times over a five-week period under a combination of three temperature levels, two prey densities, and with or without a conspecific competitor. To access the ontogenetic effects on foraging behaviour the larvae were reared from hatching and their size measured before each trial. Higher temperature, particularly for young and small larvae, and prey density significantly increased prey-capture behaviour. The life history traits strongly affected strikes, captures, and capture success and these effects were stronger than the external factor prey density or competition. These results underscore the crucial role of ontogeny on foraging performance. Future studies and predictive models of foraging behaviour should incorporate life history to better understand foraging dynamics. Our study highlights the importance of integrating developmental biology into understanding behaviour under environmental change, rather than focusing solely on external variables." (Authors)] Address: Hogreve, J., Landscape Ecology & Environmental Systems Analysis, Institute of Geoecology, Technische Universität Braunschweig, Braunschweig, Germany. Email: j.hogreve@tu-braunschweig.de

25715. Iqbal, M.; Widayanti, G.A.; Aprillia, I.; Sari, D.K.; Arifah, N. (2026): Further records of the Data Deficient Neurothemis disparilis, and possible hybrids with Neurothemis fluctuans. Agrion 30(1): 9-13. (in English) ["We report two new observations of Neurothemis disparilis, a Data Deficient dragonfly species endemic to Borneo, from West Kalimantan, Indonesia. The species was found in Kapuas Raya Village on 23 Jan 2014 (0°46'36"N, 112°29'48"E) and Embung Pangkaran on 21 November 2023 (1°02'23"N, 112°58'36"E), both located within the Kapuas Kapuas Hulu Regency. Few individuals with intermediate wing patterns between N. disparilis and N. fluctuans were observed in Embung Pangkaran, suggesting potential hybridization between the two species." (Authors)] Address: Iqbal, M., Dept of Biology, Universitas Indo Global Mandiri, Palembang 30129, Indonesia. Email: miqbal@uigm.ac.id

25716. Ithriyatina, P.; Nurhuda, F.; Putri, A.S.; Umayana, A.F.A.; Izzati, F.W.; Khotimah, U.; Hidayah, A.D.K.; Ulfa, A.; Ulum, M.M.; Noronhae, M.D.; Mercusiana, S. (2026): Indonesia Species Profile of Vestalis luctuosa (Odonata: Calopterygidae). SSRS INABIODIV Species Profile and Information. Vol. 2: No. 0009. https://publishing.ssrs.or.id/ojs/index.php/ssrs-inabiodiv: 10 pp. (in English) [Information are compiled on Conservation Status, Overall distribution, Overview, Scientific Name, Synonyms (instead of synonyms, the list includes additional Vestalis species), Common Name (Indonesia). Indonesia Local Name, Classification, Description, Ecology and Habitat, Distribution, Species Value (Ecological Value, Economic Value, Socio-Cultural Value), Threats, References] Corresponding Author ithriyatinapopi@apps.ipb.ac.id

25717. Karani, A.; Kairu, A.; Githaiga, M.; Gichira, A.; Thuita, S. (2026): Description of the final instar larvae of the threatened Kenya Jewel Platycypha amboniensis Martin 1915 (Odonata: Chlorocyphidae) from Mount Kenya. Agrion 30(1): 19-24. (in English) ["The larva of P. amboniensis is described and illustrated for the first time based on specimens from Mount Kenya and compared with P. caligata Selys 1853, the only other species of the genus whose larvae is known. The larva of P. amboniensis is bigger than that of P. caligata and differs distinctly in morphological features, including the ratio of scape to pedicel being 3:1 and the presence of a dark dorsal band. Creating an identification key for this genus is impossible as the larva of a large number of species within the genus remain unknown." (Authors)] Address: Karani, A, Dept of Biol. Sciences, Univ. of Embu, P.O. Box 6–60100, Embu, Kenya; b Centre for Ecosystem Restoration Kenya, P.O. Box 32–60100, Limuru, Kenya. Email: akaranigold@gmail.com

25718. Karani, A.M.; Kairu, A.W.; Githaiga, M.N.; Gichira, A.W.; Ng'iru, I.W. (2026): Congruence of detection probabilities and co-occurrence of threatened Afromontane damselflies with diverging functional traits (Odonata: Chlorocyphidae, Coenagrionidae). Journal of Insect Conservation 30, 16: (in English) ["The biodiversity crisis is exceptionally severe in the freshwater systems of the highly threatened Afromontane region. We estimated abundance, occupancy and detection probabilities and studied functional traits of ecological significance for adults and larvae of Platycypha amboniensis and Pseudagrion bicoerulans in Mount Kenya Forest. Our estimates of abundance were based on replicated counts, while occupancy and detection probabilities were estimated using a single-season, two-species occupancy formulation. We found that detection probabilities of one species were influenced by the detection probabilities of the other, but conversely, occupancy was not. This was supported by morphological traits, as the larvae of P. amboniensis are adapted to rocky and fast-flowing lotic streams, while P. bicoerulans is adapted to vegetated, littoral, and slow-moving reaches of the same streams. This means that, while these species have different adaptations, their co-occurrence depends on the heterogeneity of the microhabitats. We recommend implementation

of ecosystem restoration approaches that will contribute to maintain habitat complexity and therefore increase the resilience of these co-occurring species to future environmental changes. Implications for conservation: The occurrence of Kenya Jewel was not influenced by the occurrence of Giant Sprite, and there was neither competition nor niche overlap. This aligns with the differences in ecological adaptations based on the functional morphology of adults and larvae. This evidence is useful for restoration of the ecosystem to ensure that these species are conserved concurrently in their range of co-occurrence." (Authors)] Address: Karani, A.M., Dept of Biological Sciences, University of Embu, P.O. Box 6–60100, Embu, Kenya

25719. Khotimah, U.; Umayana AFA, Umayana, A.F.A.; Izzati, F.W.; Ithriyatina, P.; Nurhuda, F.; Putri, A.S.; Hidayah, A.D.K.; Ulfa, A.; Ulum, M.M.; Noronhae, M.D.; Mercusiana, S. (2026): 2026. Indonesia Species Profile of Orthetrum glaucum (Odonata: Libellulidae). SSRS INABIODIV Species Profile and Information. Vol. 2: No. 0006. https://publishing.ssrs.or.id/ojs/index.php/ssrs-inabiodiv: 18 pp. (in English) [Information are compiled on Conservation Status, Overall distribution, Overview, Scientific Name, Synonyms, Common Name (Indonesia). Indonesia Local Name (if available), Classification, Description, Ecology and Habitat, Distribution] Email: usnilkhotimah9@gmail.com

25720. Khotimah, U., Umayana, A.F.A.; Ithriyatina, P.; Ulfa, A.; Ulum, M.M.; Noronhae, M.D.; Mercusiana, S. (2026): Indonesia Species Profile of Drepanosticta sundana (Odonata: Platystictidae). SSRS INABIODIV Species Profile and Information. Vol. 2: No. 0010. https://publishing.ssrs.or.id/ojs/index.php/ssrs-inabiodiv: 9 pp. (in English) [Information are compiled on Conservation Status, Overall distribution, Overview, Scientific Name, Synonyms (instead of synonym there is of list of Drepanosticta species), Common Name (Indonesia), Classification, Description, Ecology and Habitat, Distribution, Species Value (Ecological Value, Economic Value, Socio-Cultural Value), Threats, References] Email: usnilkhotimah9@gmail.com

