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1998

23949. Nakamura, N. (1998): Rediscovery of Cercion hieroglyphicum in Kushiro. Sylvicola 16: 37-38. (in Japan, with English title) [26-VIII-1997, Hyotan Pond, Tsurugadai, Kushiro City, Japan] Address: Nakamura, N., 6-22 Shiroyama, Kushiro City, 085-0826, Japan

2001

23950. Nakataki, M. (2001): Rediscovery of Ischnura asiatica (Brauer) from Lake Harutori, Kushiro City. Sylvicola 19: 23-26. (in Japanese, with English title) [1 female, 1-IX-2001; 1 male 8-IX-2001] Address: Nakatani, M., 2-6, Meiji-cho, Nemuro City, 087-0003, Japan

2002

23951. D'Amico, F. (2002): Le peuplement d'Odonates d'une zone humide de montagne: la « tourbière » de Piet (Pyrénées-Atlantiques, France). Martinia 18(4): 135-145. (in French, with English summary) ["The Dragonfly fauna of a mountainous wetland: the peat bog of Piet in the French Pyrenees (Pyrénées-Atlantiques). Between July and mid-September 1999, a field survey (11 visits) has been carried out to assess the presence/absence of adult dragonflies and collect exuviae at ten sampling sites (10 m? each), randomly selected, in an upland peat bog (1160 m a.s.l): the so-called "tourbière de Piet" (Pyrénées-Atlantiques; France). This natural site is characterized by a patchy structure with different habitats (mainly small streams, acidic shallow ponds surrounded by Sphagnum, heathland...). On the basis of adult survey, 11 species were recorded. Among these, 5 were also identified from the 83 exuviae collected during the whole survey. Using these abundance data, we calculated both the Shannon index of diversity using Brillouin's formula (HB = 1.28) and the Berger-Parker index of dominance (d = 0.42). We also investigated dragonfly assemblage and sites structure using ordination (Correspondence Analysis, CA). The main results were as follow: i) a high inter-sites variability in dragonfly richness, ii) a natural hierarchical structure of sites and iii) a strong relationship between dragonfly species and habitats. The sampling protocol is further discussed." (Author)] Address: D'Amico, F., UPPA, Dépt d'Écol., Campus Montaury, 64600 Anglet. France. Email: frank.damico @univ-pau.fr

23952. Grand, D. (2002): Sur la distribution en Gascogne de Leucorrhinia albifrons (Burmeister, 1840) (Odonata, Anisoptères, Libellulidae). Martinia 18(4): 147-152. (in French, with English summary) ["On the distribution of Leucorrhinia albifrons (Burmeister, 1839) in Gascogne (Odonata, Libellulidae). A bibliographical synthesis of regional observations of Leucorrhinia albifrons is proposed, as well as a distribution map for the Landes, Gironde and Charente-Maritime departments. A discussion suggests that more than 100 localities may exist for this species in Gascogne area. Information are given about its biology and its preferred habitats. The regional status of "eventually threatened" is suggested in order to take into account the quick disappearing of the habitats of this species." (Author) Address: deceased

2003

23953. Tsuchiya, K. (2003): Notes on insect-watching activities in Harutori Park, under the joint aspect of Kushiro Insect Lovers' Society and Kushiro City Museum. Sylvicola 21: 103-105. (in Japanese) [Epitheca bimaculata sibirica: 9-VI-2001; Sympetrum danae: 25-K-1999; Sympetrum frequens: 25-IX-1999; Sympetrum striolatum imitoides: 25 IX-1999.] Address: not stated

2004

23954. Nakataki, M. (2004): Dragonflies of Lake Takkobu, Kushiro-cho, Hokkaido. Sylvicola 22: 9-16. (in Japanese, with English title) [17 odonate species are listed and discussed: Sympecma paedisca, Erythromma humerale, Coenagrion lanceolatum, C. ecornutum, Cercion calamorum calamorum, C. hieroglyphicum, Enallagma boreale circulatum, Aeshna nigroflava (= A. crenata), Trigomphus melampus, Somatochlora arctica, S. viridiaenea, Epitheca bimaculata sibirica, Libellula quadrimaculata asahinai, Sympetrum striolatum imitoides, S. eroticum eroticum, S. croceolum, and Pantala flavescens."] Address: Nakatani, M., 2-6, Meiji-cho, Nemuro City, 087-0003, Japan

2006

23955. Søgaard, B.; Pihl, S.; Wind, P. (2006): Arter 2004-2005. NOVANA. Danmarks Miljøundersøgelser. Faglig rapport fra DMU nr. 582. http://fagligerapporter.dmu.dk: 148 pp. (in Danish) ["The monitoring of species in NOVANA has been provisionally determined for the period 2004-2009 and primarily includes selected plant and animal species covered by the Habitats Directive and birds covered by the Birds Directive. The report presents the results of the monitoring of species in 2004-2005. Supplemented with the results of the systematic monitoring in the coming years, species monitoring in NOVANA is expected to contribute to

more concrete knowledge about changes in the distribution and population size of the species and thus a better scientific basis for assessing their conservation status." (Authors/-Google translate) Between pages 40 and 45 Ophiogomphus cecilia, Leucorrhinia pectoralis, and Aeshna viridis are treated] Address: http://www2.dmu.dk/1_viden/2_Publikationer/3_fagrapporter/rapporter/fr582.pdf.

2007

23956. Couceiro, S.R.M.; Hamada, N.; Luz, S.L.B.; Forsberg, B.R.; Pimentel, T.P. (2007): Deforestation and sewage effects on aquatic macroinvertebrates in urban streams in Manaus, Amazonas, Brazil. Hydrobiologia 575: 271-284. (in English) ["In the last few years, awareness in developed countries has increased regarding the importance of urban watercourses as essential natural resources for human well being. Macroinvertebrates have been used as bioindicators to complement physico-chemical evaluation of water quality after environmental perturbations. The city of Manaus is closely associated with the Amazonian rain forest and with its dense hydrographic network. Any perturbation, such as deforestation and/or water pollution in the city's streams, therefore causes changes in the local ecosystem as the population increases. In this study, 65 streams were sampled in October and November 2003. Samples were taken from streambed sediment in the center of the channel and litter/sediment at the edge of the stream. Deforestation, total Nitrogen (TN), total Phosphorus (TP), depth, width, electrical conductivity, temperature and dissolved Oxygen (DO) were measured. A total of 115,549 specimens were collected, distributed among 152 taxa [taxa are treated at genus level]. Oligochaeta, Chironomus, Psychodidae and Ceratopogonidae were the taxa with the greatest frequencies of occurrence and the highest total abundances. Higher deforestation, TN and TP were correlated with lower DO and greater electrical conductivity, pH and water temperature. Deforestation, TN and TP were not associated with water velocity and stream width. Depth was the only variable correlated (negatively) with deforestation and not correlated with TN and TP. Greater deforestation, TN and TP were correlated with lower richness of taxa; but these variables did not affect abundance. Canonical Correspondence Analysis ordenated the streams into two groups; the majority of the streams were in the group with high levels of deforestation and with high values of TP, TN, pH, electrical conductivity and temperature, where the macroinvertebrates were reduced to a few taxa. The other group was composed of streams that were well oxygenated and deep, where richness of taxa was higher. These results indicate changes in community composition in response to changes in environmental conditions. The highest taxa correlation was with streams that were well oxygenated and had the greatest depth and water velocity. Species Indicator Analysis identified 29 taxa as indicators of nonimpacted streams, 16 as indicators of deforested streams and three as indicators of streams impacted by deforestation and domestic sewage. Of the total sampled streams, 80% were impacted by deforestation and water pollution and had fauna tolerant of these perturbations. Water pollution, represented by TN and TP, affected the macroinvertebrate fauna in a way similar to deforestation, i.e., causing reduction in taxa richness, simplifying the insect community composition without changing abundance. Use of the taxa suggested in this study as environmental indicators could improve the evaluation of water quality in the streams in Central Amazonia. ... Delgado (2002) reported Progomphus as one of the most representative Odonata genera in the Reserva Florestal Adolpho Ducke (a preserved area in Manaus). In our study, this genus was correlated with streams that were well oxygenated and with greater depth and water velocity. Progomphus presence has been associated with sand substrate (Assis et al., 2004). Absence of this genus in the deforested and polluted streams can be explained by the surface compaction of the sand due to the formation of a layer of algae and fine sediments such as silt and organic material; this barrier does not allowing Progomphus species, which burrow in the sand, to obtain Oxygen." (Authors)] Address: Couceiro, Sheyla, Instituto de Ciências – ICC sul, Universidade de Brasília, Asa Norte, CEP 70910-970, Brasilia, DF, Brazil

2010

23957. Karlsson, T. (2010): Årsrapport 2009 för projekt Trollsländor i Östergotland. Entomologiska Föreningen Östergötland 2010: 6-12. (in Swedish) [Google translate/Verbatim: A total of 2379 approved observations of 49 dragonfly species in Östergötland have been reported to the Species Portal in 2009 up to 2009-12-01 (this also includes observations made by people outside the project as they can be considered positive side effects of the project). Compared to 2008, this is 322 fewer observations, but the number of species found has increased by one. A total of 5147 observations of 49 species have now been reported during the project. The number of species must be considered high as 51 dragonfly species are known from Östergötland. However, no new species for Östergötland have yet been found. Sweden's dragonfly fauna is still poorly researched and southern species appear to be expanding northwards. It is therefore likely that new dragonfly species will be found during the project period. The number of species/inventory square is marked by a large increase compared to the first year of the project (see table and figure below). The number of squares where any observation has been made is now up to 105 inventory squares, which is an increase of almost 90%. Squares with =20 species are almost twice as many as in 2008 and squares with =30 species have more than doubled. In the two most species-rich squares to date (7e24 and 7f22), 38 species have been found. In 7f22, two additional species have previously been observed (2004), which shows that it is likely possible to find 40 species in one square. In order to find so many species in one square, it must have many different aquatic environments and it must be inventoried carefully. As in 2008, the most reported species is Libellula quadrimaculata (186 finds), while the least reported species is Epitheca bimaculata (one find). Also well-reported species are Coenagrion pulchellum (170 finds), Aeshna grandis (153 finds), C. puella (151 finds) and C. hastulatum (144 finds), while few finds have been made of Aeshna viridis (three finds), Sympetrum flaveolum (four finds), Libellula fulva (four finds), Somatochlora arctica (five finds) and Gomphus vulgatissimus (five finds). The most well-reported species are all typical generalists, i.e. they can live in a wide variety of aquatic environments, in contrast to the species with few records that are specialized in certain environments and more locally occurring. The yellow-spotted meadow dragonfly is also a species that can vary greatly in numbers between different years. Interesting findings: During 2009, Libellula fulva was found again in Östergötland. The species was noted from Östergötland in the 1950s, but has not been reported from the region since then. During the second half of the 20th century, its distribution seems to have been limited to the lower reaches of the Emån River in eastern Småland, but it now seems to be expanding its range and was found as far north as Gästrikland in 2007. It lives mainly in vegetation-rich, slow-flowing waters and flies during June-July. L. fulva is red-listed as "vulnerable" (VU), but will

probably be classified as “least concern” (LC), i.e. not red-listed, in the new red list in 2010. On the second of July, a solitary male was found near the Valvikssjöarna lakes west of Rimforsa. A couple of days later, a targeted search for the species was made at Drillaån a couple of kilometres north of the Valvikssjöarna. Several territorial males were found here and on 17 July also a female. L. fulva is likely to be found in more, undiscovered, locations in the county. The species is probably most likely to be found in south-eastern Östergötland. The 2008 report announced six new locations in Östergötland for Lestes virens, a species that has rapidly expanded northwards in recent years, perhaps as a result of global warming. During 2009, the species was found in 10 additional locations. L. virens is listed as “Near Threatened” (NT), but will probably be classified as “Valuable” (LC), i.e. not red listed, in the new 2010 Red List as a result of the expansion. On 14 September, a Aeshna subarctica was observed on the island of Häradsskär in the Gryt archipelago. The species is strongly associated with brown-water lakes with rocking fly borders, and is rarely seen very far from such an environment. However, this aquatic environment is missing on Häradsskär and one has to travel almost two kilometres to find such an environment.”] Address: https://trollslandor.se/-ostergotland/Arsrapport_2009.pdf

23958. Karlsson, T. (2010): Inventeringshandledning för Projekt Trollsländor i Östergötland. Entomologiska Föreningen Östergötland 2010: 21 pp. (in Swedish) [Manual for the study of the Odonata of Östergötland, Sweden.] Address: https://-www.trollslandor.se/ostergotland/Inventeringshandledning_-ver2.pdf

23959. Sychra, J.; Adamek, Z.; Petrivalska, K. (2010): Distribution and diversity of littoral macroinvertebrates within extensive reed beds of a lowland pond. Annales de Limnologie - International Journal of Limnology 46: 289-289. ["Although habitats of hard emergent macrophyte beds, including reed beds (Phragmites australis), are very common in the littoral zones of stagnant waters in central Europe, research investigating their macroinvertebrate communities is still lacking. In this study, the spatial distribution of macroinvertebrates was studied within large reed beds in the littoral zone of a lowland fishpond (Nesyt, SE Moravia, Czech Republic). Using a hand net, horizontal line transects in the reed bed leading from the marginal area with the open water towards the shore were sampled. The results of NMDS ordination and PERMANOVA test proved that the taxonomic composition of the macroinvertebrate assemblage changed significantly along the investigated horizontal transect from the open water towards the shore, together with gradual changes in some environmental factors. The taxa diversity was found to be the highest in the areas closest to the shore. In the reed bed areas near open water, corixids, aquatic insects larvae, leeches, water mites, some naidids and tubificids, which represented free-swimming invertebrates with tracheal gill breathing, ectoparasites, gatherers/collectors and taxa preferring pelal and inorganic substrates, were more abundant compared with the interiors of reed beds. On the other side, in the shallow dense interior of reed beds close to the shore, gastropods, water slaters, some naidids and enchytraeids, aquatic beetles and dipteran larvae were characteristic taxa, which belonged especially to grazers and scrapers, shredders and invertebrates preferring phytal and POM (particulate organic matter) microhabitats. Different predators were recorded in areas near open water and near the shore. This invertebrate spatial distribution probably reflects changes in microhabitat and environmental conditions along the investigated horizontal transect. The results of this study proved that extensive reed beds serve as refuges for many groups of aquatic macroinvertebrates within lowland fishpond ecosystems.... Aquatic insect larvae, such as the larvae of mayflies (Cloeon dipterum, Caenis sp.), dragonflies (Ischnura elegans) and caddisflies (Oecetis sp.) were also abundant in the ecotone between open water and the reed bed at the study site, which can be related to recorded higher dissolved oxygen concentration in these reed bed areas." (Authors)] Address: Sychra, J., Department of Botany and Zoology, Faculty of Science, Masaryk University, Kotlárská 2, 611 37 Brno, Czech Republic. Email: dubovec@seznam.cz

2011

23960. Bourret, A. (2011): Divergence regionale et repartition spatiale en mosaique chez les demoiselles Enallagma hageni et E. ebrium. MSc. thesis, Faculté des études supérieures de l'Université Laval, Quebec: 71 pp. (in French and English) ["North American Enallagma damselflies radiated during the Pleistocene and species differ mainly by secondary sexual structures. Although morphologically very different, Enallagma hageni and E. ebrium are genetically very similar. Their ranges broadly overlap but these ecologically equivalent species rarely co-occur. Here, we investigated the evolutionary history of these two very young morphospecies by coupling population genetics and spatial analyses. Based on AFLP polymorphisms, population genetics analyses indicate that these morphospecies are locally diverging. They are rarely sympatric at local sites and their distribution form a mosaic of patches where one morphospecies is dominant. Reproductive interference coupled with postglacial recolonization likely explains this pattern. By limiting contemporary opportunities for gene flow, it probably also contributes to accelerating regional differentiation." (Author)] Address: https://dam-oclc.bac-lac.gc.ca/eng/45fa8088-7d84-4634-a547-81c32e811907

23961. NABU-Naturschutzzentrum Wollmatinger Ried; Jacoby, H.; Klein, E. (2011): Jahresbericht 2011 über das Natur- und Landschaftsschutzgebiet "Wollmatinger Ried - Untersee - Gnadensee" (Deutschland). Im Auftrag von Ministerium für Ländlichen Raum und Verbraucherschutz, Postfach 10, 34 44, 70182 Stuttgart, Germany: 6 pp. (in German) [Dragonflies (Odonata) by Manuel Fiebrich: During the investigations carried out as part of a diploma thesis, a total of 38 species were recorded in the reporting area. In addition to common species such as Enallagma cyathigerum, Libellula quadrimaculata and Sympetrum depressiusculum, a first record of Libellula fulva was found within the protected area, as well as a first record of Aeshna juncea in the adjacent FFH area "Göldern". It was particularly pleasing that the occurrence of Sympecma paedisca could be confirmed in a larger number of individuals than in 2005, despite a very dry spring. Other species worth mentioning that were detected are Sympetrum fonscolombii, Anax ephippiger and Gomphus simillimus. Translated with www.DeepL.com/Translator (free version)] Address: Fiebrich, M., Am Kalkofen 1, 53925 Sistig, Germany. E-maiL: m.fiebrich@freenet.de

2012

23962. Hyslop, E.J.; Nesbeth, D.A. (2012): The effects of bauxite/alumina waste on the composition of the macroinvertebrate community of the Rio Cobre, a major river in Jamaica. Biota Neotropica 12(2): 33-39. (in English) ["The paper sets out the results of a one year study on the effects of bauxite waste discharge on the macroinvertebrate fauna of

a Jamaican river, the Rio Cobre, based on monthly samples from four sites. Significantly higher levels of temperature and conductivity were found at the sites downstream of the point of effluent discharge. The invertebrate fauna of the two sites immediately downstream of the point of discharge was dominated by two invertebrate taxa: Baetis sp. (Fam. Baetidae) and Smicridea jamaicensis (Fam. Hydropsychidae). These taxa made up between 26 to 35% of the numbers at these two sites. Upstream of the bauxite waste input the community was dominated by cased caddis larvae of Helicopsyche ochthephila (Fam. Helicopsychidae) and Cubanoptilia tridens (Fam. Glossostomatidae), which also occurred at the site furthest downstream from the waste input. Scrapers dominated at the upstream site whereas collector gatherers were the predominant functional feeding category at the impacted sites. The constituents of the bauxite waste are discussed and it is proposed that the changes in faunal composition which have resulted from waste input may be a consequence of habitat alteration due to increased deposits of suspended material rather than the chemical nature of the waste." (Authors) The paper includes data on Enallagma coecum, Scapanea frontalis, and Anax junius.] Address: Hyslop, E.J., Dept Life Sciences, Univ. the West Indies, Mona campus, Kingston 7, Jamaica. E-mail: eric.hyslop@uwimona.edu.jm

23963. Peterson, T. (2012): Flora och Fauna i Rudbodakärret Lidingö. Levande Lidingö 2012: 70 pp. (in Swedish) [Odonata are treated on pages 30-32.] Address: https://www.lidingo.se/download/18.3d1e5816979fc250c26037/1571312381484/Rudbodak%C3%A4rret-Flora-och -faura-2012.pdf

2013

23964. Deliry, C. (2013): Odonates du Paléarctique Ouest - Juillet 2013. Histoires Naturelles n°26: 59 pp. (in French) [https://deliry.net/pdf/hn26.pdf] Address: Deliry, C., 20, rue de la Manine, F-38510 Morestel, France. E-mail: president@sympetrum.org

23965. Søgaard, B.; Wind, P.; Elmeros, M.; Bladt, J.; Mikkelsen, P.; Wiberg-Larsen, P.; Johansson, L.S.; Jørgensen, A.G.; Sveegaard, S.; Teilmann, J. (2013): Overvågning af arter 2004-2011 [Species monitoring 2004-2011]. NOVANA. Aarhus Universitet, DCE – Nationalt Center for Miljø og Energi. Videnskabelig rapport fra DCE - Nationalt Center for Miljø og Energi nr. 50: 240 pp. (in Danish) ["NOVANA. Aarhus University, DCE – National Center for Environment and Energy, 240 pp. - Scientific report from DCE - National Center for Environment and Energy no. 50: This report presents the results of the monitoring of species in NOVANA for the period 2004-2011. The monitoring primarily includes selected plant and animal species covered by the Habitats Directive. Species monitoring in NOVANA aims to contribute with concrete knowledge about changes in the distribution and population size of the species and thus provide a professional basis for assessing their conservation status. The report will form part of the basis for reporting to the EU in accordance with the Habitats Directive." (Authors/google translate) On pages 162 - 170 Aeshna viridis, Ophiogomphus cecilia, and Leucorrhinia pectoralis are treated:] http://www.dmu.dk/Pub/SR50.pdf

2014

23966. Biosphärenreservat Pfälzerwald Nordvogesen (2014): Artenvielfalt im Biosphärenreservat Pfälzerwald – Vosges du Nord - La diversité d´espèces dans la Reserve de biosphère Vosges du Nord - Pfälzerwald. https://www.-pfaelzerwald.de/wp-content/uploads/2015/05/Handbuch-ArtenvielfaltBiosph%C3%A4renreservatPf%C 3%A4lzerwald.pdf: 250 pp. (in bilingual in French and German) [Bilingual species profiles of Aeshna grandis, A. juncea, Leucorrhinia dubia, Coenagrion hastulatum, Cordulegaster boltonii, Ophiogomphus cecilia, and Somatochlora arctica are outlined treating Identification features, biology, habitat, distribution in the cross-border biosphere reserve Palatinate Forest – Northern Vosges, and endangerment and protection] Address: https://www.pfaelzerwald.de/wp-content/uploads/-2015/05/Handbuch_Artenvielfalt_Biosph%C3%A4renreservat_Pf %C3%A4lzerwald.pdf

2015

23967. Blanchon, Y.; Ronne, C. (2015): Première preuve d'autochtonie de Gomphus graslinii dans le département du Var (Odonata: Gomphidae). Martinia 31(1): 49-52. (in French, with English summary) ["First proof of autochtony of Gomphus graslinii in the Var department (Southeastern France): G. graslinii has been known from the Provence-Alpes Côte d'Azur region (PACA) since 2010 in the Bouches-du-Rhône department, and since 2013 in the Var department where an adult female was found on the river Argens. Accordingly, an exuviae sampling survey using a canoe was organized in July 2014 in the latter area. Several exuviae pertaining to that species were collected, providing the first proof of successful reproduction of G. graslinii in the Var department, the eastern border of its distribution range." (Authors)] Address: Blanchon, V., Chemin de la Mourgatte, 26200 Montélimar, France. E-mail: yoann.blanchon@orange.fr

23968. Clarke, T. (2015): The Canary Islands. Naturetrek Tour Report 7 – 14 November 2015: 18 pp. (in English) [Dragonflies: *Ischnura senegalensis: A new species for the Naturetrek list and only recorded on our first afternoon at Las Galletas. *Anax imperator: We saw this species on all islands and on a total of six dates during the tour. *Anax parthenope: Only recorded from Fuerteventura. *Anax ephippiger: Another new species for the Naturetrek list, seen by Tony and Pauline on La Gomera. *Orthetrum chrysostigma: Recorded from both La Gomera and Fuerteventura. *Sympetrum fonscolombii: This species was recorded on all the islands visited during the tour. *Crocothemis erythraea: Another species seen on all the main islands we visited. *Trithemis arteriosa: Another new species for the Naturetrek list, a female was seen and photographed by Tony during our picnic stop at Buenavista on the 8th.] Address: https://d11gbzngntg4t4.cloudfront.net/reports/ESP15_report_151107_The_-Canary_Islands.pdf

23969. Fuisz, T. I.; Vas, Z.; Kõrösi, Á.; Pereszlényi, Á.; Túri, K.; Urbán, S.; Karát, K. (2015): Conservation and research at the largest European Bee-eater (Merops apiaster Linnaeus, 1758) colony of Hungary. Természetvédelmi Közlemények 21: 76-86. (in Hungarian, with English summary) ["In the Golyófogó-valley of Albertirsa a significant European Bee-eater colony breeds on a large loess bank. The population has long been monitored by conservationists, and lately by the members of the Jászkun Nature Protection Association. After purchasing a 5-hectare area around the loess bank the association started a habitat restoration programme from 2003, and on the bank itself in 2009. The former waste disposal site was cleared, and the bank was restructured and cleaned from vegetation. As a result of these efforts the formerly only 30-40 pairs have increased to above 200 pairs. Besides the population trends food composition was

also surveyed at the colony. Half the collected food was composed of hymenopterans, and besides dragonflies, orthopterans and coleopterans made up approximately 10 percent each of the diet. We describe the botanical composition of the area and give a list of observed bird species." (Authors)] Address: Fuisz, T.I., Hung. Nat. Hist. Mus., 1088 Budapest, Baross u. 13, Hungary. Email: fuisz@nhmus.hu

2016

23970. Tourneur, J.; Lambret, P. (2016): Répartition et écologie de Gomphus graslinii (Odonata: Gomphidae) sur le Loir angevin: une étude pilote. Martinia 32(2): 93-115. (in French, with English summary) ["Repartition and ecology of Gomphus graslinii in the Maine-et-Loire department Abstract – The Loir River was known to host the only populations of Gomphus graslinii identified in the Pays-de-la-Loire region. A survey was conducted to map the distribution of the species on the course of the Loir River in the Maine-et-Loire department and to identify the environmental factors controlling its presence. The results show that the largest populations are found along the Loir River but that the species also breeds on the Mayenne and Sarthe Rivers. Studying different variables, we found that the most important environmental factors characterising the emergence sites of G. graslinii on the Loir River are the absence of aquatic vegetation, the presence of a continuous riparian forest inducing large shaded areas and the limitation of semi-ligneous plants on the banks. The possibility of a recent expansion of the species is discussed." (Authors)] Address: Tourneur, J., CPIE Loire Anjou, Rue Robert Schuman, La Loge, Beaupréau, F-49600 Beaupréau-en-Mauges, France. Email: j-tourneur@cpieloireanjou.fr

23971. Tratnik, A. (2016): [Dragonflies in the buds of the Alpine world]. Trdoživ V(1): 48. (in Slovene) [Verbatim/Google translate: Kali are small, shallow, standing bodies of water of artificial origin. They are typical of karst areas where surface water is scarce and are therefore the only habitats that allow animals and plants dependent on water to live in otherwise arid areas. Their biodiversity is extremely diverse and ranges from species-poor to comparable to the species-richest sections of rivers. In my master's thesis The Influence of Environmental Factors on the Diversity and Abundance of Dragonflies in Selected Kalis of the Alpine World, I dealt with dragonflies in kali on mountain plateaus, where alpine grazing is or was, taking place, for which kali were also created there. Compared to lowland karst, kali in the mountain world, above 1,000 m above sea level, are less well researched. The same is true of dragonflies, which are good bioindicators of the state of water bodies and have been less studied in our mountains. We sampled 16 kals on 6 different plateaus (Pokljuka, Jelovica, Ratitovec, Velika planina, Menina and Krvavec), and on all of them we sampled at least two kals in order to observe whether the smaller distance between them affects the similarity of the communities in them. On most of these plateaus, kals are still in use, but their management differs from kal to kal. Some are completely fenced, and water is piped from them to watering places, while livestock has free access to others. With the task, we wanted to answer what actually affects the presence and abundance of dragonflies in mountain kals. We decided to sample larvae, since they are the stage in which dragonflies survive the longest, and at the same time we also sampled other aquatic invertebrates. Unlike larvae, which in some species can live in water for several years, adult dragonflies live only a few weeks to months at most. We measured or estimated many other factors, including the number of habitat types in the area and the chemical and physical properties of the water. We also recorded the plants in the mud and their cover. Among the 393 larvae found, we found 5 species of dragonflies from 3 families. We found that the main factors affecting the presence, abundance and diversity of dragonflies in mountain muds are eutrophication (more precisely, the concentration of ammonium) and plants – both their cover and species diversity. Where the concentration of ammonium in the water was higher, there were fewer larvae, and there were also fewer species. In muds without dragonfly larvae, the concentration of ammonium was higher than in muds where we found them. Plants in the mud, on the other hand, had a positive effect on the abundance and diversity of dragonflies. The greater the cover and diversity of plants in the mud, the more larvae there were. Both plants and ammonium are directly or indirectly related to the presence of livestock near the mudflats. In all the mudflats studied, where there were no livestock or where livestock access to the mudflats was prevented by a fence, we found a higher abundance of dragonfly larvae. It also turned out that the trampling of the bank negatively affects the abundance and diversity of dragonflies in the mudflats. The trampling of the banks was even significantly higher in the mudflats where we did not record larvae than in those with them. If we take trampling as an indicator of the presence of livestock, we can conclude that livestock negatively affects the presence of dragonfly larvae. At the same time, trampling also shows us how much the mudflat is in use. Where the banks are trampled, livestock also have access to water, and when they wade through it, they can damage the larvae and their coastal microhabitats. Livestock also affects water turbidity, which indirectly negatively affects plant growth. They are directly affected by predation – where trampling was greater, there were also fewer emergent macrophyte species. Therefore, since the vegetation in the mud has a positive effect on dragonfly larvae, they are indirectly and negatively affected by the presence of livestock through the plants. Most dragonfly larvae live among aquatic vegetation, and adults of many species also lay eggs on aquatic plants. Although livestock on the mountains is the reason that mud in the mountain world exists at all, it is also the main factor that negatively affects dragonflies in them. Fencing has proven to be a good strategy for preserving mud suitable for dragonflies. However, this prevents livestock trampling, which ensures the impermeability of the mud, which in the long run means its disappearance. Therefore, it is necessary to find a balance between the presence of livestock near the mud that is still acceptable for dragonflies to live in it, while at the same time ensuring their maintenance.] Address: https://-www.dlib.si/stream/URN:NBN:SI:DOC-OYNMS8SS/29a4-cc73-166c-4719-99e4-fcdb9dfc99e6/PDF

23972. Vos-Jaspers, M. (2016): Een libel als transporteur van een slak. Spirula - Correspondentieblad van de Nederlandse Malacologische Vereniging 408: 26-27. (in Dutch, with English summary) ["A dragonfly as transporter of a snail: The transport of molluscs by animals has been known since Darwin. For instance, freshwater mussels and snails may be transported by water fowl and land snails by birds and sheep. By chance I recently photographed a groggily flying female Common darter Sympetrum striolatum. On later inspection of the picture the dragonfly proved to carry a small Gastropod on its head. Guided by the estimated ratio of length and width of the shell it is presumed to represent a juvenile specimen of the Common bithynia Bithynia tentaculata. A hypothesis is presented to explain this rare event." (Author)] Address: m.vosjaspers@gmail.com

2017

23973. Bahor, M. (2017): Favna kacjih pastirjev (Odonata) Mirnske doline in ovrednotenje naravovarstveno pomembnih obmocij - Dragonfly and damselfly fauna of the Mirna River valley and evaluation of nature conservation areas. MSc. thesis, Ljubljana, Univ. v Ljubljani, Biotehniška fakulteta, Študij ekologije in biodiverzitete: IX + 72 pp. (in Slovene, with English summary) ["Mirna Valley was odonatologically poorly studied with 37 species recorded up to 2015. The purpose of the master's thesis was to study the diversity of the dragonfly fauna in the area of the Mirna Valley and evaluate the adequacy of the current Natura 2000 areas for Coenagrion ornatum and Cordulegaster heros that are listed in the Annex of the Habitats Directive. During the survey 47 field days were conducted in the years 2015 and 2016. We collected data on the presence of 47 species of dragonflies at 119 sampling sites. We confirmed the presence of all the previously known species and recorded ten new species: Lestes barbarus, Lestes dryas, Sympecma fusca, Coenagrion pulchellum, Ischnura pumilio, Aeshna affinis, Aeshna isoceles, Brachytron pratense, Epitheca bimaculata and Sympetrum meridionale. We confirmed the reproduction of 40 dragonfly species in the Mirna Valley. Coenagrion ornatum has one of the strongest populations in Slovenia in the Mirna Valley, however Natura 2000 areas do not include its whole distribution area. For the species we defined the most important nature conservation areas according to the density of adult specimens and the confirmed reproduction. Cordulegaster heros is frequent in the influent streams and in the upper part of the river Mirna. With 32 recorded dragonfly species the fish pond Blato has one of the highest diversity of dragonfly species in Slovenia." (Author)] Address: https://repozitorij.uni-lj.si/IzpisGradiva.php?id=98325

23974. Walters, D.M.; Ford, M.A.; Zuellig, R.E (2017): A digital reference collection for aquatic macroinvertebrates of North America. Freshwater Science 36(4): 693-697. (in English) ["Aquatic invertebrates are a key component of freshwater ecosystems, and understanding aquatic invertebrate taxonomy is a cornerstone of freshwater science. Physical reference collections of expertly identified voucher specimens are the 'gold-standard' used to confirm specimen identifications. However, most biologists lack access to such collections, which themselves tend to be highly regionalized and somewhat limited in terms of taxonomic scope. The North American Aquatic Macroinvertebrate Digital Reference Collection (NAAMDRC; https://sciencebase.usgs.gov/naamdrc) was developed by the US Geological Survey (USGS) to overcome these limitations of physical collections. NAAMDRC provides users with public-domain, high-quality digital photographs to help verify specimen identifications." (Authors) Odonata are presented at family level, see: https://sciencebase.usgs.gov/naamdrc/#/collection] Address: Walters, D.M., 1US Geol. Survey, Fort Collins Science Center, 2150 Centre Avenue, Fort Collins, Colorado 80526 USA

23975. Šalamun, A. (2017): Popotni poreènik (Gomphus vulgatissimus). Trdoživ VI(1): 55. (in Slovene) ["The larvae of G. vulgatissimus live in slow-flowing streams and rivers, rarely lakes, buried in fine sand. G. vulgatissimus is a typical spring species, and in Slovenia the last molt occurs from late April to June, most often in May. The metamorphosis is coordinated, so large numbers of lions can be found in short stretches. Adults are sun-loving, but in the days before they reach sexual maturity, they can fly far away from the place of their last molt. Although G. vulgatissimus is quite common in central Europe, the larvae are sensitive to river pollution, which is why it is listed on the Red List in Slovenia as a vulnerable species (V). ... On the banks of the Drava River near Radlje, on sunny May 4, 2015, several dozen migratory river otters spawned in the same place between the mouths of the Ehartov and Suhi potok streams. Slavko Prijatelj managed to capture the entire spawning of one of them in just 20 minutes between 11:42 and 12:02." (Author/Google translate)] Address: https://botanicnodrustvo.splet.arnes.si/files/2019/03/Trdoziv11_web.pdf

2018

23976. Bahor, M. (2018): [Dragonflies in the Mirna Valley]. Trdoživ 7(2): 32-33. (in Slovene) ["My master's thesis Dragonfly fauna (Odonata) of the Mirna Valley and evaluation of areas of environmental importance was created with the aim of collecting data on the presence of dragonflies in the Mirna Valley area. In previous research, 37 species of dragonflies were recorded in the area until 2015. I collected all data from previous odonatalogical research, including unpublished ones, and included them in the overview of species diversity. In addition, in two years of intensive field work, I collected 1,430 faunal data myself at 119 sample sites and recorded 10 species for the first time in the Mirna Valley area, and also confirmed all previously known species. Eight of the 10 new species are endangered or protected in Slovenia. I devoted a little more attention to recording the qualifying species of dragonflies for Natura 2000 areas: Cordulegaster heros and Coenagrion ornatum. Natural forest streams are common in the Mirnska Valley, which is why the great pond otter is also common. By purposefully searching for the dwarf otter 33, I doubled the number of previously known localities to a total of 25, of which only a third is included in Natura 2000 areas. Since Natura 2000 areas do not include all areas with the most numerous populations, nor all areas with confirmed development of the species, in my master's thesis I proposed expanding the existing Natura 2000 areas. C. ornatum is a rare and European important species that Slovenia is obliged to protect. One of the most numerous populations in Slovenia was recorded in the Mirnska Valley; others are known from the Ljubljana Marshes and the Vipava Valley, as well as some other lowland parts of Slovenia. By comparing the density of adult individuals per 100 m of watercourse length, I also determined the most important places for the protection of this species. The population of C. ornatum has been stable for the last four consecutive years, and I have not noticed any major fluctuations in its abundance. Nevertheless, it is necessary to continue monitoring the state of C. ornatum population and plan the maintenance of canals and streams, as well as the preservation of suitable habitats for the species to reproduce. The Mirna Valley has been poorly researched in the past, both in terms of dragonflies and other organisms, so further research is needed in the area, including to verify the suitability of the declared Natura 2000 areas and to monitor the state of the populations of both protected and other species. Among the most interesting areas, which also had the highest values of the nature conservation indices used in the study, are the Krmeljska kadunja with sediment lakes in the area of abandoned mines, the Vejarska basin with the Blato pond in the area of the former clay mine and the Vejarje stream, and the Mirna-Mokronoška basin with the floodplain and backwaters along the Mirna River and clay mine lakes." (Author/Google translate)] Address: https://www.dlib.si/stream/URN:NBN:SI:doc-U09LU2U0/9b457934-b3c7-4bf0-a3d8-4f1973a90cc4/PDF

23977. Borisova, N.V.; Martynov, E.P.; Bolshakov, L.V.

(2018): New species of dragonflies (Odonata) for Chuvashia. Eversmannia 53: 38. (in Russian) [Chuvash Republic (Russia); records of Sympecma fusca, S. paedisca, Aeshna crenata, and Libellula fulva are documented.] Address: Borisova, N.V. Russia, Cheboksary, FSBI "Prisursky State Reserve", Chuvash Branch of the Russian Entomological Society, Russia. E-mail: nat-borisova18@yandex.ru

23978. Correia, R.G. (2018): Entomofauna edáfica e armazenamento de liteira em cultivos de Swietenia macrophylla (King) na Amazônia Oriental. Tese (Doutorado em Ciências Florestais) - Universidade Federal Rural da Amazônia, Belém, 2018: 81 pp. (in Portuguese, with English summary) ["The forest ecosystems, their vegetal compositions and different forms of management present in the soil entomofauna the fundamental elements for its functioning, so that the knowledge of these communities is important for the perspectives of sustainable management of forest ecosystems with Brazilian mahogany (Swietenia macrophylla King). For the enrichment of the knowledge of the entomofauna associated to the Brazilian mahogany in the eastern Amazon and considering the importance of research on entomofauna in forest plantations mainly in reforestation ecosystems, it is intended to answer the following questions: How is entomological diversity distributed and what is its contribution in the different forest ecosystems with Brazilian mahogany. ...." (Author) Coenagrionidae and Libellulidae have been captured in pitfall traps, but in low numbers.] Address: http://repositorio.ufra.edu.br/handle/1234-56789/267

23979. Godé, L.; Peruquetti, P.F. (2018): Libellules (Odonata) de la Réserve Biologique de Pedra Talhada. In: Studer, A., L. Nusbaumer & R. Spichiger (ed.), Biodiversité de la Réserve Biologique de Pedra Talhada (Alagoas, Pernambuco - Brésil). Genève, Nordesta & Conservatoire et Jardin botaniques de la Ville de Genève: 211-219. (in French) [https://nordesta.-anitastuder.org/wp-content/uploads/2020/08/Biodiv_PT_BR_-6.6.1.pdf] Address: Godé, L., 127 ter rue de la Colline, 54000 Nancy, France. Email: laurent.gode@pnr-lorraine.com

2019

23980. Thongjued, K. (2019): Diet analysis of Wrinkle-Lipped Free-Tailed Bat (Chaereplion plicatus Buchannan, 1800) using direct-PCR DGGE technique. M.Sc. thesis, Molecular Biology and Bioinformatics Prince of Songkla University: XVIII + 99 pp. (in English) ["Globally insectivorous bats have been reported as a biological pest control agent. Chaerephon plicatus may play an important role for rice pest suppression. Diet analysis is used to reveal this ecosystem service. However, fecal examination using microscopic method have never provided reliable species prey list due to the possibility of thorough mastication for some insects, hi this study, first, we developed and validated a direct PC'R protocol for fast and effective universal insect species identification. Second, we tested applicability of the well-optimized protocol hi various sample types regularly encountered hi ecological studies. Third, we employed direct PC'R protocol together with Denaturing Gradient Gel Electrophoresis (DGGE) (called direct PC'R-DGGE technique) to identify insect preys in bat guano samples, and foiuth, the ecosystem service of C. plicatus in regulating hisect pest and also its foraging behavior hi the surrounding agricultural landscapes was assessed. The developed direct PCR protocol that incorporates a 2-nun sample preparation in PBS-buffer step achieved 100% success rates for amplification hi six insect orders: Mantodea. Phasmatodea. Neuroptera. Odonata [Tholymis tillarga. Neurothemis tullia, Coenagrionidae sp.]. Blattodea. and Orthoptera. High and moderate success rates were obtamed for five other groups: Lepidoptera (97.3%). Coleoptera (93.8%). Diptera (90.5%). Hemiptera (81.8%), and Hymenoptera (75.0%). High-quality sequencing data were obtained from these amplifiable products, alio whig confidence hi species identification. The method was sensitive down to lA of a 1-mm^2 fragment of leg or body and its success rates with oven-dried, ethanol-preserved, food, bat guano, and museum specimens were 100%. 98.6%. 90.0%. 86.3%. and 30.0%. respectively. Two hundreds and seven of 240 bat guano pellets collected monthly from bat caves surrounded by rice fields were successfully amplified and provided 325 bands on DGGE gel. Sequencing confirmed that these bands comprised 42 identified OTU of insects and could be assigned to 7 orders. 25 families. 24 genera, and 26 species. The results showed that C. plicatus diet was shaped by agricultural landscape, and also relied on availability of msect preys in their foraging range. Potential rice pest species, e.g. brown planthoppers (Nilapairata lugens), and medical important insects, e.g. mosquitoes (Culex sp.) were consumed by C. plicatus. indicating its function as pest suppressing agent. This is the first time direct PCR-DGGE has been successfully used to analyze bat diet front guano samples. Diet of the bat was revealed genetically down to species level resulting in a more complete picture of ecosystem service, which allows further understanding of predator-prey interaction. These findings also provide basic data which could further benefit conservation and sustainable management of bat caves adjacent to the farmland to protect their habitat and prevent population decline, which may help to improve productivity, profitability of the agriculture industry, and consequently promote human well-being." (Author) The study includes data on Neurothemis tullia, Tholymis tillarga and Coenagrionidae sp.] Address: https://kb.psu.ac.th/psukb/-bitstream/2016/12552/1/435350.pdf

2020

23981. Anton, E.; Kopetz, A.; Krebs, D.; Müller, J.; Weigel, A. (2020): Bericht zur Gemeinschaftsexkursion des Thüringer Entomologenverbandes e. V. (TEV) im Sommer 2020 ins Eichsfeld (Westthüringen). Mitteilungen des Thüringer Entomologenverbandes 27(2): 98-214. (in Germany) [Thüringen, Germany; Coenagrion puella, Enallagma cyathigerum, Ischnura elegans, Platycnemis pennipes] Address: Müller, J., Schachtelhalmweg 33, 99092 Erfurt, Germany. Email: relluemnehcoj@web.de

23982. Jere, A.; Darshetkar, A.; Patwardhan, A.; Koparde, P. (2020): Assessing the response of odonates (dragonflies and damselflies) to a tropical urbanization gradient. Journal of Urban Ecology 6(1): 1-7. (in English) ["Understanding species responses to urbanization is important to realize their specific conservation needs. Odonates (dragonflies and damselflies) are freshwater insects perceived as good ecological indicators. To investigate responses of tropical odonates to an urbanization gradient, we sampled adult odonates along an urbanization gradient at six sites along the Mula River across Pune City, Maharashtra, India. For species–habitat analysis, we first performed a variable reduction using principal component analysis. we analyzed species–habitat data using redundancy analysis and canonical correspondence analysis. We documented 15 odonates across 6 sites. Our statistical analyses on patterns of odonate assemblages across sites and environmental variables did not return significant results. However, we detected site-exclusivity in a few species based on occurrence data and identified

urban sensitive, urban tolerant and generalist species. We found that the odonate diversity was highest at a moderately urbanized site. We believe that increase in diversity due to moderate amounts of disturbance can be explained by the intermediate disturbance hypothesis. Based on our data, we suggest that for the conservation of odonates in the urban context, anthropogenic disturbance needs to be regulated. Here, we demonstrate that understanding species–habitat associations is the first step towards understanding their ecological and conservation requirements. To conserve odonates and rivers in metropolitan cities like Pune, restoring original river-side habitat and reducing the disturbance at highly urbanized sites to at least intermediate levels needs to be done on an urgent basis." (Authors)] Address: Koparde, P., Environmental Management, Faculty of Sustainability Studies, MIT World Peace University, Pune, Maharashtra, 411038, India. Email: pankajkoparde@gmail.com

2021

23983. Choo, M.Z.J.; Low, B.W.; Yeo, D.C.J. (2021): Predaceous diving beetles: a potential alternative mosquito biocontrol agent to dragonflies. Journal of Vector Ecology 46(2): 226-229. (in English) ["Predation rates of Hydaticus pacificus (25–60 Aedes albopictus larvae) were highest among the four predator species (28–44 for Crocothemis servilia, 12–35 for Orthetrum sabina, and 11–15 for Ischnura senegalensis). Pairwise comparisons indicated that the predation rates of H. pacificus were significantly higher than O. sabina ($p < 0.01$) and I. senegalensis ($p < 0.001$), although not significantly different from that of C. servilia ($p = 0.245$)." (Authors)] Address: Yeo, D.C.J., Department of Biological Sciences, National University of Singapore, Singapore 117558. Email: dbsyeod@nus.edu.sg

23984. Cooper, S.D.; Klose, K.; Herbst, D.B.; White, J.; Drenner, S.M.; Eliason, E.J. (2021): Wildfire and drying legacies and stream invertebrate assemblages. Freshwater Science 40(4): 659-680. (in English) ["Climate change is engendering droughts and wildfires in many ecosystems, especially those in Mediterranean climates. Yet, there is little information on the long-term responses of stream invertebrates in Mediterranean climates to wildfire, particularly during and after extreme drought. To examine the effects of drought and wildfire on stream invertebrate assemblages, we sampled stream reaches in southern California with surface water in 2016, at the end of a 5-y drought, and stream reaches in 2017, after flows resumed or increased, including sites within (burned), outside (unburned), and downstream of footprints for fires occurring 8 to 10 y ago. Spatial and temporal variation in invertebrate assemblages were attributed to hydrological regimes, including stream drying during the drought, but there were few fire-legacy effects. At the end of the drought, invertebrate assemblages occupying remaining standing water with high solute, temperature, and benthic organic matter levels were dominated by tolerant, lentic taxa. After flows returned in spring 2017, all sites, including those that were dry in 2016, were dominated by quick-colonizing riffle taxa. Invertebrate densities increased into the subsequent summer at the same time that flows declined and temperatures and conductivities increased; however, sensitive cool-water taxa were more abundant at perennial, shaded sites, whereas tolerant, warm-water taxa were more abundant at shallow, open sites that had dried the year before.We observed negative relationships between riparian burning extent vs canopy cover (weak) and coarse particulate organic matter levels (strong); however, invertebrate assemblage structure was similar in basins that did and did not burn. Although invertebrate populations were severely reduced at 1 site whose basin had burned the year before, invertebrate assemblages had largely recovered after 10 post-fire y, and fire-legacy effects were dwarfed by hydrological variation, particularly stream drying during the drought. Our data also suggest the importance of protecting water supplies and riparian vegetation for perennial, shaded headwater reaches, which provide refuges from drought and wildfire for native biodiversity. ... Sampled sites that were dry in 2016 had low NMDS axis 1 scores and were characterized by high temperatures, conductivities, and bank widths, and high relative abundances of the mayfly Callibaetis, the chironomid genera Thienemannimyia and Pseudochironomus, and the dragonfly Paltothemis lineatipes, whereas wet sites with high NMDS axis 1 scores were associated with high canopy covers, water depths, and stream to bankfull width ratios, low temperatures and conductivities, and high relative abundances of the mayfly Baetis and 5 chironomid taxa (Fig. 5)." (Authors)] Address: Cooper, S.D, Dept Ecol., Evolution, & Marine Biology, Univ. of California, Santa Barbara, California 93106 USA. Email: 5sdcooper@ucsb.edu

23985. Johnson, J.T. (2021): Presumed Libellula forensis × pulchella (Eightspotted × Twelve-spotted Skimmer) Hybrids. Argia 33(4): 31-36. (in English) [presumed Libellula forensis x pulchella hybrids are documented from Coyote Wetlands, Josephine County, Oregon, 4 Jun 2018, Columbia County, Oregon; 12 Jul 1999, Marion County, Oregon; 17 Jun 2000, and Harney County, Oregon; 4 Aug 2002.] Address: Johnson, J.T., 3003 Unander Avenue, Vancouver, WA 98660, USA. E-mail: gomphusjim@gmail.com

23986. Nisbet, C. (2021): Dragonfly observations from a year in Seychelles 2019 - 2020. Dragonfly News 79: 10-11. (in English) [The following species were observed on Desroches between September 2019 and February 2020: Anax ephippiger, A. guttatus, Tramea basilaris, T. limbata, Zyxomma petiolatum, and Ischnura senegalensis.] Address: not stated

