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Martin Schorr, Schulstr. 7B, D-54314 Zerf, Germany. Tel. ++49 (0)6587 1025; E-mail: oestlap@online.de

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1996

24961. Bößneck, U. (1996): Beitrag zur Libellen-Fauna des Standortübungsplatzes Drosselberg bei Erfurt (Insecta: Odonata). Veröffentlichungen des Naturkundemuseums Erfurt 15: 144-151. ["Between 1993 and 1996, the dragonfly fauna of a military training area near Erfurt was studied. 20 species were identified. Of particular faunal interest were the occurrences of Lestes barbarus, Ischnura pumilio, Aeshna juncea, and Sympetrum pedemontanum." (Author/Google translate)]

24962. Burbach, K.; Faltin, I.; Königsdorfer, M.; Krach, E.; Winterholler, M. (1996): Coenagrion ornatum (Selys) in Bayern (Zygoptera: Coenagrionidae). Libellula 15(3/4): 131-168. (in German, with English summary) ["In 1995, 15 of the 28 occurrences of C. ornatum were surveyed on behalf of the Bavarian State Office for Environmental Protection. Populations were found in 43 ditches and 2 streams in ten areas, with nine of these being native occurrences. In four areas, three or more water bodies were colonised and the populations were relatively large (> 500 individuals), with maximum individual densities of 2 individuals/m. Essential habitat factors are low water temperature, oxygen content, flow velocity, groundwater influence, a minimum of emergent and submerged, probably evergreen vegetation (> 10%), not too dense emergent vegetation (< 80-90%), at least locally shallow water depth, little to no shade and low clearing frequency. Adjacent extensive grassland use and the presence of at least narrow unmown edge strips during the flight period appear to be necessary. The threat situation, necessary protective measures and factors that have not yet been sufficiently investigated are discussed. Clearing may only be carried out at intervals of no more than four years and in sections; if vegetation growth is heavy, mowing of the water and embankment vegetation is necessary, and adjacent areas should be used as extensive grassland." (Authors/DeepL)] Address: Burbach, K., Kirchenweg 4, 85354 Freising, Germany. E-mail: k-burbach@web.de

24963. Picknell, A.; Eades, R.A.; Phalan, B. (1996): Dragonflies - food for hobbies? Some answers. Bulletin of the Amateur Entomologists' Society 55(404): 42-43. (in English) [A record of preying of hobbies on Cordulegaster boltonii is documented.] Address: not stated

24964. Wolf, C.F. (1996): Aquatic macroinvertebrate diversity and water quality of urban lakes. MSc thesis, Graduate Faculty of Texas Tech University. IX, 104 pp. In English ["Macroinvertebrate species diversity and community composition are important themes in aquatic ecology, and are often used to evaluate environmental stress resulting from a variety of anthropogenic disturbances. On the Southern High Plains of Texas, urban areas have incorporated lakes into their stormwater and surface-water management systems. Eight urban lakes were selected to include a range of physical and biological features (i.e., lake size, relative potential for nonpoint source pollution, and presence of aquatic vegetation) representative of urban lakes in Lubbock, Texas. These lakes were categorized into three a priori groups based on the above characteristics. I evaluated 16 physicochemical attributes on a monthly basis, from February 1993 to April 1994, and found that 12 of the attributes contributed significantly to differences among groups of lakes during the study. Macroinvertebrate community composition was sampled on six different dates in each lake to capture seasonal patterns in species diversity. No significant differences in species diversity (Fisher's log series a) existed among groups of lakes in the summer or for the combined seasons data, although significant differences did occur in the spring and fall. Groups of lakes that were significantly different represent the extremes in habitat complexity and invertebrate community composition. Community composition of group 1 and 3 lakes were dominated by three to four families of invertebrates, whereas in group 2 lakes, over 60% of species abundance was attributed to one species. Mantel's nonparametric test found a significant association between matrices based on water quality similarities and macroinvertebrate similarities during the fall sampling period. Furthermore, stepwise multiple regression using invertebrate species abundances as the dependent variable and water quality characteristics as the independent variables found significant relationships between corixid, notonectid, chironomid, and cladoceran abundances and salinity, total phosphorus, dissolved oxygen, total organic carbon, and ammonia. These attributes accounted for 33-76% of the variation observed in the abundances of these species. Of the water quality characteristics found to be significant predictors of species abundances, salinity, ammonia, and total organic carbon were correlated significantly to areal extent of multiple family housing and commercial land-use surrounding each lake. These results suggest that land-use may indirectly influence macroinvertebrate community composition of urban lakes." (Author) Odonate taxa are treated at genus level.] Address: https://ttu-ir.tdl.org/server/-api/core/bitstreams/b1c63cb7-b088-4401-8a64-d0ba1048-31e9/content

2005

24965. Li, P.; Yu, X.; Zhou, C.-F. (2005): On the etymology of common dragonfly names in Chinese. Chinese Bulletin of Entomology 42(4): 475-478. (in Chinese, with English summary) ["Various common names have been created for the

odonatan insects in Chinese. Among them, several are used at present, Qing-Ting, Qing-Ling (for dragonflies), Cong, Dou-Niang (for damselflies), Shui-Cai (odonatan naiads). The etymology of them show that they come from the color or shape of dragonflies or damselflies, but maybe the “Dou-Niang” was used in Japanese firstly, and we followed it. This foreign appellation appeared in modern Chinese scientific literatures only. At present, the relation of “Dou-Niang” in Chinese and it in Japanese is too complex for scholars to verdict about it." (Authors)] Address: Zhou, C.-F., College of Life Sciences, Nanjing Normal University, Nanjing 210097, China. Email: zhouchangfa@hotmail.com

24966. Zhang, Z.; Hong, Y.; Lu, L.; Jin, Y.; Fang, X. (2005): A new genus and species of Meganeuramidae fossil dragonfly from the Namurian in China. Journal of the Chinese Academy of Sciences 5(1): 1262-1265. (in Chinese) ["A new genus and species of the family Meganeuridae is described, the Shenzhou Qilian Mountains: Shenzhousia qilianshanensis sp.n, gen. nov.. The specimen was collected from the Upper Carboniferous Tupo Formation (C2t) of Ningxia. This is the first discovery of an insect of this family in China and the largest fossil insect of the Namurian age in the world. The main characteristics of the new genus are: a wingspan of approximately 450–500 mm; a short anterior leading edge region that does not extend to the mid-wing; a short ScP that merges into the C at the point where IR2 emerges; the RP branching point is close to the wing base, earlier than the branching point of the MA; RP1+2 and RP3+4 are close to each other and parallel for a long section, gradually separating after crossing the mid-wing." (Authors/Google translate)] Address: Zhang, Z., Stratigraphic Paleontology Lab., Geological Museum of China, Beijing, China

2006

24967. Jones, G.; Parsons, S.; Zhang, S.; Stadelmann, B.; Benda, P.; Ruedi, M. (2006): Echolocation calls, wing shape, diet and phylogenetic diagnosis of the endemic Chinese bat Myotis pequinius. Acta Chiropterologica 8(2): 451-463. In English ["We describe the echolocation calls, flight morphology and diet of M. pequinius Thomas, 1908. Orientation calls are broadband, and reach low terminal frequencies. Diet comprised 80% beetles by volume [Odonata: 0,6%]. Wing shape and call design suggest that the bats fly in cluttered habitats, and the possession of moderately long ears and the dietary composition imply they forage at least sometimes by gleaning." (Authors)] Address: Jones, G., School of Biological Sciences, Univ. of Bristol, Woodland Rd, Bristol BS8 1UG, UK. Email: Gareth.Jones@bris.ac.uk

24968. Lin, S.-C.; Shieh, S.-H.; Yang, P.-S. (2006): Distribution of nenthic macroinvertebrates in Mt. Hohuan area ponds, Central Taiwan. Formosan Entomologist 26: 249-260. (in Chinese, with English summary) ["This study was conducted to survey water quality and benthic macroinvertebrates at eight ponds in the Mt. Hohuan area in 2001. In total, 32,686 specimens of benthic macroinvertebrates belonging to three classes, seven orders, eight families, and 17 taxa were collected. These taxa included nine taxa of Diptera, three taxa of Trichoptera, and one taxon for each group of the Oligochaeta, Bivalvia, Ephemeroptera, Odonata [Aeshna petalura taiyal], and Coleoptera. Diptera were the most abundant taxa, and they accounted for 93.3% of individuals. The relationships between water quality and benthic macroinvertebrates were assessed by canonical correspondence analysis (CCA). The first two CCA axes explained about 46.7% of the variance in the macroinvertebrate assemblages. Based on the ordination on the first two CCA axes, the plots were divided into three groups. Benthic macroinvertebrates at site 7 corresponded to intolerant taxa, and site 7 was classified into an oligosaprobic pond typology. Sites 1-6 had benthic macroinvertebrates belonging to tolerant taxa, and were classified as a polysaprobic pond typology. Site 8 contained taxa that had medium tolerance to poor water quality, and was determined to have a mesosaprobic pond typology." (Authors)] Address: Sue-Cheng Lin* Division of Zoology, Endemic Species Research Institute, No. 1 Min-Sheng E. Rd., Chichi, Nantou 552, Taiwan. Email: lsc@tesri.gov.tw

2008

24969. Kovacs, T.; Ambus, A.; Juhász, P.; Olajos, P. Szilágyi, G. (2008): Larval and exuvial data to the Odonata fauna of Lithuania. Folia historica naturalia musei matraensis 32: 149-159. (in English) ["This paper provides 532 records of 39 species from 108 sampling sites collected between 28 June 2005 and 5 July 2008." (Authors)] Address: Kovacs, T., Mátra Museum., Kossuth Lajos u. 40, 3200 Gyöngyös, Hungary. E-mail: koati@matavnet.hu

24970. Medlock, J.M.; Snow, K.R. (2008): Natural predators and parasites of British mosquitoes – a review. European Mosquito Bulletin 25: 1-11. (in English) ["This paper reviews the recorded predators of all life stages of British mosquitoes and assesses their relative effectiveness in limiting mosquito populations. Predators vary markedly in the different habitats that immature and adult mosquitoes frequent, with representatives from at least six insect orders, thirteen arachnid families, as well as crustaceans, amphibians, fish, birds and mammals. We conclude that predators and parasites have a limited but significant effect on overall mosquito populations, and their role should be considered when implementing habitat management, mosquito control and when modeling mosquito population dynamics." (Authors) The review includes references to Odonata.] Address: Medlock, J.M., Health Protection Agency, Porton Down, Salisbury, Wiltshire, U.K. Email: jolyon.medlock@hpa.org.uk

2009

24971. Realpe, E. (2009): Diversidad del género Ischnura (Odonata: Coenagrionidae) y su relación con la altitud y orogenia de la Cordillera Oriental-Andes colombianos. PhD thesis, Facultad de Ciencias Departamento de ciencias Biológicas Escuela de Postgrado Bogotá. D.C., Universidad de los Andes: 102 pp. (in Spanish, with English summary) ["One of the environmental factors determining species diversity and distribution is temperature, which in turn is directly related to latitude and altitude, among other factors. Therefore, it also affects odonates, whose diversity decreases with increasing temperature. Their greatest diversity is found in the tropical belt, especially the Eastern and Neotropical biogeographic regions. The first part of the study shows the effect of altitude on the diversity of odonatofauna in an altitudinal profile over the Eastern Cordillera of the Colombian Andes. The transect at the latitude of Bogotá covered altitudes between 445 meters above sea level in the eastern plains and 3,164 meters above sea level in Chingaza National Natural Park, and 243 meters above sea level in the Magdalena River valley on the western slope. The 107 species found are framed within the following geographic distribution patterns: Amazonian. Magdalena-Lake Maracaibo Paleobasin and Andean species. The following trends were observed within the profile: Widespread species, lowland species, midland species, highland species,

and species exclusive to the eastern slope, while others were found on the western slope. Two special cases were detected: one with the presence of endemic species in the San Francisco area and another with overlapping lowland and highland faunas in the Cáqueza area. Six species new to science were recorded, as well as 28 new records for the Colombian odonatophaima. Based on this information, the special case of the genus Ischnura was elucidated and therefore taken as the central model for the study. This genus was characterized by being the only one that presents species from the lowest to the highest areas sampled. It shows notable diversification, with two new species found. It has also been estimated that its origin is Neotropical and that it diversified recently between the late Pliocene and Pleistocene. Continuing with the second part of the study, two new species of the genus Ischnura are described and illustrated, one from the high altitudes of the Eastern Cordillera of the Colombian Andes and the other from mid-altitudes. The morphological elements used to differentiate the species are the coloration patterns and the shape of the caudal appendages of males and the shape of the pronotum in females. I. chingaza sp. n. is found between 2600 and 3200 m along with I. cruzi (De Marmels. 1987), sometimes sharing the same habitat. I. cyanea sp. n. is found between 1300 and 2000 m, sharing habitats with I. capreolus (Hagen) and I. ramburii (Selys). Finally, an analysis of the phylogenetic relationships of the genus present in Colombia is undertaken, based on morphological data and molecular markers, using sequences of two mitochondrial genes, COI and COII. Their diversification is also related to the recent formation of the Eastern Cordillera and their altitudinal distribution. Gene sequences obtained from Genbank of North American species were also included in the analyses to establish phylogenetic relationships among the various ciates. The data were analyzed using Maximum Parsimony, Maximum Likelihood, and Bayesian Inference, and species divergence times were estimated under the assumption of a molecular clock. The local group is represented by the species I. ramburii, I. capreolus, I. hastata, I. cyane, I. cruzi, and I. chingaza. The analyses reveal the presence of two sister groups, a ciate with a wide distribution range between lowlands and midlands, I. ramburii. I. capreolus and I. cyane and another restricted to highlands L. cruzi and I. chingaza. The phylogenetic analysis of the group suggests early divergence times especially between L. cruzi and I. chingaza. When relating the North American species with the South American ones, the topologies generally present two sister groups, one that integrates the monophyletic North American group except for I. prognathus and the exclusively South American group that includes I. chingaza, L. cruzi and I. ultima, while the other brings together the species of wide latitudinal and altitudinal distribution I. ramburii, I. cyane and I. capreolus. Previous studies also suggest that the North American species present recent divergence times, from which it can be concluded that they are two analogous phenomena, one related to latitude and the other to altitude, which coincide respectively with geological events, also recent, such as the formation of the Isthmus of Panama and the elevation of the Eastern Cordillera." (Author/Google translate)] Address: https://repositorio.uniandes.edu.co/entities/publication/fc15a015-c496-4984-82c5-68dac41f251a

24972. Zhang, G. (2009): Forest Firefighter. Training Materials. Forestry, Biological Disaster, Prevention and Control: 476 pp. (in Chinese) ["Content Overview: This textbook first introduces the basic theories of forestry and forestry biological hazards. It then covers the fundamentals of forestry biological hazard monitoring, forecasting, prevention, and plant quarantine. Finally, based on the characteristics of forestry pests, it categorizes and introduces the identification and prevention of major forestry pests, as well as scientific management measures for forestry biological hazards in major forest types. This textbook offers tailored training content for different target groups, including senior forestry workers (county and municipal-level professionals), intermediate forestry workers (technical personnel at township forestry stations, forestry biological hazard prevention team members, forestry company employees, and "forest doctors"), quarantine officers, and junior forestry workers (village forest rangers). It can also serve as a reference for professionals in the forestry industry and current students." (Publisher/Google translate) The manual includes references to Odonata.] Address: https://image.sciencenet.cn/olddata/kexue.com.cn/upload-/blog/file/2009/3/200931117402871258.pdf

24973. Zhgareva, N.N.; Solovykh, G.N.; Ivanova, I.Yu.; Kolchugina, G.F. (2009): [Some hydrochemical and hydrobiological indicators of anthropogenic threat of the River Blyawa in the vicinity of the Medgonorsk city}. Vestnik OSU No. 6/June 2009: 124-128. (in Russian) ["The results of environmental monitoring of the Blyava River near Mednogorsk are presented. Copper and cadmium concentrations exceeded the maximum permissible concentrations (MPC) and permissible levels (according to international standards) in bottom sediments at all stations studied. In the zone affected by the copper and sulfur plant, macrozoobenthos was suppressed, even to the point of complete death, indicating the unfavorable ecological state of the river. For the first time, the structure of benthic communities of the small Blyava River (64 species) was determined in different areas." (Authors/Google translate) The list of taxa includes Aeshna cyanea and Aeshna sp.] Address: Zhgareva, N.N., Orenburg State Medical Acad., Russia

2010

24974. Peng, X.; Lin, S. (2010): Introduction to dragonflies and damselflies in the Ecological Park of the Center for Endemic Species Research and Conservation. Nature Conservation Quarterly 69: 56-61. (in Chinese) [Jijizhen, Nantou County, Taiwan; 27 odonate species are listed and briefly discussed.] Address: not stated

24975. Sturm, B. (2010): Die Libellen des Lavanttales Ökologische Ansprüche und Verbreitung. MSc thesis, Naturwissenschaftlichen Fakultät, Karl-Franzens-Universität Graz: 110 pp. (in German) ["Over a period of two years, the dragonfly population at standing waters and fishponds in the Lavant Valley was mapped. 34 waters were sampled at least three times per season. Based on the random sampling and their results, it can be assumed that not the entire community at the water body could be recorded. This study can serve as a basis for further surveys and confirms that the Lavant Valley, with its 23 resident and 31 observed species, could provide further interesting research results. Of the 31 observed species, two (Lestes dryas, Sympetrum depressiusculum) are classified in the Austrian Red List of Dragonflies under the category CR, critically endangered, although one of them could not be proven to be resident at the bottom of the water body. Furthermore, one species (Somatochlora flavomaculata) is classified as critically endangered, and five (Coenagrion hastulatum, C. pulchellum, Sympecma fusca, Aeshna affinis, Sympetrum pedemontanum) are listed as endangered. Two further species (Calopteryx virgo, Ischnura pumilio) are listed in the "endangered" category (cf. RAAB et al., 2007). Based on the study results, Lake St. Andrä [17]

can be considered the most species-rich habitat, both in terms of observed and native species. The fishponds in the valleys, especially the Kollnitzer Ponds [25] and the Mehringer Pond [23], also exhibit an unexpectedly high species richness. However, fish ponds are often neglected in dragonfly observations, as it is often assumed that only a few dragonfly larvae are appropriately adapted to this habitat. Since the Lavant Valley is poorly mapped with regard to dragonfly fauna, the following native species are considered the first records in the valley: Coenagrion pulchellum, Lestes sponsa, Chalcolestes viridis, Cordulia aenea, Crocothemis erythraea, Libellula quadrimaculata, Somatochlora metallica, Sympetrum depressiusculum, S. sanguineum, and S. striolatum] Address: not stated

2013

24976. Tsou, M.-H.; Chen, J.-C.; Yeh, W.-C. (2013): Macromia berlandi, a newly recorded corduliid dragonfly in Taiwan. Nature Conservation Quarterly 81: 13-41. (in Chinese, with Title in English) ["In 2012, while conducting a nature observation trip to Mount Wu in Beida, the second author observed several scimitars flying low along the roadside in the evening. After collecting males and comparing them, they confirmed that they were Macromia berlandi Lieftinck (1941), a species not previously reported in Taiwan." (Authors/Google translate).] Address: Yeh, W.-C., Division of Forest Protection, Taiwan Forestry Research Institute (TFRI), No. 53, Nanhai Rd., Zhongzheng Dist., Taipei, 100051, Taiwan. Email: wcyeh@tfri.gov.tw

2014

24977. Arndt, E.; Gröger-Arndt, H.; Kipping, J.; P. Schnitter (Bearb.) (2014): Bewertung des Erhaltungszustandes der wirbellosen Tierarten der Anhänge IV und V der FFH-Richtlinie sowie der EU-Osterweiterung in Sachsen-Anhalt. Berichte des Landesamtes für Umweltschutz Sachsen-Anhalt (Halle), Sonderheft 3: 252 pp. (in German) ["The Fauna-Flora-Habitat Directive lists species and habitat types of Community importance in its annexes. The designation of Natura 2000 sites also ensures the long-term, favorable conservation status of these species and habitat types through appropriate protection and development measures. To ensure this, the Fauna-Flora-Habitat Directive requires member states to submit regular reports on its implementation. The reports to the European Union also address the current conservation status of the species and habitat types. The latest reporting data for the period 2007 to 2013 were recently published by the Federal Agency for Nature Conservation on its website. This compilation should be viewed in this context. It is the first time that all available data for Saxony-Anhalt on the invertebrate species listed in Annexes IV and V, as well as those resulting from the EU's eastern enlargement, can be viewed in detail. This provides a continuation of the information on the invertebrate species listed in Annex II published by the State Office for Environmental Protection in 2010." (Authors/Google translate) On pages 59-160 Sympecma paedisca, Coenagrion ornatum, Aeshna viridis, Gomphus flavipes, Leucorrhinia albifrons, and L. caudalis are treated in detail.] Address: Kipping, J., BioCart Ökologische Gutachten, Taucha/Leipzig, Germany. E-mail: biocartkipping@email.de

24978. Smith, K.G., Barrios, V., Darwall, W.R.T. and Numa, C. (Editors); Boudot, J.-P.; Kalkmann, V.J (2014): The status and diversity of freshwater biodiversity in the Eastern Mediterranean. Cambridge, UK, Malaga, Spain and Gland, Switzerland: IUCN: xiv+132pp. (in English) ["The Eastern Mediterranean region supports just over 4.4% of the global human population yet contains only 1.1% of its renewable water resources, which are under constant threat from the impacts of unsustainable water withdrawal, dam development and climate change. This IUCN report and accompanying dataset represents a major advance in the provision of information to help incorporate biodiversity needs into water development planning processes within an Integrated River Basin Management framework. This volume includes species information compiled for each river and lake sub-basin and incorporates information from the assessment conducted by IUCN's Global Species Programme, in collaboration with its partners, of the status and distribution of all described species of freshwater fishes, molluscs, odonates, and plants from across the Eastern Mediterranean with existing information for species of freshwater dependent amphibians, birds, crustaceans, and mammals. This work represents the most comprehensive assessment yet of freshwater biodiversity at the species level for this part of the world." (Authors) Chapter 5 is directed to Odonata.] Address: https://portals.iucn.org/library/sites/library/files/documents/RL-262.2-001.pdf

2015

24979. Amit, B.; Tuen, A.A.; Haron, K.; Harun, M.H.; Kamarudin, N. (2015): The diet of yellow-vented bulbul (Pycnonotus goiavier) in oil palm agroecosystems. Journal of Oil Palm Research 27(4): 417-424. (in English) ["The Yellow-vented Bulbul (Pycnonotus goiavier) is one of the most sighted birds in oil palm plantation. A study on their dietary habits was conducted at the Durafarm Oil Palm Plantation, Block S8, Betong, Sarawak, Malaysia from February 2011 to May 2013 to determine the reason behind their abundance. In this study 45 individuals of P. goiavier were dissected for stomach content analysis. Ivlevs electivity index (E) was used to measure the degree of food selection by P. goiavier. The results showed that this bird species mainly selected the Order Coleoptera (mostly pollinating weevil) (E 0.97) and Homoptera (E 0.87) as their main food sources in the oil palm plantation. This bird also selected Order Diptera (E -0.30) Hemiptera (E -0.43) and Hymenoptera (E -0.92) as a prey based on their abundance. However, this species mainly avoided feeding on insects from Order Odonata [represented by 9% of all sampled insect specimens], Orthoptera, Dictyoptera and Lepidoptera (E-1.0 each) in oil palm plantation. There is a weak negative correlation found for the distribution of P. goiavier with the abundance of insects in oil palm plantation. Further investigation is needed on this bird species towards predating the oil palm pollinating weevil since it could possibly affect the population density of the pollinating weevil and subsequently the oil palm fruit set." (Authors)] Address: Amit, B., Malaysian Palm Oil Board, 6 Persiaran Institusi, Bandar Baru Bangi, 43000 Kajang, Selangor, Malaysia. Email:bettycopa@mpob.gov.my

24980. Roland, H.-J.; Hein, A. (2015): Libellen mit Milbenbefall. Libellennachrichten 35: 18-20. (in German) [A brief report on the success of a call to dragonfly experts to report mite infestations on dragonflies. Around 450 photos come from all parts of Germany, the rest from Austria, the Czech Republic, France, Georgia, and Switzerland. Only about 40 photos show dragonflies. All the others depict damselflies.] Address: Roland, H.-J., Im Mühlahl 35, 61203 Reichelsheim, Germany. E-mail: Hjuergenroland@aol.com

2016

24981. Lagadic, L.; Schäfer, R.B.; Roucaute, M.; Szöcs, E.; Chouin, S.; de Maupeou, J.; Duchet, C.; Franquet, E.; Le Hunsec, B.; Bertrand, C.; Fayolle, S.; Francés, B.; Rozier, Y.; Foussadier, R.; Santoni, J.-B.; Lagneau, C. (2016): No association between the use of Bti for mosquito control and the dynamics of non-target aquatic invertebrates in French coastal and continental wetlands. Science of The Total Environment 553: 486-494. (in English) ["The environmental safety of Bacillus thuringiensis subsp. israelensis (Bti) is still controversial, mainly because most of the previous field studies on its undesired effects were spatially limited and did not address the relationship between community similarity and application time and frequency. No general statement can therefore be drawn on the usage conditions of Bti that insure protection of non-target organisms. The present study was conducted in eight sites distributed over the main geographical sectors where mosquito control is implemented in mainland France and Corsica. Changes in non-target aquatic invertebrates were followed at elapsed time after repeated applications of two Bti formulations (VectoBac® WDG or 12AS) up to four consecutive years. We examined the influence of both larvicide treatments and environmental variables on community dynamics and dissimilarity between treated and control areas. As it can be argued that chironomids are the most vulnerable group of non-target invertebrates, we scrutinised potential Bti-related effects on the dynamics of their community. The use of VectoBac® WDG and 12AS in coastal and continental wetlands had no immediate or long-term detectable effect on the taxonomic structure and taxa abundance of non-target aquatic invertebrate communities, including chironomids. This applied to the main habitats where mosquito larvae occur, regardless of their geographic location. Flooding, whose frequency and duration depend on local meteorological and hydrological conditions, was identified as the main environmental driver of invertebrate community dynamics. Our findings add support to the environmental safety of currently available Bti formulations when following recommended application rates and best mosquito control practices." (Authors)] Address: Lagadic, L., INRA, UMR985 Écologie et Santé des Écosystèmes, Agrocampus Ouest, 65 rue de Saint Brieuc, CS 84215, F-35042 Rennes, France. E-mail: Laurent.Lagadic@rennes.inra.f

24982. Rudolph, R. (2016): Die Libellen des Novalis. Libellula 35(1/2): 99-108. (in German, with English summary) ["Novalis and dragonflies – The oeuvre of Novalis (Georg Philipp Friedrich von Hardenberg 1772–1801) is the constituent component of early German romanticism. In his poem “Glauben und Liebe oder Der König und die Königin” Novalis mentions dragonflies bringing gifts to the Prussian King and Queen. While studying at the Bergakademie Freiberg, Novalis had come into very close contact with the dragonfly specialist Toussaint de Charpentier, in whose home in Freiberg he lived from February 1798 until May 1799. Here Novalis intensively studied Zoology, especially Entomology. Novalis was very probably induced to place dragonflies in a prominent position within that poem by experiencing the dragonflies of his friend Toussaint (who was to become his brother-in-law), and by being especially impressed by Goethe‘s dragonfly poem “Die Freuden”." (Author)] Address: Rudolph, R., Am Rhin 7, 48485 Neuenkirchen, Germany

2018

24983. Bauer, U. (2018): Libellenbeobachtungen im Landkreis Aichach-Friedberg. Berichte des Naturwissenschaftlichen Vereins für Schwaben 122: 41-55. (in German, with English summary) [Bavaria, Germany "After sample recordings of dragonfly observations between 2008 and 2016, the author conducted systematic surveys in nine of ten ordnance maps (in the scale of 1:25000) of the county district of Aichach-Friedberg both in 2017 and 2018. Additionally, dragonfly data from six other observers were evaluated. In the course of the observations, 44 dragonfly species were recorded (2007: 48 species in the county district of Aichach-Friedberg; 2017: 76 species in Bavaria). Comparisons to earlier summary publications (1998 and 2007) were made. As a new species, Coenagrion scitulum was observed for the first time in the county district at two different locations. Furthermore, the Southern Migrant Hawker (Aeshna affinis) was observed for the second time, 17 years after the first observation. According to the red list and the complete list of dragonflies in Bavaria (2017), the observed species are classified as follows: very common: six species, common: twelve species, average distribution: nine species, rare: thirteen species, very rare: four species. Seven species are on the red list; four species are on the early warning list. Protection proposals are made with respect to Coenagrion ornatum and C. mercuriale." (Author)] Address: not stated

24984. Diaz-Martinez, C.; Pichaco-Garcia, P.; Evangelio Pinach, J.M. (2018): Nuevos datos de Lestes macrostigma (Eversmann, 1836) (Odonata, Lestidae) en Castilla-La Mancha (centroeste de España) - New records of L. macrostigma in Castilla-La Mancha (east-center of Spain). Boln. Asoc. esp. Ent. 42(1-2): 157-165. In Spanish, with English title [New data from three provinces (Cuenca, Ciudad Real, Toledo) are documented and mapped.) Address: Pichaco-Garcia, P., Aguas de Alcázar, EMSA, C/ Rondilla de Cruz Verde, 1, 13600 Alcázar de San Juan (Ciudad Real, Spain. Email: ppichaco@gmail.com

24985. Franken, O.; Berg, M.P. (2018): Entomofauna van de Noord-Hollandse duinen: Verslag van de 171e NEV-zomerbijeenkomst. Entomologische Berichten 78(2): 42-69. (in Dutch, with English summary) ["Entomological fauna of the ‘Noordhollandse duinen’ and its surrounding area. A report of the 171th summer meeting of the Netherlands Entomological Society. - During the weekend of June 3-5, 2016, the 171th annual summer meeting of the Netherlands Entomological Society took place in the ‘Noordhollandse duinen’, a coastal dune area in the province of Noord Holland. The area included in this report is the relatively long and narrow strip of coastal dunes between the municipalities of IJmuiden and Camperduin. The area was visited by 47 entomologists, who together identified 1313 arthropod species. Of these, eleven were new for the fauna of the Netherlands: ten Ichneumonidae and one Diptera. Also, there were 13 new species recorded for the province of Noord Holland. The high number of newly recorded species shows that there is still a lot to discover, even in areas that have been relatively well studied." (Authors) Nine odonate species are listed on page 49: Aeshna isoceles, Anax imperator, Coenagrion puella, Enallagma cyathigerum, Ischnura elegans, Leucorrhinia pectoralis, Libellula depressa, L. quadrimaculata, Orthetrum cancellatum] Address: Franken, O., Vrije Universiteit, Afdeling Ecologische Wetenschappen, Dierecologie, De Boelelaan 1085, 1081 HV Amsterdam, The Netherlands. Email: oscarfranken@gmail.com

24986. Garcia, D.A.Z.; Vidotto-Magnoni, A.P.; Orsi, M.L. (2018): Diet and feeding ecology of non-native fishes in lentic and lotic freshwater habitats. Aquatic Invasions 13(4): 565-573. (in English) ["The Paranapanema River is most frequently invaded by non-native fish from the Upper Paraná

River Freshwater Ecoregion. To understand how the diet of non-native fishes varies based on habitat type, we studied 12 populations of 6 non-native fish species with the aim of verifying whether diet, niche breadth, or trophic guild vary between lentic and lotic habitats. Fish were sampled in both habitats in the Paranapanema River basin between August 2014 and March 2016. A permutational multivariate analysis of variance – PERMANOVA was applied so that the composition of fish diet could be compared between habitats. Levin's standardized index was used to evaluate the trophic niche breadth of the species, revealing differences in the diets of Ossancora eigenmanni, Auchenipterus osteomystax and Trachelyopterus galeatus based on habitats. Seven trophic guilds were identified, and those for Serrasalmus marginatus, Loricariichthys platymetopon, and T. galeatus were the same (piscivores, detritivores, and omnivores, respectively) in both habitats. In contrast, the trophic guilds of O. eigenmanni, A. osteomystax, and Plagioscion squamosissimus varied between the habitats. Habitat-specific variability in the diet composition of the species and, for the most, the niche breadth in the lotic habitats increased; therefore, we conclude that this type of environment can provide access to a greater variety of food resources for non-native fishes." (Authors) The data set includes larval Odonata.] Address: Orsi, M.L., Lab. de Ecologia de Peixes e Invasões Biológicas, Universidade Estadual de Londrina, Rodovia Celso Garcia Cid, Londrina, PR, CEP 86.057-970, Brazil. Email: orsi@uel.br (MLO)

24987. Leal – Sánchez, R.; Ramírez, R. (2018): Reconocimiento y distribución de la Odonatofauna (Insecta: Odonata) del Parque Nacional San Esteban, Carabobo, Venezuela. Entomotropica 33: 1-9. (in Spanish, with English summary) ["This study presents an updated checklist of the species known to occur in the park, including distribution maps and comments. The list now includes a total of 29 genera and 44 species." (Authors)] Address: Leal – Sánchez, R., Centro de Estudios en Zoología Aplicada (CEZA) - Museo de Zoología de la Universidad de Carabobo (MZUC), Facultad Experimental de Ciencias y Tecnología, Carabobo, Venezuela. Email: rels.130588@gmail.com