25721. Koch, A. (2026): The entomologist Erich Schmidt (1890 - 1969), his premature dismissal from the Museum Koenig Bonn, and the Nazi plot against the Alexander Koenig Foundation. Natural History Collections and Museomics 3: 1-28. (in English) ["Following a brief recap of the life of the entomologist Erich Schmidt (1890–1969), this paper examines his short tenure at Alexander Koenig's Natural History Museum in Bonn. Using archival records, the reasons for his premature dismissal are discussed, as well as his role during National Socialism and the resulting consequences for the establishment of the Alexander Koenig Foundation (AKS). Explosive letters from the Bonn City Archives are reproduced to demonstrate that high-ranking Nazi officials, including Bonn's mayor Ludwig Rickert, NSDAP district leader Cuno Eichler, and Karl Chudoba, the rector of the university at the time, attempted to boycott the foundation's establishment after the deaths of Alexander and Margarethe Koenig. Berthold Korf, the former senior taxidermist at the museum and a committed Nazi who had likewise been dismissed without notice by Alexander Koenig and later rose to become Bonn's police chief, also played an important role in this matter. In their will, the Koenigs had designated the AKS as the sole heir to their remaining assets. These consisted primarily of the expected proceeds from the sale of their Blücherhof estate in Mecklenburg, near Waren (Müritz), valued at 3–4 million Reichsmarks. However, the sale did not proceed due to the war. Ultimately, Blücherhof was expropriated during the Second World War, and the AKS was not established until 1946, following the collapse of the Nazi regime. In accordance with the charitable intentions of its founders, the AKS continues to support the Museum Koenig in its diverse scientific endeavours to this day." (Author)] Address: Koch, A., Biohistoricum – Research Archive for the History of Biology at Museum Koenig Bonn, Leibniz Institute for the Analysis of Biodiversity Change (LIB), Adenauerallee 160, 53113 Bonn, Germany. Email: a.koch@leibniz-lib.de

25722. Kosterin, O.E. (2026): In the middle of the Somatochlora sahlbergi kingdom. International Dragonfly Fund - Report 196: 71-81. (in English ["From 27 to 31 July 2025, Odonata were observed at two localities in the Polar Ural, Russia, near the Polyarnyy and Sob' railway stations situated at ca 67º N. Six expected species were recorded, including S. sahlbergi, which was very numerous. This confirms the expectation that this species is abundant at that latitude not only on both sides of the Polar Ural but also within the Polar Ural itself. A puzzling report of eleven additional species from about the same localities is discussed. The northernmost record of Aeshna grandis in West Siberia, from Labytnangi Town (66.66º N), is also reported." (Author)] Address: Kosterin, O.E., Institute of Cytology & Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, 630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

25723. Labdaoui, S. (2026): Les macroinvertébrés benthiques de la région de Bouira. Thèses de Doctorat, Université 8 mai 1945 - GUELMA Faculté des sciences de la nature et de la vie et sciences de la terre et de l'univers Département d'Ecologie et Génie de l'Environnement: 204 pp. (in French, with English and Arabian summaries) ["Wetlands are among the most biodiverse ecosystems, yet they remain highly vulnerable to global pressures. Benthic macroinvertebrates serve as reliable bioindicators of the ecological integrity of these freshwater systems, whose knowledge in Algeria remains limited, particularly in the Djurdjura Mountains, a region designated as a National Park and UNESCO Biosphere Reserve. This study aims to establish a taxonomic checklist of benthic macroinvertebrates within the Djurdjura hydrographic network, the main water supply for the Bouira region, to analyze their spatial distribution, identify the environmental factors structuring their assemblages, and propose conservation strategies adapted to these ecosystems. Sampling, conducted between February 2019 and June 2021 across 49 stations on both slopes of the massif, yielded a total of 50,075 individuals, belonging to two phyla, three classes, nine orders, and 58 families. Insects represented the dominant group, with a strong representation of Ephemeroptera (23,183 individuals, 24 taxa), including three endemic species recorded for the first time in the Djurdjura Mountains (Rhithrogena sartorii, Habrophelbia djurdjurensis, and Centroptilum samraouii), along with five species new to science. Plecoptera were identified as excellent indicators of cold, well-oxygenated streams, while Trichoptera revealed marked differences between preserved forested sites and those impacted by anthropogenic pressures. Diptera, Coleoptera, Hemiptera, and Odonata completed this unprecedented inventory, highlighting a largely underestimated biodiversity. Analysis of environmental parameters indicated that altitude, slope exposure, and land use strongly influence the distribution and composition of benthic communities. The contrast between the northern slope, with a Mediterranean-influenced, more humid and temperate climate, and the southern slope, subject to drier, more continental conditions, governs the hydrological, physicochemical, and biological characteristics of the studied sites. Upstream forested stations supported

diverse assemblages dominated by sensitive species, whereas stations affected by agricultural or domestic activities exhibited impoverished assemblages dominated by tolerant taxa. These findings underscore the exceptional heritage value and ecological fragility of the Djurdjura freshwater systems and highlight the need for ecological monitoring programs and tailored conservation measures to ensure their long-term sustainability." (Author) Odonata are treated at family level.] Address: https://dspace.univ-guelma.dz/jspui/handle/12345678-9/18775

25724. Louboutin, B. (2026): Émergences exceptionnellement précoces de Gomphus simillimus Selys, 1840 sur le Lez (Hérault, France), un fleuve méditerranéen à régime karstique (Odonata: Gomphidae). Martinia 40(3): 10-20. (in French, with English summary) ["Exceptionally early emergences of Gomphus simillimus Selys, 1840 in the Lez (Hérault, southern France), a Mediterranean river with a karstic regime (Odonata: Gomphidae). - G. simillimus is known to emerge in early May in southern Europe. We report here the discovery of emergences in late winter on the Lez River, a small Mediterranean river in the south of France. Monitoring at one station over five years showed that the species emerged in mid-March in 2021, late March in 2022, early April in 2023 and 2024, and late March in 2025. Weekly monitoring of emergence was carried out between mid-March and mid-July 2021, revealing emergence over a two-months period between mid-March and mid-May. This river is particular in that it is fed by a large karst resurgence, whose waters rarely fall below 14°C in winter. These observations confirm that winter temperature conditions influence the emergence period, particularly for G. simillimus, which emerges earlier than other Anisoptera here. Most protocols for searching for odonate exuviae in French waterways are carried out between late May and early August, which may be too late on certain rivers with mild temperatures for tracking certain Anisoptera such as G. simillimus. With this record of precocity for Europe, the author encourages targeted research to determine whether the Lez population is an exception or whether other early-emerging populations remain undocumented." (Author)] Address: Louboutin, B., Office pour les insectes et leur environnement, CBGP - 755, avenue du campus Agropolis - CS 30 016, 34988 Montferrier-sur-Lez Cedex, France. Email: bastien.louboutin@insectes.org

25725. Marinov, M.; Hanser, S.; Kitalong, A.; Ketebengang, H.; Villanueva, R.J.; Terayama, M.; Polhemus, D.; Ruluked, C.; Soaladaob, A.N.; Nobert, N.; Doscher, C.; Gabriel, L.; Benedict, R.O.; Dil'Mesiich Idechong, H. (2026): A contribution to the study of the Odonata fauna of Palau (Insecta: Odonata). Faunistic Studies in SE Asian and Pacific Island Odonata 50: 1-60. (in English, with Palauan summary) ["The Odonata fauna of Palau is reviewed based on all published records and new data collected during the last 25 years. The list of scientific names of taxa is updated and analysed. At least two new taxa at generic level are added based on females which could not be associated with any of the males so far reported for Palau: Pericnemis (?) Selys, 1863 proposed as a provisional scientific name for two females which were found to be closer to congenerors from the Philippines, and Gynacantha Rambur, 1842 based on one female. The updated faunistic list is accompanied by photos of live individuals and diagnostic photos of specimens of all presently known members of the included taxa. Priorities in faunistic and taxonomic studies are suggested, with a focus on phenology and habitat requirements, especially of the Palau endemics Pseudagrion palauense Lieftinck, 1962; Teinobasis palauensis Lieftinck, 1962; Drepanosticta palauensis Lieftinck, 1962 and Agrionoptera cardinalis Lieftinck, 1962. The latter is discussed in the faunistic account, with description of the exuvia (by supposition) which is proposed for first time. The three other endemics are illustrated with detailed photos of diagnostic features. Short biogeographic notes are included as well, highlighting the significance of the islands within the Republic of Palau." (Authors)] Address: Marinov, M., National Museum of Natural Hisotory, Bulgarian Academy of Sciences Tsar Osvoboditel Blvd. 1, 1000 Sofia, Bulgaria. Email: mg_marinov@yahoo.com