23987. Petsch, D.K.; Saito, V.S.; Landeiro, V.L.; Silva, T.S.F.; Bini, L.M.; Heino, J.; Soininen, J.; Tolonen, K.T.; Jyrkänkallio-Mikkola, J.; Pajunen, V.; Siqueira, T.; Melo, A.S. (2021): Beta diversity of stream insects differs between boreal and subtropical regions, but land use does not generally cause biotic homogenization. Freshwater Science 40(1): 53-64. (in English) ["Previous studies have found mixed results regarding the relationship between beta diversity and latitude. In addition, by influencing local environmental heterogeneity, land use may modify spatial taxonomic and functional variability among communities causing biotic differentiation or homogenization. We tested 1) whether taxonomic and functional beta diversities among streams within watersheds differ between subtropical and boreal regions and 2) whether land use is related to taxonomic and functional beta diversities in both regions. We sampled aquatic insects in 100 subtropical (Brazil) and 100 boreal (Finland) streams across a wide gradient of land use, including agriculture and exotic planted, secondary, and native forests. We calculated beta diversity at the watershed scale (among 5 streams in each watershed). We found higher taxonomic beta diversity among subtropical than among boreal streams, whereas functional beta diversity was similar between the 2 regions. Total land use was positively correlated with taxonomic and functional beta diversity among subtropical streams, while local environmental heterogeneity was positively correlated with beta diversity among boreal streams. We suggest that different types and intensities of land use may increase among-stream heterogeneity, promoting distinct insect assemblage

compositions among streams. Our findings also suggest that beta diversity patterns and their underlying determinants are highly context dependent." (Authors) The samples include Odonata, but they are not further specified.] Address: Petsch, Danielle, Programa de Pós-Graduação em Ecologia e Evolução, Instituto de Ciências Biológicas, Univ. Federal de Goiás, Avenida Esperança, s/n, Térreo bloco ICB5, Câmpus Samambaia, Goiânia, Goiás 74690-900 Brasil

23988. Price, B. (2021): A tribute to county dragonfly recorder Bill Budd. Dragonfly News 79: 23. (in English) [Verbatim: I first met Bill at the 2015 BDS meeting in Ippwich and he volunteered his time in the Natural History Museum dragonfly collection from 2016. Bill preferred volunteering in the winter months, freeing up his summers to observe dragonflies in the wild. His first volunteer project involved rehousing and imaging the large dragonfly collection donated by Mike Parr. Following this Bill helped rearrange the British collection of pinned dragonflies, ensuring they were in modern housing and arranged in a way that makes them much easier to find in future. Bill then went through the entire global dragonfly collection looking for type specimens and providing each with a barcode label encoding a unique number for our database. This was a huge job, sifting through 1500 drawers containing an estimated 100,000 specimens, looking for tiny labels designating the specimen as a type. I think Bill thoroughly enjoyed this search as by the end he had seen the whole collection which includes 2/3 of the currently known species on the planet! Bill's last project was a search for all the specimens in the genus Anax across the various "subcollections" within the dragonfly collection. He ended up finding 1200 specimens across the collection and this information is now being incorporated into our database as I work from home during the COVID lockdown. I'm very grateful for Bill's friendship and his help in the dragonfly collection; all four projects have significantly improved the information we have on the collection and will have a lasting impact, making it easier for current and future generations of researchers around the world to access the collection. I was very glad Bill got to see the formal publication of the species we named in his honour: Megalogomphus buddi (pictured above), a small tribute to his help in the collection and his love of dragonflies.] Address: Price, B.W., Natural History Museum, Cromwell Road, London, SW75 BD, UK. Email: b.price@nhm.ac.uk

2022

23989. Garrison, M.C.; Tennessen, K.J. (2022): Nymph Cove: Identification to genus: Gomphidae (Part 1). Argia 34(3): 26-28. (in English) ["Then there are other pairs of genera that can be recognized quickly, although telling them from each other requires a closer look. Three such generic pairs are: Aphylla/Phyllocycla, Erpetogomphus/Ophiogomphus, and Lanthus/Stylogomphus." (Authors)] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

23990. Medina-Espinoza, E.F. (2022): Grandes odonatólogos de América: George y Juanda Bick: más que un amor en común. Hetaerina 4(2): 34-36. [Verbatim/google translate: George H. Bick was born in 1914 in Neptune, Louisiana (Hornuff, 1979), a place that disappeared shortly after due to a hurricane (Bick, 2006). Perhaps for this reason he spent the first years of his life in New Orleans, also in Louisiana (Hornuff, 1979). In this city, in 1919, Juanda Claire Boncks (Dragonfly Society of the Americas [DSA], 1999) was born, who later became his wife. They both attended Tulane University. There, he obtained his bachelor's degree in 1936 and his master's degree in 1938 (Hornuff, 1979). She, on the other hand, obtained her master's degree in biology in 1942 (DSA, 1999). They met around 1940, while he was working in the Louisiana state conservation department and she was still a botany student (Hornuff, 1979). George served in the United States during the last three years of World War II (Hornuff, 1979), where he became a mosquito control officer in the United States Navy (Donnelly, 2006). Upon his return from the war, he married Juanda, in whom he found not only a life partner, but also a colleague (Hornuff, 1979). It was also during this time that George entered his PhD program at Cornell University and they had their first daughter (Bick, 1996). The Bicks became a wonderful collaborative team for 55 years (Donnelly, 2006; Smith & Patten, 2020). George's interest in dragonflies began when he was a student at Tulane University (Bick, 1996). As he recounts in his memoir Looking Back (Bick, 1996), he was standing at a pond across from the university when a gravid female Erythemis simplicicollis wandered into his net. He collected the eggs and excitedly drove to the university where his professor told him, "You'll never raise them until they become adults." George did so, and not content with that, he published a detailed paper on the natural history of this species (Donnelly, 2006). This would be his first contribution to dentistry (Donnelly, 2006). The Bicks spent their summers at resorts in Michigan, Montana, Ohio, and Oklahoma (Donnelly, 2006). In particular, they spent 16 summers in the latter state, where they developed valuable studies on the behavior of odonates together with their friend and colleague Lothar Hornuff (Bick, 1996). Juanda's interest was the behavior of dragonflies and George's, the distribution of the species (Smith & Patten, 2020). The meticulous work they carried out is evidenced by their report on sperm transfer in Zygoptera (Bick & Bick, 1965a), their article about the change in coloration of Argia throughout the day (Bick & Bick, 1965b) and by the fact that there have only been six new records of Odonata for the state of Oklahoma since their work (Smith & Patten, 2020). The Bicks are also considered to have been pioneers in conducting long-term field studies and monitoring of Zygoptera populations to record their phenology, ecology, and behavior, as well as in documenting the reproductive behavior of damselflies through recordings (Beckemeyer, 2002). Some of the collections that hold the specimens they collected are the Carl Cook Collection, Florida State Collection of Arthropods, Illinois Natural History Survey, Jean Charles Aube, Osaka Museum of Natural History, National History Museum - University of Central Oklahoma, National Museum - Smithsonian Institute, and University of Michigan Museum of Zoology (Smith & Patten, 2020). In the later stages of their dental careers, age led them to the laboratory (Donnelly, 2006) and it was with material from the International Odonata Research Institute that they carried out sensational taxonomic revisions of Neotropical zygopteran genera (Beckemeyer, 2002). The genera they studied were: Cora, Euthore, Polythore, Philogenia and Telebasis (Donnelly, 2006). They described two species of Cora (Bick & Bick, 1991), eight new species of Philogenia (Bick & Bick, 1988; one of them synonymized by Bota-Sierra et al., 2018) and nine of Telebasis (Bick & Bick, 1995; Bick & Bick, 1996), of which one also turned out to be a synonym (Garrison, 2009). In his later years, George also began to write about dragonfly conservation (Bick, 2006). Most of the odonatologists of the time met George and Juanda at the meeting organized by B.E. Montgomery where the Societas Internationalis Odonatologica was formed in 1963 (Bick, 1996). There, they presented their research on damselfly behavior and impressed many (Donnelly, 2006). Anyone who thought that Juanda's name on the papers was due only to the fact

that she was George's wife was greatly mistaken (DSA, 1999). She first recorded Anax longipes Hagen, 1861 for Oklahoma, a species that George was not able to observe until seven years later (Smith & Patten, 2020). She is even said to have corrected Jerrell J. Daigle over dinner on taxonomic details of the genera she and George had reviewed (DSA, 1999). The list of odonatologists with whom the Bicks shared moments and anecdotes was numerous, including Bill Mauffray, Clarence H. Kennedy, Dennis Paulson, James G. Needham, Jerrell J. Daigle, Ken Tennessen, Leonora K. Gloyd, Minter J. Westfall, Philip P. Calvert, Philip S. Corbet, Rob Cannings, Rodolfo Novelo, Rosser Garrison, and Nick Donnelly (Bick, 1996; Bick, 2006; see also “Some tributes to George” in volume 18 of Argia, 2005). One year before the beginning of the present millennium, Juanda died of cancer (DSA, 1999; Bick, 2006), leaving us without his extraordinary good humor and his vivid spirit (DSA, 1999) and George in the care of his daughters (Bick, 2006). George lived his last five years in the company of his daughter Suzann, who helped him maintain his communications with his odonatological friends while writing his last papers for him. George loved dragonflies, which is reflected in the fact that he worked on them until the end of his life, always maintaining his lucidity. Indeed, on November 15, 2005, George came to the studio to review the last of his articles that Suzann had written for him when he fell. Despite the doctor's expectations that George would survive the surgery and remain conscious, on November 28, he died. His last words were: "Hello, Suzann"; for his daughter who was with him all that time. Suzann recounts all these moments in her emotional farewell to her father, “Memories of my daddy, George Bick” (Bick, 2006). Fortunately, the work of both was recognized when he was still alive, George being recognized as an honorary member of the Dragonfly Society of the Americas (Beckemeyer, 2002). Juanda and he will be together in eternity united through their beloved zygopterans; Heteragrion bickorum and Telebasis bickorum were named in honor of both (Daigle, 2002; 2005). They were a team, they were inseparable (Hornuff, 1979). Proof of this is that of the 57 academic works that George published, 26 were written together with Juanda (see Donnelly, 2006). George and Juanda taught us the importance of stopping to observe, of slowing down and analysing the different aspects of the life of dragonflies (Donnelly, 2006). And, as Suzann says, they were convinced that the study of these hypnotic creatures definitely contributed to the improvement of humanity (Bick, 2006).] Address: Medina-Espinoza, Emmy, Depto de Entomología, Museo de Historia Natural de la Univ. Nacional, Mayor de San Marcos, Av. Arenales 1256, Jesús María, Lima, Peru. E-mail: efme.04@gmail.com

23991. Washko, S.; Willby, N.; Law, A. (2022): How beavers affect riverine aquatic macroinvertebrates: a review. PeerJ 10:e13180 DOI 10.7717/peerj.13180: 19 pp. (in English) ["Background: As ecosystem engineers, the construction of dams by beavers alters stream habitat physically and biologically, making them a species of interest for habitat restoration. Beaver-created habitat changes affect a wide range of aquatic invertebrate species. However, despite numerous individual studies of how beavers affect aquatic macroinvertebrate assemblages, there has been no evaluation of the consensus of these effects across studies. Methodology: We collated and examined studies comparing beaver-created ponds to nearby lotic reaches to determine general trends in aquatic macroinvertebrate richness, density, biomass, and functional composition between habitats. From this evidence, we highlight knowledge gaps in how beaver activity affects aquatic macroinvertebrates. Results: Overall, in the majority of studies, aquatic macroinvertebrate richness was higher in nearby lotic reaches compared to beaver-created ponds, but richness at coarser scales (gamma diversity) increased with the addition of beaver ponds due to increased habitat heterogeneity. Functional feeding group (FFG) patterns were highly context-dependent, though predator taxa were generally more abundant in beaver ponds than adjacent lotic reaches. Site-specific geomorphological changes, coupled with dam or riparian zone characteristics and resulting differences in basal food resources likely shape other FFG responses. Conclusions: We identify a lack of long-term studies at single or multiple sites and conclude that fine-scale approaches may improve our understanding of the dynamics of macroinvertebrates within the freshwater realm and beyond. Due to the context-dependent nature of each study, further systematic studies of beaver engineering effects across a wider variety of environmental conditions and wetland types will also help inform land and species management decisions, such as where to prioritize protection of beaver habitats in the face of a global freshwater biodiversity crisis, or where to restore beaver populations to deliver maximum benefit." (Authors) The paper includes references to Odonata.] Address: Washko, Susan, School of Natural Resources and the Environment, University of Arizona, Tucson, Arizona, United States

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23992. Arlinghaus, R.; Matern, S.; Radinger, J.; Nikolaus, R.; Meyerhoff, J.; Schafft, M.; Cyrus, E.-M.; Emmrich, M.; Hering, D.; Wolter, C (2023): Biodiversität, Angeln und Gesellschaft Wissensbasierte Empfehlungen für ein nachhaltiges Fischereimanagement an Baggerseen. Berichte des Leibniz-Institut für Gewässerökologie und Binnenfischerei (IGB) 32: 477 pp. (in German) ["...A total of 20 dragonfly species from eleven genera were observed in the quarry ponds examined. Orthetrum cancellatum was the most common, found in almost 72 percent of all quarry ponds (Figure 40). All other dragonfly species were found in less than half of the quarry ponds. With the exception of two rare species, Leucorrhinia caudalis and Sympetrum meridionale, the species inventory included widespread species. In the waters examined in this project, a maximum of twelve species were found in one lake, on average four. In addition, 14 damselfly species from eleven genera were found in the quarry ponds examined. Five of these species occurred in more than 50 percent of the waters (Figure 41). Ischnura elegans was observed in all quarry ponds. With the exception of Ceriagrion tenellum, all of the species discovered are common or very common in Germany. At least one and a maximum of nine, on average five species, were observed in the waters examined." (Authors/Googletranslate)] Address: https://www.-igb-berlin.de/sites/default/files/media-files/download-files/IGB_Bericht_Baggersee_2023.pdf

23993. Bos-Groenendijk, G.I. (2023): Dagvlinders, sprinkhanen en libellen in de Kempen, Eersel en Reuselse Moeren 2023. SNL-monitoring. Rapport VS2023.053, De Vlinderstichting, Wageningen: 33 pp. (in Dutch) [Butterflies, grasshoppers and dragonflies in the Kempen, Eersel and Reuselse Moeren 2023. 34 species of dragonflies were observed. Of special interest are Somatochlora arctica, Aeshna subarctica elisabethae, Sympetrum depressiusculum, Sympecma paedisca, Leucorrhinia albifrons, Leucorrhinia caudalis, Coenagrion lunulatum.] Address: De Vlinderstichting, Mennonietenweg 10, Postbus 506,m 6700 AM Wageningen, The Netherlands

23994. Boswell, J.; Boyd, R.J.; Bradfer-Lawrence, T.; de Ornellas, P.; de Palma, A.; de Zylva, P.; Dennis, E.B.; Foster, S.; Gilbert, G.; Halliwell, L.; Hawkins, K.; Haysom, K.A.; Holland, M.M.; Hughes, J.; Jackson, A.C.; Mancini, F.; Mathews, F.; McQuatters-Gollop, A. Noble, D.G.; O'Brien, D.; Pescott, O.L.; Purvis, A.; Simkin, J.; Smith, A.; Stanbury, A.J.; Villemot, J.; Walker, K.J.; Walton, P.; Webb, T.J.; Williams, J.; Wilson, R.; Gregory, R.D. (2023): State of Nature 2023, the State of Nature partnership. Available at: www.stateofnature.org.uk: 214 pp. (in English) ["The UK, like most other countries worldwide, has experienced a significant loss of biodiversity. The trends in nature presented here cover, at most, 50 years, but these follow on from major changes to the UK's nature over previous centuries. As a result, the UK is now one of the most nature-depleted countries on Earth. The main causes of these declines are clear, as are many ways in which we can reduce impacts and help struggling species. The evidence from the last 50 years shows that on land and in freshwater, significant and ongoing changes in the way we manage our land for agriculture, and the effects of climate change, are having the biggest impacts on our wildlife. At sea, and around our coasts, the main pressures on nature are unsustainable fishing, climate change and marine development. More broadly there has been growing recognition of the value of nature, including its role in tackling climate change, and the need for its conservation among the public and policymakers alike. With each report our monitoring of change improves and we have never had a better understanding of the state of nature. Yet, despite progress in ecosystem restoration, conserving species, and moving towards nature-friendly land and sea use, the UK's nature and wider environment continues, overall, to decline and degrade. The UK has set ambitious targets to address nature loss through the Global Biodiversity Framework, and although our knowledge of how to do this is excellent, the size of the response and investment remains far from what is needed given the scale and pace of the crisis." (Publisher) The paper includes many references to Odonata.] Address: Available at: www.stateofnature.org.uk

23995. Csar, D.; Pichler-Scheder, C.; Gumpinger, C.; Chovanec, A.; Kudrnovsky, H.; Hayes, D.S.; Muhar, S. (2023): evaRest – Evaluierung von gewässerökologischen Aufwertungsmaßnahmen. Anleitung zur Bewertung ausgewählter Indikatorgruppen. Medieninhaber und Herausgeber: Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft, Stubenring 1, 1010 Wien, Austria: 102 pp. (in German) ["Preliminary summary: This paper presents the results of a newly developed tool for the documentation, assessment and presentation of aquatic ecological changes resulting from the implementation of (hydro)morphological measures in watercourses. The methodological recording of the selected biological indicators requires only slightly more effort than the guidelines that are conventionally used to assess water bodies. Additional calculation procedures were developed to enable more precise and targeted statements on relevant changes. Clear calculation and assessment procedures have been defined for all proposed indicators, which are summarised in an Excel assessment tool provided. The aim is to use this largely standardised evaluation method to achieve results that enable a comparison to be made between sections before and after the implementation of measures as well as with the model situation. The authors wish all those who work in and around water bodies continued motivation and enjoyment in their important work. At the same time, we hope that the application of evaRest will contribute to numerous aquatic ecological learning effects. These findings should help to drive forward the individual implementation of measures in each river and, in the course of renaturalisation, create ever more natural watercourses that once again provide aquatic flora and fauna with the habitat to which they have adapted over thousands of years of evolution. The evaRest documentation and evaluation system is now undergoing a test phase and is being used in practice. To ensure continuous improvement, problems and errors as well as methodological and technical criticism are welcome and should be communicated directly to the authors. After a certain period of use, it is planned to subject evaRest to a revision in which new findings and criticism will be taken into account in order to successively optimise the system." (Authors/Translated with DeepL.com (free version) Chapter 7.6 (pages 64-69) refers to Odonata.] Address: Chovanec, A., Krotenbachgasse 68, 2345 Brunn am Gebirge, Austria. Email: andreas.chovanec@bml.gv.at

23996. Driessen, M. Theischinger, G. (2023): Dragonflies and Damselflies of Tasmania. Publisher: Tasmanian Field Naturalists Club Inc.: 132 pp. (in English) ["Dragonflies and Damselflies of Tasmania is a colour field guide dedicated solely to Tasmanian species of Odonata and includes information on their conservation and scientific significance. It also includes the most recent consensus of dragonfly and damselfly taxonomy. The beautiful images, detailed descriptions, identification keys and distribution maps will help the reader identify the dragonflies and damselflies in Tasmania. It is the ideal size to take into the field. This book caters for the beginner, providing clear images of each species (both male and female) and more experienced people who will find the illustrated keys to adults and larvae valuable. A comprehensive illustrated glossary explains all terms used in the book, something that is often lacking in other guides." (Publisher)]

23997. Dyatlova, O. (2023): Dragonflies of Moldova: an updated checklist of the Odonatofauna. GEO&BIO 25: 134-140. (in English, with Ukrainian summary) ["The present research compiles all known records of dragonflies in Moldova, including Transnistria (from the beginning of the 20th century until present), based on all known literature and other sources, and also the personal observations of the author in 2005, 2009, and 2011. Brief history of Moldovan odonatology is given with the gap of more than 50 years of odonatological studies in Moldova in the middle of the last century. The analysis shows that the checklist of Odonata in Moldova comprises 37 species. The presence of several species in Moldova needs confirmation. The probable absence of Nehalennia speciosa in the territory of Moldova is discussed in the article based on the opinion of other authors and the lack of favourable habitats in the area. The map presented illustrates the areas in Moldova with the lack of data on the presence of dragonflies. This elucidated the understudied regions. Unfortunately, some records from the literature sources are given without any coordinates, so they could not be mapped. This analysis will help in planning further research into dragonflies of Moldova. Moldova still remains poorly studied from an odonatological point of view. Further investigations will undoubtedly fill in the 'white spots' on the distribution of species in the territory of Moldova and will help in the development of modern recommendations of habitat protection, underline urgent conservation measures in the country and highlight priority species. We expect that 10 to 20 species of dragonflies remain to be discovered in Moldova. Also, field research in different phenological periods will presumably help to add some new species. The data about dragonflies of Moldova were amended after three field trips of the author in 2005 (the area near Saharna) and

in 2009 and 2011 (the route covered the territory of Moldova from south to north). Based on the author's field research, three species of dragonflies are listed for the first time for the territory of Moldova: Lestes macrostigma, Coenagrion ornatum, and Orthetrum brunneum. For one species, Coenagrion scitulum, the exact locations are given for the first time by the author. The presence of the species of European concern in Moldova include L. macrostigma and C. ornatum, and Gomphus flavipes might be considered as well by odonatologists from the neighbouring countries." (Author)] Address: Dyatlova, Olena. Email: lena.dyatlova@gmail.com

23998. Luthardt, V.; Brauner, O.; Hammerich, J.; Probst, R.; Schulz, C.; Wachtel, S.F. (2023): Resilienz naturnaher Moore im Klimawandel – Fallbeispiele aus dem Biosphärenreservat Schorfheide-Chorin. Natur und Landschaft 98(3): 124-131. (in German, with English summary) ["Resilience of near-natural peatlands under climate change – Case studies from the Schorfheide-Chorin Biosphere Reserve: Climate change is affecting the few remaining mires that are still accumulating peat. The question thus arising is this: To what extent can the resilience of these autochthonous ecosystems, in all their diversity, be enhanced? For this purpose, long-term observation series of mostly undisturbed peatlands in the Schorfheide-Chorin Biosphere Reserve in the German regional state of Brandenburg are evaluated. These are set in context with the findings of success monitoring of rewetted forest peatlands. A newly developed indicator system for assessing mire-specific biodiversity is used to evaluate the state of the peatland. In addition, greenhouse gas emissions are estimated using the GEST (greenhouse gas emissions habitat types) method and potential new peat formation is considered. The analyses show that the buffering capacity of peat accumulating peatlands in the study area is still intact and that disturbances can be overcome without changing the system. The waterlogging measures were consistently successful and led to a measurable revitalisation. The article underscores the urgent need to stabilise the water balance of all peatlands that are still in a near-natural state. This is vital in order to preserve them as important elements of autochthonous biodiversity with all their positive landscape functions." (Authors) Odonata are specified in the supplemental material (https://opus4.kobv.de/opus4-hnee/frontdoor/index/index/docId/377).] Address: Luthardt, Vera, HNE Eberswalde, FB Landschaftsnutzung und Naturschutz, Schicklerstr. 5, 16225 Eberswalde, Germany. EMail: vera.luthardt@hnee.de

23999. Messias, G.P. (2023): O mundo das libélulas: O que sabem os alunos do ensino fundamental no município de Uruçuí, Piauí? Trabalho de Conclusão de Curso, Instituto Federal de Educação, Ciência e Tecnologia do Piauí, IFPI, Campus Uruçuí: 24 pp. (in Portuguese, with English summary) [The world of dragonflies: What do elementary school students in the municipality of Uruçuí, Piauí know? "Dragonflies are important insects for the functioning of aquatic ecosystems, in addition to being good indicators of the quality of these environments. Even with all the importance of the group, dragonflies are little known by the population, including Basic Education students. In this context, this work aimed to investigate the knowledge that Basic Education students in the municipality of Uruçuí, Piauí, have about the ecology and importance of these insects. The study was carried out with students in the 7th, 8th and 9th years of Elementary School II in a public school in the municipality. A questionnaire containing 20 questions with open and closed questions was applied, which sought to analyze the students' prior knowledge about dragonflies, for example the type of environment in which they live, food, importance, threats they suffer. A total of 141 students were interviewed, of which 105 (74%) said they knew the dragonfly in the adult phase, which is terrestrial, but 87 (62%) said they did not know the larval phase, which is aquatic. Many students made mistakes or did not answer questions related to the environment, food, importance, and threats suffered by these insects. Therefore, it is concluded that there are." (Author)] Address: http://bia.ifpi.edu.br:8080/jspui/bitstream/123456789/2304/3/2023_tcc_gpmessias.pdf

24000. Newton, L.; Tolman, E.; Kohli, M.; Ware, J.L. (2023): Evolution of Odonata: Genomic insights. Current Opinion in Insect Science 58:101073. doi: 10.1016/j.cois.2023101073: 5 pp. (in English) ["• Most odonate studies using –omics approaches have focused on systematics. • Recent transcriptomic work has converged on a tree of life for Odonata. • Eight genomes exist for dragonflies & damselflies; few are fully annotated. • Functional and population genomics are areas for future work in Odonata. Odonata is an order of insects that comprises ~6500 species. They are among the earliest flying insects, and one of the first diverging lineages in the Pterygota. Odonate evolution has been a topic of research for over 100 years, with studies focusing primarily on their flight behavior, color, vision, and aquatic juvenile lifestyles. Recent genomics studies have provided new interpretations about the evolution of these traits. In this manuscript we look at how high throughput sequence data (i.e., subgenomic and genomic data) has been used to answer long standing questions in Odonata ranging from evolutionary relationships to vision evolution to flight behavior. Additionally, we evaluate these data at multiple taxonomic levels (i.e., ordinal, familial, generic, and population) and provide comparative analysis of genomes across Odonata, identifying features of these new data. Lastly, we discuss the next two years of Odonata genomic study, with context about what questions are currently being tackled." (Authors)] Address: Newton, Lacie, American Museum of Natural History, Division of Invertebrate Zoology, NY, NY, 10024

24001. Petzold, F.; Schubert, P. (2023): Zum Vorkommen der FFH-Art Helm-Azurjungfer (Coenagrion mercuriale) in Brandenburg (Insecta: Odonata). Naturschutz und Landschaftspflege in Brandenburg 32(1-4): 58-63. (in German, with English summary) ["The presence of the FFH species C. mercuriale in Brandenburg is currently confined to a single drainage System near Schlalach on the northeastern edge of the Beiziger Vorfläming. This population has been regularly monitored since 2006. The results indicate that the species relatively quickly responds to improvements or deteriorations in habitat quality with corresponding increases or decreases in abundance. Based on the monitoring results, concrete ecological requirements for water management tailored to the needs of C. mercuriale have been developed in a timely manner. Currently, the population is primarily threatened by deficits in the water supply of reproductive habitats due to a lack of summer precipitation. To improve the chances of the species' long-term survival in Brandenburg, other water bodies in the region need to be maintained in a condition favorable for C. mercuriale colonization, thereby enabling the species to establish itself in additional drainage Systems." (Authors)] Address: Petzold, F., Lutherstr. 130, 07743 Jena, Germany. E-mail: falk_petzold@web.de

24002. Pineda-Alarcón, L.; Cañón, J. (2023): Modelación de la relación predador-presa para la comunidad de macroinvertebrados en el litoral del lago de tota. Acta biológica colombiana 28(2): 189-203. (in Spanish, with English summary)

["Modeling the predator-prey relationship for the macroinvertebrate community on the shore of Lake Tota: High Andean lakes are ecosystems affected by multiple anthropogenic pressures that alter water quality and biotic communities, and aquatic macroinvertebrates are excellent bioindicators for these ecosystems. The present work analyzes the dynamics of the macroinvertebrate community associated with Egeria densa, the relationship with physicochemical variables, biotic indices, and predator-prey interaction in the littoral of Lake Tota. This work was developed in three campaigns on nine sampling stations on the perimeter of the lake. Among the findings, Hyallela sp. (30 %) and Dicrotendipes sp. (27 %) are the most abundant and dominant taxa of the study, being bioindicators of the presence of decomposing organic matter and decrease in water quality. ANOVA analysis of the physicochemical variables of water and nutrients of Egeria densa showed significant differences at the temporal level. The biotic indices showed differences in water quality, determining a possible zoning of this parameter along the coast. Finally, to identify community relationships, a predator-prey model is presented, with Hyalella sp. as prey and Ischnura sp. as predator through the Lotka-Volterra equations, finding that there is agreement between the behavior of measured and simulated abundances. In this way, the trophic dynamics contribute to understand the communities and their projection in time in relation to the environmental conditions of the littoral zone." (Authors) Special emphasis is given to Ischnura sp.] Address: Pineda-Alarcón, Ludy, Grupo GAIA, Facultad de Ingeniería, Universidad de Antioquia, Calle 67 No. 53 - 108, Medellín, Colombia. Email: ludy.pineda@udea.edu.co

24003. Price; B.W.; Allan, E.L. (2023): The genome sequence of the White-legged damselfly, Platycnemis pennipes (Pallas, 1771) [version 1; peer review: 2 approved, 1 approved with reservations]. Wellcome Open Research 2023, 8:320: 13 pp. (in English) ["We present a genome assembly from an individual male P. pennipes. The genome sequence is 1793.3 megabases in span. Most of the assembly is scaffolded into 13 chromosomal pseudomolecules, including the X sex chromosome. The mitochondrial genome has also been assembled and is 15.42 kilobases in length." (Authors)] Address: Allan, Louise, Natural History Museum Genome Acquisition Lab, Darwin Tree of Life Barcoding collective, Wellcome Sanger Institute Tree of Life programme, Wellcome Sanger Institute Scientific Operations: DNA Pipelines collective, Tree of Life Core Informatics collective, Darwin Tree of Life Consortium

24004. Senyutina, N.; Timofeeva, S.; Abramkov, N. (2023): Fauna and phenology of dragonflies (Insecta: Odonata) of the vicinity of the village of Borok, Yaroslavl region. Completed by students of grade 9 "B". Moscow School in the South-West No. 1543: 28 pp. (in Russian) ["Conclusions 1. Currently, the annotated list of dragonflies of the village of Borok, Yaroslavl region, includes 29 species belonging to 8 families, and the list of dragonflies of the Yaroslavl region contains 49 species, also belonging to 8 families (4 new species were discovered for the village of Borok). 2. In the territory of the Yaroslavl region, the diversity of species of dragonfly imagoes collected in late June and early July is higher than that of larvae. 3. The Leningrad and Yaroslavl regions have similar richness and diversity of dragonfly species, but only 16% of the species are common to both regions. 4. At the same time, the common species have different flight periods and larval sizes." (Authors/google translate)] Address: https://bioclass.ru/wp-content/uploads/2024-/09/Odonata_2023.pdf

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24005. Al-Qadhar, M.R. (2024): Exploration of arthropods in Cayenne pepper (Capsicum frutescens) plants under the shade of sugar palm (Arenga pinnata) in a polyculture system in Ulak Segelung village, Ogan Ilir Regency, South Sumatra. Program studi agroekoteknologi, Fakultas Pertanian, Universitas Sriwijaya: xvi + 42 pp. (in Indonesian, with English summary) ["Cayenne pepper (Capsicum frustescens) is a crop that is widely cultivated in Indonesia in addition to high demand, this plant is also easy to cultivate. Sugar palm (Arenga pinnata) is a useful plantation crop, one of which is to maintain ecological balance, so it is suitable to be planted with other plants or plant cultivation with a polyculture system. Polyculture causes more arthropods to be present, this is due to the diverse types of plants planted on one land. Not many studies have provided information on arthropods in aren palm and raw chilli plants grown in polyculture. Therefore, this study aims to see what arthropods are present in cayenne pepper plants and aren palm plants grown in polyculture and to see how they differ from previous studies conducted in the same location. This research was conducted from June to October 2024 located in Aren Plantation, Ulak Segelung Village, Ogan Ilir, South Sumatra. There were 35 plots of cayenne pepper plants arranged in rows and the method used was purposive random sampling. Arthropods were obtained using 3 traps including sweep net, yellow sticky trap and light trap. In this study, 274 arthropod individuals were found, belonging to 9 orders, 28 families, and 47 species. The Diversity Index (H') value in this plantation is included in the high category, with an index value reaching 3.22. The value of the Evenness Index (E) obtained was 0.84, indicating that the evenness of arthropods in the palm plantation was relatively high. There is no dominating species in this plantation, this is reflected in the Dominance Index (D) value of only 0.06. The Odonata order was the most frequent order found every week of observation, with the highest percentage in week 4, which was 54% or 15 individuals [Ceriagrion auranticum, (b) Ceriagrion tenellum [sic], (c) Lestes concinnus, (d) Pseudagrion microcephalum, (e) Neurothemis fluctuans, (f) Acisoma panorpoides, (g) Sympetrum flaveolum [sic]]. Arthropods that act as predators dominated this study, with a percentage of 47% or 129 individuals. Analysis using NCSS software showed that the P-value <0.01 for the relationship between arthropods and aren palm plants in yellow sticky trap, cayenne pepper plant height with observation week, cayenne pepper plant leaf count with planting week, cayenne pepper plant fruit count with observation week, and arthropods with light trap which showed a significant effect. Meanwhile, the relationship between arthropods with weeks of observation in yellow sticky traps, arthropods with weeks of observation in sweep nets, arthropods with cayenne pepper plants in sweep nets, and the relationship between arthropods with days of observation in light traps showed a P-value> 0.01 which indicated no significant effect." (Author)] Address: An incomplete thesis is available at: https://repository.unsri.ac.id/166855/-3/RAMA_54211_05071282126065_0008056202_0019128302_01_front_ref.p df

24006. Arya, M.; Bisht, S.; Tiruwa, A. (2024): Ecological insights into insect diversity in protected area networks of Kumaun region, Western Himalaya. Entomologica Hellenica 33(2): 34-69. (in English) ["The Uttarakhand region of the Western Himalaya, known for its rich biodiversity, includes several protected areas ranging from tropical to temperate zones. This study explores insect diversity across the six

protected areas within the Kumaun Himalayan region. Altogether, a total of 412 insect species from nine taxonomic orders and 70 families were documented. Order Lepidoptera was the most diverse with a maximum of 154 species, followed by Coleoptera (81 species), Hymenoptera (58 sp.), Orthoptera (33 sp.), Hemiptera (31 sp.), Odonata (28 sp.), Diptera (23 sp.) and Isoptera and Neuroptera as the least dominant with two species each. Shannon's species diversity (Hs) ranged 3.99 to 4.95, with the highest diversity in Nandhaur Wildlife Sanctuary and the lowest in Naina Devi Himalayan Bird Conservation Reserve. Cluster analysis revealed two main diversity patterns, indicating significant beta diversity amongst the study areas. Species-wise occupancy and abundance analysis revealed that Pieris brassicae, P. canidia, and Apis dorsata had the highest relative abundance from all protected areas. Conversely, 91 insect species had a relative abundance of only 0.03% each. Furthermore, seven species demonstrated the highest normalized occupancy of 1.00, indicating their adaptability to diverse environmental conditions within the protected areas. These findings thus emphasize the importance of habitat diversity and targeted conservation strategies to maintain insect populations and ecosystem health in the Kumaun Himalaya." (Authors)] Address: Arya, M.K., Insect Biodiversity Lab., Dept of Zoology, D. S. B. Campus, Kumaun Univ., Nainital-263002, Uttarakhand, India. Email: dr.manojkumar19@rediffmail.com

24007. Babaci, S.; Chaibi, R.; Mimeche, F. (2024): Study of the diet of Luciobarbus callensis at Soubella dam and Oued l'Ham in the M'Sila region (Algeria). South Florida Journal of Development, Miami, v.5, n.12: 1-7. ["This research focused on the diet of the barbel L. callensisin two distinct environments in M'sila region of Algeria, Soubella dam and Oued El-Ham. By analyzing the digestive contents of 117 specimens from Oued El-Ham and 107 from Soubella dam over the period from January to December 2023, the study revealed a clear diversity in the diet of this species, divided into two main categories: an animal component, including zooplankton and insects, and a plant component, mainly represented by filamentous algae. However, we observed significant differences between the two sites. At Oued El-Ham, copepods were the most abundant among the zooplankton, accompanied by macro invertebrates such as Corixidae and Dytiscidae, while at Soubella dam, Baetidae and copepods constituted the main food resources. The emptiness coefficient, an indicator of the percentage of empty digestive tracts, showed pronounced seasonal variations, with higher values in winter (9.4% at Oued El-Ham and 12.15% at Soubella) and lower values in summer (1.71% and 1.87%, respectively). This study reveals that seasonal variations strongly influence the omnivorous diet of L. callensis in the two studied environments." (Authors) The list of taxa includes "Libellulidae" and "Lestidae"] Address: Babaci, S., Fac. Sciences, Dept of Natural & Life Sciences, Lab. Biol. Sciences & Agronomic Sci., Amar Telidji Univ., Address: 3000, Laghouat, Algeria. Email: s.babaci@lagh-univ.dz

24008. Bal, D. (2024): Rediscovery of the Sumatran endemics Onychogomphus rappardi (Odonata: Gomphidae) and Herona sumatrana sumatrana (Lepidoptera: Nymphalidae), with notes on observations of other rare species from the north of Sumatra. Bio Palembanica 1(2): 48-58. (in English) ["Several rare insects were observed around Ketambe in the centre of the Leuser Ecosystem in July 2024. The main subjects discussed are the micromoth Collinsa sp. aff. sphoraria Swinhoe (supposedly new to science) and the rediscoveries of the dragonfly Onychogomphus rappardi Lieftinck, 1937 and the butterfly Herona sumatrana sumatrana Moore, 1881. Both O. rappardi and H. sumatrana sumatrana are Sumatran endemics." (Author)] Address: Bal, D., Ministry of Agriculture, Fisheries, Food Security and Nature, Nature Department, P.O. Box20401, 2500 EKDen Haag, The Netherlands. Email: d.bal@minlnv.nl

24009. Beck, A.; Baber, K.; Keitel, M.; Schnabel, H. (2024): Der 21. Mai 2023 – Tag der Artenvielfalt im Dubringer Moor – Ablauf und Ergebnisse. Berichte der Naturforschende Gesellschaft der Oberlausitz 30: 235-248. (in German, with English summary) ["May 21, 2023 – Biodiversity Day in the Dubringer Moor – Procedure and results as part of a joint event organised by the Naturforschende Gesellschaft der Oberlausitz e.V. and its partners on 20 and 21 May 2023, the "Dubringer Moor" nature reserve was examined with regard to selected animal and plant species groups. With the participation of the public the species groups butterflies, beetles, dragonflies, spiders, amphibians and reptiles, birds, ferns and seed plants were analysed. The species inventory found confirms the extraordinary value of the area, which has already been established in previous surveys beyond the borders of Oberlausitz." (Authors) The following odonate species are documented: Cordulia aenea, Libellula quadrimaculata, Erythromma najas, Coenagrion puella, C. pulchellum, C. hastulatum, Leucorrhinia pectoralis, Pyrrhosoma nymphula, and Platycnemis pennipes.] Address: Beck, A., Am Bärenstein 3, 01796 Struppen, Germany. E-Mail: farnica@gmx.de

24010. Biradar, G.S.; Khan, M.H.; Bankey, S.; Mishra, A.; Joshi, G.; Agrawal, A. (2024): Bio-inspired corrugated airfoil aerodynamics under external turbulence at low Reynolds numbers. Journal of Flow Visualization and Image Processing 31(1): 75-97. (in English) ["Particle image velocimetry measurements have been undertaken to investigate the aerodynamic performance of bio-inspired corrugated airfoil under the influence of external turbulence. The study is motivated by the gliding flight of dragonflies and its relevance to bio-inspired corrugated wing design for Micro Air Vehicles. The detailed flow field measurements are undertaken at 6% free stream turbulence intensity for six angles of attack (±50, ±100 and ±150). The low Reynolds number regime from Re= 1200 to 13200 corresponding to dragonfly flight has been covered in the current study. The aerodynamic performance of the corrugated airfoil is evaluated by obtaining drag and lift coefficients using modified wake survey method and Kutta-Joukowski theorem respectively. The calculated Cl and Cd are compared with available literature and it is noted that the performance of corrugated profile airfoil degrades significantly under the influence of external turbulence. The temporal wake obtained from the mean velocity fields is also presented for better visualization of flow dynamics. The findings of the study indicate that the performance of corrugated airfoil under external turbulence is strongly influenced by angle of attack at lower Re." (Authors)] Address: Muralidhar, K., Department of Mechanical Engineering, Indian Institute of Technology Kanpur, Kanpur 208016, India

24011. Birrell, J.H.; Verberk, W.C.E.P.; Woods, H.A.; (2024): Consistent differences in tissue oxygen levels across 15 insect species reflect a balance between oxygen supply and demand and highlight a hitherto unknown adaptation for extracting sufficient oxygen from water. Current Research in Insect Science 6, 2024, 100095: 8 pp. (in English) ["Highlights: • We measured tissue PO2 in juvenile and adult insects from 15 species and nine orders. • PO_2 varied

in juveniles and adults by habitat, activity level, and stage duration. • Individuals that breathe underwater exhibited remarkably low PO2 (mean: 0.88 kPa). • Tissue PO_2 was low even under hyperoxia, suggesting active down-regulation. • Low tissue PO2 likely helps aquatic insects to breathe under water. Abstract: Animals, including insects, need oxygen for aerobic respiration and eventually asphyxiate without it. Aerobic respiration, however, produces reactive oxygen species (ROS), which contribute to dysfunction and aging. Animals appear to balance risks of asphyxiation and ROS by regulating internal oxygen relatively low and stable, but sufficient levels. How much do levels vary among species, and how does variation depend on environment and life history? We predicted that lower internal oxygen levels occur in insects with either limited access to environmental oxygen (i.e., insects dependent on aquatic respiration, where low internal levels facilitate diffusive oxygen uptake, and reduce asphyxiation risks) or consistently low metabolic rates (i.e., inactive insects, requiring limited internal oxygen stores). Alternatively, we predicted insects with long life-stage durations would have internal oxygen levels > 1 kPa (preventing high ROS levels that are believed to occur under tissue hypoxia). We tested these predictions by measuring partial pressures of oxygen (PO_2) in tissues from juvenile and adult stages across 15 species comprising nine insect orders. Tissue PO_2 varied greatly (from 0 to 18.8 kPa) and variation across species and life stages was significantly related to differences in habitat, activity level, and life stage duration. Individuals with aquatic respiration sustained remarkably low PO_2 (mean = 0.88 kPa) across all species from Ephemeroptera, Plecoptera, Trichoptera, and Diptera, possibly reflecting a widespread, but hitherto unknown, adaptation for extracting sufficient oxygen from water. For Odonata, aquatic juveniles had higher PO_2 levels (mean = 6.12 kPa), but these were still lower compared to terrestrial adults (mean = 13.3 kPa). Follow-up tests in juvenile stoneflies showed that tissue PO_2 remained low even when exposed to hyperoxia, suggesting that levels were down-regulated. This was further corroborated since levels could be modulated by ambient oxygen levels in dead individuals. In addition, tissue PO_2 was positively related to activity levels of insect life stages across all species and was highest in stages with short durations. Combined, our results support the idea that internal PO_2 is an evolutionarily labile trait that reflects the balance between oxygen supply and demand within the context of the environment and life-history of an insect." (Authors) Aeshna palmata, immature, Aeshna palmata adult, Sympetrum danae adult] Address: Birrell, J.H., Dept of Biology, University of Montana, Missoula, Montana, 59812 USA. Email: jackson.birrell@umontana.edu

24012. Blinshtein, S. (2024): Feeding of the paddyfield warbler Acrocephalus agricola (Jerdon, 1845) in the northwestern Black Sea region. Munis Entomology & Zoology 19(2): 669-673. (in English) ["The contents of 29 stomachs of the Paddyfield Warbler that caught on the shores, in the upper reaches and in the bay-bar were analysed. The taxonomic composition of the food the Paddyfield Warbler is given firstly for the southern Ukrainian steppe. The average fullness of the stomach (n=29) was 14.5 specimens. The diet consists almost entirely of insects of six orders [including Ischnura sp.]. More than 420 food objects were identified to species or higherranking taxa. The choice of food is determined by the size of the prey and its ability. Birds do not hunt outside of their characteristic habitats. the highest stomach fullness is in July and "September." (Author)] Address: Blinshtein, Semen, Zoological Museum of Odesa Mechnikov National University, Ukraine. Email: sblinstein@alice.de

24013. Boisteau, S. (2024): Recherche et caractérisation de l'habitat de 3 espèces de libellules du genre Leucorrhinia (Anisoptera: Libellulidae) en Sarthe. Master 2 PNB: Patrimone naturel et biodiversité. Année 2023-2024. Université de Rennes: 42 pp. (in French, with English summary) ["The dependence of dragonflies on a mosaic of varied aquatic and terrestrial habitats makes them true macroecological barometers of climate change. Contemporary records of 3 species of the genus Leucorrhinia (L. albifrons, L. caudalis and L. pectoralis) testify a recent colonization, but raise questions about the actual establishment of breeding populations. As these emblematic and endangered taxa have never been the subject of formal research in the department, the present study aims to provide an initial overview. We sampled 15 ponds in a forest environment (including 8 sites of historical presence) by sampling imagos and searching for exuviae. To attest to the habitat's suitability, we also recorded a number of landscape variables like habitat surface, woodland, number of ponds and local variables such as aquatic vegetation, helophytes, water transparency. We also used the recently developed VCS index to measure the proximity of sampled habitats to typical habitats (heaths, bogs). However, no Leucorrhine was observed at 14 of the 15 visited water-bodies. The numbers observed in the only breeding habitat show remarkable population densities for L. caudalis and L. albifrons. We were able to highlight the more restricted typology of water bodies colonized by L. pectoralis compared with L. caudalis. Community analysis enabled us to identify some species with similar ecological requirements to Leucorrhines. Our results underline the importance of the structuring of aquatic vegetation and water quality, supported by a matrix of connected forest habitats, in the population establishment process of Leucorrhines. However, the sampling of these spring species was strongly influenced by unfavorable weather conditions during the emergence period. It therefore appears that the continuation of this study over the next few years is essential if more robust results are to be obtained." (Author)] Address: https://libellules.pnaopie.fr/wp-content/uploads/2024/09/Memoire_-M2_PNB_S.-Boisteau.pdf

24014. Borisov, A.S.; Borisov, S.N.; Iakovlev, I.K.; Onishko, V.V.; Ganin, M.Yu.; Tsurikov, S.M.; Tiunov, A.V. (2024): Origin of the Red-veined Darter dragonflies migrating into the European part of Russia revealed by stable isotopes of hydrogen. Ecological Entomology 49(6): 974-978. (in English) ["Dragonflies are well-known migratory insects, and stable isotopes have been used successfully to study their migrations in America and Asia but less so in Europe. Here we used the isotopic composition of hydrogen (δ^2H value) in metabolically inert wing tissues of the dragonfly Sympetrum fonscolombii to investigate migration patterns and likely origin of immigrants into the European part of Russia. During spring–summer, sexually mature dragonflies arrive to Russia for reproduction and individuals of the summer generation (descendants of immigrants) presumably migrate in the opposite direction in the fall. Analyses included 39 specimens of immigrant S. fonscolombii dragonflies, 11 specimens from 3 species of resident dragonflies (including S. fonscolombii) from the European part of Russia and 16 specimens representing 9 resident dragonfly species from Iran. The average δ^2H values of the wings of immigrant S. fonscolombii (-71.9 ± 23.4‰) were significantly higher than those of resident dragonflies in European Russia (-121.7 ± 9.5‰) and similar to those of resident dragonfly species from Iran (-72.3 ± 18.4‰). Based on a geostatistical model of the global δ^2H values in precipitation, and considering the distribution of S. fonscolombii, the most probable natal area

of immigrants arriving in European Russia is located in Southwest Asia. The suggested migration zone covers regions located between approximately 26°–28° N in the south and 56°–58° N in the north, while the migration distance can reach 2000–4000 km." (Authors)] Address: Borisov, A.S., Institute of Systematics & Ecology of Animals, Siberian Branch of Russian Acad. Sciences, Frunze Street, 11, Novosibirsk 630091, Russia. Email: baswatch@gmail.com

24015. Borisov, S.N.; Borisov, A.S. (2024): Migrant dragonfly Pantala flavescens (Fabricius, 1798) (Odonata, Libellulidae) in western Russia and different migration cycles in the western Palearctic. Eurasian entomological journal 23(6): 360-368. (in English, with Russian summary) ["Data are provided on the distribution and phenology of P. flavescens in the western part of Russia. The northernmost point of the range is located in the vicinity of Moscow, the easternmost is in Astrakhan'. Analysis of the phenology of immigrants and residents shows that in the western Palearctic P. flavescens has two migration zones that differ in annual cycles. The «Eurasian migration zone» includes most of the continental Europe (excluding the southern part of the Iberian Peninsula), southern Russia and Turkey. Immigrants arrive there in April–May, presumably from the southern regions of South–West Asia. The summer generation appears at the end of June–September. The «Mediterranean migration zone» covers the south of the Iberian Peninsula and the Mediterranean islands (Pelagic, Sicily, Malta and Cyprus). Immigrants of P. flavescens arrive here mainly in July–August, presumably from Europe. These are individuals of the European summer generation. Egg laying occurs before the end of the year, and the local generation emerged in October–January. Colonization of the territories of Europe, southern Russia and Turkey by the species has been observed since the end of the last century and is apparently associated with general climatic warming." (Authors)] Address: Borisov, S.N., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze Str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

24016. Borisova, N.V.; Yakovlev, A.A.; Ivanov, A.V. (2024): New and interesting records of dragonflies (Insecta: Odonata) in the Chuvash Republic in 2023. Part 2. Natural science research in Chuvashia 10: 28-39. (in Russian, with English summary) [Russia; records of the following species are discussed and mapped: Calopteryx virgo, Coenagrion johanssoni, C. lunulatum, Erythromma viridulum, Ischnura pumilio, Nehalennia speciosa, Aeshna crenata, Anax imperator, A. parthenope, Sympetrum fonscolombii, S. pedemontanum, and Crocothemis erythraea] Address: Borisova, N.V. Russia, Cheboksary, FSBI "Prisursky State Reserve", Chuvash Branch of the Russian Entomological Society, Russia. E-mail: nat-borisova18@yandex.ru