24988. Yang, G.; Xu, J.; Yang, S.; Zhang, J.; Zhang, G. (2018): Correlationship between environmental factors and diversity of Odonata species in Erhai Lakeshore wetland. Journal of Lake Sciences 30(4): 1075-1082. (in Chinese, with English summary) ["In order to explore the influence of environmental factors on the species diversity of dragonflies in Lake Erhai, field studies were carried out between May 2014 to May 2017 in 10 sample sites at Lake Erhai shore. A total of 1448 Odonata samples, be-longing to 28 species, 22 genera and 11 families, were reported. Meanwhile, 20 families 46 species of plants were also recorded. Correlation analysis between diversity of Odonata species (adults and larvae) and environmental factors were carried out. The results showed that the diversity of adult dragonfly were positively correlated with the vegetation richness, wetland vegetation coverage, emergent vegetation coverage, submerged aquatic vegetation coverage, whereas negatively correlated with the degree of human disturbance and floating vegetation coverage. The diversity of larvae dragonfly was positively correlated with the dissolved oxygen and sediment. The findings of the study provided practical suggestions for the protection of dragonfly habitats and the ecological restoration of lakeshore buffer strips in Lake Erhai." (Authors) The following species are listed: Anotogaster gregoryi, Anax nigrofasciatus, A. parthenope julius, Gynacantha subinterrupta, Anisogomphus rnaacki, Macromia moorei, Epophthalmia elegans, Hemicordulia edai, Brachythemis contaminata, Crocothemis servilia, Diplacodes nebulosa, Orthetrum albistylum, Orthetrum sp., O. sabina, O. triangulare, O. neglectum, Pantala flavescens, Sympetrum fonscolombii, S. hypomelas, Caliphaea angka, Aristocypha fenestrella, Ceriagrion fallax, Aciagrion olympicum, Ischnura mildredae, Paracercion melanotum, Calicnemia eximia, Megalestes micans, and Indolestes assamica.] Address: Yang, G., College of Agriculture & Biology Science, Dali University. Dali 671003. P.R. China. Email: yanggh727@ sina.com

2019

24989. Briggs, A.; Pryke, J.S.; Samways, M.J.; Conlong, D.E. (2019): Macrophytes promote aquatic insect conservation in artificial ponds. Aquatic conservation: marine and freshwater ecostystems 29(8): 1190-1201. (in English) ["Farmland ponds promote regional aquatic biodiversity; however, optimally managing these ponds requires knowledge on how the biodiversity differs between ponds across catchments with different land uses. This study investigated the response of macrophytes, both those in the pond and on the bank, as well as dragonfly and water beetle species richness, diversity and composition in artificial ponds, to numerous environmental variables in catchments dominated by three land uses: protected areas (as reference sites), sugarcane-dominated and forestry-dominated landscapes, across two seasons. There was a strong association between insect species richness and vegetation cover, particularly sedges (Cyperus spp.) in spring and bulrushes (Typha capensis) in summer. There was also a positive response between insect species richness and sedges up to 70% cover, and bulrushes up to 40% cover, after which there was a decrease. Furthermore, the protected area ponds contained more rare and specialist insect species. Pond size was not a major variable for biodiversity overall. Although there was generally little congruence in composition among the three taxa, dragonflies were a good surrogate for water beetles and floating macrophytes. Well-vegetated ponds, both in the water and along the margin, are the most suited to promoting biodiversity, as long as the vegetation is not too dense, and not dominated by one plant species. Artificial ponds in production landscapes have great potential for conserving aquatic species, irrespective of land use, as long as there is management for macrophyte density and heterogeneity." (Authors)] Address: Pryke, J.S., Dept of Conservation Ecology & Entomology, Stellenbosch University, Private Bag X1, Matieland, 7602, South Africa. Email: jpryke@sun.ac.za

24990. Chiu, E.; Wan, N.; Li, T. (2019): Common Dragonfly in Hong Kong urban. Learn it, love it & conserve it. Publisher: Caritas Chan Chun Ha, Field Studies Centre: 22 pp. (in Chinese & English) ["Approximately 130 species of Odonata species have been recorded in Hong Kong. You may think that in order to see the colorful dragonflies and damselflies, you have to visit the remote countryside. In fact, it is not difficult to find them in urban parks of our city. By reading this booklet, the authors hope you will gain basic information of dragonflies and will start to appreciate them. This booklet introduces the body structure of dragonflies, their life cycle and common species in urban area. You may think that dragonfly conservation is an issue far from your reach. Actually, simple actions, such as cherishing water resources and avoidance of polluting rivers and ponds, already help dragonfly conservation." (Authors)] Address: https://www.caritasfsc.edu.hk/media/%E9-%A6%99%E6%B8%AF%E5%B8%82%E5%8D%80%E5-%B8%B8% E8%A6%8B%E8%9C%BB%E8%9C%93.pdf

24991. Gogoi, A.; Barman, A. (2019): Distribution of aquatic insects at Maguri beel of Tinsukia District, Assam, North

East India. Ecology, Environment & Conservation 25(1): 360-364. (in English) ["A study was conducted on aquatic insect community of Maguri beel at three selected sites (MS1, MS2, MS3) of Tinsukia district near Dibru Saikhowa National Park. The sampling of aquatic insects was done in replicates during September 2014-2015. The study recorded 4 orders, 12 families, 21 genera and 23 species of aquatic insects. Highest density of order Hemiptera was recorded in pre monsoon and lowest and same density was recorded of order Odonata and Coleoptera in monsoon and winter. The study revealed low Shannon Weiner Diversity Index values of aquatic insects (Shanon H<1) in all the sites indicating perturbed conditions of water." (Authors) Pseudagrion microcephalum, Trithemis aurora, Sympetrum sp., Libellula sp., Tramea sp., Cordulegaster sp.] Address: Barman, A., P.G Dept Zoology, Bajali College, Pathsala, Barpeta, Assam, India. Email: alak-2007@gmail.com

24992. Surdo, L. (2019): Citizen Science: Sicilian Naturalistic News: Lindenia tetraphylla (Odonata, Gomphidae). Naturalista siciliano IV, XLIII (2): 256-257. (in English) [1-3 territorial males of L. tetraphylla were observed at from 16.VI. 2019 to 29.VII.2019. This is the 2nd site record in Sicily; the 1st was at lake “Lago della Trinità” (Castelvetrano, Trapani) (SURDO, 2017). Observer: Barraco, L., via Passo Enea, 104 – 91100 Trapani, barracoluigi@gmail.com] Address: Surdo, S., Dipto SAAF, Viale delle Scienze Ed. 4 - 90128 Palermo, Italy. Email: salvatore.surdo@unipa.it

24993. Trueman, J.W.H.; Rowe, R.J. (2019): Reply to Nel, Garrouste, and Schubnel (2019) “The wing venation of Odonata. International Journal of Odonatology. International Journal of Odonatology 22(3-4): 167-172. (in English) ["We address six issues raised by Nel, Garrouste & Schubnel (2019) concerning the scheme of wing vein homology and nomenclature proposed by Trueman & Rowe (2019); showing in particular how evidence presented in a tomographical study of a dragonfly wing by Jacquelin et al. (2018) fits into this scheme." (Authors)] Address: Trueman, J.W.H., Research School of Biology, Australian National University, Canberra, Australia. Email: truemanic@gmail.com

24994. Yao, Y.; Xu, F.; Liu, D.; Hu, Z. (2019): Species and faunal analysis on insects in Guizhou Dejiang Nangan Nature Reserve. Journal of Zhejiang Forestry Science and Technology 39(4): 54-58. (in Chinese, with English summary) ["In 2016, investigations were carried out by line transect and net capture on insects in Nangan Nature Reserve, Guizhou province for 3 times. The result demonstrated that 464 species were captured, belong to 15 orders. Faunal analysis on insect species in the Reserve indicated that Oriental species were dominant, and had the closest relation with the Palaearctic, but the farthest relation with neotropic based on the world zoogeographical region. The fauna was dominant by the Central China elements based on China zoogeographic region, and had the closest relation with the Southwestern region and the farthest relation to the Qinghai Tibet region." (Authors) Odonata accounted to 32 species, but no details are given.] Address: Yao, Y., Forestry College of Guizhou University, Guiyang 550025, China

24995. Zhu, M.; Wei, S.; Ran, J.; Lin, Y.; Mao, Y.; Ma, X.; Qiu, R. (2019): Preliminary survey on insects in the Heizhugou National Nature Reserve, Sichuan. Sichuan Journal of Zoology 38(6): 703-713. (in Chinese, with English summary) ["To primarily explore the insect resources of the Heizhugou National Nature Reserve, Sichuan province, a total of 860 specimens were acquired from July to September, 2018. These specimens were found to belong to 255 genera, 88 families, 12 orders and 305 species. The results of species group analysis showed that Lepidoptera (158 species), Coleoptera (76 species) and Hemiptera (40 species) were the dominant insects in the reserve, accounting for 51.80%, 24.92% and 13.11% of the total, respectively. The diversity analysis results showed that the richness, dominance and diversity index were the highest in Lepidoptera (23.798, 0.042 and 2.775, respectively), followed by Coleoptera (11.369, 0.026 and 1.273, respectively). In terms of uniformity, Hemiptera had the highest uniformity (0.021), followed by Lepidoptera and Orthoptera (both 0.018), and Coleoptera (0.017). The results of faunal composition analysis showed that the most insects in the reserve were Oriental species (211, 69.18%), followed by widespread species (53, 17.38%), and Palearctic species were the least (41, 13.44%). If excluding the widespread species, the insect fauna in the reserve was dominated by Oriental species, accounting for 83.73%. In addition, the categories of insect resources in the reserve were summarized. Meanwhile, an insect species directory of the reserve was provided." (Authors) The following odonate species are listed: Cordulegaster pekinensis, Epophthalmia elegans, Orthetrum triangulare, Pantala flavescens, Philoganga robusta, and Caliphaea consimilis] Address: not stated

2020

24996. Dineen, K. (2020): An investigation into aquatic invertebrates, saline influence and other factors associated with management of Ballyvergan Marsh, Youghal, Co. Cork. Cork: Community-Academic Research Links, University College Cork: 42 pp. (in English) ["The main aim of this project was to investigate aquatic invertebrate communities, saline influence and other factors associated with management of Ballyvergan Marsh in Youghal, Co. Cork [Ireland]. The marsh examined in this study, has been proposed as a Natural Heritage Area (pNHA Site code: 0078). Ballyvergan marsh is of high ornithological importance. ... Fieldwork showed that the invertebrate richness and diversity was higher in the freshwater areas than in brackish and saline areas.... Ballyvergan has had various Odonata sightings over the years, with the bird hide pond providing an ideal breeding ground and the many drains within the marsh providing a hunting ground for adults. Sightings of species such as Anax imperator and A. Parthenope have been recorded along with Aeshna mixta (Murphy & Rogan, 2004). Data for Odonata records in Ballyvergan is rare due to the lack of reports published on the topic in the area. Due to this lack of information, identifying the nymphs that were found in our samples provided important insight into the other types of Odonata that are present in Ballyvergan marsh. The dragonfly nymphs were identified from the Aeshnidae, which is consistent with adult sightings (Murphy & Rogan, 2004). The Zygoptera nymphs belonged to the Coenagrionidae family, commonly known as Narrow-winged damselflies. These use the vegetation to hunt for their prey and spend considerable amount of time out of the water on the vegetation. No clear indication as to why their abundance peaked around the saline transition was found. It is possible they are present across the entire stream but due to their preference for living on the vegetation. Briers & Biggs (2003) showed that Odonata, specifically Coenagrionidae are good indicator species for species richness for ponds in Oxfordshire, UK. They investigated several species which occurred across a range of ponds in Oxforshire and concluded that Coenagrionidae appear to be the best suited to an indicator group as they are predators depending on the presence of other taxa for food. A similar study in Sweden also concluded that Odonata as a group are a good

indicator for water quality and plant diversity (Sahlén & Ekestubbe, 2001). On further examination the Conenagrionidae specimens were identified as being one of the following species: Coenagrion lunulatum, C. puella, C. pulchellum or Enallagma cyathigerum." (Author)] Address: https://cora.ucc.ie/items/6a0ff1af-eedd-4f05-a7f2-860d7896179a

24997. Hill, B.; Roderus, D.; Malinger, A.; von Blankenhagen, B. (2020): 4. Bundesmonitoring 2020 zur Erfassung der Helm-Azurjungfer (Coenagrion mercuriale) (Art des Anh. II der FFH-RL) in Hessen. Stand: 31.10.2020. Auftraggeber: HLNUG (Hessisches Landesamt für Naturschutz, Umwelt & Geologie) Europastr. 10 35394 Gießen, Germany. Projekt – Nr.: G20 - 50. 26 pp. (in German) ["The last federal monitoring of C. mercuriale in Hesse took place in 2015 and 2016. As part of the implementation of the FFH monitoring, the four study areas were therefore re-examined in 2020. The results will be included in the report to the EU in 2025. The species was observed at all four sample sites, but only in larger numbers in the Bruch nature reserve near Heegheim. In the remaining areas, populations comprised fewer than 10 individuals. Significant declines were observed everywhere. In the Riedwiese nature reserve near Frankfurt, the local population is close to extinction (a tandem). In addition to the low numbers of individuals, insufficient water flow, with some areas drying out in summer, and a lack of wintergreen submerged vegetation were characteristic. In some cases, deficiencies in ditch maintenance, excessive livestock trampling, or the lack of riparian buffer zones were further impairments. In Gelnhausen and in the Riedwiese Nature Reserve, beaver construction activity has a negative impact on the water supply of the ditches. For the reasons mentioned above, virtually all main criteria can only be rated at value level C. The overall conservation status is consistently classified as medium to poor (value level C). Accordingly, it has deteriorated in three of the four conservation areas since the last assessment. The need for maintenance measures is rated as high, although without an improvement in the water supply, the future prospects are considered very poor." (Authors/Google translate).] Address: https://www.hlnug.de/fileadmin/dokumente/naturschutz/artenschutz/steckbriefe/Libellen/Gutachten/Artgutachten _2020-_Helm_Azurjungfer_Coenagrion_mercuriale.pdf

24998. Hong Kong Wetland Park (2020): An Encounter with Odonates. Pamphlet: 2 pp. [This "An Encounter with Odonates" pamphlet briefly describes life stages of the odonates, it also serves as a photo guide for ease of reference on some odonates commonly found in Hong Kong Wetland Park. (Publisher).] Address: https://www.wetlandpark.gov.hk/filemanager/files/public/Download/pamphlets/2020_An_Encounter-_with_Odonate s.pdf

24999. Ran, H.-F.; Cao, Y.-P.; Ba, Y.-B.; Tian, Y.; Ma, A.-H.; Liu, W.-X; Lu, Z.-Y.; Li, J.-C.; Gao, H.-M. (2020): Structure and diversity of arthropod community in vegetable soybean field in Shijiazhuang. Journal of Environmental Entomology 42(5): 1159-1167. (in Chinese, with English summary) [" In order to clarify the structure and diversity of arthropod community in vegetable soybean field in Shijiazhuang, Malaise trap was used in this research to collect arthropods. The arthropod species were identified, the composition, structure of arthropod community and the dynamics of main groups were also studied. The results showed that; A total of 6 927 arthropods belonging to 3 classes, 11 Orders, 94 families and 255 speeies were collected by Malaise trap, among which, 45 were Chilopoda, 31 were Collembola, and 6 851 were insects. In Insecta, the Order of quantity from large to small was; Hemiptera > Diptera > Coleoptera > Mecoptera > Lepidoptera > Hymenoptera > Neuroptera > Orthoptera > Odonata. The major groups were Cicadellidae, Aphididae, Thripidae, Noctuidae, Lathridiidae, Coccinellidae, and Syrphidae. The leaf hoppers, aphids, thrips, nocturnal moths and leaf beetles were the dominant pest populations. Syrphidae and Coccinellidae were the main natural enemies. The arthropod species and number in this vegetable soybean field were far more than that in other fields. Diversity analysis showed that the diversity index, evenness index and richness index of arthropod community structure in vegetable soybean field Shijiazhuang were all high, indicating that arthropod community had high stability in this area." (Authors) Taxa are treated at family level, no details to Odonata are given.] Address: Ran, H.-F., Institute of Cash Crops, Hebei Academy of Agriculture & Forestry Sciences; Hebei Vegetable Engineering Technolog)' Research Center, Shijiazhuang 050051, China. Email: ranhongfan@163.com

2021

25000. David, S.: Halada, L.; Rusnák, T.; Gašparovicová, P. (2021): Vážky (insecta: odonata) v katastrálnom území obce Runina - Odonata (insecta) of the Runina cadastral area. Ekologické štúdie 12(2) (2021): 52-67. (in Slovakian, with English summary) ["During the course of the years 2020 and 2021, we examined changes in the use of agricultural land and their impact on dragonfly biodiversity in the cadastral area of the village of Runina in the Poloniny National Park and the UNESCO Biosphere Reserve. We recorded dragonflies in 13 localities, which represent non-reproductive (hunting) habitats (meadows and pastures at the edge of the forest, forest roads) and reproductive habitats (fen bog, fire reservoir, garden pond). We confirmed the occurrence of 12 species of dragonflies, 5 species in the process of breeding in the area (Aeshna cyanea, Cordulia aenea, Libellula depressa, Orthetrum coerulescens and Pyrrhosoma nymphula) respectively. The eurytopic species Aeshna cyanea (28 specimen D = 41.3 %) and Pyrrhosoma nymphula. (15 individuals, D = 11.9) occurred with the highest dominance. The typical species of the area is Cordulegaster bidentata, a forest species which reproductive habitat are small streams and their tributaries in the beech altitudinal zone. Rivulets outside in the forest are not suitable habitats for dragonfly breeding, they have a stony or gravelly bottom with mud sediments. Fen bog (loc. 3) and the garden pond (loc. 8) are the most important for their breeding. We have proven that artificially created aquatic habitats are the equivalent substitute for the missing natural aquatic ecosystems in the area." (Authors)] Address: David, S., Ústav krajinnej ekológie SAV Bratislava, poboèka Nitra, Akademická 2, 949 74 Nitra, Slovakia. Email: stanislav.david@savba.sk

25001. Hill, B.; Roderus, D.; Malinger, A. (2021): 5. Bundesmonitoring 2020 zur Erfassung der Helm-Azurjungfer (Coenagrion mercuriale) (Art des Anh. II der FFH-RL) in Hessen. Stand: 31.10.2021. Auftraggeber: HLNUG (Hessisches Landesamt für Naturschutz, Umwelt & Geologie) Europastr. 10 35394 Gießen, Germany. Projekt – Nr.: G20 - 50: 26 pp. (in German) ["The last federal monitoring of C. mercuriale in Hesse took place in 2020. As part of the implementation of the FFH monitoring, the four study areas were therefore re-examined in 2020. The results will be included in the report to the EU in 2025. The species could only be observed in two of the sampled areas, but only in larger numbers in the Bruch nature reserve near Heegheim. Two males were still observed in the Kinzig Valley near Gelnhausen, and no animals have been recorded in the Kist nature reserve near Berstadt. In the Riedwiese nature reserve near Frankfurt, the

local population appears to have died out completely. Although the rainy spring had stabilized water levels in all areas, the effects of the previous dry years are still having an impact. In most areas, there is a lack of submerged wintergreen vegetation and ditch maintenance. In Gelnhausen and the Riedwiese Nature Reserve, beaver construction activity is negatively impacting the water supply of the ditches. For the reasons stated above, most of the main criteria can only be rated at value level C. The overall conservation status in the Heegheim Bruch is currently favorable (value level B) and in Gelnhausen, moderate to poor (value level C). The two other sample areas are currently classified as insignificant (value level D) due to a lack of evidence of the species. Accordingly, the status has deteriorated in two of the four conservation areas since the previous year. The need for conservation measures is rated as high, and without an improvement in the water supply, the future prospects are considered very poor." (Authors/Google translate).] Address: https://www.hlnug.de/fileadmin/dokumente/naturschutz/artenschutz/steckbriefe/Libellen/Gutachten/Artgutachten _2021_Helm_-Azurjungfer_Coenagrion_mercuriale.pdf

25002. Krasutsky, B.V.; Gashek, V.A.; Polyakov, V.E. (2021): New registrations of plants, fungi and invertebrates of the Red Data Book of the Chelyabinsk region. [Proceedings of the II International Scientific and Practical Conference (Chelyabinsk, October 8–10, 2021). – Chelyabinsk: Krai Ra, 2021]: 184-188. (in Russian, with English summary) ["... Ophiogomphus cecilia: Category III. A rare, locally distributed species in the region, inhabiting forest, forest-steppe, and, to some extent, steppe zones [1]. Between 2017 and 2020, we found it in the Arshinsky, Karagaisky, Nyazepetrovsky, Serpievsky, and Shaburovsky Nature Reserves, in the Kashtaksky Bor, Travnikovsky Bor, and Cherny Bor nature monuments, in the Kasli, Kusinsky, and Nyazepetrovsky Districts, and in the vicinity of Chelyabinsk Airport (Chelyabinsk City District) [3]." (Authors)] Address: Krasutsky, B.V., Botanical Garden, Ural Branch of the Russian Acad. Sci., ul. 8 Marta 202a, Ekaterinburg, Sverdlovsk Oblast, 620130 Russia. Email: boris_k.63@mail.ru

25003. Yu, X.; Chen, X.Y.; Zhang, M. (2021): A preliminary guide of taxonomy of Odonata. Bio-101 e1010677. Doi: 10.21769/BioProtoc. 1010677: 17 pp. (in Chinese) ["This article systematically introduces the background knowledge of odontology research and discusses the fundamentals of specimen collection, preservation, and preparation from a taxonomic perspective. It also provides a morphological key for common taxa and numerous morphological image diagrams for easy reference, making it easier for beginners and graduate students to get started in odontology. Furthermore, based on the current state of odontology research and to keep pace with the times, this article focuses on the general process of molecular-assisted identification, aiming to provide standardized guidance for integrated identification by beginning researchers." (Authors/Google translate)] Address: Yu, X., College of Life Sciences, Chongqing Normal Univ., Chongqing, 401331, P.R. of China. Email: lannysummer@163.com

2022

25004. Czabanowska-Wrobel, A. (2022): Poetry and Existence: The Kingfishers of Adam Zagajewski and Gerard Manley Hopkins. Konteksty Kultury 2022/20: 31-41. (in English) ["The article presents an interpretation of Adam Zagajewski's poem "The Kingfisher" from the 2014 volume Asymmetry in the context of Gerard Manley Hopkins's [*As kingfishers catch fire, dragonflies draw flame"], whose initial words, cited in English, were used as the motto. The article reviews the motif of the kingfisher in poetry and culture. The possible readings of the poem also relate to the symbolism of colours and fire, through which its ontological and metapoetic senses are revealed." (Author)] Address: Czabanowska-Wrobel, Anna, Wydzia. Polonistyki Uniwersytetu Jagiello.skiego, Poland. Email: anna.czabanowska-wrobel@uj.edu.pl

25005. Frank, M.; Bruens, A. (2022): Die Libellen Deutschlands: Entdecken - Beobachten - Bestimmen. Quelle & Meyer Verlag Wiebelsheim: 416 pp. (in German) ["Dragonflies are acrobats of the air. Their diverse color patterns and unusual developmental strategies in water and on land fascinate researchers and nature lovers alike. This innovative photo identification book allows all of Germany's dragonflies to be identified using excellent image comparisons. The book precisely highlights key characteristics through magnification, notes, and arrows, making it perfect for use in the field. Each species is profiled with information on its habitat, characteristics, possible identities, behavior, and hatching. Current distribution maps provide an overview of the regions in which the species can be found." (Publisher/Google translate)] Address: ISBN 978-3494018454

25006. Li, J.; Huang, X., (2022): Progress and perspectives on insect biogeography in China. Acta Geographica Sinica 77(1): 133-149. (in Chinese, with English summary) ["Insects are the most diverse group of organisms on the Earth. There are more than one million insect species, accounting for more than half of the total. Insects usually play important parts in the ecosystem and have close relations with humans. Therefore, understanding biodiversity and distribution patterns of insects is of important significance for biogeography science as well as the development of human society. Based on detailed literature retrieval and content analysis, this paper presents the trends of publications on insect biogeography in China during the past 70 years, and summarizes main research progress from the following aspects: insect species survey, insect fauna, insect community diversity, genetic diversity patterns of insects, and distribution patterns of insects. Encouraging progress on insect biogeography have been made in China during the past decades, however, researchers need to strengthen the thinking and study on several aspects including integrative biogeography thinking, spatial and temporal scales, refining scientific questions and hypotheses, trait biogeography of insects, and sharing of biodiversity and distribution data of insects. ... This paper* searched the CNKI and Web of Science databases for journal articles related to insect biogeography in China from 1950 to 2020. The search terms used included China, Insect, Archaeognatha, Zygentoma, Ephemeroptera, Odonata, Plecoptera, Isoptera, Blattodea, Mantodea, Crylloblattodea, Mantophasmatodea, Phasmatoptera, Embioptera, Orthoptera, Dermaptera, Zoraptera, Psocoptera, Anoplura, and The search terms included Thysanoptera, Hemiptera, Neuroptera, Megaloptera, Raphidioptera, Coleoptera, Strepsiptera, Diptera, Mecoptera, Siphonaptera, Trichoptera, Lepidoptera, Hymenoptera, Fauna, Diversity, Distribution, Zoogeography, Biogeography, Population Genetics, Phylogeography/Phylogeography, and Molecular Ecology. These search terms covered major insect groups and biogeographical studies from macro to micro levels. Searches were cross-referenced, resulting in a total of 2,054 articles (1,595 in Chinese and 459 in English). A list of these articles is provided in the appendix and can also be downloaded from the data-sharing website DataOpen: http://www.dataopen.info/home/datafile/index/id/190). Biogeographic research increasingly relies on the sharing of large-scale species and distribution data, so we also searched for insect data releases in several large databases and herbaria.

Based on the exploration and analysis of the search results, combined with other resources, this article summarizes the main historical context and current status of insect biogeography, and provides information and suggestions for future research." (Authors)] Address: Huang, X., State Key Lab. of Ecological Pest Control for Fujian & Taiwan Crops, College of Plant Protection, Fujian Agriculture and Forestry University, Fuzhou 350002, China. Email: huangxl@fafii.edu.cn

25007. Liu, T.; Jiang, L.; Qiao, G. (2022): Annual report of new insect taxa of Chinese Hemiptera and 28 other orders described in 2021. Biodiversity Science 30, 22300. doi: 10.-17520/biods.2022300: 1-8, Appendix. (in Chinese and English) ["Aims: This study aims to review and update information from 2021 about newly described taxa of Chinese Hemiptera and 28 other insect orders (all orders except Coleoptera, Diptera, Lepidoptera, and Hymenoptera). Methods: We reviewed the literature on new taxa of Chinese Hemiptera and 28 other insect orders described in 2021 and compiled a list of type specimens and a bibliography. We characterized the hotspots for new species discovery by analyzing provincial administrative regions and at the spatial scale of 200 km × 200 km, respectively. We also examined the specimen preservation sites, the authorship of new species descriptions, and the journals where the work was published. Results: In 2021, 422 new taxa—including 35 new genera, 386 new species, and 1 new subspecies—were described in Chinese Hemiptera and 28 other insect orders. The hotspots for new species discovery were mainly in Southwest China (Yunnan, Guizhou, Sichuan, etc.) and the adjacent areas (Guangxi, Xizang, etc.). And at the spatial scale of 200 km × 200 km, the hotspots are mainly located in mountainous regions. 395 researchers participated in the naming and description of new taxa this year, and related works were published in 28 journals, with a total of 205 articles. Conclusion: This timely study updates basic biodiversity data about Chinese insects in Hemiptera and 28 other insect orders. This work plays an essential role in accelerating the construction of a data-sharing platform, supporting biodiversity conservation and management, and ensuring national biosecurity." (authors) The single Odonata documented is Ischnura praematura Sanmartin-Villar & Zhang, 2021. Address: Liu, T., Key Lab. Zoological Systematics & Evolution, Inst. of Zoology, Chinese Academy of Sciences, Beijing 100101

25008. Nahli, A.; Sghiouer, F.E.; Oubraim, S.; Chlaida, M. (2022): Structure and trophic organisation of the macrobenthic community of the Hassar stream after installation of the Mediouna wastewater treatment plant (Casablanca, Morocco). Environment and Natural Resources: Challenges and Solutions. IOP Conf. Series: Earth and Environmental Science 1090 (2022) 012002: 7 pp. (in English) ["The goal of this research is to assess changes in the structure of benthic macroinvertebrate Functional Feeding Groups (FFGs) in the Hassar Stream (north-east of Casablanca) after the Mediouna wastewater treatment plant (WWTP) was installed. Over the course of a year, from November 2013 to October 2014, data on water quality and macroinvertebrate fauna are gathered at seven sampling stations. To measure the resilience of FFGs, macroinvertebrates are used to analyse the influence of physicochemical water quality on their organisation. Based on FFGs abundance, Collector-gatherers make up 39.06 percent of the macroinvertebrates' assemblage, followed by shredders (28.41%) and collector-filters (28.41%) (18.76%). Except for the upstream stations (S1 and S2), the FFGs ratios indicated that the environment is largely heterotrophic, has a significant relationship with riparian inputs, and generally stable substrates. These findings emphasise the necessity of researching macroinvertebrate FFGs as a supplement to measuring the ecological integrity and resilience of rivers after anthropogenic impact reduction." (Authors) Taxa mentioned include Odonata, but no detailed information on taxa is presented.] Address: Nahli, A., Ecology & Environment Laboratory, Fac. Sciences Ben M'sik, Hassan II Univ. of Casablanca, Sidi Othmane, 7955, Casablanca, PB, Morocco

25009. Waitzbauer, W.; Karolyi, F. (2022): Ein fast vergessener Ort großer Biodiversität – Die Entomologische Sammlung der Universität Wien. Schriften des Vereins zur Verbreitung naturwissenschaftlicher Kenntnisse 156–157 (2022): 11-42. (in German, with English summary) ["An almost forgotten place of high biodiversity – The entomological collection of the Vienna University - The relocation of the Biology Center of the University of Vienna (UZA 1) from its previous long-term location in 1090 Vienna to the new Biology Building (UBB) in the 3rd district in 2021 required, among other things, an inventory and partial reorganization of the extensive entomological collection holdings. The majority of these are old remnants of the institute's own collections of various insect groups, as well as old private donations, collection entries from recent decades from excursions abroad and recent material from thesis and project activities. In the course of processing and sorting into new insect boxes, especially Coleoptera, Hymenoptera and Lepidoptera proved to be extremely species-rich with many rare species, including numerous unique rarities. ... In contrast, only comparatively small populations of other species-rich insect orders exist, such as flies and mosquitoes (Diptera), bugs, cicadas and aphids (Hemiptera) or Odonata, and some orders are missing altogether, such as Ephemeroptera." (Authors).] Address: Waitzbauer, W., Dept for Functional & Evolutionary Ecology, University of Vienna, Djerassiplatz 1, 1030 Vienna, Austria. Email: wolfgang.waitzbauer@univie.ac.at

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25010. Cachazo, L.M.; Makati, K.; Chadwick, M.A.; Catford, J.A.; Price, B.W.; Mackay, A.W.; Guiry, M.D.; Murray-Hudson, M.; Murray-Hudson, F. (2023): A review of the freshwater diversity in the Okavango Delta and Lake Ngami (Botswana): taxonomic composition, ecology, comparison with similar systems and conservation status. Aquatic Sciences (2023) 85:115: 19 pp. (in English) ["Freshwater organisms in the Okavango Delta and Lake Ngami (Botswana) provide direct and indirect benefits to people and the economy of the region. However, their existence could be potentially threatened by human activities (primarily, upstream water abstraction and planned hydropower structures) coupled with climate change. For their protection, it is essential to know their distribution, ecology, and status of the ecosystems that they inhabit. Publications that record taxa from the Delta at species level are scarce, particularly aquatic macroinvertebrates. Identifying organisms to species level can provide more accurate information for environmental monitoring and conservation programmes but requires significant training and expertise. Here, we present a comprehensive taxonomical review of 2204 freshwater species from the Okavango Delta and Lake Ngami, with additional 355 species found in other areas of Botswana that are likely to be present in the study region. We also compare the diversity of the Okavango Delta and Lake Ngami with two other tropical wetlands: the Pantanal (Brazil) and the Kakadu Region (Australia). We show that biodiversity in the Okavango Delta and Lake Ngami is higher than in previous estimates, with recorded species richness dominated by phytoplankton and macroinvertebrates. Most species are widespread across the system and southern Africa. The resulting database includes

new records (Bryozoa, Porifera), information on species conservation status, habitat, ecology, distribution in continental Africa, site details and taxonomical notes. This will be an essential resource for researchers, conservation managers, policy makers and consultants investigating freshwater biodiversity in tropical wetlands in the region." (Authors) The list of species includes Anax bangweuluensis, Trithemis aequalis, and T. brydeni.] Address: Cachazo, L.M., Dept Geography, King's College London, Bush House, North East Wing, 40 Aldwych, London WC2B 4BG, UK. Email: luis.moliner_cachazo@kcl.ac.uk