25726. Mehendale, T. (2026): A preliminary checklist of dragonflies and damselflies (Odonata) in a small part of Madugundi, Karnataka, India. Entomologia Hellenica 35(1): 46-62. (in English) ["A preliminary study was conducted in a small area of Madugundi village, Western Ghats, Chikkamagaluru district, Karnataka, India, to document Odonata diversity. The author recorded 67 species of odonates belonging to 10 families. This study aims to aid understanding the region's biodiversity and highlights the urgent need for targeted conservation strategies to protect the freshwater ecosystems and their unique Odonata assemblages from ongoing environmental threats." (Author) Euphaea wayanadensis, Indosticta deccanensis, Melanoneura bilineata, Gomphidia kodaguensis, Heliogomphus promelas, Melligomphus acinaces, Hylaeothemis apicalis] Address: Mehendale, T., 601, Manisha CHS, VP Road, Pendse Nagar, Dombivli (E), 421201, Thane, Maharashtra, India. Email: tmehendale28@gmail.com

25727. Miroglu, A.; Salur, A.; Suludere, Z. (2026): Ultrastructure of the secondary male genital organ of Platycnemis dealbata (Zygoptera: Platycnemididae). Microscopy research and technique 89(3): 538-545. (in English) ["In this study, the secondary male genitalia of P. dealbata was examined for the first time using Scanning Electron Microscope (SEM). The research revealed the ultrastructural features and various sensory structures of these organs. Two main types of sensilla were identified in the secondary genital organ: putative chemical sensilla and hair sensilla that detect mechanical stimuli. The study examined structures such as the ligula head, anterior and posterior hamuli, lamina anterior, and lamina batilliformes in detail. Four projections were observed on the ligula head, and it has been suggested that these projections play a role in sperm transport. Additionally, the hair sensilla on the sternum assist in detecting contact with the female and in anchoring during mating. This research compared the genital structure of P. dealbata with other Platycnemis species and revealed some similarities and differences. The study contributes to our knowledge of the reproductive biology and evolutionary adaptations of the Odonata taxon by presenting new hypotheses about the functions of these complex structures." (Authors)] Address: Miroglu, A., Dept of Fisheries Technology Engineering, Fatsa Faculty of Marine Sciences, Ordu University, Ordu, Türkiye

25728. Nogueira, A.; Oliveira, B.; Padilha, J.G.; Varandas, S.; Teixeira, A.; Sousa, R. (2026): Impact of the highly invasive Signal Crayfish (Pacifastacus leniusculus) on freshwater macroinvertebrate communities. Freshwater Biology 71(2): 15 pp. (in English) ["Invasive non-native species threaten freshwater ecosystems, disrupting the functioning and structure of the food chain and potentially leading to biodiversity loss. As omnivores, crayfish can modify their environment, directly affecting organisms such as macroinvertebrates. Macroinvertebrates, intermediate consumers in food chains, are influenced by both top-down and bottom-up forces, playing fundamental functional roles within freshwater ecosystems. The main aim of this study was to assess the effects of the

signal crayfish Pacisfatacus leniusculus on the freshwater macroinvertebrate community in a mountainous area with very low human disturbance, while controlling for other measured environmental factors (e.g., T°C, pH, TDS). To this end, 34 sites (18 invaded and 16 non-invaded) in the Rabaçal and Tuela River basins (Portugal) were sampled. Comparisons were made between basins and invaded and uninvaded sites regarding abundance, biomass, richness and indices of macroinvertebrate community diversity and functionality. A total of 38,529 organisms from 133 freshwater macroinvertebrate taxa were identified. Our results showed a decline in the biomass, richness and diversity of macroinvertebrates with increasing crayfish abundance. Few differences in functional diversity were found, probably due to functional redundancy; however, crayfish did affect certain functional groups: drillers and periphyton-associated macroinvertebrates exhibited a negative correlation with crayfish abundance, whereas scrapers and gravel-associated macroinvertebrates demonstrated a positive response. In addition to the abundance of signal crayfish, temperature, total dissolved solids and pH showed some influence on the macroinvertebrate community. Overall, these findings are fundamental for better understanding, predicting and managing crayfish impacts in low disturbance areas of upper catchments. It is important to continue monitoring not only non-native crayfish populations but also macroinvertebrate (and other) communities, as our findings clearly demonstrate the sensitivity of these organisms to crayfish presence. Future research should investigate the main mechanisms of this change in the macroinvertebrate community." (Authors) The Supplementary Material contains information on Onychogomphus uncatus, Gomphus pulchellus, Boyeria irene, Anax, Calopteryx, Cordulegaster boltonii, Platycnemis, Erythromma lindenii, Sympetrum, Oxygastra curtisii, Chalcolestes viridis, and Macromia splendens.] Address: Nogueira, A., CBMA—Centre for Molecular & Environmental Biology/ARNET-Aquatic Research Network/IB-S, Institute of Science and Innovation for BioSustainability, Dept of Biology, Univ. of Minho, Braga, Portugal. EmaiL antonio.m.b.nogueira@gmail.com

25729. Onishko, V.V.; Kosterin, O.E.; Voinov, I.O. (2026): Odonata of South Ural, Russia, as observed on expedition of July 2021. International Dragonfly Fund - Report 196: 1-70. (in English) ["On 3rd-14th July 2021, Odonata were examined in 39 localities in South Ural, in Oremburg and Chelyabinsk Province and Bashkortostan Republic, and one locality in Middle Ural, Sverdlovsk Province (Russia). In total 56 species were registered by photographs and/or collections, plus one species just visually. Of them, Orthetrum albistylum, O. brunneum, O. caerulescens anceps and Sympetrum meridionale are reported for South Ural for the first time. While O. brunneum and O. caerulescens could be overlooked in poorly studied Orenburg Province, O. albistylum and S. meridionale have obviously extended their ranges to South Ural from south or west, most probably as a result of climate warming. Anax imperator and A. parthenope were found to have well established themselves across South Ural, the former appearing very common. Flourishing populations of Ischnura aralensis at two lakes in Chelyabinsk Province were re-examined. We failed to confirm the arguable reports of Shaogomphus postocularis epophthalmus, Lindenia tetraphylla, Macromia fraenata, Somatochlora exuberata and Cordulegaster boltonii and while visiting the relevant or close localities. Specimens of Gomphus vulgatissimus from the south of the region studied had yellow colour on their femora, up to predominating on all femora in both sexes. This character is usually associated with the southern sister species Gomphus schneideri. However, their structural characters rather do not fit that taxon so we abstain from associating the South Uralian specimens with it." (Authors)] Address: Onishko, V.V., 1 Konenkov Str. 9, app. 265, Moscow, 127560, Russia