24017. Brito, J.S.; Cottenie, K.; Cruz, G.M.; Calvão, L.B.; Barbosa Oliveira-Junior, J.M.; Carvalho, F.G.; Brasil, L.S.; Dias-Silva, K.; Bastos, R.C.; Resende, B.O.; Santos Ferreira, V.R.; Soares Vieira, L.J.; Michelan, T.S.; Juen, L. (2024): Odonata responses to dispersal and niche processes differ across Amazonian endemism regions. Insect Conservation and Diversity 17(6): 988-1000. (in English) ["Niche and dispersal-based processes govern freshwater communities, such as aquatic insects, shaping their distribution and establishment in the environment. So, we aimed to address the relative influence of niche and dispersal-based processes on Odonata diversity in Amazonian freshwater systems, and the influence of species dispersal functional traits on their longitudinal and latitudinal ranges. We used the Dispersal-Niche Continuum Index (DNCI) to test (i) regions more distant would present a prevalence of dispersal-based processes, and (ii) different patterns would come from the two Odonata suborders; and by applying generalised linear models, we tested (iii) dispersal-related functional traits from the suborders would influence latitudinal and longitudinal midpoints of the species. We found that more distant regions had lower values of pairwise Dispersal–Niche Continuum, mainly for Zygoptera, corroborating our first hypothesis. Moreover, Zygoptera also presented the lowest absolute values of Dispersal–Niche Continuum and Anisoptera presented a joint influence of niche and dispersal-based processes, agreeing with our second hypothesis. Only Zygoptera presented a significant association between dispersal functional traits and longitudinal midpoints, corroborating our third hypothesis. Our results indicated a prevalence of dispersal-related processes for Zygoptera, which can be explained by massive geographical barriers, such as the rivers, and their narrow physiological and ecological tolerance. Moreover, dispersal-related traits demonstrated significant influence on longitudinal midpoints of Zygoptera, a scenario that the presence of the rivers may explain. A better understanding of the prevalent predictors of the species and how their dispersal ability governs their distribution has conservational implications." (Authors)] Address: Brito, J.S., Programa de Pós-graduação em Ecologia, Universidade Federal do Pará, Belém, Brazil. Email: jotabio13@gmail.com

24018. Buczynski, P.; Oldak, K.A.; Staniec, B.; Tanczuk, A.; Wagner, G.K. (2024): Report on the implementation of the research project Project implementation agreement No. NB 0701-2/2024/3 Peat bogs in the Bagno Forest as secondary habitats and refuges for insects associated with transitional and raised bogs in the Poleski National Park. - Inventory, evaluation, protection. The research was financed from the resources of: The Research and Action Fund for Environmental Protection in the Lublin Coal Basin GRANTS FOR SCIENTISTS. Maria Curie-Sklodowska University in Lublin Institute of Biological Sciences Department of Zoology and Nature Conservation Lublin 2024: 216 pp. (in Polish) ["As part of the project "Peatlands in the Bagno Forest as secondary habitats and refuges for insects associated with transitional and high peat bogs in the Poleski National Park. Inventory, evaluation, protection", in 2024, 18 peatlands located in wet forests between the peat bogs around Lake Moszne and the village of Jamniki were examined. Three groups of fauna were examined: aquatic (Odonata dragonflies, Coleoptera beetles, Trichoptera caddisflies) and terrestrial (Coleoptera beetles, Hymenoptera ants: Formicidae, Lepidoptera butterflies). The objectives of the research were: inventory of fauna; assessment on this basis of the condition of peatlands and their role in the protection of species and assemblages associated with high and transitional peat bogs; identification of habitat features that favor this protection, especially those that can be used in active protection. 387 species were recorded (dragonflies – 36, water beetles – 93, caddisflies – 7, ground beetles – 181, ants – 12, butterflies – 61). Of these, 176 were recorded for the first time in the Polesie National Park, which indicates that the Park's fauna is still very incompletely recognized in terms of some insects (especially ground beetles and ants). For each of the studied insect groups, detailed data on the fauna of individual peat bogs and the occurrence of peat bog stenotope were presented, and, based on the results of biocenotic and statistical analyses (NMDS, CCA, RDA), environmental factors significant for the formation of their assemblages were analyzed. These were mainly: water turbidity; water pH; water temperature; air temperature; insolation;

open water surface area; Sphagnum cover; astatism; diversity and spatial formation of vegetation in water and on the shore; degree of tree succession on the sphagnum; anthropopressure. Ant and butterfly fauna was not very specific for peat bogs and poor in species of “special care”. On the other hand, the fauna of the remaining studied groups was assessed as valuable, rich in peat bog stenotope creating communities similar to those in natural environments, with numerous species of “special care”. Peat bogs in the Bagno Forest turned out to be important for its protection. The value of individual research areas was different, from quite low to very high, but each was important as an element of a mosaic of habitats in a different stage of succession and with different habitat conditions. Moreover, the most valuable fauna of individual groups occurred in other peat bogs and in other habitat conditions. Succession leading to the disappearance of the studied peat bogs, accelerated by droughts resulting from climate change, was indicated as the greatest threat to habitats and species: within approx. 20-30 years, peat bogs in the Bagno Forest will most likely dry out and then begin to be absorbed by the forest. In this way, first very valuable communities of aquatic insects will disappear, and then terrestrial ones. The only method of action that can prevent this is active protection. It was proposed to implement a rotation model on at least part of the peat bogs (the rest can be left without interference as part of the protection of the succession process). For the needs of ad hoc actions and on a smaller scale, a number of less invasive active protection measures were also proposed." (Authors)] Address: Buczynski, P., Dept of Zool., Maria Curie-Sklodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

24019. Busmachiu, G.; Cretu, I.; Bacal, S.; Burduja, D. (2024): New data on Insecta from Old Orhei, Republic of Moldova. Muzeul Olteniei Craiova. Oltenia. Studii si comunicări. Stiinþele Naturii 40(2): 100-104. (in Romanian, with English summary) ["The paper includes first data about the species diversity of insects (Coleoptera and Odonata) from Old Orhei, Republic of Moldova. A total number of 46 insect species were revealed, of which 16 Odonata and 30 Coleoptera. The research carried out in alfalfa allowed highlighting a wide spectrum of Coleoptera with different trophic preferences, with the predominance of phytophagous and zoophagous species." (Authors)] Address: Busmachiu, Galina, Institute of Zoology, State University of Moldova. Email: danavirlan3@gmail.com

24020. Carrillo-Lara, D.E.; Novelo-Gutiérrez, R. (2024): New records and localities of Odonata from Zacatecas, Mexico. Notulae odonatologicae 10(4): 141-144. (in English) ["A list of 25 species found in three new localities, including five new records for Zacatecas State, Mexico, is provided. Enallagma novaehispaniae, Protoneura cara, Celithemis eponina, Paltothemis lineatipes, and Tauriphila australis are recorded for the first time, increasing to 51 the number of species for this state." (Authors)] Address: Novelo-Gutiérrez, R., Instituto de Ecología, A.C. Red de Biodiversidad y Sistemática. Carretera antigua a Coatepec 351, El Haya 91073 Xalapa, Veracruz, Mexico. E-mail: rodolfo.novelo@inecol.edu.mx

24021. Catalin, S.; Ovidiu, T. (2024): Researches regarding the entomofauna from the Ostroveni - Dolj area. Annals of the University of Craiova 29(65): 490-495. (in English) [Romania; the list of taxa includes Orthetrum spp. and Libellula spp.] Address: Catalin, S., University of Craiova, Romania. Email: catalin.stan@edu.ucv.ro

24022. Cawood, R.A.; Samways, M.J.; Pryke, J.S. (2024): Umbrella index as a conservation tool across pondscapes: a case study using frogs, aquatic insects, and plants in South Africa. Environmental and Sustainability Indicators 24, December 2024, 100478: 15 pp. (in English) ["Highlights: • Here we use the umbrella index for pond prioritization. • Dragonflies, frogs, aquatic insects and plants were assessed in ponds. • Cross-taxon responses were weak due to differential environmental drivers. • Within taxa responses were strong highlighting the need for a multi-taxon approach. Abstract: Biological surrogates are valuable for conservation when they are easy and cost-effective to sample, sensitive to anthropogenic change, and show similar assemblage patterns to other taxa. The umbrella index (UI) developed by Fleishman et al. (2000), aims to conserve most species in an ecosystem by focusing on a single or small group of co-occurring species to represent all species present. Here we focus on various lentic aquatic insects (‘aquatic insects’ henceforth refers to aquatic beetles, aquatic bugs, and dragonfly larvae), adult dragonflies, frogs, and aquatic plants as potential surrogates for pond communities in the Midlands, KwaZulu-Natal Province, South Africa. There were some cross-taxon correlations, but these were too weak to consider for surrogacy, largely due to dissimilar responses to the same environmental gradients. However, using UI we identified five dragonfly species, nine aquatic insect species, and three frog species as potential umbrella groups for their own taxa. The UI for same-group surrogates was flexible and covered most taxa, ranging from co-occurring habitat generalists to rare specialist species. Furthermore, all four endemic species sampled here were effective surrogate species for other local taxa, with two of them ranking top in their own taxonomic group. The lack of congruence among the different taxa means that one taxon cannot be used to stand in for another. However, the UI allowed efficient site prioritisation, so long as a multi-taxon approach is used. We recommend the UI approach when selecting surrogates to represent aquatic fauna within a pondscape of the Midlands of South Africa." (Authors)] Address: Pryke, J.S., Dept of Conservation Ecology and Entomology, Stellenbosch University, Stellenbosch, South Africa. Email: jpryke@sun.ac.za

24023. Cezário, R.R.C.; de Almeida, J.G.L.; Peixoto, P.E.C.; Wilts, B.D.; Guillermo-Ferreira, R.N. (2024): The mechanistic origin of amber pigmentation of Perithemis tenera (Say, 1840) wings (Odonata: Libellulidae) and its function in conspecific signalling. Zoology 167, November 2024, 126226: (in English) ["Highlights: •The absorbance curve observed in Perithemis tenera wings indicate a pigmentary origin of the amber coloration •Melanins and ommochromes are responsible for the coloration •P. tenera visual system modelling shows that conspecifics are able to detect the amber color of male wings against their natural habitats Abstract: Animal coloration serves various signaling and non-signaling functions. In Odonata, such colors may not only play photoprotective and/or thermoregulatory roles but also serve as visual signals during courtship and/or agonistic interactions. Here, we analyzed the coloration of Perithemis tenera wings, a potential secondary sexual ornament, applying spectrophotometry and visual modeling to gain a deeper understanding of their color mechanisms and functions. The amber coloration of the P. tenera wings results from the interaction of light with both the melanized chitin matrix and possibly ommochrome pigments. Additionally, by fitting the absorbance curve of P. tenera wings to the extinction coefficient of different melanins, we deduced that pheomelanin is likely the pigment embedded in the wing’s chitinous matrix. The amber coloration of P. tenera wings

stands out against their natural habitat, making it detectable by conspecifics. Finding multiple pigments in the P. tenera wings not only enhances our understanding of the functional roles of pigmentation in Odonata but also offer broader insights into how structural and pigment-based colorations evolve as multifunctional traits." (Authors)] Address: Cezário, R., Lab. of Ecological Studies Ethology & Evolution (LESTES), Dept Biol. Sciences, Federal Univ. of Triângulo Mineiro, Uberaba, MG, Brazil. Email: rcezariobio@gmail.com

24024. Chovanec, A. (2024): Nachweise eines androchromen Weibchens sowie von Männchen mit rot gefärbtem Thorax von Sympetrum sanguineum (Odonata: Libellulidae). Libellula 43(3/4): 193-207. (in German, with English summary) ["Records of an androchrome female and of males with a red-coloured thorax of Sympetrum sanguineum (Odonata: Libellulidae) – In this paper a photo of an androchrome female of Sympetrum sanguineum engaged in a tandem is presented. Furthermore, males of the same species with a partly or nearly totally red-coloured thorax are documented. Observations were made at small artificial ponds in Lower Austria in August 2024.0] Address: Chovanec, A., Krotenbachgasse 68, 2345 Brunn am Gebirge, Austria. Email: andreas.chovanec@bml.gv.at

24025. Chovanec, A.; Rabitsch, W. (2024): Die Rolle der Österreichischen Gesellschaft für Entomofaunistik in Zeiten der Biodiversitätskrise – Gedanken zum 25-jährigen Bestehen des Vereins. Beiträge zur Entomofaunistik 25: 3-14. (in German) ["Numbers of contributions (long articles and short contributions) per different arthropod groups published in the 25 volumes of the journal “Beiträge zur Entomofaunistik”: ... The Odonata (n=28 publications) are the most frequently covered group, which exclusively comprises aquatic taxa. This analysis includes long articles as well as short communications and comments on the respective insect of the year; abstracts from conferences are not included. As several insect orders were covered in individual publications, the total number of papers shown in Figure 1 is 440." (Authors/google translate. Records of Gomphus pulchellus are outlined.] Address: Rabitsch, W., Lorystraße 79/3/45, 1110 Wien, Austria. Email: wolfgang.rabitsch@univie.ac.at

24026. Chovanec, A.; Schaufler, K. (2024): Die Grüne Flussjungfer Ophiogomphus cecilia (Geoffroy in Fourcroy, 1785) (Insecta: Odonata): eine FFH-Art an der Pram in Oberösterreich. Beiträge zur Entomofaunistik 25: 23-39. (in German, with English summary) ["Ophiogomphus cecilia (Geoffroy in Fourcroy, 1785): a species included in the Habitats Directive at the river Pram in Upper Austria. – Rehabilitation measures carried out at the river Pram (Upper Austria) from 2011 to 2014 favoured the colonisation of the restructured river section by O. cecilia. An odonatological study performed in 2023 at three stretches in the restructured river section revealed a decrease of the number of the species’ individuals compared with the results of a study of 2016. Furthermore, the number of the investigated stretches with records of this species decreased from three in 2016 to one in 2023. It is assumed that increased shading by riparian trees and shrubs has a negative effect on this population of O. cecilia." (Authors).] Address: Schaufler, Kristina, Antonigasse 55/9, 1170 Wien, Austria. Email: kristina.schaufler@umweltbundesamt.at

24027. De Knijf, G.; Billqvist, M.; van Grunsven, R.H.A.; Prunier, F.; Vinko, D.; Trottet, A.; Bellotto, V.; Clay, J.; Allen, D.J. (2024): Measuring the pulse of European biodiversity. European Red List of Dragonflies & Damselflies (Odonata). Brussels, Belgium: European Commission: 46 pp. (in English) ["Aim: This European Red List provides an updated summary of the conservation status of the European species of dragonflies and damselflies (hereafter Odonata), evaluated according to the IUCN Red List Categories and Criteria (2012a) and IUCN's global (IUCN Standards and Petitions Committee, 2022) and regional (IUCN, 2012b) guidelines. It is a completely revised second edition with inclusion of any new data. It is a comprehensive, region-wide assessment of dragonflies and builds on the previous work done for the first European Red List of Dragonflies (Kalkman et al., 2010) and on the Atlas of the dragonflies and damselflies in Europe (Boudot and Kalkman, 2015; Kalkman et al., 2018). It identifies species threatened with extinction at the European and EU27 Member State levels so that appropriate policy measures and conservation actions can be taken to improve their status, based on the best available evidence. Scope: The geographic scope of this European Red List spans the entirety of the European continent. It extends from Iceland, Svalbard and Franz Josef Land in the north to the Canary Islands in the south, and from the Azores in the west to the Urals in the east, including the European part of Türkiye ('Türkiye -in-Europe') and most of the European parts of the Russian Federation. Cyprus, the European Macaronesian islands (the Canaries, Madeiran and Azores archipelagos) and the Spanish North African Territories (Ceuta, Melilla, and the Plazas de soberanía) are included in the assessment region, whereas the North Caucasus parts of European Russia (e.g. Krasnodar Krai, Republic of Dagestan, Stavropol Krai and other administrative units within the Russian Northern Caucuses) fall beyond the European scope of this European Red List. Red List assessments were made at two regional levels: for geographical Europe and for the 27 Member States of the European Union (hereafter, EU27). All 146 dragonfly species recorded for the European region were included in this assessment. The original list of species was supplemented by recently published taxonomic revisions of findings of new species (see Appendix 1). Four species that are only very occasionally observed in Europe without proof of reproduction were classed as Not Applicable for the European Red List, and this analysis focuses on the 142 assessed species. Results: Of the 142 species assessed, a best estimate of 21.0% (29 species) of extant species for which sufficient data are available are threatened (i.e., assessed as Critically Endangered, Endangered or Vulnerable) on the European scale, with 1.4% being Critically Endangered, 6.3% Endangered and 12.7% Vulnerable. In addition, 12.0% (17 species) were assessed as Near Threatened, with four species (2.8%) considered Data Deficient (Figure 5; Table 3). The situation for the 137 species occurring within the EU is quite similar to that of Europe as a whole (Figure 6); 21.9% (30 species) of extant species for which sufficient data are available are threatened (with none assessed as Data Deficient), of which 1.5% are Critically Endangered, 7.3% Endangered and 13.9% Vulnerable. A further 19 species (13.1%) were assessed as Near Threatened. The highest number of threatened species are found in a broad belt approximately from southern France to southern Scandinavia and the Baltic states. Comparing the present Red List with the previous one (Kalkman et al., 2010), a significant increase in the number of threatened species is observed, at both Pan Europe and EU levels. The number of Endangered and Vulnerable species increased by nearly 50%. Many of these new threatened species are typical of nutrient poor or small oligotrophic aquatic ecosystems. Despite a slight increase in the number of dragonfly species being found in Europe and in EU27, a lower number of species are now considered as Least Concern. Both indicate that

the situation of dragonflies has dramatically declined over a period of only 10 years. Conservation action: After the assessments of the European dragonflies was completed, European dragonfly experts participated in February and March 2024 in conservation action planning workshops focusing on the threatened species. The project followed the IUCN SSC Conservation Planning Specialist Group (CPSG) "Assess-to-Plan" (A2P) methodology which is designed to build consensus on the priority actions required over the next 5-10 years and to identify organisations that can take these actions. Recommended conservation actions were organised under three goals: 1) Knowledge, tools, and expert capacity; 2) Protecting, restoring, managing, and monitoring key habitats and populations; and 3) Ensuring effective policy and planning support. An increased awareness permeates all three goals. Each conservation action includes a goal and a set of associated sub-goals. The targets include European and national government agencies and local management authorities, funding agencies, NGOs, relevant business sectors, policy makers (local, national and regional), water management agencies, developers and their ecologists, the scientific community and places of learning (universities, institutes, schools), the main land-user groups (agriculture, grasslands, forestry), Natura 2000 site managers, municipal managers of public territory and parks, nature conservation area management bodies, groups with similar conservation interests (e.g. groups aiming to conserve freshwater habitats for other invertebrate species), and local communities in areas where action is most needed. See Moving from Assessment to Planning for Threatened European Dragonflies (TBD, 2024) for these details. Work on the ground: To properly protect the threatened species there must be effective policy and planning support for dragonflies at European, national, and local levels. An update to the species included in the Annexes of the EU Habitats Directive can be a first step. But the European Commission (hereinafter EC) can also take the necessary steps and action to ensure that conservation measures are taken for threatened European dragonflies. Other important factors are funding mechanisms for the protection and management of threatened species, European regulation on minimum water flow (e-flow), reduced risks from dams (stricter ecological guidelines for new dams, funding for dam removal). The European Red List must also work through at the national level. The national countries must also take their responsibility for the European threatened species that occur in their national territories. This is even more important for very localised species, often endemics that are threatened. This must include not only associated protection and planning, but also adequate implementation and enforcement of existing laws and regulations, as well as the necessary conservation actions. To achieve adequate protection, restoration and management of priority habitats and populations of threatened dragonflies, several measures are required. Natural flow rates and clean water in European rivers and streams should be a focus of course. In priority oligotrophic wetlands, water levels should be maintained or restored, while nutrient-enrichment, such as through atmospheric nitrogen deposition, and other risks are excluded. In protected areas, threatened species should be conserved effectively with species-specific planning and urgent measures for the most pressing cases. Climate change is an overarching threat to many species, so climate-adapted management plans that include dragonflies should be established for the planning and are the conservation of smaller watercourses in the Mediterranean the effects of prolonged drought is vital for Europe's most threatened dragonflies, which depend on streams and rivers. Management plans for these systems need to be prioritised, developed and implemented. The European Red List of Odonata is part of a wider initiative aimed at assessing the status of European species. The current European assessments of dragonflies, this report and the A2P (TBD, 2024) provide key resources for policy makers, conservationists, NGOs, environmental planners, and other stake-holders across the region. The results of this project can be applied at a regional scale to prioritise sites and species for inclusion in regional research and monitoring programs and to identify internationally important biodiversity sites. Red Lists are a dynamic tool that will evolve over time as species are reassessed according to new information or situations. Research and monitoring: More research and European-wide monitoring are needed to be able to carry out adequate conservation. Improved knowledge of threatened species population trends and their drivers as well as development of dragonfly indicators and an established data sharing platform are essential. For this reason, the Dragonfly Conservation Europe (DCE), a European society was recently established. It aims to be an overarching society of dragonfly experts providing essential knowledge, tools, and expertise to support effective dragonfly conservation. Nurturing volunteers through funded programs and well-targeted Citizen Science initiatives can also help. Capacity building through education will be important over the next 5-10 years and priority countries or regions include Greece and other countries in south-eastern Europe such as Albania, Bulgaria, Romania and North Macedonia. During the process of compiling data for this European Red List, several knowledge gaps have been identified. Across Europe, there are significant geographical, geopolitical, and taxonomic differences and other challenges regarding the quality of available data on species distribution and status. There is a clear need to collate information from all ongoing and planned data collection initiatives and for a wider European dragonfly conservation action plan to be researched and developed. Few European countries have any kind of organised and systematic monitoring program for dragonflies, and many have only basic data on the species' distribution and population status at best." (Authors)] Address: https://www.trollslandeforeningen.se/wp-content/uploads/2024/08/ERL-Dragonflies_De-Knijf-and-al-2024.pdf

24028. De Marmels, J. (2024): Neocordulia maurocostai sp. nov. (Odonata, Anisoptera: Oxygastridae), a new species of Emerald dragonfly from western Pantepui region, Venezuela. Zootaxa 5493(1): 72-78. (in English) ["The new species is described and illustrated from two males (holotype: Venezuela, Amazonas State, Serranía del Cuao, Caño Negro, 1440 m elevation, 5.087°N, 67.438°W, deposited in the MIZA Odonata collection, Universidad Central de Venezuela, Faculty of Agronomy, Maracay). The new species differs from all other species so far known mainly in structure of posterior hamulus and cercus. The subgenus Mesocordulia May, 1992 is formally elevated to generic rank different from Neocordulia Selys, 1882.] Address: De Marmels, J., Museo del Instituto de Zoología Agrícola Francisco Fernández Yépez (MIZA), Facultad de Agronomía, Universidad Central de Venezuela, Apartado 4579, Maracay 2101-A, Venezuela. Email: demarmjc@gmail.com

24029. de Oliveira, F.Z. (2024): Elucidando a competição intra e interespecífica em ninfas de libélulas neotropicais. Trabalho de Conclusão de Curso (Graduação em Gestão e Análise Ambiental) – Universidade Federal de São Carlos, São Carlos, 2024. Disponível em: https://repositorio.ufscar.br/handle/ufscar/20667: 33 pp. ["Understanding the processes that structure natural communities is one of the ultimate goals of ecology. Among these processes, competition is fundamental to maintaining biodiversity. According to the Coexistence

Theory, for two or more species to coexist, it is necessary to follow the criterion of invasibility, when they are capable of invading a community and increasing their abundance when rare. Thus, one of the mechanisms that can favor coexistence is to make intraspecific competition greater than interspecific competition, so that each population self-regulates before competitively excluding the other. However, when the invasibility criterion is not met, species can co-occur in the long term when they have no ecological differences (equivalent) and their populations are simply affected by neutral demographic processes (independent of the species). Dragonfly nymphs are organisms that are potentially affected by neutral processes, as they are opportunistic generalists, with similar sit-and-wait strategies. Thus, to test the ecological equivalence of dragonfly nymphs, competition experiments were conducted in microcosms under controlled conditions. Our experiments manipulated total abundances in monocultures and relative abundances in pairs of species of Libellulidae and Coenagrionidae, with the aim of quantifying the intra- and interspecific per capita effect on mortality, spatial distribution, number of emergences and ecdyses. The results revealed that there is strong intraspecific competition compared to interspecific competition, leading to higher mortality in situations with higher intraspecific densities for both species. Our calculations of the coexistence mechanisms suggest a high spatial niche differentiation and small differences in fitness, leading to a potential stabilization in the coexistence of dragonfly nymphs of the two families." (Author)] Address: https://repositorio.ufscar.br/bitstream/handle/ufscar/-20667/Monografia_Frederico_Zanatta.pdf?sequence=1&isAllowed=y

24030. De Oliveira Silva, B.; Souza, F.N.; da SilvaD.C.; Borges Santos, F.B. (2024): Avaliação da capacidade predatória das larvas de Odonata sobre as larvas de Aedes aegypti (Diptera: Culicidae) na região Sudoeste da Bahia. Ensaios e Ciência: Ciências Biológicas, Agrárias e da Saúde, [S. l.] 28(3): 389-393. (in Portuguese, with English summary) ["Dengue, a disease caused by the arbovirus DENV and transmitted by the mosquito Aedes aegypti, represents a global challenge, with millions of cases reported annually. In Brazil, the situation is alarming, with a significant increase in recent years. In light of this scenario, the present study aimed to investigate the feasibility of biological control using larvae from five families of the order Odonata as predators of A. aegypti larvae under laboratory conditions. Four experiments, each lasting 12 hours, were conducted. Each container was supplied with either three or two Odonata larvae of the same family, and subsequently, 150 A. aegypti larvae were added to the containers with three Odonata larvae, and 50 were added to those containing two Odonata larvae. The results revealed variability in the predation of A. aegypti larvae by Odonata larvae, with the families Aeshnidae, Libellulidae, and Coenagrionidae exhibiting the highest predation rates, in descending order. These findings suggest that biological control could represent a promising alternative to traditional methods to combat the dengue vector, contributing to the reduction of disease incidence. However, further research is necessary to consider ecological aspects and successfully implement this strategy." (Authors)] Address: De Oliveira Silva, B., Univ. Estadual do Sudoeste da Bahia, Campus de Vitória da Conquista. BA, Brasil. Email: brunooliesz@gmail.com

24031. Djene, K.R.; Allouko, J.-R.; Kone, K.; Bony, K.Y. (2024): Benthic macroinvertebrates diversity in the Tiemba River, north-west of Côte d'Ivoire. Journal of Zoological Research 6(2): 12-20. (in English) ["This study was carried to determine the diversity and structure of macroinvertebrates in the Tiemba river in north-west Côte d'Ivoire. Sampling of these macroinvertebrates was carried out at four different stations in the river using a Van Veen bucket and a haul net over an area of 1 m² (2 m * 0.5 m). The structure of benthic species was then studied using Shannon and Piélou indexes. Finally, a Canonical Correspondence Analysis (CCA) was carried to compare the relationship between the distribution of macroinvertebrate species and physicochemical variables. The results showed that a 253 macroinvertebrate species, divided into 04 classes, 09 orders and 20 families, were identified in the Tiemba river. This macrofauna is made up of 78% arthropods, 16% molluscs and 6% worms. The insect class was the best represented, with several orders including Hemiptera, Coleoptera, Diptera, Odonata and Hymenoptera. The most dominant orders in this river are Hemiptera, Coleoptera and Diptera, which are pollutant-resistant organisms, reflecting moderately polluted water. Analysis of the diversity indexes revealed that the macroinvertebrate groups in the Tiemba river are diverse and well organised. The distribution of macroinvertebrates was strongly influenced by temperature, conductivity, pH, nitrite, dissolved oxygen and depth. These results provide the foundations to all biomonitor action for the ecological quality of that river." (Authors) The identifications of Odonata remain questionable, as e.g. the endemic species Coenagriocnemis reuniense is listed for Côte d'Ivoire; same to Pseudagrion punctum.] Address: Djene, K.R., Tropical Biodiversity & Ecology Laboratory, Jean Lorougnon Guédé University, Daloa, Côte d'Ivoire-BP 150 Daloa, Ivory Coast

24032. Dow, R.A.; Butler, S.G. (2024): Previously unpublished Odonata records from Sarawak, Borneo, part XII: More Odonata from Kapit Division. Faunistic Studies in Southeast Asian and Pacific Island Odonata 46: 1-18. (in English) ["Records of adult and larval Odonata from the Kapit Town area in Kapit Division, Sarawak, Malaysian Borneo, made in 2023 and 2024, are presented. One hundred and seven species were recorded, nine of which were first records for the division and a further 21 were first records for Kapit District. The total number of Odonata known from Kapit Division was raised to 167. The most significant of the adult records is that of a female Linaeschna (probably L. polli), a genus only known from the male until now. From the larval records, single larvae of Borneogomphus and another Onychogomphine species stand out, the former is particularly notable since it was made at a lowland site. The diversity of the Gomphidae in Borneo is briefly discussed and compared with a recent study made in Thailand as well as more generally with mainland Southeast Asia." (Authors)] Address: Dow, R.A., Institute of Biodiversity and Environmental Conservation, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia. Naturalis Biodiversity Centre, P.O. Box 9517, 2300 RA Leiden, The Netherlands. Email: rory.dow230@yahoo.co.uk

24033. Đurdevic, A.; Medenica, I.; Samardžic, A.; Nikolic, M. (2024): Trithemis annulata (Palisot de Beauvois, 1807) and Selysiothemis nigra (Vander Linden, 1825) (Odonata: Libellulidae): New members of the dragonfly fauna of Serbia. Acta Entomologica Serbica 29(2): 1-10. (in English, with Serbian summary) ["Field investigations along the South Morava River near Niš have led to the discovery of two new dragonfly species for Serbia: ... S. nigra was found in large numbers and with confirmed reproduction at several sites, indicating well-established populations. In contrast, Trithemis annulata was recorded at only two locations, with sightings limited to male individuals patrolling or resting in the typical "obelisk" posture. These findings increase the total

number of dragonfly species known in Serbia to 69, enriching our understanding of the region's biodiversity and providing a foundation for further ecological and conservation research." (Authors)] Address: Đurdevic, Aca, Institute for Nature Conservation of Serbia, Office in Niš, Vožda Karadorda 14/II, 18000 Niš, Serbia

24034. Emeljanov, A.F. (2024): New data on the olistheter structure in dragonflies and damselflies (Odonata). Entomological Review 104: 321-323. (in English) ["Examination of cross-sectional images of gonapophyses in Calopteryx splendens and Coenagrion hastulatum, has shown that they possess a typical non-detachable olistheter that is found in all Pterygota with a normally developed primary ovipositor. The new data suggest that the non-detachable olistheter of the type discovered in Odonata may be a synapomorphy of Pterygota excluding Ephemeroptera." (Author)] Address: Emeljanov, A.F., Zoological Institute, Russian Academy of Sciences, 199034, St. Petersburg, Russia

24035. Fenn-Moltu, G.; Liebhold, A.M.; Weber, D.C.; Bertelsmeier, C. (2024): Pathways for accidental biocontrol: The human-mediated dispersal of insect predators and parasitoids. Ecological Applications 34(8), e3047: 14 pp. (in English) ["Introductions of insect predators and parasitoids for biological control are a key method for pest management. Yet in recent decades, biological control has become more strictly regulated and less frequent. Conversely, the rate of unintentional insect introductions through human activities is rising. While accidental introductions of insect natural enemies can potentially have serious ecological consequences, they are challenging to quantify as their movements go largely unobserved. We used historical border interception records collected by the US Department of Agriculture from 1913 to 2018 to describe the diversity of entomophagous insects transported unintentionally, their main introduction pathways, and trends in host specificity. There were 35,312 interceptions of insect predators and parasitoids during this period, representing 93 families from 11 orders, and 196 species from these families. Commodity associations varied, but imported plants and plant products were the main introduction pathway. Most interceptions originated with commodities imported from the Neotropical, Panamaian, and Western Palearctic regions. Among the intercepted species, 27% were found in material originating from more than one country. Two thirds of species were polyphagous host generalists. Furthermore, 25% of species had already been introduced intentionally as biological control agents internationally, and 4.6% have documented negative impacts on native biodiversity or human society. Most of the intercepted species that have not established in the United States are host generalists or have at least one known host species available. The unintentional transport of diverse natural enemy insects has the potential to cause substantial ecological impacts, both in terms of controlling pests through accidental biocontrol and disrupting native communities. Characterizing the insects being transported and their introduction pathways can inform biosecurity practices and management. ... The Neuroptera, Mantodea, Odonata [Euphaeidae], Raphidioptera, Strepsiptera (endoparasites), Dermaptera, and Trichoptera together made up less than 1% of interceptions." (Authors)] Address: Bertelsmeier, Cleo, Department of Ecology and Evolution, University of Lausanne, Lausanne, Switzerland. Email: cleo.bertelsmeier@unil.ch

24036. Ferreiro, N. (2024): The great insect decline in Argentina. Community and Ecology 2(1): 10 pp. (in English) ["A 41% of arthropod species are declining, and one-third of all species are threatened by extinction. Changes in land use are recognized as the primary cause of this decline. The scarcity of data for the Southern Hemisphere is partly due to limited funding but particularly due to the hyperdiversity of tropical regions. The objective of this study was to investigate the presence of this issue in scientific articles and the contribution of insects to the total number of threatened species in Argentina. Globally, the percentage of articles related to insect extinctions in Google Scholar has grown exponentially over the past twenty years, from 0.42% in 2000 to 6% in 2021. However, no significant growth was found in the number of articles on this topic in Argentina during the study period. Currently, only 23 insect species are recognized as at risk out of a total of 572 threatened species according to the "IUCN Red List of Threatened Species" for Argentina. These species belong to the orders Odonata (8), Coleoptera (1), Lepidoptera (2), Hymenoptera (11), and Orthoptera (1 species), representing only 4% of the total threatened species. In comparison, it is estimated that 26% and 27% of threatened species in the much less diverse faunas of Germany and the United Kingdom, respectively, are insects. These results suggest that the percentage of endangered insects in Argentina is being underestimated due to taxonomic and population knowledge gaps, consistent with reports by other authors. In hyperdiverse countries like ours, only molecular techniques can process large samples quickly enough to obtain estimates of insect diversity before they disappear." (Author)] Address: Ferreiro, N., Instituto de Ecología y Desarrollo Sustentable, Universidad Nacional de Luján-CONICET, Luján, Buenos Aires, 6700, Argentina

24037. Ferreras-Romero, M.; Márquez-Rodríguez, J. (2024): Urban dragonfly fauna of a Mediterranean city in southwestern Europe: How suitable are artificial habitats for thermophilic species? Odonatologica 53(1/2): 21-38. (in English) ["The Odonata fauna of three different artificial habitats in the Seville urban area, southern Spain, was analysed and compared: a channel with concrete walls, two ponds located inside a public park, and the old watercourse of the Guadalquivir River, a dead arm lacking water flow. Invasive animal species were common at these sites. No restoration or conservation measures or management practices to facilitate the development of autochthonous fauna have been undertaken. Ischnura graellsii, Anax parthenope, Crocothemis erythraea, and Trithemis annulata were observed repeatedly and consistently. Other frequent species were Sympetrum fonscolombii and Trithemis kirbyi. Odonata diversity of the four urban water bodies was poor and the spectrum of species trivialised. More than 90% of the Anisoptera records pertain to thermophilic species with a wide African distribution. Only one European endemic, Platycnemis latipes, was found. Several species exhibited multivoltine life cycles in these artificial habitats." (Authors)] Address: Márquez-Rodríguez, J., Laboratorio de Zoología. Facultad de Ciencias Experimentales. Universidad Pablo de Olavide. A-376, Km 1. E-41013 Sevilla, Spain. Email: jmarrod1@admon.upo.es

24038. Garrison, M.; Tennessen, K.J. (2024): Nymph Cove: Identification to Genus: Libellulidae, Part 2. Argia 36(3): 34-37. (in English) [Tramea, Erythemis, Nannothemis, Micrathyria and Pachydiplax; Leucorrhinia, Crocothemis, Erythrodiplax, and Sympetrum (in part)] Address: Garrison, Marla, Liebman Institute for Science Innovation at McHenry County College, Crystal Lake, Illinois, USA

24039. Góral, N. (2024): Are the dispersal capabilities of Zygoptera underestimated? A critical review (Odonata). Odonatologica 53(3/4): 307-328. (in English) ["While Anisoptera are

more commonly associated with long-distance dispersal, there are notable cases of Zygoptera colonising remote areas such as desert oases and oceanic islands. Despite being generally regarded as less mobile, many Zygoptera species have demonstrated substantial dispersal ability, challenging previous assumptions. However, these findings have had limited impact on the prevailing consensus. Current understanding of species mobility relies heavily on capture-mark-recapture (CMR) studies, which sometimes conflict with direct evidence of species expansion or with the results of molecular analyses. Although tracking species by tagging can provide valuable information, it appears to underestimate long-distance dispersal, and therefore general conclusions should be treated with caution. This paper provides an overview of documented instances of long-distance dispersal in Zygoptera, covering cases ranging from migration events to the expansion of species' ranges and concluding with pioneer species with dispersal incorporated into their life strategy. Additionally, the problems caused by treating Zygoptera as sedentary for odonatological research and species conservation policy are discussed." (Author)] Address: Góral, Nikola, Laboratory of Nature Education and Conservation & Molecular Biology, Techniques Laboratory, Faculty of Biology, Adam Mickiewicz University in Poznañ, Poland. Email: nikola.goral@amu.edu.pl

24040. Günther, A.; Olias, M.; Kipping, J.; Bowler, D. (2024): Rote Liste und Artenliste Sachsens Libellen. Herausgeber: Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie, Pillnitzer Platz 3, 01326 Dresden: 42 pp. (in German) [Red List of Odonata for the federale state Sachsen, Germany. https://publikationen.sachsen.de/bdb/artikel/46402/documents/70443] Address: Günther, A., Naturschutzinstitut Freiberg, B.-Kellermann-Str. 20, 09599 Freiberg, Germany

24041. Hacet, N. (2024): Type localities of Odonata species described in Türkiye and their connections to the country's biodiversity. Acta Entomologica Serbica 29(2): 11-28. (in English, with Serbian summary) ["Situated at the crossroads of Europe and Asia, Türkiye has a diverse and rich biodiversity. The number of Odonata species identified from Türkiye so far is approximately 73% of the total number identified in Europe. 21 taxa (15 species and 6 subspecies) were first described from Türkiye. The country lies at the intersection of three global biodiversity hotspots – Caucasus, Irano-Anatolian, and the Mediterranean Basin – which overlap geographically with the type localities of the Odonata species described in the country. These regions, where species diversity is high, also host endemic Odonata species. Three taxa (Calopteryx waterstoni Schneider 1984, Cordulegaster amasina Morton 1916, and Cordulegaster kalkmani Schneider et al., 2021) are endemic to Türkiye. The presence of endemic species in biodiversity hotspots, where original habitats have been lost at an alarming rate, highlights the urgent need to assess their conservation status according to the IUCN Red List categories. Ensuring the longterm conservation of Odonata biodiversity in Türkiye depends on sustainable protection programs that address pollution, habitat fragmentation, and overexploitation of the remaining relatively natural freshwater ecosystems." (Author)] Address: Hacet, Nurten, Trakya University, Faculty of Science, Department of Biology, 22030 Edirne, Türkiye. Email: nurtenhacet@trakya.edu.tr

24042. Hamdi, R.; Zerguine, K.; Ramani, K. (2024): Diversity and distribution of aquatic macroinvertebrates in Lake Tonga and Mekhada Marsh (north-east Algeria) in relation to climate change. Biharean Biologist 18(2): 99-114. (in English) ["This study aimed to estimate macro-invertebrate distribution and diversity across different stations. We conducted an annual sampling of macro-invertebrates at two RAMSAR sites in the El Tarf region of Algeria over two successive cycles (2021–2023). Our sampling included nine stations, five in Lake Tonga and four in the Mekhada Marsh. 1909 specimens representing 76 taxa were identified, with 1233 originating from Lake Tonga and 676 from the Mekhada Marsh. Lake Tonga was the most abundant site, and Station S1 exhibited the highest diversity, while the Mekhada Marsh was the least diverse. Hemiptera and Odonata were the dominant orders. The analysis revealed severe environmental degradation in both sites, driven by anthropogenic activities and climatic changes. These findings underscore the urgent need for conservation measures to preserve these ecologically significant wetlands." (Authors) The following taxa are reported: Lestes sp., Sympetrum sp., Libellula sp., Orthetrum sp., Erythromma najas, Ischnura sp., Enallagma cyathigerum, Coenagriides sp., Cordulegaster sp., Ophiogomphus sp. [sic], Oxygastra curtislii, Anax imperator mauricianus, Aeshna sp., Calopteryx sp.] Address: Hamdi, R., Biology, Water and Environment Laboratory (LBEE), Department of Ecology and Environmental Engineering, Faculty SNV/STU, University 8 Mai 1945 Guelma, BP 401 24000 Guelma, Algeria. Email: rayenehamdi1@gmail.com

24043. Huang, D.-Y.; Ji, G.-Z.; Gao, J.; Cai, C.-Y.; Nel, A. (2024): Discovery of Hemeroscopus baissicus (Odonata, Anisoptera, Hemeroscopidae) from the Lower Cretaceous Naijiahe Formation (Ningxia, NW China) and its stratigraphic significance. Journal of Insect Biodiversity 60(1): 89-97. (in English) ["Several newly collected dragonfly wings from the Lower Cretaceous Naijiahe Formation (Kangjiawan locality, Tongxin County, Ningxia Hui Autonomous Region, NW China) have been identified as belonging to the widely distributed species Hemeroscopus baissicus, found in North China and South Korea at similar palaeolatitudes. This species shows potential for stratigraphic correlation. The findings suggest that the Shahai-Fuxin Formation (western Liaoning), Lushangfen-Xiazhuang Formation (western Beijing), Madongshan-Naijiahe Formation (Ningxia), and Zhonggou Formation (Jiuquan Basin) are likely of comparable ages." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@mnhn.fr

24044. Hunger, H.; Burbach, K.; Günther, A.; Petzold, F.; Trockur, B.; Weihrauch, F.; Willigalla, C. (2024): Aktueller Kenntnisstand zur Verbreitung von Orthetrum albistylum in Deutschland (Odonata: Libellulidae). Libellula Supplement 17: 129-140. (in German, with English summary) ["Current state of knowledge on the distribution of Orthetrum albistylum in Germany – An overview of the currently known population situation of O. albistylum in Germany is given on the basis of the authors' own data, published records, data from the Bavarian State Office for the Environment, the Schutzgemeinschaft Libellen in Baden-Württemberg, the Central Species Database of Saxony and the "Living Atlas – Nature Germany". There is no evidence of current range expansion in Baden-Württemberg. The occurrences are concentrated in a limited area around Freiburg i. Br. Earlier occurrences in the south are deserted. In Bavaria, there has been a steady spread since the 2010s in the Rosenheim and Chiemgau area. Records have increased in recent years. In Rhineland-Palatinate, no further records were made after initial records in 2008 and 2016. In Saarland, the species was first recorded in 2023. In Saxony, it was first recorded in 2016 and has been found regularly since then, mainly in Upper Lusatia

and the surrounding area. O. albistylum was also first recorded in Brandenburg in 2016, since when further records have been made in Lower Lusatia. In 2023, a native occurrence was detected on the Oder. The spread in Brandenburg and Saxony is presumably from the south-east Polish distribution area. In Baden-Württemberg, a northern spread has not yet been detected. In all likelihood, the colonisation of Bavaria was caused by means of transalpine Foehn winds from the south. The thereby emerging bridgeheads north of the Alps were sources for a subsequent slow spread of the species in the southeast of Bavaria." (Authors)] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INULA), Schwester-Adolfa-Weg 44, 79115 Freiburg, Deutschland Germany. E-mail: holger.hunger@inula.de

24045. Johnson, J.T. (2024): A review of Odonata hybrids of the Western Hemisphere. Bulletin of American Odonatology 14(1): 1-25. (in English, with Spanish and Portuguese summaries) ["A total of 42 Odonata hybrids of 69 parental species have been reported from the Western Hemisphere. Discounting reports considered unsupported or misinterpreted leaves credible reports of 38 hybrids (9 Zygoptera, 29 Anisoptera) of 64 parental species (15 Zygoptera, 49 Anisoptera). Six families are represented: Coenagrionidae, Aeshnidae, Gomphidae, Macromiidae, Corduliidae, and Libellulidae. This review includes 16 hybrids not included in previous summaries, including three that were previously unpublished. No intergeneric hybrids were reported." (Authors)] Address: Johnson, J.T., 3003 Unander Avenue, Vancouver, WA 98660, USA. E-mail: gomphusjim@gmail.com

24046. Karube, H.; Phan, Q.T. (2024): True systematic position on Chlorogomphus vani Phan & Karube, 2022 (Odonata: Chlorogomphidae). Tombo 67(1): 37-39. (in English) ["We newly position Chlorogomphus vani Phan & Karube, 2022 as the genus Watanabeopetalia and the subgenus Matsumotopetalia, by detail comparison and examination of morphology." (Authors)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

24047. Karube, H.; Kaga, R.; Watanabe, S. (2024): The current status of the declining dragonflies of Tsushima - Estimation or factors contributing to the decline of Sympetrum frequens (Selys,1883). Tombo 67(1): 40-50. (in Japanese, with English summary) ["Based on four field surveys conducted in Tsushima during the summer to autumn of 2023, we report on the decline of the genus Sympetrum in Tsushima, and noted that we could not find Lestid damselflies. In Tsushima, where the topography is mountainous and there are only a few low marshy areas, the habitat of dragonflies is limited. The marshy areas that once existed in abundance at the back of the bay topography were converted to rice paddies by agricultural development and then abandoned, but now became increasingly dry. The recent deterioration of water quality due to pesticide pollution and the drastic reduction of wetland environment and habitat area due to vegetation succession have also taken a heavy toll on the riparian environment, and the situation is expected to worsen in the future. In addition to the follow-up survey of the over-summering problem of Sympetrum frequens discussed in this paper, we would like to conduct additional surveys in spring and early summer to clarify the actual status of the Odonata fauna in Tsushima in the early 2020s." (Authors)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

24048. Karube, H.; Kaga, R.; Tanio, T. (2024): On the first records of Ictinogomphus pertinax (Hagen in Selys, 1854) and Deielia phaon (Selys, 1883) collected from Tsushima Island. Tombo 67(1): 51-53. (in Japanese, with English summary) ["We found and recorded the first specimens of Ictinogomphus pertinax and Deielia phaon, whose distribution range expanded to Tsushima Island, Nagasaki Prefecture, from the Masanobu Aiura Collection in the Tsushima Museum. The first record of Ictinogomphus pertinax was collected in July 2007, and it took more than 10 years to reach Tsushima from Iki Island, located about 50 km southeast of Tsushima." (Authors)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

24049. Karube, H.; Katatani, N.; Phan, Q.T. (2024): A new species of 'Chlorogomphus gracilis group' from the Central Highlands of Vietnam with a description of new subgenus Spinorogomphus (Odonata: Chlorogomphidae). Tombo 67(1): 31-36. (in English) ["Chlorogomphus serratus sp. nov. is described from the Central Highlands of Vietnam. This new species resembles Ch. gracilis known from Hainan Island, S. China. These two species constitute a unique species group, which is described as new subgenus Spinorogomphus." (Authors)] Address: Haruki Karube, H., Kanagawa Prefectural Museum of Natural History (Odawara, Kanagawa, Japan). Email: paruki@nh.kanagawa-museum.jp

24050. Keil, L. (2024): Das Fortpflanzungshabitat der Sibirischen Winterlibelle Sympecma paedisca am Bodensee. Mitteilungen des Badischen Landesvereins für Naturkunde und Naturschutz e. V. 26: 139-142. (in German) [S. paedisca prefers slightly reedy areas of the reed meadows as a breeding habitat, but overall the plant species composition of the reed meadows seems to play a minor role. Investigations into structural parameters of vegetation are recommended. The reed belts (Phragmites australis) are not used to any significant extent as a breeding habitat.] Address: Keil, Linda, Institut für Naturschutz und Landschaftsanalyse - INULA, Basler Landstr. 49e, 79111 Freiburg, Germany. Email: linda.keil@inula.de

24051. Khusanov, A.K.; G'anijonov, D.M.; Tillaeva, S.T. (2024): Faunistic analysis of dragonfly (Insecta, Odonata) distributed in the eastern part of Andijan. Theoretical & Applied Science 4(132): 276-283. (in English) [southeastern regions of Andijan, Uzbekistan. The following species are documented and treated: Gomphus flavipes, Anax imperator, A. parthenope, Sympetrum vulgatum, S. fonscolombii, Libellula quadrimaculata, Orthetrum brunneum, Calopteryx splendens, C. virgo, Lestes dryas, Ischnura elegans] Address: Khusanov, A.K., Andijan state university, Department of Zoology and biochemistry, Russia. Email: a_xusanov75@adu.uz

24052. Khusnah, L.; Jamiati, R.; Sholeha, A.R. (2024): Diversity of dragonfly (Odonata) at the Imam Nahrawi Stadium UIN Kiai Haji Achmad Siddiq Jember. Journal of Biology Education 7(2): 167-177. (in English) ["This research aims to determine the diversity of dragonflies in the Imam Nahrawi Stadium, UIN Kiai Haji Achmad Siddiq Jember. This stadium is an open space with green grass and is located next to the Bedadung river. Samples were taken in two parts, namely the edge of the stadium and the middle of the stadium. Sampling was carried out in June 2022, using the field by field method at the specified location. The dragonflies obtained were identified for their morphological characteristics and counted using the Shannon-Wiener diversity index formula. The results of the research show a diversity index of 0,61 which means the level of dragonfly diversity at the

Imam Nahrawi stadium is relatively low. This shows that the stadium environment is less supportive for the productivity of dragonflies, most of the vegetation in the stadium is grass, while the vegetation on the edge of the stadium adjacent to the river is small in number and is made worse by the dirty condition of the river." (Authors)] Address: Khusnah, Laila, UIN Kiai Haji Achmad Siddiq, Jember, Indonesia. Email: lailakhusnah18@gmail.com

24053. Kim, H.; Lee, S. (2024): Distribution characterization of Odonata in protected wetland areas. Korean Journal of Applied Entomology 63(4): 413-423. (in Korean, with English summary) ["Odonata have been widely proposed as bioindicators of environmental quality in wetland ecosystems, and their distribution and abundance have been used as measures for wetland ecosystem evaluation and biodiversity. In this study, we analyzed the distribution status of Odonata according to wetland type in 25 wetland protection areas designated and managed by the Ministry of Environment (MOE). This was done to provide data on habitat conservation and changes in species distribution due to climate change. As a result, 10 families and 67 species were confirmed, Libellulidae was the most frequent family, with 24 species were observed among this family, Furthermore, 52 species were observed in riverine wetlands, 50 species in mountainous wetlands, 30 species in lacustrine wetlands, and 32 species in artificial wetlands. The distribution areas of two species belonging to the climate-sensitive biological indicator group (Ischnura senegalensis and Ceriagrion nipponicum) gradually expanded. Two species belonging to the endemic species group (Nihonogomphus minor and Asiagomphus melanopsoides) have a small population size, and it is necessary to devise a management method through continuous monitoring. Our results can be used as baseline data for the conservation and management of wetland ecosystem by surveying the ecological characteristics of dragonflies distributed in protected wetland area." (Authors)] Address: Kim, H., Wetlands Research Team, National Institute of Ecology, Changnyeong 50303, Korea. Email: sanghunlee@nie.re.kr

24054. Kittelmann, M.; McGregor, A.P. (2024): Looking across the gap: Understanding the evolution of eyes and vision among insects. BioEssays 2024;2300240: 14 pp. (in English) ["The compound eyes of insects exhibit stunning variation in size, structure, and function, which has allowed these animals to use their vision to adapt to a huge range of different environments and lifestyles, and evolve complex behaviors. Much of our knowledge of eye development has been learned from Drosophila, while visual adaptations and behaviors are often more striking and better understood from studies of other insects. However, recent studies in Drosophila and other insects, including bees, beetles, and butterflies, have begun to address this gap by revealing the genetic and developmental bases of differences in eye morphology and key new aspects of compound eye structure and function. Furthermore, technical advances have facilitated the generation of high-resolution connectomic data from different insect species that enhances our understanding of visual information processing, and the impact of changes in these processes on the evolution of vision and behavior. Here, we review these recent breakthroughs and propose that future integrated research from the development to function of visual systems within and among insect species represents a great opportunity to understand the remarkable diversification of insect eyes and vision." (Authors) The paper includes references to Odonata,] Address: Kittelmann, Maike, Dept of Biological & Medical Sciences, Oxford Brookes University, OxfordOX3 0BP, UK. Email: maike.kittelmann@brookes.ac.uk

24055. Kranthi, P.; Vedasree, A.; Sahu, T.; Yazhni, P.; Samuthirapandi, S. (2024): Insects on the menu: Evaluating entomophagy for future food security. International Journal of Innovative Science and Research Technology 9(12): 1350-1365. (in English) ["Entomophagy, the practice of eating insects as food, offers a sustainable alternative to conventional animal protein sources. Insects are potentially rich sources of nutrients like protein, vitamins, healthy fats, and minerals. Globally, insects are already a dietary staple in many cultures and offer a lower environmental footprint compared to traditional livestock, emitting lesser greenhouse gases and requiring less land. With the potential to address malnutrition and enhance food security, entomophagy is increasingly recognized as a viable solution to global food challenges. However, cultural and psychological barriers remain, and broader acceptance could facilitate its integration into mainstream diets." (Authors) The study includes several references to Odonata.] Address: Kranthi, P., Project Associate - I, Department of Entomology, ICAR-Indian Institute of Rice Research, Rajendranagar, Hyderabad, India

24056. Krasutsky, B.V.; Gashek, V.A.; Polyakov, V.E. (2024): The main results of monitoring of protected invertebrates of Chelyabinsk Oblast after publication of the second edition of the regional Red Data Book. Ecosystem Transformation 7(3): 13-63. (in English, with Russian summary) ["The new data on the distribution and bioecological features of 42 species included in the regional Red Data Book have been obtained. These are 37 species of insects, three species of arachnids and two species of gastropods. For 17 species, the data on their distribution in the region turned out to be fundamentally new. Seven studied species are represented in the Red Data Book of the Russian Federation and 36 species in the Red Data Books of other subjects of the Russian Federation. The driving factors of negative impact on the populations of many species are the following: a) intensive, sometimes continuous logging and forest fires, b) large-scale and intensive use of pesticides by farmlands and on the adjacent territories, c) significant recreational load on typical habitats of rare species, d) death of many invertebrates on dirt roads caused by motor vehicles of tenants, hunters, producers of biological products, etc. e) unregulated grazing of livestock, running of horses' herds, organization of new farmlands and their further active exploitation, as well as fires in the steppe zone. … In our opinion, Anax parthenope, … deserve to be listed in the third edition of the Red Data Book of Chelyabinsk Oblast in category III or IV." (Authors) Records of Anax imperator, Ophiogomphus cecilia and Leucorrhinia caudalis are presented and mapped in detail.] Address: Krasutsky, B.V., Botanical Garden of the Ural Branch Russian Acad. Sciences, ul. 8 Marta 202a, Ekaterinburg, Sverdlovsk Oblast, 620130 Russia. Email: boris_k.63@mail.ru

24057. Krishnanunni, T.A.; Neha, N.; Arya, R.; Nameer, P.O. (2024): A preliminary study of odonate fauna in the high ranges of Munnar, southern Western Ghats, India. Journal of Threatened Taxa 16(12): 26240-26250. (in English, with Malayalam summary) ["A study was conducted at Munnar Forest Division Idukki District, Kerala, the southern Western Ghats, to assess the diversity of odonates. Around 44 species of odonates, which include 29 species of Anisoptera and 15 species of Zygoptera. The odonate diversity of Munnar Forest Division accounted for 24.72 % of the odonates in Kerala and 22.45 % of the odonates of the Western Ghats. The study highlights the importance of biodiversity documentation at high altitudes in the Western Ghats." (Authors)] Address: Krishnanunni, T.A., College of Forestry, Kerala Agricultural University, Thrissur, Kerala 680656, India.