25011. 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 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 Lestes 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

25012. Holuša, O. (2023): Expansion of Erythromma lindenii (Selys, 1840) (Odonata: Coenagrionidae) is still ongoing: settlement of Central Europe by various migratory routes. Libellula 42(1/2): 49-61. (in English, with German summary) ["The E. lindenii population in the Czech Republic was only recently established; the species was not present before 2009. In 2020, E. lindenii was identified for the first time in two places in the Moravia territory (eastern country of the Czech Republic) surrounding the town of Znojmo (Znojmo district). In 2021–2022, a stable population was discovered in the area. In 2022, another expansion of the species to the Lanžhot village are was observed at the confluence of the Dyje/Thaya and Kyjovka Rivers (the Bøeclav district), at the March/Morava river near Hohenau an der March (the Gänserndorf district) in Austria, and in two places near the Moravský Svätý Ján village in Slovakia (the Senica district, found as a new species in Slovakia). These data confirm the quick northeastwards expansion of the species range in Central Europe in the area of the Pannonian biogeographical province, i.e., by the Danube-Pannonian current. This expansion contrasts with the expansion to the territory of Bohemia, which was settled by the Lusatian migration flow in 2009." (Author)] Address: Otakar Holuša, O., Mendel Univ. Brno, Fac. Regional Development & International Studies, Tr. Generála Píky 7, 613 00 Brno, Czech Republic. Email: holusao@email.cz

25013. Liu, H.-C.; Chen, S.-L.; Tang, H.-C.; Ma, C.-H.; Lee, I.-L.; Hu, F.-S.; Ho, B.-H.; Lin, H.-Y.; Chou, C.-J. (2023): Survey of aquatic insect fauna in Alibang Eco-Farm, Taiwan. Taiwanese Journal of Entomological Studies 8(3): 61-69. (in Chinese, with English summary) ["Alibang Eco-Farm is situated in the low-altitude region of the Datun Volcano Group in northern Taiwan, renowned for its rich wetland resources and diverse aquatic insect population. This study offers an overview of the aquatic insect fauna discovered in Alibang Eco-Farm and the nearby Alibang Stream. Species data were gathered through long-term Odonata monitoring spanning from 2003 to 2023, as well as a water insect survey conducted in 2023. The findings revealed a total of 136 species belonging to 45 families and 7 orders. Notably, this study marks the first recorded instance of Peltochares atropiceus Régimbart, 1903, a species of water scavenger beetle, on the island of Taiwan." (Authors) 80 odonate species are listed in a table. "In April 2023, in addition to collecting at the Alibang Ecological Farm, the adjacent Alibang Creek was also surveyed for both larvae and adults. Among the species, larvae of Macromia urania and Heliogomphus retroflexus were recorded. Because the April survey took place during spring and summer, a small number of Mnais tenuis, which emerges in early spring, could be seen in the small streams along the forests within the park. Some species, such as Euphaea formosa, have been recorded at both the farm and the Alibang Creek, but their habitats appear to be more specific to the creek. The Anotogaster klossi, for example, prefers to dwell in the small understory ditches within the park. Other species, such as Sinictinogomphus clavatus and Rhyothemis severini, have been observed as active adults in ponds and marshes. The water dragonfly, the only protected species in the order Odonata, has been recorded both within the park and in the Alibang River. Numerous water scorpions have been observed hiding in the mud and sand at sampling sites 5 and 11. Alibang, located in northern Taiwan, bears the brunt of the northeast monsoon. Several species of stray dragonflies have been documented in Taiwan, often discovered during the northeast monsoon, particularly species of the genus Sympetrum (Ma et al. 2022). However, the only migratory dragonfly species currently recorded at the Alibang Ecological Farm are Ischnura asiatica and Anax julius. Future observations in autumn could be increased to enhance research on other migratory dragonfly species."] Address: Liu, H.-C., Dragonfly Association of Taiwan, 2F., No. 5, Long'an Rd., Xinzhuang Dist., New Taipei City 24260, Taiwan. Email: td965771@gmail.com

25014. Lohmann, H. (2023): Anmerkungen und Replik zur historischen Verbreitung von Coenagrion scitulum in Nordwestdeutschland (Odonata: Coenagrionidae). Libellula 42(1/2): 63-68. (in German, with English summary) ["Notes and replication on the historical distribution of Coenagrion scitulum in north-west Germany (Odonata: Coenagrionidae) – The

information and research on the findings of C. scitulum in Lieckweg et al. (2023) were checked. It was confirmed that the alleged discovery near Bremerhaven (not Wilhelmshaven) by W. Genz (Münchberg in Kiebitz 1962) must be deleted as a misidentification. A repeated analysis of the photo of a male from the Rietberg fishponds south of Gütersloh reproduced in Kiebitz (1962) revealed two species-characteristic constant features, which allow a clear assignment to C. scitulum. On the one hand, the median lobe of the posterior margin of the pronotum is shaped like a triangular pointed tongue – unlike in C. pulchellum, where there is only an arched curvature. On the other hand, the tapering black lateral stripes on the third abdominal segment, which are typical for C. pulchellum, are missing. Finally, the specimen had been submitted for reidentification to the internationally renowned odonatologist Paul Münchberg, who confirmed its affiliation to C. scitulum also on the basis of the appendages. The characteristics researched by Lieckweg et al. (2023) must be described as variable and consequently not species-constant. Thus, this find, which was already recognised by Lohmann (1980), remains the first record for North Rhine-Westphalia." (Author).] Address: Lohmann, H., Hertener Str. 62, 79618 Rheinfelden, Germany. Email: heinrich-lohmann@gmx.de

25015. Martens, A. (2023): Erfahrungen beim langfristigen Management des Kalikokrebses. Tagungsband. Beiträge zur Fachtagung. Veranstalter forum flusskrebse e. V. lG Dä Neu Fischer. Koordinationsstelle Flusskrebse, Schweiz: 58-62. (in German) ["The invasive calico crayfish Faxonius immunis successfully colonizes small ponds, which are important breeding habitats for dragonflies and amphibians. A corresponding pond complex has been studied since 2014; the years 2016 to 2021 are evaluated here. As a management measure, one pond was completely enclosed with a tree trunk barrier in 2016, which significantly reduced recolonization. The bottoms of two ponds were covered with granite gravel in 2017 and 2018, respectively, and an incomplete tree trunk barrier was added to another pond in 2020. The calico crayfish was successfully suppressed in the ponds by placing sand-lime bricks that were regularly sampled during the winter months. At the same time, however, there was repeated, intensive reimmigration from a nearby ditch." (Author/Google translate).] Address: Martens, A., Pädagogische Hochschule Karlsruhe, PF 111062, 76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

25016. Mohapatra, S.C.; Kanuri, V.V.; Vaddem, K.K.; Saha, S.; Ali, S.Y.; Verma, A.; Biswas, M.K.; Vidyarthi, A.K. (2023): Spatio-temporal variability in macroinvertebrate community structure and ecological health status of a tropical dynamic river-estuarine system, India: An integrated approach of multivariate analysis. Environmental Research 238, 117236: 13 pp. (in English) ["River-estuarine ecosystems are under severe anthropogenic threat due to resource exploitation, transportation, sewage/industrial discharges, and pollutants from surrounding areas. Monitoring the water quality and biological communities is essential for assessing ecosystem health and sustainability. Present study integrated the ecological community data along with water quality analysis to understand the impact of anthropogenic pressures on benthic macroinvertebrates. Samples were collected from 10 locations (comprising of both rural and urban areas) for Benthic macroinvertebrates, physico-chemical and microbiological parameters along the lower stretch of the Bhagirathi-Hooghly river-estuarine (BHE) system during the post-monsoon seasons of 2020, 2021, and 2022. During the entire study period, a total of 5730 individuals from 54 families in 19 orders of 3 phylum of macroinvertebrate were recorded. Among them Thiaridae (27.1%) and Chironomidae (22.8%) were found to be the most abundant families. Based on the water quality data Cluster analysis and nMDS indicated two distinct groups of locations: Group-I with rural settings and Group-II with urban settings. Alpha diversity metrics showed higher diversity (2.817) and evenness (0.744) in rural locations (Group-I) compared to urban locations (GroupII). The overall saprobic score of the macroinvebrate data revealed Group-I (5.09) to be in good condition, while Group-II (4.95) showed moderately polluted conditions. Redundancy analysis (RDA) highlighted the correlation of pollution-tolerant species (Chironomidae, Culicidae) with high organic loads i.e., biochemical oxygen demand (BOD), chemical oxygen demand (COD) in Group-II. In contrast, Group-I locations exhibited positive correlations with Dissolved Oxygen (DO) and supported less pollution-tolerant organisms (Coenagrionidae, Dytiscidae). The study emphasizes the importance of integrated analysis of ecological community data and water quality parameters to assess the health status of river-estuarine ecosystems." (Authors)] Address: Mohapatra, S.C., Central Pollution Control Board, MoEF & CC, Regional Directorate, Kolkata, India

25017. Nahli, A.; Oubraim, S.; Chlaida, M. (2023): Monitoring structural and functional responses of the macroinvertebrate community in a resilient stream after its depollution (Casablanca, Morocco). Environmental Monitoring and Assessment 195, 210: 195-210. (in English) ["This study evaluates the changes in the structure of the macroinvertebrate functional feeding groups (FFGs) of the Hassar Stream (northeast of Casablanca) following the installation of Mediouna's wastewater treatment plant (WWTP). Data on water quality and the macroinvertebrate fauna were collected at seven sample points from November 2013 to October 2014. Macroinvertebrates were used to assess the impact of physicochemical and hydromorphological properties on the FFG organization and resilience. Redundancy analysis (RDA) was employed to examine the distribution of FFGs along this stream. Based on the FFGs' relative abundance, collector-gatherers account for 39.06% of the macroinvertebrates' assemblage, followed by shredders (28.41%), collector-filters (18.76%), scrapers (7.16%), and predators (6.6%). The FFG ratios revealed that the environment was highly heterotrophic (P/R < 0.75), and all studied stations had relatively stable substrates. In addition, the ratios indicated that the studied stations had a functional riparian zone (CPOM/FPOM > 0.25), except for stations S1 and S2. Simultaneously, the RDA model revealed that the distribution of the FFGs closely followed fluctuations in the water quality (BOD_5, NH_4^+, PO_4^{3-}, EC, and Cl^-) and hydromorphic properties (flow and depth). These findings highlight the importance of studying macroinvertebrate FFGs as a complementary way to assess the aquatic ecosystems' ecological integrity and resilience following anthropogenic impact reduction." (Authors)] Address: Nahli, A., Ecology & Environment Lab., Fac. Sciences Ben M'sik, Hassan II Univ. of Casablanca, Sidi Othmane, 7955, Casablanca, PB, Morocco

25018. Tang, C.; Ge, C.; Cao, Y.; Cao, H.; Song, X.; Liao, H. (2023): Insect diversity in different stand types of urban forest: A case study at the southern foot of Zijin Mountain, Nanjing. Biodiversity Science 31(2), 22357. doi: 10.17520/biods.-2022357: 1-13. (in Chinese, with English summary) [Jiangsu province, China "Aims: This research aimed to clarify the correlation between various environmental factors, such as anthropogenic impacts, and the insect diversity in urban forests, which can lead to the elucidation of key factors that can affect insect diversity in urban forests. Furthermore, this could result in the development and implementation of more

efficient conservation guidelines and conservation strategies for the protection of urban species diversity. Methods: From late July 2020 to early July 2021, with the use of sweeping method and Malaise traps, we collected insects from six habitats with different stand types from Zijin Mountain, Nanjing, including greenway in artificial broadleaf forest, greenway in broadleaf-conifer mixed forest, wetland in broadleaf-conifer mixed forest, as well as woodlands in artificial coniferous forest, broadleaf-conifer mixed forest, and broadleaf mixed forest. Insects were identified using morphological guides from taxonomic monographs. Shannon-Wiener diversity index, Pielou evenness index, Margalef richness index, and Simpson diversity index were used to evaluate alpha-diversity. Differences between different habitats was estimated by rarefaction and extrapolation analyses. Bray-Curtis distance was calculated to evaluate the similarity of insect diversity and richness between different habitats. The influence of different environmental variables, both abiotic and biotic, on insect diversity was evaluated by redundancy analysis and Pearson correlation. Both samplings of the whole year and a part of summer were used. Results: A total of 59,648 insects belonging to 145 species in 78 families and 9 orders were collected. Among these, the orders Lepidoptera, Hemiptera, Hymenoptera, and Diptera had the highest number of species and relative abundance. Most species were captured between July and September. Rarefaction and extrapolation analyses showed that the collections of specimens can represent the insect communities of each habitat. The alpha-diversity analyses indicated that woodland in broadleaf mixed forest had the highest insect diversity among sampled habitats, while woodland in artificial coniferous forest had the lowest. Although most habitats do not differ significantly in alpha-diversity, in terms of species composition, only the wetland in broadleaf-conifer mixed forest was moderately similar to the woodland in broadleaf mixed forest. Other habitats were all moderately dissimilar or very dissimilar to each other. The redundancy analyses showed that artificial interference of vegetation, pedestrian volume, altitude, temperature, sunshine duration, and precipitation were the major variables that significantly impacted insect diversity at the southern foot of Zijin Mountain. In addition, Pearson analyses indicated that most variables are correlated to insect diversity. Despite the different effects environmental variables have on the alpha-diversity of major insect orders, artificial interference of vegetation had the most significant effect, as our results showed that insect diversity significantly decreased with the increase of artificial interference of vegetation. Considering the correlations between insect diversity and other variables that can be attributed to artificial interferences, we determined that vegetation structure was the variable that has the highest degree of influence on insect diversity in urban forests. Conclusion: This study clarifies key factors affecting insect diversity in urban forests. This could potentially provide theoretical guidance in urban species diversity conservation. Scientific planning and management of vegetation structure may be the key to preserving insect diversity in urban forests. It is thus suggested that more research on the dominant factors affecting the diversity of the major insect groups be carried out. This, even at a smaller scale according to local conditions, could greatly benefit the dynamic management of urban forests." (Authors) The supplementary material includes Anax parthenope, Copera tokyoensis, Platycnemis phyllopoda, Crocothemis servilia, Orthetrum albistylum, Pantala flavescens and Pseudothemis zonata.] Address: Liao, H., Institute of Leisure Agriculture, Jiangsu Academy of Agricultural Sciences, Nanjing 210014, China. Email: lhj@jaas.ac.cn

25019. Ventura, I.M.C. (2023): Influência do gradiente de urbanização sobre as comunidades de odonatos (Insecta: Odonata) em lagoas de Aracaju, Sergipe. BSc thesis, Monografia apresentada ao Departamento de Ecologia da Universidade Federal de Sergipe como parte dos requisitos para obtenção do título de Bacharel em Ecologia: 51 pp. (in Portuguese) ["Habitat loss due to urbanization is one of the main causes of biodiversity decline. Urban ponds are considered important habitats due to their capacity to harbor a vast diversity of species; however, they are subject to great anthropogenic pressure. Therefore, the objective of the study was to analyze how the urbanization gradient affects the abundance, richness, and diversity of dragonfly species in urban ponds in Aracaju, Sergipe. For this purpose, 16 urban ponds were sampled during the dry and rainy seasons. The following variables were measured: dissolved oxygen, pH, water temperature, water pressure, electrical conductivity, total dissolved solids, salinity, and reduction potential, in addition to the distance between the ponds and the city center, the distance between the ponds and the main rivers (Poxim River, Sergipe River, Vaza Barris River), and the average distance between the ponds. In total, 342 specimens were collected, belonging to the suborders Anisoptera and Zygoptera, distributed in four families, 17 genera, and 31 species. Among these, there was a new record for the state of Sergipe: Homeoura chelifera. Anisoptera was the richest suborder with 23 spp. and Zygoptera was the most abundant with 198 individuals. There was an influence of seasonality on the species composition. Among the physicochemical variables, water pressure was the only one that showed a positive relationship with the richness and diversity of dragonflies. In addition, the “distance from the city center” negatively influenced the diversity and connectivity between the lakes; richness and diversity were positively influenced by the proximity between the lakes and by the proximity of the Vaza Barris River, and negatively by the proximity of the Sergipe River. This study is the first sampling of dragonflies in an urban area of the Northeast. The increasing urbanization of the Sergipe coast has eliminated the lagoons in the central areas of Aracaju. The remaining lagoons, which are more peripheral and closer to each other, harbor greater diversity because they are in less urbanized areas; however, they still suffer from great anthropogenic pressures. Therefore, we believe that the proximity of urbanized areas and environmental degradation, including pollution and reduction of riparian vegetation, may be factors that affect the odonate communities in the lagoons of Aracaju. Finally, we highlight the importance of conservation strategies for the urban lagoons of the metropolitan region of Aracaju as a way to mitigate the negative effects of urbanization on biodiversity." (Authors-/Google translate)] Address: https://ri.ufs.br/jspui/bitstream-/riufs/20031/2/Iza_Mayra_Castro_Ventura.pdf

25020. Yang, H.; Zhang, T.; Cao, W.; Xu, Z.; Chen, H.; Yue, Y.; Gu, J. (2023): Structures and diversities of insect communities in six wetland parks in Chengdu City. Wetland Science 21(1): 44-57. (in Chinese, with English summary) ["From May to September 2020, a combination method of random sampling and systematic sampling was used to study insects in Baihetan National Wetland Park, Qimuhe River Wetland Park, Bailuwan Wetland Park, Xiangcheng Wetland Ecological Park, Qinglong Lake Wetland Park and Nanhu Wetland Park in Chengdu city. Composition and biodiversity of insect communities in 6 wetland parks were investigated and analyzed. The research results showed that in the 6 wetland parks, a total of 9993 insect samples were collected, and 486 insect species of 141 families in 16 orders were recorded, including Hemiptera, Coleoptera, Lepidoptera, Diptera, Odonata, Orthoptera and Hymenoptera insects were the dominant groups. The diversities of insect communities in Qimuhe

River Wetland Park and Baihetan National Wetland Park were relatively higher, and the structures of insect communities were complex. In the 6 wetland parks, the families, species and individual numbers of herbivorous insects were much larger than those of predatory insects, neutral insects, and parasitic insects. There were significant positive correlation relationships between individual number of herbivorous insects and that of predator insects, between species number of herbivorous insects and that of parasitic insect, between individual number of herbivorous insects and that of parasitic insect." (Authors) 29 odonate taxa are listed: Matrona basilaris, Paracercion calamorum, P. melanotum, P. v-nigrum, Agriocnemis pygmaea, Ischnura senegalensis, I. asiatica, Ceriagrion nipponicum, Agriocnemis femina, Platycnemis phyllopoda, Ictinogomphus rapax, Trigomphus svenhedini, Anisogomphus maacki, Acisoma panorpoides, Pseudothemis zonata, Deielia phaon, Trithemis aurora, Orthetrum sabina, O. triangulare, O. pruinosum neglectum, O. albistylum, Sympetrum darwinianum, S. eroticum ardens, S. infuscatum, Brachydiplax flavovittata, Pantala flavescens, Tramea virginia, Crocothemis servilia servilia, Epophthalmia elegans] Address: Gu, J., School of Agriculture, Sichuan Agricultural University, Chengdu 611130, Sichuan, P.R. China. Email: E-mail: 1240892497@qq.com

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25021. Abdullah, M.I.; Mamat, N. (2024): First Odonata survey and utilization of Odonata diversity as bioindicator for Sungai Chiling habitat quality. International Journal of Research and Innovation in Applied Science (IJRIAS) IX(7): 675-683. (in English) ["A study was conducted at Sungai Chiling Fish Sanctuary in Selangor in assessing the habitat quality by utilizing the Odonata diversity. Sampling using sweep net was conducted for three days from 0900 hours to 1700 hours through the six river crossings. Results showed 48 individuals from 15 species and 6 families were collected and no significant difference for species richness and abundance across the crossings. The species diversity, evenness and species present there indicate good water quality. However, slight disturbance at the entrance based on the Odonata species richness and disturbance-associated species present there." (Authors)] Address: Muhammad Izzuddin Abdullah., Noorhidayah Mamat Institute of Biological Sciences, Faculty of Science, Universiti Malaya, Malaysia

25022. Ahmednur, M.; Sabir, R.; Lenjissa, D.; Ambelu, A. (2024): Effects of channelization on macroinvertebrate assemblages in a small stream: The case of Awetu in Jimma City, Ethiopia. Heliyon 10(23), e40778: 12 pp. ["Freshwater ecosystems are increasingly modified worldwide by anthropogenic activities. Land use change is one of the leading factors responsible for stream ecosystem degradation. Physical habitat disturbance due to channelization is among the factors responsible for the loss of biodiversity and degradation of river water quality worldwide. Since 2020, Jimma City municipality has been beautifying the city and one of the activities is channelizing using concrete embankment, a part of the Awetu stream that runs through the city. The main aim of this study is to assess the effect of channelization on macroinvertebrate assemblages and the water quality of the Awetu stream. A cross-sectional study was conducted in April 2022. Macroinvertebrates, water samples, and habitat data were collected from 21 sampling sites along the three segments of the stream (upstream, channelized, and downstream). Data were analyzed for different macroinvertebrate metrics and water quality parameters. Canonical Correspondence Analysis was used to examine the overall relationship between macroinvertebrate assemblages and water quality parameters. The upstream site has better macroinvertebrate assemblages than channelized and downstream sites ($p<0.05$). The downstream site showed better assemblage compared to the channelized site, though it was not significant. Regarding water quality parameters, a significant variation was observed between channelized and, un-channelized sites (upstream and downstream) ($p<0.05$). The habitat condition score varied from 47 (poor) at channelization to 150 (suboptimal) upstream. Upstream sites were found to have relatively better macroinvertebrate assemblages, better water quality, and good habitat conditions. The downstream sites had lower macroinvertebrate assemblages, poor habitat conditions, and degraded water quality compared to the upstream sites. The channelized segment had the poorest habitat, with poor macroinvertebrate assemblages and water quality. Thus, the conservation of habitat conditions along the channelized segments of the Awetu stream is recommended to improve the water quality and macroinvertebrate assemblage." (Authors) Odonate abundance is documented at family level: Gomphidae, Coenagrionidae, Libellulidae.] Address: Mahmud Ahmednur: Email: mahmudahmednur@gmail.com

25023. 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 5(12): 1-7. (in English) ["This research focused on the diet of the barbel Luciobarbuscallensisin 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 macroinvertebrates 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 Luciobarbus callensis in the two studied environments." (Authors)] Address: Babaci, Soufyane, Graduated in Biological Sciences, Amar Telidji Univ., Faculty of Sciences, Dept of Natural & Life Sciences, Lab. of Biological Sciences & Agronomic Sciences, Amar Telidji Univ., 3000, Laghouat, Algeria. Email: s.babaci@lagh-univ.dz

25024. Bakare, A.B.; Adu, B.W.; Ehikhamele, E.I. (2024): Effects of anthropogenic disturbances on adult Odonata fauna in Akure, south west Nigeria. The Journal of Basic and Applied Zoology 85(56): 8 pp. (in English) ["Background: Human activities such as deforestation, urbanization, industrialization, canalization, and water abstraction, negatively affect biodiversity. This study was carried out to determine the effect of anthropogenic activities on the composition, distribution, and abundance of Odonata of Akure South Local Government Area. Results: A total of 2376 Odonata individuals (1363 dragonflies and 1013 damselflies) in 6 families (Libellulidae, Coenagrionidae, Calopterygidae, Platycnemididae, Chlorocyphidae) and Gomphidae, 19 genera and 36 species were recorded in this study. Pseudagrion 'A' kersteni (651) is the most frequent species followed closely by

Trithemis arteriosa, they were found in all the sites, therefore are generalists. Eight species including Lestinogomphus minutus, Pantala flavescens, Copera sikassoensis, etc., are least represented in the study, they were made up of one individual each. Leo study site has the richest odonate fauna (Simpson dominance: 0.8497, Shannon–Wiener H_: 2.234 and Margalef: 3.021); while, the least was Oda (Simpson dominance: 0.7899 and Shannon Wiener H_: 1.932). The distribution of the species was highest at Oda (evenness E: 0.4931), followed closely by Leo (evenness E: 0.4916); while, Ijapo (evenness E: 0.3852) is the least. Conclusion: The few stenotopic species and, proliferation of eurytopic species in the study sites proved that the sites are undergoing intense anthropogenic disturbance and conservation efforts must therefore be put in place to prevent the extinction of these species and their restoration in sites they were absent." (Authors)] Address: Bakare, A.B., Dept of Biology, Federal Univ. of Technology, Akure, Nigeria. Email: bakareayo4success@gmail.com

25025. 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., Inst. Systematics & Ecology of Animals, Russian Acad. of Sciences, Siberian Branch, Frunze Str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

25026. Cabrera, M.; Capparelli, M.V.; Velarde, E.; Portilla, K.; Caiza, R.; Mogollon, N.G.; Rico, A. (2024): Effects of the insecticide chlorpyrifos on Amazonian freshwater invertebrates: A mesocosm experiment. Science of The Total Environment 957, 177831: (in English) ["Chlorpyrifos is one of the most widely used insecticides globally, yet its toxicity for tropical aquatic ecosystems in Latin America has not been thoroughly evaluated. In this study, we conducted a 70-day mesocosm experiment to assess the effects of chlorpyrifos on zooplankton and macroinvertebrate communities representative of the Ecuadorian Amazon. Mesocosms were exposed to a single application of chlorpyrifos at four nominal concentrations (0.01, 0.1, 1, and 10 µg/L). Results showed rapid chlorpyrifos dissipation, with a half-life of 1.2 days. For some Rotifera species, including Polyarthra luminosa and Anuraeopsis sp., a consistent No Observed Effect Concentration (NOEC) of 0.01 µg/L was identified. Cyclopoida (e.g., Macrocyclops sp.) also displayed treatment-related declines, with a NOEC of 0.1 µg/L. Among macroinvertebrates, the most sensitive taxon was the Ephemeropteran Caenis sp. (NOEC: 0.1 µg/L), while other insect taxa (Odonata, Diptera) also showed significant treatment-related declines. Based on the response of some Rotifera species and the zooplankton community, we determined a mesocosm NOEC of 0.01 µg/L. The response of Rotifera taxa was explained by indirect effects resulting from a decline in copepod populations within the experimental systems, which led to an increase in Cladocera (e.g., Moina sp.), effective grazers on small rotifers. Our findings suggest a mesocosm NOEC slightly lower than those reported in other tropical and temperate studies (0.1 µg/L), potentially due to differences in species composition and interactions. Finally, our study highlights that measured chlorpyrifos concentrations in Latin American surface waters exceed levels at which both direct and indirect effects have been observed. Additional monitoring and regulatory measures are needed to control chlorpyrifos use and environmental release in tropical regions with intensive agriculture and high rainfall." (Authors)] Address: Rico, A., Cavanilles Inst. Biodiversity & Evolutionary Biology, Univ. Valencia, c/Catedrático José Beltrán 2, 46980 Paterna, Valencia, Spain. Email: andreu.rico@uv.es

25027. 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) ["From our observation regarding the entomofauna of Ostroveni area, during the research, 116 species of Arthropods were collected and identified (belonging to the orders: Acari, Orthoptera, Dermaptera, Thysanoptera, Homoptera, Hymenoptera, Neuroptera, Odonata, Coleoptera, Lepidoptera, Diptera) of which 93 species (80%) are harmful and 23 species (20%) are useful species. The most numerous order was Coleoptera (35%), followed by the order Lepidoptera (19%), the order Heteroptera and Hymenoptera (9%) each." (Authors) The list of taxa includes as "Beneficial species" Orthetrum spp. and Libellula spp.] Address: Catalin, S., University of Craiova, Romania. Email: catalin.stan@edu.ucv.ro

25028. De Meulenaer, B. (2024): A Wildlife Guide to Georgia. Pelagic Publishing 20-22 Wenlock Road London N1 7GU, UK: 144 pp. (in English) ["Considered by many to be one of the most interesting, varied and biodiverse destinations in the Western Palearctic, Georgia has a great deal to offer for the naturalist-traveller. This guidebook is the first of its kind for the area, not only giving information on where to go birding, but also covering mammals, reptiles, butterflies, dragonflies, flora and numerous other items of note. Since the Rose Revolution in 2003, Georgia has gained popularity among western travellers. With the Caucasus being one of the richest wildlife hotspots in the world, featuring a high degree of endemism – not to mention the hospitable people, dramatic landscapes and last but not least the wonderful cuisine – it makes an excellent travel destination. This book is the practical guide for any nature enthusiast considering a visit to Georgia – from the serious birder to the butterfly fanatic, to the traveller with a general interest in the natural world. Packed with photographs and tips, it also contains many practical maps and suggested routes. An indispensable companion for any journey to the region." (Publisher) The book includes information on selected Odonata species.] Address: www.pelagicpublishing.com

25029. De Oliveira Silva, B.; Souza, F.N.; da Silva, D.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., Univde Estadual do Sudoeste da Bahia, Campus de Vitória da Conquista. BA, Brasil. Email: brunooliesz@gmail.com

25030. Djamai, C.; Memeche, F.; Chettibi, A.; Memeche, H. (2024): Pollution monitoring for aquatic ecostystem integrity using biotic indices based on macroinvertebrates: Case study, Tonga Lake, North-East Algeria. Geo-Eco-Marina 30/2024: 10 pp. (in English) ["The aim of this study was to estimate the diversity of aquatic macroinvertebrates and evaluate the water quality of Tonga Lake (Algeria). Tonga is about 2,700 ha with an average depth of 1.20 m. It is communicating with the Mediterranean Sea through an artificial channel called Messida. The collection of aquatic macroinvertebrates from the seven stations was carried out in the coastal area from March 2017 to February 2018. For this purpose, we used both physicochemical variables and three biotic indices: 1) the FBI (Family Biotic Index); 2) the BMWP (Biological Monitoring Working Party); and 3) the ASPT (Average Score Per Taxon). The indices were calculated using fauna collected from seven stations along the littoral of Tonga Lake. The fauna recorded in this work is composed of seven orders; the most dominant orders were Heteroptera (24.87%), Diptera (21.41%), followed by Coleoptera (19.39%), Ephemeroptera (17.20%), Basommatophora (13.56%), Odonata (3.46%) [treated at family level], and Acari (0.12%). The results also revealed that the BMWP index value classified Tonga Lake as having medium biological quality, while the FBI and ASPT indices classified it as having poor biological water quality." (Authors)] Address: Memeche, F., Fac. of Sciences, Dept Agricultural Sciences, Univ. of M'Sila, PO Box166, Ichebilia, 28000, M'Sila, Algeria. Email: fateh.mimeche@univ-msila.dz

25031. Fan, H.; Liu, T.; Chen, Y.; Liao, Z.; Chen. J.; Hu, Y.; Qiao, G.; Wei, F. (2024): Geographical patterns and determinants of insect biodiversity in China. Science China. Life sciences 67(6): 1255-1265. (in English) ["Insects play important roles in the maintenance of ecosystem functioning and the provision of livelihoods for millions of people. However, compared with terrestrial vertebrates and angiosperms, such as the giant panda, crested ibis, and the metasequoia, insect conservation has not attracted enough attention, and a basic understanding of the geographical biodiversity patterns for major components of insects in China is lacking. Herein, we investigated the geographical distribution of insect biodiversity across multiple dimensions (taxonomic, genetic, and phylogenetic diversity) based on the spatial distribution and molecular DNA sequencing data of insects. Our analysis included 18 orders, 360 families, 5,275 genera, and 14,115 species of insects. The results revealed that Southwestern and Southeastern China harbored higher insect biodiversity and numerous older lineages, representing a museum, whereas regions located in Northwestern China harbored lower insect biodiversity and younger lineages, serving as an evolutionary cradle. We also observed that mean annual temperature and precipitation had significantly positive effects, whereas altitude had significantly negative effects on insect biodiversity in most cases. Moreover, cultivated vegetation harbored the highest insect taxonomic and phylogenetic diversity, and needleleaf and broadleaf mixed forests harbored the highest insect genetic diversity. These results indicated that human activities may positively contribute to insect spatial diversity on a regional scale. Our study fills a knowledge gap in insect spatial diversity in China. These findings could help guide national-level conservation plans and the post-2020 biodiversity conservation framework." (Authors)] Address: Qiao, G., CAS Key Laboratory of Animal Ecology and Conservation Biology, Institute of Zoology, Chinese Academy of Sciences, Beijing 100101, China. Email: qiaogx@ioz.ac.cn