25730. Pakeman, R.J.; Stockan, J.A. (2026): Species Climate Indices predict changes in occurrence of some UK invertebrate groups. Ecological Indicators 184 (2026) 114715: 8 pp. (in English) ["Studies of the impacts of climate change on invertebrates have largely been concentrated on large, easy to identify groups such as butterflies, dragonflies and moths. Taking advantage of trend data calculated for a wider set of invertebrate species in the UK, a wider assessment was carried out by evaluating the relationships between both long-term and short-term species trends and Species Climate Indices. Across all invertebrate species there was a positive relationship between both January and July Temperature Indices and both long-term and shortterm trends, and a negative relationship between Species Precipitation Index and long-term trends. A subset of species groups showed similar responses, including the first evidence using this approach for differential responses of species …. Combining trend information with information on the climate preferences of species provides a means of broadening understanding beyond groups that are the focus of specific recording schemes." (Authors)] Address: Pakeman, R.J., James Hutton Institute, Craigiebuckler, Aberdeen AB15 8QH, UK. Email: pakeman@hutton.ac.uk

25731. Palacino-Rodríguez, F.; Rios-Olaya, K.J.; Quijano-Cuervo, L.G.; Clavijo-Baquet, S. (2026): Increased eutrophication influences reproductive and territorial behaviour of adult dragonflies in Andean habitats. Proceedings of the Royal Society B: Biological Sciences 293 (2065): 20252681: 12 pp. (in English) [Columbia; "Odonata provide crucial insights into environmental health as bioindicators of aquatic and terrestrial ecosystems, making it essential to study eutrophication effects on their populations. These insects exhibit diverse reproductive and territorial behaviours, which may be the first response to environmental disturbances. We hypothesized that eutrophication disrupts physiology and alters energy investment, affecting nutritional status and time allocation to territorial and reproductive behaviours. We estimated flight capacity and body condition-related traits in two sympatric dragonfly species at 12 sites along an eutrophication gradient, and recorded their territorial and reproductive behaviours. We determined the effects of eutrophication, body condition, and flight capacity-related traits on reproductive and territorial behaviours and analysed them according to sex and species. We found that increased eutrophication reduced on males the time allocated to territoriality and interspecific interactions, but increased the time spent in copulation and guarding females during oviposition. However, time spent for females in reproduction (e.g. copulation and oviposition) was positively related to eutrophication in Erythrodiplax abjecta but negatively related in Sympetrum gilvum. These differential responses indicate species-specific adaptive responses; however, the general reduction in behavioural duration suggests that physiological constraints imposed by altered environments may limit energy allocation for key activities in odonates." (Authors)] Address: Clavijo-Baquet, Sabrina, Sección Etología, Facultad de Ciencias, Universidad de la Republica, Montevideo, Montevideo11100, Uruguay. Email: sabrinaclavijo@fcien.edu.uy

25732. Payra, A.; Philip, J.G.; Islam, N.; Mardi, S.; Barman, R.; Deka, S.; Koparde, P. (2026): First description of the male Megalogomphus flavicolor (Fraser, 1923) from the fringe of Raimona National Park, Assam, India (Odonata: Gomphidae). Zootaxa 5748(2): 285-294. (in English) ["M. flavicolor

was described based on a female specimen from Bihar. To date, no formal description has been available for the male. The present communication deals with the first description of the previously unknown male of M. flavicolor, along with the supplementary notes on the morphology of female, based on a male and a female specimen collected from the fringe area of Raimona National Park in Assam, Northeast India. The present record also designates the first record of M. flavicolor for the northeast Indian state Assam, representing easternmost distributional range of the species." (Authors)] Address: Koparde, P., Dept of Environmental Studies, Dr Vishwanath Karad MIT World Peace University, Pune, Maharashtra, India. Email: pankaj.koparde@mitwpu.edu.in

25733. Phan, Q.T.; Keetapichayakul, T.S.; Tran, Y.N.; Long, T.D. (2026): Records of dragonflies and damselflies from the western Nghe An UNESCO Biosphere Reserve, central Vietnam: Part 1. Pu Huong Nature Reserve. International Dragonfly Fund - Report 198: 1-16. (in English) ["A total of 105 odonate species (43 damselflies and 62 dragonflies) were documented from Pu Huong Nature Reserve, located within the western Nghe An UNESCO Biosphere Reserve, for the first time. Among them, Burmagomphus asahinai and Ceriagrion chaoi represent new national records for Vietnam. In addition, the occurrences of Ceriagrion azureum, Devadatta ducatrix, Protosticta satoi, Heliogomphus bidentatus, Nihonogomphus schorri and Macromia urania extend the known distribution ranges of these species southward." (Authors)] Address: Phan, Q.T., Center for Entomology & Parasitology Research, Institute of Research & Training of Medicine, Biology & Pharmacy, Duy Tan University, Da Nang, 550000, Vietnam. Email: pqtoan84@gmail.com

25734. Phan, Q.T.; Mai, N.T.P.; Son, L.V. (2026): Description of Protosticta hopkinsi sp. nov. from the Bidoup Nui Ba National Park, the Central Highlands of Vietnam (Odonata: Zygoptera: Platystictidae). Zootaxa 5748(2): 276-284. (in English) ["Protosticta hopkinsi sp. nov. is described from the Central Highlands of Vietnam (Holotype male: Vietnam, Lam Dong Province, Lac Duong District, Thien Thai waterfall, 12.14472°N, 108.52944°E, alt. 1,559 m a.s.l., 29 April 2025, Zoological Collection of Duy Tan University). The new species can be easily distinguished from all other species in the Protosticta trilobata group by the combination of the yellow stripe on dorsal synthorax of male and female, and the shape of the apical part of the paraprocts." (Authors) Protosticta trilobata group: Protosticta beaumonti, Protosticta hopkinsi sp. nov., Protosticta linnaei, Protosticta nigra, Protosticta proboscis, Protosticta trilobata, Protosticta pseudocuriosa] Address: Phan, Q.T., Center for Entomology & Parasitology Research, Institute of Research & Training of Medicine, Biology & Pharmacy, Duy Tan University, Da Nang, 550000, Vietnam. Email: pqtoan84@gmail.com

25735. Pozo Ramos, R. A. (2026): Caracterización de la calidad del agua mediante macroinvertebrados en la represa Velasco Ibarra, provincia de Santa Elena. La Libertad. UPSE, Matriz. Facultad de Ciencias del Mar: 144pp. (in Spanish, with English summary) ["Due to the tolerance of benthic macroinvertebrates to pollution and their long-life cycles, they are considered reliable biological indicators for determining water quality in ecosystems. In this study, the ecological health of the Velasco Ibarra Reservoir, located in the province of Santa Elena, was evaluated using the BMWP/Ecu index, the Human Disturbance Index, and environmental parameters. A total of 1,367 individuals were recorded, distributed across eight families and six orders: Diptera (285), Hemiptera (34), Odonata (6), Coleoptera (2), Hygrophila (37), and Sorbeoconcha (1,003). The latter order showed the highest abundance, accounting for 73.43 % of the total, represented by the family Thiaridae, followed by Diptera, represented by the family Chironomidae, which comprised 20.85 % of the community. The application of the BMWP/Ecu index led to the classification of the three sampling stations as heavily polluted waters with critical quality levels, obtaining scores of 28 for station 1 and 2, and 21 for station 3. Spearman correlation analyses revealed that water mineralization, expressed through electrical conductivity and total dissolved solids, was a determining factor in the distribution of the communities. Multivariate analyses confirmed the existence of three distinct environments, characterized by a mineralization gradient that separated Station 3 from Stations 1 and 2, demonstrating environmental filters that shape community structure. The Human Disturbance Index indicated moderate impacts at Stations 1 and 3 (51.42 % and 56.66 %, respectively) and a lower impact at Station 2 (45 %), with solid waste and artisanal fishing identified as the primary sources of ecosystem pressure." (Authors)] Address: https://repositorio.upse.edu.ec/server-/api/core/bitstreams/f35647e7-df3a-4266-a8d6-f57e07445-115/content