24058. Lee, D.J.; Cannings, R.A. (2024): From tourist to resident: first breeding record of Pantala hymenaea (Odonata: Anisoptera: Libellulidae) in British Columbia. Journal of the Entomological Society of British Columbia 121, e2601: 7 pp. (in English) [South campus research pond facility at the University of British Columbia (UBC) (49.24745° N, 123.23277° W), August 2023] Address: Lee, D.J., Dept Zool., University of British Columbia, 6270 University Blvd, Vancouver, BC V6T 1Z4, Canada. Email: danlee@zoology.ubc.ca

24059. Lee, J.; Kim, S.-S.; Kim, N.-H. (2024): Comparison of insect assemblages in grassland and forest habitats. Korean J. Environ. Biol. 42(4): 468-482. (in Korean, with English summary) ["This study aimed to compare terrestrial insect communities in forests and grasslands to explore habitat-specific differences. Grassland and undisturbed forest zones in Buk-sil-ri, Jeongseon-eup, Gangwon-do were surveyed in August and September of 2022 and 2023 using visual inspection and light traps. A total of 1,369 individuals from 447 species, 56 families, and 13 orders were recorded. Lepidoptera was the most dominant (44.0%, with 239 species and 602 individuals) order, followed by Hemiptera (17.6%, 81 species and 241 individuals) and Odonata (11.4%, 13 species and 156 individuals). While most orders, including Lepidoptera, Hemiptera, and Diptera, showed higher abundance and richness in forests than in grasslands, the diversity index was greater in grasslands. The presence of diverse vegetation including invasive species in grasslands likely influenced insect diversity and composition. These findings can enhance our understanding of insect community dynamics across forest and grassland habitats." (Authors) the following odonate species are listed: Ischnura asiatica, Sympetrum depressiusculum, S. pedemontanum, S. risi, S. striolatum] Address: Lee, J., Ecological Information Team, Division of Ecol. Res. Strategy, National Inst. Ecoll., Seocheon 33657, Republic of Korea. E-mail. jinlee23@nie.re.kr

24060. Lee, S.-H.; Han, H.-W.; Yoon, C.-S.; Hong, S.-J.; Cheong, S.-W. (2024): Community characteristics and stability of benthic macroinvertebrates in Wondong wetland. Korean Journal of Environmental Science 33(12): 993-1008. (in Korea, with English summary) ["This study analyzed the ecological changes in the community structure of benthic macroinvertebrates in the Wondong Wetland, South Korea, to provide baseline data for its conservation and management. Between 2022 and 2023, four classes, six orders, 20 families, 43 genera, 75 species, and 2,404 individuals were identified, with insects, particularly Odonata, being predominant. Pollution-tolerant species, such as Cipangopaludina chinensis malleata and chironomids, were dominant. Environmental disturbances caused fluctuations in species and individual numbers, with notable increases in species from Diptera, Systellommatophora, and Isopoda in 2023. Although the species richness remained stable, the diversity index decreased from 3.307 in 2022 to 3.223 in 2023. Site 1 had low diversity and evenness owing to the dominance of pollution-tolerant species. Biological water quality assessments showed that the biological monitoring working party and average score per taxon were more sensitive and suitable for monitoring of Wondong Wetland. Functional feeding groups were mainly predators and gathering collectors, with changes in their proportions depending on habitat and pollution level. Notably, Site 1 had more gathering collector species, whereas Site 2 was rich in predatory species. The species composition of the habitual dwelling group was dominated by climbers, whereas the abundance composition was dominated by sprawlers. Changes in habitual dwelling groups were minimal during the study period, although the abundances of burrowers and skaters increased in 2023. The community loss index showed greater instability in 2023, especially during summer, with increased community loss in autumn compared to that in 2011. Relative resistance and resilience were higher at Site 1, indicating ecosystem stability, whereas Sites 2 and 3 exhibited high resistance but low resilience. This study highlights the Wondong Wetland's high conservation value and calls for its designation as a protected area with systematic management." (Authors)] Address: Cheong, S.-W., Dept Biol. & Chem., Changwon National Univ., Changwon 51140, Korea. E-mail: swcheong@changwon.ac.kr

24061. Leith, N.T.; Moore, M.P. (2024): Heat-absorbing sexual coloration co-adapts with increased heat tolerance in dragonflies. Frontiers in Ethology 3:1447637: 8 pp. (in English) ["Producing and maintaining sexually selected ornaments often hinders survival. Because viability-related traits dictate the survival costs conferred by sexual ornaments, the evolution of viability-related traits can limit and/or compensate for ornament evolution. Here, we examine how the ornamental coloration of male dragonflies co-adapts with thermal physiology-a key suite of viability-related traits that influences nearly all reproductive and ecological interactions. Males of many dragonfly species produce dark color patches on their wings to attract potential mates and intimidate reproductive rivals. However, dark coloration also subjects male dragonflies to heat stress in warm climates by absorbing excess solar radiation. Our phylogenetic comparative analyses revealed that dragonfly species with dark sexual coloration have also evolved increased critical thermal maxima, which may allow them to compensate for ornament-induced heating. This pattern of correlated evolution was especially strong for species that inhabit tropical climates, where the heating costs of dark coloration are most severe. Given that darkened sexual coloration is taxonomically widespread and consistently elevates body temperatures, the pattern of co-adaptation between sexual ornaments and thermal physiology found here could represent a key process driving eco-physiological divergence in the past and influencing how populations respond to the changing climates of the future." (Authors) Studies species: Pachydiplax longipennis, Micrathyria aequalis, M. ocellata, Tramea cophysa, T. carolina, T. binotata, Miathyria marcella, Erythemis plebeja, E. simplicicollis, Erythrodiplax funerea, Pseudoleon superbus, Orthemis ferruginea, Tauriphila argo, Macrothemis pseudimitans, Dythemis nigrescens, Macromia taeniolata, Gynacantha nervosa, Anax junius, Epigomphus quadracies] Address: Leith, Noah, Saint Louis University, St. Louis, Missouri, USA. Email: leith.eco.evo@gmail.com;

24062. Lemke, M.; Dorda, H. (2024): Erstnachweis von Orthetrum albistylum im Saarland (Odonata: Libellulidae). Libellula 43(1/2): 117-126. (in German, with English summary) ["First record of Orthetrum albistylum in Saarland (Odonata: Libellulidae) – O. albistylum was recorded for the first time in Saarland (Germany). On several days, one male was observed in an almost nine years old complex of three artificial ponds in the middle of a pastured area. The circumstances of the discovery are reported and individual behaviours are discussed." (Authors)] Address: Lemke, M., Gymnasialstr. 30, 66557 Illingen, Germany. Email: malemke@gmx.de

24063. Lemke, M. (2024): Zur Entstehung des kongenialen Teams Angelika Borkenstein und Reinhard Jödicke – ein „Entwicklungshelfer“ erinnert sich*. Libellula Supplement 17: 7-10. (in German, with English summary) ["On the origin of the congenial team Angelika Borkenstein and Reinhard Jödicke – a personal recollection of how this relationship was put

forth – Together, as a congenial team, Angelika Borkenstein and Reinhard Jödicke for around ten years have been trying to explain the behaviour and ecology of Odonata with tremendous curiosity and high meticulousness, as well as using their photographic skills. While telling the story of their first odonatological contact, this article will present insights into how this friendship between A. Borkenstein and R. Jödicke became such a success." (Author)] Address: Lemke, M., Gymnasialstr. 30, 66557 Illingen, Germany. Email: malemke@gmx.de

24064. Lévêque, A.; Duputié, A.; Vignon, V.; Duez, F.; Godé, C.; Mazoyer, C.; Arnaud, J.-F. (2024): Levels and spatial patterns of effective population sizes in the Southern Damselfly (Coenagrion mercuriale): On the need to carefully interpret single-point and temporal estimations to set conservation guidelines. Evolutionary Applications 17(12), e70062: 16 pp. (in English) ["The effective population size (Ne) is a key parameter in conservation and evolutionary biology, reflecting the strength of genetic drift and inbreeding. Although demographic estimations of Ne are logistically and time-consuming, genetic methods have become more widely used due to increasing data availability. Nonetheless, accurately estimating Ne remains challenging, with few studies comparing Ne estimates across molecular markers types and estimators such as single-sample methods based on linkage disequilibrium or sibship analyses versus methods based on temporal variance in allele frequencies. This study aims at bridging this gap by analysing single-sample and temporally spaced populations in C. mercuriale, a bioindicator Odonata species of conservation concern found in southwestern Europe's freshwater stream networks. A total of 77 local populations were sampled from a semi-urbanised area located in eastern France near Strasbourg city, yielding 2842 individuals that were genotyped with microsatellites and 958 of which were also genotyped for 2092 SNPs. Spatial genetic structure was stable over time, suggesting porosity between alternate-year cohorts. When accounting for spatial genetic structure, single-sample and temporal estimations of Ne were consistent for each set of molecular markers. Biologically meaningful results were obtained when the effect of migration was minimising by considering metapopulation Ne estimates based on the level of genetic differentiation and population boundaries. In terms of applied conservation and management, most depicted metapopulations displayed large Ne, indicating no immediate need for conservation measures to mitigate anthropogenic pressures, provided that a continuous suitable freshwater network is maintained. However, urbanisation negatively impacted Ne levels in populations close to Strasbourg city. Because Ne is used to inform conservation decisions, caution is crucial in interpreting Ne estimates, especially in continuously distributed populations undergoing migration. Altogether, our study highlights the challenge of obtaining robust Ne estimates and the necessity of careful interpretation to set relevant conservation guidelines." (Authors)] Address: Arnaud, J.-F., Univ. Lille, CNRS, UMR 8198 – Evo-Eco-Paleo, Lille 59000, France. Email: jean-francois.arnaud@univ-lille.fr

24065. Lieckweg, A.; Lüers, E.; Mau-Hansen, C.; Borchert, K.J.; Hesse, V. (2024): Erste Nachweise der Gabel-Azurjungfer (Coenagrion scitulum, Odonata: Coenagrionidae) in Niedersachsen. Drosera 41: 13-28. (in German, with English summary) ["First records of the Dainty Bluet (Coenagrion scitulum, Odonata: Coenagrionidae) in Lower Saxony. – In 2021, Coenagrion scitulum was independently discovered and documented in five districts of Lower Saxony. According to the current state of knowledge, the discovery of a tandem on 17/06/2021 represented the first record of the species for the federal state of Lower Saxony, the first discovery for the district of Oldenburg and currently the northernmost record worldwide. Four further Lower Saxon sites in the districts of Schaumburg, Diepholz, Gifhorn and Göttingen were identified by calls for reports of further finds. Indeed, they were first finds for these districts. Searching in 2022, the species was observed again at the two sites in the districts of Oldenburg and Göttingen, but not in the other three districts. The behaviour of many individuals observed at the sites was so specific that they helped to identify the species. Together with the circumstances of findings presented here, they can also provide clues for further new observations of this species in Lower Saxony. The migratory movements of C. scitulum via various distribution corridors to Lower Saxony and the question of whether this species has already been established in the federal state are discussed." (Authors)] Address: Lieckweg, Ariane, Artillerieweg 9, 26129 Oldenburg, Germany. Email: ariane.lieckweg@web.de

24066. Liu, P.; Nel, A.; Zhuo, D.; Zheng, D. (2024): A new burmagomphid dragonfly (Odonata, Anisoptera, Gomphides) from mid-Cretaceous Kachin amber. Palaeontographica Abteilung A 329(1-2): 1-8. (in English) ["Amber provides a favourable environment for fossil preservation, especially for those delicate insects such as dragonflies. In the present study, a complete hind wing of a burmagomphid dragonfly, Kachingomphides yujiai gen. et sp. nov., was described from mid-Cretaceous Kachin amber. Within Burmagomphidae Zheng, Nel & Wang, 2018, Kachingomphides gen. nov. is distinguished from the remaining two genera in having a larger size, three secondary antenodal crossveins between Ax1 and Ax2, five secondary antenodal crossveins after Ax2, pterostigma covering two cells, vein CuAa with four posterior branches, and six rows of cells between CuAa and posterior wing margin." (Authors)] Address: Zheng, D., State Key Laboratory of Palaeobiology and Stratigraphy, Nanjing Institute of Geology and Palaeontology and Center for Excellence in Life and Paleoenvironment, Chinese Academy of Sciences, 39 East Beijing Road, Nanjing, 210008, China. Email: drzheng@nigpas.ac.cn

24067. Löffler, E. & Jentzsch, M. (2024): Erfassung der Libellenfauna an ausgewählten Moorstandorten in der Dresdner Heide mit besonderer Berücksichtigung von Somatochlora arctica (Zetterstedt, 1840) (Odonata). Mitteilungen Sächsischer Entomologen 43(150): 183-198. (in German, with English summary) ["There are several valuable moor sites in the Dresdner Heide. In 2021, the dragonfly fauna was recorded in four of these areas and the species composition was discussed in connection with the characteristics of the moor sites and their possible threats. The studies are based on the observation of the imagines and the collection of exuviae. By means of the formation of abundance classes and the observed behaviour of the species, the probability of their reproduction in the area was assessed. A total of 20 species was recorded, including Somatochlora arctica at the Gutebornbach spring bog. Nevertheless, all sites have a minimum of necessary habitat structures. However, for the continued existence of S. arctica in the Dresdner Heide and due to the partially degraded character of the moors, it is recommended that renaturation measures be considered S. arctica can be used as a model species for appropriate landscape Conservation measures. This should take place in conjunction with long-term studies of the dragonfly fauna." (Authors)] Address: Jentzsch, M., Hochschule für Technik und Wirtschaft Dresden, Fakultät Landbau/Umwelt/Chemie, Pillnitzer Platz 1, 01326 Dresden, Germany. Email: matthias.jentzsch.2@htw-dresden.de

24068. López-Díaz, J.A.; Novelo-Gutiérrez, R.; Schmitter-Soto, J.J.; Gómez, B. (2024): Odonatofauna (Insecta) del volcán Tacaná, Chiapas, México: lista de especies y distintividad taxonómica - Odonatofauna (Insecta) of the Tacaná volcano, Chiapas, Mexico: list of species and taxonomic distinctness. Revista Chilena de Entomología 50(4): 759-774. (in Spanish, with English summary) ["The fauna of adult Odonata distributed in six streams of the Tacaná Volcano Biosphere Reserve was recorded during the rainy and dry seasons between the years 2023 and 2024. A total of 25 species were documented, belonging to 11 genera and seven families. With this study, the number of species recorded in the Soconusco region in the state of Chiapas increases to 88 species. In addition, the average taxonomic distinctness (Δ+) of the Odonata assemblages and their variance (λ+), were analyzed. The relationship of both metrics respect to the elevation and physical integrity of the streams was evaluated, finding no relationship between these and the elevation, however, λ+ was negatively associated with the physical integrity of the water bodies. Therefore, greater stability occurs in the taxonomic structure of the odonate assemblages in more conserved streams, especially due to the integrity of the ribereñan vegetation." (Authors)] Address: López-Díaz, J.A., Conservación de la Biodiversidad, El Colegio de la Frontera Sur (ECOSUR), San Cristóbal de Las Casas, Chiapas, México. Email: juan.lopez@posgrado.ecosur.mx

24069. Low, K. (2024): Dragonfly prey in the diet of the Yellow Bittern. Malaysian Bird Report 4/2024: 60-61. (in English) ["On 24 XI 2024 I was observing a Yellow Bittern (Botaurus sinensis) at a wetlands site in Singapore. It spotted a dragonfly in the air, lunged out to catch it and fed on it. The ability to fully extend its long neck, rapidly, aids in the capture of the dragonfly in the air." (Author)] Address: unkown

24070. Lozano, F.; Ramos, L.; Del Palacio, A.; Muzón, J. (2024): 09 Odonata. Editorial: Guía de biodiversidad: Corredor biológico Avellaneda-Quilmes. Coordinación Ecológica Área Metropolitana Sociedad del Estado. ISBN: 978-631-90518-0-3: 155-170. (in Spanish) ["The Avellaneda and Quilmes Coastal Corridor has 41 species of dragonflies, which represents 53% of those registered for the Province of Buenos Aires [Argentina]. The great diversity of this area is mainly due to the fact that it is located between two ecoregions: Delta and the Paraná and Pampa Islands. Below, their morphology, life cycle, the ecological conditions necessary for their development and their classification for the study area are detailed. Also, the strategies to observe them, since to differentiate some species a short-range binocular is enough, while others require laboratory strategies." (Authors/Google translate)] Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina. E-mail: muzon@ilpla.edu.ar

24071. Magsalay, D.D.; Nuñeza, O.M.; Villanueva, RJ.T. (2024): Species diversity and distribution of Odonata in Brgy. Rogongon, Iligan City, Philippines. Biodoversitas 25(12): 4909-4919. (in English) ["Odonata is an insect order often utilized as a bioindicator to help determine the health of an ecosystem. The Philippine Odonata is recognized to have high diversity and endemicity, especially the suborder Zygoptera, since its limited range and its habitat distribution are low. This study was conducted to provide baseline information on the species diversity and distribution of Odonata in Brgy. Rogongon, Iligan City, Philippines. The research employed an 'opportunistic method', a strategy that involves collecting data based on the availability of the species, using sweep nets as a collection tool. Therefore, 35 species belonging to 10 families under 25 genera were found. Results showed that the most abundant family is Libellulidae (S = 9), followed by the family Platycnemididae (S = 8). All the study sites showed moderate diversity (H' = 1.73 - 2.75). On the other hand, one endangered, three vulnerable, and two near-threatened Odonata species were recorded in this study. Moreover, the distribution trend of Odonata species along an elevational gradient in the study areas is that species richness and endemism increase until Site 2 (730 to 787 m asl.) and then decreases as the elevation increases. Factors such as habitat structure and level of disturbances could be the reason for such a trend. Environmental factors such as air temperature, relative humidity, water temperature, water pH, and streamflow affect the distribution and abundance of the Odonata based on the canonical correspondence analysis. Any alteration in the habitat in each study site would be a threat to the population of Odonata. Thus, there is a need to protect the remaining forest of Iligan City, especially since endangered and vulnerable species are present. ... In terms of distribution status, 20 (57%) are Philippine endemics, namely: Ceriagrion lieftincki Asahina, 1967, Cyrano angustior Hämäläinen, 1989, Coeliccia exoleta Lieftinck, 1961, Devadatta basilanensis Laidlaw, 1934, Diplacina bolivari Selys, 1882, D. braueri Selys, 1882, Drepanosticta lestoides (Brauer, 1868), Igneocnemis fuligifrons (Hämäläinen, 1991), Rhinocypha turconii Selys, 1891, Risiocnemis appendiculata (Brauer, 1868), R. atripes, R. flammea, R. moroensis Hämäläinen, 1991, Teinobasis samaritis Ris, 1915, Vestalis melania Selys, 1873, Heteronaias heterodoxa (Selys, 1878), Idionyx philippa Ris, 1912, Heliogomphus bakeri Laidlaw, 1925, and two are Mindanao island endemic, namely Drepanosticta aries Needham & Gyger, 1941 and Igneocnemis tendipes (Needham & Gyger, 1941). Based on IUCN 2020, three vulnerable species, two near-threatened species, and one endangered species were observed in this study. The vulnerable species are C. exoleta, D. aries, and D. lestoides, which were observed in Sites 2, 3, and 4. Near-threatened species were observed in all four established sites whereas the endangered species, R. moroensis was recorded in Site 4 only." (Authors)] Address: Magsalay, D.D., College of Mathematics and Natural Sciences, Northwestern Mindanao State College of Science & Technology. Labuyo 7214, Tangub City, Philippines. Email: denmar.magsalay@nmsc.edu.ph

24072. Mahmoudi, K.; Bendali-Saoudi, F.; Soltani, N. (2024): Spatial and temporal patterns of the macroinvertebrate community in Tonga Lake (Algeria) in relation to water quality. Brazilian Journal of Animal and Environmental Research 7(4): 1-29. ["The current study aimed to investigate the macroinvertebrate community and its relationship with environmental parameters in a protected lake, Tonga Lake (Northeast Algeria). Macroinvertebrate sampling was carried out at three sites at Tonga Lake over one year (March 2017 to February 2018). This lake located in the El Kala National Park, has been a Ramsar classified area since 1983. A total of 42,849 individuals of macroinvertebrates were collected. The thirty species (30) identified belong to 20 families: … [Odonata: Crocothemis erythraea, Anax imperator, and Lestes virens (sic)]. The highest diversity was recorded during the summer. Seven physicochemical parameters were measured at each site: pH, dissolved oxygen, temperature, nitrite, nitrate, ammonium, and orthophosphate. The analysis verified by the Kruskal Wallis test between the means of inter-site and inter-season comparisons shows that the change in physicochemical parameters was only significant for the temperature between seasons. The rest of the water parameters measured revealed non-significant variations.

Overall, the kinetic abundance of the different families and the distribution of species change according to the season and the site." (Authors)] Address: Mahmoudi, Khaoula, Faculty of Exact Sciences and Natural and Life Sciences, Department of Natural and Life Sciences, Tebessa. Algeria. E-mail: mahmoudikhaoula88@yahoo.com

24073. Martens, A.; Suhling, F. (2024): Nachweis einer zweiten Jahresgeneration von Sympetrum striolatum in Mitteleuropa durch Emergenz an Springbrunnen (Odonata: Libellulidae). Libellula Supplement 17: 81-86. (in German, with English summary) ["Confirmation of a second annual generation of Sympetrum striolatum in Central Europe by records from waterspout fountains – In mid-October 2018, the emergence of S. striolatum was detected in two fountains of Bruchsal Palace, Baden-Württemberg, Germany. As overwintering of eggs or young larvae in these fountains, which were dry between November and April, was unlikely, we assume that the individuals originated from egg depositions from 2018 and thus needed less than one year to develop. These findings support the assumption of Jödicke & Thomas (1993) that S. striolatum can develop to imago in the course of one summer in Central Europe north of the Alps. Due to the long flight period, the species could thus have the potential for a second annual generation. We discuss the possibility that besides high temperatures, other environmental conditions such as the absence of competition/predation by other odonate larvae and a good food supply would be required to enable a second annual generation." (Authors)] Address: Martens, A., Institut für Biologie, Pädagogische Hochschule Karlsruhe, Bismarckstraße 10, 76133 Karlsruhe, Germany. Email: martens@ph-karlsruhe.de

24074. Martins, R.T.; Firmino, V.C.; Hamada, N. (2024): Amazonian aquatic insects in a changing landscape. In: de Souza, S.S., Braz-Mota, S., Val, A.L. (eds) The Future of Amazonian Aquatic Biota. Springer, Cham. 586 pp. https://-doi.org/10.1007/978-3-031-66822-75: 111-136. (in English) ["Multiple local anthropogenic pressures and climate changes threaten the biodiversity of aquatic insects in the Amazon. In this chapter, we review the impacts of various land use practices (e.g., urbanization, pasture, agriculture, mining, and dams) and climate change on aquatic insect assemblages in the Amazon region. We explore how these factors might influence the composition, richness, abundance, diversity, and ecosystem processes (e.g., leaf decomposition) of these insect communities. Finally, we outline future perspectives for studies of insects and aquatic environments in the Amazon." (Authors) https://www.researchgate.net/publication/387510494_Amazonian_Aquatic_Insects_in_a_Changing_Landscape] Address: Martins, R.T., Biodiversity Coordination, Brazilian Nati. Inst. for Amazonian Res. (INPA), Manaus, AM, Brazil. E-mail: renato.martins@inpa.gov.br

24075. Mathers, K.L.; Robinson, C.T.; Hill, M.; Kowarik, C.; Heino, J.; Deacon, C.; Weber, C. (2024): How effective are ecological metrics in supporting conservation and management in degraded streams? Biodiversity and Conservation 33: 3981-4002. (in English) ["Biodiversity loss is increasing worldwide, necessitating effective approaches to counteract negative trends. Here, we assessed aquatic macroinvertebrate biodiversity in two river catchments in Switzerland; one significantly degraded and associated with urbanisation and in-stream barriers, and one in a near-natural condition. Contrary to our expectations, environmental heterogeneity was lower in the near-natural stream, with enhanced productivity in the degraded system resulting in a greater range of environmental conditions. At face value, commonly employed alpha, beta and gamma biodiversity metrics suggested both catchments constituted healthy systems, with greater richness or comparable values recorded in the degraded system relative to the near-natural one. Further, functional metrics considered to be early indicators for anthropogenic disturbance, demonstrated no anticipated differences between degraded and near-natural catchments. However, investigating the identity of the taxa unique to each river system showed that anthropogenic degradation led to replacement of specialist, sensitive species indicative of pristine rivers, by generalist, pollution tolerant species. These replacements reflect a major alteration in community composition in the degraded system compared with the near-natural system. Total nitrogen and fine sediment were important in distinguishing the respective communities. We urge caution in biodiversity studies that employ numerical biodiversity metrics alone. Assessing just one aspect of diversity, such as richness, is not sufficient to track biodiversity changes associated with environmental stress. We advocate that biodiversity monitoring for conservation and management purposes must go beyond traditional richness biodiversity metrics, to include indices that incorporate detailed nuances of biotic communities that relates to taxon identity." (Authors) Odonate taxa are treated at genus level." (Authors) Unique to Glatt: Onychogomphus sp.] Address: Mathers, Kate, Dept of Surface Waters Research & Management, Eawag (Swiss Federal Inst. of Aquatic Science & Technology), 6047, Kastanienbaum, Switzerland

24076. Mazza, G.; Turillazzi, F.; Ancillotto, L.; Viviano, A.; Di Lorenzo, T.; Mori, E. (2024; 2025): Beaver dams in Mediterranean ecosystems: trait-specific effects on macroinvertebrates. Journal of Zoology 324(4): 353-362. (in English) ["After centuries of extinction due to human persecution, Eurasian beavers Castor fiber L. have been released to Southern Europe in the last decades. Being ecosystem engineers, beavers have attracted great attention regarding restoration of aquatic and terrestrial ecosystems. Nonetheless, the effects of the species on aquatic invertebrates known to date are not univocal and mostly refer to central European riverine systems. Here, we evaluated the effects of beaver presence on aquatic macroinvertebrates for the first time in a Mediterranean riverine ecosystem, by applying a sound control-impact sampling design and controlling for seasonal variation in macroinvertebrate assemblage composition. A significant variation in response to season was evident for macroinvertebrate communities, revealing distinct assemblages during spring and summer. Furthermore, the presence of beavers was also identified as a significant driver of species composition, as samples near the beaver dam showed significant variation from control sites. Macroinvertebrate [including "Odonata"] community traits changed according to the relative position to the beaver dam, as control sites featured on average higher abundances of taxa with higher values of bioindication score, larger size, lower adaptation to drag, and were less frequently of introduced origins. Yet, these differences were strongly taxon- and season-specific in their intensity and direction. Differences across sites were mainly driven by the relative abundances of few taxa—including both alien species and high environmental quality indicators—such as those from genera Potamopyrgus, Baetis, Habrophlebia, Ephemerella, Leuctra, and Radix, which explained about 70% of the observed divergence among conditions. Our results indicate that beavers and their engineering activity may induce highly variable species-specific responses in macroinvertebrates, thus possibly representing a driver of environmental heterogeneity along Mediterranean rivers, and that both bioindicators and alien species may exploit such heterogeneity." (Authors) Three taxa of

Odonata were collected, but not detailed.] Address: Ancillotto, L., CNR IRET, Via Madonna del Piano 10, 50019, Sesto Fiorentino, Firenze, Italy. Email: leonardo.ancillotto@cnr.it

24077. McPeek, M; Resetarits, W.; Holt, R.D. (2024): The evolution of passive dispersal versus habitat selection have differing emergent consequences in metacommunities. Philosophical transactions of the Royal Society B 379(1907): 17 pp. (in English) ["Dispersal among local communities is fundamental to the metacommunity concept but is only important to the metacommunity structure if dispersal causes distortions of species abundances away from what local ecological conditions favour. We know from much previous work that dispersal can cause such abundance distortions. However, almost all previous theoretical studies have only considered one species alone or two interacting species (e.g. competitors or predator and prey). Moreover, a systematic analysis is needed of whether different dispersal strategies (e.g. passive dispersal versus demographic habitat selection) result in different abundance distortion patterns, how these distortion patterns change with local food web structure, and how the dispersal propensities of the interacting species might evolve in response to one another. In this article, we show using computer simulations and analytical models that abundance distortions occur in simple food webs with both passive dispersal and habitat selection, but habitat selection causes larger distortions. Additionally, patterns in the evolution of dispersal propensity in interacting species are very different for these two dispersal strategies. This study identifies that the dispersal strategies employed by interacting species critically shape how dispersal will influence metacommunity structure." (Authors)] Address: McPeek, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

24078. Meleshko, Zh.E.; Marchenko, I.I. (2024): To the species composition of Odonata in Bobruisk District. Ecological culture and environmental protection: IV Dorofeev readings: materials of the international scientific and practical conference, Vitebsk, November 29, 2024. - Vitebsk: VSU named after P. M. Masherov: 69-70. (in Russian) [Belarus; "Currently, 13 species of dragonflies are listed for the territory of Bobruisk district, among which two protected species are indicated: Aeshna viridis and Anax imperator [1]. Transformation of natural ecosystems and pollution of watercourses undoubtedly leads to the depletion of species composition. In this regard, the aim of this study was to further investigate the species composition of dragonflies in the Bobruisk district. Material and methods. The material was collected from July to August 2023 using an entomological net in two stations. On the territory of the city of Bobruisk, a reservoir that had not previously been studied by the above-mentioned authors was chosen on the territory of the Shinnik sanatorium (station 1), which is a small lake surrounded by a forest. The second station is Lake Tarasovo in the vicinity of the village of Dubovka. During the research, 16 species of dragonflies belonging to 6 families were found: Calopterygidae - 1 species; Coenagrionidae - 4 species; Lestidae - 3 species; Platycnemididae - 1 species; Aeshnidae - 2 species; Libellulidae - 5 species. Results and discussion. Only 5 species were found at the first station, namely: Lestes virens; Ischnura elegans; Libellula depressa; Sympetrum sanguineum and Aeshna viridis. 70 At the second station, 12 species of dragonflies were collected: Calopteryx virgo; Coenagrion johanssoni; C. pulchellum; Enallagma cyathigerum; Ischnura elegans; Chalcolestes viridis; Sympecma paedisca; Platycnemis pennipes; Anax imperator; Libellula quadrimaculata; Orthetrum coerulescens; Sympetrum flaveolum. Only one species, Ischnura elegans, was found to be common to the two permanent establishments. According to seasonal activity, most species belong to the summer group; L. quadrimaculata belongs to the spring-summer group, and A. viridis and S. sanguineum belong to the summer-autumn group [2]. Rare and protected species for this territory include A. viridis, A. imperator, and S. paedisca." (Authors)] Address: Zh.E. Meleshko, I.I. Marchenko Belarusian State University, Minsk, Republic of Belarus, meleshje@bsu.by

24079. Negi, P.; Singh, D. (2024): Benthic macroinvertebrates diversity and quality of water in first-order streams of Badiyar Gad, lesser Himalaya, Uttarakhand, India. International Journal of Environmental Studies 81(3): 1354-1369. (in English) ["First-order streams serve as a nursery of macroinvertebrates which act as secondary producers in the aquatic food chain and indicators of water quality. The present investigation conducted on three first-order streams of Badiyar Gad revealed Trichoptera to be the most diverse order followed by Ephemeroptera, Diptera, Coleoptera, Odonata [Euphaea, Gomphus], Lepidoptera, Plecoptera, Hemiptera, Arhynchobdellida, and Decapoda, indicating good water quality for these streams. High density, diversity, and even distribution of benthic macroinvertebrates during the winter season indicated stable ecosystems and healthy water quality. The presence of 35 families and 52 genera indicates a good habitat with numerous ecological niches for the macroinvertebrates. Two genera Maruina and Neophylax were identified as unique in these streams. They have not been previously reported from the Garhwal Himalayan streams." (Author)] Address: Singh, D., Freshwater Biodiversity Laboratory, Dept of Zoology, H.N.B. Garhwal University, Srinagar (Garhwal), India. bhandaridrdeepak5@gmail.com

24080. Nel, A.; Xu, M.; Wang, Y.; Song, X.; Gao, J.; Ji, G.; Huang, D. (2024): New Chinese Jurassic damsel-dragonflies of the families Paragonophlebiidae, Selenothemistidae and Isophlebiidae (Odonata, Epiproctophora) from the Jurassic Ordos Basin of NW China. Geobios 87: 37-44. (in English) ["The Jurassic damsel-dragonfly family Paragonophlebiidae was till now monogeneric, with the sole genus Paragonophlebia and the two species P. inexpectata and P. patriciae, from the Middle Jurassic of Central Asia. Here we describe the new genus and species Sinagonophlebia yananensis Nel and Huang, from the Middle Jurassic of China, and we attribute the late Triassic and early Jurassic Diastatommites liassina (Strickland, 1840) from UK to the same family. We restore it in the genus Diastatommites Tillyard, 1925. We also describe the selenothemistid Yananthemis zaoyuanensis Nel and Huang, nov. gen., nov. sp., plus an isophlebiid gen. et sp. indet. from the same outcrop. These three damsel-dragonflies increase our knowledge on the already impressive diversity of the Odonata from the Mesozoic of China." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@mnhn.fr

24081. Nel, A.; Huang, D.-Y.; Lian, X.-N. (2024): Redescription of the 'libelluloid' Mesocordulia boreala (Odonata: Mesocorduliidae) from the Lower Cretaceous of China. Zootaxa 5562(1): 31-37. (in English) ["On the basis of a very well-preserved new specimen, we redescribe the Early Cretaceous genus and species Mesocordulia boreala, currently attributed to the Cretaceous subfamily Mesocorduliinae of Araripelibellulidae. We refine key characteristics of wing venation, which allow us to exclude this species from the Araripelibellulidae and elevate the Mesocorduliinae to the family rank as Mesocorduliidae. The relationships of this fossil

are clarified. As the genus name Mesocordulia is preoccupied, we propose a replacement name, Guocordulia." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@mnhn.fr

24082. Orlofske, J.M.; Wilson, B.R.; Tesar, D.E.; Tyrrell, C.D.; Headley, R. (2024): Fluvial habitat associations of riverine dragonflies (Odonata, Gomphidae) in the Huron Mountains (Michigan, USA). River Research and Applications 40(10): 2022-2034. (in English) ["The presence of sediment-burrowing clubtail dragonflies (Gomphidae) may be directly related to riverine geomorphic properties. Their synchronous emergence behavior, marked by persistent exuviae, allows for the examination of emerging adult-stage habitats. Here we explore how emerging adult and benthic larvae are related to hydrogeomorphic factors through regression modeling. Nine sites in two subwatersheds of the Huron Mountain region (Michigan, USA) were surveyed during two periods: May/June 2021 and August 2021. Temperature, pH, dissolved oxygen, conductivity, and discharge were measured concurrent with invertebrate surveys, and field samples of total suspended solids, nutrients, and substrate particle size distribution were also taken. In spring, 317 exuviae were collected, including 153 Gomphidae. In August, 45 larvae were collected including 22 Gomphidae. Spearman's rank correlations preceded robust regression analysis to aid variable selection. Although nonsignificant, Gomphidae exuviae were negatively correlated with conductivity, average water depth, and percent sand while non-Gomphidae exuviae were positively correlated with the same variables. The model selection found the top models for Gomphidae and non-Gomphidae exuviae abundance to relate to depth and conductivity, while the top model for Gomphidae larvae was with discharge. All single variable models (discharge, width, and percent sand) had similar AICc criterion values when examining their relationship with non-Gomphidae larval abundance. Our study demonstrates that larvae of several riverine dragonfly taxa in the Huron Mountains co-occur despite hydrogeomorphic variation, yet, at emergence, specific taxa may be responding to different stream properties. Understanding the habitat requirements of riverine dragonflies and how these potentially shift throughout development can support conservation efforts." (Authors) Boyeria vinosa, Hylogomphus adelphus, Phanogomphus spicatus, Ophiogomphus colubrinus, Cordulegaster maculata, Somatochlora williamsoni] Address: Orlofske, Jessica, Biological Sciences Department, University of Wisconsin-Parkside, Kenosha, WI, USA. Email: orlofske@uwp.edu

24083. Pantke, C. (2024): Libellen am Gründoblbach in Passau, dem Patenbach des Naturwissenschaftlichen Vereins Passau. Der Bayerische Wald 37: 6-11. (in German) [Near Passau, Bavaria, Germany; between 1989 and 2023, 23 odonate species were recorded, including Cordulegaster boltonii, Orthetrum brunneum and O. albistylum.] Address: Pantke, Christa, Forchheimerstr. 7, 94034 Passau, Germany

24084. Petzold, F.; Brauner, O; Knopf, G.; Müller, O. (2024): Untersuchungen zur Auswirkung der Umweltkatastrophe in der Oder im Hochsommer 2022 auf die Fließgewässer-Libellenzönose unter besonderer Berücksichtigung der Flussjungfern (Gomphidae). Libellula 43(1/2): 35-48. (in German, with English summary) ["Investigations on the impact of the environmental disaster in the river Oder in midsummer 2022 on the stream dragonfly community with special consideration of Gomphidae – In August 2022, an environmental catastrophe in the river Oder led to a mass die-off of fish, mussels, and aquatic snails. High electrolyte concentrations from wastewater of the Polish mining industry and low water levels brought about a bloom of the brackish water algae Prymnesium parvum. The toxins (prymnesins) produced by this alga under certain environmental conditions are considered to be the reason of the mass mortality of gill-breathing aquatic organisms. However, extensive studies of the dragonfly fauna on the river Oder in 2023 did not reveal any negative effects of the disaster on this species group. The findings of this analysis are presented and discussed in this paper." (Authors)] Address: Müller, O., Birkenweg 6d, 15306 Libbenichen, Germany. Email: mueller.ole@gmail.com

24085. Prastyanto, P.I.; Kalimantoro, T.T.; Sari, D.I.; Sidik, F.; Estim, A.; Sari, Y.A. (2024): Biodiversity monitoring of Odonata in Peramun Hill Natural Reserve, Belitung Island, Indonesia: Future conservation program. Journal of Hunan University 51(11): 134-144. (in English, with Chinese summary) ["This study provides a novel assessment by examining the biodiversity of Odonata [n=18] across multiple habitat types—ponds, streams, and grasslands—within the Peramun Hill Natural Reserve, Belitung Island, which has not been extensively explored in previous studies. Field surveys conducted in February 2024 recorded 279 individuals, predominantly from Libellulidae and Platycnemididae families. Pond habitats demonstrated the highest species richness and diversity, with a Shannon-Wiener diversity index (IT) of 2.48 and a low dominance index (D = 0.09), indicating a stable and diverse community. Grassland areas, although less species-rich, supported adaptable species such as Pantala flavescens, whereas stream habitats, characterized by higher evenness (J = 0.95), were preferred by species sensitive to water quality, such as Prodasineura collaris. Notably, Tetrathemis flavescens, classified as Near Threatened, suggests the potential of this species to serve as a bioindicator for future biodiversity monitoring. The unique focus of this study on habitat-specific matrices highlights the importance of habitat diversity in maintaining ecological stability and species richness. Conservation efforts should prioritize collaborative management, habitat restoration, and ongoing biodiversity assessments to safeguard Odonata populations and their ecosystems." (Authors)] Address: Sari, Yasmine Anggia, Dept of Environmental Engineering, Universitas Sumatera Utara, Medan, 20155, Indonesia. Email: yasmineanggiasari@usu.ac.id

24086. Prieto-Rodado, O.J.; Prieto-Rodado, N.S.; Prieto-Rodado, J.L.; Prieto-Rodado, A. (2024): Estructura ecológica de la communida de macroinvertebrados acuáticos associados a una querbrada de bosque sco tropical, affluente de 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 [Hetaerina, Argia, Epigomphus, Phyllogomphoides, Brechmorhoga, Dythemis, Libellula] 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)] Address: Prieto-Rodado, O.J., Grupo de Biotecnología y Medio Ambiente, Universidad INCCA de Colombia. Email: priet.scar@gmail.com

24087. Ramola, G.C.; Rawat, N.; Singh, R.; Sajwan, A.S.; Sahu, L.; Rawat, P. (2024): Insect as an ecological indicator: Review. International Journal of Environment and Climate Change 14(12): 260-279. (in English) [Verbatim: "3.9 Dragonflies: Dragonflies can effectively determine the health of wetlands. According to Gardon (2023), the presence of multiple dragonfly species in a wetland indicates high water quality, as dragonflies require clean water for larval development. They are regarded as the best ecological indicators in aquatic and riparian environments. They respond quickly and sensitively when heavy metals accumulate. Dragonflies are thought to be most vulnerable to habitat disruption, particularly in lakes and flooded drainage areas. Their presence in any water body demonstrates that it is free of synthetic pollution, and they are an excellent indication of the health of both terrestrial and aquatic ecosystems (Parikh et al., 2021).] Address: Gaurav Chand Ramola; G.C., DBS Global Univ., Selaqui, Dehradun, Uttarakhand, India. E-mail: gauravramola30-@gmail.com

24088. Rassato, J. (2024): Late season presence and oviposition of Sympetrum striolatum (Charpentier, 1840) in Carnia (Eastern Alps, North-east Italy). Atti del Museo Civico di Storia Naturale di Trieste 65: 119-123. (in English, with Italian summary) ["From 2018 to 2023, from mid-November onwards the hydrographic network and waterbodies were examined in a stretch of the Tagliamento Valley (370-400 m a.s.l., 46°24'30"N 12°53'00"E; Carnic Alps) to determine the presence and behavioral typology of the Odonata. Three species were recorded: Sympetrum striolatum, Chalcolestes viridis (until mid-November) and Aeshna cyanea (until the end of November). For the first species, an extension of the fight period until 3 December was recorded, with oviposition until 2 December and dispersal until the end of November. Individuals of Sympetrum striolatum were observed at temperatures between 3 and 4 °C (even after night frosts with temperature between -4 and -5 °C) and copulation and oviposition at temperatures between 6 and 7 °C. The observations also occurred after periods of inactivity of a few days due to abundant rain and wind. The change in phenology is put in relation to global warming." (Authors)] Address: Rassato, J., Via Udine 9 – 33028 Tolmezzo, Italy. E-mail: itassar@tiscali.it