25032. Garzón Lozano, P. (2024): Visión en acción: función optomotora de combinaciones cromáticas en náyades de Rhionaeschna marchali (Odonata; Aeshnidae). MSc thesis, Facultad de Ciencias - Programa de Biología, Universidad El Bosque: 69 pp. (in Spanish, with English summary) ["Vision in action: optomotor function of color combinations in Naiads of Rhionaeschna marchali (Odonata; Aeshnidae) - The combination of multiple ommatidia allows the insect to obtain a composite image of its environment, useful for detecting movements and changes in light, having an apposition arrangement of the ommatidia. The optomotor function allows compensatory movements to stabilize your vision and the image you perceive during movement. Ommatidia have receptors for a wide range of wavelengths including visible waves. The organisms were maintained under controlled conditions in the laboratory and exposed to Black-White, Black-Blue, Black-Red, Black-Green, Blue-Red, Green-Blue and Green-Red color contrast tests for 3 minutes with one turn clockwise at 3rpm. A total of 182 individuals were collected. R. marchali reacted to all combinations including red color; the stimuli to which they presented the greatest sensitivity was to the colors green and blue together. They reached low angular velocities which corresponds to their low inactivity in their natural environment. In the early stages this species is recognized as a tactical predator and as it develops it becomes visually dependent hunting, so the most noticeable responses occur in stages 1-0. However, a similar angular velocity was maintained in all stages." (Author)] Address: https://repositorio.unbosque.edu.co/server/api/core/bitstreams/e2c6252f-4e72-460b-9c9d-7ef653ab4f8f/content

25033. Genser, J. (2024): Neue Naturschutzgebiete im Regierungsbezirk Freiburg: NSG „Bächetal" – Kulturlandschaft mit Biber. Mitt. Bad. Landesverein Naturkunde u. Naturschutz 26. DOI: 10.6094/BLNN/Mitt/26.02 Seiten 11-18: 11-18. (in German, with English summary) ["The nature reserve „Bächetal" was established in 2021. In contrast to many protection procedures, the approval passed without major conflicts. The protected area includes the lower part of the Krähenbach, a valley near Tuttlingen-Möhringen. The small river´s floodplain is noticeably shaped by beavers. The areas habitats and typical species are described." (Author) From the 24 odonate species listed for the Nature protection

area, Isoaeschna isoceles, Onychogomphus forcipatus and Orthetrum brunneum are briefly mentioned.] Address: Genser, J., Lotte-Paepcke-Hof 2, 79111 Freiburg, Germany. Email: jogenser@gmail.com

25034. Geraeds, R.P.G. (2024): Dragonflies of the Driestruik Nature Reserve. natuurhistorisch maandblad 113(5): 141-148. (in Dutch, with English summary) ["Driestruik is a small nature reserve of about 23 ha, situated south-east of the city of Roermond. It consists mainly of woods, heathlands and grasslands. There are four small ponds in the area that are used as breeding habitats by dragonflies. Observations of dragonflies were mainly collected during a long-term study of reptiles at the Driestruik, between September 2011 and October 2016. Since 2016, the area has been visited less frequently. During this research, 1976 observations of 3582 dragonflies were collected. A total of 35 Odonata species were found, 15 species of damselflies and 20 species of dragonflies. The most frequently observed species was Sympetrum striolatum, while the largest number of observed individuals were Coenagrion puella. Stylurus flavipes and Cordulegaster boltonii were the rarest species, as only one specimen of each was found. Twenty-five species were found by the four ponds and 22 of them used these as breeding waters. The grasslands beyond the immediate vicinity of the ponds harboured 35 species. Ten of these species have not formed populations at the Driestruik reserve. These are mainly species depending on running water, like Calopteryx splendens, Gomphus vulgatissimus, and Ophiogomphus cecilia. The other species reproduce in both slowly flowing and stagnant water, for example Platycnemis pennipes and Aeshna isoceles. The majority of the damselflies observed in the grasslands beyond the immediate vicinity of the ponds were found before their main flight period, while observations of damselflies after the main flight period were very rare. This suggests that damselflies use this area mainly during the maturation period. Most dragonfly species were also frequently observed in the grasslands during and after the main flight period. The grasslands are used during the maturation period, but most dragonfly species also use the area frequently during the breeding period." (Author)] Address: Geraeds, R.P.G., Heinsbergerweg 54a, 6061 AK Posterholt, The Netherlands. Email: rob.geraeds@kpnplanet.nl

25035. 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, Lab. Nature Education and Conservation & Molecular Biology, Techniques Lab., Faculty of Biology, Adam Mickiewicz University in Poznañ, Poland. Email: nikola.goral@amu.edu.pl

25036. Hamilton, V.; Stepenuck, K.F.; Zinna, R.A.; Traylor, A.M,; Penrose, D.; Sigler, W.A. (2024): Volunteer accuracy in a benthic macroinvertebrate participatory science project. Citizen Science: Theory and Practice 9(1): 27. DOI: https://-doi.org/10.5334/cstp.756: 14 pp. (in English) ["Concerns about the accuracy of volunteer-derived aquatic macroinvertebrate identifications and the resulting influence on calculated water quality metrics can limit use of volunteer-generated data in freshwater-focused participatory science programs. To address these concerns, we assessed 357 benthic macroinvertebrate quality control (QC) samples collected by volunteers using leaf packs, kick nets, and visual assessments between 2011 and 2016 for the Environmental Quality Institute (EQI) in North Carolina, USA. We reviewed each sample for quality, and compared macroinvertebrate identifications and water quality metric scores determined by volunteers to identification and metrics determined by an entomologist. About 80% of the QC samples were identified to be of high quality, indicating proper preparation, preservation, and labeling of samples. The majority of samples that received low quality ratings were improperly or poorly preserved. We recommend use of 95% (rather than 70%) ethanol for macroinvertebrate preservation, and increased communication to volunteers during QC sampling periods to enhance their success in properly preserving samples. We observed significant ($p < 0.005$) linear relationships between volunteer and entomologist-derived water quality metrics including a biotic index, Taxa Richness, and percent intolerant Ephemeroptera, Plecoptera and Trichoptera (EPT) taxa. However, visual assessments – those in which no sampling equipment was used to collect aquatic macroinvertebrates – reduced the goodness of fit between volunteer and entomologist-derived biotic index scores and artificially increased the goodness of fit between volunteer and entomologist derived Taxa Richness and percent EPT scores. We recommend calculating water quality metrics based only on leaf pack and kick net samples collected by volunteers." (Authors) The study also considers Odonata.] Address: Hamilton, Virginia, Montana State University, Bozeman, Montana, USA

25037. Hermans, J.T. (2024): The Northern white-faced darter (Leucorrhinia rubicunda) in the Dutch province of Limburg (Odonata: Libellulidae). A disappearing species of fens and bogs. Part I: Phenology and distribution. natuurhistorisch maandblad 113(8): 229-240. (in Dutch, with English summary) ["L. rubicunda is a mediumsized dragonfly. It often occurs together with the smaller, sleeker and smaller-spotted L. dubia. L. rubicunda is somewhat larger and more robust, the abdominal spots (red in males, yellow in immatures and females) are larger and the costa (leading vein) of the forewing is yellow (dark brown to black in L. dubia). Together with the White-faced darter, the Northern white-faced darter has the northernmost distribution of all European species of Leucorrhinia. It is found from the north and north-west of mainland Europe eastwards to western Siberia and the eastern part of the Altai Mountains. In the Netherlands, L. rubicunda is largely restricted to peat bogs and fenlands. The majority of its habitats are acidic and oligotrophic. Over the last decade, the species has suffered a severe decline in the Netherlands (and in neighbouring Belgium and Germany), due to eutrophication caused by high emissions of nitrogen compounds and desiccation of its habitat, worsened by climate change. L. rubicunda formerly had around seven temporary and eight stable populations in Limburg. All temporary populations have vanished, and only

three of the eight stable populations have so far survived, at Griendtsveen, Mariapeel and Groote Peel." (Author)] Address: Hermans, J.T.; Hertestraat 21, NL-6067 ER Linne, The Netherlands. E-mail: jthermans21@gmail.com

25038. Hermans, J.T. (2024): The Northern white-faced darter (Leucorrhinia rubicunda) in the Dutch province of Limburg (Odonata: Libellulidae). A disappearing species of fens and bogs. Part 2: Habitat and its management. natuurhistorisch maandblad 113(10): 289-298. (in Dutch, with English summary) ["L. rubicunda inhabits peat bogs and fenlands, where it often co-occurs with L. dubia. At these sites, the majority of its habitats are acidic and oligotrophic, with a vegetation of peat mosses (Sphagnum spec.), sedges and rushes. Habitats are largely unshaded and often situated in forest areas. Small, mostly short-lived populations of L. rubicunda can also be found near mesotrophic lakes, in more nutrient-rich habitats such as dune lakes or meadow pools. The species has a broader ecological range than L. dubia. L. rubicunda is a more active dragonfly, with a more vagrant behaviour than L. dubia. The severe decline of the species in Limburg is discussed in relation to the habitat requirements of larvae and adults. The article ends with proposals to maintain, restore and expand the last three remaining reproduction sites in Limburg.] Address: Hermans, J.T.; Hertestraat 21, NL-6067 ER Linne, The Netherlands. E-mail: jthermans21@gmail.com

25039. Herrmann, A. (2024): Dichteabhängige Effekte des Kalikokrebses Faxonius immunis auf Libellenlarven in einem Maßnahmengewässer eines Natura-2000 Gebiets - Reversibel oder nicht? Libellula 43(3/4): 209-220. (in German, with English summary) ["Density-dependent effects of the calico crayfish Faxonius immunis on dragonfly larvae in a management waterbody within a Natura 2000 area – are they reversible? – The invasive calico crayfish Faxonius immunis has significant effects on the population densities of native Odonata larvae within the invertebrate communities in small water bodies along the Upper Rhine, especially at high population densities. In a pond within the Natura 2000 area “Rheinniederung zwischen Wintersdorf und Karlsruhe”, data on the invertebrate community was collected in 2019 during a period of high crayfish population density and again in 2020 after management efforts, where crayfish were trapped and removed. The data was compared to previous records from before the colonization by the calico crayfish. The results showed that both species diversity and individual counts, for the entire invertebrate community as well as the dragonfly group specifically, returned to values comparable to those before the invasion by F. immunis, following the reduction in crayfish density." (Author).] Address: Herrmann, A., Göhrenstr. 13, 76199 Karlsruhe, Germany. Email: al.herrmann@web.de

25040. Iwata, T.; Yoshioka, T. (2024): Dragonflies and damselflies collected in Takamagahara and Ryusho-ike, the Hida Mountains, Toyama Prefecture, Central Japan in 2023. Bulletin of the Toyama Science Museum 48: 19-25. (in Japanese, with English summary) ["Dragonfly fauna in Takamagahara and Ryusho-ike, the Hida Mountains, Toyama Prefecture, central Japan was surveyed in August 2023, and 11 species were confirmed. Of these, Ceriagrion melanurum, Lyriothemis pachygastra, and Orthetrum albistylum were recorded for the first time in the Takamagahara area. Additionally, Sympetrum danae was confirmed in Toyama Prefecture for the first time in 22 years. Combining the results of previous study and this survey, 19 species of dragonflies have been confirmed in the Takamagahara area. The dragonfly fauna is well reflected by the fact that it is located at an altitude of about 2,100 m in the Hida Mountains, as both the alpine species of Leucorrhinia dubia and S. danae were confirmed in Honshu. Since Takamagahara and Ryusho-ike are thought to have been formed by a landslide on the western slope of Mt. Suisho-dake that occurred about 10,000 years ago, this dragonfly fauna is also thought to have been formed over a period of at most 10,000 years, and is not considered a relict from the glacial period. Furthermore, some species such as C. melanurum and L. pachygastra, may have been newly introduced in the past 20 years, suggesting that the dragonfly fauna in this area may be in unexpectedly rapid flux over a short period of time." (Authors)] Address: Toyama Science Museum, 1-8-31 Nishinakano-machi, Toyama 939-8084, Japan

25041. Karagöz, H.; Hacet, N. (2024): Odonata fauna of Kýrklareli province, with updated species list of Longoz Forest in Thrace Region (Türkiye). Brachytron 25(2): 1-13. (in English, with Dutch summary) ["This study was conducted to investigate the Odonata fauna of Kýrklareli province in the Thrace Region. It was carried out at 58 different localities in various wetlands in the Kýrklareli province in 2022 and 2023. Lestes dryas, Erythromma viridulum, Cordulia aenea and Libellula quadrimaculata were recorded for the first time in this province. Of these species, C. aenea is also a new record for the Turkish Thrace Region. Three species recorded during this study are listed as Threatened in the Red List of European Odonates: Cordulegaster insignis, C. picta and Somatochlora borisi; the latter species is endemic to the Balkans. For these species, a new location was found. In the Longoz Forests, which have a special habitat, ten new species have been added to the list, which brings the total number of species to 29." (Authors)] Address: Hacet, Nurten, Trakya University, Fac. of Science, Dept of Biology, Edirne, Türkiye. Email: nurtenhacet@trakya.edu.tr

25042. Li, D.; Mu, Y.; Lau, G.-K.; Chin, Y.; Lu, Z. (2024): Numerical study on the aerodynamic performance of dragonfly (Anax parthenope julius) maneuvering flight during synchronized-stroking. Physics of Fluids 36(9), 091911 (2024) https://doi.org/10.1063/5.0222144: (in English) ["Dragonflies exhibit outstanding performance in flight due to their exceptional flying capabilities. However, micro air vehicles developed based on biomimetics principles fall far short of dragonflies in terms of maneuverability. To investigate the ability of dragonflies to change flight states per unit time during synchronized-stroking, this study first takes the dragonfly as the biological observation subject. Based on the acquired biological characteristics, a geometric model required for numerical simulation is established. Combined with the dynamic observation results and flapping patterns of the dragonfly, a systematic analysis of the aerodynamic performance and surrounding flow field structure during maneuvering flight at different flapping frequencies is conducted. The results indicate that changes in the dragonfly's flapping frequency have a significant impact on lift and roll moment, while the impact on pitch moment and lateral force is minimal, varying only within the range of 10%–20% with a frequency increase in 5 Hz. Even with the same flapping frequency in the left and right wings, a residual pitch moment of up to 18.5 mN mm remains, causing the dragonfly's body to oscillate back and forth. By changing the flapping frequency of one wing, the dragonfly can achieve maneuvering turns to the opposite side. During the entire downstroke, the fluid around the wings generates additional circulation due to rotational effects, which is more beneficial for maneuvering takeoff. During the upstroke, the trailing-edge vortices shed significantly, creating a large pressure difference between the forewing and hindwing surfaces, which is more conducive to forward maneuvering flight." (Authors)] Address: Lu, Z., School of Aeronautics & Astronautics, Sun Yat-sen Univ., Shenzhen 518107, China. Email: cnluzhb7@mail.sysu.edu.cn

25043. Li, Y.; Ge, J.; Feng, D.; Yang, Y.; Liu, H. (2024): Population dynamics and diversity of dragonflies in Baiyangdian wetland. Wetland Science 22(6): 895-901. (in Chinese, with English summary) ["The Baiyangdian Wetland Nature Reserve is situated in Xiong'an New Area, Hebei Province. From January 2021 to December 2022, a bi-monthly survey of Odonata was conducted in seven representative areas. Through species identification and statistical analysis, the abundance and diversity indices of Odonata were examined. The findings revealed a total of 21 species from 17 genera and 6 families within the Odonata, with the Libellulidae exhibiting the highest number of species at 52.38% of the total, followed by Coenagrionidae at 23.81%, which represented an increase of four species compared to previous surveys. Ischnura elegans emerged as the most dominant species alongside four other dominant ones: Ischnura asiatica, Paracercion plagiosum, Crocothemis servilia and Rhyothemis fuliginosa. A total count of 2 724 adult Odonata was recorded during the two-year survey period while June showing the highest species abundance and richness observed while July exhibited the highest Shannon-Wiener diversity index. In compared with Shannon-Wiener diversity index H', Pielou evenness index and interspecific random encounter rate PIE, Margalef richness index showed significant discrimination in monthly Odonata communities in Baiyangdian wetland and proved more suitable for evaluating population dynamics of Odonata in this area." (Authors)] Address: Li, Y., College of Life Sciences, Hebei University, Baoding 071002, Hebei, P.R. China. Email: E-mail: liyuntaofestumail.hbu.cdu.cn

25044. 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. 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

25045. 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." (Authors)] Address: Magsalay, D.D., College of Mathematics & Natural Sciences, Northwestern Mindanao State College of Science & Technology. Labuyo 7214, Tangub City, Philippines. Email: denmar.magsalay@nmsc.edu.ph

25046. Manger, R. (2024): The parasitic infection rate of Dragonfly midges (Forcipomyia paludis) in De Wieden. Brachytron 25(1): 1-8. (in Dutch, with English summary) ["Targeted research was conducted in De Wieden on the occurrence of the dragonfly midge (Forcipomyia paludis) during June and July 2024. Only 18 dragonfly species were observed, of which 7 were infected by the dragonfly midge. The average infection rate was 7.8%. Almost all midges were observed at the base of the forewings, at the level of the cubital veins. The dragonfly midge appears to be less common in De Wieden than in De Weerribben. The difference in the infection rate of the dragonfly fauna between the two areas cannot be explained. It might be that the rather low density of Cladium mariscus, the management or the succession stage are responsible for this." (Authors)] Address: Manger, R., Stoepveldsingel 55, 9403 SM Assen. The Netherlands. E-mail: rene@mangereco.nl

25047. Mehmood, S.A.; Ahmed, S.; Zia, A.; Khan, W.; Panhwar, W.A. (2024): Molecular phylogenetics of Green-Eyed Skimmers Macromia moorei (Odonata: Corduliidae) of Hazara Region, Pakistan. Proceedings of the Zoological Society 77(3): 387-391. (in English) ["Phylogenetic relationships of green-eyed skimmers, Macromia moorei was studied to estimate the evolutionary history among the members of family Corduliidae under order Odonata using the genetic methods of maximum probability, maximum parsimony, and Bayesian examination. 53 DNA sequences and 3660 genetic characters/loci were used in the present study. Genetic distance of every nucleotide sequence was sorted from 0.69 to 98.10%. The outcomes of the combined COI + 16S DNA sequences revealed topology/phylogram through generally stronger bootstrap provision than evaluation of each gene in single analysis. Molecular analyses based on mitochondrial DNA yielded the position of M. moorei as a sister species of M. ampigena in family Corduliidae." (Authors)] Address: Mehmood, S.A., Dept of Zoology, Hazara University Mansehra, Mansehra, Pakistan. Email: banianhu@gmail.com

25048. Monappa, N.B.; Sekarappa, B. (2024): Density, abundance and diversity of insect pollinators at agro-ecosystems of Kodagu District, Karnataka, India. Asian Journal of Biological and Life Sciences 13(2): 384-394. (in English) ["Aim: Inventorying the insect pollinators and their diversity at different agro-ecosystems of Kodagu district. Background: Many insect species play a crucial role in the process of pollination of various flowering plant species amidst diversified agro-ecosystems. Published reports on insect pollinators are diffused and it is necessitated in Kodagu district. Hence, the study of insect pollinators was carried out at different agro-ecosystems of Kodagu district of Karnataka during 2020-

2023. Materials and Methods: Twelve study sites were selected randomly at different habitats such as plantations, uncultivable lands, paddy fields, horticulture gardens, meadows, scrubby jungle and agriculture farms by following standard methods. b: Total 79 insect species were observed on different flora which belongs to six orders, 22 families and 69 genera. Hymenopterans were predominant (86.3%) and it was followed by Lepidopteron (8.1%) found commonly at different agro-ecosystems of Kodagu district. However, Coleopterans (1.7%), Dipterans (1.7%), Hemipterans (1.0%) and Odonates (1.1%) [Neurothemis tullia, Orthetrum luzonicum, Sympetrum sp.] were less in number and their per cent occurrence was less than 2. Interestingly, Apidae family members of the order Hymenoptera were very high and it was followed by Nymphalidae and Pieridae of the order Lepidoptera and Syrphidae of the order Diptera compared to other families. The diversity indices revealed considerable variations and surprisingly, 2.8% insect pollinators decline was observed at different agro-ecosystems of Kodagu district. Conclusion: Thus, present investigation provided an insight on commonly occurring pollinating insect species, their distribution, diversity and declining trend at agro-ecosystems of Kodagu district, Karnataka." (Authors)] Address: Monappa, N.B., Dept of Zoology, Field Marshal K M Cariappa College, Madikeri, Kodagu, Karnataka, INDIA.

25049. Motamedinia, B.; Cardinal, S.; Kelso, S.; Callaghan, C.; Ghahari, K.; Wilmshurst, J.F.; Skevington, J. A (2024): Portable photocollector for the field collection of insects in biodiversity assessment. Insects 2024, 15, 896. 12 pp. (in English) ["Studies regarding insect biodiversity often require large samples, which are not always easy to obtain since preparing and cleaning the debris from samples takes much time. Insects are usually acquired using sweep netting methods, but these yield a great amount of additional material to sort. With the purpose of lightening this task, we designed a low-cost photocollector device powered by an LED light source for attracting insects. Timed trials were conducted in the grasslands of the Canadian prairies to determine its efficiency in sorting live insects from debris. For this purpose, two group of insects were considered: bees and flies. We noticed that various species of bees and flies moved at different speeds. This would mean our photocollector can serve as an effective tool to accelerate insect collection based on their speed, thereby contributing to the study of insect diversity. Abstract: Arthropod biodiversity research usually requires large sample collections. The efficient handling of these samples has always been a critical bottleneck. Sweep netting along transects is an effective and commonly used approach to sample diverse insects. However, sweep netting requires the time-consuming task of sorting insects from the large amounts of debris and foliage that end up in the sweep net along with the insects. To address this, we introduce a robust, portable, and inexpensive photocollector device with an LED light source to extract insects from sweep net samples in a standardized way. Timed field trials tested the photocollector's efficiency in extracting live insect samples from debris, focusing on Hymenoptera and Diptera. We found that 73% (±13%) of undamaged specimens moved toward the collection bottle within the first hour and 79% (±13%) after four hours. Of the insects failing to move after four hours, most (81%) were damaged and likely unable to move. Accounting only for undamaged specimens, 83% (±11%) moved after 1 h and 90% (±11%) moved after 4 h. We found significant differences in when families of Hymenoptera and Diptera moved. We suggest that the photocollector can be a useful tool in standardized biodiversity assessments. ... This minimum sample size removed Araneae, Neuroptera, Odonata, and Thysanoptera from the order-based analysis, representing 0.11% of specimens across all time intervals, and prevented very rare taxa from excessively influencing the proportional movement rates." (Authors)] Address: Motamedinia, B., Canadian National Collection of Insects, Arachnids and Nematodes, Agriculture & Agri-Food Canada, 960 Carling Avenue, Ottawa, ON K1A 0C6, Canada. Email: bmotamed@uoguelph.ca

25050. 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

25051. Nel, N.; Poschmann, M.; Nungesser, K.; Schindler, T.; Stenger, M.-J. (2024): New records of damsel-and dragonflies (Odonata: Zygoptera, Anisoptera) from the Miocene of the Mainz Basin (Tertiary; SW-Germany). Mainzer Geowissenschaftliche Mitteilungen 52: 137-144. (in English, with German summary) [" New finds of damsel- and dragonflies from the Miocene Wiesbaden Formation of the Mainz Basin are figured and described. The wing fragment of the family Libellulidae and an almost complete specimen of Lestes sp. (Lestidae) widen our knowledge of the biota of the Wiesbaden Formation, in particular as historical finds must be considered lost or their repository unknown, respectively. The Lestidae constitutes the first record of Zygoptera for the Tertiary of the Mainz Basin." (Authors).] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@mnhn.fr

25052. Olatunji, O.E.; Elakhame, L.A.; Osimen, E.C.; Tampo, L.; Edegbene, A.O. (2024): Responses of macrobenthic invertebrates' diversity to environmental factors in a tropical freshwater river in Edo State, Nigeria. Biologia 79: 3315-3326. (in English) ["Macroinvertebrates occupy an important trophic level in riverine ecosystems based on their composition and diversity. In this study, we explored the biodiversity pattern of macroinvertebrates in relation to environmental parameters in a bid to assess the water quality of the Uwagbe River, Nigeria. Sampling was carried out in three well marked stations from March 2018 to February 2020 following standard procedures. The physico-chemical parameters recorded were within the acceptable limit by World Health Organization and Federal Environmental Protection Agency of Nigeria standards except the pH and DO of Stations 2 and 3 and BOD of Station 3. The Principal Component Analysis showed pH and DO to be positively associated with Station 1. 13 orders of macroinvertebrates, comprising of 32 families, 45 taxa and 4,796 individuals were recorded. The most dominant order was Diptera (26.7%) while the least was Arachnida (0.1%). The most predominant taxon was Lumbricus sp. (7.9%), while

the least was Aeshna sp. (4.3%). Diversity indices showed that Station 1 had the highest indices for Margalef index, Shannon-Wiener diversity index (H), Equitability index (E) and Simpsons' dominance index while Station 3 had indices with the lowest values. Canonical Correspondence Analysis ordination showed that chloride, alkalinity, BOD, nitrate, phosphate and water depth were strongly correlated with families such as Lumbricidae, Chironomidae, Potamonautidae, Tabanidae and Palaemonidae in Station 3. DO and pH were strongly associated with Amphipodae, Hydrophilidae, Gerridae and Libellulidae families in Station 1. The study revealed the significance of the utility of macroinvertebrates community structure and its relationship with environmental factors in assessing the level of perturbation in riverine ecosystems. The results provide insight on how river managers can put in place appropriate conservation processes to forestall the incessant level of perturbation occurring in riverine ecosystems." (Authors)] Address: Olatunji, O.E., Dept of Biological Sciences, College of Basic & Applied Sciences, Glorious Vision University, Ogwa, Edo State, Nigeria

25053. Paul, G.; Suresh, P.; Sebastian, A.T.; Philip, N.S. (2024): Odonata fauna in adjoining riparian agriland and the riparian urbanland of Muvattupuzha river, Kerala, India. Journal of Biodiversity and Environmental Sciences 25(4): 150-156. (in English) ["This study, conducted between February and May 2019, coincided with the COVID-19 lockdown period in India. Researchers examined Anisoptera and Zygoptera assemblages in riparian habitats bordering the Muvattupuzha River, Kerala, India. The investigation revealed a fascinating contrast: odonate diversity was significantly higher in agricultural land than in urban areas. A total of 46 species from nine families were documented across both habitats. The urban zone displayed a community of 19 species, with an even split between Anisoptera (19) and Zygoptera (9). Conversely, the agricultural land teemed with a richer assemblage of 28 species, including a surprising dominance of damselflies (17) compared to dragonflies (11). This finding highlights the potential of agricultural landscapes to support odonate populations, particularly damselflies. Furthermore, the agri-land was a refuge for two endemic Western Ghats species, Macrogomphus wynaadicus and Heliocypha bisignata, adding to its ecological significance. Researchers conducted a physico-chemical analysis of Muvattupuzha River water samples collected near the study sites to understand potential environmental influences. The analysis revealed variations in 14 measured parameters, which may warrant further investigation to elucidate their role in shaping odonate diversity across these contrasting riparian habitats. The timing of this study, coinciding with the lockdown, offers a unique opportunity to understand how reduced human activity might influence odonate populations. With less traffic and potentially altered land-use patterns during the lockdown, the study provides valuable insights into the potential benefits of reduced anthropogenic pressure on freshwater ecosystems and their biodiversity." (Authors)] Address: Paul, Geetha, Dept Zool., Bishop Heber Coll., (Autonomous), (Affiliated to Bharathidasan Univ.), Tiruchirappalli, 620017, Tamil Nadu, India

25054. Probst, R.; Probst, R. (2024): Die größte Libelle Europas im Höhenflug? Ein Nachweis der Großen Quelljungfer (Cordulegaster heros) auf über 900 Meter Seehöhe in Kärnten. Carinthia II 214/134: 231-234. (in German) ["Europe's largest dragonfly soaring high? A record of the Great Darter (Cordulegaster heros) at over 900 meters above sea level in Carinthia - Due to its southern origin, C. heros is classified as a heat-loving dragonfly species. Currently, the three highest recorded locations in the Austrian dragonfly database (W. Holzinger, written communication) are located almost exactly at 700m a.s.l. The records are located in Glashütten near Langeck in Burgenland, at the Radlpass on the Styrian side, and also in Carinthia in the Sattnitz range near the village of Wurdach. It is therefore remarkable that on July 12, 2023, we were able to provide a significantly higher record of the Great Darter at 933 meters above sea level. The record is located in the Feldkirchen district (N 46.6644 / E 14.0353) in the closed forest area of the Ossiacher Tauern. An individual was observed resting near a clearing in an open stand of old trees in the montane forest and documented. The habitat at the site of discovery (light spruce forest) as well as the altitude may initially seem very unusual. However, a large part of the life of this dragonfly species takes place away from water. Not even males permanently patrol streams (W. Schweighofer, written communication; cf. Schweighofer 2008), so there are large (and methodologically difficult to close) gaps in our knowledge about the periods away from water. We rather assume that C. heros is more widespread than previously known in general (e.g., Chovanec 2023) and also in warmer "high altitudes" such as the Ossiacher Tauern with their numerous forest streams. However, it remains to be examined how regularly (and persistently) this dragonfly species visits altitudes above the current limit of around 700 meters. This short message may invite observations of this attractive group of dragonflies, not least because the two other representatives of the genus, Thecagaster bidentata and C. boltonii, are classified as Near Threatened and Vulnerable in the Carinthian Red List." (Authors/Google translate)] Address: Probst, R., Neckheimstr. 18/3, 9560 Feldkirchen, Austria. Email: remo.probst@gmx.at

25055. Schloemer, S. (2024): European beaver (Castor fiber) engineered habitats and their invertebrate community in mountain streams - Vom Europäischen Biber (Castor fiber) gestaltete Lebensräume und ihre Wirbellosengemeinschaft in Bächen des Mittelgebirges. PhD thesis, Faculty of Biology, University of Duisburg-Essen, Germany: 143 pp. (in English, with German summary) [Nordrhein-Westfalen, Germany; "Beavers (Castor spp.) shape and change their habitat more than almost any other animal species. Beaver dams, beaver ponds and their marginal bogs, stream splits, side channels, beaver meadows and large amounts of deadwood used to be common structures in small streams. The reintroduction and distribution of beavers in the northern hemisphere is accompanied by a continuous “restoration” of the small watercourses and their floodplains, the consequences of which has scarcely been explored to date. To investigate the influence of beaver activities, I studied aquatic habitats created by beavers and compared them with aquatic habitats in comparable stream sections without beavers. I used the abundance, species richness and functional groups of the macrozoobenthos community, as well as the size, diversity and complexity of the habitats as indicators. In the first chapter, I explored the impact of beaver activities on stream and floodplain morphology and habitat complexity, using aerial photography, transect mapping and a geographic information system. I focused on changes in wetted surface, macro- and microhabitats, as well as the connectivity of the stream-floodplain complex. The results revealed that beaver activities drastically increased the wetted surface area and created a diverse complex of lentic, lotic and semi-aquatic habitats. Furthermore, beaver activities improved the connectivity of the stream-floodplain complex by lengthening the shoreline, reducing stream incision and thus enhancing the hydrological connection between the aquatic and the riparian area. Additionally, the number, diversity and heterogeneity of microhabitats increased due to beaver activities. Especially, the

amount of deadwood increased extremely, and - together with the presence of emergent macrophytes – contributed to a higher habitat complexity and diversity in comparison with stream sections without beavers. In the second chapter, I studied the macrozoobenthos community in the beaver created habitats, such as ponds and side channels and compared them to habitats stream sections without beavers, e.g. riffles and pools. For this, I collected 188 habitat-specific macrozoobenthos samples that yielded more than 82,000 individuals. The differences between stream section types were analysed in terms of the abundance and species richness, as well as the flow preferences of the macrozoobenthos community. Beaver activities had a profound positive impact on macrozoobenthos diversity, significantly enhancing both species richness and abundance. In beaver territories, the flow preferences are more heterogeneous than in stream sections without beavers which are dominated by lotic taxa. Community composition was most similar between habitat types with comparable flow patterns, such as beaver ponds and pool-habitats in non-beaver territories. In both stream sections types, rheophilous taxa accounted for the largest percentage (> 50 %) of the community. Furthermore, the results show that beaver activity increased the functional and taxonomical diversity of macrozoobenthos. In the third and final chapter, the macrozoobenthos fauna of beaver dams was investigated in detail. Beaver dams are special habitats in the aquatic-terrestrial interface, but their macrozoobenthos community is hardly known. This study aimed to quantify and characterize this community, taking into account the maintenance state of the dams. Nine different areas of a dam were systematically sampled, from the top to the middle and bottom areas using a suction device specially developed for this purpose. The macrozoobenthos community of beaver dams proved to be diverse and predominantly rheophile. Differences in the colonizing structure were directly dependent on the degree of maintenance and the area of a dam. The species distribution indicated an increase of flow velocity from the top to the bottom of the dams. Thereby, the flow gradient was higher in maintained dams than in abandoned ones. In terms of feeding types, shredders were most strongly represented. However, these were less common in middle and bottom areas, especially in maintained dams, where passive filter feeders predominated. In addition, next to the typical running water fauna, semi-aquatic taxa also colonized beaver dams, preferably in middle and bottom areas of abandoned dams. The results show that beaver dams offer an impressively wide range of environmental conditions and habitat types that promote a high biodiversity in streams and floodplains. Due to the sample size and the methods used, this study is one of the most detailed on this subject conducted to date. Therefore, this thesis provides new insights into the complexity of beaver engineering of aquatic ecosystems. In the context of the ongoing devastation of aquatic environments, the expansion of the beaver represents an outstanding potential for species and habitat conservation, restoration, maintenance and protection. In addition, the results may update the classic concept of the hydromorphology and invertebrate colonization of mountain streams, in which beaver activities have not yet been taken into account." (Authors) Six odonate species are listed: Aeshna cyanea, Calopteryx splendens, C. virgo, Cordulegaster boltonii, Libellula depressa, and Pyrrhosoma nymphula.] Address: https://duepublico2.uni-due.de/servlets/MCRFileNodeServlet/duepublico_derivate_0008-1583/Diss_Schloemer.pdf