25736. Rais, L.; Lakhdari, S.; Maghni, N.; Messai, A. (2026): Odonata diversity and first regional records from semi-arid wetlands of northeastern Algeria: assessing their bioindicator role. Euro-Mediterranean Journal for Environmental Integration 11, 32: 10 pp. (in English) ["This study explores the diversity and community structure of Odonata in the semi-arid wetlands of the Khenchela and Batna regions in northeastern Algeria, reporting several species recorded for the first time in this area. Field surveys were conducted from May to November 2023 across three freshwater sites: the Hassakheth Reservoir, Guechtane Wadi and the Tagharist Dam in Yabous. A total of twelve (12) species were identified, belonging to six families and encompassing both suborders: Zygoptera (Enallagma deserti, Ischnura saharensis, Coenagrion caerulescens, and Calopteryx virgo meridionalis) and Anisoptera (Anax imperator, Onychogomphus forcipatus, Orthetrum coerulescens, Orthetrum machadoi, Sympetrum fonscolombii, Sympetrum meridionale, Sympetrum vulgatum, and Trithemis kirbyi). The Shannon diversity index ranged from 1.61 to 2.27, reflecting moderate species richness across sites. Remarkably, the Batna and Khenchela wetlands shared only a single species, suggesting localized ecological differentiation. Among all sites, the Tagharist Dam exhibited the most structured and ecologically stable Odonata community, underscoring its importance for regional biodiversity conservation within this vulnerable semi-arid ecosystem." (Authors)] Address: Lakhdari, Somia, Lab. of Biotech., Water, Environment & Health, Abbes Laghrour University, Khenchela, Algeria

25737. Sato, R.; Terakita, A.; Koyanagi, M. (2026): Dragonfly red opsins share a common tuning mechanism with mammalian red opsins and further enhancement of near-infrared sensitivity. Cellular and Molecular Life Sciences 83, 66: 15 pp. (in English) ["Some animals, such as primates and insects have color vision including sensitivity to red light (red vision). Red vision is basically achieved through opsins sensitive to the red region (red opsins), which independently evolved in different lineages. In dragonfly red vision, which is known to sense longer-wavelength light compared with humans, however, the underlying opsins and the spectral tuning mechanism are largely unknown. Here we investigated dragonfly opsins and found that RhLWA2s are the longest-wavelength-sensitive opsins, so-called red opsins in dragonflies. Spectroscopic analysis of the recombinant pigment of RhLWA2 from Asiagomphus melaenops (Am_RhLWA2) revealed that it has an

absorption maximum at 580 nm and exhibits bistability, indicating that Am_RhLWA2 is the longest-wavelength-sensitive bistable opsin to date. Mutational analysis of Am_RhLWA2 revealed that position 292 is responsible for the red shift. The spectral tuning site as well as the mechanism for the red shift (S292A) is shared with that of mammalian red opsins, showing parallel evolution between mammalian and insect green-/red opsins, and the substitution from Ala to Val (A292V) in a dragonfly lineage further enhanced the red sensitivity to near-infrared region. Furthermore, we succeeded in engineering red-shifted Am_RhLWA2 mutant having an absorption maximum at 590 nm by introducing V211C mutation. Cultured cells expressing the red-shifted Am_RhLWA2 mutant exhibited significant Ca^{2+} responses to 738 nm light, showing the potential of near-infrared sensitive optogenetic tools to control GPCR-signaling. Based on the analysis of body coloration of a related dragonfly species, the longer-wavelength sensitivity of Am_RhLWA2 could confer an advantage in sex recognition." (Authors) The focus of this study was set on Sieboldius albardae.] Address: Koyanagi, M., Dept Biology, Graduate School of Science, Osaka Metropolitan University, Osaka 558-8585, Japan. Email: koyanagi@omu.ac.jp

25738. Sawant, D.; Chandran, A.V.; Mathews, R.J.; Kunte, K. (2026): Description of Lyriothemis keralensis sp. n. (Odonata: Libellulidae) from the southwestern coast of India. International Journal of Odonatology 29: 19-36. (in English) ["Lyriothemis keralensis sp. n. is described from the coastal plains adjoining the Western Ghats of Kerala, southern India, based on a male holotype (IBC-CD161) and a female paratype (IBC-CD310) (type specimens are deposited in the Biodiversity Lab Research Collections, currently held at the National Centre for Biological Sciences, Bengaluru). This taxon was hitherto misidentified as L. acigastra (Selys, 1878) from which it differs in having leaner abdomen, and differently shaped secondary genitalia and caudal appendages. Information on its biology and ecology are provided." (Authors) The study includes many references to Lyriothemis defonsekai van der Poorten, 2009.] Address: Chandran, A.V., Indian Foundation for Butterflies Trust, C-703, Alpine Pyramid Apts, near Canara Bank Layout, Kodigehalli, Bengaluru, Karnataka 560097, India. Email: avivekchandran2@gmail.com

25739. Schwarz, M.B.; Evans, B.J.E.; O'Carroll, D.C.; Fabian, J.M.; Wiederman, S.D. (2026): Dragonfly target-detecting neurons adapt to Stimulus saliency. Vision Research 238, 108713: 11 pp. (in English) ["The dragonfly visual System contains neurons that respond to the movement of small targets, even when embedded in visual clutter. Sonic of these target-detecting neurons facilitate their spiking activity to targets moving along continuous trajectories and selectively attend to one target when presented in a pair. When a target is rapidly repeated, the spiking activity of these 'small target motion detcctor' (STMD) neurons decreases. This 'adaptation' is spatially localised with a time course dependent on the frequency of Stimulation. Here, we presented rapidly repeating targets of varying contrast and direction, as well as perturbing facilitatory and selective pathways by evoking localised adaptation. Using extracellular electrophysiology, we show that higher target contrast elicits stronger adaptation; how-ever, the time course of diminishing responses was similar across contrasts. This relationship between target saliency and adaptation is also observed with targets moving in the preferred direction causing stronger adaptation. Targets that jitter, as is likely the case during rapid head foveation of prey, induce less adaptation as the jitter radius increases. We observed that the strengthening effect of facilitation competes against suppressive adaptation. Moreover, we observed that STMDs arc unlikely to selectively attend to targets that traverse an adapted location. These results provide insight into how dragonfly target-detecting neurons adapt their responsiveness to visual targets in their environment that would be encountered during flight when pursuing prey or conspecifics." (Authors)] Address: School of Biomedidne, The University of Adelaide, Adelaide, Australia, Department of Biology, Lund University, Sweden

25740. Seemab; Attaullah, S.; Khan, S.; Ullah, M. (2026): Diversity, distribution, and habitat preference of dragonfly (Odonata) in District Mardan, Khyber Pakhtunkhwa, Pakistan. Journal of Wildlife and Biodiversity 9(4): 104-122. (in English) ["Dragonflies are recognized as flagship species in freshwater conservation and act as a bio-control agent of important pests. To update existing information on the species composition, diversity and abundance in district Mardan, this study was carried out from March 2022 to October 2024. The total of 2240 collected specimens was identified into 23 species belonging to 14 genera and 4 families. Libellulidae was the predominant family with 13 genera and 19 species; Orthetrum pruinosum neglectum, O. coerulescens anceps, O. triangulare, O. cancellatum cancellatum, O. chrysostigma luzonicum, O. chrysis, O. sabina, Trithemis festiva, T. aurora, T. kirbyi, Neurothemis tullia tullia, N. fluctuans, Brachythemis contaminate, Pantala flavescens, Acisoma panorpoides, Crocothemis servilia, Sympetrum hypomelas, Diplacodes lefebvrii and Palpopleura sexmaculata, followed by Gomphidae with two genera and two species: Onychogomphus bistrigatus and Ictinogomphus angulosus. … Aeshnidae and Corduliidae, each comprised of a single species and a single genus: Anax immaculifrons and Macromia moorei. Orthetrum pruinosum neglectum was reported as the most dominant (RA=25%) and constantly distributed species, whereas Sympetrum hypomelas was ranked satellite (RA=0.08%) and sporadically distributed species. Among the four tehsils, Rustam was found to be the most diverse in terms of the highest number of species (23), Simpson diversity index I-D (0.8818), Shannon diversity index H (2.51302), Evenness index E (0.801475), and Margelaf Richness Index D (3.350969). Preferred habitats of various dragonfly species were also analyzed. Keeping in mind the declining diversity of dragonflies due to habitat destruction, an extensive study needs to be carried in the study area to focus on the habitat preferences and conservation of different dragonfly species." (Authors)] Address: Ullah, M., Dept Zool., Islamia College Univ., Peshawar, Pakistan. Email: mujibkhanicp@gmail.com