24089. Reinhardt, K.; Otti, O. (2024): Marienkäferpuppe (Coccinella septempunctata) (Coleoptera: Coccinellidae) schlüpft von einer Libellenexuvie (Aeshna cyanea) (Odonata: Aeshnidae). Mitteilungen Sächsischer Entomologen 43 (Nr. 150): 75-77. (in German) ["On July 3, 2024, a further search by the second author revealed another exuvia of Aeshna cyanea, which must have been overlooked and which now also provided an indication of the residence time mentioned at the beginning as well as use by other animals: On July 5, 2024, a seven-spot ladybird C. septempunctata LINNAEUS, 1758 hatched from a ladybird pupa attached to the exuvia. The pupa was attached to the trapping mask (Figure 1). The ladybird larva had thus anchored itself between the trapping mask and the dragonfly's holding substrate, a reed leaf. The terrestrial beetle larva could only have pupated on the exuvia that was already on land. According to Srivastava & Okmar (2003), the duration of pupal development at a constant temperature of 20°C is about 4.5 days. The average daily temperatures in Dresden at the beginning of July were 15-18 °C, falling to 10-12 °C at night.... The pupa that hatched on July 5, 2024 could have been attached about six to seven days earlier, i.e. on June 27, 2024, if the temperatures were constant at around 15°C. If one assumes that the development took about two to four days longer due to the cooler night temperatures, this would indicate a pupation date between June 23 and 25, 2024 - the pupa would have been attached to the exuvia for about eight to eleven days until it hatched. This also corresponds to the statements by Klausnitzer et al. (2022), who assume a pupal period of 10-14 days in the field. At the same time, this shows that the dragonfly exuvia also adhered to the substrate for at least eight to eleven days. For Aeshna cyanea, there does not seem to be any evidence yet of the duration of exuviae in the habitat. This allows us to at least narrow this down to about 10 days, which also corresponds to the mean value of Mauersberger's (2022) study on the related Aeshna mixta. Whether Anax exuviae can generally remain on the substrate for significantly longer than Aeshna, and why, or whether this was a special case (Roland 2010) remains to be clarified. A ladybird, Harmonia axyridis (PALLAS, 1773), has already been mentioned as a secondary user of a (Libellula) exuvia (Jäckel & Koch 2015), but C. septempunctata has not yet been mentioned. The use of exuviae as a pupation site is also already known." (Authors/Google translate)] Address: Reinhardt, K., Angewandte Zoologie, Technische Universität Dresden, Zellescher Weg 20B, 01069 Dresden, Germany. Email: klaus.reinhardt-@tu-dresden.de

24090. Rodríguez Calvache, K.V.; Pinilla Gil, E.J.; Gil Padilla, L.N. (2024): Calidad ecológica y servicicios ecosistémicos en el rio Jordán-Chicamocha. Boletín de la Sociedad Zoológica del Uruguay 33 (2): e33.2.1: 13 pp. (in Spanish, with English summary) ["Ecological quality and ecosystem services in the Jordán-Chicamocha River [Colombia]. The Jordán-Chicamocha River, born in the Runta district south of Tunja, has undergone significant changes due to human development, which has led to eutrophication, loss of vegetation cover, and increased frequency of flooding. The ecological quality and ecosystem services (ES) were evaluated in three sections of the river through in situ sampling of physicochemical variables and analysis of benthic macroinvertebrates, identifying 13 families, with a predominance of Tubificidae and Glossiphoniidae. These findings are related to high levels of hardness, phosphates, nitrates and electrical conductivity, in addition to evidence of physical degradation in the river bed and riverbank. According to the Andean Biological Index (ABI), the ecological quality is classified as moderate, very poor, and poor. A total of 100 surveys indicated that, despite the provision of wildlife habitats and water availability, these benefits diminish with increased urbanization and lower ecological quality. Anthropogenic activities exert pressure on the ecosystem, altering the composition and distribution of the evaluated community and affecting the ecological quality, functions and services of the aquatic ecosystem." (Authors) The study includes data on "Aeshnidae and Libellulidae".] Address: Rodríguez Calvache, Karem Valentina, Unidad de Ecología en Sistemas Acuáticos-UDESA- Escuela de Biología - Facultad de Ciencias Básicas –Univ. Pedagógica y Tecnológica de Colombia-UPTC. Email: karem.roriguez@uptc.edu.co

24091. Roland, H.-J.; Benken, T.; Leipelt, K.-G.; Martens, A. (2024): Die parasitische Wassermilbe Arrenurus papillator an den Flügeln von Sympetrum fonscolombii (Acari; Odonata): eine aktuelle Übersicht. Libellula Supplement 17: 73-79. (in German, with English summary) ["The parasitic water mite Arrenurus papillator on the wings of Sympetrum fonscolombii (Acari; Odonata): a review with recent data – The red larvae of the water mite A. papillator are characteristic and easily visible feature on the wings of S. meridionale in central Europe. The attachment of water mites to odonate wings also occurs in other Sympetrum species, especially S. fonscolombii. The aim of this study is to analyse the relatively rare cases in S. fonscolombii recorded from the well-documented influx into Germany in 2015." (Authors)] Address: Roland, H.-J., Im Mühlahl 35, D-61203 Reichelsheim, Germany. Email: hjroland@gmx.de

24092. Roslin, E.E.; Sapaat, E. (2024): Digitizing Odonata specimens and enhancing data accessibility through the BIDARA database. Enhanced Knowledge in Sciences and Technology 4(2): 673-679. ["Natural history museum collections are an invaluable source of information on storing the remains biodiversity of the Earth from the past until present, particularly for providing detailed historical data and morphological reference specimens. The data and information are mostly store in physical form, and digitization of collections offers public access to the information of specimens and images data to discuss species ecological distribution and morphological for future actions on conservation efforts. many museum collections of Odonata around the world still lack comprehensive digitization, posing several challenges and limitations to researchers and educators. This study aims to set up baseline data of Odonata species in UTHM Natural History collection and to digitize Odonata specimens into Biodiversity Data Integration for Research Assets (BIDARA) database. This study also provides low-cost methods for digitization process, and images and information of digitized Odonata specimens from UTHM Natural History collection into BIDARA, a biodiversity database platform develops under efforts of Centre of Research for Sustainable Uses of Natural Resources (COR-SUNR). This research conducts several steps for digitization process, from pre-digitization, during digitization and exporting images to BIDARA database. This study also discusses future recommendations for effective ways to manage biodiversity data." (Authors)] Address: Sapaat, Arney, Centre of Research for Sustainable Uses of Natural Resources (CoR-SUNR) Universiti Tun Hussein Onn Malaysia (UTHM), Pagoh, Muar, 84600 Johor, Malaysia. Email: arney@uthm.edu.my

24093. Samrit, C.; Suresh, M.; Yogesh, B. (2024): Diversity and abundance of dragonflies (Anisoptera: Odonata) on rice in Bhandara district (M.S.), India. BIOINFOLET - A Quarterly Journal of Life Sciences 21(3): 335-339. (in English) [21 Anisoptera (no Zygoptera) are recorded between January and December 2021 on rice fields in Bhandara District, Maharashtra, India.] Address: Suresh, M., Dept of Zoology, N.P. Waghaye College of Arts and Science, Chopa, Mohadi, Maharashtra, India. Email: suresh.masram@gmail.com

24094. Schiel, F.-J. (2024): Das Verschwinden von Sympetrum flaveolum in der baden-württembergischen Oberrheinebene (Odonata: Libellulidae). Libellula Supplement 17: 17-24. (in German, with English summary) ["The disappearance of Sympetrum flaveolum in the Upper Rhine valley in the German federal state of Baden-Württemberg (Odonata: Libellulidae) – Until 2006, S. flaveolum was presumed to be a widespread and moderately common species in Baden-Württemberg including the Upper Rhine valley. From more than 200 sites where it was recorded in the past, only one to two sites now remain on the eastern edge of Baden-Württemberg on the base of the Swabian Alb. The analyses of the data of the NGO “Schutzgemeinschaft Libellen in Baden-Württemberg e.V.” since 1980 including several of the author’s data, lead to the following conclusions: Sympetrum flaveolum immigrated regularly in the past with subsequent regional colonisations of additional suitable water bodies. Pronounced clusters of records date from 1984–1989, 1994–1998 and 2002–2006. Probably, as a result of accelerating climate change with a loss of habitats in the source regions, the last documented influx dates back more than 20 years." (Author)] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenenweg 9, 77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

24095. Setyani, A.I.; Khairunnisa, N.; Suryani, S. (2024): Diversity of dragonflies (Odonata) in the insect museum and lake archipelago area at Taman Mini Indonesia Indah. Journal of Natural and Applied Sciences Pakistan 6(2): 1853-1863. (in English) ["Dragonflies are insects that are highly reliant on freshwater habitats. Nevertheless, a multitude of problems pose a threat to the dragonfly population in urban freshwater ecosystems. This study aims to determine the diversity of Odonata orders found in Taman Mini Indonesia Indah and the effect of environmental parameters on diversity for dragonfly ecosystem balance. This research was conducted in Taman Mini Indonesia Indah, Jakarta, Indonesia. Using purposive sampling to determine sampling stations based on the habitat inhabited by dragonflies. The observation location was divided into two large stations with each large station consisting of three sub stations. Data collection was carried out using direct capture or hunting techniques. Data was collected from March to May 2024. The results showed that there were 11 species from 3 families with a total of 137 individuals. The results of the Shannon-Wiener diversity index analysis showed that the highest dragonfly diversity value was found at station 1 with a value of H' = 1.68, and the location with the lowest value was station 2 with a value of H' = 0.82. At two different station locations and having different ecosystems, the dragonfly community structure formed is also different. The vegetation composition at each station is also one of the factors causing differences in dragonfly community structure." (Authors)] Address: Setyani, A.I., Dept of Biology Education, Faculty of Math & Science, State University of Jakarta, Indonesia. Email: setyanisa.intan@gmail.com

24096. Simonsen, T.J.; Archibald, S.B.; Ware, J.L.; Rasmussen, J.A. (2024): Case 3893 – Furagrion Petrulevicius et al., 2008 (Insecta, Odonata): proposed conservation of usage by designation of a neotype for its type species Phenacolestes jutlandicus Henriksen, 1922. The Bulletin of Zoological Nomenclature 81(1): 115-117. (in English) ["The purpose of this application, under Article 75.5 of the ICZN Code, is to conserve the usage of the generic name Furagrion Petrulevicius, Wappler, Wedmann, Rust & Nel, 2008 for a genus of fossil damselflies, by setting aside the existing holotype of Phenacolestes jutlandicus Henriksen, 1922 (now Furagrion jutlandicus) and designating a neotype. The existing holotype (MGUH 1819; in the Natural History Museum of Denmark, Copenhagen) is an incomplete fossil comprised of the distal two-thirds of the abdomen, the distal half of two wings and a small, unplaceable wing fragment. The diagnostic characters for determining genus-level affiliations of fossil Odonata are generally found in the venation of the basal third of the wings, and the genus Furagrion (type species P. jutlandicus)

was diagnosed based on a non-type wing (FUM-N-13856; in the Fur Museum, Nederby, Denmark) using characters in the basal part that are not visible in the holotype of P. jutlandicus. It is not possible to determine whether the holotype of P. jutlandicus is conspecific with the nominal species F. morsi Zessin, 2011, known only from the basal half of a wing, nor whether Furagrion is synonymous with the nominal genus Morsagrion Zessin, 2011 (type species M. ansorgei Zessin, 2011). Recent research has shown that the placement of Furagrion within a suborder and family cannot be established without examining characters of the head and eyes, which are missing in the holotype. We therefore propose that the holotype of P. jutlandicus be set aside and that a complete fossil with all four wings clearly preserved and a complete body including the head (specimen MM-10752 in Museum Mors, Nykøbing Mors, Denmark) be designated as neotype." (Authors)] Address: Simonsen, T.J., Natural History Museum Aarhus, Wilhelm Meyers Allé 10, DK-8000 Aarhus C, Denmark. Email: t.simonsen@nathist.dk

24097. Singh, H.; Walia, G.K. (2024): A review of the cytogenetically studied Odonata species of North India. Records of the Zoological Survey of India 124(3): 273-286. (in English) ["North India's diverse geography and climate make it the most biodiversity-rich region in the country. Various species (flora and fauna) have been studied cytogenetically to study genetic diversity and their evolutionary relationships. The present study aims to compile the cytogenetic data of Odonata species available in the region. A total of 90 cytogenetically studied Odonata species have been listed. The chromosome number varies from n=12 to n=14 in all the studied species. Sex determination is XX/X0 type except for Nychogomphus duaricus (Fraser, 1964) and Scalmogomphus schmidti (Fraser, 1937). m chromosomes are present in 84% of the studied species. Morphological variations in the different populations of species or chromosome markers have also been enlisted. This will provide a holistic view of the number of species studied in a particular state/UT in North India and evaluate the genetic variations/ adaptations in the geographically isolated Odonata. The review also identifies gaps in the existing literature and highlights the need for further research on the cytogenetics of species in North India." (Authors)] Address: Walia Gurinder Kaur, Dept of Zoology & Environmental Sciences, Punjabi University, Patiala – 147002, Punjab, India. Email: gurinderkaur_walia@yahoo.co.in

24098. Sufian, A.I.; Sahwee, Z. (2024): Development of UAV fuselaged using biomimetic concepts based on dragonfly wing pattern: Enhancing structural efficiency and lightweight design. Journal of Engineering and Technology 15(2): 16 pp. (in English) ["This research paper presents an invention that focuses on the application of biomimetic concepts based on the wing structure of dragonflies in the design and construction of UAV (Unmanned Aerial Vehicle) fuselages. The use of the structural and aerodynamic attributes exhibited by dragonfly wings structure into the design of UAV fuselage has the potential to enhance structural performance and yield a construction that is characterized by its low weight. This research encompasses a comprehensive analysis of the biological characteristics, structural composition, and aerodynamic properties of dragonfly wings. The effectiveness of the biomimetic-inspired UAV fuselage is determined through the utilization of SolidWorks and Ansys software. The results demonstrate the potential of incorporating biomimetic designs inspired by dragonfly wings into UAV technology, providing environmentally sustainable and lightweight alternatives for future aerial vehicles." (Authors)] Address: Sufian, A.I., Unmanned Aerial System Research Cluster, Univ. Kuala Lumpur Malaysian Institute of Aviation Technology, 43800, Dengkil, Malaysia. Email: fqhzzt@gmail.com

24099. Sun, C.; Xia, L.; Zhang, M.; He, Q.; Yu, N.; Xiang, H. (2024): The impacts of different seasons on macroinvertebrate community structure and functional diversity in the Jingui River, China. Global Ecology and Conservation 51, e02876: 13 pp. (in English) ["Species diversity and functional diversity indices reflect the variations of community structure and their responses to environmental stress. This study clarifies the biodiversity of macro invertebrates in the Jingui River of Shenzhen and their response to the aquatic environment across different seasons. Utilizing ten functional traits, we conducted a seasonal survey at ten sampling points to examine changes in macroinvertebrate species and functional diversity, along with their relationships with environmental variables in the JGR. The results of the study demonstrated that the species and functional diversity of macroinvertebrates were significantly affected by season. Redundancy analysis indicated that water velocity, hydrogen ion concentration, turbidity, water depth, and total nitrogen were the most important factors for macro invertebrate functional diversity. Moreover, structural equation modeling demonstrated that seasonal variations in total nitrogen, ammonia nitrogen, nitrate nitrogen, conductivity, water velocity, and hydrogen ion concentration directly or indirectly impacted the species diversity and functional diversity of macroinvertebrates. This study provides valuable information into the seasonal variation characteristics of macroinvertebrate communities, contributing to a more comprehensive understanding of biodiversity crucial for maintaining river ecosystem functioning and stability.... Significant seasonal variations were observed in the species number of Diptera ($p < 0.05$), Odonata ($p < 0.05$), Trichoptera ($p < 0.05$), Decapoda ($p < 0.05$), and Mesogastropoda ($p < 0.05$)." (Authors)] Address: Yang, H., School of Ecology and Environmental Science, Yunnan Key Laboratory for Plateau Mountain Ecology and Restoration of Degraded Environments, Yunnan University, Kunming 650091, China. Email: yanghaijun@ynu.edu.cn

24100. Swaby, E.J.; Coe, A.L.; Hutchinson, D.; Riva, L.; Nel, A. (2024): A new Liassophlebiidae (Odonata: Heterophlebioidea) from strata close to the Triassic-Jurassic boundary in Somerset, UK. Historial Biology 36(11): 2478-2484. (in English) ["Liassophlebiidae is an extinct family of damsel-dragonflies found in Upper Triassic and Lower Jurassic strata of Europe, Asia and Antarctica. Whilst Liassophlebiidae is well represented by Lower Jurassic fossils, their lowest occurrence in the Upper Triassic has hitherto only been suggested by three fragmentary specimens. These were originally ascribed to two species: Liassophlebia withersi and L. batheri, but the latter is now considered nomen dubium. Here we describe a fourth, better preserved specimen that is likely to be Rhaetian (Late Triassic) in age. The specimen, BRSMG Cg3101 a+b, was collected from Bowdens Quarry, Somerset, UK, from the lower part of the White Lias Formation. The specimen comprises an incomplete forewing attributed to Liassophlebia due to: the small number of antenodals, antesubnodals and crossveins between RP and MA based RP3/4 in the base of RP2 opposite the subnodus; a straight and elongate secondary longitudinal vein in the postdiscoidal area; numerous cells and secondary veins in radial and median areas. The specimen is likely to represent a new species and provides stronger evidence than the previous three specimens of the presence of Liassophlebiidae during the late Rhaetian. Its stratigraphical position suggests that Liassophlebiidae arose in the immediate aftermath of the Triassic-Jurassic

mass extinction." (Authors)] Address: Swaby, Emily, School of Environment, Earth and Ecosystem Sciences, The Open University, Walton Hall, Milton Keynes, UK. Email: emily.swaby@open.ac.uk

24101. Taufika, R.; Erawati, D.N.; Fisdiana, U.; Humaida, S.; Harlianingtyas, I. (2024): Assessment of insect population abundance and its effect on the production value of fresh fruit bunches of oil palm (Elaeis guineensis Jacq.). IOP Conf. Series: Earth and Environmental Science 1446 (2025) 012026: 7 pp. (in English) ["Over the last three years, Crude Palm Oil (CPO) production in Indonesia has fluctuated. One of the factors causing fluctuations in CPO production is resistance and resurgence, which causes an explosion in the population of secondary pests and a decrease in the population of pollinator insects and natural enemies. This study aimed to analyze the insect population based on the abundance level and insects' role in oil palm plantations. It also analyzed the estimated production of oil palm fresh fruit bundles based on fruit census based on age. The research was conducted in the 7-year-old oil palm collection garden of Politeknik Negeri Jember. Insect population data were collected for 90 consecutive days in all oil palm trees. Production estimation was carried out by census of fruits aged 0-1, 1-2, 2-3, 3-4, 4-5, and 5-6 months. Parameters observed were an abundance of each insect species and estimated and realized production. Data analysis used the Shannon-Wienner diversity index, production estimation equation, and production distribution. The results showed that insects caught in oil palm plantations were ten families, with a total of 614 individuals, with the family of Formicidae having the highest species abundance. Estimated oil palm production 2024 for 12 consecutive months is 266; 252.5; 234.1; 215.7; 169.8; 156.1; 133.1; 128,5; 105,6; 192,8; 252,5; 270,8 kg. This shows that insect populations affect the value of fresh fruit bunch production." (Authors) Among the 478 individuals counted are 25 "Odonata".] Address: Taufika, R., Dept of Agricultural Production, Politeknik Negeri Jember, Jl. Mastrip 164, Jember, East Java, Indonesia. Email: ramadhantaufika@polije.ac.id

24102. Theys, C.; Janssens, L.; Rosier, L.; Stoks, R. (2024): The hydroperiod gradient drives species sorting in pace-of-life strategies but not in stressor sensitivity in Lestes damselfly larvae. Science of The Total Environment 954, 176396: 11 pp. (in English) ["Highlights: • The hydroperiod gradient caused strong species sorting in the pace-of-life. • Vernal pond specialists had a faster pace-of-life than hydroperiod generalists. • Strong differences in pace-of-life strategy could not predict stressor sensitivity. • Decoupling of life-history and physiology causes this lack of predictive power. • Physiology is crucial to predict species differences in stressor sensitivity. Abstract: Many species sort along environmental gradients, whereby species traits are predicted to shift as integrated sets of life-history, behavioural and physiological traits thereby making up a fast-to-slow pace-of-life continuum. This has also been predicted to cause species differences in stressor sensitivity along such gradients with a faster pace-of-life causing a higher sensitivity. We tested for predictable differences in pace-of-life and in stressor sensitivity for a set of four Lestes damselfly species that separate along the hydroperiod gradient. We reared in a common-garden experiment, larvae of two vernal pond specialists, L. dryas and L. barbarus, and two hydroperiod generalists, L. sponsa and L. virens, and exposed them to transient food deprivation and pesticide exposure, and monitored a set of life-history, behavioural and physiological traits both in the larvae and in the adults. Consistent with the time constraints imposed by the shorter hydroperiod of their habitat, the vernal pond specialists showed a faster pace-of-life (faster growth and development, and higher activity levels) than the hydroperiod generalists. Yet, in contrast with theory, this was not associated with a higher metabolic rate and a lower energy budget, neither with a higher oxidative damage to lipids. Both food deprivation and pesticide exposure were experienced as stressors, and species showed compensatory responses to cope with the transient food deprivation, including compensatory growth and delayed development. Nevertheless, the sensitivity to these stressors could not be predicted based on the difference in pace-of-life strategy between the vernal pond specialists and the hydroperiod generalists because of a decoupling of life-history and physiological traits. Our study indicates that while pace-of-life strategies change largely predictably along the hydroperiod gradient, these are not reliable predictors of species sensitivity to stressors. This highlights the need to consider also physiological traits to arrive at a generalizable predictive framework of species sensitivity to global change." (Authors)] Address: Theys, Charlotte, Laboratory of Evolutionary Stress Ecology and Ecotoxicology, University of Leuven, Charles Deberiotstraat 32, B-3000 Leuven, Belgium. Email: theys.charlotte@kuleuven.be

24103. Tolman, E.R.; Beatty, C.D.; Kohli, M.K.; Abbott, J.; Bybee, S.M.; Frandsen, P.B.; Gosnell, J.S.; Guralnick, R.; Kalkman, V.J.; Newton, L.G.; Suvorov, A.; Ware, J.L. (2024): A molecular phylogeny of the Petaluridae (Odonata: Anisoptera): A 160-Million-Year-Old story of drift and extinction. Molecular Phylogenetics and Evolution 200, 108185: 13 pp. (in English) ["Highlights: • Petaluridae is a relict dragonfly family, comprised of only eleven species known for their exclusive use of fen and bog habitats, burrowing behavior as nymphs, remarkably large adult body sizes, and extended lifespans. • Utilizing a dataset of over 900 loci, we reconstructed a maximum likelihood phylogeny to understand the evolutionary history of Petaluridae. We further examined intrafamilial relationships at “difficult nodes” through gene tree likelihoods and quartet scores. • Through divergence time estimation analysis, we trace the origin of the Petaluridae back to the early Cretaceous. The family comprises a Gondwanan and a Laurasian clade, which separated approximately 160 million years ago. Species within Petaluridae exhibit a wide range of ages, from 6 to 120 million years. • Our biogeographical analysis suggest that continental drift, land bridge exposure, and the uplift of mountain ranges played important roles in the divergence of Petaluridae. Despite their strategy of habitat specialization, Petaluridae species have persisted for tens of millions of years, an exception to the notion that specialization leads to extinction over long time scales. Abstract: Petaluridae is a relict dragonfly family, having diverged from its sister family in the Jurassic, of eleven species that are notable among odonates for their exclusive use of fen and bog habitats, their burrowing behavior as nymphs, large body size as adults, and extended lifespans. To date, several nodes within this family remain unresolved, limiting the study of the evolution of this peculiar family. Using an anchored hybrid enrichment dataset of over 900 loci we reconstructed the species tree of Petaluridae. To estimate the temporal origin of the genera within this family, we used a set of well-vetted fossils and a relaxed molecular clock model in a divergence time estimation analysis. We estimate that Petaluridae originated in the early Cretaceous and confirm the existence of monophyletic Gondwanan and Laurasian clades within the family. Our relaxed molecular clock analysis estimated that these clades diverged from their MRCA approximately 160mya. Extant lineages within this family were identified to have persisted from 6 (Uropetala) to 120 million

years (Phenes). Our biogeographical analyses focusing on a set of key regions suggest that divergence within Petaluridae is largely correlated with continental drift, the exposure of land bridges, and the development of mountain ranges. Our results support the hypothesis that species within Petaluridae have persisted for tens of millions of years, with little fossil evidence to suggest widespread extinction in the family, despite optimal conditions for the fossilization of nymphs. Petaluridae appear to be a rare example of habitat specialists that have persisted for tens of millions of years." (Authors) Tanypteryx hageni T. pryeri T. thoreyi Phenes raptor Uropetala chiltoni U. carovei Petalura ingentissima P. hesperia P. litorea P. gigantea] Address: Tolman, E.R., American Museum of Natural History, Department of Invertebrate Zoology, New York, 10024, USA. Email: etolman@amnh.org

24104. Tran, M.K.; Phan, Q.T.; Dang, P.D. (2024): Dragonflies and damselflies (Insecta: Odonata) in Tram Chim National Park, Southern Vietnam: Updated species list and threats to their habitats. International Dragonfly Fund - Report 190: 1-20. (in English) ["Published regional records are reviewed and their validity is analyzed. In total, thirty-five species of Odonata are recorded from Tram Chim National Park, southern Vietnam. In addition, threats from human land-use activities as rice production and shrimp farming to Odonata and proposals for appropriate conservation solutions are discussed." (Authors)] Address: Tran, M.T., Faculty of Biology & Biotechnology, University of Sciences, Vietnam National University, 277 Nguyen Van Cu, 5 Ward, Ho Chi Minh City, Vietnam. Email: tmkhang2506@gmail.com

24105. Ul Hayat, A.; Ud Din, N.; Sana, K.; Farooq, M.T.; Khan, D.; Khan, A.S.; Perveen, K.; Zainab, A.; Khan, A.U. (2024): Exploring the fauna of dragonflies in District Dera islamil khan KPK, Pakistan. The Research of Medical Science Review 2(3): 1712-1718. (in English) ["Duration of this study is 9 months i.e. February 2021 to November 2021. A total of 915 specimens were collected from the sampling site, Paharpur, Daraban, Kulachi, Prova and main Dikhan city of the district Dikhan. The identified specimens belong to Libellulidae and Aeshnidae,8 genera and 14 species respectively. Family Libellulidae was the largest family consisting 13 species Palpopleura sexmaculata, Pantala flavescens, Orthetrum chrysis, O. cancellatum cancellatum, O. sabina, O. glaucum luzonicum, Bradinopyga geminata and Trithemis festiva. Family Aeshnidae comprising only one species Anax Immaculifrons it can be concluded that this region has a diverse dragonfly fauna. Similarly survey on large scale is recommended to fully evaluate the dragonfly fauna of District Dera Ismail khan kpk Pakistan." (Authors)] Address: Ul Hayat, A., Institute of Biological Sciences, Gomal Univ., D.I Khan, Pakistan. Email: aqeemulhayatkhan @gmail.com

24106. Vilenica, M.; Brigic, A.; Štih Koren, A.; Koren, T.; Sertic Peric, M.; Schmidt, B.; Bužan, T.; Gottstein, S. (2024): Odonata assemblages in urban semi-natural wetlands. Insects 2024, 15(3), 207; https://doi.org/10.3390/insects15030207: 18 pp. (in English) ["Simple Summary: Aquatic habitats in urban areas are often important for conservation of local biodiversity. Although Odonata are widely used as ecological indicators of freshwater habitat integrity and health, our understanding and knowledge of their ecological requirements in urban landscapes is not yet complete. Therefore, the taxonomic and functional diversity of Odonata assemblages was analyzed in a semi-natural wetland in the Croatian capital in the summers of 2020 and 2023. The two main habitat types, anthropogenically disturbed and natural oxbow lakes, mostly had comparable assemblage metrics. However, we found significant differences in relation to the time scale, where most metrics were lower in 2023, indicating the negative impact of extreme climate events (including droughts) that occurred in this region after 2020. As even some species of conservation concern were detected, our results indicate that semi-natural urban wetlands, especially natural oxbow lakes, have great potential to function as good habitats for Odonata. Abstract: As the human population in urban areas is continuously growing, urbanization is one of the greatest threats to biodiversity. To mitigate the negative effects, the inclusion of blue zones (aquatic habitats) in modern urban development practices is strongly recommended, as they could be beneficial for the local biodiversity conservation. Odonata are a flagship group and are widely used in freshwater conservation as ecological indicators of habitat integrity and health. However, our understanding of their ecological requirements in urban landscapes is not yet complete. Therefore, we analyzed the taxonomic and functional diversity of Odonata in a semi-natural wetland in the Croatian capital. This study was conducted in the summers of 2020 and 2023. Most taxonomic and functional assemblage metrics were comparable between the two main habitat types, anthropogenically disturbed and natural oxbow lakes. However, significant differences were found in relation to the time scale, where most metrics were lower in 2023, indicating the negative impact of extreme climate events (including droughts) that occurred in this region after 2020. With 19 species recorded, our results indicate that semi-natural urban wetlands, especially natural oxbow lakes, have great potential to function as good habitats for Odonata, where even some species of conservation concern were detected. When developing landscape management plans in urban areas, it is essential to consider the importance of habitat heterogeneity in terms of good structure of aquatic macrophytes (presence of submerged, emergent and floating vegetation), which would ensure the most suitable habitat conditions for local Odonata species." (Authors)] Address: Vilenica, Marina, Faculty of Teacher Education, University of Zagreb, Trg Matice Hrvatske 12, 44250 Petrinja, Croatia

24107. Walia, G.K.; Chahal, S.; Singh, H. (2024): Origin of the large X chromosomes and their behavior during meiosis in Nychogomphus duaricus and Scalmogomphus bistrigatus of family Gomphidae (Odonata: Anisoptera) from India. North-Western Journal of Zoology 20(2): 189-191. (in English) ["Cytogenetically, 80 species of the family Gomphidae have been studied worldwide (Chahal 2019, Kuznetsova & Golub 2020, Walia et al. 2021, Mola et al. 2022). Out of 85 Indian gomphid species, only 13 species have been described cytogenetically. Most data pertain to chromosome numbers, sex-determining mechanisms, and metrical data on chromosomes (Kuznetsova & Golub 2020). The most common sex-determining mechanism in gomphids is XX (?)/X0 (?) types, and the X chromosome is the largest element in the complement of the family Gomphidae (Kuznetsova & Golub 2020). Neo-XY sex-determining mechanism is reported only in six gomphid species: Gomphus graslinii, Onychogomphus forcipatus, Nychogomphus duaricus, Progomphus intricatus, Scalmogomphus schmidti and Stylurus townesi. During the present study, N. duaricus and S. bistrigatus have been described cytogenetically, and the origin of large X chromosomes and their behavior during meiosis have been explained." (Authors)] Address: Walia, Gurinder, Dept of Zool. & Environmental Sciences, Punjabi Univ., Patiala-147002, Punjab, India. Email: gurinderkaur_walia@yahoo.co.in

24108. 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 on the occasion of his 75th birthday on July 1, 2023.] Address: Weihrauch, F., Jägerstr. 21A, 85283 Wolnzach, Germany. E-mail: Florian.Weihrauch@t-online.de

24109. Wildermuth, H.; Borkenstein, A.; Wildermuth, S. (2024): Libellen – Insekten der Ornithologen: Libellen und Vögel im Vergleich. Libellula Supplement 17: 25-58. (in German, with English summary) ["Dragonflies – insects of the ornithologists: dragonflies and birds compared – A noticeable number of ornithologists are increasingly interested also in dragonflies. We asked ourselves what the reason might be and therefore were searching for similarities between dragonflies and birds. Despite enormous differences in size, anatomy, physiology, behaviour, ecology, and evolution, for field naturalists there are quite a few apparent parallels. Foremost is their ability to fly and thus to have conquered the air space. Dragonfly wings as mobile structures of the exoskeleton made of chitin and bird wings with an endoskeleton of air-filled bones, steering muscles, and feathers, together with powerful flight muscles, good eyes, and efficient brain, enable equally different types of flight: gliding and soaring, flapping, whirring, flying backward, long-distance and swarm flight. Dragonflies can fly in tandem and mate mid-air, which among birds only swifts are able to. Wings are also used as social signals, for threatening and courtship. Both, dragonflies and birds may be differently coloured depending on species and sex. Striking colours and colour patterns occur, which are based on iridescent structures on the body surface on one hand and on pigments in the skin structures on the other. All colours from ultraviolet to red are reflected. Despite the different construction of the eyes, dragonflies and birds can discern all spectral colours including UV, in addition also linearly polarized light. Different coloration and colour patterns are used for species and gender recognition, and in some cases, they also play a role in the choice of the sexual partner. The main similarities and differences between dragonflies and birds are rooted in their phylogeny. Dragonflies are six-legged, four-winged arthropods whose ancestors appeared in the upper Carboniferous 325 million years ago. Since the Jurassic period (ca 150 mya), the Odonata have not changed significantly. Birds are feathered, two-winged vertebrates that are systematically attributed to the dinosaurs. Their ancestors were small predatory dinosaurs whose first representatives turned up in the Upper Triassic (228 mya). The “modern” birds appeared in the Early Cretaceous (135 mya). Since, they have developed an enormous diversity of forms and have adapted to a wide variety of habitats and lifestyles." (Authors)] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

24110. Yoon, S.; Kang, W. (2024): Bridging knowledge and data gaps in Odonata rarity: A South Korean case study using multispecies occupancy models and the Rabinowitz framework. Insects 2024, 15, 887: 17 pp. (in English) ["Simple Summary: Odonata, play an essential role in freshwater ecosystems. However, identifying their rarity and conservation status is often difficult due to gaps between available data and existing knowledge. In this study, we employed the Rabinowitz rarity classification framework, using outputs from multispecies occupancy models that predict the occurrence of Odonata species in South Korea. We compared the results of these models with established information, such as geographic range, habitat preference, conservation status, and citizen science records. Our findings reveal that species with high need for conservation measures were typically identified as rare or data-deficient. However, notable discrepancies emerged, particularly for species traditionally regarded as common, often inhabiting lentic habitats. This highlights the necessity of standardized survey methods and improved access to data on legally protected species for accurate rarity assessments. Our study emphasizes the importance of enhancing survey protocols and data-sharing practices to provide more reliable species rarity evaluations and support effective conservation strategies for freshwater ecosystems. Abstract: Accurate assessment of species rarity and conservation status requires an approach that integrates data-driven models with established ecological knowledge. In this study, we applied multispecies occupancy (MSO) and latent factor multispecies occupancy (LFMSO) models to estimate the occurrence of 133 Odonata species in South Korea. Using the model outputs, we implemented the Rabinowitz rarity framework to conduct data-based rarity assessments, which were then compared with known ecological information, including geographic ranges, habitat preferences, regional Red List statuses, and citizen science observations. Our findings reveal both alignments and discrepancies between these data-driven rarity assessments and traditional ecological knowledge. For example, species classified as near threatened (NT) or vulnerable (VU) on the regional Red List generally corresponded with high-rarity classifications based on the Rabinowitz framework. However, significant inconsistencies were identified, particularly for certain lentic Odonata species traditionally considered common. These results suggest that spatial biases in field surveys, combined with limited access to data on legally protected species, can impede accurate rarity assessments. These findings underscore the need for standardized survey protocols and improved data-sharing policies for sensitive species to reduce biases and enhance the reliability of rarity assessments. This is essential for effective conservation planning and biodiversity management in freshwater ecosystems." (Authors)] Address: Yoon, S., Dept of Forest Resources, Graduate School of Kookmin Univ., 77 Jeongneung-ro, Seongbuk-gu, Seoul 02707, Republic of Korea

24111. Yoshinari, K.; Otaki, K.; Imai, K.; Shiraishi, M.; Moriuchi, Y.; Ujino, S.; Iida, A.; Kumagai, K.; Shibuya, G.; Nakatani, N. (2024): Seasonal changes in and characteristics of aquatic animal communities in Rakuno Gakuen paddy field. Journal of the Rakuno Gakuen University 49(1): 17-26. (in Japanese, with English summary) ["This study surveyed aquatic animals in Rakuno Gakuen's constructed paddy field (ca. 16 a). Although the paddy field used tap water as a water source and was not directly connected to other water bodies, many aquatic animals were observed. A total of 1,069 aquatic animals from 30 species were found over six surveys conducted in the paddy fields. This number of species was similar to that of aquatic animal surveys conducted in other paddy fields. The number of animals increased from early June, when the survey began, reached a peak in early July, and then gradually decreased. Many early-stage individuals, such as the larvae of both dragonflies and beetles and juveniles of Anura, were confirmed. Therefore, it is suggested that the paddy field surveyed in this study acted as a breeding area and nursery for aquatic animals." (Authors) The following odonate species are listed: Sympetrum frequens, S. croceolum, S. baccha matutinum, S. darwinianum, S. fonscolombii, Pantala flavescens, Deielia phaon, Ischnura asiatica, Lestes sponsa, and Anax nigrofasciatus nigrofasciatus.] Address: Nakatani, N., Water Chemistry, Dept of Environmental Sciences, College of Agriculture, Food & Environmental Sciences, Rakuno Gakuen Univ. 582, Bunkyodai-Midorimachi, Ebetsu, Hokkaido 069-8501, Japan. Email: nakatani@rakuno.ac.jp

24112. Youcefi, A.; Mahdjoub, H.; Zebsa, R.; Kahalerras, A.;

Amari, H.; Zouaimia, A.; Bensouilah, S.; Khelifa, R. (2024): The effect of age on survival is similar in males and females of an aquatic insect species. Ecologies 5(3): 491-501. (in English) ["Age is a critical intrinsic factor that influences the probability of survival of organisms on Earth. In many animals, the lifestyles and habitat occupancy of males and females are so different that the effect of age could be sex-dependent. To reveal such patterns in wild animal populations, we here use a natural population of Calopteryx haemorrhoidalis in Northeast Algeria to analyze the influence of age and sex on survival probability using daily capture–mark–recapture. We used stepwise model selection on Cormack–Jolly–Seber models that explain recapture and survival probability, including age and sex as covariates. We marked a total of 214 adults throughout the study period (41 days). The sex ratio did not deviate from unity. Recapture probability depended on sex and time, with a slightly higher recapture probability in males (0.30 [95% CI: 0.27–0.35]) than females (0.26 [0.22–0.30]). The survival probability was slightly higher in females (0.89 [0.86–0.91]) than males (0.86 [0.82–0.88]). The best model for the survival probability included an additive effect of sex and age, indicating that the survival probability of both sexes declined with age. Interestingly, the lifespan of some individuals reached 119–130 days, which is surprisingly long compared to other temperate damselflies." (Authors)] Address: Youcefi, A., Biology Dept, University of Tamanrasset, Tamanrasset 11000, Algeria

24113. Yuan, D.; Long, Y.; Liu, D.; Zhou, F.; Liu, C.; Chen, L.; Pan, Y. (2024): Ecological impact of surfactant Tween-80 on plankton: High-scale analyses reveal deeper hazards. Science of The Total Environment 912, 169176: (in English) ["The ecological risks of surfactants have been largely neglected because of their low toxicity. Multiscale studies have indicated that even if a pollutant causes no acute toxicity in a test species, it may alter interspecific interactions and community characteristics through sublethal impacts on test organisms. Therefore, we investigated the lethal and sublethal responses of the plankton species Scenedesmus quadricauda, Chlorella vulgaris, and Daphnia magna, to surfactant Tween-80. Then, high-scale responses in grazer life-history traits and stability of the D. magna-larval damselfly system were further explored. The results showed that discernible adverse effects on the growth or survival of the three plankton species were evident only at exceptionally high concentrations (=100 mg L-1). However, 10 mg L-1 of Tween-80 notably affected the MDA concentration in grazer species, simultaneously displaying a tendency to diminish grazer's heartbeat and swimming frequency. Furthermore, Tween-80 reduced the grazer reproductive capacity and increased its predation risk by larval damselflies, which ultimately jeopardized the stability of the D. magna-larval damselfly system at much lower concentrations (10–100 fold lower) than the individual-scale responses. This study provides evidence that high-scale traits are far more sensitive to Tween-80, compared with individual-scale traits for plankton organisms, suggesting that the ecological risks of Tween-80 demand careful reassessment." (Authors) Wikipedia: "Surfactants are chemical compounds that decrease the surface tension or interfacial tension between two liquids, a liquid and a gas, or a liquid and a solid. The word "surfactant" is a blend of surface-active agent, coined in 1950."] Address: Pan, Y., School of Ecology and Environmental Sciences & Yunnan Key Laboratory for Plateau Mountain Ecology and Restoration of Degraded Environments, Yunnan University, Kunming, Yunnan 650091, China. Email: panying@ynu.edu.cn

24114. Zablocki, P. (2024): 5. Fauna. 5.2. Watki (Odonata). In: Sierakowski, M., Hebda, G. (red.). Stobrawski Park Krajobrazowy. Monografia przyrodnicza. Wydawnictwo Uniwersytetu Opolskiego. Opole: 329-350. (in Polish) [The monograph on the Polish Stobrawski Landscape Park contains a list 53 of odonate species. The following species are discussed in detail: Sympetrum flaveolum, Leucorrhinia pectoralis, L. rubicunda, L. dubia, Orthetrum brunneum, Orthetrum coerulescens, O. albistylum, Libellula fulva, Cordulegaster boltonii, Ophiogomphus cecilia, Onychogomphus forcipatus, Stylurus flavipes, Aeshna subarctica elisabethae, A. juncea, A. viridis, A. affinis, Coenagrion hastulatum, Ischnura pumilio, Lestes barbarus, L. dryas] Address: Zablocki, P., Dzial Przyrody, Muzeum Slaska Opolskiego w Opolu, Poland. Email: przyroda@muzeum.opole.pl

24115. Zandigiacomo, P.; Pontarini, R.; Fiorenza, T.; Chiandetti, I.; Pecile, I. (2024): Distribution, habitat and evidence of breeding of Aeshna grandis (Linnaeus, 1758) (Odonata: Aeshnidae) in Friuli Venezia Giulia (North-east Italy). Gortania 46: 29-36. (in English, with Italian summary) ["The occurrence of adults of the uncommon species A. grandis in several sites of the Friuli Venezia Giulia region (FVG) has been known for several years. However, it has always been assumed that these specimens were migrants or vagrants. In this note, all literature reports and news up to 2023 relating to the presence of the species in the regional territory have been considered. In FVG, A. grandis is distributed only in the alpine area of Tarvisio (south-eastern Alps). Adults of the species have been detected mainly near lotic freshwater habitats, such as pools, ponds, peat bogs, and wetlands, and sometimes along streams and clearings in woods. Due to the repeated observations over the years of adults in hunting, tandem and oviposition, as well as of an emerging adult and exuviae (i.e. certain reproductive events), A. grandis can be considered resident in FVG. However, further investigations are necessary to find any new reproductive sites of the species, especially in the Tarvisio area, which will need to be appropriately protected." (Authors)] Address: Zandigiacomo, P., Dipto di Scienze AgroAlimentari, Ambientali e Animali (DI4A) - Entomologia – Univ. degli Studi di Udine, Via delle Scienze 206, I-33100 Udine, Italy. Email: pietro.zandigiacomo@uniud.it

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24116. Aliyev, S.; Ahmadova, K.; Suleymanov, S.; Abdurrahmanova, Z.; Farzali, S. (2025): Macrozoobenthos of the rivers of North-Eastern Azerbaijan. BIO Web of Conferences 151, 03009 (2025): 15 pp. (in English) ["Between 2020 and 2023, an in-depth analysis was conducted on the species composition of the macrozoobenthos in the Yalama River, including its tributaries Telchay, Mukhtadyrchay, Velmirchay, and Khuraychay, as well as other significant rivers in northeastern Azerbaijan. During this period, a total of 53 species of benthic organisms, representing 14 different taxonomic groups, were identified across the rivers studied. These findings provide important insights into the biodiversity and ecological health of the region's freshwater ecosystems. Among the various groups recorded, mollusks, dragonflies, crustaceans, and chironomid larvae were particularly prominent, both in terms of species richness and their ecological significance within the aquatic habitats. These groups are crucial for understanding the dynamics of the river systems, as they play key roles in nutrient cycling, sediment stability, and the food web. The diversity of these species also reflects the environmental conditions and the unique characteristics of the rivers in this region, which may be influenced by factors such as water quality, habitat variation, and seasonal changes." (Authors) The following taxa are listed and documented from

most (!) of the studied sites: Agrion virgo, Coenagrion lindeni [sic], C. mercuriale, C. armatum, C. puella, and C. scitulum. No question, most of the taxa are misidentifications.] Address: Aliyev, S., Institute of Zoology MSREA, Dept of Hydrobiology, AZ1004, Baku, Azerbaijan. Email: alisaleh56-@mail.ru

24117. Araújo, A.B.; Batista, L.T.; Barreto da Silva, W. (2025): Comunidades de libélulas (Insecta: Odonata) em paisagens antropizadas no município de Itaituba, estado do Pará, Brasil: um estudo de caso no Rio Piracanã. Revista Brasileira de Meio Ambiente, v.13, n.1. 047-061 (2025): 47-61. (in Portuguese, with English and Spanish summaries) ["Dragonfly communities in anthropized landscapes in the municipality of Itaituba, state of Pará, Brazil: a case study in Piracanã River. Biomonitoring techniques are frequently used to assess environmental integrity and propose conservation strategies based on the behavior of biotic communities. This study evaluated the effects of anthropogenic environmental changes in the municipality of Itaituba - PA, on dragonfly communities in two Permanent Preservation Areas (APPs) on the banks of the Piracanã River, determining their potential as bioindicators of environmental quality. The Habitat Integrity Index (HII) was used to verify the environmental variables present in each location. Data for the collected specimens were analyzed by Analysis of Variance (ANOVA), Linear Regression, Permutational Multivariate Analysis of Variance (PERMANOVA), Nonmetric Multidimensional Scaling (NMDS) and Indicator Value (IndVal). Our results indicated that the degraded area (IIH = 0,10) presented greater richness ($F=6.60$ $p<0.01$) and abundance ($F=45.02$ $p<0.0001$) of Odonata than the area considered preserved (IIH = 0,48) due to the occurrence of generalist species of Anisoptera, whose ecophysiological needs depend on places with greater incidence of sunlight. The low richness and diversity of Zygoptera in the preserved area were associated with human activities (fishing, deforestation and flow of people) and microclimatic variables. The difference in taxonomic composition was related to the physical conditions of aquatic environments, such as temperature, physical parameters of the water and luminosity, which are important for the distribution of Odonata species. The species considered as habitat indicators were possible due to the composition of the landscape, mainly due to the absence and/or presence of aquatic and riparian vegetation." (Authors) The following taxa are listed: Argia sp., Ischnura fluviatilis, Brachymesia herbida, Diastatops intensa, Erythemis vesiculosa, Erythrodiplax umbrata, Fylgia sp., Miathyria marcella, and Tauriphila argo] Address: Araújo, Ana, Graduanda em Licenciatura em Ciências Biológicas, Instituto Federal do Pará, Brasil. Email: ana.beatriz.cb20@gmail.com

24118. Arce-Valdés, L.R.; Ballén-Guapacha, A.V.; Rivas-Torres, A.; Chávez-Ríos, J.R.; Wellenreuther, M.; Hansson, B.; Sánchez Guillén, R.A. (2025): Testing the predictions of reinforcement: long-term empirical data from a damselfly mottled hybrid zone. Journal of Evolutionary Biology 38(1): 10-27. (in English, with Spanish summary) ["Theoretical work suggests that reinforcement can cause the strengthening of prezygotic isolation in sympatry by mitigating the costs of maladaptive hybridization. However, only a handful of studies have simultaneously tested multiple predictions of this theory in natural populations. We investigated reinforcement in a mottled hybrid zone between the damselflies Ischnura elegans and Ischnura graellsii, which are characterized by incomplete and asymmetric reproductive isolation and exhibit reproductive character displacement in mating-related structures. We tested the conditions for reinforcement by quantifying whether hybridization was costly and prezygotic isolation stronger in sympatry compared with allopatry. Additionally, we investigated two specific predictions of reinforcement: (a) greater premating asymmetries in sympatry; and (b) weaker postzygotic isolation in sympatry than in allopatry. Our findings indicate the presence of maladaptive hybrids, which suggests Bateson–Dobzhansky–Müller incompatibilities in allopatry. We also found that reinforcement has strengthened mechanical isolation, at least in one direction in sympatry. We observed evidence for greater premating asymmetries in sympatry than in allopatry, which is consistent with reinforcement. However, fully testing the prediction of weaker postzygotic isolation in sympatry compared to allopatry was hindered by the highly asymmetrical levels of reproductive isolation between the two reciprocal cross directions. Our study highlights a case where reinforcement and heterospecific gene flow exert opposite effects on reproductive isolation between reciprocal crosses, where reinforcement increases reproductive isolation in one direction while gene flow weakens it in the opposite direction." (Authors)] Address: Arce-Valdés, L.R., Biology Dept, Concordia Univ., 7141 Sherbrooke St. W., Montreal, Quebec H4B 1R6, Canada. Email: bio.l.rodirigo.arce@gmail.com

24119. Armitage, P.D.; Tapia, G.; Cooling, D.A.; Hawczak, A. (2025): Biodiversity in "small" freshwater habitats. Proceedings of the Dorset Natural History and Archaeological Society 145: 23-28. (in English) [Axmouth Lyme Regis NNR, UK; "The macroinvertebrate faunal communities of small, often transitory, freshwater habitats are described based on 7 published and 2 unpublished surveys between 1982 and the present. A total of 444 taxa were recorded from 341 samples in 124 sites representing 5 lentic and 5 lotic habitat types. The conservation status of each sampled site was assessed using the Community Conservation Index. High conservation values were recorded in most habitat types with their proportion dependant partly on the number of sites and samples taken in each habitat group. Thirty-seven Notable, Rare and Vulnerable species were recorded in the surveys. These include 20 Coleoptera, 4 Trichoptera, 9 Diptera (mainly mosquitoes and dixid midges) 2 Odonata [Sympetrum flaveolum, Libellula fulva] and 2 Hemiptera. Small freshwater habitats are important for maintaining high biodiversity by providing refugia and pathways for the spread of species and improving connectivity between water bodies thereby reducing the effects of environmental fragmentation." (Authors)] Address: not stated