25056. Schweighofer, W. (2024): Beobachtungen zum Dämmerungsflug der Großen Quelljungfer Cordulegaster heros Theischinger, 1979. Observations on the crepuscular flight of the Balkan Goldenring Cordulegaster heros Theischinger, 1979. Beiträge zur Entomofaunistik 25: 142-146. (in German) ["On July 10, 2020, I last examined the evening flight of C. heros. The scene was again the Langegger Graben in the Dunkelsteinerwald/Lower Austria, which was then predominantly shaded by deciduous forest. A small tributary flows into the larger Aggsbach stream (48°19'08.7" N, 15°27'37.7" E, 330 m). A little upstream of this confluence was a calmer section of the stream, widened to just under a meter in width, which was particularly suitable for photographic purposes. Over the years, I tried to take usable flight photographs of C. heros there. While on summer days, there was often only light flight activity during the day on this stream system, the patrol flight of the males intensified significantly towards the evening. Egg laying and mating were also frequently observed at these times. As was usual at the site during all the years of irregular surveys between 2008 and 2020, there was intense flight activity that evening, with good chances of photographing males flying past at short intervals. Even during this phase, I noticed the unusually strong flight of a mayfly species (Ephemera sp.). However, the heros males were still displaying normal behavior, i.e., typical patrol flight with more or less strong aggression toward encountered or catching males. I was able to take occasional images, which showed that the heros males were apparently also successfully hunting the mayflies during the patrol, although incidental prey capture during the patrol is considered normal (Pix et al. 2021). Around 8:45 p.m. CEST, however, the density of males flying past me became increasingly higher. In relative darkness, I saw up to five males simultaneously flying over the slightly wider stretch of stream in front of me, only a few meters long, and never leaving this area. This was no longer a directed patrol flight; rather, it was a targeted hunting flight for the mayflies above the water surface. The males present suddenly ignored each other; all aggressive behavior had ceased. This phase lasted about ten minutes, then the male damselfly disappeared suddenly, as quickly as they had appeared. Likewise, the mayflies had largely vanished. Shortly afterwards, at 8:53 p.m., a final male patrolled past me downstream; this marked the end of the stream flight for that day." (Authors/Google translate)] Address: Schweighofer, W., Ötscherblick 10, 3661 Artstetten, Austria. Email: wolfg.schweighofer@gmx.at

25057. Severina, I. Yu.; Novikova, E.S.; Zhukovskaya, M.I. (2024): Insect ocelli: Ecology, physiology, and morphology of the accessory visual system. Neuroscience and Behavioral Physiology 54: 1432-1441. (in English) ["The peripheral photoreceptor system of adult insects and larvae of incompletely metamorphosed insects consists of a pair of compound eyes and several simple chamber-type eyes, or ocelli. The origin of ocelli is linked with the simple eyes of crustacean larvae; ocelli, along with compound eyes, form the basic plan of the photosensory system of insects. The development of these light-sensitive organs is closely related to flight, allowing body position to be maintained relative to the horizon. They are highly sensitive and fast-acting, which is critical for small individuals which are easily carried away by air currents. Insect species which have transitioned to life in low-light conditions have ocelli of greater size and can also have enhanced photosensitivity due to a reflective tapetum and loss of polarization sensitivity and color discrimination. When light intensity decreases below a critical level, for example, when living in caves, ocelli disappear. Ocelli in actively moving daytime insects can acquire sensitivity to polarization, features of object vision, and several (usually two) spectral photoreceptor types. The high speed of the ocellar visual system is ensured by its small number of synaptic relays and direct connections

with effector neural circuits" (Authors)] Address: Zhukovskaya, M.I., Sechenov Institute of Evolutionary Physiology & Biochemistry, Russian Academy of Sciences, St. Petersburg, Russia

25058. Sinha, C. (2024): A comparative study of biomass and net production of aquatic insects of Hardia wetland of Saran District of North Bihar, India. Biospectra 19(2): 1-4. (in English) ["Arthropods were the dominant group among macroinvertebrates, surpassing molluscs and annelids in abundance. Among arthropods, insects were the most dominant subgroup. In total, 85 species of macroinvertebrates were recorded in this study, classified into three major groups: arthropods, molluscs, and annelids. Arthropods occupied the highest position, comprising 66 species and accounting for 78.17% of the total. Molluscs followed with 11 species (12.64%), while annelids were the least represented, with 8 species (9.19%). Within arthropods, 66 species were identified, including 3 species of decapods. The insect subgroup was the most diverse, with 63 species. Among them, coleopterans and hemipterans were equally dominant, each with 24 species. Odonates [not further details are given] accounted for 8 species, dipterans for 4 species, and ephemeropterans for only 3 species. The density of arthropods varied throughout the year, ranging from 170 individuals per cubic meter in August to 980 individuals per cubic meter in February. Their population showed an increasing trend during winter and late monsoon and a decreasing trend during summer and early monsoon. Overall, macroinvertebrate populations were highest in winter, followed by summer and monsoon. The decline in summer is attributed to low water levels and the decomposition of macrophytes (aquatic plants). The monsoon decline is likely due to heavy rainfall, which disrupts habitats. In contrast, the winter increase is linked to the abundant growth of macrophytes, which provide shelter, food, and diverse spawning sites. The biotic index of insects suggests that the water quality is fair, with minor disturbances. The highest monthly and daily net production of aquatic insects was observed during summer and monsoon, while negative growth was recorded during the post-monsoon and winter months." (Authors)] Address: Sinha, Chitralekha, P.G. Dept Zoology, M.S. College, Motihari, B.R.A.B. Univ., Muzaffarpur, Bihar, India. Email: chitralekhasinhateacher@gmail.com

25059. Vega-Badillo, V.; Hernández-Ortiz, V.; Valenzuela González, J.E.; Novel-Gutiérrez, R.; Ibánez-Bernai, S.; Reynoso-Velasco, D. (2024): Catalogue of the types of Diptera, Hemiptera, Hymenoptera, Odonata, and Strepsiptera in the IEXA Entomological Collection at Instituto de Ecología, A. C. Zootaxa 5551(1): 401-452. (in English) ["The IEXA Entomological Collection at Instituto de Ecología, A. C. (Xalapa, Veracruz, Mexico) is one of the most important scientific collections in Mexico based on its taxonomic and geographic coverage and number of specimens (approx. 400,000), including its name-bearing types. The insect orders best represented in the collection are Coleoptera, Diptera, Hemiptera, Hymenoptera, and Odonata. The present catalogue is the result of a recent update of the collection database, which included capturing the number, sex, and label data on specimens in the types collection. This publication is the first part of the catalogue and includes information on five orders (Diptera, Hemiptera, Hymenoptera, Odonata, and Strepsiptera), 28 families, 84 genera, and 175 species. In total, the IEXA collection has 1,532 type specimens of these five orders, of which 77 are holotypes and 1,455 paratypes (including eight allotypes). According to the original descriptions, type specimens of two species in Hemiptera were to be deposited in the IEXA; however, the specimens are not in the collection and are considered to be lost." (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

25060. 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)] Address: Pan, Y., School of Ecology and Environmental Sciences & Yunnan Key Laboratory for Plateau Mountain Ecology & Restoration of Degraded Environments, Yunnan University, Kunming, Yunnan 650091, China. Email: panying@ynu.edu.cn

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25061. Aberathna, W.S.S.L.; Dhanushka, M.G.G.; Palihawadana, A. (2025): Odonata diversity in Okanda Creek Mangrove Ecosystem in east Coast of Sri Lanka: Diversity' indices as potential indicators of ecosystem health. International Conference on Mangroves for Sustainability 2025 (ICMS 2025) 22nd - 24th & 26th July 2025: 31. (in English) [Verbatim: The present study aimed to examine the diversity and assemblage of the Odonata community in the Okanda mangrove ecosystem, eastern coast of Ampara district. This area has been highly populated during the pilgrim season and the level of contamination of the water and impact on the mangrove vegetation in this area in terms of biological balance is high. Odonata arc considered as bioindicators, so the study was carried out to identify the diversity of Odonata in the area. Observations were carried out in three selected 100m long transects between 0600h to 0900h in the morning, once a month for a period of three months from July to September 2024. Data acquisition was carried out with the naked eye and photographed where necessary. Data were analyzed using Microsoft Excel software and diversity indices. During the study, 6 species of Odonata belonging to two families, including three species of dragonflies (Suborder: Anisoptera; family Libellulidae) and other remaining damselflies (Suborder: Zygoptera; family Coenagrionidae) were recorded from the Okanda creek mangrove forest area. Accordingly, the

overall Shannon-Weiner index for all transects is 1.26 - 0.42, and Simpson's index is 0.75. Ischnura senegalensis, Pseudagrion microcephalum, Pantala flavescens and Diplacodes trivialis were highest abundant, while Ischnura aurora rubilio, Macrodiplax cora being the lowest and rare to observe in generally, the diversity of Odonata in the study area is low, while a few species dominate the area. The loss of diversity can be due to land and water pollution and disturbances on mangrove cover for the given period. The prevalence of I. aurora rubilio and Macrodiplax cora used as an environmental indicator, testifies to environmental pollution in the area. Further this study is considered as one of the first few attempts on the island to record diversity aspects of odonata of mangal ecosystem.] Address: Aberathna, W.S.S.L., Agmnomy Division, Main Outgmwer Unit, Ethimale Plantations PLC, Siyambalanduwa, 91030, Sri Lanka. Email: ethnosameera40000@gmail. com

25062. Adawi, S.H.; Romdhane, M.S.; Hmida, L. (2025): Ecological functioning and value - A case study of the Wadi Qana Protected Area, Palestinian Authority. Wetland Ecosystems 45, 92: 20 pp. (in English) ["Wetlands play a crucial role in conserving fauna and flora and contribute to the equilibrium of ecosystems. The primary objective of this groundbreaking study conducted in the Palestinian Authority was to highlight the importance of wetlands and their ecological functions. This was accomplished by investigating and monitoring the diversity of aquatic fauna and flora, as well as emphasizing the economic value of wetland areas. The study specifically focused on the Wadi Qana protected area, which is situated in the West Bank region. The research was conducted from December 2022 to September 2023. A total of 90 families of aquatic fauna and flora were documented in the Wadi Qana protected area. This included 38 families belonging to 7 orders of aquatic and semi-aquatic insects, 3 families of freshwater snails, 1 family of Bivalvia, 5 families of Crustaceans, 2 families of leeches, 3 families of amphibians, 2 families of reptiles, 1 family of fish, 7 families of freshwater plants, 17 families of phytoplankton, and 11 families of zooplankton, 122 of wild plants, 160 migratory and resident species, and it meets at least three of the RAMSAR Convention criteria. The study found a significant correlation between the total family number and, water surface area, water sources, surrounding habitat, water type, soil type, and average monthly rainfall with p-values of less than 0.05. In addition to the significant biodiversity, the study revealed that the Wadi Qana wetland area plays crucial roles in several other aspects. It serves as a site for ecotourism and recreation, and it also contributes to water harvesting. Moreover, the wetland area has economic importance, with an estimated economic return from tourism, agricultural activities, and water utilization in the area reaching approximately $1,791,166 million." (Authors) Odonate taxa are treated at family level: Aeshnidae, Calopterygidae, Coenagrionidae, Gomphidae, Libellulidae, Lestidae.] Address: Adawi, S.H., Palestinian Institute for Biodiversity and Sustainability, Bethlehem, Palestine. Email: shd_adawi@yahoo.com

25063. Agna, R.N.; Prastowo, P. (2025): Keanekaragaman Capung (Odonata) di Kawasan Royal Sumatra Golf Course. BEST Journal (Biology Education, Sains and Technology) 8(2): 884-890. (in Indonesian, with English summary) ["The Royal Golf Sumatra area, located in Tuntungan District, Medan City [Indonesia's North Sumatra province], is a modern residential area equipped with a golf course, lake, and garden, and is situated along a river. These conditions make the area, particularly around the lake and river, a potential habitat for Odonata. This study aims to determine the diversity and abundance of dragonflies in the area. The research was conducted in May 2024 using field observation methods with direct observation techniques in four different habitats: lake, river, golf course, and garden. The data obtained were analyzed using the Shannon-Wiener diversity index, relative abundance, and similarity index. The results showed the presence of 7 dragonfly species from two families, Chlorocyphidae and Libellulidae, with a diversity index categorized as low (H' = 1.85). There was no significant effect of habitat type on the diversity of Odonata in the Royal Sumatra Golf Course area. The species with the highest abundance was Neurothermis terminata, while N. fluctuans had the lowest abundance. Based on habitat, the highest abundance was found in the river habitat (31.6%), while the lowest was in the golf course habitat (19.8%). The dominance level of Odonata in the Royal Sumatra Golf Course area was categorized as moderate (0.18)." (Authors)] Address: Agna, Radina Nur, Biologi FMIPA Univ. Negeri Medan, Indonesia. Email: radinaagna@gmail.com

25064. Ahmed, G.; Das, A.N.; Nag, S.; Ahmed, A. (2025): Seasonal variation of odonatan diversity in Mahamaya Reserve Forest, Kokrajhar District, Assam, India. Journal of Animal Diversity 7(1): 69-76. (in English) ["The present study on the diversity of Odonata of Mahamaya Reserve Forest, Kokrajhar, Assam, India, documents 53 species from meadows, ponds, and forest ecosystems and agricultural fields nearby the reserve forest from April 2021 to August 2022. Of this biodiversity 33 species belong to the Anisoptera, including 3 families and 24 genera, and 20 species belong to Zygoptera, which includes 4 families and 12 genera. Libellulidae were the most diverse in the Anisoptera with the 25 species and the family Coenagrionidae, in the Zygoptera was richest with 15 species. Gynacantha dravida, G. subinterrupta, Anax guttatus, A. ephippiger, and Lestes praemorsus were recorded for the first time from this area." (Authors)] Address: Das, A.N., Dept of Zoology, Univ. of Science & Technology Meghalaya, Baridua, Ri-Bhoi-793101, India. Email: arupn8@gmail.com

25065. Amann, G.; Puchta, A.; Amann, S. (2025): Renaturierung im Hochmoor Schollenschopf in Hohenems unter den Bedingungen des Klimawandels – eine besondere Herausforderung. inatura – Forschung online 135: 47pp. (in German, with English summary) ["A bog with mountain pine (Pinus uncinata) disturbed due to former peat cutting and drainage in the Austrian Alps at 1040 m a. s. l., called Schollenschopf (Hohenems, Vorarlberg, Austria), was restored in autumn 2019. We monitored the water balance and vegetation as well as dragonflies, butterflies, and bees from 2019 until 2024. The water table varied slightly during most of the year, but fell notably when summer drought was severe. The water table was balanced when precipitation was evenly distributed over the year. But the bog obviously can not absorb and store all the water of heavy precipitation events. The vegetation, predominantly hummock vegetation, was investigated on 16 permanent observation plots. Between 2019 and 2024 the species composition did not change significantly, but for some species we could prove a change in their abundance. For example, in the moss layer Sphagnum magellanicum as indicator species of a living raised bog was more abundant in the final year. With regards to vegetation, we found favourable development towards a living raised bog in most plots. Disturbance indicator like Molinia caerulea did not expand their range in the bog. Some mountain pines died during the study duration and most individuals showed symptoms pointing to the brownspot needle disease (Lecanosticta acicola). From an over 100-year-old list of plant species including mosses we can assume that the bog provided also bog pools in earlier times before peat cutting. Just before restoration the bog did not provide suitable habitats for dragonflies any more,

after restoration shallow pools were colonized by dragonflies quickly, including bog specialists like Somatochlora arctica, Leucorrhinia dubia and Aeshna juncea. Dehydration of pools and high water temperatures during hot and dry summer periods, as well as vegetation succession, hinders permanent settlement of dragonflies, mainly bog specialists. Wild bees visit blooms of the abundant dwarf shrubs in the bog (bilberry, bog bilberry, heather), but suffer from competing honey bees of a nearby apiary. The species diversity of butterflies is limited by a lack of suitable habitats nearby and the small area of the bog (3,5 ha). Climate change with increasing durations of hot and dry weather conditions in summer, is likely to be the greatest danger to the renaturalised bog ecosystem. ... In the summer of 2019, prior to the raised bog renaturation, only three dragonfly species were identified in the study area: Aeshna grandis, A. mixta and Cordulegaster bidentata. All observations were made at the edge of the raised bog, and there was no evidence of any of the three species being native to the area. In the summers of 2020-2024, after the raised bog renaturation, 13 additional dragonfly species were observed in the area in addition to the species mentioned above, including two species for which localised populations could be confirmed (Aeshna cyanea and Libellula quadrimaculata) and five species for which there is evidence of localised populations (egg laying: Pyrrhosoma nymphula, Aeshna juncea, Cordulegaster boltonii and Somatochlora arctica; larval finds: Aeshna juncea, Leucorrhinia dubia). Seven to eleven species were recorded in the area each year. " (Authors/partly translated with DeepL.com).] Address: Amann, G., Waldrain 9, 6824 Schlins, Austria. Email: amann.wr09@gmail.com

25066. Aouadi, A.; Samraoui, F.; Bouhala, Z.; Souiki, L.; Samraoui, B. (2025): Macrophyte cover and environmental factors shaping macroinvertebrate diversity in a Mediterranean urban pond. Wetlands Ecology and Management 33, 10: 16 pp. (in English) ["This study explored macroinvertebrate diversity and its relationship with macrophyte cover in Boussedra, an urban pond in north-eastern Algeria subject to high anthropogenic pressure. Monthly macroinvertebrate samples and physico-chemical parameters were collected from five sampling sites, each characterised by distinct vegetation types or the absence thereof: Typha angustifolia, Tamarix africana, Bolboshoenus maritimus–Juncus maritimus, Phragmites australis, and open water. Analysis of the Normalised Difference Vegetation Index (NDVI) from 2003 to 2020 revealed a significant decline in macrophyte density over time. A total of 7,004 macroinvertebrates, representing 38 taxa, were collected, with Diptera, Hemiptera, and Coleoptera emerging as the most abundant and diverse groups. Sites dominated by T. angustifolia exhibited the highest macroinvertebrate richness and abundance, while open water areas had the lowest diversity. Relationships between taxon richness, abundance, species composition, environmental factors, and vegetation strata were investigated using univariate and multivariate analyses. Generalised Linear Modelling (GLM), vector fitting, and PERMANOVA demonstrated that vegetation type was strongly associated with macroinvertebrate assemblage composition. The findings underscore the ecological importance of small urban wetlands and highlight the critical role of aquatic vegetation in fostering macroinvertebrate diversity. Furthermore, the study emphasises the need to protect these habitats and calls for additional research to develop effective strategies for aquatic vegetation restoration and phytoremediation on a broader scale." (Authors) Odonate taxa reported are: Orthetrum sp, Aeshnidae, Coenagrionidae, and Sympetrum sp.] Address: Samraoui, Farrah, Dept of Ecology, Université 8 Mai 1945 Guelma BP 4010, 24000, Guelma, Algeria

25067. Apfelbaum, S.I.; Lehnhardt, S.M.; Boston, M.; Daly, L.; Pinnow, G.; Gillespie, K.; Waller, D.M. (2025): Native grass enhances bird, dragonfly, butterfly and plant biodiversity relative to conventional crops in Midwest, USA. Agriculture 15,1666: 22 pp. (in English) ["Conspicuous declines in native grassland habitats have triggered sharp reductions in grassland birds, dragonflies, butterflies, and native plant populations and diversity. We compared these biotic groups among three crop type treatments: corn, alfalfa, and a perennial native grass, Virginia wild rye, (Elymus virginicus L.) or VWR. This crop type had 2-3X higher bird, dragonfly, butterfly and plant species richness, diversity, and faunal abundance relative to alfalfa and corn types. VWR crop fields also support more obligate grassland bird species and higher populations of dragonfly and butterfly species associated with grasslands and wet meadows. In contrast, the corn and alfalfa types support few or no obligatory grassland birds and mostly non-native insects such as the white cabbage looper (Artogeia rapae L.), the common yellow sulfur butterfly (Colias philodice Godart.), and the mobile and migratory Anax junius. In sum, the VWR perennial native grass crop type offers a special opportunity to improve the diversity and abundance of grassland bird species, beneficial insect species, and many native plant species within agricultural landscapes." (Authors) The supplementary material lists the following odonate species: Tramea lacerata, Pachydiplax longipennis, Anax junius, Libellula pulchella, Plathemis lydia.] Address: Apfelbaum, S.I., Applied Ecological Inst., Inc., N673 Mill Rd., Juda, WI 53550, USA. Email: steve@aeinstitute.org

25068. Aranbarri, M.; Flores, L.; Guzmán, I.; Larrañaga, A.; Rall, B.C.; Reiss, J. (2025): Habitat complexity reduces the feeding strength of freshwater predators. Ecology and Evolution 15:e72258: 13 pp. (in English) ["The physical structure of an environment potentially influences feeding interactions among organisms, for instance, by providing refuge for prey. We examined how habitat complexity affects the functional feeding response of an ambush predator (damselfly larvae Ischnura elegans) and a pursuit predator (backswimmer Notonecta glauca) feeding on the isopod Asellus aquaticus. We ran experiments in aquatic microcosms with an increasing number of structural elements (0, 2, or 3 rings of plastic plants in different spatial configurations), resulting in five habitat complexity levels. Across these levels, predators were presented with different prey densities to determine the functional response pattern. The experimental design and analysis allowed us to test for effects of structure presence, amount, and complexity level on functional response in one pass, without confounding predictors. Across all complexity levels, the feeding for both predators was best described by a type II functional response model, and habitat drove feeding strength. Regarding the latter, the predators showed different responses to the complexity treatments. The overall feeding rate of I. elegans was mainly explained by the absence versus presence of structure. Yet, in the case of N. glauca, feeding rate was strongly dependent on habitat complexity with the predator showing a unique maximum feeding rate (i.e., the inverse of the handling time) for each complexity level and a decreasing attack rate with increasing amount of habitat. On average, prey consumption by both predators was reduced when complex structures were present, compared to the 'no habitat structure' environment (e.g., consumption more than halved for some treatments). Our findings demonstrate that habitat complexity dampens feeding rates and therefore plays a key role in the stability of freshwater ecosystems." (Authors)] Address: Reiss, Julia, Centre for Pollution Research & Policy, Brunel University of London, Uxbridge, UK. Email: julia.reiss@brunel.ac.uk

25069. Baeta, R.; Léauté, J.; Sansault, É; Pincebourde, S. (2025): Citizen data speak on the diversity of Odonata in ponds surrounded by crop fields. The Bulletin of the Ecological Society of America 106(2):e02215. https://doi.org/10.1002/bes2.2215: 6 pp. (in English) ["Dragonflies and damselflies are emblematic due to their beauty and the ease of distinguishing them from any other insect, making them ideal to engage citizens in research programs. Indeed, “atlas” programs on Odonata have flourished in Europe and Americas since a decade or so, in which citizens can upload their own observations into global databases via apps or web interfaces. We used a citizen database, which inevitably is perfectly imperfect due to the many biases already identified for such data, to determine that species richness is influenced by the intensive agriculture surrounding ponds from a distance up to 1,600 m." (Authors)] Address: Pincebourde, S., Inst. de Recherche sur la Biol. de l’Insecte, UMR 7261, CNRS – Univ. de Tours, Tours, France. Email: sylvain.pincebourde@univ-tours.fr

25070. Balázs, A.; Brochard, C.; Šipoš, J. (2025): Morphometric study of the exuviae of Aeshna juncea (Linnaeus, 1758) (Odonata: Aeshnidae). Aquatic Insects 46(1): 55-70. (in English) ["This study assessed various anatomical parameters of exuviae of three distinct populations of A. juncea in Iran, the Netherlands and France. 50 specimens (25 males, 25 females) from each country were analysed in detail. We measured 20 morphological traits for females and 19 traits for males. We found out that body length, left foreleg, left forewing sheath, left hindwing sheath, length of cercus, epiproct, epiproct spine, paraprocts and length of abdominal spines were larger in specimens originating from Iran compared to specimens collected in the studied areas of France and the Netherlands. In contrast, width of head and minimal width of prementum were larger in specimens from the Netherlands. According to our results, the measured morphological parameters indicated a greater similarity between the specimens found in France and the Netherlands compared to the specimens recorded in Iran. The presented data might be useful for future comparison of other populations of A. juncea throughout Eurasia." (Authors)] Address: Balázs, A., Dept Zool., Fisheries, Hydrology & Apiculture, Mendel Univ. in Brno, Zemedelská 1665/1, Brno, 613 00, Czech Republic. Email: balazsaeko@gmail.com

25071. Bansal, L. (2025): Effect of predator stressors on thyroid hormone levels in tadpoles of Lithobates pipiens. Journal of Undergratuate Studies 9: 20-33. (in English) ["Organisms can alter their phenotype to adapt to environmental challenges. Tadpoles exposed to predator cues (dragonfly nymphs [Aeshnidae]) through visual, olfactory, or both cue types develop deeper tails, improving survival. While the neurological and hormonal mechanisms behind this plasticity are unclear, corticosterone from the hypothalamus-pituitary-interrenal (HPI) axis is a potential contributor. The hypothalamus-pituitary-thyroid (HPT) axis, interconnected with the HPI axis, is responsible for triiodothyronine (T3)-mediated tail resorption during metamorphosis, but its role in this response is unknown. This study investigated the effect of perceived predation risk on free T3 hormone levels in Lithobates pipiens tadpoles. At Gosner Stages 25–27 (premetamorphic), tadpoles were exposed to predator cues (no cue, visual (V), olfactory (O), or combined (V+O)). Total protein concentration in 16 whole-body homogenates was quantified using the Bradford assay, and free T3 protein levels were measured via enzyme-linked immunosorbent assay (ELISA). It was hypothesized that predation cues would reduce free T3 levels proportionate to the stressor's magnitude, with the lowest levels expected in V+O conditions. Findings indicated a moderate impact of predation cues on free T3 levels, highlighting the need for further research with larger sample sizes. This study contributes to understanding the neurobiological mechanisms mediating morphological stress responses, offering insights that could guide conservation efforts for this species." (Author)] Address: not stated

25072. Bates, O.K.; Bertelsmeier, C. (2025): Predictions of future insect distributions under climate change. Diversity and Distributions, 2025; 31:e70106: 14 pp. (in English) ["Aim: Climate change has severe consequences for insects worldwide, many of which play key ecological roles. Despite a large literature predicting insect distribution changes over future climate change, a synthesis of predictions of insect responses to climate change in the literature is still lacking. Location: Global. Methods: We conducted a review of insect range size predictions under climate change and the methodologies and data sources used by 351 studies. Results: From the literature, studies were not significantly more likely to predict range reductions compared to range increases. While introduced species were predicted to increase more frequently in range than native species, both increases and decreases were predicted in both groups, highlighting species-specific changes. However, large differences in study methodology hinder our ability to compare predicted responses across species. Predictions of future ranges may be driven by factors such as species' physiology and geographic distribution. However, there is a large variety in predicted changes between insect species, and it is unknown to what extent these differences among species are due to the specific set of methodologies and data used to model the species' distribution, given that individual studies vary greatly in regard to the methodologies and data used to make predictions. We therefore discuss these differences and how they may influence range predictions. Conclusions: Due to the large differences in studies, concrete conclusions about the future state of insect distributions are unknown. There is a need for standardised benchmarking approaches across insect species groups, using multiple climate emissions scenarios and global circulation models at relevant data resolutions for insect species." (Authors) The study includes Odonata.] Address: Bertelsmeier, Cleo, Dept of Ecology & Evolution, University of Lausanne, Lausanne, Switzerland. Email: cleo.bertelsmeier@unil.ch

25073. Batty, P.M.; Muir, D. (2025): Management of breeding pools for Aeshna caerulea (Azure Hawker) and Leucorrhinia dubia (White-faced Darter) on the Corrour Estate, Inverness-shire, in North-West Scotland. Journal of the British Dragonfly Society 41(2): 81-108. (in English) ["Corrour Estate, is a remote Highland estate on the eastern edge of Rannoch Moor, Scotland and an important site for Aeshna caerulea which breeds there in shallow bog pools. Surveys have shown that larvae are very vulnerable during extended periods of dry weather due to their breeding pools drying out. The British Dragonfly Society, supported by the Corrour Estate, initiated trial management to restore and create pools with deeper refuge areas to aid larval survival. Deeper pools also proved to be suitable habitat for another rare species, Leucorrhinia dubia (White-faced Darter). Nine other breeding Odonata species at Corrour were also found to benefit from this work. The results of the trial will be used as an aid to inform further management at Corrour and in other areas across Scotland towards the conservation of these rare bog species and dragonflies in general, and to ameliorate the challenges of ongoing climate change." (Authors)] Address: Batty, Patricia, Kirnan Farm, Kilmichael Glen, Lochgilphead PA318QL, UK

25074. Belay, T.; Dadebo, E.; Tilahun, G.; Aemro, D. (2025): Food and feeding habits of three ecologically important fish species in Lake Hawassa, Ethiopia. Journal of Fisheries and Environment 49(2): 34-51. (in English) ["A total of 824 specimens of E. paludinosus (total length: 3.1–11.0 cm) were analyzed to assess feeding habits in Lake Hawassa. Among these, 68 individuals (8.3%) had completely empty guts. The remaining 756 individuals (91.7%) had nonempty guts containing seven major prey items in varying proportions (Table 1)." (Authors) 33 insect taxa were recorded, among them 1 individual of Zygoptera and 3 individuals of Anisoptera.] Address: Belay, T., Dept of Aquatic Sciences, Fisheries & Aquaculture, College of Natural & Computational Sciences, Hawassa Univ., Hawassa, Ethiopia. Email: teshimeansc@gmail.com

25075. Benhadji, N.; D Dabrowski, J.; Brysiewicz, A.; Czerniejewski, P.; Halasa, L. (2025): Environmental drivers of macrozoobenthos structure along a discontinuous tributary of the Oder River (North-Western Poland). Water 17, 3005. https://doi.org/10.3390/w17203005: 20 pp. (in English) ["The Mysla River, a right-bank tributary of the Oder catchment, was the focus of our study on the impact of environmental parameters on macrozoobenthos diversity and composition. We surveyed 18 sites along the My´sla catchment, from upstream to the outlet, recording environmental features and sampling macrozoobenthos. The taxa composition (31 taxa) was dominated by insect larvae, particularly Diptera Chironomidae, with moderate contributions from mollusc families such as Sphaeriidae, Bithyniidae, and Planorbidae, which are primarily filter-feeders or grazers. Based on environmental affinities, the river was divided into three sections. Sites within lake areas and those with diverse sediment types exhibited the highest biodiversity. Conductivity, flow rate, nitrogen compound levels, dissolved oxygen, suspended particles, and current velocity most strongly influenced biodiversity, while substrate type shaped taxa composition. Lakes heavily disrupt the ecological continuity of the Mysla River, significantly altering natural ecological processes and causing deviations from the River Continuum Concept (RCC), whereas artificial structures exert only minor additional influence. We examined the applicability of the RCC by analyzing macrozoobenthos structure along the upstream-to-downstream gradient. This preliminary study contributes to ongoing regional research, highlighting the role of lakes in shaping the Mysla River ecosystem and assessing the relevance of RCC in unique river systems." (Authors) Taxa - including Odonata - are treated at family level, and documented at Supplemental Material.] Address: Benhadji, N, Institute of Technology & Life Sciences-National Research Institute, Falenty, 3 Hrabska Avenue, 05-090 Raszyn, Poland. Email: n.benhadji@itp.edu.pl

25076. Benkheira, A.; Ouadah, N. (2025): Premières mentions de l'Aeschne isocèle, Isoaeschna isoceles (O.F. Müller, 1767) sur l'oued Mazafran (wilaya de Tipasa, Algérie) (Odonata: Aeshnidae). Martinia 39(8): 50-55. (in French, with English title) [First records of I. isoceles on Mazafran oued (Algeria): Site 1 (36°41'48"N - 2°48'10"E; 8 May 2024), Site 2 (36°36'48"N - 2°46'54"E; 9 &11 June 2025).] Address: Benkheira, A., Rue du 20 août, 42040 Sidi Rached, Tipasa, Algeria. Email: benkheiraa@yahoo.fr

25077. Bo, T.; Caneparo, M.; Gruppuso, L.; Fenoglio, S. (2025): Growing up in the cold: notes about winter diet of Perla grandis Rambur, 1842 (Plecoptera, Perlidae) in a glacial stream (Aosta valley NW Italy). Entomological News 132(4): 521- (in English) ["Aquatic insects constitute the richest and most diverse component of river communities, but while taxonomic knowledge has increased enormously, many aspects of their ecology remain unknown. Studying aquatic insects' trophic ecology can be useful in order to better understand not only their diet, but also ecosystem functioning and biogeochemical processes. Furthermore, looking at the apical predators present in a specific environment is of utmost importance, especially in those fishless habitats where aquatic insects, such as stonefly nymphs, are at the apex of the trophic web. Herein, we report our findings regarding diet selection implemented by the Plecoptera Systellognatha Perla grandis in a glacial alpine lotic system. Obtained results suggest that: i) fine organic matter (FPOM) can be frequently found in examined gut contents, ii) some prey are actively selected and iii) age-related prey selection shift can be observed." (Authors)] Address: Gruppuso, Laura, ALPSTREAM—Alpine Stream Research Center/Parco del Monviso, 12030 Ostana (CN), Italy. Email: laura.gruppuso@unito.it