25741. Shama, F.N.; Jecha, J.S. (2026): Experimental and numerical investigation on aerodynamic performance of wind turbine blades with dragonfly-inspired corrugated microstructures. Big.D (2026) 3:1: 11 pp. (in English) ["The increasing demand for wind energy highlights the need for passive flow control strategies that enhance aerodynamic efficiency without increasing system complexity. Although biomimetic surface microstructures have demonstrated drag reduction potential, the applicability of insect-inspired corrugations—typically effective at low Reynolds numbers—to wind turbine blades operating at higher Reynolds numbers remains insufficiently understood. In this study, a dragonfly-inspired corrugated microstructure (height H = 0.4 mm, width W = 1.8 mm, spacing S = 1.2 mm) was fabricated on a NACA 0012 airfoil using high-precision laser engraving (±10 μm). Aerodynamic performance was evaluated through wind tunnel experiments at wind speeds of 5–25m/s ($Re = 5.0\times10^4$–2.5×10^5) and angles of attack from 0° to 12°, complemented by CFD simulations employing the SST k–ω turbulence model. Each test condition was repeated three times to ensure data reproducibility. The results demonstrate a statistically

significant maximum drag reduction of 4.5% ($p < 0.05$) at 15 m/s ($Re = 1.5\times10^5$) and 6° angle of attack, accompanied by an 8.2% improvement in lift-to-drag ratio and a 2° stall delay. Flow visualization via PIV and CFD reveals that stable leading-edge vortices are trapped within corrugation valleys, forming a fluid–fluid interface that reduces skin friction and suppresses flow separation. A scaling-based design rationale is further discussed by linking the corrugation height to the local boundary-layer thickness in the optimal Reynolds-number window ($Re \approx 1.25\times10^5$–$1.75\times10^5$), providing a practical guideline for transferring insect-inspired corrugations to wind energy aerodynamics. By linking corrugation geometry to boundary-layer scaling and vortex trapping behavior, this study provides mechanistic insight into the applicability of insect inspired microstructures at high Reynolds numbers and highlights a promising passive flow control paradigm for wind turbine blade design." (Authors)] Address: Jecha, J,S., Serengeti EcoVentures Limited Liability Company, Arusha, Tanzania. Email: jechasul@proton.me

25742. Stocco, A.; Fulan, J.A.; José de Castro, R. (2026): Temporal effect on predation of Astyanax lacustris and Poecilia reticulata fingerlings by Odonata nymphs in an experimental environment. EDUCAmazônia 19(1): 249-263. (in Portuguese) ["The study evaluated the predatory impact of nymphs from the order Odonata [Anax, Tramea] on two fish fry species: Astyanax lacustris (native) and Poecilia reticulata (invasive), both commonly found in aquaculture systems. The experiment was conducted over 72 hours, with fry counted and replaced every 12 hours, testing three treatments: only A. lacustris, only P. reticulata, and both species together. Each aquarium contained one Odonata nymph that had fasted for 24 hours, under constant temperature (26 °C) and continuous lighting. Statistical analyses (Kruskal-Wallis and Dunn's test) revealed no significant differences in predation between the two species, suggesting a lack of selectivity. However, significant differences were observed over time, with higher predation rates during the first 12 hours, possibly due to predator satiation after initial consumption. These findings indicate that Odonata predation is not species-specific but is influenced by temporal feeding dynamics. Therefore, management strategies in aquaculture should consider the timing of predator feeding behavior to minimize economic losses due to fry mortality, particularly in the initial hours after stocking, when fry is more vulnerable to predatory nymphs." (Authors)] Address: Stocco, Amanda, Graduada em Ciências Biológicas (Bacharelado), Universidade Federal de São Carlos (UFSCar). Mestranda do Programa de Pós-Graduação em Ecologia e Recursos Naturais (PPG-RN), Brasil. Email: amanda.stocco61@estudante.ufscar.br

25743. Székely, A.; Kollar, L.; Mészaros, A. (2026): Northernmost recorded breeding of the Black Pennant Se/ysiothemis nigra (Vander Linden, 1825) shows further spread in the Carpathian Basin (Odonata, Libellulidae). Evolutionary Systematics 10: 21-29. (in English) ["Northward range expansion has become increasingly common among European arthropods in recent decades. As global temperatures rise and the spread of artificial habitats alters ecological conditions, many species are establishing breeding populations outside their native ranges. S. nigra, considered native to the Iranoeremian region, has shown a rapid range expansion across Europe, reaching several new countries since the 2000s. As part of this process, the species was recorded in Hungary as well as in the Carpathian Basin in 2020 for the first time, when a single female specimen was observed during a field survey. In this study, we examined the species at the northern edge of its current European distribution in Hungary, using both traditional field observations collected between 2020 and 2025 and citizen science data. We documented 39 new occurrences, including multiple swarms consisting of more than one hundred individuals. At one of these sites, where copulating adults had previously been observed, larval sampling revealed the presence of immature stages. A total of 11 naiads were found in two gravel pit lakes, providing direct evidence of successful reproduction at 47.3262°N. This represents the first known autochthonous population in the Carpathian Basin and the northernmost breeding population of the species worldwide. Our results demonstrate that S. nigra is established and increasingly widespread in the Carpathian Basin, highlighting the importance of confirmed breeding populations in assessing range dynamics while emphasizing the growing value of citizen science platforms for tracking distributional changes in arthropods." (Authors)] Address: Székely, A., Institute of Biology, ELTE Eétvés Lorand University, Pazmdny Péter sétany 1/C, H-1117 Budapest, Hungary. Email: aronszekely2@gmail.com

25744. Theischinger, G.; Mitchell, A.; Polhemus, D.A.; Richards, S: (2026): Systematics of the Pseudagrion red-group from the Bismarck and Solomon archipelagoes (Odonata: Zygoptera: Coenagrionidae). International Dragonfly Fund Report 197: 1-38. (in English) ["We examined the structural morphology, colour patterns and genetic relationships of representatives of the Pseudagrion red-group occurring on the Bismarck and Solomon archipelagoes. Five species-level taxa are recognised in this group, that we informally call the P. incisurum 'complex': P. bougainville sp. nov. from Bougainville; P. brevicornis sp. nov. from Choiseul; P. incisurum Lieftinck from Guadalcanal and Malaita; P. lorenzi Gassmann from New Britain and Lihir Island; and P. simillimum sp. nov. from the New Georgia group in the Solomons. All of these species are brown-yellow to red damselflies, with a yellow face and with black pattern elements on the head, thorax and abdomen, and differ markedly from all other Papuan Pseudagrion by the shape of their male superior anal appendages. When viewed in lateral aspect, the appendages appear more or less parallel sided — at least not subconical —and apically rounded to almost truncate, not subacute or bilobed; and when viewed in a skewed dorsal aspect show a basal excavation anterior to a more or less developed subbasal to median process and a reflexed apical hook. Similarities in morphology supported by a molecular phylogeny based on mitochondrial and nuclear gene fragments indicate that these five species are closely related, but more extensive sampling of Pseudagrion species is required to confirm that they form a monophyletic group." (Authors)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