24120. Benstead, P.; Guillon, B.; Heaivilin, C. (2025): Recent observations of male and female Sarasaeschna pramoti (Anisoptera: Aeshnidae) in north-west Thailand. Agrion 29(1): 5-7. (in English) [" During a recent trip to the mountains of northwest Thailand in May and June 2024, single male and female Sarasaeschna pramoti were photographed separately in the Doi Inthanon National Park. This species was previously only known from two male specimens (the types) collected in the same area in 1999. There have been no published sightings since the original discovery of the two males. The female was therefore unknown until our recent observation. The two sightings of S. pramoti are detailed and photographs of the males of S. pramoti and its close relative Sarasaeschna niisatoi are compared. The authors consider the two species may be synonyms." (Authors)] Address: Benstead, P., Tranv. 9, 26962 Grevie, Sweden, Email: philbydog1@icloud.com

24121. Benstead, P.; Mallo, F.N. (2025): Do recent Ictinogomphus celebensis (Anisoptera: Gomphidae) records from

Sulawesi (Indonesia) reveal the presence of two species? Agrion 29(1): 22-25. (in English) ["The first live images of both subspecies of Ictinogomphus celebensis (a Sulawesi endemic) are presented along with a handful of other records of the species from the citizen science database iNaturalist. Details of the habitat for both sub-species are recorded for the first time. The authors conclude that the two subspecies are so well differentiated that they almost certainly constitute separate species." (Authors)] Address: Benstead, P., Tranv. 9, 26962 Grevie, Sweden, Email: philbydog1@icloud.com

24122. Betz, O. (Ed.) (2025): Insect ecomorphology. Linking functional insect morphology to ecology and evolution. Academic Press: 350 pp. (in English) ["Insect Ecomorphology: Linking Functional Insect Morphology to Ecology and Evolution offers the most up-to-date knowledge and understanding of the morphology of insects and the functional basis of their diversity. This book covers the form and function of insect body structures synthesized with their physiological performance capabilities, biological roles, and evolutionary histories. Written by international experts, this book provides a modern outline of the topic, exploring the ecomorphology of functional systems such as insect feeding, locomotion, sensing, and reproduction. The combination of conceptual and review chapters, methodological approaches, and case studies enables readers to delve into active research fields and attain a general idea of the explanatory power of the form-function-performance paradigm. The book uncovers key structures of the different regions of the insect body, elucidates how they function, and investigates their ecological and evolutionary implications. Insect Ecomorphology: Linking Functional Insect Morphology to Ecology and Evolution is a vital resource for entomologists, biologists, and zoologists, especially those seeking to better understand the morphology and physiological impacts tying insects to environments and evolution." (Publisher) Odonata are treated at the following pages: 63, 68, 96, 100, 107-108, 158-159, 175, 215, 262, 265, 266f, 267-268, 284, 286, 345-348, 351, 399-400, 533.] Address: Bharati, S.K., Dept Zoology, Magadh University, Bodh Gaya, Bihar, India

24123. Bharati, S.K.; Pattanayak, A.; Yadav Deen, S.N.P. (2025): Diversity and habitat preferences of Odonata in agricultural landscapes of Gaya, Bihar, India. The Bioscan 20(1): 47-51. (in English) ["A comprehensive survey of Odonata species diversity across agricultural landscapes in Gaya revealed 25 species from 4 families, with distinct patterns of abundance and distribution across habitat types. Anisoptera were represented by 16 species, with the family Libellulidae being the most diverse, while Zygoptera accounted for 9 species, primarily from the Coenagrionidae family. Diversity indices indicated high species richness in habitats with permanent water, particularly in irrigated croplands (Shannon-Wiener H' = 3.07), while fallow lands showed the lowest diversity (H' = 2.1). Odonata species were most abundant in irrigated croplands (51% of species), followed by rainfed croplands (37%) and fallow lands (12%). Seasonal variations also influenced species richness, with peak diversity during the monsoon and lowest richness in winter. Multivariate analysis revealed key environmental factors shaping Odonata diversity, including water availability ($r = 0.81$, $p < 0.01$), vegetation cover, and proximity to water bodies. Sensitive species like Ceriagrion coromandelianum and Copera marginipes were associated with undisturbed habitats, while generalists such as Pantala flavescens adapted to both disturbed and undisturbed environments. The study highlights the role of irrigated croplands as biodiversity hotspots and suggests the use of Odonata as ecological indicators in agricultural landscapes, where water availability and habitat structure are crucial determinants of species composition." (Authors)] Address: Bharati, S.K., Dept of Zoology, Magadh University, Bodh Gaya, Bihar, India

24124. Bílková, E.; Šigutová, H.; Pyszko, P.; Prieložná, V.; Dolný, A. (2025): Adapting a country-specific Dragonfly Biotic Index: Framework for seven Central European countries and transboundary pattern analysis. Ecological Indicators 170, 113111: 11 pp. (in English) ["Highlights: • Dragonfly Biotic Index (DBI) indicates condition and integrity of freshwater habitats. • Each odonate species is scored based on its distribution, threat and sensitivity. • We set the DBI values for odonate species in seven Central European countries. • The values for individual species considerably vary across countries. • For meaningful assessments, it is important to use country-specific DBI values. Abstract: Freshwater diversity is experiencing a significant crisis due to anthropogenic pressures and climate change, with losses exceeding those in terrestrial ecosystems. The Dragonfly Biotic Index (DBI) offers an effective tool for assessing the health and ecological integrity of freshwater habitats through the presence/absence data of odonate species, which respond diversely to environmental changes. Each species within the assemblage is given a value from 0 to 9, which is based on the sum of three sub-indices, each ranging from 0 to 3: distribution, threat, and sensitivity. Originally developed for South Africa, the DBI has been adapted to few regions worldwide. In this study, we adapted the DBI for individual seven Central European countries (Austria, Czechia, Germany, Poland, Slovakia, Slovenia, and Switzerland) using updated species distribution data, national red lists and sensitivity based on the species affinity to specific habitats and population trends. Furthermore, we analyzed transboundary patterns of species distribution and threat, and tested how the subindices vary based on taxonomic and ecological classification (Zygoptera vs Anisoptera, lotic vs lentic species). Our results revealed significant variation in DBI across countries, emphasizing the importance of country-specific adoptions. Anisoptera exhibited moderate total DBI values, whereas Zygoptera presented either high or low values. Furthermore, lentic species displayed lower sensitivity than lotic species. The newly presented DBI values offer a practical tool for conservation, enabling standardized freshwater health monitoring and guiding efforts across Central Europe. This study underlines the necessity of regularly updating DBI to reflect local ecological conditions, ensuring targeted freshwater conservation strategies." (Authors)] Address: Dolný, A., Dept of Biology & Ecology, Faculty of Science, Univ. of Ostrava, Chittussiho 10, 710 00 Ostrava, Czechia. Email: ales.dolny@osu.cz

24125. Bo, T.; Marino, A.; Guareschi, S.; Laini, A.; Fenoglio, S. (2025): Rice fields and qquatic insect biodiversity in Italy: State of knowledge and perspectives in the context of global change. Water 2025, 17, 845. https://doi.org/10.3390/w17-060845: (in English) ["Rice fields are one of the most important and extensive agro-ecosystems in the world. Italy is a major non-Asian rice producer, with a significant proportion of its yield originating from a vast area within the Po Valley, a region nourished by the waters of the Alps. While the biodiversity of these rice fields has been extensively documented for certain faunal groups, such as birds, there remains a paucity of research on the biodiversity of aquatic insects. A further challenge is the limited dissemination of findings, which have been primarily published in “gray” literature (local journals, newsletters and similar). Moreover, rice fields are of particular significance in the field of invasion biology, given their role in the arrival and spread of alien

species. While the efficacy of rice fields as a substitute for the now-disappeared lowland natural environments is well documented, it is equally evident that traditional rice-growing techniques can require an unsustainable use of water resources, which threatens the biodiversity of the surrounding lotic systems. Here, we summarize and review multiple sources of entomological information from Italian rice fields, analyzing both publications in ISI journals and papers published in local journals (gray literature). In the near future, strategies that reduce the demand for irrigation, promote the cultivation of drought-tolerant crops, and utilize precision farming techniques will be implemented. The challenge will be balancing the need to reduce water withdrawal from rivers with the maintenance of wetlands where possible to support this pivotal component of regional biodiversity." (Authors) Taxa - including Odonata - are treated at family level.] Address: Bo, T., Dept of Life Sciences & Systems Biology, Univ. Turin, 10123 Turin, Italy. Email: tiziano.bo@unito.it

24126. Boderau, M.; Garrouste, R.; Kundura, J.-P.; Nel, A. (2025): A new Saxonagrionidae (Insecta: Odonatoptera) from Southern France Middle Permian confirms the attribution of the family to Panodonata. Palaeoentomology 8(1): 9-11. (in English) ["The superorder Odonatoptera Martynov, 1932 comprises a great number of clades (e.g., Meganisoptera, Protanisoptera, Triadophlebiomorpha, etc.) that could be considered as orders at the same rank of the extant Odonata (dragonflies, damsel-dragonflies and damselflies) (Nel & Piney, 2023). The Odonatoptera is very ancient, with representatives dating from the Serpukhovian (late Early Carboniferous) (Petrulevicius & Gutiérrez, 2016). But how old are the Panodonata Bechly, 1996, the clade containing the Odonatoptera with the synapomorphy 'distal discoidal vein MAb (= distal side of discoidal cell) and subdiscoidal vein (origin of CuA on MP) aligned' (Bechly, 2016)? Kohli et al. (2016) proposed the triassolestid Triassolestodes asiaticus (age ca. 237 Ma) as the oldest known representative of the crown Odonata because this family belongs to the Epiproctophora (the stem group of the extant Anisoptera). Kohli et al. (2021: fig. 4) dated the divergence between the Zygoptera and Epiproctophora as between 298 and 253 Ma, on the basis of the work of Kohli et al. (2016). Nel et al. (1999) and Prokop et al. (2015) described the two families assigned to Panodonata: Saxonagrionidae Nel, Gand, Fleck, Béthoux & Lapeyrie, 1999 and Huangiopteridae Prokop, Szwedo, Lapeyrie, Garrouste & Nel, 2015 on the basis of two wings from the Guadalupian of Lodève (Southern France)." (Authors)] Address: Boderau, M., Institut de Systématique, Évolution, Biodiversité (ISYEB), Muséum National d'Histoire Naturelle, Centre National de la Recherche Scientifique, Sorbonne Univ., École Pratique des Hautes Études, Université des Antilles, Paris, France

24127. Bosc, C.; Recoura-Massaquant, R.; Piffady, J.; Geffard, O.; Chaumot, A. (2025): Linking new national active biomonitoring data with stream macroinvertebrate communities suggests large-scale effects of toxic contamination on freshwater ecosystems. Science of The Total Environment 959, 178328: 10 pp. (in English) ["Highlights: •We used new in situ bioassay data to estimate chemical toxicity in streams. •Toxicity changed the structure and reduced the richness of invertebrate communities. •The effect was independent of confounding physico-chemical and spatial parameters. Abstract: Since recent years, an increasingly large number of toxic chemicals enters watercourses threatening freshwater biodiversity. But ecological studies still poorly document the quantitative patterns linking exposure to complex mixture of toxic chemicals and species communities' integrity in the field. In this context, French monitoring authorities have recently deployed at a national scale in situ biotests using the feeding inhibition of the crustacean Gammarus as toxicity indicator. In this paper, we conjointly exploit this new type of biomonitoring dataset and ecological data for macroinvertebrates to gain information about the structuring influence of toxicity on aquatic communities. Especially, we used multivariate analyses with variation partitioning for testing the hypothesis that toxicity (feeding inhibition index) can explain variations in the taxonomical composition between 76 stations on French streams while, for different spatial scales, estimating the confounding influences of other environmental and spatial factors. Our results showed that changes in the toxicity indicator were significantly associated with specific changes in the taxonomic composition of stream macroinvertebrate communities. That association was weakly confounded with the effects of environmental and spatial factors, especially at the largest spatial scale considered. That taxon turnover linked to toxicity was associated with reduced richness at the community scale, and the replacement of native taxa by alien taxa. Overall, our study thus supports the hypothesis that toxic contamination modifies the structure of stream communities and ergo threatens aquatic biodiversity." (Authors) The data include Platycnemis sp.] Address: Bosc, C., INRAE, UR RiverLy, Villeurbanne 69625, France. Email: christopher.bosc@inrae.fr (

24128. Bose, C.N.; Boswell, A.; Kakkassery, F.K. (2025): A molecular phylogeny of Zygopterans (Insecta, Odonata) of Kerala, India. Journal of Insect Biodiversity and Systematics 11(1): 195-205. (in English) ["Molecular phylogenetic reconstruction of the suborder Zygoptera based on sequences of the nuclear ribosomal gene 18S and mitochondrial gene COI was carried out using species collected from India. Sequence samples of 19 species belonging to 7 families of Zygoptera were used for the analysis. All the existing family levels in Zygoptera were confirmed as monophyletic clades in both analyses. While the 18S analysis resolved deep relations well, the COI analyses supported recently diverged clades. The analysis based on the COI gene showed the monophyly of families Coenagrionidae, Calopterygidae, Lestidae, Chlorocyphidae, and Platycnemididae and was found as a distinct clade. The remaining families Platystictidae and Euphaeidae were polyphyletic to the former clade showing more genetic divergence. In the 18S analysis, from the common ancestor, a monophyletic clade of Coenagrionidae, Platycnemididae, Lestidae and Chlorocyphidae evolved. Euphaeidae, Platystictidae and Calopterygidae were polyphyletic." (Authors) The study includes the following 21 species: Lestes praemorsus, Protosticta gravelyi, Neurobasis chinensis, Heliocypha bisignata, Libellago indica, Dysphaea ethela, Copera vittata, Prodasineura verticalis, Aciagrion approximans krishna, Agriocnemis pieris, Agriocnemis splendidissima, Archibasis oscillans, Ceriagrion cerinorubellum, C. rubiae, Ischnura rubilio, Paracercion calamorum, P. malayanum, Pseudagrion decorum, P. indicum, Orthetrum luzonicum, and Palpopleura sexmaculata.] Address: Kakkassery, F.C., St. Thomas' College (Autonomous), Thrissur, Kerala, India. Email: kakkassery@yahoo.com

24129. Bowler, D.E.; Callaghan, C.T.; Felappi, J.F.; Mason, B.M.; Hutchinson, R.; Kumar, P.; Jones, L. (2025): Evidence-base for urban green-blue infrastructure to support insect diversity. Urban Ecosystems (2025) 28:0: 14 pp. (in English) ["Green-blue urban infrastructures potentially offer win-win benefits for people and nature in urban areas. Given increasing evidence of widespread declines of insects, as well as their ecological importance, there is a need to better understand

the potential role of green-blue urban infrastructure for insect conservation. In this review, we evaluated 201 studies about the ability of green-blue infrastructure to support insect diversity. Most studies were focused on the role of local and landscape-level characteristics of green-blue infrastructure. Fewer studies explicitly compared one type of infrastructure to another, and even fewer compared insect communities between green-blue infrastructure and traditional infrastructure. Overall, the body of research highlights the importance of plant diversity and reduced intensity of management (e.g., mowing) for most insect taxon groups. While local characteristics seem to be generally more important than landscape factors, insect communities within green-blue infrastructures can also depend on their connectivity and landscape context. Some infrastructure types are generally more beneficial than others; for instance, ground-level habitats tend to support more insects than green roofs. Few studies simultaneously studied synergies or trade-offs with other services provided by greenblue infrastructure, but environmental variables, such as tree cover and plant diversity, that affect insects are likely to also affect the provision of other services such as improving thermal comfort and the well-being of people. Our review offers some initial evidence for how green-blue infrastructure could be designed for multifunctionality with insects in mind." (Author) The paper includes a few references to Odonata.] Address: Bowler, Diana, Biodiversity Monitoring & Analysis, UK Centre for Ecology & Hydrology, Wallingford, UK. Email: diana.e.bowler@gmail.com

24130. Brabant, C.; Noorbhai, N.; Bendixen, M.; Iversen, L.L. (2025): Mapping the global impact of mining activities on freshwater biodiversity to inform conservation priorities. Aquatic Conservation: Marine and Freshwater Ecosystems, 2025; 35:e70094: 8 pp. (in English) ["Natural resource mining is a vital global industry serving sectors such as construction, infrastructure and electronics. The negative impacts of mining, exacerbated by poor governance and lax legislation, have detrimental consequences on the environment, especially in freshwater systems. Mining is shown to disrupt hydrological regimes, sediment dynamics and vegetation structure, which affect water quality, species composition and overall ecosystem health. However, little is known about the global extent of mining impacts on freshwater biodiversity, ultimately hindering mitigation efforts and effective policy implementation. Here, we address this knowledge gap by developing an impact probability model to generate global threat maps based on the impact of mining for freshwater fish, macrophytes and odonatan. We show that the impact of mining differs significantly between taxonomic groups, with hotspots of risk coinciding with high-biodiversity and wilderness areas. Using a random forest machine learning model, we show that the extent of mining impacts is driven primarily by environmental and anthropogenic variables, such as land surface runoff and the Human Development Index. This overview of the global distribution of mining's threat is urgently needed for conservation plans to mitigate the impact of mining on biodiversity." (Authors)] Address: Brabant, C., Dept of Biology, McGill Univ. Montréal, Canada. Email: christophe.brabant@mail.mcgill.ca

24131. Byeon, J.S.; Kim, D.G. (2025): Development of a wetland ecosystem health assessment method using benthic macroinvertebrate community. Wetlands 45(1), 4: (in English) ["Benthic macroinvertebrates are a major ecological group in freshwater ecosystems, exhibiting diverse adaptations depending on their habitat. Based on these characteristics, studies using benthic macroinvertebrate communities for aquatic ecosystem health assessments are currently being conducted worldwide, primarily focusing on lotic ecosystems such as rivers, and estuaries. However, due to the significant environmental changes caused by water flow affecting water quality, food sources, and microhabitats, it is essential to develop indices specialized for lentic ecosystems, which have different flow characteristics, to accurately evaluate their health. Therefore, this study aimed to develop a wetland health assessment index using benthic macroinvertebrates. Preliminary indicators were selected from domestic and international health assessment methods, and final indicators were chosen based on their correlation with water quality status, applicability in Korea, redundancy between indicators, and their reflection of wetland characteristics. The verification of each indicator was performed using benthic macroinvertebrate community data from 37 wetlands, while water quality data were used from wetland assessments conducted from 2018 to 2022. Evaluation scores were calculated based on the cumulative distribution function, reflecting the distribution of data for each indicator. The final indicators included the number of taxa, total individual density, the number and percentage of OCH (Odonata, Coleoptera, Hemiptera) taxa and individual density, non-insect taxa (%), Chironomidae spp. individual density (%), functional feeding groups (FFGs), and habitat-oriented groups (HOGs), with a total of eight indicators selected. We developed an index to effectively assess Korean wetland health, providing a foundational resource for health evaluations in Korea." (Authors)] Address: Kim, D.G., Institute of Environmental Ecology, Sahmyook University, Seoul, Republic of Korea

24132. Cairns, J.; Baird, I.R.C.; Johnson, F.; Noble, L.; Glamore, W. (2025): Detecting Petalura gigantea: Novel eDNA method and water balance modelling insights enable improved catchment management and conservation outcomes. Ecohydrology 18(2), e70013: 14 pp. (in English) ["P. gigantea, has long-lived fossorial larvae that are dependent on high water tables in peat swamps (mires) within its range in south-east Australia. It is an endangered species and is recognised as an appropriate umbrella species for the conservation of its upland swamp habitats. Detection of P. gigantea traditionally involves systematic exuviae surveys or line transect surveys for adults during the flying season from October to February. To address the limitations of these survey methods, we developed an environmental DNA (eDNA) assay to detect the species in swamp discharges. The eDNA quantitative polymerase chain reaction (qPCR) assay was successful in detecting a known population of P. gigantea and indicated the presence of larval populations in two swamps, one where traditional surveys had failed to detect the species. We used swamp water balance models, calibrated to three swamps, to inform the applicability of the eDNA detection method and to explore how catchment characteristics influence habitat suitability. Incorporating these hydrological considerations with basic climatic data enhances the reliability of eDNA detection. This approach, when combined with traditional survey techniques, supports improved conservation outcomes for this species and its endangered, groundwater-dependent, peat swamp communities. Developing eDNA assays for other peatland-dependent species globally could facilitate broader biodiversity assessments and bolster conservation of these sensitive habitats." (Authors)] Address: Cairns, J, Water Research Lab., UNSW Sydney, Sydney, Australia. Email: joe.cairns@unsw.edu.au

24133. Calheiros, C.S.C.; Ilarri, M.; Godinho, M.; Castro, P.M.L.; Pereira, S.I.A. (2025): Biodiversity assessment in a floating treatment wetland established in a stormwater pond. Ecological Engineering 215, 107598: 10 pp. (in English)

["Highlights: •Bacteria capable of producing plant growth-promoting substances were identified. •FTW supported the complete lifecycle of Odonata. •FTW function as biodiversity hotspots and promote ecosystem regeneration. Abstract: Floating treatment wetland (FTW) are a nature-based solution delivering a wide range of ecosystem services when applied in water bodies, such as lakes and rivers. They are recognized for delivering biodiversity, aesthetic integration, and water quality enhancement through phytoremediation processes, although research is still needed to go deeper into the processes underlying the performance of these systems and evaluate the extent of biodiversity promotion especially on pond ecosystems. This study aimed to assess the plant establishment and biodiversity associated with an FTW set up in a rural artificial stormwater pond, with a polyculture comprising Iris germanica, Acorus gramineus, Caltha palustris, and Typha latifolia set in a cork agglomerate platform. For this, it was assessed the culturable bacterial communities associated to the floating platform and the rooting system, and the macroinvertebrates associated to the FTW and to the pond margin. Culturable bacterial communities colonizing the floating platform biofilm and the plant rhizosphere were isolated, identified by 16S rRNA, and characterized for their ability to produce plant growth-promoting substances (e.g., indole-acetic acid, siderophores). There was a high bacterial genera diversity associated with the FTW and with the ability to produce plant growth-promoting substances. Bacterial strains with outstanding growth-promoting traits can be used in the future to support phytoremediation strategies or plant resilience to climate change-related abiotic stresses. Regarding the biodiversity of macrofauna, namely macroinvertebrates, associated with FTW, they were mostly from the order Odonata. The FTW attracted mainly individuals of the genus Coenagrion, which represented more than 80 % of the associated fauna. The full life cycle of dragonflies and damselflies occurred in the FTW. These systems proved to be a hotspot of biodiversity supporting water and landscape management plans, besides aesthetics integration. This study gives new insights into broadening the FTW applications in stormwater or prospects to polluted water." (Authors) The following odonate species are listed: Crocothemis erythraea, Libellula depressa, Orthetrum coerulescens, Sympetrum striolatum, Anax imperator, Ceriagrion tenellum, Ischnura graellsii, Pyrrhosoma nymphula, Calopteryx haemorrhoidalis, C. virgo.] Address: Calheiros, Cristina, CIIMAR/CIMAR LA, Interdisciplinary Centre of Marine & Environmental Research, Univ. Porto, Terminal de Cruzeiros do Porto de Leixoes, Avenida General Norton de Matos, S/N, 4450-208 Matosinhos, Portugal. Email addresses: cristina.sc.calheiros@gmail.com

24134. Cano-Barbacil, C.; Sinclair, J.S.; Welti, E.A.R.; Haase, P. (2025): Recovery and degradation drive changes in the dispersal capacity of stream macroinvertebrate communities. Global Change Biology 31(1), e70054: 13 pp. (in English) ["Freshwater ecosystems face significant threats, including pollution, habitat loss, invasive species, and climate change. To address these challenges, management strategies and restoration efforts have been broadly implemented. Across Europe, such efforts have resulted in overall improvements in freshwater biodiversity, but recovery has stalled or failed to occur in many localities, which may be partly caused by the limited dispersal capacity of many species. Here, we used a comprehensive dataset comprising 1327 time series of freshwater macroinvertebrate communities ranging from 1968 to 2021 across 23 European countries to investigate whether dispersal capacity changes with the ecological quality of riverine systems. Sites experiencing improvements in ecological quality exhibited a net gain in species and tended to have macroinvertebrate communities containing species with stronger dispersal capacity (e.g., active aquatic and aerial dispersers, species with frequent propensity to drift, and insects with larger wings). In contrast, sites experiencing degradation of ecological quality exhibited a net loss of species and a reduction in the proportion of strong dispersers. However, this response varied extensively among countries and local sites, with some improving sites exhibiting no parallel gains in macroinvertebrates with higher dispersal capacity. Dispersal capacity of the local species pool can affect the success of freshwater ecosystem restoration projects. Management strategies should focus on enhancing landscape connectivity to create accessible “source” areas and refugia for sensitive taxa, especially as climate change reshapes habitat suitability. Additionally, biodiversity initiatives must incorporate adaptive decision-making approaches that account for the site-specific responses of macroinvertebrate communities to changes in ecological quality." (Authors) The publication includes references to "Odonata".] Address: Cano-Barbacil, C., Department of River Ecology and Conservation, Senckenberg Research Institute and Natural History Museum Frankfurt, Gelnhausen, Germany. Email: carlos.cano-barbacil@senckenberg.de

24135. Cartron, C. (2025): Entre terre et rivière: analyse d’un suivi sur le long terme des odonates Onychogomphus forcipatus, Ophiogomphus cecilia et Stylurus flavipes et mise en place d’un suivi du lézard Lacerta agilis. Rapport de stage de fin d’étude - Master 2 Biodiversité Écologie Évolution parcours Écologie Évolutive et Comportementale, Université de Tours: 47 pp. (in French, with English summary) ["Biodiversity’s collapse coupled with insufficient knowledge on many species requires more systematic population monitoring. On the one hand, as part of the monitoring program “Suivi des Odonates Gomphidés et Anisoptères Prioritaires” (Monitoring of Gomphidae Odonata and Priority Anisoptera) also known as SOGAP, I analysed the population trends in the Loire regionof the odonates Ophiogomphus cecilia, Stylurus flavipes and Onychogomphus forcipatus. I also studied the influence of water levels on their population dynamics. Between 2015 and 2023, the populations of O. cecilia and S. flavipes declined by more than 90 % while O. forcipatus remained stable. The collapse of O. cecilia and S. flavipes may be partly linked to decreasing water levels during low-water periods.)] Address: https://libellules.pnaopie.fr/wp-content/uploads/-2025/02/Rapport_M2_Chloe_CARTRON.pdf

24136. Cawood, R.A.; Samways, M.J.; Pryke, J.S. (2025): Viable conservation of pondscapes includes the ecotones with dryland. Biological Conservation 302, 110944: 9 pp. (in English) ["Highlights: •Transitional zones between aquatic and terrestrial realms lead to species sorting. •Dryland-associated species respond to water conditions, and vice versa. •Each pond within a pondscape supports its own suite of species. •Terrestrial buffer zones are necessary to protect wetland biota. •The entire pondscape, including all transition zones, must be conserved. Abstract: Marshlands are ecotones between standing water and terrestrial environments, where aquatic and terrestrial species overlap. However, little is known about the assembly rules of organisms inhabiting this ecotone, which is inherently dynamic according to the amount of available water. We separated the waterbody/dryland ecotone of 22 standing waterbodies into five zones according to plant composition, structure, and water depth. Here, the waterbodies had limited inflows and outflows, and were highly responsive to seasonal precipitation events. We then determined the extent to which insect species assemblages change across the five zones

and identify environmental factors driving these changes. Each zone had a characteristic suite of plant species, which differed greatly among the standing waterbodies. Dragonflies were present across the entire ecotone, although turnover peaked at the ecotone centre, while butterflies peaked in the grassland zone, along with some marsh-associated species. Grasshoppers preferred grassland associated with the smaller waterbodies. Dragonfly, grasshopper, butterfly, and plant species compositions each responded to their own sets of both aquatic and terrestrial variables. Overall, pond ecotones had high species turnover and high conservation value for both aquatic and terrestrial species, indicating that ponds have a much larger footprint than just the extent of wet areas. The terrestrial buffer zones are required for protection of the local biota. In turn, wet areas provide increased opportunities for dryland species. Buffer zones should be determined not so much in linear metres, but rather should also include dryland, which varies among waterbodies according to micro-topography. Pondscape (all the standing waterbodies) conservation must include all the transition zones, so that the full habitat heterogeneity around such waterbodies is built into the set of functionally connected waterbodies." (Authors)] Address: Cawood, R.A., Dept of Conservation Ecology & Entomology, Faculty of AgriSciences, Stellenbosch Univ., Private Bag X1, 7602 Matieland, South Africa. Email address: rcawood@sun.ac.za

24137. Cesarini, G.; Fornaroli, R.; Boggero, A.; Musazzi, S.; Zaupa, S.; Dumnicka, E.; Marchetto, A.; Rogora, M. (2025): First assessment of freshwater monitoring under the Eu National Emission Ceilings Directive: Emerging issues and way forward. Water Air Soil Pollut (2025) 236:181: 22 pp. (in English) ["Air pollution has significantly increased during the Anthropocene, adversely affecting ecosystems and human health. The National Emission Ceilings Directive (NECD, 2016/2284/EU) set targets for reducing emissions and required Member States to establish a national monitoring network to assess ecosystem changes due to air pollution. For freshwaters, the NECD monitoring focused on assessing effects of sulphur and nitrogen deposition and acidification status using chemical parameters and sensitive biological indicators. This paper evaluates the present NECD monitoring scheme and its applicability in Italy, from site selection to initial data collection. High mountain lakes were selected as study sites, because they are free from direct human impacts and sensitive to air pollutant deposition. A two-year survey of chemical and biological components (diatoms and macroinvertebrates) was conducted in eight lakes with the aim to (1) assess the suitability of chemical parameters and biological indices for evaluating air pollutant impacts on sensitive water bodies in Italy, focusing on acidification and nitrogen enrichment, and (2) discuss the current approach's achievements and limitations. Results highlighted the need to develop specific indices for detecting atmospheric pollution impacts on freshwater ecosystems. Beside acidification, other drivers, including nutrients, proved to be important in shaping mountain lakes biological assemblages and affecting their response to pollutant deposition. Our study contributed to a critical assessment of the present freshwater monitoring under the NECD from the Italian perspective, providing indications on future improvement and development of the monitoring scheme itself. ... Chironomids accounted for 80.85% in our lakes, while oligochaetes constituted about 12.17% of the macroinvertebrate assemblages. In the two-years, other represented taxa were Plecoptera (. 1%), Bivalvia, Coleoptera, Diptera, Gastropoda, Hemiptera, Megaloptera, Odonata, Trichoptera, and Tricladida (< 1%). ... Considering the distribution of macroinvertebrates along a pH gradient, it seemed that predators such as Orthetrum ..." (Authors)] Address: Cesarini, Giulia, National Research Council – Water Research Institute (CNR-IRSA), L.Go Tonolli 50, 28922 Verbania Pallanza, Italy. Email: giulia.cesarini@-irsa.cnr.it

24138. Cezário, R.; Marques Lopez, V.; Datto-Liberato, F.; Bybee, S.M.; Gorb, S.; Guillermo-Ferreira, R. (2025): Polarized vision in the eyes of the most effective predators: dragonflies and damselflies (Odonata). The Science of Nature 112, 8: 12 pp. (in English) ["Polarization is a property of light that describes the oscillation of the electric field vector. Polarized light can be detected by many invertebrate animals, and this visual channel is widely used in nature. Insects rely on light polarization for various purposes, such as water detection, improving contrast, breaking camouflage, navigation, and signaling during mating. Odonata are highly visual insects with polarization sensitivity for water detection and likely also navigation. Thus, odonates can serve as ideal models for investigating the ecology and evolution of polarized light perception. We provide an overview of the current state of knowledge concerning polarized light sensitivity in these insects. Specifically, we review recent findings related to the ecological, morphological, and physiological causes that enable these insects to perceive polarized light and discuss the optical properties responsible for the reflection of polarized light by their bodies and wings. Finally, we identify gaps in the current research and suggest future directions that can help to further advance our knowledge of polarization sensitivity in odonates." (Authors)] Address: Roucourt Cezário, R., LESTES, Entomology and Experimental Biology Center, Federal University of Triângulo Mineiro (UFTM), Uberaba, MG, Brazil. Email: rcezariobio@gmail.com

24139. Chandran, A.V.; Sawant, D.; Chandran, R.; Koparde, P.; Jose, S.K.; Kunte, K. (2025): Two new species of Merogomphus Martin, 1904 (Odonata: Anisoptera: Gomphidae) from the Western Ghats, India. Zootaxa 5588(2): 201-226. (in English) ["We describe two new species of dragonflies from the Western Ghats Biodiversity Hotspot, Merogomphus aryanadensis sp. nov. from Kerala and M. flavoreductus sp. nov. from Maharashtra, India. Morphologically, these species are closely aligned with M. tamaracherriensis Fraser, 1931, an endemic species of the Western Ghats; however, they are distinguished by unique features in their caudal appendages, accessory genitalia, and body markings. Additionally, both species are considerably smaller than other known Merogomphus spp. found in India. The differential diagnosis presented includes a comprehensive morphological photographic assessment of the two new species described and their two endemic congeners, also from the Western Ghats. We also establish a significant genetic distance between these newly described Merogomphus species and M. tamaracherriensis." (Authors)] Address: Chandran, A.V., Aqua Research Lab, Dept of Geology & Environmental Science, Christ College (Autonomous), Irinjalakuda, Univ. of Calicut, Kerala, India. Email: avivekchandran2@gmail.com

24140. Chandran, A.V.; Jose, S.K.; Dawn, P. (2025): Description of the final instar larva of Aethriamanta brevipennis (Rambur, 1842) [Odonata: Anisoptera: Libellulidae] from Kerala. Zootaxa 5588(4): 544-550. (in English) ["The final instar larva and exuvia of Aethriamanta brevipennis (Rambur, 1842) is described from Thumboor Wetlands, Kerala. This Asian species bears dorsal spines on S5–8, short lateral spines on S8–9; labium has 12–12 premental setae and 7–7 palpal setae. Numerous long, hair-like setae are present all over the body, distal abdominal segments being

most setose; setae also present on tibiae of all legs, wingpads and posterior margin of head." (Authors)] Address: Chandran, A.V., Aqua Research Lab; Department of Geology and Environmental Science; Christ College (Autonomous); Irinjalakuda; Thrissur; Kerala 680125, India, Email: avivekchandran2@gmail.com

24141. Charan, S.K.; Sharma, P.; Singh, A.; Gunsaria, S.; Meena, V.K. (2025): University campuses as urban biodiversity reservoirs: A comprehensive study of faunal diversity in university of Rajasthan. Uttar Pradesh Journal of Zoology 46(4): 207-222. (in English) ["This study presents a comprehensive assessment of faunal diversity on the University of Rajasthan campus, a critical green space in the rapidly urbanizing city of Jaipur, India. Through systematic observational surveys conducted over the year 2024, we identified 109 species across 3 phyla, 5 classes, 29 order and 74 families, with Arthropoda dominating (73.5%), followed by Chordata (24.8%) and Annelida (1.8%). The high diversity of arthropods, particularly pollinators like bees, underscores their ecological importance in maintaining ecosystem functions such as pollination and nutrient cycling. The presence of diverse bird and mammal species further highlights the campus's role as a biodiversity refuge in an urban landscape. These findings emphasize the ecological significance of university campuses as microcosms of urban biodiversity and provide a baseline for future conservation efforts. This study not only contributes to the understanding of urban ecosystems but also offers actionable insights for integrating biodiversity conservation into urban planning, ensuring the resilience of ecosystems in the face of increasing urbanization." (Authors) The list of taxa includes Anax immaculifrons and Orthetrum sabina.] Address: Sharma, P., Dept of Zoology, Bee Biodiversity Lab. No. 33, Univ.of Rajasthan, Jaipur, Rajasthan, India. Email: Priyankaanilsharma2@gmail.com;

24142. Chatterjee, T.; Chakrabarty, S.; Mitra, B.; Chaudhuri, P. (2025): Unveiling the association of mangrove flowering phenology on the dynamics of insect abundance. Acta Oecologica 126, 104052: 10 pp. (in English) ["Highlights: •Decline in pollinators, put insect-pollinated mangrove ecosystem under threat. •Examined temporal variation of insect abundance in relation to floral availability. •We found seasonal insect abundance to be positively related to flowering phenology. •Steady supply of floral resources required for maintaining pollinator abundance. Abstract: Mangroves are ecologically unique ecosystems supporting large biodiversity. Climate change and anthropogenic interferences led to continuous decline of mangroves worldwide. Simultaneously, continuous decline in pollinators, have put these primarily insect-pollinated ecosystems under threat. Therefore, to understand seasonal and interannual variation in floral-visitor population, study of insect-visitor abundance in relation to flowering phenology is critical. In this context, present study (2022–2023) was conducted in the mangrove belt of Purba Medinipur, West Bengal, India. We observed quantitative floral availability as flowering phenology of four dominant mangrove species: Avicennia marina, Avicennia officinalis, Aegiceras corniculatum, and Acanthus ilicifolius. We also examined the seasonal and interannual variation in insect abundance within the mangrove community via pan traps. To identify potential pollinator groups among insects from the pan traps, we studied foraging behaviour of these insect visitors separately. Finally, we investigated the relationship between floral availability and insect-visitor abundance. In this study, a total 35 insect species of eight orders were collected across all pan traps, among which, 19 species were classified as potential pollinators. Hymenoptera was most abundant in pan trap captures, followed by Diptera, Lepidoptera and Coleoptera. Significantly higher insect abundance was observed during the peak flowering at community-level. There was no interannual variation in insect abundance between two years. This is the first comprehensive quantitative study identifying potential mangrove pollinators and demonstrating their positive relationship with floral availability, which affecting pollinator abundance. This also indicates that steady supply of floral availability is required for maintaining the pollinator abundance in the community." (Authors) The study includes "Odonata".] Address: Chaudhuri, P., Department of Environmental Science, University of Calcutta, 35, Ballygunge Circular Rd., Kolkata, 700019, West Bengal, India. Email: punarbasu_c@yahoo.com

24143. Chen, Y.; Yang, Z.; Guo, Z.; Zhan, L.; Storey, K.B.; Yu, D.; Zhang, J. (2025): Mitochondrial gene expression of three different dragonflies under the stress of Chlorpyrifos. Insects 2025, 16, 85. https://doi.org/10.3390/insects16010085: 15 pp. (in English) ["Simple Summary: Mitochondrial genes can play a crucial role in insect resistance to pesticides. This study investigated the impact of chlorpyrifos (CPF) insecticide on the mitochondrial function of dragonflies by measuring changes in the transcript levels of mitochondrial protein-coding genes (mtPCGs) using the larvae of three dragonfly species (Anax parthenope, Epophthalmia elegans, and Gomphidia confluens). The study demonstrated that transcript levels of different mtPCGs from the three dragonfly species were significantly elevated in the presence of CPF, reflecting that these genes respond to varying levels of environmental contamination. These findings provide a new direction for pesticide detection in aquatic environments. Abstract: Chlorpyrifos (CPF) is an organophosphate insecticide that is extensively utilized globally due to its effectiveness against over 200 pest species. CPF exhibits its toxicity primarily through the inhibition of the acetylcholinesterase (AChE) enzyme, while mitochondrial damage and dysfunction have also been observed. The present study quantified the transcript levels of mitochondria protein-coding genes (mtPCGs) using quantitative realtime polymerase chain reaction (RT-qPCR) in samples of larvae of three dragonfly species (A. parthenope, E. elegans, and G. confluens) under different levels of CPF stress. By exposing larvae from uncontaminated populations to 0.05 ìg/L CPF for 24 h, the transcript levels of seven mtPCGs in A. parthenope were significantly increased ($p < 0.05$) by 1.89 ± 0.42-fold for COI, 4.30 ± 0.24-fold for COIII, 5.94 ± 0.17-fold for ND1, 4.69 ± 0.56-fold for ND2, 3.44 ± 0.48-fold for ND4, 2.19 ± 0.53-fold for ND4L, and 5.05 ± 0.36-fold for Cytb, respectively. In E. elegans, the transcript levels of ND1, ND2, and ND4 increased by 1.23 ± 0.15, 1.48 ± 0.31, and 1.98 ± 0.25-fold, respectively ($p < 0.05$). In G. confluens, the transcript levels of COI, COIII, and ND4 increased by 1.56 ± 0.13, 1.50 ± 0.26, and 3.74 ± 0.40-fold, respectively ($p < 0.01$). It was demonstrated that the transcript levels of different mtPCGs showed significant up-regulation in the three different dragonfly larvae under CPF stress in the absence of mortality. ND4 was significantly increased in all three species, indicating that it is an important target gene. The present study underscores the response of mitochondrial gene expression in larvae of three different species in response to CPF pollutants, indicating that pesticide influences can potentially alter mitochondrial gene expression and potentially act as a method for assessing aquatic ecosystem health." (Authors)] Address: Zhang, J., College of Life Sciences, Zhejiang Normal University, Jinhua 321004, China. Email: zhang3599533@163.com

24144. Cordero-Rivera, A.; Rivas-Torres, A.; Encalada, A.C.

(2025): Behavioural diversity of an insular population of Tramea darwini, with notes on Brachymesia herbida and Erythemis vesiculosa (Odonata, Libellulidae). Biological Journal of the Linnean Society, 2025, 144, blaf004: 9 pp. (in English) ["Behavioural diversity is a level of biodiversity that focuses on the existence of alternative behaviours, either linked to different ecological functions or with similar functional significance. Here, we tested whether libellulid dragonflies from species-poor communities of Isabela island (Galapagos) show high diversity in their egg-laying strategies, which is the expectation if the behavioural niche is not completely filled by the relatively few species present in the community. Our results indicate that the community of odonates of these island ponds shows very high diversity of oviposition strategies, with four modes for Tramea darwini (more than any other studied population of the genus) and two for the other common libellulids, Brachymesia herbida and Erythemis vesiculosa. The most frequent oviposition strategy of T. darwini ('tandem–oviposition tandem') was clearly less efficient than oviposition by females alone or under non-contact guarding, and a similar result was found for B. herbida and E. vesiculosa, whose females were more efficient when alone in comparison to oviposition under male non-contact guarding. We suggest that this paradox is attributable to sexual conflict, which favours a different behaviour in males and females." (Authors)] Address: Cordero-Rivera, A., Universidade de Vigo, ECOEVO Lab, E.E. Forestal, Campus Universitario A Xunqueira, 36005 Pontevedra, Spain. E-mail: adolfo.cordero@uvigo.gal

24145. Crowley, L.M.; Wawman, D.C. (2025): The genome sequence of the Ruddy Darter, Sympetrum sanguineum (Müller, 1764). Wellcome Open Research 2025, 10:23 Last updated: 15 JAN 2025: 12 pp. (in English) ["We present a genome assembly from a male specimen of S. sanguineum. The haplotype-resolved assembly contains two haplotypes with total lengths of 1,500.53 megabases and 1,304.05 megabases. Most of haplotype 1 is scaffolded into 13 chromosomal pseudomolecules, including the X sex chromosome, while haplotype 2 is scaffolded into 12 autosomes." (Authors)] Address: University of Oxford and Wytham Woods Genome Acquisition Lab

24146. Cruz da Silva, E.; Souza de Azevedo, K.; de Carvalho, F.G.; Juen, L.; Silva da Rocha, T.; Oliveira-Junior, J.M.B. (2025): Impacts of oil palm monocultures on freshwater ecosystems in the Amazon: a case study of dragonflies and damselflies (Insecta: Odonata). Aquatic Sciences 87:1: 16 pp. (in English) ["The aim of this study was to investigate the effects of oil palm (Elaeis guineensis) plantations on the water quality and physical structure of streams in the Amazon region and on the diversity of adult odonates. We tested the hypotheses: (1) that streams draining palm oil monocultures have low water quality and physical integrity and (2) that changes in water quality (local variables) and physical structure (landscape variables) of streams affect the abundance and species richness of the Odonata. A total of 22 streams were studied, of which 15 were in drainage areas used for oil palm plantations and seven were in primary forest areas in the eastern Amazon, Pará State, Brazil. To represent environmental conditions, we selected local variables (e.g., temperature, dissolved oxygen, and turbidity) and landscape variables (e.g., vegetation at 50 and 500 m distance from sampling points) known to be important for the Odonata community. Our results showed that oil palm plantations impact both the physical structure of Amazonian streams and Odonata diversity. The analyses revealed that Odonata abundance and species richness were influenced differently by the variables tested, with dissolved oxygen positively related to Odonata abundance and water temperature and turbidity negatively related to Odonata abundance. Changes in the surrounding vegetation were found to affect the physical structure of streams and influence dragonfly communities. Based on these results, we recommend the implementation of integrated approaches that consider local and landscape factors when monitoring aquatic ecosystems." (Authors)] Address: Cruz da Silva, E., Lab. de Ecologia e Conservação (LABECO), Instituto de Ciências Biológicas (ICB), Univ. Federal do Pará (UFPA), Belém, Pará, Brazil. Email: evertonsilva856@gmail.com

24147. da Silva, E.C.; Guerrero-Moreno, M.A.; Oliveira, F.A.; Juen, J.; de Carvalho, F.G.; Barbosa Oliveira-Junior, J.M. (2025): The importance of traditional communities in biodiversity conservation. Biodiversity and Conservation 34: 685-714. (in English) ["More than one-third of the world's high-biodiversity areas are inhabited by traditional communities, which possess deep knowledge and a unique relationship with the environment, resulting in sustainable management of natural resources. However, the importance of these communities is not always highlighted; therefore, this study conducts a mapping of scientific literature on the importance of these communities in biodiversity conservation, identifying trends, gaps, and areas of focus. A total of 519 articles from the Scopus and Web of Science databases were analyzed. The highest scientific productivity was recorded in 2022 (n = 59; 11.36%), and the Journal of Ethnobiology and Ethnomedicine was the most prolific on the subject. Brazil (n = 128; 24.66%) and India (n = 94; 18.11%) were the countries with the highest scientific output, while India (n = 80; 15.41%) and Brazil (n = 58; 11.17%) were the most studied. However, the USA leads in scientific collaboration networks. The main contributions of traditional communities to biodiversity conservation included management and sustainable use of natural resources (71.29%) and cultural and traditional practices (46.43%). The results reflect the growing recognition of the importance of traditional communities in nature conservation. Conservation policies and strategies should recognize and incorporate the knowledge and practices of these communities to strengthen environmental preservation and promote social justice and equity. Only by acknowledging the value of these communities' actions will it be possible to combat neocolonialism, where they are viewed or considered merely as subjects of study or as labor to be exploited for data generation, without due recognition of their importance." (Authors) The paper includes citations with reference to Odonata.] Address: Cruz da Silva, E., Programa de Pós-Graduação em Ecologia (PPGECO), Univ. Federal do Pará (UFPA), Belém, Pará, Brazil. email: evertonsilva856@gmail.com

24148. Dalu, T.; Zantsi, B.P.; Wu, N.; Cuthbert, R.N. (2025): Effects of water and sediment chemistry variables on aquatic macroinvertebrate community structuring in a subtropical Austral river system. Environmental Science and Pollution 32: 1830-1845. (in English) ["Riverine physical and chemical characteristics are influencing ecosystem integrity while shaping and impacting species richness and diversity. Changes in these factors could potentially influence community structuring through competition, predation and localised species extinctions. In this study, eight sampling sites over multiple seasons were assessed along the streams draining the City of Nelspruit, South Africa, to examine river health based on water and sediment quality, while using macroinvertebrates as bioindicators for pollution. All water variables with the exception for salinity were found to be significantly different among seasons, with sites having significant differences among all water variables. All sediment chemistry variables were also found to be significantly different among sites and

seasons, with the exception of K for sites and Zn and Ca for seasons. The PCA factor loadings and two-cluster analysis identified two groupings, i.e. group 1 that consisted of all metals apart from K and Na and group 2 with K and Na metals. A total of 4470 macroinvertebrate taxa were identified, with Crustacea Caridina nilotica and Diptera Chironominae being dominant across seasons, with macroinvertebrate communities being found to be significantly different among sites and seasons. The most common functional feeding groups across sites were the collector–gatherers (52.2%), followed by collector–filters (26.8%), predators (16.4%), scrapers (4.4%) and shredders (0.1%). Boosted regression trees indicated that high variation in species richness occurred with change in resistivity, P, water pH, ORP, conductivity and S concentrations. These results evidence a strong linkage among the sediment, water quality, substratum embeddedness and habitat structure and community structure. It is important to protect the integrity of aquatic ecosystems through effective monitoring due to the increasing water and sediment quality pressures that arise from various anthropogenic activities." (Authors)] Address: Dalu, Tatenda, School of Biology & Environmental Sciences, Univ. of Mpumalanga, Nelspruit, 1200, South Africa