25078. Boudinot, B.E.; Beutel, R.G.; Weingardt, M.; van de Kamp, T.; Hammel, J.U.; Li, D.; Richter, A.; Wipflerg, B. (2025): The insect head rewound: Clarifications to the groundplan of Hexapoda (Pancrustacea). Arthropod Structure & Development 89, 101490: 12 pp. (in English) ["The organization of the hexapod head remains a cornerstone problem in arthropod systematics, central to segmental homology, character definition, higher-level phylogeny, and functional and evolutionary morphology. Recently, Nel et al. (2025) proposed an alternative interpretation of insect head segmentation that departs markedly from established anatomical and comparative frameworks. We evaluate the internal consistency and external coherence of that hypothesis using their model groups, broader taxonomic samples, prior studies (including crustaceomorph Pancrustacea) and our own investigations. We identify multiple implausible anatomical interpretations and logical contradictions in their reconstruction. Our reanalysis, supported by microtomographic imaging (i- and SR-i-CT), shows that the proposed revision lacks empirical foundation (e.g. Psocodea), does not meet its own definitions (e.g. Neuropteroidea), misidentifies homologs (e.g. Coleoptera, Formicidae), and is unsupported by fossil or developmental evidence. Consequently, the new theory yields unreliable homology statements and obscures groundplan conditions and character polarities of the hexapod head. We therefore reject the hypothesis that "intercalate" and "promandible" sclerites existed in the groundplan of Hexapoda, and the assumed plesiomorphy of dicondyly. Our findings clarify relationships among major head sclerites, endoskeletal elements, and the head capsule's strengthening ridges, underscoring the need for comprehensive anatomy, broad sampling, and logical rigor in resolving arthropod head evolution." (Authors) The stucy includes references to Odonata.] Address: Boudinot, B.E., Entomology II, Division of Terrestrial Zoology, Senckenberg Research Institute & Nature Museum Frankfurt, Senckenberganlage 25, 60325, Frankfurt am Main, Germany. Email: brendon.boudinot@senckenberg.de

25079. Bourhis, Y.; Milne, A.E.; Shortall, C.R.; Beckman, B.; Blumgart, D.; Edwards, R.; Evans, L.C.; Foster, C.W.; Fox, R.; Botham, M.S.; Rowland, C.; Roberts, S.; Speight, M.C.D.; Hassall, C.; Kunin, W.E.; Bell, J.R. (2025): Trait mediation explains decadal distributional shifts for a wide range of insect taxa. Nature Communications 16:8131: 1-11. (in English) ["Shifts in insect distributions have been reported globally, largely attributed to climate and landscape changes. Communities are being reshaped, with species response traits mediating the effects of changing environments. Using a machine-learning approach we model 1252 insect occupancies across three decades in Great Britain. We combine independent models of nine insect groups (butterflies, moths, odonates, orthopterans,

carabids, ladybirds, bees, wasps and hoverflies) to take a high-level view of the trends and key environmental drivers of insect occupancy, as well as to highlight the trait mediations underlying the resulting niches. Across this wide taxonomic range, we identify common trends in insect occupancies, showing no Great Britain-wide decline since 1990, but instead local declines and changes in community compositions. Known drivers of biodiversity loss appear to underlie those changes, notably urban sprawl and landscape simplification. Our approach also highlights the crucial roles of two response traits: habitat breadth, in mediating the effects of changing landscapes diversity and voltinism, in mediating the effects of increasing temperatures on insect life cycles." (Authors)] Address: Bourhis, Y., Net Zero Resilience Farming, Rothamsted Research, West Common, Harpenden, UK. Email: bourhis.yoann@gmail.com

25080. Brinesh, R. (2025): Studies on the metacercariae (Digenea) infecting dragonfly nymphs of the families Gomphidae & Libellulidae from Malampuzha, Palakkad. Asian Journal of Biology 21(9): 10-16. (in English) ["In a study conducted in the freshwater bodies of Malampuzha, located in the Palakkad district of Kerala, between June and August 2023, researchers discovered three species of metacercariae from dragonfly nymphs. The identified dragonfly nymph belongs to Gomphidae family and Orthetrum genus [sic!] and Libellulidae family and Brachydiplax genus. The three metacercariae discovered and described morphometrically in details. Two metacercaria were already identified: Ganeo tigrinus (Mehra & Negi, 1928), Pleurogenoides malampuzhensis (Brinesh and Janardanan, 2013), while a new Metacercaria described during this investigation is distinct from others in having greenish contents in its caecae so it is recorded here as Metacercaria sp. I Malampuzha. The discovery of Metacercaria sp. I Malampuzha adds to the biodiversity of the region and highlights the importance of studying larval stages of aquatic insects as potential hosts for parasitic organisms. The ecological data of prevalence and intensity of metacercariae in the different host was analyzed and discussed." (Author)] Address: Brinesh, R., a Dept Zoology, Sreekrishna College, Guruvayur, India. Email: brineshr@gmail.com

25081. Büsse, S. (2025): Review on the thorax musculature in Odonata (Insecta), including the 3D-anatomy of adult Epiophlebia superstes. Arthropod Structure & Development 89, 101478: 16 pp. (in English) ["Odonata comprises Anisoptera, Zygoptera, and Epiophlebia, with Anisoptera and Epiophlebia forming the clade Epiprocta. Anisoptera exhibits robust bodies, dissimilar wing pairs, and eyes that may touch, while Zygoptera has slender bodies, uniform wings, and separated eyes; Epiophlebia, however, combines features of both, reflecting likely an ancestral condition. Detailed studies of odonatan thoracic musculature reveal differences between life stages and taxa, highlighting adaptations to larval aquatic and adult aerial lifestyles. This study revisited the thorax anatomy of Epiophlebia superstes to fill gaps in knowledge. High-resolution X-ray tomography was used to analyse, revealing 58 thoracic muscles: 17 in the prothorax, 20 in the mesothorax, and 21 in the metathorax. Comparison with previous studies confirmed the most known muscles, identified five new ones, and corrected earlier misinterpretations. Differences in muscle configurations among Odonata larvae and adults reflect their distinct ecological niches. Larvae generally possess more muscles, likely supporting their swimming and substrate-clinging activities. The generalised thorax model compiled findings from prior and current studies, simplifying the anatomy for comparative analysis with other insect groups. By enhancing understanding of Odonata thoracic anatomy, this research provides insights into the evolution of the insect flight apparatus, bridging knowledge gaps and aiding broader comparative studies." (Author)] Address: Büsse, S., Cytology & Evolutionary Biology, Zoological Institute and Museum, Univ. of Greifswald, Soldmannstr. 23, 17489, Greifswald, Germany. Email: buesses@uni-greifswald.de

25082. Cairns, J. (2025): Ecohydrological insights for conserving Australia's temperate upland swamps. PhD thesis, School of Civil and Environmental Engineering, Faculty of Engineering, UNSW Australia: 171 pp. (in English) ["Temperate upland peat swamps in Australia are endangered ecosystems that provide habitat for rare and threatened species, and essential services such as drinking water supply and carbon storage. These ecosystems face threats on numerous fronts, including climate change, urbanisation, and mining impacts. This thesis investigates the hydrology and ecology of these swamps to improve conservation efforts via four main studies. The first study developed and applied water balance models to examine the impacts of longwall mining on the hydrology of upland swamps. Results from this research highlighted the influence of longwall mining in comparison to unmined sites. Undermining reduced discharge and water storage volumes, with the water lost through subsidence-induced fracturing becoming the dominant component of the water balance. The second study further expanded these hydrologic models to examine the climate sensitivity of upland swamps and establish generalised environmental water requirements. Modelling results revealed significant declines in achieving environmental water requirements under future climates, although mining-induced subsidence had greater hydrologic impacts. The third study introduced a novel environmental DNA (eDNA) assay for detecting the endangered giant dragonfly (Petalura gigantea) in upland swamp outflows. Water balance models were used to inform field sampling protocols based on antecedent weather conditions. Field applications of this method successfully detected P. gigantea, providing a valuable complement to traditional survey methods. These new methods can aid in the conservation of the species and, thereby, upland swamps, as P. gigantea is recognised as an umbrella species for these environments. The final study evaluated the ecosystem services of upland peat swamps in the Sydney drinking water catchment. Two scenarios, including a protection scenario, where policy decisions are rapidly enacted to prevent further impacts to upland swamps, and a status quo scenario, where mining continues unabated within existing mining leases, were tested. For each scenario various ecosystem services were assessed including habitat provision, flow regulation, stored carbon, and drinking water supplied. This evaluation process resulted in different future outcomes and highlighted the importance of conservation over resource extraction. In combination, these studies provide further understanding of upland swamp ecohydrology and the threats posed by longwall mining. Future management actions required to conserve these vulnerable ecosystems are outlined, as well as future research needs to further improve the management of upland swamps." (Author)] Address: https://unsworks.unsw.edu.au/bitstreams/c890c5b8-22ea-4e6e-965d-1629469220ac/download

25083. Cham, S. (2025): Eye and antenna cleaning in flight in Cordulia aenea (Linnaeus) (Downy Emerald) and Somatochlora metallica (Vander Linden) (Brilliant Emerald). Journal of the British Dragonfly Society 41(2): 139-146. (in English) ["Eye cleaning while in flight requires great agility and co-ordination by a dragonfly and is reported here in C. aenea and S. metallica for the first time. Using a Canon R5 Mk2 camera firing at 30 fps, males of both species were recorded

using their forelegs to rapidly clean their eyes and antennae whilst in flight." (Author)] Address: Cham, S., 2 Hillside Road, Lower Stondon, Bedfordshire SG16 6LQ, UK.

25084. Chandran, A.V., Sawant, D., Chandran, R., Koparde, P., Ogale, H., Rane, A.A. & Kunte, K. (2025): Two new species of Protosticta Selys, 1885 (Odonata: Zygoptera: Platystictidae) from the Western Ghats, India. Zootaxa 5679(4): 451-483. (in English) ["We erect two new species of damselflies from the Western Ghats Biodiversity Hotspot, Protosticta sanguinithorax sp. nov. from Kerala and P. shambhaveei sp. nov. from Maharashtra, India. Morphologically, these species show close affinity with P. sanguinostigma Fraser, 1922, an endemic species of the Western Ghats; however, they are distinguished by their ground colouration, unique features in their prothoraxes, caudal appendages, and accessory genitalia. We also establish a significant genetic distance, based on the COI gene, between these newly erected Protosticta species and P. sanguinostigma. We present an updated taxonomic key to the males of Protosticta species in the Western Ghats, incorporating newly available diagnostic information." (Authors)] Address: Chandran, A.V., Society for Odonate Studies, Velloorparampil, Kuzhimattom PO, Kottayam, Kerala 686533, India.

25085. Chovanec, A. (2025): Die Libellen des Naarn-Unterlaufs (Oberösterreich): aktueller Status und Vergleich mit Ergebnissen aus dem Jahr 2018 (Insecta: Odonata). Beiträge zur Entomofaunistik 26: 35-58. (in German, with English summary) ["The dragonflies of the lower reach of the River Naarn (Upper Austria): current status and comparison with results from 2018 (Insecta: Odonata). – The present paper deals with the odonatological evaluation of the morphological rehabilitation measures carried out at the lower, epipotamon reach of the River Naarn in Upper Austria between 2008 and 2016. Based on the application of the Rhithron-Potamon-Concept, the current status of the dragonfly and damselfly fauna was compared to a rivertype-specific inventory of reference species. The study carried out in 2024 focused on the detection of Odonata in the imaginal stage and revealed records of 17 species with all target reference species and some of the accompanying reference species included. The dragonfly-based ecological status of most of the investigated river sections as well as of the total lower reach was classified as “good”. Ophiogomphus cecilia (Fourcroy, 1785), listed in the Annexes II and IV of the EU Habitats Directive, occurred in an autochthonous population with high numbers of individuals. There were no significant differences between the results obtained in 2024 and a study performed in 2018 at the same river reach." (Author).] Address: Chovanec, A., Krotenbachgasse 68, 2345 Brunn am Gebirge, Austria. Email: andreas.chovanec@bml.gv.at

25086. Clements, H.O. (2025): Limb regeneration in damselflies based on developmental stage. The University of Arkansas Undergraduate Research Journal 24(1), Article 5: 25-35. (in English) ["Injury is common in wild animals, yet some species possess an adaptive advantage: regeneration. Enallagma vesperum, a species of damselfly, exhibits this regenerative ability, though its persistence and effectiveness across developmental stages remain poorly understood. While previous studies indicate that regeneration ceases following adult emergence, it is unclear whether this ability also diminishes prior to the final larval molt. This study investigated the effectiveness of limb regeneration in E. vesperum across early and late larval instars. I hypothesized that earlier instars would exhibit greater regenerative success due to fewer competing energetic demands compared to later instars, which may prioritize resources for processes such as tissue differentiation and physiological preparation for metamorphosis. My results support this prediction, demonstrating that E. vesperum in early developmental stages exhibited much greater limb regenerative success than those in later stages. These findings highlight the role of developmental timing in shaping regenerative capacity and suggest potential trade-offs between regeneration and other growth-related processes as larvae approach metamorphosis." (Author)] Address: Clements, Haven, Dept of Biology, Univ. of Arkansas, USA

25087. Cordero-Rivera, A. (2025): Global species richness of dragonflies and damselflies (Odonata): latitudinal trends and insular colonization. PeerJ. 2025 Sep 15:13:e20004. doi: 10.7717/peerj.20004. eCollection 2025: 19 pp. (in English) ["Odonates are mainly "sun lover" insects, and therefore reach maximum diversity in tropical regions, particularly in rainforests. Here, worldwide patterns of species richness of the order are analysed, by compiling a database of species numbers for 255 continental regions and 243 islands. Area, distance to continents and elevation for all islands were estimated, and their effect analysed on odonate species richness by means of linear models. As expected, a clear effect of latitude and insularity on the species richness of Odonates was found, with a maximum of 550 species in the equator for continental areas but only 200 species in islands. In islands, latitude, area and distance to the continent clearly affect species richness, but elevation had no significant effect. The continental countries with highest richness are Venezuela (548) and Colombia (543 species). Brazil (863) and China (818) have higher richness, but given their size were included in the analysis as states and regions. Excluding very large islands (New Guinea, Sumatra or Borneo), which are considered continents in this paper, Japan (209) is the archipelago with highest richness, albeit Indonesia (737) and the Philippines (306) have more species, but were analysed subdivided by islands. The proportion of Zygoptera found at the different regions was negatively affected by latitude and positively by the area, but not by insularity. In contrast, in islands the proportion of Zygoptera was not affected by latitude, distance or elevation, but was positively affected by area. These analyses highlight the ability of odonates to colonize even the most remote islands, places that can be sources of rapid speciation, as occurred in Hawaii or Fiji." (Author)] Address: Cordero Rivera, A., Depto de Ecoloxia e Bioloxia Animal, Univ. de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

25088. Csutoros, A.; Rochas, P.; Berger, L. (2025): De nouveaux éléments sur l’écologie de Nothodiplax dendrophila Belle, 1984, en Guyane (Odonata: Libellulidae). Martinia 39(10): 72-78. (in French) [New data on the ecology of Nothodiplax dendrophila Belle, 1984, in French Guiana (Odonata: Libellulidae). "Nothodiplax is a monospecific genus represented by the species Nothodiplax dendrophila Belle, 1984. It was described based on three males and two females collected in 1964 in north-eastern Suriname (Belle, 1984). It was then reported in French Guiana (Machet, 1991), but no other observations were reported until 2019, when a new record was reported by S. Uriot (Faune Guyane, 2025) in Montsinéry-Tonnegrande. The species has been observed in a gallery forest in Suriname (Belle, 1984) and mainly in savannahs in French Guiana (Fig. 1). Due to the small number of observations (Tab. 1), this species is considered poorly known in South America, especially since its larval stage and breeding habitat have not yet been described (Garrison et al., 2006). However, in recent years, new surveys of N. dendrophila in Guyana have provided a better understanding of the ecology and distribution of this species, which is currently considered endemic

to Suriname and Guyana (Fig. 1). ... In Suriname, Belle discovered the species in 1964 near a sandy-bottomed stream in a gallery forest within a biotope combining savannah and forest habitats (Belle, 1984). He noted that N. dendrophila primarily inhabits the upper parts of trees, but can also descend into the lower vegetation of streams. In French Guiana, and surprisingly compared to Belle's observations, most occurrences of N. dendrophila come from savannahs, open, and semi-open areas. The discovery of emerging individuals attests to the species' nativeness (Barbotte & Ruffoni, 2018) in temporary and shallow environments within floodplain savannahs on hydromorphic soil (Léotard & Stier, 2013). Given the low number of observations (Table 1), nothing precludes the possibility that it may reproduce in other habitats where it has not yet been detected. Furthermore, according to observations by Belle (1984), N. dendrophila adults spend part of their time in trees, particularly when disturbed. It would therefore be interesting to look for adults at the edges of the forests bordering the savannahs of Guiana. When the emerging individuals were discovered in the Savane du Galion, L. Berger collected exuviae and larvae in the flooded area. The larvae were reared until emergence, confirming that the exuviae found under the emerging individuals belong to N. dendrophila. A detailed description of the larva and its exuviae can thus be provided. The adults were observed from November to July. Based on occurrences in French Guiana (Table 1), emergence would begin in April and could continue until July. Adults would reproduce at the beginning of the rainy season. Regarding larvae, development would take place in temporary savanna habitats when they are filled with water and could extend over several months. Increased data collection would be useful to refine our understanding of the species' phenology. The distribution of N. dendrophila appears particularly fragmented between Suriname and French Guiana, where it is mainly located south of Montsinéry-Tonnegrande (Fig. 1). Despite high survey pressure in favorable areas (floodplain savannas), the species was not encountered in either the Savane Trou-Poissons (Sinnamary) or the Savane des Pères (Kourou) by Minot (2014). Its small size, discreet coloration, and flight behavior—which involves flying several meters above the ground to reach the trees—make it particularly difficult to detect. It is therefore likely to go unnoticed. In the space of 70 years, 44% of French Guiana's savannahs have disappeared, and nearly half of the remaining savannahs are now threatened by urbanization and agriculture (Savanes de Guyane, 2022). N. dendrophila, along with other species dependent on this habitat, could thus see their populations decline sharply or even disappear locally. The preservation of savannahs, as well as their associated species, is therefore a major challenge to prevent the risk of extinction and preserve the biodiversity specific to these environments." (Authors; translated with DeepL and Google translate)] Address: Csutoros, A., 48 mail Gaston Bardet, 35190 Le Rheu, France. Email: antoinecsutoros@gmail.com

25089. Dankaka, A.H.; Imam, T.S.; Suleiman, K.; Umar, A.B.; Shah, M.M. (2025): Macroinvertebrate community structure and biomonitoring of pollution in Thomas Reservoir, Kano State, Nigeria: Implications for sustainable management. Journal of Applied and Advanced Research 10: 11-18. (in English) ["This study assessed water quality in Thomas Reservoir, Nigeria, using macroinvertebrate communities as bioindicators from May 2019 to February 2020. Four sampling sites (A-D) representing varying anthropogenic impacts were examined using an Ekman grab and hand net collections. During the research, 2,086 individuals from 14 families and 17 species across three phyla (Annelida, Mollusca, and Arthropoda) were identified. Dominant taxa included pollution-tolerant Tubifex sp. (13.66%) and Chironomus sp. (11.27%), while sensitive Ameletus sp. showed minimal abundance (0.48%). Spatial analysis revealed the highest diversity at Site A (Shannon H'=0.367) and the lowest at Site C (H'=0.004), corresponding with pollution gradients from agricultural (Site A) and domestic (Site C) sources. The Biological Monitoring Working Party (BMWP) score of 69 classified the reservoir as Class III "moderately impacted", supported by low Average Score Per Taxon (ASPT) values (0.08-0.20). Seasonal variations showed 62.18% wet-season abundance versus 37.82% in dry periods ($p<0.05$). The prevalence of tolerant taxa (Tubificidae, Chironomidae) alongside depressed Ephemeroptera (7.91%) indicates chronic pollution stress from agrochemicals and detergents. These findings demonstrate the reservoir's ecological degradation and highlight the utility of macroinvertebrate biomonitoring in Nigerian freshwater systems. Immediate mitigation measures, including riparian buffer establishment and community education programs to restore water quality, were recommended." (Authors) "Macroinvertebrate specimens were identified to the lowest possible taxonomic level using standardized dichotomous keys from the following authoritative sources: Andrews (1972) for general freshwater invertebrates, Mellanby (1977) for aquatic insect identification, Pennak (1978) for North American freshwater invertebrates, and Merritt and Cummins (1996) for aquatic insects of North America (3rd edition)."] Address: Dankaka, A.H., Dept of Biol. Sciences, Northwest Univ., Kano, Nigeria

25090. David, G.; Krieg-Jacquier, R.; Barré-Chaubet, H.; Cuenot, T.; Malchausse, A. (2025): La collection d'odonates de Léandre Pidancet (1824-1888) au musée de Poligny (Jura). Martinia 39(9): 56-71. (in French, with English summary) ["The authors present the seven boxes from Léandre Pidancet's collection, which formed the basis of the Catalogue des Libellulidées des environs de Besançon (1856), and are now exhibited at the Poligny Museum (Jura). The historical context of the collection is provided. The analysis of this heritage collection is based on previous publications related to the catalogue and on the direct examination of the specimens. A revised list of the species represented, as well as a clarification of the geographical area concerned, is proposed." (Authors)] Address: David, Gwénaël, FNE Jura, France. Email: gwen2dav@yahoo.fr

25091. Degtyarev, N.I. (2025): Arthropods (Arthropoda) of the Pryteletsky part of the Altaisky Biosphere Reservate based on the results of field research in 2024. Field Research in the Altai Biosphere Reserve 7: 44-59. (in Russian, with English summary) ["Based on field collections and observations, 191 species were discovered in the Altaisky Nature Reserve in 2024, of which Somatochlora exuberata Bartenev, 1910 was first recorded for the reserve territory. In sum, eight odonate species are documented: 1. Aeshna crenata (N51.79933°, E87.7199°), 20.07.2024; 2. Aeshna juncea (N51.41708°, E87.88034°), 26.07.2024; (N51.41642°, E87.88103°), 26.07.2024; 3. Coenagrion hastulatum (N51.80234°, E87.72412°), 20.07.2024; (N51.79933°, E87.7199°), 20.07.2024; 4. Enallagma cyathigerum (N51.79933°, E87.7199°), 20.07.2024; 5. Lestes sponsa (N51.79933°, E87.7199°), 20.07.2024; 6. Somatochlora exuberata (N51.41633°, E87.88052°; N51.41637°, E87.88027°), 27.07.2024; 7. Sympetrum danae (N51.80191°, E87.72466°), 21.07.2024; 8. Sympetrum flaveolum (N51.80191°, E87.72466°), 20.07.2024; (N51.79933°, E87.7199°), 20.07.2024.] Address: Degtyarev N.I., Tsentralno-Chernozemny State Nature Biosphere Reserve named after Prof. V. V. Alekhin, Kursk region, Russia. Email: dni_catipo@mail.ru

25092. Deguchi, K.; Fukuzawa, K.; Sakiyama, T.; Ishiyama, N.; Morimoto, J. (2025): Aquatic plants, water quality and surrounding environment affecting dragonfly larval populations. Journal of the Japanese Society of Revegetation Technology 51(1): 103-108. (in Japanese, with English summary) ["Dragonfly larvae in ponds are known to use aquatic plants as foraging, hiding and hatching sites, but it is less clear whether there are specific aquatic plant species that affect the abundance of each dragonfly species. In this study, we investigated the local environment (aquatic plants and water quality) and the surrounding environment (e.g. forest and agricultural land coverage) affecting the populations of 26 dragonfly larval species in 10 ponds in the Sapporo suburban area, and analysed them using GLMM, focusing on each species as well as coverage and growth type of waterweeds. The results suggest that there is a significant correlation between the coverage of specific aquatic plant species and specific dragonfly larval populations in six of the eight species that could be modelled. It was also found that Phosphorus as phosphate (PO_4-P) was negatively correlated with damselfly larval abundance in the suborder Zygoptera." (Authors) Ischnura asiatica, Cercion calamorum, Anax parthenope, Sympetrum infuscatum, Crocothemis servilia, Somatochlora viridiaenea, Coenagrion lanceolatum, Aeschnophlebia longistigma] Address: Deguchi, K., Graduated School of Agriculture, Hokkaido Univ., Japan. Email: deguchi.keisuke.q8@elms.hokudai.ac.jp

25093. Derksen, M. (2025): Odonata Park: a wetland park for downtown Winnipeg. A Practicum Submitted to the Faculty of Graduate Studies of The University of Manitoba in partial fulfillment of the requirements of the degree of Master of Landscape Architecture, Department of Landscape Architecture, Faculty of Architecture, University of Manitoba, Winnipeg, Manitoba: 95 pp. (in English) ["Odonata Park: A wetland park for downtown Winnipeg, is a practicum project that has allowed me to test the boundaries of what is possible for urban habitat, stormwater management, and placemaking in the uniquely harsh context of downtown Winnipeg. Human pollution and climate change are having detrimental effects on nature and people. Pollution stemming from human activity poisons freshwater ecosystems throughout the province. The concrete blanket of urban development is further esasperating the problem. The pavment heats up the landscape to the point where it is becoming a health risk. The destruction of natural habitats such as wetlands only compounds these issues, as they are nature's way of filtering pollutants from water and air. A key function of this design is to capture, manage, and purify stormwater in downtown Winnipeg. The focal point is on a specified site, but the hope is that this project can capture water from a more expansive area. This would lessen the burden on Winnipeg's sewer system and reduce pollution in natural water bodies. While focusing on the technical requirements of stormwater management, another goal will be to reuse the captured water to facilitate a viable wetland habitat. To accomplish this, the project incorporates a group of indicator species, in this case, dragonflies of the order Odonata. These species live in and around wetlands, and their numbers are often linked to the health of these environments. Therefore, designing an environment to meet their needs will result in a healthy habitat, not only for Odonata but a wide range of wetland species. Equally important to designing a place for habitat is making a space for downtown Winnipeg. This practicum aims to reveal more potential for downtown, providing a new space for visitors and residents. This practicum comes with an opportunity to demonstrate a holistic design approach that combines sustainability, habitat, and place." (Author)] Address: https://mspace.lib.umanitoba.ca/items/57b9f1f4-5554-4d48-b9e0-4419530c5ab7

25094. Desmita, Y.; Aryani, Z. (2025): Rancangan pembelajaran media metamorfosis kupu-kupu, katak dan capung. Jurnal Inovasi Wawasan Akademik 1(5): 397-405. (in Indonesian, with English summary) ["Learning design media metamorphosis of butterflies, frogs and dragonflies - Metamorphosis learning media is a message-carrying technology that can be utilized for educational purposes. This media is designed to explain the stages of metamorphosis in butterflies, frogs, and dragonflies through interactive visualization. The metamorphosis media helps students understand the differences between complete and incomplete metamorphosis in science lessons (IPAS). The use of media in teaching and learning is important because it can stimulate student interest and motivation, as well as provide a more meaningful learning experience. The method used in this study is descriptive qualitative, where the teacher demonstrates the stages of metamorphosis using props designed to resemble the actual process. The results from the simulation show that students are more motivated and able to understand the concept of metamorphosis more easily. This media is expected to improve the quality of classroom learning and serve as an innovative solution in science education." (Authors)] Address: Desmita, Yola, STKIP, Widyaswara Indonesia. Email: yoladesmita@gmail.com

25095. Dey, A.; Das, D. (2025): Odonata diversity as a bioindicator of habitat quality in an urban landscape: Insights from Tripura university campus, Northeast India. Acta Entomology and Zoology 6(2): 157-165. (in English) ["This study documents the diversity and community structure of Odonata within the semi-urban landscape of Tripura University campus, Northeast India, over a one-year period (April 2024-March 2025). A total of 33 species belonging to 25 genera and 5 families were recorded, comprising 23 species of Anisoptera and 10 of Zygoptera, representing 44% of the known odonate fauna of Tripura. The family Libellulidae was the most dominant, with Rhyothemis variegata identified as the only eudominant species. Diversity indices, the Shannon index (2.335) and the Simpson index (0.8288), indicated moderate to high diversity, whereas low evenness (0.3129) reflected community dominance by a few generalist species. The presence of both pollution-sensitive and pollution-tolerant taxa highlights habitat heterogeneity and potential anthropogenic impacts. Distribution patterns revealed a predominantly clumped assemblage, linked to habitat patchiness and resource concentration. The results underscore the ecological value of urban green spaces in sustaining odonate biodiversity and provide a baseline for long-term monitoring and regional conservation strategies." (Authors)] Address: Dey, D., Ecology & Biodiversity Laboratory; Department of Zoology, Tripura University (A Central University), Suryamaninagar, West Tripura, India

25096. Doucet, G.; Coulette, S. (2025): Cinétique d'émergence, sex-ratio, estimation de la taille des populations et éléments sur la phénologie d'Aeshna subarctica elisabethae Djakonov, 1922 sur deux tourbières de la Réserve Naturelle Nationale des Ballons-Comtois (Odonata: Aeshnidae). Martinia 39(1): 1-12. (in French, with English summary) ["Emergence kinetics, sex-ratio, population size estimates and phenological information for Aeshna subarctica elisabethae on two peat bogs of the Ballons-Comtois National Nature Reserve - Few studies are available on the ecology and biology of A. subarctica elisabethae in France. Work carried out in 2020 on two peat bogs in the Ballons-Comtois National Nature Reserve in the Haute-Saône department provided information on the emergence kinetics, sex ratio and phenology of this taxon in the Vosges massif. It shows that emergence is relatively regularly distributed between late May / early June and the end of August, with a median emergence time (EM50)

of about 45 days (estimated between 36 and 53 days). The sex ratio was balanced with 50% males and 50% females for the 398 exuviae collected. With 194 exuviae collected from the Grand Rossely peat bog and 204 from the Bravouse plateau peat bog in 11 visits, these two sites appear to be major sites for this taxon in France and even in Western Europe. Given the importance of this species and rapid climate change, long-term monitoring of the species and its community seems essential, particularly at these two sites." (Authors)] Address: Doucet, G., 22 rue de la Grette, 25000 Besançon, France. Email: guillaume.doucet@yahoo.fr

25097. Doychev, D.D.; Taneva, L.R. (2025): An unpolluted regulated stream and its recovery gradient dependency from environmental variables. Limnetica 44(1): 159-177. (in English, with Spanish summary) [Bulgaria; "Periods of thermal stratification in deep dams can result in increased liberation of ammonia and phosphates at the sediment-water interface, which can cause nutrient enrichment in the downstream river section. We studied the recovery gradient of a thermally altered, regulated, unpolluted stream and its dependency on the main environmental variables. Macroinvertebrate assemblages were assessed in the spring-summer and autumn periods, at three sampling sites in a 1.25 km river reach, downstream from the dam, for 4 years (2019-2022). Water samples were collected from all riverine sites and one site in the dam. Nutrients were measured and hydrological alteration indices were calculated for the longitudinal gradient survey. We aimed to unravel the main environmental variables linked to the dam-induced hydro-morphological pressure affecting macroinvertebrate communities. Complex interactions between nutrients and the main physical parameters were identified as responsible for the observed trends. The analysis revealed natural-born hypolimnetic ammonia as the most contributing parameter to the biomonitoring metrics reflecting the status of macroinvertebrates. Ammonia enters the river system mainly during the dam thermal stratification periods (spring-summer) and as a result, macroinvertebrate communities had the highest recovery rates in the autumn. In this season the stream can achieve good ecological status even as near as 25 m below the dam wall if ammonia concentrations are low. Therefore, seasonal fluctuations of parameters such as dissolved oxygen and temperature in the hypolimnion are affecting invertebrate communities." (Authors) In the Supplemental Material, Odonate taxa are treated at family level.] Address: Doychev, D.D., Dept Biol., Fac. Natural Sciences, Konstantin Preslavsky Univ. of Shumen, 115 Universitetska Str., 9700 Shumen, Bulgaria. Email: d.doichev@shu.bg