25745. Trapero Quintana, A.D.; Martínez, T.; Menor, R.; Tarruella Rodenas, M.J. (2026): Libélulas (Odonata: Insecta) de un embalse de riego en El Puerto de la Harina, Villena, Alicante. Cuadernos de Biodiversidad 70: 1-12. (in Spanish, with English summary) ["Dragonflies are characteristic insects of aquatic environments and, as biological indicators of these habitats, constitute excellent models for their assessment. They act as rapid colonizers of these environments, where they reproduce and develop their larval stages. In this study, the composition and abundance of dragonflies were documented in an irrigation reservoir located in the rural area of El Puerto de la Harina in Villena, Alicante, based on historical records of adults and weekly collections of exuviae conducted from March to August 2024 and 2025. A relative abundance rank plot was constructed, and the temporal frequency of species during the sampling periods was estimated. Nine

species belonging to three families and seven genera were detected. Trithemis kirbyi was the dominant species, followed by T. annulata, Enallagma cyathigerum, and Orthetrum cancellatum, with Libellulidae being the most diverse family. The odonate assemblage exhibited a relatively uneven distribution of relative abundance, characterized by dominant species with significant high and medium constancy percentages. It is evident that the diversity, abundance, and constancy of odonates are related to the structural characteristics and biotic factors of the studied freshwater environment. Strategies such as short larval cycles and occupation of key microhabitats in the water bodies are the key explaining the abundance of dominant species. Monitoring irrigation ponds enables the evaluation of their role in maintaining and diversifying odonatocenoses across the Iberian Peninsula, where they occur scattered throughout Spain. Such monitoring also provides novel insights into the order Odonata and freshwater entomofauna in general." (Authors)] Address: Adrian David Trapero-Quintana: Email: trapero76@gmail.com

25746. Uche-Dike, R.; Tolman, E.; Benischek, C.; Schneider, M.; Kohli, M.K.; Bush, J.; Frandsen, P.B.; Errigo, I.M.; Frankel, W.; Gnojewski, K.; Chmura, K.; Jordan, D.; Kittler, H.; Liao, M.; Tobin, T.; Su, C.; Castillo, G.; Derderian, E.; Wei, M.; Fernandez-Jaurez, S.; Tamano, T.; Gallafent, B.; Jenson, J.; Walser, C.A.; Ware, J.L.; Beatty, C.D. (2026): Integrating eDNA and community science to monitor urban Odonata diversity. Insect Conservation & Diversity 19(1): 84-92. (in English) ["The study of insect decline remains a major and increasingly urgent frontier in insect biodiversity and conservation. Despite increased attention to fluctuating insect decline trends, relatively little data have been compiled about aquatic insect species, particularly in urban ecosystems. Here, we combine environmental DNA (eDNA) metabarcoding and community science observations to monitor Odonata communities across an urban system in southwest Idaho, USA. We show that the distribution of Odonata communities across this urban landscape is not uniform, and that both monitoring methods have distinct strengths and limitations. Environmental DNA metabarcoding was sensitive to the detection of genera from underrepresented families in the region but was less effective at distinguishing closely related genera, particularly in sites where DNA degradation may have occurred. Community science observations effectively detected genera from more species-rich families but failed to capture relatively rare taxa or those with short flight periods. These findings highlight the complementary strengths of both methods: eDNA excels at detecting elusive or rare taxa in targeted sampling windows, while community science provides broader temporal coverage and finer taxonomic resolution. Integrating both methods offers a more robust approach to monitoring and managing urban biodiversity. In cases where only one method is employed, care should be taken to account for its inherent detection biases." (Authors)] Address: Tolman, E., Virginia Tech, Blacksburg, VA, 24061, USA. Email: etolman@amnh.org

25747. Ullah, I.; Ilahi, I.; Zia, A. (2026): Exploring the Odonata fauna of Hindu Kush range in Upper Dir with the first record of Cephalaeschna klapperichi (Schmidt, 1961) from Pakistan. Oriental Insects 60(1): 164-193. (in English) ["The current study was conducted to explore the Odonata fauna of Hindu Kush range in district Upper Dir, Pakistan. Field surveys were conducted during 2023–2024. Specimens were collected through aerial nets and identified under stereoscope. The fieldwork yielded a sum of 623 Anisoptera specimens identified into 3 families, 12 genera and 27 species and 140 Zygoptera specimens identified into 4 families, 5 genera and 6 species. The species Cephalaeschna klapperichi is recorded for the first time from Pakistan. Based on zoogeographical affiliation, 7 species are common to Palearctic, Oriental and Afrotropical region; however, 15 species show Palearctic as well as Oriental affiliation, 5 independently represent Oriental affiliation, 2 show Paleo-Oriental association, 2 species reflect Oriental, Palearctic and Indo-Australian affiliation, 1 species is distributed across four regions i.e. Oriental, Palearctic, Australian and Nearctic and 1 species shows Palearctic as well as Nearctic affiliation." (Authors)] Address: Ullah, I., Dept of Zoology, Univ. of Malakand, Chakdara, Pakistan. Email: ikramzoology@-sbbu.edu.pk

25748. Umayana, A.F.A.; Izzati, F.W.; Ithriyatina, P.; Nurhuda, F.; Putri, A.S.; Khotimah, U.; Hidayah, A.D.K.; Ulfa, A.; Ulum, M.M.; Noronhae, M.D.; Mercusiana, S. (2026): Indonesia Species Profile of Coeliccia membranipes (Odonata: Platycnemididae). SSRS INABIODIV Species Profile and Information. Vol.2: No. 0007. https://publishing.ssrs.or.id/ojs-/index.php/ssrs-inabiodiv: 10 pp. (in English) [Information are compiled on Conservation Status, Overall distribution, Overview, Scientific Name, Synonyms, Common Name (Indonesia). Indonesia Local Name, Classification, Description, Ecology and Habitat, Distribution, Species Value (Ecological Value, Economic Value, Socio-Cultural Value), Threats, References]

25749. Vanderelst, D.; Geipel, I.; Peremans, H. (2026): A robotic model of efficient prey finding in the gleaning bat Micronycteris microtis. Journal of Experimental Biology 229(1): jeb250818: 13 pp. (in English) ["The common big-eared bat (Micronycteris microtis) gleans its prey directly from plant surfaces. Previous experiments have shown that this bat exploits the specular reflection effect to discriminate between occupied and empty leaves. Using this effect requires the bat to position itself such that it can ensonify the leaves at sharp angles. If the bat can perceive the orientation and position of individual leaves, it could position itself to take advantage of the specular reflection. However, this would be a highly inefficient foraging strategy. The bat would first have to inspect each leaf to determine its position and orientation. Given that, under natural conditions, the vast majority of leaves do not feature prey, this would require the bat to spend most of its time collecting information on empty leaves. Here, we propose a strategy that allows a bat to exploit the specular reflection effect without inferring the position and orientation of individual leaves. We implement this strategy on a robotic arm equipped with a sonar head. The robot is tasked with finding a 3D-printed dragonfly on one of a set of artificial leaves. The robot follows an echo amplitude gradient and abandons this search whenever the echoes become too weak. Importantly, the robot does not actively find or locate individual leaves. We show that the proposed sensorimotor model can exploit the specular reflection effect to efficiently and effectively locate prey. Our results increase the plausibility of M. microtis using the specular reflection effect under natural conditions." (Authors)] Address: Vanderelst, D., Depts of Biological Sciences, Electrical & Computer Engineering, and Mechanical & Materials Engineering, University of Cincinnati, Cincinnati, OH 45221, USA. Email: vanderdt@ucmail.uc.edu