24149. de Bruyn, A.M.H.; Heddle, C.B.; Ings, J.; Gürleyük, H.; Brix, K.V.; Luoma, S.N.; Arnold, M.C. (2025): Development of a bioaccumulation model for selenium oxyanions and organoselenium in stream biota. Environmental Toxicology and Chemistry 44(2): 363-374. (in English) ["Selenium (Se) occurs in natural surface waters as a variety of inorganic and organic chemical species, typically dominated by the oxyanions selenate and selenite. Organoselenium species, although hypothesized to be more bioavailable than oxyanions, have rarely been identified or quantified in natural waters and little is known about their fate or bioaccumulative potential. We studied spatial patterns of bioaccumulation in relation to aqueous Se speciation over 5 years at more than 100 locations near coal mine operations in southeast British Columbia, Canada. We used a sequential approach to fitting bioaccumulation model coefficients, first using sites with no detectable organic Se species (< 0.01 $\mu g\ L^{-1}$) to describe the bioaccumulation of selenate and selenite, then applying those relationships to the remaining sites to infer the bioavailability of detectable organoselenium species. Our analysis indicated that the methylated species methylseleninic acid was the most bioaccumulative form, followed by dimethylselenoxide. Organoselenium species were associated primarily with mine sedimentation ponds and are presumed to be products of Se metabolism by algae and bacteria. Highly bioavailable organoselenium species exported from the ponds appear to be responsible for enhanced Se bioaccumulation in biota in downstream lotic reaches, with this influence diminishing with distance from ponds as concentrations decline. Our findings indicate that managing biological productivity in mine sedimentation ponds could help manage Se risk in the receiving environment." (Authors)] Address: de Bruyn, A.M.H., ADEPT Environmental Sciences Ltd, Vancouver, BC, Canada. Email: adrian.debruyn@outlook.com

24150. Dewastra Bayu Wicaksana, S.; Ardyan Pramudya Kurniawan; Prautama, C.; Jumas, J.R.; Hutabarat, F.; Tambunan, A. S. (2025): Arthropoda diversity in high-value conservation areas of Rokan Hulu's Palm oil ecosystems. Jurnal Biologi Tropis 25(1): 606-615. (in Indonesian, with English summary) ["The transformation of tropical forests into oil palm plantations in Indonesia has significantly impacted biodiversity, including arthropod species, which serve as indicators of ecosystem health. This study investigates the diversity of arthropods in High Conservation Value (HCV) areas within the oil palm ecosystem of Rokan Hulu, Riau Province. The research was conducted in three HCV areas—Sialang Forest, Makam Keramat Forest, and Pendalian River—using the Visual Encounter Survey (VES) method. Observations were made in July–August 2024, documenting species diversity and environmental parameters. A total of 187 arthropod individuals from 38 species and 12 families were identified, with Libellulidae and Nymphalidae as the most dominant families. Diversity and evenness indices were calculated using the Shannon-Wiener and Evenness formulas, yielding values of 3.05 (high diversity) and 0.558 (moderate evenness), respectively. Environmental parameters, such as light intensity 4802,00±6204,84 Lux; wind speed 0,33±0,52 m/s; humidity 72,53±16,02%; temperature 31,63±4,20°C; and soil pH 6,42±0,38 were measured, supporting arthropod distribution." (Authors) Tholymis tillarga, Tramea transmarina, Neurothemis ramburii, N. fluctuans, Diplacodes trivialis, Brachydiplax chalybea, Potamarcha congener, Pantala flavescens, Orthetrum sabina] Address: Satya Dewastra Bayu, Wicaksana, Sustanability Sync, Dept, Ailesh, Yogyakarta, Indonesia. Email: satyadbw@ailesh.id

24151. Dolai, S.; Samanta, A.K.; Mallick, Md. A. I. (2025): Diversity and distribution of Odonates in a coastal ecosystem of Namkhana, West Bengal, India. Munis Entomology & Zoology 20(1): 1610-1630. (in English) ["Dragonflies are aquatic insects that are intimately tied to the presence of freshwater ecosystems. The decline of dragonfly populations in rural areas can be attributed to various factors, including habitat destruction, water pollution, and altered ecosystem dynamics. This comprehensive study investigated the diversity and distribution of odonates in a coastal ecosystem of Namkhana, West Bengal, India. A total of 39 species were recorded, comprising 26 Anisoptera and 13 Zygoptera, across four sites with distinct biodiversity profiles. Statistical analysis revealed significant variations in species composition, abundance, and distribution patterns across the grids, with Grid 4 emerging as the most diverse. Seasonal monitoring showed changes in species distribution and abundance, with some species exhibiting significant increases or decreases during different seasons. Behavioral aspects, including feeding other odonates, egg-laying, mating, territorial defense, and communal roosting, were also explored. Advanced statistical analyses, including species packing curve, abundance, and paired group UPGMA hierarchical cluster analysis were employed to elucidate the ecological patterns. Alpha diversity analysis and individual rarefaction analysis provided further insights into species diversity. The findings highlight the importance of conservation efforts to protect these vulnerable species and their habitats, and provide valuable insights into the ecological significance of Odonates in coastal ecosystems." (Authors)] Address: Dolai, S., Dept of Microbiol., Vijaygarh Jyotish Ray College, 8/2, Bejoygarh, Jadavpur, Kolkata, West Bengal - 700032, India

24152. Donnelly, T.W.; Michalski, J. (2025): A new species of Neotropical Enallagma Charpentier of the cyathigerum complex from Tobago (Odonata: Coenagrionidae). Zootaxa 5604(3): 383-388. (in English) ["Enallagma tobagoensis sp. nov. (Holotype, male: Tobago, St. John Parish, stream along Northside Road (N 11.2868°, W 60.6808°, 8 August 2019, Thomas W. Donnelly and John Michalski leg.) is described based on two incomplete males. The new species is a smaller melanic version of the Enallagma cyathigerum complex and is the first member of that group known from the Neotropical region." (Authors)] Address: Michalski, J., 2223 Mount Kemble Ave., Morristown NJ 07960, USA. Email: huonia@aol.com

24153. El Ghoubali, D.; Pirro, S.; Ghazal, H. (2025): The complete genome sequence of Neurobasis kaupi, the Great Blue Metalwing (Calopterygidae, Odonata). Biodiversity Genomes, January. https://doi.org/10.56179/001c.128305.: 2 pp. (in English) ["We present the complete genome sequence of Neurobasis kaupi, the Great Blue Metalwing. Illumina sequencing was performed on genetic material from a wild-caught specimen. The reads were assembled using a de novo method followed by a finishing step. The raw and assembled data are publicly available via Genbank." (Authors)] Address: unknown

24154. Enawgaw, Y.; Wagaw, S.; Degafu, A. (2025): Macroinvertebrates assemblages as bioindicators of ecological health in Lake Arekit: Response to physicochemical stressors in a tropical highland Lake. Jefore Ethiopian Journal of Applied Sciences 1(1): 177-205. (in English) ["Freshwater lakes in tropical highlands face growing threats from human activities, but their ecological responses are poorly understood. This study examines the spatial distribution of benthic macroinvertebrates in Lake Arekit, Ethiopia, and their relationship with water quality to assess ecological health under agricultural and urban pressures. Water quality and macroinvertebrate communities were analyzed at three sites from February to May 2023. Results showed significant spatial differences in water quality ($p < 0.05$), with higher turbidity (110.11 NTU), nitrate (36.37 ìg L^{-1}), and ammonium (83.95 ìg L^{-1}) at disturbed sites. Macroinvertebrate communities included six taxa, dominated by pollution-tolerant Chironomidae (22.4%), Odonata [Coenagrionidae] (31.5%), and Hemiptera (29.6%), with low diversity (Shannon index: 1.3–1.5) indicating moderate pollution. Redundancy Analysis (RDA) linked ammonium (NH_3-N), turbidity, and total dissolved solids to community structure, explaining 93.2% of species-environment variance. The shoreline site, affeced by waste and runoff, had fewer taxa (5) and more tolerant species, while the macrophyte site had higher diversity (6 taxa). These findings reveal Lake Arekit's ecological decline and highlight macroinvertebrates as effective bioindicators. Recommendations include reducing fertilizer use and improving wastewater treatment to combat eutrophication and protect biodiversity. This study offers a monitoring framework for freshwater ecosystems in developing regions facing similar human-induced threats." (Authors)] Address: Enawgaw, Y., Wolkite University, Department of Biology, Wolkite, Ethiopia. Email: yirga.enawgaw@wku.edu.et

24155. Eriksen, T.E.; Brittain, J.E.; Sandin, L.; Friberg, N. (2025): Unveiling cryptic macroinvertebrate sentinels to enhance biomonitoring in tropical rivers: Bridging traditional approaches with DNA barcoding in the Indo-Burma biodiversity hotspot. Science of The Total Environment 958, 1 January 2025, 178064: 12 pp. (in English) ["Highlights: •Lack of biomonitoring threatens freshwater ecosystems in biodiversity hotspots. •Developed a macroinvertebrate-based tool to assess understudied tropical rivers. •Combined traditional biomonitoring with DNA barcoding for assessments. •Found highest precision in assessment utilizing cryptic species fauna. •The integrated approach valuable for assessing rivers in biodiversity hotspots. Abstract: Human activities present significant threats to tropical freshwater ecosystems, notably in many global biodiversity hotspots, threats that are further increased by inadequate taxonomic knowledge and the lack of appropriate biomonitoring tools. This study integrates globally validated biomonitoring approaches with DNA-based identification methods to create a macroinvertebrate-based tool for diagnosing ecosystem health and assessing the biodiversity of tropical river ecosystems in Myanmar (Indo-Burma bioregion). To evaluate river site degradation, comprehensive data on water and habitat quality, as well as land use information, were collected. Riverine macroinvertebrates were sampled by kick sampling, and subsequent DNA barcoding analysis was used to establish molecular taxonomic units (MTUs) for key bioindicator groups, including Ephemeroptera, Plecoptera, Trichoptera, Coleoptera, and Odonata (EPTCO) as species-level identification nomenclature was lacking. Tolerance scores for the local fauna were derived along an environmental degradation gradient to enable comparisons with widely adopted global assessment tools relying on macroinvertebrate metrics. In both study areas, the upper parts of the river networks were generally undisturbed by human activities while stressors associated with urban and agricultural land use were evident in the lower parts of the catchments. The highest precision for assessment of river health was found when establishing tolerance scores adjusted to local species composition in each study area separately. Although a family-level-based multimetric approach was significantly related to the main environmental degradation gradient, assessments utilizing cryptic species-level data (MTUs) emerged as the being most precise indicator in both areas. Our study highlights the synergistic benefits of merging traditional biomonitoring with DNA-based methods for species identification for biomonitoring in tropical river ecosystems. To halt biodiversity decline and curb the extent of the escalating nature crisis, such integrated approaches will be highly valuable in understudied and biodiversity-rich aquatic ecosystems." (Authors) Taxa are treated at family level.] Address: Eriksen, T.E., Norwegian Institute for Water Research (NIVA), Økernveien 94, 0579 Oslo, Norway. Email: tor.erik.eriksen@niva.no

24156. Fajgenblat, M.; Wijns, R.; De Knijf, G.; Stoks, R.; Lemmens, P.; Herremans, M.; Vanormelingen, P.; Neyens, T.; De Meester, L. (2025): Leveraging massive opportunistically collected datasets to study species communities in space and time. Ecology Letters 28:e70094: 13 pp. (in English) ["Online portals have facilitated collecting extensive biodiversity data by naturalists, offering unprecedented coverage and resolution in space and time. Despite being the most widely available class of biodiversity data, opportunistically collected records have remained largely inaccessible to community ecologists since the imperfect and highly heterogeneous detection process can severely bias inference. We present a novel statistical approach that leverages these datasets by embedding a spatiotemporal joint species distribution model within a flexible site-occupancy framework. Our model addresses variable detection probabilities across visits and species by modelling phenological patterns and by extending the use of latent variables to characterise observer-specific detection and reporting behaviour. We apply our model to an opportunistically collected dataset on lentic odonates, encompassing over 100,000 waterbody visits in Flanders (N-Belgium), to show that the model provides insights into biological communities at high resolution, including phenology, interannual trends, environmental associations and spatiotemporal co-distributional patterns in community composition." (Authors)] Address: Fajgenblat, M., Lab. of Freshwater Ecology, Evolution & Conservation, KU Leuven, Leuven, Belgium. Email: maxime.fajgenblat@gmail.com

24157. Fedorcák, J.; Veselý, L.; Košco, J.; Mari, S.; Kainz, M.J.; Závork, L. (2025): Dietary overlap of invasive cyprinids and common carp in fishponds of Central Europe. Aquaculture 595(2), 741677: 8 pp. (in English) ["Highlights: •Study of dietary overlap between common carp and invasive cyprinids in fishponds. •Isotopic niche overlap is higher in intensive

and semi-intensive fishponds. •Low production intensity ponds show less dietary competition and niche overlap. •Invasive cyprinids in fishponds mainly consume zooplankton and macroinvertebrates. •Invasive cyprinids can have negative impacts on fishpond ecosystem and production. Abstract: Freshwater fishponds are an important part of the global aquaculture fish production, but they also are a source of invasive species with potentially negative impacts on pond ecosystems. In this study, we investigated dietary competition between common carp (Cyprinus carpio) and two invasive cyprinids, Pseudorasbora parva and Carassius gibelio, in fishponds of Central Europe. Using $\delta^{13}C$ and $\delta^{15}N$ stable isotopes analysis, we evaluated the extent of isotopic niche overlaps and the utilization of dietary sources by these species in fishponds that differ in the intensity of fish production. The isotopic niche of C. carpio and the invasive cyprinids overlap more in ponds with intensive (south-eastern Czechia) and semi-intensive (northern Austria) fish production then in ponds with low intensity production (eastern Slovakia). Our results also suggest that both invasive species opportunistically adjust their diet to their gape size and that they predominantly assimilate dietary energy from zooplankton and macroinvertebrates rather than from primary producers and detritus. Our study highlights the high potential of these invasive cyprinids to compete with C. carpio in fishponds of Central Europe." (Authors) Benthic macroinvertebrates include Odonata, without further specification.] Address: Zavorka, L., WasserCluster – Biologische Station Lunz, Inter-University Center for Aquatic Ecosystem Research, Dr. Carl-Kupelwieser Promenade 5, 3293 Lunz/See, Austria. Email: libor.zavorka@wcl.ac.at

24158. Foltzer, A.; Gérard, A. (2025): Epitheca bimaculata (Charpentier, 1825) (Insecta, Odonata, Corduliidae), une nouvelle espèce d'odonate pour la Réserve naturelle nationale de la tourbière de Machais (France, Grand Est). Bulletin de la Société d'Histoire naturelle et d'Ethnographie de Colmar 81(4): 17-19. (in French, with English summary) ["The discovery of an exuvia of E. bimaculata on the 5th of June 2023 is the first sighting of this species within the Tourbière de Machais national nature reserve, at an altitude of 980 meters above sea level. It appears to be the highest location in the Vosges mountains so far, with the last known reproduction confirmed at 693 meters. 13 Anisoptera are known on this peat bog. Specific surveys on dragonflies have been conducted since 2015, and the temperature of the water is showing a significant increase between 2021 and 2023. The warming climate, and particularly the warm years of 2022 and 2023, could explain that colonization uphill, even if some other locations are probably still to be discovered." (Authors)] Address: Foltzer, A., Parc naturel régional des Ballons des Vosges, 1 Place des verriers, 68820 Wildenstein, France. Email: a.foltzer@parc-ballons-vosges.fr

24159. Gao, K.; Donatia, A.; Ainsworth, J.; Wu, D.; Terner, E.R.; Perry, M.W. (2025): Deep conservation complemented by novelty and innovation in the insect eye ground plan. PNAS 122(1), e2416562122: 111 pp. (in English) ["Significance: Insect eyes have adapted to a vast range of environments and natural histories, yet the compound eye remains fundamentally similar. We explore the genetic and developmental basis of this dichotomy. We identify a set of transcription factors that are expressed in homologous photoreceptor types across a wide range of species and find that distant groups use the same signaling pathways for photoreceptor recruitment. We find that flies are unique in using Sevenless signaling to recruit only the R7 photoreceptor. We identify three categories of modifications that adapt insect eyes to meet specific functional requirements. Deep conservation of patterning will simplify the search for the genetic basis of adaptation by making differences stand out. Abstract: A spectacular diversity of forms and features allow species to thrive in different environments, yet some structures remain relatively unchanged. Insect compound eyes are easily recognizable despite dramatic differences in visual abilities across species. It is unknown whether distant insect species use similar or different mechanisms to pattern their eyes or what types of genetic changes produce diversity of form and function. We find that flies, mosquitos, butterflies, moths, beetles, wasps, honeybees, and crickets use homologous developmental programs to pattern their retinas. Transcription factor expression can be used to establish homology of different photoreceptor (PR) types across the insects: Prospero (Pros) for R7, Spalt (Sal) for R7+R8, and Defective proventriculus (Dve) for R1-6. Using gene knockout (CRISPR/Cas9) in houseflies, butterflies, and crickets and gene knockdown (RNAi) in beetles, we found that like Drosophila, EGFR and Sevenless (Sev) signaling pathways are required to recruit motion and color vision PRs, though Drosophila have a decreased reliance on Sev signaling relative to other insects. Despite morphological and physiological variation across species, retina development passes through a highly conserved phylotypic stage when the unit eyes (ommatidia) are first patterned. This patterning process likely represents an “insect eye ground plan” that is established by an ancient developmental program. We identify three types of developmental patterning modifications (ground plan modification, nonstochastic patterns, and specialized regions) that allow for the diversification of insect eyes. We suggest that developmental divergence after the ground plan is established is responsible for the exceptional diversity observed across insect visual systems." (Authors) The paper includes a few references to Odonata.] Address: Perry, M.W. Email: mwperry@ucsd.edu.

24160. Ge, J.; Chen, J.; Zi, F.; Song, T.; Hu, L.; He, Z.; Wu, L.; Ding, Y.; Li, H. (2025): Seasonal variations in macrobenthos communities and their relationship with environmental factors in the alpine Yuqu River. Biology 2025, 14(2), 120; https://-doi.org/10.3390/biology14020120: 25 pp. (in English) ["This study investigated the spatial and temporal variations of macrobenthos [including "Gomphidae sp."] community structure in the Yuqu River Basin during the dry and wet seasons due to environmental factors. This study quantified the independent and interactive contributions of hydrophysical, hydrochemical, and climatic factors to the community structure through a variance decomposition analysis (VPA). The study findings indicate that during May (the dry season), factors such as water depth, flow velocity, dissolved oxygen, and air temperature exhibit relatively minor fluctuations, rendering the aquatic environment more stable than in the rainy season. This stability is particularly conducive to the maintenance of the macrobenthic community structure and species diversity, which is especially evident in aquatic insects with nesting habits, such as those belonging to the Trichoptera …. In contrast, during August (the rainy season), substantial precipitation alters the thermal conditions of the river, increases flow velocity, raises water levels, and introduces a significant influx of organic matter through sedimentation. This distinctive ecological environment fosters unique adaptive strategies among macrobenthic organisms. Notwithstanding a notable decline in species diversity during this particular phase, there is a concurrent increase in the abundance of individual organisms, which is indicative of the populations’ remarkable capacity to swiftly adapt to environmental heterogeneity. Research has demonstrated that macrobenthic communities within the Yuqu River

Basin adopt pronounced adaptive tactics that vary significantly between seasons. During the dry season, these macrobenthic fauna rely heavily on the stability of their physical habitat. In stark contrast, they are compelled to navigate and cope with the more intricate and dynamic changes in hydrological and chemical conditions that characterize the rainy season. The presented results uncover the sensitive responsiveness of the macrobenthic fauna to seasonal hydrological and environmental fluctuations in high-altitude river systems and their adaptive strategies under diverse ecological stressors. Arthropods, in particular, exhibit a marked sensitivity to seasonal hydrological and environmental changes. This study delves into the biodiversity of high-altitude river ecosystems, analyzing the ecological environment and the distribution patterns and seasonal variation characteristics of macrobenthic communities. This study aims to examine how diverse seasons and hydroclimatic conditions modulate the composition of macrobenthic assemblages within the tributaries and principal channels of high-altitude river systems, thereby establishing a foundational reference for future water ecosystem assessments in such regions." (Authors)] Address: Li, H., Wuhan Zhongke Ruihua Ecological Technology Co., Ltd., Wuhan 430063, China. Email: lihongtao@sinoeco.net

24161. Gerfand, B.; Arthaud, F.; Evette, A.; Testi, B.; Peyras, L.; Gaucherand, S. (2025): Ecological quality of snowmaking reservoirs in the Alps and management perspectives. Aquatic Sciences 87, 9: 14 pp. (in English) ["Alpine freshwater ecosystems are biodiversity hotspots providing key ecosystem services. These ecosystems face threats from climate change and anthropogenic activities. Snowmaking reservoirs have emerged across the globe as a response to snow rarefaction and increasing winter tourism, and despite efforts to assess their environmental impact, our understanding of their ecological quality after being built remains limited. In the present study, we evaluated representative snowmaking reservoirs in French Alpine counties (départements) and their potential to serve as aquatic ecosystems. A comprehensive approach was employed encompassing ski resort surveys and geographical analyses of 136 reservoirs, complemented by investigations into abiotic characteristics and biodiversity surveys in 28 sampled reservoirs. The findings indicated that the multiplication and proximity of these reservoirs to freshwater habitats make them components of the alpine aquatic landscape. Terrestrial vegetation, although sparse, was commonly present on the banks of these reservoirs, but they systematically lacked aquatic vegetation. Faunal diversity appeared to be limited, and consisted of both indigenous and non-native species. Comparisons of snowmaking reservoirs with mountain lakes revealed similarities in water quality, implying the potential for similar oligotrophy and biotic communities. However, differences in conductivity, alkalimetry and pH were observed, possibly linked to distinct differences in water sources or retention times. Snowmaking reservoirs displayed unique habitat features through their structure and functioning. Although these reservoirs are attractive in terms of their biodiversity, there are concerns regarding their capacity to support species due to observations of drowned mammals and stranded amphibians and dragonflies. Our observations reveal potential ecological traps in the design, exploitation and uses of snowmaking reservoirs. Recommendations are made to enhance existing structures and future designs by increasing ecological processes and better protecting biodiversity.... Odonates were observed at different stages of their life-cycle, including adults and larvae, although no exuvia were found.... Regarding mortality, we noted the mortality of ... odonate imagos in 3.6%.... We were also unable to find all odonate life stages, indicating that these species may not complete their entire life-cycle in snowmaking reservoirs as they require physical support when emerging, typically provided by aquatic vegetation..." (Authors)] Address: Gerfand, B., Université Grenoble Alpes, INRAE, LESSEM, 38000, Grenoble, France. Email: gerfand.benjamin@gmail.com

24162. Glidewell, D.; Beyer, J.E.; Hambright, K.D. (2025): Microcystins bioaccumulate but do not biomagnify in an experimental aquatic food chain. Harmful Algae 141, January 2025, 102768: (in English) ["Highlights: • Grazers (Daphnia) grazing on Microcystis accumulate microcystins in their tissues • Microcystins then transfer from grazers' tissue to invertebrate predators' tissue • The concentration of microcystins decreases with increasing trophic level • The primary route of microcystin transfer from grazers to predators is tissue, not gut contents • Microcystins do not biomagnify within this experimental system Abstract: Microcystins—common hepatotoxins produced by cyanobacteria—have been detected in a wide range of organisms, though research examining the trophic transfer of microcystins and whether microcystins bioaccumulate or biomagnify in food webs has generated contradictory results. Here, we explored the trophic transfer of microcystins from the herbivorous water flea, Daphnia pulex, to the predatory larvae of Enallagma sp. We tested the hypotheses that microcystins transfer from the tissue of herbivorus zooplankton to that of predatory invertebrates and that these toxins biomagnify across trophic levels. We also assessed the relative contribution of toxin transfer from the gut and tissue of Daphnia pulex to Enallagma sp. We found that microcystins are effectively sequestered in the tissue of Daphnia pulex, and that these sequestered toxins are then transferred to the tissue of Enallagma sp. The contribution of gut contents to toxin transfer was negligible. Contrary to the pattern predicted by biomagnification, we found that the concentration of microcystins decreased with increasing trophic levels. Our results support the hypothesis that microcystins can be transferred trophically, but do not support the hypothesis that microcystins biomagnify from lower to higher trophic levels. Conversly, we observe biodilution in this system. These results have consequences for the impact of microcystins across trophic levels in a changing world with increasing intensity and duration of harmful algal blooms." (Authors)] Address: Hambright, K.D., Plankton Ecology & Limnology Laboratory, School of Biological Sciences, 730 Van Vleet Oval, University of Oklahoma, Norman, OK, 73071, USA. Email: dhambright@ou.edu

24163. Haque, M.T.; Paul, S.; Herberstein, M.E.; Khan, M.K. (2025): Latitudinal gradient of thermal safety margin in an Australian damselfly: implications for population vulnerability. R. Soc. Open Sci. 12: 241765. https://doi.org/10.1098/rsos.241765: 12 pp. (in English) ["The thermal tolerance of species may be exceeded by the predicted temperature increases and thus contribute to species extinction. However, the impact of temperature increases is thought to vary between climate regions and across latitudes. Here, we aim to establish the vulnerability of an ectothermic insect to a warming climate by estimating the thermal safety margin in Ischnura heterosticta. We measured the critical thermal maximum (CTmax) along a latitudinal gradient of 17° from 21 populations along the eastern coast of Australia. Our results showed that damselflies inhabiting tropical regions had higher CTmax than temperate damselflies. CTmax increased with increasing mean temperature and decreasing latitude. We further found a positive correlation between damselfly parasite number and temperature. Body size, body condition and sex had no impact on CTmax. Our projections showed that the damselfly thermal safety margin will be narrower in

the tropics compared with temperate regions under a predicted 2.6°C annual mean temperature (future projected – current) increase for the years 2061–2080. Therefore, damselflies in the tropics are likely to be more vulnerable to climate change-driven extinction even though they have a relatively higher CTmax. Nevertheless, behaviour, temperature adaptation and thermal plasticity might mitigate predicted vulnerability." (Authors)] Address: Khan, M.K., School of Natural Sciences, Macquarie University, North Ryde 2109, Australia. Email: bmbkawsar@gmail.com

24164. Harahap, R.r.; Shahroni, A.M. (2025): Record of two endemic damselflies from Obi Island, Moluccas, Indonesia with habitat description. Treubia 51(2): 169-174. (in English) ["Obi Island as part of the Wallacea region has a variety of fauna with limited information such as Odonata taxa. In observations conducted in lowland secondary forests, two endemic damselflies were discovered, namely Argiolestes obiensis and Drepanosticta obiensis. Both species have habitat preferences for rocky streams with dense vegetation in the forest. In addition to habitat information, the first photograph of both species from the field was obtained in this study. This information is useful for data deficient species." (Authors)] Address: Shahroni, A.M., Dept of Biology, Faculty of Mathematics & Natural Sciences, Brawijaya University, Malang, Indonesia. Email: amsyahroni11@gmail.com

24165. Hárságyi, D.; Berta, B.J.; Boóz, B.; Pap, Z.; Pernecker, B.; Szloboda, A.; Miliša, M.; Paril, P.; Csabai, Z.; Móra, A. (2025): Occurrence data for stream-dwelling macroinvertebrates from Central Europe. Data in Brief 58 (2025) 111272: 7 pp. (in English) ["Freshwater ecosystems represent an unparalleled diversity of habitats and species, but the actual distribution of many species remains obscured or incomplete. The aim of the survey was to contribute to the knowledge on the fauna of lesser-known areas and fill the gaps in the distribution maps of the species. The dataset is based on a one-year-long study surveying 60 locations from different drying river networks that represent different ecoregions in Central Europe: Balcanic (Croatia, 15 sites), Continental (Czechia, 20 sites) and Pannonian (Hungary, 25 sites). Multihabitat sampling approach was applied for collecting stream-dwelling macroinvertebrates. Individuals were identified to the lowest possible taxonomic level, typically to species level. The dataset includes 1827 geo-referenced occurrence records based on presence-absence data of 164 taxa across Gastropoda, Hirudinea and various groups of Insecta (Coleoptera, Hemiptera, Megaloptera, Odonata, Trichoptera) along with geographical information on the sampling sites, and details of the taxonomy of the species. The data can support future studies in ecology, biogeography and nature conservation." (Authors)] Address: Móra, A., Eötvös Loránd University, Department of Environmental & Landscape Geography, Pázmány Péter sétány 1/C, Budapest H1117, Hungary. Email: marnold@gamma.ttk.pte.hu

24166. Huang, W.; Zhao, T.; Fan, M.; Duan, Y.; Tian, L.; Li, H.; Cai, W.; Song, F. (2025): Phylogenetic relationships and divergence times of Odonata inferred from mitochondrial genome. iScience 28, 111806: 16 pp. (in English) [Highlights: •53 mitogenomes of Odonata was sequenced and determined. •A newly evolutionary hypothesis of Odonata was derived from mitochondrial phylogenomics. •Mito-nuclear discordance in estimating divergence time was observed within Odonata. Summary: Understanding the origin and evolutionary history of Odonata are crucial, as they represent central members of the first winged lineages. Here, we assembled the largest mitogenome dataset to date, comprising 143 mitogenomes representing three suborders, 18 families, of which 53 mitogenomes were newly sequenced. Phylogenetic inferences demonstrate that the mitogenome is a powerful tool for resolving lower-level divergence within Odonata, and it falls short in addressing higher-level relationships like suborder, superfamily, and interfamily classifications. The evolutionary history of Odonata was reconstructed by incorporating 11 fossil records, estimating the origin of Odonata occurred in the Jurassic, with the Cretaceous emerging as a critical period for the initial radiation of main Odonata lineages. Furthermore, we employed fossil calibration strategies from various studies to calibrate our analyses, enabling the investigation of mito-nuclear discordance patterns in divergence time inferences. Our results revealed significant differences in divergence time estimates inferred solely from mitochondrial or nuclear data within Odonata, particularly pronounced when using older upper bounds values for fossils." (Authors)] Address: Song, F., Dept of Entomology & MOA Key Lab of Pest Monitoring & Green Management College of Plant Protection, China Agricultural University, Beijing, China. Email: fansong@cau.edu.cn

24167. Iqbal, M.; Aprillia, I.; Widayanti. A.A.; Arifah, N.; Sari, D.K. (2025): First record of Ceriagrion auranticum Fraser, 1922 (Zygoptera: Coenagrionidae) from Borneo. Agrion 29(1): 10-11. (in English) ["C. auranticum was observed and photographed at Kapuas Raya, Kapuas Hulu District, West Kalimantan Province, Indonesia in January 2014. This report is the first published record of Ceriagrion auranticum from Borneo." (Authors)] Address: Iqbal, M, Dept of Biology, Universitas Indo Global Mandiri, Palembang 30129, Indonesia. Email: miqbal@uigm.ac.id

24168. Janssen, S.E.; Hoffman, J.C.; Krabbenhoft, D.P. (2025): New tools for a legacy problem: How isotope tracers inform area of concern actions in the St. Louis River in Lake Superior. Journal of Great Lakes Research 51(1):102494: 9 pp. (in English) ["Numerous mercury (Hg) sources can contribute to biological burdens within the Great Lakes, including atmospheric deposition (e.g., precipitation), non-point source land runoff (e.g., watershed), and legacy contamination. Due to these different environmental entry points, it is often difficult to ascertain if legacy Hg contamination contributes to contemporary fish consumption advisories within Areas of Concern (AOCs), as designated by the United States-Canada Great Lakes Water Quality Agreement. In this study, we aimed to assess the contributions of legacy Hg to sediments in nearshore wetland habitats and co-located prey items (dragonfly larvae ["Anisoptera"] and yellow perch) within the St. Louis River AOC using Hg stable isotopes. We observed that nearshore sediments had the same Hg source portfolio as previously examined main channel sites. Furthermore, this data confirmed that two major Hg sources were contributing to sediments within nearshore regions of the St. Louis River AOC: legacy and watershed Hg. The contribution of legacy Hg was estimated in biota and demonstrated that up to 64% of the Hg in fish tissue in the lower estuary (St. Louis Bay) was from legacy sources, but that this percentage declined substantially when examining upstream regions of the AOC. These data indicate the influence of legacy Hg to the food web varies spatially within the St. Louis River. We further found that watershed Hg sources are an important Hg contributor to the St. Louis River, which likely applies to other impacted and unimpacted tributaries across the Great Lakes region." (Authors)] Address: Janssen, Sarah, U.S. Geological Survey Upper Midwest Water Science Center, One Gifford Pinchot Drive, Madison, WI 53726, USA. Email: sjanssen@usgs.gov

24169. Kaiser, T. (2025): Hans-Joachim Clausnitzer (11.1.1942 bis 19.12.2024). Floristische Notizen aus der Lüneburger Heide 33: 35-40. (in German) [Obituary for a strongly influencing odonatologist in the late 1970th and beginning 1980th in Niedersachsen, Germany.] Address: Kaiser, T., Am Amtshof 18, 29355 Beedenbostel, Germany

24170. Kirk, D.A.; Martínez-Lanfranco, J.A.; Forsyth, D.J.; Martin, A.E. (2025): Invertebrate diversity is shaped by farm management, edge effects and landscape context in the Prairie Pothole Region of Canada. Agriculture, Ecosystems & Environment 377, 109194: 18 pp. (in English) ["Highlights: •We compared arthropod diversity among land management types and landscape contexts. •At conventionally-managed sites, alpha richness increased with grassland amount. •Richness decreased with increasing management intensity in fields but not margins. •Increasing grassland amounts around conventional fields could benefit invertebrates. •Less intensive management and more semi-natural cover are better for invertebrates. Abstract: Terrestrial invertebrates provide essential ecosystem services, and there is concern that their contribution could be compromised by population declines due to agricultural intensification, including pesticide use. Identifying alternative and beneficial agricultural land management measures could stem or reverse biodiversity loss. Here we examine morphospecies composition and abundance of terrestrial invertebrates sampled with pitfall traps and sweep nets in fields and field margins in the Prairie Pothole Region, Canada, close to focal wetlands on 43 sites representing four land management types. These were: conventional, minimum tillage, organic, and perennial cover. We estimate diversity at local and regional scales (alpha, beta, gamma) and examine the impacts of land management in interaction with landscape context on these descriptors of local and landscape biodiversity. We found that: 1) alpha morphospecies richness (hereafter 'alpha richness') was greater at conventionally-managed sites when they were surrounded by more grassland; 2) alpha richness differed among land management types for field locations, but not field margin locations (and also tended to be lower in fields than field margins, especially for sweep net samples); 3) species composition differed somewhat between sites managed for perennial cover versus the remaining three land management types; and 4) conventional sites had the lowest gamma evenness. Our results suggest that increasing the amount of grassland in landscapes could lessen the impact of conventional agriculture and that field margins in intensively managed farming systems are important for invertebrate diversity in this region. Maintaining natural and seminatural cover in agroecosystems, in addition to low-intensity farming practices, could sustain invertebrate biodiversity and facilitate important ecosystem services." (Authors) In the supplementary material "Coenagrionidae, Lestidae, Libellulidae" are listed.] Address: Martin, Amanda, Dept of Biology, Carleton University, 1125 Colonel By Drive, Ottawa, Ontario K1S 5B6, Canada. Email: Amanda.Martin@ec.gc.ca

24171. Lamouille-Hébert, M.; Arthaud, F.; Besnard, A.; Logez, M.; Datry, T. (2025): Increased drying threatens alpine pond biodiversity more than temperature increase in a changing climate. Aquatic Sciences 87:25: 19 pp. (in English) ["Climate change is one of the main drivers of biodiversity decline. Rapidly changing climate in the form of warming, drying, and habitat isolation causes freshwater species to change their spatial extent, as most species have little capacity for in situ responses. However, the relative contribution of these three effects to freshwater species' changing spatial distributions is actively debated. To shed light on this debate, we explored temperature, hydroperiod, and habitat connectivity effects on alpine pond species occupancy probabilities in the northern French Alps. We studied alpine ponds as ideal test systems because they face climate change effects more rapidly, and in more concentrated areas, than any other freshwater ecosystem. We used multispecies occupancy models with three biological groups (amphibians, macrophytes, and Odonata [Aeshna cyanea, A. juncea, Coenagrion hastulatum, C. puella Libellula quadrimaculata, Pyrrhosoma nymphula, Leucorrhinia dubia, Somatochlora alpestris]) to examine contrasting responses to climate change. Contrary to expectations, temperature was not the main driver of species occupancy probabilities. Instead, hydroperiod and connectivity were stronger predictors of species occupancy probabilities. Furthermore, temperature increases had the same effect on occupancy probabilities of non-alpine specialist and alpine specialist species. Nonetheless, temperature disproportionately affected a greater number of specialist species compared with non-alpine specialists. We conclude that climate change mitigation will primarily benefit a greater number of alpine specialist species than non-alpine specialists. Finally, we suggest that enhancing our understanding of freshwater hydroperiods will improve our predictions of climate change effects on freshwater species distributions." (Authors)] Address: Datry, T., Inst. national de Recherche en Sciences et Technologies pour l'Environnement et l'Agriculture, CS 70077 Lyon, France. E-mail: thibault.datry@irstea.fr

24172. Li, Z.; Wang, B.; Zhang, L.; Liang, Q.; Sun, B.; Wang, F. (2025): Characterization of hydrodynamics around plates shaped like dragonfly wings as a sediment reduction measure in a sewer system. Water Research 274(4):123152: (in English) ["Highlights: • The use of hydrodynamic characteristics to analyze sediment reduction performance was validated. • The incorporation of sediment reduction measures considerably increases the local velocity and turbulent kinetic energy. • Using plates shaped like dragonfly wings as sediment reduction measures optimizes the sediment reduction performance. Abstract: Sediment control is a major concern in sewer management. Early studies focused on the parameters affecting the efficiency of existing dredging facilities, and novel long-term sediment reduction measures have not been developed. Superior sediment reduction performance has been demonstrated for plates folded at 25° placed in a pipe. In this study, flushing experiments are carried out to validate the efficacy of using hydrodynamic characteristics to analyze sediment reduction performance. A detached-eddy simulation is performed to characterize the hydrodynamics around various plates shaped like dragonfly wings placed in pipes to enhance sediment reduction performance. Experimental results indicate that the maximum sediment reduction efficiency occurs in the middle section of the plates for both coarse and fine sediment beds, where the flushing thickness is extended by 1.3 cm and 3.2 cm, respectively. However, the sediment reduction efficiency is maximized for mixed sediment beds downstream, where the flushing thickness is extended by 2.4 cm. The results of numerical simulations indicate that compared with conventional sediment reduction measures, the plates produce less detrimental effects on the streamwise velocities near the pipe bottom at the plate front and increase the time-averaged vertical and transverse velocities as well as the overall turbulent kinetic energy. Therefore, the use of plates shaped like dragonfly wings is an effective sediment reduction measure." (Authors)] Address: Sun, B., School Water Conservancy & Transportation, Zhengzhou Univ., Zhengzhou 450001, China. Email: sunbin@zzu.edu.cn

24173. Lin, X.; Zhang, X.; Tan, L.; Tian, Z.; Li, J.; Luo, Q.; Resh,

V.H.; Cai, Q.; Chiu, M.-C. (2025): Temporal ecological processes have different seasonal influences on multiple dimensions of riverine insect diversity in China. Insect Conservation and Diversity 18(2): 246-259. (in English) ["An understanding of the relative importance of ecological processes affecting biological communities can assist in interpretations of biodiversity patterns. However, the mechanism behind temporal beta diversity, which refers to the dissimilarity between community structures at different times, remains unclear for aquatic insect communities. Therefore, we collected monthly samples of aquatic insects at five sites in streams from July 2011 to June 2012 in Central China. The five sample sites were located in river sections with perennially flowing water, which were subject to little human disturbance. We examined taxonomic- and trait-based temporal beta diversity patterns of riverine insects across seasons in sites. Taxonomic- and trait-based temporal beta diversity demonstrated a decline with species richness but an increase with the time between sampling dates. Taxonomic-based temporal beta diversity was significantly higher than trait-based temporal beta diversity. Turnover (i.e. species replacement) was the main driver of taxonomic-based temporal beta diversity whereas nestedness (i.e. species gain or loss) contributed more to trait-based temporal beta-diversity values. In addition, the correlation between taxonomic- and trait-based temporal beta diversity was weak. Deterministic processes (i.e. operating through physico-chemical factors and climate) and stochastic processes (i.e. operating through temporal variables) are distinct, but they can act together in influencing the temporal beta diversity of riverine insects. Taxonomic-based temporal beta diversity was more sensitive to environmental changes than trait-based temporal beta diversity, and taxonomic shift do not necessarily result in trait changes. The main driver of taxonomic-based temporal beta diversity changed with the location and components analysed. In contrast, stochastic processes were the most dominant influence on trait-based temporal beta diversity. Results suggest that taxonomic- and trait-based conservation measures should consider both turnover and nestedness patterns in the protection of riverine insects in China and elsewhere. Additionally, the development of integrated monitoring and management protocols that apply across seasons and life stages should be considered." (Authors) In the supplementary material, only one odonate taxa is listed: Boyeria+sp. (cf: Boyeria maclachlani)] Address: Cai, Q., Inst. of Hydrobiology, Chinese Academy of Sciences, Wuhan, China. Email: qhcai@ihb.ac.cn

24174. Maliao, R.J.; Cahilig, R.C.; Cahilig, R.R.; Jaspe, B.T. (2025): Climate change, traditional ecological knowledge, and riverine biodiversity conservation: a case in Aklan, Central Philippines. Environment, Development and Sustainability 27: 4745-4767. (in English) ["We framed climate change (CC) discourse through its disruptions to local culture and livelihood in a subsistence riverine fishing community in Central Philippines. Our main goal was contextualizing how local communities' traditional ecological knowledge (TEK) related to climate, fisheries, and taboos can strengthen freshwater fisheries management and biodiversity conservation. We adopted a mixed-method purposive sampling of the 126 fishing households in the Nabaoy River Watershed in the municipality of Malay in Aklan province. The high CC awareness was associated with the increasing frequency and intensity of extreme climatological events and erratic weather patterns. These CC-driven perturbations were primarily attributed to the ballooning human population and deforestation. These threats, in turn, were linked to the diminishing state of the Nabaoy River, heralded by the perceived marked decline of frog and dragonfly populations believed to be indicators of river health. Riverine biodiversity was also perceived as dwindling, with fish catch and their sizes shrinking. Furthermore, the observed fishing taboos guiding local informal (de facto) institutions corroborated formal (de jure) temporal and spatial fisheries management measures. Indeed, local communities have relevant long-term knowledge of management (e.g., TEK) and development-oriented structures and systems (e.g., informal institutions). These invaluable social capital assets are crucial in building resilient governance systems to address local conservation issues and concerns, particularly in data-deficient areas or lacking formal management contexts. Hence, formal management interventions should integrate TEK and the informal institution in which it is embedded and engage local TEK holders as partners in freshwater conservation efforts." (Authors)] Address: Maliao, R.J., Faculty of Science and Technology, University of Debrecen, Debrecen 4032, Hungary. Email: rjmaliao@mailbox.unideb.hu

24175. Mallo, F.N.; Iqbal, M. (2025): Ceriagrion auranticum Fraser, 1922 (Zygoptera: Coenagrionidae), a new record for Sulawesi. Agrion 29(1): 8-9. (in English) ["On 20 May 2024, C. auranticum was recorded and photographed in Tagolu Village (0°46'36"N, 112°29'48"E), Poso District, Central Sulawesi Province, Indonesia. This record represents the first report of Ceriagrion auranticum in Sulawesi." (Authors)] Address: Iqbal, M., Dept Biology, Univ. Indo Global Mandiri, Palembang 30129, Indonesia. Email: miqbal@uigm.ac.id

24176. Marinov, M.; Donnelly, T.W.; Beatty, C.D. (2025): Nikoulabasis dalingarum, sp. nov. from Fiji (Odonata: Coenagrionidae). Zootaxa 5601(2): 395-400. (in English) ["Nikoulabasis dalingarum sp. nov. (holotype male, Viti Levu, Fiji) is erected as a new taxon. Illustrations of key characters and a distribution map are provided." (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

24177. Márton, Z.; Barta, B.; Vad, C.F.; Szabo, B.; Hamer, A.J.; Kardos, V.; Laskai, C.; Fierpasz, A.; Horvath, Z. (2025): Effects of urbanisation, habitat characteristics, and management on garden pond biodiversity: Findings from a large-scale citizen science survey. Landscape and Urban Planning 257, May 2025, 105299: 11 pp. (in English) ["Highlights: •Over 800 garden pond owners participated in a citizen science project in Hungary. •Garden ponds commonly hosted amphibians, odonates, and birds. •Pond age, area, and vegetation influenced the occurrence of these animal groups. •Urbanisation had a negative effect on amphibian communities. •Algaecide application played a key role in the presence of multiple animal groups. Abstract: The rapid expansion of urban areas often leads to degradation, fragmentation, and loss of natural habitats, threatening biodiversity. While urban ponds might contribute substantially to the biodiversity of urban blue-green infrastructure, the role of garden ponds is still largely unknown. We lack a comprehensive understanding of how local habitat features, different forms of management, and urbanisation might impact the biodiversity of these habitats. This study aimed to reveal the importance of garden ponds via a country-wide online citizen science survey in Hungary, Central Europe. Data from over 800 pond owners revealed the occurrence and local frequency of various native animal taxa (amphibians, odonates, and birds), and introduced animals (e.g., fish). We collected data about pond features and management practices. We tested the effects of pond features, pond management, and landscape-level drivers (urbanisation, surrounding wetland coverage) on the

presence of conspicuous animal taxa (adult amphibians and tadpoles, birds, odonates) to identify the potential drivers of the biodiversity of garden ponds. Key pond features including pond age, area, aquatic and shoreline vegetation were the most important factors, while algaecide addition was the most influential management practice negatively affecting amphibian presence. Urbanisation negatively affected the presence of adult amphibians and their tadpoles, but it was not associated negatively with the presence of odonates and birds. Our results indicate the high potential to utilise garden ponds as urban habitats surveyed with the help of the public. Developing effective urban biodiversity monitoring and conservation strategies are necessary for a better functioning blue-green infrastructure. The high level of engagement of pond owners, as in our survey, can create valuable data for achieving these aims." (Authors)] Address: Márton, Zsuzsanna, HUN-REN Inst. of Aquatic Ecol., Centre for Ecol. Research, Budapest, Karolina út 29, 1113 Budapest, Hungary. Email addresses: marton.zsuzsanna@ecolres.hu

24178. Matos, M.H.O.; Oliveira, F.R.; Lansac-Tôha, F.M.; Progênio, M.; MeiraB.R.; Santana, L.O.; Cochak, C.; Machado Velho, L.F.1 (2025): Experimental approach on the contribution of wind and animal vectors in the dispersal and colonization of testate amoebae (Protista, Amoebozoa) in freshwater ecosystems. Acta Limnologica Brasiliensia 37, e1 https://doi.org/10.1590/S2179-975X2324: 13 pp. (in English, with Portuguese summary) ["We aimed to understand how testaceous amoebae spread in new sites, assessing their dispersal potential by wind and animals in freshwater ecosystems. Methods: We conducted a field experiment over 33 days between July and August 2018. The study included four different approaches: (i) a control group exposed exclusively to wind, (ii) the addition of propagules dispersed by Odonata, (iii) the addition of propagules dispersed by amphibians, and (iv) the combined addition of propagules of both animals. Results: We detected a total of 13 species of testate amoebae. Regarding species richness, we observed a steady increase throughout the experimental period. In terms of abundance, a similar trend was observed, with differences in the treatment of all vectors combinated, when comparing the treatments with only wind, and the combination of wind and vectors alone, indicating a possible progressive colonization of these organisms in the new aquatic environment. Regarding the composition of testate amoebae, we did not detect significant differences between treatments within each period or between different treatments throughout the experiment. Conclusions: Our results demonstrate the importance of animal vectors in the transport of testate amoebae cysts." (Authors)] Address: Matos, M.H.O., Núcleo de Pesquisas em Limnologia, Ictiologia e Aquicultura – NUPÉLIA, Programa de Pósgraduação em Ecologia de Ambientes Aquáticos Continentais – PEA, Univ. Estadual de Maringá – UEM, Av. Colombo, 5790, CEP 87020-900, Maringá, PR, Brasil. Email: matheushematos@gmail.com

24179. Mayer-Goyenechea, I.G.; Montiel-Canales, G.; Márquez, J.; Hornung-Leoni, C.G.; Castillo-Cerón, J.M.; Manríquez-Morán, N.L. (2025): Unraveling biogeographic boundaries within the Sierra Madre Oriental, México: An endemicity analysis using a taxonomically diverse dataset. Ecology and Evolution 15(1), e70779: (in English, with Spanish summary) ["The Sierra Madre Oriental (SMO) is a significant mountain range and one of Mexico's 14 biogeographical provinces. Its delimitation has been debated. This study aims to analyze the distribution of plants, beetles, odonates, amphibians, reptiles, and mammals using an endemicity analysis to identify endemism areas and confirm the SMO's biogeographical units. Georeferenced data for 326 species distributed in the Sierra Madre Oriental were compiled using QGIS software, and an endemicity analysis (EA) was carried out with NDM-VNDM to evaluate taxon distribution congruence in predefined grids. Different grid sizes and specific parameters were used to identify areas of endemism, with an Endemicity Index (EI) assigned to measure the consistency of these areas. Six main areas of endemism (EA) were identified: two in the northern region and four in the southern region of the SMO. These areas are supported by several taxa, except mammals, which did not significantly contribute to the identified AEs. The study suggests new boundaries within the SMO, establishing the Rio Verde as the natural barrier in the north rather than the Moctezuma River. The multi-taxonomic analysis supports dividing the SMO into two subprovinces, proposing a new delimitation based on the distribution of species with different dispersal capacities. This new regionalization can be useful for prioritizing conservation areas and designing more effective strategies. Future research should include more distribution data of mammals and birds to strengthen these results and better define the subprovinces and biogeographical districts of the SMO." (Authors) The following Odonata are integrated in the analysis: Amphipterygidae: Amphipteryx agrioldes, Calopterygidae: Hetaerina capitalis, H. infecta, Heteragrion tricellulare, Coenagrionidae Argia calida, A. cuprea, A. rudolphi, Ischnura posita, Mecistogaster modesta, Protoneura cupida, Pseudostigma aberrans, Gomphidae: Erpetogomphus erici, E. liopeltis Phyllogomphoides suasus, Lestidae: Archilestes regalis, Libellulidae: Brechmorhoga vivax, Libellula herculea, Platystictidae: Palaemnema paulicoba, Thaumatoneuridae: Paraphlebia zoe] Address: Mayer-Goyenechea, Irene Goyenechea, Centro de Investigaciones Biológicas (CIB), Universidad Autónoma del Estado de Hidalgo, Mineral de la Reforma, Hidalgo, Mexico. Email: ireneg@uaeh.edu.mx