25098. Durand, A.; Larnaudie, S.; Champelovier, D.; Ronsin, B.; Lafon, I.; Giurfa, M. (2025): A comprehensive characterization of opsin distribution across the visual system in the three castes of the honeybee. iScience 28, 113105: 21 pp. (in English) ["Honeybees see the world through photoreceptors in their compound eyes and ocelli, which express four opsins: UVOP (UV-sensitive), BLOP (blue-sensitive), and LOP1/LOP2 (both green-sensitive). Here, we provide the first comparative mapping of opsin RNA across the three bee castes: workers, drones, and queens. In all castes, Lop1 was exclusive to the compound eyes, while Lop2 was confined to the ocelli, which also contained Uvop photoreceptors. Queens and workers exhibited three ommatidial types in their compound eyes, with six Lop1 photoreceptors, alongside either one Uvop and one Blop, two Uvop or two Blop photoreceptors. Drones shared the same ommatidial types ventrally, but the upper two-thirds of their compound eyes exhibited only two ommatidial types: one with one Uvop and seven Blop photoreceptors, the other with two Uvop and six Blop photoreceptors. Our findings reveal unknown caste-specific adaptations in bee vision, enhancing understanding of the evolutionary diversity of insect visual systems." (Authors) The paper includes references to Odonata.] Address: Lafon, Isabelle, Research Centre on Animal Cognition, Centre of Integrative Biology, CNRS, University Paul Sabatier, 31062 Toulouse, France. Email: isabelle.lafon@cnrs.fr

25099. Ekpah, O.; Suhling, F. (2025): Occurrence and distribution of Odonata (Insect: dragonflies and damselflies) in Nigeria. International Journal of Odonatology 28: 146-158. (in English) ["An inventory of Nigeria's Odonata and their distribution in each of the country's ecological zones are presented for the first time. Records is based on occurrence information from databases, verified literature, and observations from the field between 2020 to 2025. Databases included Odonata Database of Africa with records as far back as 1905 and iNaturalist from September 2012 to April 2025. Red List Categories were assigned to all species following the IUCN global Red List assessments but with modification for some species, thereby creating a proposed national Red List. With a total of 4630 records, the number of Odonata species known and confirmed to occur in Nigeria is 249. Some Odonata species previously known to occur at some particular localities were no longer found there indicating a change in diversity from 1905. A list of odonate species which are found near the Nigerian borders in neighbouring countries but have not been confirmed in Nigeria are given. Comments are also made on Odonata species unlikely to occur in Nigeria but reported in literature." (Authors)] Address: Ekpah, O., Institut für Geoökologie, Technische Universität, Braunschweig, Germany. Email: ojonugwa.ekpah@tu-braunschweig.de

25100. Elafri, A.; Halassi, I.; Aoues, A.; Ghomrassi, H. (2025): Odonata assemblages in highland hydrosystems of north-eastern Algeria, with notes on elevational patterns: application of species occupancy models. Journal of Insect Biodiversity and Systematics 11(2): 391-405. (in English, with Arabian summary) ["We aim in this study to increase our knowledge of the Odonata in the Aures, an unexplored region of north-eastern Algeria, using single-species occupancy model (spOccupancy R package) coupled with spatial interpolation technique (kriging ArcGis) to assess the relationships between elevation and odonatan species distribution. From time windows of about 90 days (June to August 2021), a total of 22 odonatan species belonging to 2 suborders (Anisoptera and Zygoptera) have been recorded in 15 sampling wet biotopes; among them the endangered Calopteryx exul. Our modelling shows that 62% of the odonatological community has a uniform probability of being present in the studied area. The probability of detecting a species is similar during each survey for 90% of the odonatological community except for the endangered Calopteryx exul ($p < 0.05$) and Crocothemis erythraea ($p < 0.05$). We also found that Ischnura graellsii and I. saharensis are the most common species; they are predicted to occur in more than 60% of sites, followed by Anax imperator, Orthetrum chrysostigma, and Platycnemis subdilatata, where they occur in about 50% of the wet biotopes sampled. Finally, our modelling revealed no evidence for a significant altitudinal variation (500 to 1900 meters above sea level) impact on both occupancy and detectability of the majority of the odonatan species, except for Crocothemis erythraea and Sympetrum fonscolombii. The kriging interpolation indicates that they are concentrated within the altitude range of 400 m to 1000 m." (Authors)] Address: Elafri, A., Fac. Natural & Life Sciences, Abbess Laghrour Univ. of Khenchela, Algeria. Email: a.elafri@univ-khenchela.dz

25101. Fahy, J.C.; Dodd, J.A.; Spray, C.J.; Oertli, B. (2025): The potential contribution of flood management ponds to pondscape biodiversity: Evidence from dragonflies. Ecological Solutions and Evidence 6:e70081: 13 pp. (in English) ["1. After decades of river channelisation, restoration projects are flourishing, many with the aim of reducing flood risk by re-connecting rivers to their floodplains and making space for water. Pond creation is often included to enable temporary storage of surface water as a natural flood management (NFM) measure in catchment-scale restoration programmes. 2. However, evidence on the potential benefits of these newly created NFM ponds for biodiversity is still scarce, including for flagship wetland groups such as Odonata. To examine this, inventories of adult Odonata were undertaken in the Eddleston Water catchment (Scottish Borders). Twenty ponds were surveyed: ten newly created NFM ponds and 10 pre-existing ponds (used as reference sites). 3. Pond creation for NFM has strengthened the regional Odonata populations [Aeshna juncea, Libellula quadrimaculata, Sympetrum danae, S. striolatum, Coenagrion puella, Enallagma cyathigerum, Ischnura elegans, Lestes sponsa, Pyrrhosoma nymphula] and increased habitat availability, with all recorded species of dragonflies now found at more sites. NFM ponds display slightly higher Odonata alpha species richness than reference ponds. Community composition of NFM ponds was similar to that of reference ponds, as were their environmental conditions. Richness in Odonata was positively correlated with macrophyte richness and the percentage of pond shoreline covered in emergent vegetation, along with pond density. 4. Practical implication. Our investigation shows that ponds created primarily as NFM measures can host Odonata communities as diverse as established ponds, provided they are well located, well designed, and managed in ways that allow the development of aquatic vegetation in the pond and on its shoreline. As such, the flood management ponds of the Eddleston Water catchment are a good example of effective nature-based solution implementation, tackling the twin crises of climate change and biodiversity loss." (Authors)] Address: Fahy, Julie, University of Applied Sciences & Arts Western Switzerland, HEPIA, Geneva, Switzerland. Email: julie@fahy.net

25102. Fan, G.; Nel, A.; Zhang, L.; Xiao, C.; Zheng, D. (2025): The oldest-known Cymatophlebiinae (Odonata: Aeshnoptera: Cymatophlebiidae) from the Upper Jurassic of Inner Mongolia, northeastern China. Historical Biology 37(2): 234-239. (in English) ["Aeshnoptera greatly diversified with a wide distribution during the Mesozoic. The genus Cymatophlebia is one of the most diversified aeshnopteran dragonflies, which survived during the Middle Jurassic and Early Cretaceous. In the present study, Cymatophlebia daohugouensis sp. nov. the oldest-known representative of this genus is described from the Middle Jurassic (upper Callovian) Haifanggou Formation of northeastern China. It differs from the other species of Cymatophlebia in having three rows of cells in the postdiscoidal area before the midfork, four-celled discoidal and subdiscoidal triangles, and two rows of cells between Rspl and IR2 basally. This study provides new clues for exploring the early origination and evolution of the cymatophlebiid dragonflies in Laurasia." (Authors)] Address: Zhang, Lijun, South China Sea Culture Museum, Hainan Tropical Ocean University, Sanya, China. Email: syzlj@126.com

25103. Fan, G.-Q.; Qin, S.-Z.; Hu, C.-X. (2025): Retrospection of research on dragonfly and damselfly (Odonata) during past fifty years: A bibliometric review. Insects. 2025 Sep 9;16(9):945. doi: 10.3390/insects16090945: 24 pp. (in English) ["Simple abstract: Odonata are not just beautiful insects but also important indicators of environmental health. Scientists have published thousands of studies on these insects in the past fifty years, but a comprehensive overview of Odonata research has been lacking. We set out to analyze nearly 5000 scientific articles from the 1970s to today to find out what topics scientists have focused on and how this research has evolved. Our analysis showed that the number of studies has grown dramatically, especially in recent years, with the United States leading in publications, followed by countries in Europe, Asia, and Latin America. Researchers have explored many aspects of dragonfly and damselfly biology, including how they live and grow, how they fly and hunt, how they interact with their habitats, and how to protect them when their environment changes. We also identified new trends in recent research, such as efforts to catalog and conserve species worldwide, deeper genetic studies of their evolutionary relationships, and using these insects as natural “health monitors” of ecosystems. Understanding these patterns helps scientists and conservationists see what we know and what we still need to learn, guiding future studies that support environmental monitoring and biodiversity conservation.”] (Authors)] Address: Qin, S.-Z., College of Life & Health Science, Kaili Univ., Kaili 556011, China. Email: sz_qin@163.com

25104. Fehlinger, L.; Chaguaceda, F.; Tirozzi, P.; Tomas-Martín, M.; Jakobsson , E.; Chonova, T.; Misteli, B.; Scotti, A.; Henriques, J.F.; Rubio-Ríos, J.; Morant, D.; Marle, P.; Kolar, V.; Stamenkovic, O.; Mondav, R.; Münzner, K.; Osakpolor, S.E.; Bonacina, L.; Nava, V.; Drohan, E.; Fenoy, E.; Llorente, A.; Mathieu-Resuge, M.; Halabowski, D.; Juvigny-Khenafou, N.P.D.; Martelo, J.; Nash, L.N.; Fahy, J.C.; Cunillera-Montcusí, D.; Balibrea, A.; Rimcheska, B. (2025): Nutrients on the move: Investigating large scale fatty acid exports from European ponds via emerging insects. Limnology and Oceanography 70(10): 2844-2857. (in English) ["Permanent ponds are key landscape units that supply various ecosystem services. Notably, the export ofaquatic subsidies to land via emerging insects may significantly influence terrestrial food webs. Polyunsaturatedfatty acids (PUFA), which enhance consumer fitness, are among the essential exported components. The patterns and drivers of dietary exports from ponds via insects remain poorly known, particularly at continentalscales. We analyzed the exports of biomass, lipid, and fatty acid contents from emerging insects, sampled in36 ponds across 11 European countries, from 36 N to 59 N and from 26 W to 19 E, over four seasons. Wefound that biomass and fatty acid exports decreased with increasing latitude and were higher in spring and sum-mer. Seasonal effects also increased with higher latitudes. Temperature was the most important predictor ofinsect biomass, explaining 27.6% of the total variation and showing an unimodal response. Thus, increasingtemperature may promote exports in colder regions and seasons but may negatively influence biomass exportsin already warm regions. The exports of total lipids, PUFA, and eicosapentaenoic acid were correlated toexported biomass, while those of docosahexaenoic acid were linked to the emergence of Chaoboridae. Our findings indicated that PUFA contents were affected by taxonomic insect community composition and pond tro-phic state (indicated by chlorophyll a). Two of the correlates identified here (temperature and trophic state) are influenced by anthropogenic activity via climate and land use change, respectively. Thus, human activityimpacts the food webs in and around ponds by influencing the quantity and quality of nutritional exports." (Authors) Taxa - including Odonata - are treated at order level.] Address: Fehlinger, Lena, WasserCluster Lunz-Biologische Station GmbH, Lunz am See, Austria

25105. Fincke, O. (2025): Book Review. Eur. J. Entomol. 122: 147-148. (in English) [Review of: Rüppell, G. & Hilfert-

Rüppell, D. 2024: Dragonfly behaviour: Discovering the dynamic of life of an ancient order of insects. Springer-Verlag GmbH, Berlin, Heidelberg, xx + 229 pp., 290 colour photos, 30 blackand-white illustrations. ISBN 978-3-662-70233-8 (hardback), 978-3-662-70234-5 (e-book). Hardcover price EUR 28.07.] Address: Fincke, Ola, Department of Biological Sciences, University of Oklahoma, Norman, OK, USA

25106. Fitzgerald, K.V.; Ammerman, L.K. (2025): Cave Myotis (Myotis velifer) consume diverse prey items and provide important ecosystem services. Journal of Mammalogy 106(1): 157-167. (in English, with Spanish summary) ["Insectivorous bats play an essential role as predators in natural ecosystems and contribute to pest control in agricultural landscapes. However, characterizing diets of specific bat species is difficult using conventional methods that cannot capture detailed dietary information. In this study, we used metabarcoding of the cytochrome oxidase I mitochondrial gene to analyze fecal samples of Myotis velifer and provide insight into the seasonal variation of diet from a colony located in the Chihuahuan Desert region of Texas. After filtering sequence reads, we recovered and analyzed 706 molecular operational taxonomic units (MOTUs) in the diet of M. velifer. We found 484 taxa (species and genus level) belonging to 11 insect orders in 66 fecal samples collected from March to October 2021. The orders containing the most MOTUs were Diptera (n = 353), Lepidoptera (n = 160), and Blattodea (n = 59). In their diet, we identified important insect crop pests, non-native insects, and substantial consumption of mosquitoes. Dietary composition shifted throughout seasons. Bats captured in summer months consumed the highest diversity of arthropod orders, and those captured in the spring consumed more diet items but were less diverse in arthropod orders. Our results uncovered 2 additional orders consumed by M. velifer, Blattodea and Odonata, that have not been previously described in their diet." (Authors)] Address: Fitzgerald, Katheryn, Dept of Ecology, Evolution & Conservation Biology, University of Illinois Urbana-Champaign, Urbana, IL 61801, United States. Email: kvf2@illinois.edu

25107. Flanagan Pritz, C.; Emery, C.; Johnson, B.L.; Willacker, J.J.; Kotalik, C.; Ko, K.; Bell, M.; Walters, D.; Eagles-Smith, C.A. (2025): Sampling dragonflies for mercury analysis in Grand Canyon National Park, 2018–2024: A contribution of the Dragonfly Mercury Project. Science Report NPS/SR—2025/283. National Park Service, Fort Collins, Colorado. https://doi.org/10.36967/2310449: 50 pp. (in English) ["The Dragonfly Mercury Project is a collaborative initiative that utilizes dragonfly larvae as biosentinels to monitor mercury concentrations across 180 national parks and other protected lands, including Grand Canyon National Park (GRCA). These indicators serve as surrogates for environmental risk and can indicate where fish consumption could pose health risks through exposure to mercury. From 2018 to 2024, citizen scientists and staff from the National Park Service and U.S. Geological Survey helped collect close to 400 larvae from 25 GRCA sites across nearly 300 river miles, revealing mercury concentrations ranged from 3.0 to 1,337 ng/g (parts per billion) dry weight. Results were available for 20 tributary sites. Upon comparing mercury concentrations to an impairment index, 90% of the sites (N = 18) were classified as low or no risk for ecological impairment, though 10% (2 sites) exceeded moderate or severe risk benchmarks (Pete's Pocket and Buck Farm Canyon, respectively). The data from GRCA tributaries suggests that mercury (Hg) risk is relatively low compared to the nationwide dataset. A catch-per-unit-effort metric was used to assess sampling difficulty at 10 sites, revealing that Nankoweap Creek would take the longest to sample, while the mainstem site at Colorado River RM204 would take the shortest. Sources of mercury to GRCA likely stem from a combination of atmospheric deposition, upstream discharge from Lake Powell, and other watershed contributions. In addition, food web dynamics, underlying water chemistry, and environmental disturbances (e.g., floods) contribute to mercury mobilization, production, and bioaccumulation. Report findings provide a baseline for connecting ongoing science in the Colorado River watershed, informing management actions, and enhancing public engagement through citizen science." (Authors)] Address: https://irma.nps.gov/DataStore/Reference/-Profile/2310449

25108. Fundira, T.; Arnscheidt, J.; Jordan, P. (2025): Evaluating the effectiveness of Forest-to-Bog restoration on carbon sequestration, water chemistry, and biodiversity in Irish and British peatlands. Wiley Interdisciplinary Reviews: Climate Change 16:e70016: 20 pp. (in English) ["Globally, 3%–4% of the peatland area has been drained for forestry, and in temperate oceanic regions, treeless bogs were historically converted to non-native forest plantations. This has caused carbon-rich peat oxidation, heightened fire risk, and water and biodiversity degradation. Restoration to open-treeless bog through clear-felling and re-wetting (forest-to-bog) aims to reverse forestry impacts and restore biodiversity, carbon sequestration, and water quality functions. However, a comprehensive evaluation of its effectiveness and timelines is lacking. This review systematically synthesizes restoration outcomes in temperate oceanic peatlands, revealing mixed success over a multi-decadal scale. Despite a global search, findings were geographically limited to the Irish and British Isles. Post restoration, onsite land-atmosphere greenhouse gas (GHG) net flux approaches net-zero within 11–13 ± 2 years (75% CI), largely driven by water table and vegetation recovery. Water chemistry initially deviates due to nutrient and trace metal release after clear-felling but shows positive trajectories after 4–10 years; full recovery of dissolved organic carbon, ammonium nitrogen, and zinc may exceed two decades. Water table recovery occurs within 6–10 years, but full stabilization may require 20+ years. Faunal recovery, though slower, reflects trophic and habitat dependencies, significantly recovering after a decade. Legacy effects, such as harvest residue, microtopographies, and initial peatland conditions hinder restoration. Innovative methods, including surface terraforming and whole-tree removal, promise accelerated recovery. Knowledge gaps include limited availability of long-term GHG data, forestry full life cycle assessments, and fluvial carbon monitoring. Sustained investment, standardized monitoring protocols, and policy support are required to enhance restoration outcomes. ... The aquatic macroinvertebrates in clear-felled catchments exhibit negative eutrophication-driven and geology-moderated "winner-loser" dynamics that favor generalist species (e.g., larger Coleoptera and Odonata) at the expense of conservation-priority taxa—the International Union for Conservation of Nature (IUCN)-redlisted such as Cordulia aenea (Drinan et al. 2013). These rapid shifts highlight the limitations of relying solely on headline diversity metrics such as species richness, which can obscure deeper functional degradation. Long-term monitoring is needed to understand temporal changes." (Authors)] Address: Fundira, T., School of Geography & Environmental Scien., Ulster Univ., Coleraine, UK. Email: fundira-t@ulster.ac.uk

25109. Ganeswari, C.; Priyatharsini, R., Babu, R., & Subramanian , K. A. (2025): Geographic range extension of Cyclogomphus gynostylus Fraser (Odonata) to Southern India. Indian Journal of Entomology 88: 400-402. (in English) ["The gomphid genus Cyclogomphus Selys, 1854 is restricted to

peninsular India and Sri Lanka. Based on the morphological and molecular studies of specimens collected from Madurai, Tamil Nadu, we report the range extension of Cyclogomphus gynostylus Fraser, 1926 to southern India which was previously known to be endemic to Sri Lanka." (Authors)] Address: Subramanian, K. A., Southern Regional Centre, Zoological Survey of India, Chennai 600028, Tamil Nadu, India. Email: subbuka.zsi@gmail.com

25110. Garrison, M.; Tennessen, K.J. (2025): Nymph Cove: North American Libellulidae Habitus. Argia 37(2): 14-16. (in English) ["Since a picture is supposedly worth a thousand words, this Nymph Cove can be brief. We present here the habitus for the North American genera of Libellulidae in photographic format, for ease of comparison. In addition, we have split the family habitus into four separate groupings, each corresponding to one of the four previous Libellulidae: Identification to Genus articles." (Authors)] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

25111. Ghanchi, M.; Ghanchi, M.O.; Yadav, J.K.; Dangi, R. (2025): Comparative dynamics and area health model: miscellany of butterflies versus odonates of Dholka, Ahmedabad. J. Appl. Entomol. 5(3): 44-54. (in English) ["Far beyond their dazzling colors, butterflies, dragonflies, and damselflies are living barometers of environmental health, whispering the stories of air, water, and habitat quality. In the rapidly growing urban sprawl of Ahmedabad, these delicate fliers serve as irreplaceable sentinels of ecological balance. This study offers a replicable blueprint for assessing “area health” through a fine-scale examination of urban biodiversity, green habitats, and supporting environmental parameters. Our 8 km² focus area, Dholka town, Ahmedabad, is crowned by three tranquil lakes and embraced by a lush pocket forest. Weather records of temperature, humidity wind speed, visibility, and UV index paint Dholka as a rare refuge of biodiversity within a concrete-dominated landscape. Within its mosaic of habitats, we documented an impressive diversity: 30 butterfly species (Lepidoptera), 9 dragonfly species, and 8 damselfly species. Remarkably, this richness flourished on wild plant species often dismissed as weeds, yet here, they proved to be ecological lifelines. Prosopis juliflora (Fabaceae), Alternanthera ficoidea (Amaranthaceae), Lantana camara (Verbenaceae), Dicliptera paniculata (Acanthaceae), and Tephrosia purpurea (Fabaceae) served as vital microhabitats, nurturing countless indicator species. Rigorous water quality analyses further reinforced our holistic health assessment model. This research underscores the hidden power of small green ecosystems, capable of sustaining biodiversity and stabilizing the broader metropolitan environment. We urgently advocate for the inclusion of select butterfly and odonate species in the IUCN conservation list, ensuring their protection before they slip unnoticed toward extinction. In safeguarding these sentinels, we safeguard the very heartbeat of our urban ecosystems." (Authors) Crocothemis servilla, Brachythemis contaminata, Diplacodes trivialis, D. haematodes, Rhyothemis variegata, Orthetrum sabina, Tholymis tillarga, Tramea basilaris, Urothemis signata, Ceriagrion coromandelianum, Pseudagrion microcephalum, P. rubriceps, Mortonagrion varralli, Ischnura nursei, Paracercion calamorum, Agriocnemis pygmaea] Address: Ghanchi, M., LBALAB Association, 156/6/36, Chhagan Ji Wadi, Laxmi Nagar, Meghaninagar, Ahmedabad, Gujarat, India

25112. Gilbert, J.D.; Márquez, F.J.; Ortega, F.; Guerrero, F. (2025): Macroinvertebrate metacommunity in Mediterranean mountain ponds (south of Spain). Biodiversity and Conservation 34(12): 4251-4271. (in English) ["Mediterranean mountain ponds are excellent model systems for studying aquatic community changes and their underlaying mechanism. Their location within mountain landscapes results in isolated and poorly connected ponds. Furthermore, these dynamics ecosystems exhibit regional variation in environmental and spatial characteristics, making them ideal island ecosystems for metacommunities studies. This study investigates the influence of environmental and spatial factors on macroinvertebrate metacommunity structure in 23 isolated Mediterranean mountain ponds in Andalusia (south Spain). Macroinvertebrate combined pattern-based (Elements of Metacommunity Structure) and mechanistic (Redundancy Analysis and variation partitioning) approaches were employed to examine non-random distribution patterns in macroinvertebrates metacommunity structure. Additionally, by classifying macroinvertebrates into functional traits groups, allowed for an assessment of how different trait-based assemblages responded to these environmental and spatial drivers, providing a more nuanced understanding of community assembly. Results revealed a nested species distribution pattern, with species-poor ponds as subsets of richerones. Redundancy Analysis identified hydroperiod and pond size as important environmental drivers, while fine-scale spatial variables had a greater influence than broad-scale ones. Although environmental factors explained more variation overall, no strong direct relationship with environmental variables was observed. The results suggest that nested patterns are driven by a combination of biogeographical processes, local environmental factors (pond size, hydroperiod), and fine-scale spatial structure. These findings emphasize the importance of considering habitat heterogeneity, connectivity, and regional species pools for effective conservation and management strategies of these pond ecosystems. Conservation efforts should prioritize maintaining connectivity between ponds and preserving those with high species richness to ensure the long-term persistence of macroinvertebrate metacommunities." (Authors) Odonate taxa are treated at family level: Aeshnidae, Gomphidae, Coenagrionidae, and Lestidae] Address: Guerrero, F., Depto de Biología Animal, Biología Vegetal y Ecología, Universidad de Jaén, Campus de las Lagunillas, s/n., 23071 Jaén, Spain. Email: fguerre@ujaen.es

25113. Glidewell, D.; Beyer, J.E.; Hambright, K.D. (2025): Microcystins bioaccumulate but do not biomagnify in an experimental aquatic food chain. Harmful Algae 141, 102768: (in English) ["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 a damselfly, 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 Lab., School of Biological Sciences, 730 Van Vleet Oval, Univ. Oklahoma, Norman, OK, 73071, USA. Email: dhambright@ou.edu

25114. Gonzalez, C. (2025): Seasonality of gregarine infections in Enallagma civile. MSc. thesis, Faculty of the Department of Biological Sciences, Sam Houston State University: VII+25 pp. (in English) ["Gregarines (Apicomplexa: Eugregarinida) are ubiquitous parasites of invertebrates, especially insects, and 10 species have been described from Zygoptera. However, very little research has investigated seasonal patterns of infection. A single study, conducted in Canada, did investigate seasonal patterns of gregarine infection in adult damselflies and found unimodal patterns in prevalence and intensity of infection. We investigated seasonal patterns of gregarine infections in Enallagma civile adults over the flight season, and larvae over an entire year at a small pond in southeast Texas. Sampling was conducted bi-weekly throughout 2024, resulting in two larval samples per month over the entire year, and two adult samples per month during the flight season. Two gregarine species, an undescribed species of Hoplorhynchus and Steganorhynchus dunwoodyi have previously been collected from E. civile at this location. However, during our study, only three individuals of E. civile harbored a gregarine that was not Hoplorhynchus sp. Prevalence in larvae was highest just prior to the start of the adult flight season (90% in February) and was lowest at the end of the adult flight season (5.3% in October). Prevalence in larvae was about the same during the flight season (ranging from 50% to 69%). The prevalence of infection in adults fluctuated throughout the flight season with the highest prevalence coming at the midpoint of the season (62% in June) with the lowest prevalence (35% in May). Gregarine mean intensity fluctuated in the larvae throughout the year, with the highest coming right after the midpoint of the flight season, but the lowest coincides with the lowest prevalence of infection. In the adults the highest intensity coincides with the midpoint of the flight season and with the highest prevalence of infection, with the lowest coming at the end of the flight season." (Authors)] Address: https://shsu-ir.tdl.org/server/api/core/bitstreams/2c1f052d-4481-4dd6-b9e7-20a9042e9751/content

25115. Goswami, R.; Rawat, D.; Negi, C.S. (2025): Indian Odonata: Diversity, ecology, and conservation challenges. Indian Journal of Ecology 52(5): 1023-1030. (in English) ["Odonata is one of the most ancient groups of flying insects, with fossil records dating back to the Permian era (299-251 million years ago). Classified into three suborders based on morphology: The Anisozygoptera, Zygoptera, and Anisoptera, they are amphibious hemimetabolic insects having the aquatic egg and larval stages, while the adults are terrestrial…. Epiophlebia laidlawi, … is found in Darjeeling. This review summarizes literature of last 30 years and reveals: (i) the total diversity of species encountered remains very small- 508, considering country's large area as well as the multitude of habitat kinds; (ii) only 12 species of dragonflies and 14 species of damselflies find mention as rare, endangered, and threatened species (RET), while a very significant number (179) have been categorized as data deficient or not evaluated. The limited recorded diversity and conservation status of Indian odonates reflect a lack of comprehensive research, even in terms of basic inventorization. Most studies focus solely on species inventorization, overlooking ecological aspects. This paper highlights the urgent need for in-depth studies addressing habitat types and environmental changes. Addressing these gaps is crucial to safeguard these bioindicators and ensure the sustainability of freshwater ecosystems." (Authors)] Address: Negi, C.S., Ecology & Biodiversity Laboratory, Motiram Baburam Government Postgraduate College, Haldwani-263 139, India. Email: csnsacred1@gmail.com

25116. Guadalupe Poi, A.S.G.; Casco, S.L.; Gallardo, L.I. (2025): Linking hydrological connectivity with the richness and composition of aquatic invertebrates across the Paraná River floodplain, Argentina. Limnetica 44(1): 29-41. (in English, with Spanish summary) ["Lateral hydrological connectivity can affect the community characteristics by promoting dispersal of organisms between the river and its floodplain. We investigated the species richness, specific diversity, and relative abundance of microcrustaceans transported by the flood and the macroinvertebrates retained by Pontederia crassipes Mart, roots in five floodplain lakes with different connectivity within the RAMSAR Site Humedales Chaco. Due to differences in the slopes of the floodplain studied, the connectivity was determined by the topographic location of each lake, rather than by the distance from the river. During the hydrological connection, there was a transverse gradient in the physical and chemical characteristics of the water, with an increase in the electrical conductivity and a decrease in dissolved oxygen and suspended solids in the more isolated sites. A total of 62 species of microcrustaceans (48 cladocerans and 14 copepods) and 63 taxa of macroinvertebrates were identified. The microcrustaceans had high species richness in the three most connected lakes, whereas the macroinvertebrates had a peak in taxa richness in the lakes with intermediate connectivity. The low beta diversity (pw) for both microcrustaceans (14.63 %) and macroinvertebrates (16.9 %) indicated that taxa richness varied little between sites with different hydrological connectivity. In both assemblages, cluster analysis based on the similarity of the relative abundance grouped the three sites more connected and separated from the less connected sites. Our results suggest that species richness followed different patterns in different assemblages across the lateral gradient and that the hydrological connectivity was more related to the relative abundance of microcrustaceans and macroinvertebrates than to the classical measures of pw. Species diversity indices did not vary between sites. The high total species richness of invertebrates is mainly a result of the spatial arrangement of the different floodplain lakes." (Authors) The Supplemental Materials contains the following odonate taxa: Coenagrionidae larvae, Telebasis sp., Libellulidae larvae, Miathyria marcella.] Address: Guadalupe Poi, Alicia Susana, 1 Centro de Ecología Aplicada del Litoral (CONICET-UNNE). Ruta 5, Km 2.5. 3400 Corrientes, Argentina. Email: guadalupepoi@gmail.com

25117. Hadfield, R.K.; Sutherland, L.N.; Dallin, F.; Polhemus, D.; Jordan, S.; Bybee, S.M. (2025): Historical classification and nomenclature of Hawaiian damselflies (Pinapinao, Odonata: Coenagrionidae: Megalagrion): a review. International Journal of Odonatology 28: 132-145. (in English) ["The endemic Hawaiian damselflies of the genus Megalagrion have a complex taxonomic history. Classification within Megalagrion has predominantly focused on morphology and geography, followed by more recent and extensive molecular work. This combined effort has increased our understanding of the group, provided insight into existing taxonomic questions, and raised new questions. Here we outline the historical classification and nomenclature leading up to the present understanding of Megalagrion. Additionally, we discuss taxonomic issues that remain and make recommendations for future work."