25750. Varone, M.; Di Lillo, P.; Lucibelli, F.; Volpe, G.; Carfora, A.; Mazzucchiello, S.M.; Aceto, S.; Saccone, G.; Salvemini, M. (2026): The insect eye: From foundational biology to modern applications in pest management. Insects 2026, 17, 167: 22 pp. (in English) ["The ability of an animal to perceive its visual environment underpins many behaviors essential to survival, including navigation, foraging, predator avoidance, and recognition of conspecific individuals, making vision a

critical element of both reproductive success and survival itself. In insects, eyes have evolved widely, shaped by different habitats and lifestyles, with striking examples such as the high-resolution diurnal vision of dragonflies, which enables rapid detection of prey and environmental features, in contrast with the highly sensitive nocturnal optical system of hawkmoths, which specializes in capturing even single photons. At the core of this diversity is a fundamental trade-off: at one extreme lies sensitivity, the ability to perceive visual stimuli, even under poor lighting conditions. At the other extreme, acuity, is the ability to resolve fine spatial details. This review seeks to synthesize current knowledge of insect visual systems, from their evolutionary origins to the developmental processes so far identified, from cellular organization to their role in behavior, to provide insights for designing novel, targeted, and sustainable vision-based technologies for the control of pest insects." (Authors)] Address: Varone, Marianna, Dept of Biology, Univ. of Study of Naples Federico II, 80100 Naples, Italy. Email: marianna.varone@unina.it

25751. Wachi, N.; Noriyuki, S.; Naruse, T.; Baba, Y.G. (2026): Field observation of predation on insects in mangrove habitat at Iriomote Island, the Yaeyama Islands, southwestern Japan. Entomological Science 29(1), e70000: 7 pp. (in English) ["Mangrove forests form vital interfaces between aquatic and terrestrial ecosystems, supporting a wide variety of organisms, both vertebrates and invertebrates. Although insects have long been underrepresented in mangrove research, particularly compared with studies on plant biology and ecosystem functioning, recent findings suggest that their diversity and ecological importance are greater than previously recognized. Nevertheless, their roles in trophic interactions, especially as prey, remain poorly understood. Here, we document six instances of insect predation from a mangrove habitat on Iriomote Island, the Yaeyama Islands, Japan. These include predation by fish, crabs, spiders, dragonflies, wasps and flies on various insect taxa, some of which are associated with mangrove environments. Although fragmentary, these records indicate that insects contribute to mangrove food webs not only as herbivores and detritivores but also as an important prey resource for a broad range of predators. Our observations underscore the need for further research into insect-mediated trophic relationships in mangrove ecosystems." (Authors) Figure 3 shows Orthetrum pruinosum neglectum catching a honey bee, Apis mellifera in flight.] Address: Wachi, N., Iriomote Station, Tropical Biosphere Research Center, University of the Ryukyus, 870 Uehara, Taketomi 907-1541, Japan. Email: nwachi@cs.u-ryukyu.ac.jp

25752. Watanabe, R.; Ohba, S.-y.; Tawa, K.; Sagawa, S. (2026): The roles of fallow-field biotopes and winter-flooded paddy fields as breeding and overwintering sites for aquatic insects. Insect Conservation and Diversity 19(2): 360-379. (in English) ["The populations of Odonata, Hemiptera and Coleoptera have substantially declined in paddy-field environments, prompting efforts to conserve these species through creating fallow-field biotopes and winter-flooded paddies. However, permanent biotopes may not support the breeding of some species, and winter-flooded paddies may be ineffective overwintering sites. As such, we assessed the roles of these habitats as breeding and overwintering sites through multiregional and two-year single-region surveys. We found that the biotopes served as breeding sites for Odonata and Hemiptera species that overwinter underwater, have long larval periods, or primarily inhabit ponds, as well as for endangered low-mobility species (e.g., Ilybius apicalis). Larvae of Dytiscidae (e.g., Graphoderus adamsii and Hydaticus bowringii) and Hydrophilidae (e.g., Regimbartia attenuata) and Sympetrum nymphs were more abundant in the paddy fields than in the biotopes during the breeding season. Similarly, prey abundance was higher and temporal overlap with prey was larger in paddy fields with dytiscid larvae, suggesting that aquatic insects select breeding sites based on prey availability and synchrony. Most aquatic insects were more abundant or were found in the biotopes in winter, indicating that winter-flooded paddies are unsuitable overwintering sites. These findings highlight the complementary roles of biotopes and paddy fields in supporting aquatic insect diversity. The flooding of biotopes should be tailored to site conditions and target species to improve conservation outcomes." (Authors)] Address: Watanabe, R., Dept of Environmental Life Science, College of Life Science, Kurashiki University of Science and the Arts, Nishinoura, Tsurajima-cho, Kurashiki, Okayama 712-8505, Japan. Email: r-watanabe@kusa.ac.jp

25753. Yan, Y.; Yang, F.; Zheng, Y.; Du, Y.; Guo, Z., (2026): Nb2C/MWCNTs composite photothermal superhydrophobic anti/de-icing coating inspired by dragonfly wings. Chemical Engineering Journal 532, 174407. (in English) ["Icing causes severe economic losses and safety hazards, and existing anti/de-icing materials suffer various limitations. Nb2C remains relatively unexplored in this field, and this is the first report using Nb2C MXene for photothermal anti/de-icing applications. Inspired by dragonfly wing veins, a micro-nano grid structure was laser-engraver on an Al substrate, followed by simple spraying to fabricate a Nb2C/MWCNTs composite coating (PCNA). The bio-inspired microstructure delivers excellent hydrophobicity (CA: 152°, SA: 3.2°) to reduce ice nucleation and adhesion, while enabling efficient light trapping for solar energy utilization. Under 1-sun illumination, PCNA rapidly heated to 76.4°C and melted a 0.5cm³ ice in 90s; at -15°C, it delays 15μL water droplet freezing to 1411s with ice adhesion strength of 7.97±0.54kPa. The coating also exhibits good anti-fouling and mechanical durability." (Authors)] Address: Yang, F., Sichuan Province All-Electric Navigation Aircraft Key Technology Engineering Research Center, China. Email: yfc@hubu.edu.cn

25754. Yu, P.; Godoy-Diana, R.; Benjamin Thiria, B.; Kolomenskiy, D.; Engels, T. (2026): Aerodynamic consequences of wing damage in dragonfly flapping flight. Interface 23, 234: 15 pp. (in English) ["Flapping wings are the primary means by which dragonflies generate forces, but they are susceptible to damage due to their inherent fragility. The damage results in a reduction in wing area and a distortion of the original wing, which in turn leads to a decline in flight ability. Furthermore, the flows of dragonfly forewings and hindwings exhibit an interaction; thus, damage to the forewing can also impact the aerodynamic performance of the ipsilateral hindwing. In this study, we examine this problem through computational fluid dynamics simulations on a series of damaged dragonfly forewing/hindwing models according to the probability of area loss from the literature. The flow fields and aerodynamic forces for the different damaged wing cases are compared with those for the intact wings. This comparative analysis reveals how the different patterns of wing damage modify the vortex structures around the flapping wings and lead to a drop in aerodynamic force production. The causes behind the diminishing aerodynamic performance are shown to be subtler than the pure area loss and are regulated by the changes in the flow field that result from wing damage. Wing–wing interaction becomes particularly important when forewing damage occurs." (Authors)] Address: Engels, T., Institut des Sciences du Mouvement Etienne-Jules Marey, Aix-Marseille Université, Marseille, France. Email: thomas.engels@univ-amu.fr