24180. Mitchell, R.M.; Herlihy, A.T.; Hughes, R.M. (2025): Striving for consistency in a national lake assessment: Defining reference status and littoral macroinvertebrate condition in lakes across the conterminous United States. Ecological Indicators 170, 112992: 11 pp. (in English) ["Highlights: •Macroinvertebrate indices were developed for lakes in the conterminous U.S. •Physiochemical and disturbance variables were used to identify reference sites. •Reference site distribution defined benchmarks used to assess biological condition. •44% of lakes in the conterminous U.S. were in good biological condition in 2022. Abstract: Benthic macroinvertebrates are widely used for assessing lotic ecosystems, however, their use in assessing lake condition has been more limited—especially at large, continental extents. We used data collected during the U.S. EPA's National Lake Assessment between 2007–2022 to develop and validate a national macroinvertebrate multi-metric index (MMI) of lake condition across the conterminous U.S. As part of that process, we identified least-disturbed ecoregional reference lakes by filtering all sampled lakes by using specific physical, chemical, and disturbance variables to remove disturbed lakes. To account for natural variability, different criteria values were used for each of the nine national ecoregions. This allowed for a regionally explicit and reproducible definitions of lake reference condition for current and future analyses. Because of insufficient reference lake numbers in some of the nine ecoregions, macroinvertebrate MMI development was done independently for each of five aggregate national ecoregions. All 126 candidate macroinvertebrate metrics were screened for reproducibility, responsiveness, and redundancy to identify the best metric in each of six group types: composition, diversity, feeding group, habit, richness, and pollution tolerance for each ecoregion. The six chosen metrics were summed to calculate the MMI. Condition benchmarks (good/fair/poor) for assessing biological

condition were defined for each ecoregion based on reference lake MMI percentiles. Using these five MMIs with the 2022 survey data, an estimated 44% of the lakes were in good condition, whereas 27% were in poor condition. Our MMIs offer managers valuable tools for assessing lakes at large ecoregional and continental extents." (Authors) Odonata are treated at order level.] Address: Mitchell, R.M., United States Environmental Protection Agency, Office of Water, 1200 Pennsylvania Ave., NW, MC 4502T, Washington, DC 20460, USA. Email: mitchell.richard@epa.gov

24181. Munyai, L.F.; Gumede, B.P.; Dondofema, F.; Dalu, T. (2025): Environmental characteristics shape macroinvertebrate community structure across spatiotemporal scales in a subtropical African river system. Scientific Reports 15: 6595, https://doi.org/10.1038/s41598-025-91346-9: 11 pp. [in English] ["Understanding the impact of human activities and environmental drivers on macroinvertebrate communities is critical to adequately manage river ecosystems under multiple stressors. In this study, we assessed macroinvertebrate community structure in relation to water and sediment chemistry. Samples (i.e., water, sediment and macroinvertebrates) were collected from 16 sites along the subtropical Luvuvhu River (South Africa) mainstem and its tributaries across two seasons (i.e., cool–dry (June), hot–wet (November)). The analysed data was assessed using multivariate analyses and diversity matrices. Significant differences were observed across seasons and river sections for most water (i.e., pH, temperature, resistivity, ammonium, phosphates) and sediment (i.e., potassium, sodium, copper, zinc, boron, sediment organic carbon) variables. Macroinvertebrates exhibited high diversity during hot–wet season compared to the cool–dry season, with a six distinct macroinvertebrates families (i.e., Odonata [Paragomphus sp.; Ictinogomphus sp.; Lestinogomphus sp.; Pseudagrion sp.; Libelluloidea invitae; Zosteraeschna sp.; Platycypha sp.; Sympetrum sp.; Anax speratus; Libellulidae, Ceriagrion glabrum; Orthetrum; Coenagrionidae; Phaon iridipennis; Zygonyx natalensis; Platycypha caligata; Pseudagrion sp.], Diptera, Coleoptera, Hemiptera, Trichoptera, Ephemeroptera) having a high taxon abundances. Based on CCA analysis, seasons were positively associated with CCA axis 2, and were characterised by high Mg, Na, pH, sediment organic carbon, ammonium and phosphates, with all highlighted variables having a significant effect on macroinvertebrate community composition. The results obtained from this study highlighted that water and sediment chemistry had significant associations with changes in macroinvertebrate communities and composition. Therefore, understanding the relationship between water and sediment chemistry, and macroinvertebrates diversity matrices in rivers that are impacted by human activities is essential for comprehending the integrity of river ecosystem and for providing guidance to conservation managers. This knowledge will assist on how to effectively manage and safeguard these systems against further deterioration from anthropogenic activities." (Authors)] Address: Dalu, T., Aquatic Systems Research Group, School of Biology and Environmental Sciences, University of Mpumalanga, Nelspruit, South Africa. Email: dalutatenda@yahoo.co.uk

24182. Nafisah, N.A.; Nisa, S.A.R.: Wahyudi, C.I.; Hashifah, F.N. (2025): Distribusi dan karakteristik nimfa capung (Odonata) die habitat Sungai Hutan petungkriyono. Biogenerasi 10(1): 776-782. (in Indonesian, with English summary) ["This study aims to determine the distribution and characteristics of dragonfly nymph families in the Sokokembang, Karanggondang, Tirta Muncar, and Curug Lawe Rivers at the Petungkriyono Forest. Each location consists of five sampling points. Sampling was conducted using the line transect and dip netting methods at each observation point. Environmental parameters measured include water temperature, pH, dissolved oxygen (DO) levels, and current velocity. The results of the study indicate that the diversity of dragonfly nymphs found consists of the suborders Anisoptera (Cordulegastridae, Gomphidae, and Libellulidae) and Zygoptera (Euphaeidae and Platystictidae). Nymphs from the Euphaeidae family had the highest number of individuals, whereas the Cordulegastridae family was the least encountered. The distribution of dragonfly nymphs observed is influenced by environmental parameters and habitat preferences. Nymphs of the Cordulegastridae family were predominantly found in muddy substrates, while the Gomphidae family was observed in fast-flowing river currents. Research and monitoring of dragonfly nymph populations are crucial as indicators of aquatic ecosystem health." (Authors) The identifications should be wrong, as they partly were done using North American identification keys.] Address: Nafisah, N.A., Fakultas Biologi Universitas Jenderal Soedirman, Indonesia

24183. Nagasaka, K. (2025): Study on the water repellency of the wings of Japanese Paleoptera and the structure and chemical substances of protrusions on the surfaces: A comparative study of the dragonflies and mayflies. Collection of Excellent Papers on Project Research 2024: 66-94. (in Japanese, with English summary) ["This paper explores the water repellency and chemical composition of the wing surfaces of Japanese dragonflies and mayflies (Atrocalopteryx atrata, Rhithrogena japonica). Previous research has shown that dragonflies' wings possess nanostructures, specifically nanopillars, contributing to their effective water repellency. This study aims to examine the water repellency and surface characteristics of mayfly wings while delving into the evolutionary correlation between dragonflies and mayflies. The sliding and contact angles of both insects' wings were measured, and significant hydrophobicity in mayflies' wings was revealed. However, unlike dragonflies' wings, the hydrophobicity of mayflies' wings decreased upon exposure to chloroform. Furthermore, an analysis using Electrospray Ionization Mass Spectrometry (ESI-MS) detected the presence of palmitic acid and stearic acid on the surface of the wings of the mayflies. These empirical insights prompt the author to postulate that the wings of the common ancestor of dragonflies and mayflies harbored saturated fatty acids. Subsequent to the speciation event between Odonata and Ephemeroptera, dragonflies underwent a unique evolutionary adaptation, developing nanopillars on their wings." (Author)] Address: https://-da.lib.kobe-u.ac.jp/da/kernel/0100492580/0100492580.pdf

24184. Nakanishi, K.; Akanuma, H.; Kobayashi, R.; Yokomizo, H.; Hayashi, T.I.; Robson, B.; Usio, N. (2025): Experimental test of the effects of prolonged flooding practices on animal communities in rice paddy fields. Agriculture, Ecosystems & Environment 379, 28 February 2025, 109369: (in English) ["Highlights: •Effects of winter and summer water management practices were assessed in rice paddies. •Winter flooding (WF) did not affect freshwater insect richness and spider abundance. •WF increased the number of egg masses of amphibians. •Mid-season drainage (MD) had negative impacts on freshwater insects and spiders. •Diversification of WF and postponing or ceasing MD may improve conservation outcomes. Abstract: Although environmentally friendly rice farming is expected to contribute to biodiversity conservation in paddy fields, scientific testing of the impact of individual management practices in rice cultivation is still in its early stages. This study used field experiments to quantify

the effects of winter flooding and summer, mid-season drainage (a short-term soil drying in the middle of the rice growing season) on animal communities in paddy fields. We used a 2×2 factorial design with the factors winter flooding (±) and mid-season drainage treatment (±), crossed, and three replicate paddy fields in each combination (total n = 12). Our field experiments showed that winter flooding had little effect on the taxonomic richness and abundance of freshwater insects and spiders, but it increased the number of egg masses in amphibians such as the montane brown frog Rana ornativentris and the Japanese black salamander Hynobius nigrescens. In contrast, mid-season drainage negatively affected the taxonomic richness and abundance of freshwater insects, and the abundance of spiders. In particular, mortality usually occurred in species whose larval stage overlapped the period of mid-season drainage. Winter flooding promotes the biodiversity of animal communities in paddy fields. For amphibians that breed in the early spring, winter flooding provides breeding habitat. Mid-season drying had negative effects on animal biodiversity. Delaying or ceasing mid-season drainage would improve reproductive opportunities for freshwater insects and maintain species diversity. Diversification of winter flooding and winter drying across a rice paddy landscape and prolonged summer flooding practice may improve conservation outcomes." (Authors) The abundance of Odonata was significantly lower with the WF treatment than without the treatment in the pre-MD period (coefficient of WF = -2.09, P = 0.012, Table 2). Sympetrum dragonflies were absent from the WF treatment, although our samples contained many Libellulidae that could not be identified at the species level (Tables S1, S2).] Address: Nakanishi, K., Biodiversity Division, National Institute for Environmental Studies, Onogawa 16-2, Tsukuba, Ibaraki 305-8506, Japan. Email: nakanishi.kosuke@nies.go.jp

24185. Navarro, M.; del Palacio, A.; Lozano, F.; Muzon, J.; Ramos, L.S. (2025): Colecciones científicas en Latinoamérica: La colección de Odonata del Laboratorio de Biodiversidad y Genética Ambiental (BioGeA), Avellaneda, Argentina. Hetaerina 6(1): 15-17. (in Spanish) [Verbatim/Google translate: The Biodiversity and Environmental Genetics Laboratory (BioGeA) was founded within the Department of Environment and Tourism by resolution of the Higher Council of the National University of Avellaneda (UNDAV) No. 062-16 of March 9, 2016. Its main objective is to develop research aimed at deepening knowledge of biodiversity, with special emphasis on the geographic reference area of UNDAV, the flood plain of the Río de la Plata. This laboratory has one of the most important collections of the Odonata order in South America and the most important in Argentina. Based on the work of Luis Alberto Bulla, a taxonomist who worked mainly with the Coenagrionidae family from Buenos Aires, odonatological research in Argentina was consolidated thanks to the promotion of faunal studies developed at the Institute of Limnology of La Plata (ILPLA). Since the 1990s, work on taxonomy and biogeography of the families Coenagrionidae, Lestidae, Aeshnidae and Libellulidae has multiplied, mainly carried out by the founding group of BioGeA, made up of Javier Muzón, Federico Lozano, Lia Ramos and Alejandro del Palacio. In Argentina, 285 species have been recorded so far, grouped into 89 genera and 15 families. Among the families recorded in this country are: Aeshnidae; Austropetaliidae; Corduliidae + Neocordulia (considered incertae sedis); Gomphidae; Libellulidae; Neopetaliidae; Petaluridae; Synthemistidae; Calopterygidae; Coenagrionidae; Dicteriadidae; Heteragrioniidae; Lestidae; Megapodagrionidae; Polythoridae. All of these families are represented in the collection (Table 1). Currently, the BioGeA collection has about 22,100 adult individuals, preserved dry in envelopes with identification cards. Of these, approximately 19,500 are identified at least to genus level and 16,200 to species level. The collection also has larvae preserved in alcohol and specimens or parts of specimens preserved in absolute alcohol for molecular studies. 70% of the collection comes from collections made in various parts of Argentina, largely carried out by the BioGeA team. There are records from 22 of the 23 Argentine provinces, with data missing from San Juan. Buenos Aires, Corrientes, Entre Ríos and Misiones have the largest number of records. The rest of the specimens come from other countries, mainly American. Currently, 25 families are represented, with Coenagrionidae and Libellulidae being the most numerous. The type specimens designated by this work team have been deposited mostly in the Natural Sciences Museum of La Plata (Muzón et al., 2007). Since 2018, the digitalization of the BioGeA Odonata collection began, which has a permanently updated database. Although it is not open access, the material can be consulted in the laboratory or the desired information can be requested via email.] Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina. E-mail: muzon@ilpla.edu.ar

24186. Nel, A.; Bernard, R.; Szybiak, R.; Daraz, B.; (2025): The first fossil insects from the marine Oligocene Menilite Formation in Poland (Odonata, Coleoptera). Palaeoentomology 8(1): 80-88. (in English) ["Lestes polonicus sp. nov. and Calosoma winnicaensis sp. nov., respectively, the first Oligocene Lestidae and Carabidae from Poland, are described from the marine Menilite Formation. Lestes polonicus sp. nov. is the ninth species of the Eocene-Oligocene Lestes group with a longitudinal intercalary row of cells in the area between MP and CuA, confirming its abundance and diversity during this period, and extending its distribution to the easternmost part of Central Europe. This group has not been recorded later during the Miocene and Pliocene. With the described species, the genus Calosoma seems to have been as diverse during the Oligocene as it is today in Europe." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@mnhn.fr

24187. Noone, W.N.; Edwards, P.M.; Pan, Y.; Thorne, C. (2025): Floodplain restoration and its effects on summer water temperature and macroinvertebrates in Whychus Creek, Oregon (USA). River Research and Applications 41: 37-55. (in English) ["Stream restoration is a proposed climate adaptation tool; however, outcomes of floodplain restoration on stream temperature have been debated. Despite a growing number of studies that investigated water temperature in restored streams, few have quantified temperature variations in new habitat types created by restored hydrogeomorphic processes to explore the effects on aquatic macroinvertebrates. We evaluated the hypotheses: (1) restoration increases habitat diversity, (2) habitat diversity increases water temperature variability, and (3) restoration increases the diversity of macroinvertebrate assemblage and temperature associations. In August 2021, we collected environmental data to describe the aquatic habitats, water temperature and quality (continuous and discrete), and macroinvertebrates in 40 riffle, pool, and off-channel sites in a stream being restored, Whychus Creek, Oregon, USA. Our study is a site comparison of three reaches—one restored in 2012, another restored in 2016, and an unrestored (control) that will soon undergo restoration. Evaluations of the hypotheses show: (1) Habitat diversity in restored reaches is effectively three types of aquatic habitats versus only one in the control (riffles), (2) water temperature variability in habitats created by restoration (off-channel) is high and low, and suggest a range of hyporheic

connectivity and flow paths are present, and (3) restoration created a different macroinvertebrate assemblage, with 16 additional taxa in off-channel habitats, and the range in macroinvertebrate thermal optima is approximately doubled when off-channel macroinvertebrate thermal optima are accounted for. Our results support the idea that floodplain restoration creates more diverse thermal conditions and different macroinvertebrate communities in restored stream reaches." (Authors) Odonata are treated at family level.] Address: Noone, W.N., Dept of Environ. Science & Management, Portland State Univ., Portland, Oregon, USA. Email: wnoone@blm.gov

24188. Onen, H.; Kaindoa, E.W.; Nkya, J.; Limwagu, A.; Kaddumukasa, M.A.; Okumu, F.O.; Kayondo, J.K.; Akol, A.M.; Tripet, F. (2025): Semi-field experiments reveal contrasted predation and movement patterns of aquatic macroinvertebrate predators of Anopheles gambiae larvae. Malaria Journal 24, 4: 11 pp. (in English) ["Background: Members of the Anopheles gambiae complex are major malaria vectors in sub-Saharan Africa. Their larval stages inhabit a variety of aquatic habitats in which, under natural circumstances, they are preyed upon by different taxa of aquatic macroinvertebrate predators. Understanding the potential impact of predators on malaria vector larval population dynamics is important for enabling integrated local mosquito control programmes with a stronger emphasis on biocontrol approaches. This study experimentally evaluated the predation efficacy and foraging strategy of three common aquatic macroinvertebrate predators of An. gambiae, diving beetles (Coleoptera), backswimmers (Hemiptera), and dragonfly nymphs in a semi-field system in South-Eastern Tanzania. Methods: An array of alternating small and large basins used as aquatic habitats was created in two compartments of a semi-field system and filled with well water. Field-collected adult diving beetles, backswimmers or dragonfly nymphs were randomly assigned to these habitats and Anopheles arabiensis larvae were added as prey in half of the habitats. The number of mosquito larvae consumed, predator mobility across habitats and mortality were recorded at 24, 48 and 72 h. Results: The presence of An. gambiae larvae in habitats significantly increased the survival of backswimmer and dragonfly nymphs, which are not mobile. In contrast, diving beetles survived well under any initial condition by preferentially flying away from habitats without prey to nearby larger habitats with prey. The larval predation rates of predacious diving beetle, backswimmer and dragonfly nymphs were stable over time at a mean of 3.2, 7.0 and 9.6 larvae consumed each day. Conclusion: This study demonstrates that aquatic macroinvertebrate predators display adaptive foraging behaviour in response to prey presence and aquatic habitat size. It also confirms the ability of these predators to significantly reduce An. gambiae larval densities in aquatic habitats, thus their potential for consideration as additional biocontrol tools for mosquito population reduction." (Authors)] Address: Tripet, F., Dept of Zoology, Entomology and Fisheries Sciences, College of Natural Sciences, School of Biosciences, Makerere University, P.O. Box 7062 Kampala, Uganda. Email: frederic.tripet@swisstph.ch

24189. Palacio, A.; Ferreira, V.R.S.; Batista, J.D.; Juen, L. (2025): New records for Erythrodiplax fulva (Libellulidae: Odonata) from Brazil. Revista Brasileira de Entomologia 69(1), e20240070: 4 pp. (in English) ["The genus Erythrodiplax is the most species-rich libellulid in the Neotropics. E. fulva is one of the less known species of this genus, with its larva currently unknown and conservation status undefined. It was described based on specimens from Venezuela and later recorded from Guiana and French Guiana. We record the species from Brazil for the first time, comment on the importance of the distributional expansion range of E. fulva and point out the main differences between similar species." (Authors)] Address: Ferreira, V.R., Univ. Federal do Pará (UFPA), Laboratório de Ecologia e Conservação (LABECO), Belém, PA, Brasil. Email: victor_rennan890@hotmail.com

24190. Paul, G.; Karnaver, P.; Sreelekshmi, I.; Joseph, A.; Suresh, P. (2025): Water quality and odonate diversity in Peruvelichal paddy fields of Vettiyar village in Alappuzha District of Kerala. Records of the Zoological Survey of India 124(1S): 491-500. (in English) ["The Present study focusses on water quality and odonate diversity of three selected sites (Pond, Stream and River) associated with Peruvelichal paddy fields of Vettiyar Village in Alappuzha district of Kerala conducted from December 2022 to May 2023, revealing the presence of 14 odonate species namely Libellulidae (11 species), and Coenagrionidae (3 species). The most abundant Anisopteran species was found to be Neurothemis tullia (617 individuals) and among Zygoptera, the most abundant species was Pseudagrion microcephalum (150 individuals). A categorisation of species into Very common (VC), Common (CO) Rare (RA) and Occasional (OC) based on the number of individuals recorded showed that 4 species (29%) were of very common occurrence, 5 species (36 %) were common, 3 species (21%) were rare and 2 species (14%) were occasional visitors. A total of 1086 individuals belonging to 14 Taxa were observed. Biodiversity indices such as Simpson's index (D) (0.861), Shannon-Wiener Index (H) (2.239), Equitability Index (J) (0.8486) and Evenness Index (E), (0.6706) indicated stable environment and good distribution of odonates along the study site. Water Quality Index was highest at Site II (70.83) followed by Site I (54.19) and Site III (52.89). Strikingly, the WQI of all three sites falls under Category III (poor Water quality). The stream was the most contaminated among the three sites. Adult female dragonflies congregate around emergent aquatic plants to lay eggs on their leaves, indicating the necessity of clean water to complete their life cycle. The study provides information on the odonate diversity of the area, which acts as the baseline data for future ecological studies highlighting the importance of preserving biodiversity and maintaining the quality of aquatic ecosystems by assessing and addressing the pollution levels in water bodies." (Authors)] Address: Karnaver, Preetha, Dept of Zoology, Christian College, Chengannur, Alappuzha 689122, Kerala, India. Email: preethakarnaver@christiancollege.ac.in

24191. Phattanarak, C.; Chainthong, D.; Boonsoong, B. (2025): New record of Stylogomphus lawrenceae Yang & Davies, 1996 (Odonata, Gomphidae) in Thailand and updates on its distribution. Check List 21(1): 242-247. (in English) ["S. lawrenceae is reported from reared specimens for the first time in Thailand. This is a range extension to the south from a previously known locality (China and the northern part of Laos). We also provide a comparison and updated distribution map of three known Stylogomphus species in Thailand." (Authors)] Address: Boonsoong, B., Animal Systematics & Ecology Speciality Research Unit (ASESRU), Dept of Zoology, Faculty of Science, Kasetsart University, Bangkok, Thailand. Email: fscibtb@ku.ac.th

24192. Prins, N.; Spitzen-van der Sluijs, A.; Verbrugge, L.; Jongejans, E. (2025): The extent of amphibian, fish and water plant translocations by garden pond owners. Biological Invasions 27, 46: 16 pp. (in English) ["Some people move plants and animals to or from their garden ponds. Translocations by garden pond owners might contribute to the spread of pathogens and species, but generally go undocumented.

We therefore conducted an online survey targeting Dutch garden pond owners through various relevant communication channels and hobbyist groups to explore the extent (frequency, distance and number) of fish, amphibian and water plant translocations. A total of 563 questionnaires were returned, of which 556 were suitable for analyses. Our findings show that all species groups are occasionally collected from natural areas, with plants more often collected than fish and amphibians. When removed from garden ponds, amphibians were translocated to natural water bodies in 70% of the cases, which was more often compared to fish (24%) and water plants (7%). In total, 19% of the 732 documented translocations involved alien species, of which nine alien plant and 16 alien fish species could be identified. The distances over which animals and plants were transported ranged between 8 m and 260 km. Our study shows that translocations of animals and plants by garden pond owners are common and that motivations of people can differ. Further quantification of these translocations is vital to better assess the relative impact of this pathway on the spread of invasive alien species and pathogens. Better information, including repeated communication and a best practices protocol, is required to raise awareness among pond owners." (Authors) The paper includes a passing reference to Odonata.] Address: Jongejans, Eelke, Radboud Institute for Biological & Environmental Sciences, Radboud University, Heyendaalseweg 135, 6525 AJ Nijmegen, The Netherlands. Email: Eelke.Jongejans@ru.nl

24193. Rahmawati, Y.F.; Leksono, A.S.; Gama, Z.P.; Rizali, A. (2025): The impact of refuges on Citrus orchards associated with arthropods in different agroecosystem in Malang, Indonesia. Cogent Food & Agriculture, 11:1, 2448599, DOI: 10.1080/23311932.2024.2448599: 17 pp. (in English) ["Pests are one of the constraints in citrus cultivation in Malang District, Indonesia, as they affect yield quality. The objective of this study was to evaluate the diversity of visiting arthropods and their relationship with environmental parameters. Arthropods were observed in 4 replicates in monoculture (control) and polyculture citrus orchards (July-December 2023). This study adopted three measures of Hill's number (q = 0,1,2) to compare species diversity. Analyses were conducted using the R package (iNEXT) version 2.0.20. Pearson and Principal Component Analysis (PCA) tests examined the relationship between arthropod species and the environment. A total of 12,286 Arthropod individuals were observed, consisting of 11 orders, 74 families, and 168 species. ..." (Authors) Orthetrum sabina, Crocothemis erythraea [sic], and Pantala flavescens are listed.] Address: Leksono, A.S., Department of Biology, Faculty of Mathematics and Natural Sciences, Brawijaya University, Jl. Veteran, Malang, East Java, 65145 Indonesia. Email: amin28@ub.ac.id

24194. Romero-Martín, A.; Márquez, F.J.; López-Montoya, A.J.; Gilbert-Rus, J.D. (2025): Caracterización biométrica de larvas de Cordulegaster boltonii (Donovan, 1807) en Sierra Nevada (sureste de la Península Ibérica). Limnetica 44(1): 125-139. (in Spanish, with English summary) ["C. boltonii is a dragonfly widely distributed in Europe and North Africa, with populations recorded in more than 25 countries. However, biometrics studies carried out on larvae of this species are very scarce. Based on previous research and the purpose of this study, four highly representative morphological parameters have been selected and used to characterize larvae of this species: total length (TL), abdominal length (AL), head width (AC) and length of the right metathoracic pteroteca (LP). This research is the first biometric study carried out with C. boltonii larvae from five water courses in the Sierra Nevada, southeast Iberian Peninsula. When comparing the values of these variables between larvae of different sexes and larval stages, no significant differences were detected between the studied populations. The results reveal very homogeneous and unique values for the species in Sierra Nevada, establishing a biometric pattern for the last four larval stages (F-3 to F-0), also taking into account the sex of the specimens." (Authors)] Address: Gilbert-Rus, J.D., Parque Nacional y Parque Natural de Sierra Nevada. Consejería de Sostenibilidad, Medio Ambiente y Economía Azul - Junta de Andalucía. 18191 Pinos Genil, Granada, Spain. Email: dgilbert@ujaen.es

24195. Rüppell, G.; Hilfert-Rüppell, D. (2025): Dragonfly behavior: Discovering the dynamic life of an ancient order of insects. Springer: 240 pp. (in English) ["This book is the first to allow you to experience the details of the ultra-fast lives of dragonflies, these large, beautiful flying insects, through an abundance of unique snapshots and image sequences. Dragonflies are world champions of flight, bionic wonders; they reveal much about the mysteries of evolution. We witness their social interaction, and appreciate their success over three hundred million years. Dragonflies - what an evocative name! - are easy to observe, even for beginners. About 80 species live in Germany, and every body of water is home to a few. They are not shy, do not sting and often come very close. Perhaps you will fall in love with dragonflies - just like the two authors who have been studying them for over 30 years. With the knowledge in this book, you will look at dragonflies in a completely novel way."] Address: Hilfert-Rüppell Dagmar, Zool. Inst. TU Braunschweig, Fasanenstr. 3, 38092 Braunschweig, Germany. E-mail: d.hilfert@tu-bs.de

24196. Saç, G.; Agdamar, S.; Acar, Ü.; Giannetto, D. (2025): Seasonal and spatial variation in the diet of Gambusia holbrooki in different water bodies of Karaburun Peninsula (Western Türkiye). Diversity 2025, 17(1), 51; https://doi.org/10.3390/-d17010051: 14 pp. (in English) ["The Eastern mosquitofish Gambusia holbrooki Girard, 1859, has been widely introduced into tropical and temperate countries as a biological agent to control mosquitos, which are associated with diseases such as malaria and yellow fever. However, the species exhibits invasive characteristics by competing with native species for food and habitat use. This study investigates the feeding ecology of G. holbrooki populations from three distinct freshwater environments (Lake Iris, Eglenhoca Reservoir, and Parlak Reservoir) on the Karaburun Peninsula (North-Western Türkiye), a region outside its native range. The primary aim was to evaluate seasonal and spatial variations in the diet of the species. A total of 871 specimens were analysed: 247 from Iris Lake, 318 from Parlak Reservoir, and 306 from Eglenhoca Reservoir. Low percentages of empty stomachs (=20%) across all populations indicate high feeding intensity. The results reveal that G. holbrooki exhibits a generalist feeding strategy, consuming a wide range of food items such as insects, zooplankton, and plant material across all the investigated environments. The relative importance of food groups (determined by the Importance Index, MI%) varied seasonally but not spatially. In all three populations, the most important food source in the spring was dipterans, followed by plants in the summer and fall, and cladocerans in the winter. Plants accounted for the largest percentage of the diet in every population (MI% >65%). These findings suggest that G. holbrooki adapts its diet to seasonal food availability." (Authors)] Address: Saç, Gülsah, Department of Biology, Faculty of Science, Istanbul University, Vezneciler-Fatih, 34134 Istanbul, Türkiye

24197. Samways, M.J.; Pryke, J.S.; Gaigher, R.; Deacon,

C. (2025): Biosphere reserves in the megadiverse cape floristic region are effective in conserving arthropod diversity. Integrative Conservation. https://doi.org/10.1002/inc3.72: 18 pp. (in English) ["Biosphere reserves (BRs) aim to protect global biodiversity alongside social and economic development. Each BR is composed of a core area where biodiversity conservation is maximal. Surrounding this zone is a buffer and then a transition zone where agroecological farming and other low-intensity land-uses are undertaken to an increasing degree. The Cape Floristic Region (CFR) is a biodiversity hotspot at the southern tip of Africa, extremely rich in endemic plants and arthropods. We review the instigation of four CFR BRs for effective conservation to protect this unique biodiversity, and where new species are regularly being discovered. Core areas protect many endemic and rare arthropod species with impacts from human activities in these critical areas being softened by the outer zones. Within the buffer and transition zones, agroecological approaches are advancing arthropod conservation, largely through maintenance of natural patches in the agricultural matrix. While larger patches are better, small patches also have high value for arthropods, especially when functionally connected. Other biodiversity-friendly farming methods such as high vegetation cover between vine rows are also proving to be effective for indigenous arthropod conservation, as is an ecologically sensitive pest management strategy. Furthermore, a national programme aimed at removal of invasive alien trees is enabling arthropod recovery, especially endemic stream insects. Although fire is a natural CFR phenomenon, increased fire frequency is of concern. Nevertheless, natural fire refuges remain vitally important and are playing a critical role, especially for vulnerable species-rich groups like pollinators. Overall, there is optimism that most arthropod species will remain at effective population levels in this megadiversity hotspot by putting in place effective precautionary measures. Flere we show that the BR model contributes towards the protection of the CFR's endemic arthropod fauna, with potential to expand the BRs beyond the four official reserves." (Authors)] Address: Deacon, C., Department of Conservation Ecology and Entomology, Stellenbosch University, Matieland 7602, South Africa. Email: charldeacon@sun.ac.za

24198. Sarsavan, A.; Pawar, M.; Talegaonkar, R.; Sharma, H.; Kumawat, S. (2025): First record of Elattoneura nigerrima (Laidlaw, 1917) (Odonata: Platycnemididae) from Rajasthan, India: Habitat insights and morphological observations. Species 2025; 26: e10s1779: 4 pp. (in English) [27-VII-2023, fast flowing seasonal stream (25°19'N, 75°12'E) near Deogarh village, Mandalgrah block, Bhilwara district, India.] Address: Sarsavan, A., Foundation for Ecological Security, Post Box No. 29 Jahangirpura, Hadgud, District –Anand Gujarat, India- 388 370. Email: manohar.pawar@fes.org.in

24199. Sayer, C.A.; Fernando, E., Jimenez, R.R.; Macfarlane, N.B.W.; Rapacciuolo, G.; et al. (2025): One-quarter of freshwater fauna threatened with extinction. Nature (2025). https://doi.org/10.1038/s41586-024-08375-z: (in English) ["Freshwater ecosystems are highly biodiverse and important for livelihoods and economic development, but are under substantial stress. To date, comprehensive global assessments of extinction risk have not included any speciose groups primarily living in freshwaters. Consequently, data from predominantly terrestrial tetrapods are used to guide environmental policy and conservation prioritization, whereas recent proposals for target setting in freshwaters use abiotic factors. However, there is evidence that such data are insufficient to represent the needs of freshwater species and achieve biodiversity goals. Here we present the results of a multi-taxon global freshwater fauna assessment for The IUCN Red List of Threatened Species covering 23,496 decapod crustaceans, fishes and odonates, finding that one-quarter are threatened with extinction. Prevalent threats include pollution, dams and water extraction, agriculture and invasive species, with overharvesting also driving extinctions. We also examined the degree of surrogacy of both threatened tetrapods and freshwater abiotic factors (water stress and nitrogen) for threatened freshwater species. Threatened tetrapods are good surrogates when prioritizing sites to maximize rarity-weighted richness, but poorer when prioritizing based on the most range-restricted species. However, they are much better surrogates than abiotic factors, which perform worse than random. Thus, although global priority regions identified for tetrapod conservation are broadly reflective of those for freshwater faunas, given differences in key threats and habitats, meeting the needs of tetrapods cannot be assumed sufficient to conserve freshwater species at local scales." (Authors)] Address: Sayer, Catherine, IUCN (International Union for Conservation of Nature), Cambridge, UK

24200. Schwesig, K.; Zizka, V.; Scherber, C.; Hölzel, N. (2025): Comparing eDNA and transect methods for aquatic biodiversity assessment in lakes and ponds. Molecular Ecology Resources 25(3), e14060: 12 pp. (in English) ["Biodiversity monitoring increasingly relies on molecular methods such as eDNA metabarcoding. However, sound applications have so far been only established for a limited number of taxonomic groups. More information on the strengths and weaknesses of eDNA methods, especially for poorly covered groups, is essential for practical applications to achieve the highest possible reliability. We compared amphibian and Odonata data from eDNA metabarcoding and traditional transect walks on N = 56 plots in 38 water bodies distributed over six extraction sites for building materials in Northwest Germany. The traditional amphibian assessment included visual encounters, dip netting and acoustic detection, while Odonata were assessed through exuviae. In total, both methods detected 8 out of 11 amphibian species, while the remaining three species were detected by eDNA only. We did not find differences in amphibian species numbers per plot, but mean detection probabilities were higher with metabarcoding. In contrast, both methods detected 10 out of 29 Odonata species, while the remaining 19 species were detected by exuviae only. Species numbers per plot were higher for exuviae and only 30% of species were detected with metabarcoding. The species identified by eDNA were those with high abundance, and their detection probabilities were similar to transect walks. The results for amphibians show equal suitability and high complementarity of the compared methods. Metabarcoding detected species more efficiently and therefore offers a suitable protocol for biodiversity monitoring. For Odonata, eDNA metabarcoding showed considerable gaps, implying the need for protocol evaluation and improvement in assessment of ecological communities based on eDNA." (Authors)] Address: Schwesig, Katharina, Biodiversity & Ecosystem Research Group, Inst. Landscape Ecology, Univ. of Münster, Münster, Germany. Email: katharina.schwesig@uni-muenster.de

24201. Senn, P. (2025): How climate warming appears to be affecting the odonate fauna of Gdynia (N Poland): results and observations from the 2024 season. W jaki sposób ocieplenie klimatu zdaje siê wplywaæ na faunê wa¿ek w Gdyni: wyniki i obserwacje z sezonu 2024 r. Odonatrix 212: 21 pp. (in English) ["The paper presents interesting new records of dragonflies from the Gdynia district of Chwarzno-Wiczlino (N Poland) in 2024. The breeding of Sympetrum

fonscolombii was confirmed, and Aeshna affinis and Erythromma viridulum were reported for the first time from Gdynia. In addition, S. meridionale was recorded in the city for the third time. Six species listed as endangered in the European Red List of Dragonflies were recorded: Lestes sponsa, Aeshna grandis, Somatochlora metallica, Sympetrum danae, S. pedemontanum and S. vulgatum. The apparent replacement of S. vulgatum by S. striolatum and the probable northward and eastward range shifts of cold-adapted species of Siberian and West Siberian are analysed." (Authors)] Address: Senn, P., ul. Kañskiego 7D/9, 81-306 Gdynia, Poland. Email: petersenn47@gmail.com

24202. Serrana, J.M.; Li, B.; Watanabe, K. (2025): Cross-taxa assessment of species diversity and phylogenetic structure of benthic communities in a dam-impacted river undergoing habitat restoration. Science of the Total Environment 958, 177886: 11 pp. (in English) ["Highlights: • Metabarcoding was used for cross-taxa assessment in a dam-impacted river. • Independent factors influenced alpha-diversity across benthic groups within the same habitat. • Positively correlated alpha-diversity of benthic macroinvertebrates and microbial communities. • Cross-taxa assessments are crucial for effective river ecosystem monitoring. Abstract: Exploring diversity and community composition patterns across evolutionary and functionally diverse organisms is critical for understanding the general processes that shape biodiversity in response to environmental changes. Knowledge of multitrophic relationships offers valuable insights to support the effective assessment and management of freshwater ecosystems. In this study, we conducted a cross-taxa assessment of benthic macroinvertebrates and microorganisms using metabarcoding-based surveys to evaluate habitat restoration in a damimpacted river. We found no correlation between the alpha-diversity of the benthic macroinvertebrate and microbial communities. This suggests that factors influencing the alpha-diversity of different trophic groups might operate independently or through different mechanisms, even within the same habitat. In contrast, we observed positively correlated alpha-diversity patterns between the two benthic communities influenced by dam fragmentation and gravel bar restoration. This suggests that environmental heterogeneity between sites may have a common influence on the patterns of pairwise dissimilarities in the benthic communities, even though they have significant differences in key traits, e.g., species composition, functional roles, or trophic level. Additionally, phylogenetic structure analysis revealed a greater dam impact on benthic macroinvertebrates than microbial communities. ... Notable observations were the positive correlations between the amphipods (Amphipoda), haplotaxids (Halpotaxida), oligochaetes (Lumbriculida), and Odonata and caddisfly nymphs (Trichoptera) against the bacterial phyla Patescibacteria, Chloroflexi, Nitrospirota, Fusobacteriota, and Elusimicrobiota." (Authors)] Address: Watanabe, K.Center for Marine Environmental Studies (CMES), Ehime Univ., Matsuyama, Ehime, Japan. Email: watanabe.kozo.mj@ehime-u.ac.jp

24203. Sivell, O.; Sivell, D.; Mitchell, R.; Webb, J. (2025): The genome sequence of the Small Red Damselfly, Ceriagrion tenellum (de Villers, 1789) [version 1; peer review: awaiting peer review]. Wellcome Open Research 2025, 10:79: 12 pp. (in English) ["The genome sequence has a total length of 2,077.00 megabases. Most of the assembly (99.28%) is scaffolded into 14 chromosomal pseudomolecules, including the X sex chromosome. The mitochondrial genome has also been assembled and is 17.21 kilobases in length." (Authors)] Address: Sivell, Olga, Natural History Museum, London, England, UK

24204. Sniegula, S.; Konczarek, D.; Bonk, M.; Antol, A.; Amer, N.R.; Stoks, R. (2025): Non-consumptive effects of native, alien and invasive alien crayfish on damselfly egg life history and carry-over effects on larval physiology. NeoBiota 97: 215-235. (in English) ["Invasive alien (IA) predators pose significant threats to native ecosystems, often leading to profound impacts on prey species through both direct and non-consumptive effects (NCE). This study focused on the NCE of predator-induced stress from one native crayfish species, noble (Astacus astacus), compared to one alien Danube crayfish (Pontastacus leptodactylus) and two IA crayfish species, signal (Pacifastacus leniusculus) and spinycheek crayfish (Faxonius limosus), on the native damselfly Ischnura elegans. We investigated the direct crayfish cue effect on egg traits as well as potential carry-over effects from the egg stage to the larval stage. We hypothesised that native crayfish cues would lead to more pronounced negative effects on prey traits compared to alien and IA crayfish, due to an evolutionary history of interaction and recognition of these threats. Unexpectedly, compared to native crayfish cues, alien and IA crayfish cues caused significantly higher egg mortality and prolonged developmental times, particularly cues from danube and signal crayfish, while cues from spinycheek crayfish had weaker, yet, still significant effects. Hatching synchrony was reduced and this to the same extent by the cues of all four crayfish species. Notably, cues from both alien and IA crayfish species caused significant carry-over effects, resulting in reduced larval survival, mass and fat content, which were more pronounced for danube and signal crayfish. Native crayfish cues did not induce carry-over effects, suggesting that I. elegans may have evolved a degree of resilience against this predator or that native crayfish produce chemical cues that do not cause a strong antipredator response. Our findings underscore the importance of considering immediate and carry over effects of crayfish on prey traits across multiple life stages, particularly in the context of biological invasions." (Authors)] Address: Sniegula, S., Institute of Nature Conservation, Polish Academy of Sciences, al. Adama Mickiewicza 33, 31-120 Kraków, Poland. Email: szymon.sniegula@gmail.com

24205. Sniegula, S. (2025): Two new records of the common hawker Aeshna juncea (LINNAEUS, 1758) in the Austrian Alps. Odonatrix 213: 3 pp. (in English, with Polish summary) ["A. juncea is widespread in Europe, preferring acidic peat bogs and small dystrophic water bodies, particularly those with sedge-covered banks. The species is classified as Endangered (EN) on the latest European Red List of Odonata due to a strong de-cline in populations over the past decade, primarily driven by habitat loss and hydrological changes. In Austria, A. juncea is common and classified as Least Concern (LC) on the Austrian Red List. This study documents two previously unrecorded sites of A. juncea in the Austrian Alps, highlighting its presence in mountain habitats. These records might be important for monitoring environmental changes in alpine regions." (Author)] Address: Sniegula, S., Institute of Nature Conservation, Polish Academy of Sciences, al. Adama Mickiewicza 33, 31-120 Krakow, Poland.Email: szymon.sniegula@gmail.com

24206. Soares, A. do R.; Sudaryanti, S.; Koderi (2025): Bioassessment of macroinvertebrates in Coban Rais River, Oro-Oro Ombo Vilage, Post Administrative of Batu, Batu City. Jurnal Penelitian Pendidikan IPA 11(1): 405-414. (in English) ["Coban Rais, part of the Brantas River upstream area, is a tourist destination with natural waterfalls and anthropogenic activities affecting its river health. This study analyzed river health using macroinvertebrates sampled at nine

stations with varying land uses. Samples were collected with hand nets (500 ìm mesh) using a 10-meter kicking technique in riffle areas. Data were analyzed using the SIGNAL2 index. A total of 76 macroinvertebrate families from 15 orders, ... Station 4 had the highest diversity (33 families), …, while Station 9 recorded the lowest (7 families), … SIGNAL2 results categorized stations 1 and 2 as unpolluted (values of 6.26 and 5.39, respectively), stations 3–8 as lightly polluted (values between 3.71 and 4.79), and station 9 as heavily polluted (3.61). Recommendations include maintaining unpolluted stations through regular cleaning and erosion control, reducing waste disposal near lightly polluted stations, and treating livestock waste before discharge at heavily polluted sites. Public awareness campaigns are vital to promote river health and protect macroinvertebrate diversity." (Authors) Taxa are treated at family level, but obviously are misidentified as the list includes the Central American family Amphipterygidae.] Address: Soares, Adelina do Rego, Environmental Resource Management and Development Program, Graduate School, Universitas Brawijaya, Malang, Indonesia. Email: ade.drsl@gmail.com

24207. Stefanescu, C (2025): Millions ofinsects migrate across the Pyrenees: heavy transitand conflicting ecological roles. Proc. R. Soc. B292: 20242096.https://doi.org/10.1098/-rspb.2024.2096: 4 pp. (in English) ["During the four seasons in which the study was carried out, migratory insects of up to 20 families belonging chiefly to five orders were identified: Diptera, Hymenoptera, Hemiptera, Lepidoptera and Odonata. The Diptera were by far the best represented order, since they accounted for up to 89% of all specimens, while Hymenoptera and Hemiptera contributed 6% and 5% of the specimens, respectively, and Lepidoptera and Odonata barely 1% each.... Another sign of change is the relative rarity of dragonflies in recent samplings at Bujaruelo, which contrasts with what the Lacks described as an 'uncountable stream' in 1950. [Lack D, Lack E. 1951 Migration of insects and birds through a Pyrenean pass. J. Anim. Ecol. 20, 63–67.]" (Author)] Address: Email: cstefanescu@mcng.cat

24208. Stinshoff, P.; Henn, Y.; Rommel, S.H.; Helmreich, B. (2025): Heavy metal leaching from stormwater control measures – insights into field and lab prestressed media and road-deposited sediments. Environmental Science Water Research & Technology 11: 328-340. (in English) ["The risk of heavy metal leaching from sorptive filter media in stormwater control measures (SCMs) treating road runoff is mainly assessed through lab-scale studies. In contrast, investigations with filter media prestressed under real conditions are crucial. Therefore, the leaching potential of five traffic-relevant heavy metals (Cr, Cu, Ni, Pb, and Zn) from field-scale and lab-scale prestressed sorptive filter media and road-deposited sediments (RDSs) from a decentralized treatment facility was assessed using quiescent batch leaching tests with and without adding de-icing salts. The hydraulic retention times of a maximum of 7 days should represent prolonged submerged conditions during dry periods. The leaching quantity order was Zn » Cu > Ni, whereas no observed leaching was quantified for Cr and Pb for all tested materials. Considerable loads of Cu only leached from the field-scale prestressed sorptive filter media, which was mainly associated with the presence of dissolved organic matter. Regarding the tested filter media, zeolite and carbonate sand revealed significantly higher leaching of Zn under the influence of deicing salts. The leaching of Cu and Zn concerning the mobile heavy metal fraction was less than 0.2%. The highest concentrations of heavy metals were observed for the RDSs, where up to 0.3% leached of the potential mobile fraction during one dry cycle." (Authors) The study includes a passing reference to Odonata.] Address: Stinshoff, P., Chair of Urban Water Systems Engineering, Technical Univ. of Munich, Am Coulombwall 3, 85748 Garching, Germany. Email: sww@tum.de

24209. Sun, L.; Cheng, Z.; Wang, M.; Wei, C.; Liu, H.; Yang, Y. (2025): A multi-levels analysis to evaluate the toxicity of microplastics on aquatic insects: A case study with damselfly larvae (Ischnura elegans). Ecotoxicology and Environmental Safety 289, 1 January 2025, 117447: 10 pp. (in English) ["Highlights: •PS MPs had no significant effects on the body weight and survival rate of damselfly larvae. •The activity and movement tendency decreased with the increase of PS MPs concentration. •Expression levels of some metabolites altered, such as nicotinic acid, fumaric acid, and stearic acid. •The pathways related to oxidative phosphorylation and carbon metabolism were upregulated. •The species richness of gut microbes increased significantly, and the composition altered. Abstract: Microplastic (MP) pollution prevalent in freshwater environments and jeopardizes the organisms living there. Dozens of studies have been conducted to investigate the harmful effects of microplastics on organisms. However, the most diverse and sensitive aquatic insects are often overlooked, also there is a lack of a comprehensive research exploring the toxicity of microplastics. Here, taking the damselfly larvae (Ischnura elegans) as the subject, we investigated the effects of different concentration levels of polystyrene microplastics (PS MPs) on their physiological characters, behavioristics, metabolomics and transcriptomics, as well as gut microbiome. The results showed that the PS MPs had no significant effects on the body weight and survival rate, but led to behavioral inhibition. Furthermore, expression levels of some metabolites altered, such as nicotinic acid, fumaric acid, and stearic acid. Meanwhile, the pathways related to oxidative phosphorylation and carbon metabolism were upregulated at the transcriptomic level. Moreover, there was a modification of the gut microbial community, with an increase in species richness but a shift towards potentially harmful bacteria. Our findings suggested that exposure to PS MPs affected the overall health of damselfly larvae. Therefore, effective management of MPs to minimize their environmental input is crucial in reducing health risks to aquatic organisms." (Authors)] Address: Liu, H., Key Laboratory of Zoological Systematics and Application, School of Life Science, Institute of Life Science and Green Development, Hebei University, Baoding 071002, China. Email: liuhy@hbu.edu.cn

24210. Willink, B. (2025): The genome sequence of the Tropical Bluetail Damselfly, Ischnura senegalensis (Rambur, 1842) [version 1; peer review: awaiting peer review]. Wellcome Open Research 2025, 10:104 Last updated: 24 FEB 2025: 13 pp. (in English) ["We present a genome assembly from a specimen of Ischnura senegalensis (Tropical Bluetail; Arthropoda; Insecta; Odonata; Coenagrionidae). The assembly contains two haplotypes with total lengths of 1,599.82 megabases and 1,602.78 megabases. Most of haplotype 1 (96.41%) is scaffolded into 14 chromosomal pseudomolecules, including the X sex chromosome, which haplotype 2 is a scaffold-level assembly. The mitochondrial genome has also been assembled and is 18.11 kilobases in length." (Author)] Address: Willink, Beatriz, Department of Entomology, Cornell University, Ithaca, New York, USA

24211. Wilson, K. (2025): Ian David Endersby 18 April 1941 to 19 April 2024. Agrion 29(1): 3. (in English) [Obituary for the wellknown Australian odonatologist Ian David Endersby.] Address: Wilson, K.D.P., 18 Chatsworth Road, Brighton, BN1 5DB, UK. E-mail: kdpwilson@gmail.com