(Authors)] Address: Hadfield, R.K., Dept Biol., Brigham Young Univ., 4102 LSB, Provo, UT 84602, USA. Email: robert7hadfield@gmail.com

25118. Hanindharputri, M.A.; Artayasa, N.; Remawa, A.A.G.R.; Dew, A.K. (2025): Visual interpretation of Dragonfly Wine's new label in a hermeneutic perspective. European Journal of Arts, Humanities and Social Sciences 2(2): 26-34. (in English) ["The wine industry in Indonesia has been growing rapidly, despite the country not being a major grape producer. PT. Hatten Bali, Tbk., as a pioneer in Indonesia's wine industry, continues to embrace local values in its products, including Dragonfly Wines. In 2021, the Dragonfly label underwent a design transformation, shifting from a minimalist aesthetic to a more expressive and colorful look, aligning with a younger and more dynamic target market. This change has led to various visual interpretations that influence the product's image and consumer perception. This study analyzes the transformation of the Dragonfly Wines label through Jacques Derrida's hermeneutic approach to understand how visual meaning evolves alongside design changes. The research employs a qualitative descriptive method, focusing on the analysis of visual communication design elements, including illustration, color, and typography. The findings reveal that the dragonfly illustration, as the central element of the new label, symbolizes transformation and adaptability, while the use of brighter colors reflects energy and enthusiasm. The design change also impacts consumer perception, with many assuming that the new label represents a different product or a reformulated version. This study reaffirms that visual elements in branding play a crucial role in shaping product identity and perception. The transformation of the Dragonfly Wines label is not merely an aesthetic strategy but a branding approach that adapts to market dynamics while preserving the essence of the brand identity." (Authors)] Address: Hanindharputri, M.A., Doctoral Program, Graduate School, Indonesian Art Institute, Denpasar, Indonesia

25119. 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, 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 Univ., Dept Environ. & Landscape Geogr., Pázmány Péter sétány 1/C, Budapest H1117, Hungary. Email: marnold@gamma.ttk.pte.hu

25120. Hartanto, A.; Rahayu, S. (2025): Inventarisas jenis-jenis makroinvertebrata di Daerah riparian Desa Radak Kabupaten Kubu Raya - Macroinvertebrates inventory in the riparian area of Radak Satu village Kubu Raya Regency. Akuatik Tropis 1(1): 23-32. (in Indonesian, with English summary) ["One of the villages that has a very potential riparian zone is Radak Satu Village [West Kalimantan, Indonesia]. The riparian zone with its vegetation provides benefits as a habitat for other organisms including macroinvertebrates. The existence of these macroinvertebrates is very important, not only related to the food chain, but can also be used as a bioindicator of aquatic quality. The aim of this research is to inventory the types of macroinvertebrates in the riaparian area of Radak Satu Village, Kubu Raya Regency. This research was conducted from February to April 2021 with sampling locations divided into four stations. The parameters observed consisted of the number and type of macroinvertebrates as well as the types of vegetation. The results of the research showed that 37 types of macroinvertebrates were found in the riparian area of Radak Satu Village, Kubu Raya Regency, belonging to 30 families. Several species that are often found in this area include shrimp (Palaemonetes paludosus), grasshoppers (Tetrigidae), crickets (Gryllidae), and dragonflies consisting of Pantala flavescens, Brachythemis contaminate, Lestidae, and Ceriagrion cerinorubellum." (Authors)] Address: Rahayu, S., Program Studi Manajemen Sumberdaya Perairan, Univ. Tanjungpura, Indonesia. Email: sri.rahayu@faperta.untan.ac.id

25121. Hartono, A.; Fahira, N.; Dalimunthe, R.R.; Munthe, D.W.; Ayundari, S. (2025): Identifikasi Ordo Odonata di Kampus II Universitas Islam Negeri Sumatera Utara. Biocaster: Jurnal Kajian Biologi 5(4): 569-579. (in Indonesian, with English summary) ["The diversity of Odonata species in urban areas, including campus environments, is often not optimally documented, even though this information is crucial as a basis for environmental management and conservation of local species. Campus II of the State Islamic University of North Sumatra, which has a small aquatic ecosystem, such as ponds and riparian vegetation, is a potential habitat for the existence of the Odonata order. However, until now there has been no scientific study documenting the species in the area. Therefore, this study was conducted with the aim of identifying Odonata species found in the Campus II environment of the State Islamic University of North Sumatra. This research is an exploratory research with data collection techniques using direct sampling methods in the field. Specimen collection was carried out using insect nets, visually documented through digital cameras, and identified using taxonomic determination keys as the main reference. Stationery is used for recording data during field observation. The data from the research were analyzed qualitatively using the Miles and Huberman model analysis technique which involved four systematic steps, namely data collection, data reduction, data presentation, and conclusion drawn. The results of the study showed that in the Campus II area of the State Islamic University of North Sumatra, two species of Odonata were found, namely Diplacodes trivialis ... and Agriocnemis pygmaea .... These two species show adaptation to artificial aquatic habitats in the campus environment. This study concluded that even though the area is semiurban, there is still a diversity of Odonata species that needs attention. The implications of this study are expected to be an initial reference for the development of local insect biodiversity studies as well as the basis for the formulation of insect-friendly habitat management policies in university areas." (Authors)] Address: Hartono, A., Program Studi Pendidikan Biologi, Fakultas Keguruan dan Ilmu Pendidikan, Univ. Samudra, Jalan Prof. Dr. Syarief Thayeb, Langsa, Aceh 24416, Indonesia. Email: adihartono@unsam.ac.id

25122. He, G.; Zhu, F.; Ning, Y.; Yang, H. (2025): Effects of wing vein flexibility on the aerodynamic characteristics of

dragonfly-like wings in forward flight. Journal of Aerospace Engineering 38(1): (in English) ["The passive deformation of the flexible wing plays a crucial role in enabling insects to generate high lift and efficient flight. This study aims to investigate the impact of wing vein flexibility distributions on the aerodynamic characteristics of an imitation dragonfly wing during flapping forward flight. The structural deformation and the flow field characteristics of the flapping wing model under different degrees of freedom are studied for three cases: uniform flexibility, nonuniform flexibility, and rigidity. The nonuniform flexible distribution is modeled by command flow, and the bidirectional fluid–structure coupling technology is used to model the interaction between structure and fluid. The results indicate that the nonuniform flexible distribution can significantly improve the peak thrust coefficients and time-averaged thrust coefficients in the flapping condition, as well as the thrust duration in the flapping-torsion condition. In the former condition, the flexible wing primarily exhibits spreading deformation. In the latter condition, it involves both spreading and chordal bending deformation. Based on the vortex theory, it is observed that the flexible wing generates stronger and wider vortices compared with the rigid wing, forming a vortex ring that contributes to the wing's high lift. Consequently, the flexible wing exhibits superior aerodynamic performance. The numerical examples suggest that the nonuniform flexible distribution is optimal for the imitation dragonfly wing." (Authors)] Address: He, G., College of Mechanical & Electrical Engineering, Hohai Univ., Changzhou 213022, China. Email: hegang@hhu.edu.cn

25123. Hermans, J.T. (2025): Dragonflies and damselflies of the Enci quarry at Sintpietersberg Hill. natuurhistorisch maandblad 114(11): 265-271. (in Dutch, with English summary) ["Outpost and habitat for southern species Limestone quarries in the province of Limburg are of great entomological importance, especially for dragonflies. Their sheltered conditions provide a special, dynamic and warm habitat. Up to 2011, around 37 dragonfly species had been recorded. Research in 2023 and 2024 added three new species [table 1]. 15 dragonflies must be regarded as visitors; nine species have breeding populations and breeding by eight species could not be confirmed. Some species, like Orthetrum brunneum, Ischnura pumilio and Sympetrum striolatum are characteristic of sparsely vegetated seepage areas; these species were found to reproduce in seepage areas with shallow ponds and small streams. Near small streams, Orthetrum coerulescens was also present, with a small breeding population. Some species, like Crocothemis erythraea and Erythromma viridulum, which originate from more southern areas, have been observed near more open pools. Most of the above species need the dynamic situation found in the ENCI limestone quarry. Now that the exploitation of this quarry has come to an end, conserving this special habitat and its dragonfly fauna requires a tailored approach. Future management must focus on keeping the aquatic habitats free of overgrowing by shrubs and trees, in combination with small-scale digging or turf-cutting." (Author)] Address: Hermans, J.T., Hertestraat 21 6067 ER Linne, The Netherlands. Email: jthermans21@gmail.com

25124. Hermans, J.T. (2025): De Gevlekte witsnuitlibel (Leucorrhinia pectoralis) in Limburg (Odonata: Libellulidae). Toename van een zwervende opportunist - Leucorrhinia pectoralis in the Dutch province of Limburg (Odonata: Libellulidae). natuurhistorisch maandblad 114(10): 229-244. (in Dutch, with English summary) [" Increase of a wandering opportunist L. pectoralis is the largest Leucorrhinia whiteface dragonfly, with a conspicuous yellow spot on segment 7 which allows males and most females to be identified with the help of binoculars. It is a Palaearctic species whose distribution ranges from western Europe across the south of western Siberia to the foothills of the Altai Mountains. The species is widely distributed in central Europe and the south of Fennoscandia but rare in many countries. This whiteface has declined in large parts of its European range, particularly in the western and southern parts of central Europe. Throughout Europe, L. pectoralis has suffered mainly from eutrophication and largescale conversion of fenlands and peat systems for agriculture. The decline of the species seems to have halted since the 1990s, especially since the beginning of the present century, when a trend towards recovery was reported in several areas, sometimes assisted by large-scale migrations. L. pectoralis is found in a relatively wide array of habitat types, such as borders of bogs, forest lakes, fenlands, marshy ditches and oxbows. The water of the larval habitat is mostly unshaded and dominated by submerged vegetation in the early and middle succession stages. L. pectoralis is considered to be a specialist of fenlands or shallow peaty habitats with black water. Larvae are sensitive to predation by fish and reach their highest density in fish-free waters. L. pectoralis inhabits two main habitat types in the Netherlands. The first type are fenlands, where the species can achieve large and stable populations, especially in the province of Overijssel. The second type are mesotrophic pools on sandy soils, which are under severe pressure of eutrophication, acidification and desiccation. Populations here are small and mostly unstable. The habitat occupied by the species in the province of Limburg belongs to the second type. At six locations in northern and central Limburg, L. pectoralis has probably established small but more or less stable populations. This should be proved by searching for exuviae at these locations. L. pectoralis is red-listed as endangered; proven reproduction sites should be protected and managed in such a way that the required early and middle succession stages of the vegetation can be maintained." (Author)] Address: Hermans, J.T., Hertestraat 21 6067 ER Linne, The Netherlands. Email: jthermans21@gmail.com

25125. Holzinger, W.E.; Ehmann, H.; Friess, T.; Komposch, B. (2025): Die Libellenfauna (Insecta: Odonata) des Gampermoores (Steiermark, Österreich). Mitteilungen des Naturwissenschaftlichen Vereines fur Steiermark 154: 45-58. (in German, with English summary) ["The dragonfly fauna (Insecta: Odonata) of the Gampermoor (Styria, Austria) - The "Gampermoor", situated in the valley of the Enns River near Liezen (Styria) is - in terms of nature conservation - one of the most valuable peat bogs of the Eastern Alps. The western part of the area is protected as a Natura 2000 site. We present the results of dragonfly surveys from 1991-2024. In total 32 species were recorded, 27 are autochthonous. Of particular importance are large populations of Leucorrhinia pectoralis and Nehalennia speciosa. Restoration measures (bunging of drainage ditches, widening the didges, scrub clearance) in the eastern, already heavily dried out part of the area were implemented in 2021. As early as 2022 to 2024, 14 dragonfly species were recorded flying around the newly created waterbodies." (Authors).] Address: Holzinger, W., ÖKOTEAM-Institut für Tierökologie und Naturraumplanung Bergmanngasse 22, 8010 Graz, Austria. Email: holzinger@oekoteam.at

25126. Holzinger, W.E.; Philipp, K. (2025): Die Schabrackenlibelle Anax ephippiger (Burmeister, 1839) neu für die Steiermark (Österreich) (Insecta: Odonata: Aeshnidae). Entomologica Austriaca 33: 62-67. (in German, with English summary) ["Anax ephippiger new to Styria (Austria). The first record of A. ephippiger from Styria was obtained on 20 April 2025 in Pirka near Graz. This brings the total number of dragonfly species known to occur in Styria to 65, with up to

five further new records expected in the near future." (Authors)] Address: Holzinger, W.E., Ökoteam – Institut für Tierökologie und Naturraumplanung, Bergmanngasse 22, 8010 Graz, Austria. E-Mail: holzinger@oekoteam.at

25127. 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(2), 111806: 15 pp. (in English) [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 Entomology and MOA Key Lab of Pest Monitoring and Green Management College of Plant Protection, China Agricultural University, Beijing, China. Email: fansong@cau.edu.cn

25128. Husnah, N.J.; Supeno, B.; Muthahanas, I. (2025): Identifikasi keberadaan Capung pada ekosistem pertanaman bawang merah di sentra produksi kabupaten Lombuk Timur - Identification of the presence of dragonflies in the onion plant ecosystem in the production center of east Lombok Regency. Agroteksos 35(2): 437-449. (in Indonesian, with English summary) ["Dragonflies play a crucial role in the shallot ecosystem as natural pest predators and bioindicators of environmental quality. The aim of this study was to identify dragonfly species in the shallot ecosystem in East Lombok Regency. The research method usedwas descriptive, and samples were collected using an insect net with a double swing technique in each plot (600 m²). The netted dragonfly samples were placed in labeled containers, then identified in the Laboratory. The results of the study found that there were seven species in the shallot planting ecosystem in the production center of East Lombok Regency, namely five species: Crocothemis servilia, Pantala flavescens, Orthetrum sabina, O. testaceum, Diplacodes trivialis, Agriocnemis femina and Ischnura senegalensis. The dragonfly species diversity index across all study sites was in the moderate category, with values ranging from 1.48 to 1.86. The location with the highest diversity value was Apitaik 1 Village (1.86), while the lowest was Teko Village (1.48). The species with the highest relative abundance was Orthetrum sabina, and the species with the lowest abundance was Diplacodes trivialis." (Authors)] Address: Supeno, B., Program Studi Agroekoteknologi, Jurusan Budidaya Pertanian, Fakultas Pertanian, Universitas Mataram, Mataram, Jalan Pendidikan No 37, Mataram 83125-Lombok NTB, Indonesia. Email: bsupeno59@unram.ac.id

25129. Husnah, N.J.; Supeno, B.; Muthahanas, I. (2025): Keanekaragaman Capung pada Ekosistem Bawang Merah (Allium ascalonicumL.) di Kecamatan Pringgabaya Kabupaten Lombok Timur - Dragonfly diversity in the Shallot (Allium ascalonicum L.) ecosystem in Pringgabaya District, East Lombok Regency. Universitas Kristen Wira Wacana Sumba Fakultas Sains dan Teknologi SATI: Sustainable Agricultural Technology Innovation. 4th Nasional Seminar on Sustainable Agricultural Technology Innovation, 1 Agustus 2025: 813-826. (in Indonesian, with English summary) ["This study aims to determine the diversity, abundance, and dominance of Odonata in the shallot planting ecosystem in Pringgabaya District, East Lombok Regency. The research method used is a descriptive method with field survey techniques through direct observation in several locations. The research locations were determined by purposive sampling based on the largest to smallest shallot land area. The locations are Kerumut Village, Teko Village, Apitaik Village 1, and Apitaik Village 2. Sampling used an insect net with a double swing technique in each plot (600 m²). The netted dragonfly samples were put in containers that had been labeled with the location for further identification in the Laboratory. The results of the study obtained seven dragonfly species, including five species: Crocothemis servilia, Pantala flavescens, Orthetrum sabina, O. testaceum, Diplacodes trivialis, Agriocnemis femina, and Ischnura senegalensis. The diversity index ranged from 1.48-1.86 (medium category), and the dominance index ranged from 0.16-0.23 (low category). The species with the highest abundance was O. sabina." (Authors)] Address: Supeno, B., Program Studi Agroekoteknologi, Jurusan Budidaya Pertanian, Fakultas Pertanian, Universitas Mataram, Mataram, Jalan Pendidikan No 37, Mataram 83125-Lombok NTB, Indonesia. Email: bsupeno59@unram.ac.id

25130. Ilhamdi, M. L.; Al Idrus, A.; Zulkifli, L.; Santoso, D.; Mertha, I.G.; Alhafizin, M. (2025): Diversity of dragonfly in the Segenter waterfall ecotourism area, Lombok Island. Jurnal Biologi Tropis 25(4): 5296-5303. (in Indonesian, with English summary) ["Segenter Waterfall in West Lombok has a unique bio-ecological characteristic, as it provides a habitat for various interesting dragonfly species. This can be utilized as an object for ecotourism and a learning resource. The aim of this research was to analyze the diversity of dragonflies in Segenter Waterfall. The method used in this research was a survey method with an area exploration technique following predetermined transect lines based on observation results: the edge path, the middle path, and the watershed path. The sweeping net method was used to collect dragonflies that could not be identified in the field for further observation in the laboratory. The results showed that the highest species abundance was Orthetrum sabina (0.55) and the lowest was Anax guttatus (0.19). Meanwhile, the highest diversity index was found in the water path (2.96) and the lowest in the middle path (2.74). In conclusion, the diversity of dragonfly species varies across each observation path, with the highest order being the Water Path, followed by the Edge Path, and the lowest being the Middle Path in the Segenter Waterfall area, Lombok Island." (Authors)] Address: Mohammad Liwa Ilhamdi, M.L., Program Studi Pendidikan, Biologi, FKIP Universitas Mataram, Indonesia. Email: liwa_ilhamdi@unram.ac.id

25131. Ilicheva, P.I.; Vasenev, I.I.; Taller, Ye.B. (2025): Ecological evaluation of seasonal dynamics of macrobenthos biodiversity in water ecosystems in the conditions of southwestern administrative Okrug of Moscow. Problems of regional ecology 2/2025: 59-64. (in Russian, with English summary) ["The results of monitoring studies and ecological evaluation of the seasonal dynamics of macrozoobenthos biodiversity in the ponds in the Butovo Forest Park and the South Butovo Landscape Park in the South-Western District of Moscow for five months (May—September) from 2020 to

2024 are presented. The greatest species diversity of the studied macrozoobenthos was revealed in summer, the lowest in spring, in the absence of significant interannual differences in the seasonal dynamics of their taxonomic composition. All the discovered species of macrozoobenthos are typical to ponds in urban ecosystems. Representatives of the following families were the most common and were identified in the samples from all ponds: Notonectidae, Dytiscidae and Hydrachnidae … Enallagma cyathigerum, ... The environmental assessment of the water ecosystems quality based on bioindication indicators of macrozoobenthos revealed statistically significant seasonal dynamics of the total number of species observed in the ponds and the impact of increased water pollution from vehicles, road building and recreational activities on the macrozoobentos biodiversity." (Authors)] Address: Ilicheva, P.I., Post-graduate of Ecology Dept, Russian State Agrarian Univ. — Moscow Timiryazev Agricultural Acad., Moscow, Russia. Email: polinailicheva@yandex.ru

25132. Iqbal, S.; Waseem, M.; Ullah, S.; Arshad, R.; Najaf, D.E.; Akram, A. (2025): A review of heavy metals bioaccumulation in insects for environmental monitoring. The Journal of Basic and Applied Zoology 86, 69: 13 pp. (in English) ["Background: Heavy metal pollution from industrial, mining, and agricultural sources threatens ecosystems and human health. Insects, with their ecological diversity and sensitivity to environmental changes, are promising bioindicators for monitoring such contamination. Methods: A systematic review was conducted using Web of Science, Scopus, and PubMed, searching for peerreviewed studies (2000–2024) on insects as bioindicators of heavy metal pollution. Using the search string "insects AND ('heavy metals' OR 'heavy metals') AND (bioaccumulation OR bioindicators OR biomonitoring)," 50 studies were selected based on their focus on insect taxa, metal bioaccumulation, and ecological or physiological responses. Results: Insect taxa, including Chironomidae, Carabidae, and Apis mellifera, effectively detect metals like lead (Pb), cadmium (Cd), and mercury (Hg) across aquatic, terrestrial, and agricultural ecosystems. Analytical techniques, such as comet assays and atomic absorption spectroscopy, reveal responses like DNA damage, deformities, and population shifts. Insects' abundance, ease of sampling, and sensitivity enhance their biomonitoring utility. Conclusions: Insects are reliable, cost-effective tools for assessing heavy metal pollution. This review highlights research gaps, including underrepresented taxa and regions, and advocates for standardized insect-based monitoring to support sustainable environmental management." (Authors) The review includes a brief chapter on Odonata.] Address: Waseem, M., Department of Zoology, Cholistan University of Veterinary & Animal Sciences, Bahawalpur, Pakistan. Email: 21-cuvas-0009@student.cuvas.edu.pkakistan

25133. Ivanov, A.I.; Ilyin, V.Yu.; Polumordvinov, O.A. (2025): Biodiversity in the ecosystems of the natural reserve Nikonovskiy Bor (Penza Oblast) and the impact of the pyrogenic factor. Biosphere 17(1): 11 pp. (in Russian, with English summary) ["Natural conditions, flora, fauna, and mycobiota of the regional nature reserve (RNR) "Nikonovskiy Bor", which occupies 680 hectares above the flood plain of the river Sura in Penza Oblast are characterized comprehensively. The dry elevated plots there are covered by pine forests of the lichen, lichen-mossy, herbaceous and bilberry types. Swampy areas between dunes feature bog-moss mires. Lowlands on the borders between upper terraces and flood plains are occupied by alder woods. Vascular plants in the RNR are represented by 135 species. A peculiar feature of flora there is the presence of steppe species. Species registered in the Red Book of Penza Oblast include … 21 insects. Among insects, eight species are registered in Red Book of the Russian Federation (2024): Anax imperator, …." (Authors) The list of taxa includes A. imperator and Calopteryx virgo, basing on Kozhanchikov I. V. Methods of studying insect ecology. Moscow: Higher School; 1961.] Address: Ivanov, A.I., Penza State Agrarian University & Penza State University, Penza, Russia. Email: rcgekim@mail.ru

25134. Jasmi, R.A.; Meiliana, U.; Nursyamsul, H.; Asalisa, M.; Oktadiansyah, R.; Farid, A.M.; Yulyatunnikmah, S. (2025): Comparison of insect diversity in Long bean (Vigna sinensis L.) and corn (Zea mays) plantations in Banjarsari Village, Serang City, Banten. Advances in Tropical Biodiversity and Environmental Sciences 9(3): 157-164. (in English) ["This study aims to compare the diversity of insect species and their ecological roles in two types of crops, namely long beans (Vigna sinensis L.) and corn (Zea mays), cultivated in Banjarsari Village, Serang City, Banten. The study was conducted over two days in March 2025, utilizing observation and sampling methods with a single-sweep technique in both the morning and afternoon sessions. The results showed that the long bean plantation had higher insect diversity compared to the corn plantation. In total, 14 insect species were identified, belonging to 11 families and five orders, with ecological functions classified as herbivores, predators, and pollinators. The species Valanga nigricornis was the most dominant herbivore, especially on long bean plants. Meanwhile, species from the Formicidae and Libellulidae [Pantala flavescens, Orthetrum sabina] families acted as natural predators, and the species Apis cerana and Ropalidia marginata functioned as pollinators. Environmental factors, including vegetation type, soil moisture, and food availability, influenced the presence of various insect types. The results of this study underscore the significance of insect diversity as an indicator of agricultural ecosystem stability, as well as a crucial component in the management of sustainable agroecosystems." (Authors)] Address: Jasmi, R.A., Dept Biology, Fac. Science & Technology, Univ. Islam Negeri Sultan Maulana Hasanuddin Banten. Jl. Syech Nawawi Al-Bantani, Curug, Serang, Banten 42171, Indonesia. Email: riski.andrian@uinbanten.ac.id

25135. Jasmi, R.A.; Febryansyah, A.; Musthopa, M.H.; Hanafiah, R.I.; Hikmah, A.N.; Laira, M. (2025): Identifikasi Jenis-Jenis Serangga Berdasarkan Peran Ekologis Di Ekosistem Sawah Desa Juhut Kabupaten Pandeglang. Symbiotic: Journal of Biological Education and Science 6(2): 182-192. (in Indonesian, with English summary) ["Identification of insect types based on ecological roles in the rice field ecosystem of Juhut Village, Pandeglang Regency - Rice fields are ecosystems that are home to various types of insects that play roles as herbivores, predators, pollinators, and decomposers. This study aims to analyze the various types of insects found in the rice fields of Juhut Village, Pandeglang Regency. The research method used is qualitative, with data collection using random sampling. Data analysis was performed using descriptive qualitative analysis. A total of 137 insect individuals were found, consisting of pest insects, pollinating insects, soil insects, and predatory insects. The identified insects came from the order Orthoptera … at 25.55%, Hemiptera… at 43.80%, Lepidoptera … at 9.49%, Odonata (Neurothemis fluctuans, Diplacodes trivialis, Tramea transmarina, Agriocnemis femina, and Orthetrum sabina) at 17.52%, and Coleoptera (Coccinella sp.) at 3.65%. This study shows that rice field ecosystems have a fairly high level of insect species, which play a major role in the balance of rice field ecosystems." (Authors)] Address: Jasmi, R.A., Program Studi Biologi, Fakultas Sains, UIN Sultan Maulana Hasanuddin Banten, Jl. Syech

Nawawi Al Bantani Kp. Andamui, Kel. Sukawana, Kec. Curug, Kota Serang, Banten 42171, Indonesia. Email: riski.andrian@uinbanten.ac.id

25136. Jithin, V.; Naniwadekar, R. (2025): Effects of abiotic and biotic factors on tadpole occurrence and abundance in seasonal rock pools of rock outcrops, northern Western Ghats. Aquatic Ecology 59: 797-803. (in English) ["Freshwater rock pools formed due to erosion and weathering in outcrops are known to act as essential frog breeding habitats. In the northern part of the Western Ghats-Sri Lanka biodiversity hotspot, large freshwater rock pools are shown to be important for adult stage of three species of frogs: Jaladhara Skittering Frog (Euphlyctis jaladhara), Nilphamari Narrow-mouthed Frog (Microhyla nilphamariensis), and Common Indian Treefrog (Polypedates maculatus). Previous studies have thus recommended conservation of existing rock pools and restoration or creation of rock pools for amphibian conservation, in light of reduced rock pool availability due to rapid conversion of outcrops to orchards. To this end, knowledge of tadpole ecology in the rock pools is essential for further research and conservation actions. We assessed the influence of abiotic (pool size, monsoon progression) and biotic (predator abundances) factors on occurrence and abundance of tadpoles of the three species by periodically monitoring the ephemeral freshwater rock pools in lateritic plateaus of the northern Western Ghats. Tadpole occurrences and abundances were negatively associated with monsoon progression, and not associated with predator abundances for all species, while they were positively associated with rock pool size, species-specifically." (Authors) The paper includes references to Odonata.] Address: Jithin, V., Nature Conservation Foundation, 1311, “Amritha”, Vijayanagar 1st Stage, Mysuru, Karnataka, 570017, India

25137. Keetapithchayakul, T.S.; Makbun, N.; Ignatius, K.J.; Lohsomboon, N. (2025): Odonata fauna of Khao Yai National Park and the adjacent regions in Thailand, Part II: updating information and citizen science. Faunistic Studies in SE Asian and Pacific Island Odonata 49: 1-24. (in English) ["Larval and adult odonate surveys were conducted at 11 sites in Khao Yai National Park (KYNP) and adjacent areas during the rainy seasons (May–October) of 2023 and 2024, alongside a citizen science event in September 2023. A total of 106 Odonata species (61 Anisoptera, 45 Zygoptera) were recorded, increasing KYNP’s known odonate fauna from 142 to 147 species. Gomphidia kruegeri, Atratothemis reelsi, Copera chantaburii, Nannophyopsis clara, and Protosticta khaosoidaoensis are new records for KYNP. Epophthalmia vittata, Lestes decipiens, and Aciagrion paludense were updated following recent taxonomic assessments, resulting in A. paludense documented for the first time in Thailand. Larval sampling, supported by the integration of citizen science data, yielded records of over 40 species, including nine for which the larval stage still awaits description. This study established an updated baseline for odonate biodiversity in KYNP, emphasized the importance of larval-stage documentation, and validated the efficacy of combining professional surveys with citizen science. Future research should incorporate molecular barcoding, seasonal resampling, and continued habitat stratified surveys to monitor long-term biodiversity changes in response to climate variability." (Authors)] Address: Keetapithchayakul, T.S., The Center for Entomology & Parasitology Research, College of Medicine and Pharmacy, Duy, Tan University, 120 Hoang Minh Thao, Lien Chieu, Da Nang, Vietnam. Email: Keetapithchayakul.TS@gmail.com

25138. Körner, A. (2025): Biologie und Verbreitung der Vogel-Azurjungfer (Coenagrion ornatum) in der Steiermark (Österreich). MSc thesis, Naturwissenschaftlichen Fakultät der Karl-Franzens-Universität Graz: 77 pp. (in German, with English summary) ["The focus of this thesis lies on a damselfly species that is protected throughout Europe, the Ornate Bluet (Coenagrion ornatum). The Laabach ditch south of Graz is probably home to the largest population of this species in Austria. The aim is to study the population size and ecology of this species: Central questions are mainly the diurnal phenology of the species, the annual phenology, and the population size of the species at the Laabach. The Laabach was therefore investigated by dividing it into a total of 59 homogeneous sections and surveying the dragonfly und damselfly fauna there (together with Christina Rieckh). Further investigations were made along the section with the largest density of C. ornatum: section LB 29, 72 metres long). A total of 24 days were spent here in the field. Mark-release experiments were carried out to determine the migratory behaviour of C. ornatum and to estimate the lifespan of adult individuals. For this purpose, the animals were individually marked on the wing and released. All recaptures were precisely located and recorded. A total of 514 damselflies were marked and 106 recaptured. Daytime activity is highly correlated with the cloud cover (many animals only when the sun is shining), but the time of day also plays a very important role. The animals can only be seen around midday (start around 10-11 a.m., end of flight time between 3 and 4 p.m. CEST). There are always far fewer females than males at the ditch. Most individuals were found in mid to late May, with the last individuals flying until 9 July. The population size was over 1,500 individuals. The lifespan of adult animals is around 5.7 days; the oldest damselfly was recaptured 19 days after marking. The largest documented migration distance was 300 metres." (Author).] Address: https://unipub.uni-graz.at/obvugrhs/download/pdf/11697961

25139. Kroth, N.; Cozzer, G.N.; Lemes da Silva, S.; Rezende, R.; Magro, J.D. (2025): Female oviposition preferences and larval behavior of the Aedes aegypti mosquito (Linnaeus, 1762) exposed to predator cues (Odonata: Libellulidae). Limnetica 44(1): 85-99. (in English, with Portuguese summary) [Brazil; "The reproductive success of mosquitoes is heavily influenced by females' ability to select suitable oviposition sites for the proper development of their offspring. Many of these potential habitats may harbor predators, and the detection of these predators is crucial for assessing the risk of predation, which can, in turn, influence the behavior of the prey. However, there are often trade-offs to consider, which can impact the life history of these organisms. In our study, we investigated the oviposition preferences and larval behavioral responses of the Aedes aegypti mosquito when exposed to cues from predators and the actual presence of predation by Libellulidae larvae. We observed the mosquito's choices regarding oviposition with and without predation cues for a duration of ten weeks, following 48 hours of exposure. Additionally, we measured larval behavior across various treatments, including those with predation cues, predator cues, the presence of larvae, and controls with only water. Our findings revealed that the highest preference for oviposition occurred in containers with high organic matter content, regardless the presence of both predator cues and actual predators. Furthermore, we noted significant changes in larval behavior in response to predation cues, including evasive behaviors. When facing the risk of predation, larvae spent more time near the container's edges and exhibited discrete feeding behaviors or avoidance of the risk of predation. Conversely, in the absence of predation risk, larvae explored the entire container, swimming vigorously. These results highlight the significance of anti-predatory behaviors triggered by the

recognition of predation cues in the context of Ae. aegypti's reproductive success." (Authors)] Address: Cozzer, G.N., Communitarian Univ. of Chapecó Region (Unochapecó), Postgraduate Program in Environmental Sciences - Chapecó, Santa Catarina, Brazil. Email: pinocozzer.ps@unochapeco.edu.br

25140. Kumar, D.; Saxena, K. (2025): Effects of temperature and relative humidity on abundance of dragonfly species in Sikar district, Rajasthan (India). Journal of Entomology and Zoology Studies 13(4): 111-114. (in English) ["The study carried out in Sikar district shows that temperature and relative humidity are the effective controlling factors of abundance of these insects. Their existing numbers increases for specific values of temperature and humidity. Data were collected for November, 2023 to October, 2024 period, from the selected places of Sikar district, where generally dragonflies are found in abundance. Results show that dragonfly specimens are scarce during the March-June months, when temperatures range from 13.8° to 41.9°C and relative humidity levels range from 23 to 53%. Dragonflies are more common in the months of July to October when they find a balance of temperature and relative humidity." (Authors)] Address: Saxena, Kanan, Dept of Zoology, Government Meera Girls College, Udaipur, Rajasthan, India

25141. Lafuente, W.; Moreno, J.L.; Carpio, A.J. (2025): Effect of seasonality and associated environmental drivers on macroinvertebrate assemblages in Neotropical coastal headwater streams. River Research and Applications 41: 1143-1157. (in English) ["Comprehensive research into the environmental factors that affect the spatial and temporal variability of benthic macroinvertebrate communities in the headwater coastal streams of Ecuador is limited. Therefore, a study was carried out in four headwater coastal streams to address this gap. This study lasted for 2 years and included two surveys in summer and two in winter. The spatial and temporal variation of community metrics (abundance, richness, and diversity), functional feeding groups, and environmental factors were analyzed. A total of 47 genera from 33 families and 12 orders were collected, 29 of which were new records for the studied region. 79% of the total number of macroinvertebrates collected belonged to three orders of insects: hemipterans, ephemeropterans and coleopterans. The most abundant non-insect was the amphipod Hyalella. In seasonal terms, the populations of odonates, hemipterans, and coleopterans decreased in winter, whereas those of amphipods, trichopterans, ephemeropterans, and dipterans increased. The dominant functional feeding group consisted of predators, with the heteropterans Rhagovelia and Husseyella being the most abundant genera across all streams. Populations of predators and scrapers decreased in winter, whereas those of shredders and collectors increased. The results showed significant differences among the macroinvertebrate metrics obtained for each stream and season. The abiotic PCA ordination and biotic NMDS ordination of macroinvertebrate assemblages were consistent. The BEST routine inferred that the environmental variables that best explained assemblage patterns were phosphate concentration and stream width, although dissolved oxygen, water temperature, and current velocity were also important explanatory variables. In conclusion, seasons had a major influence on the macroinvertebrate assemblages of neotropical coastal headwater streams. During summer (the dry season), environmental stability supported higher richness and diversity, whereas in winter (the rainy season), hydrologic perturbation disrupted and altered the structure and composition of the macroinvertebrate community." (Authors) The study includes data on Odonata at order level.] Address: Moreno, J.L., Depto de Producción Vegetal y Tecnología Agraria, Universidad de Castilla-La Mancha, Albacete, Spain. Email: joseluis.moreno@uclm.es

25142. Lee, S.-H.; Chi, W.-J.; Ahn, N.-H.; Yoon, K.A.; Kim, J.H. (2025): Discovery and characterization of novel polyacrylic urethane-degrading bacteria from intestine of the red-veined darter (Sympetrum fonscolombii). Science of The Total Environment 1005, 180847: 12 pp. (in English) ["Plastic waste accumulation poses significant environmental and socioeconomic challenges due to the inherent resistance of plastics to degradation. Among plastics, polyurethane (PU) is widely used but particularly recalcitrant. In this study, we identified and characterized two bacterial strains, Serratia sp. IBT73 and Pseudomonas sp. IBT82 from the intestine of S. fonscolombii), with the potential to degrade polyacrylic-urethane (PAU). Extracellular esterase, urease, and protease activities involved in PU degradation were detected and purified esterases from both strains exhibited PAU-degrading capabilities. The biodegradation of PU materials was comprehensively confirmed through scanning electron microscopy, Fourier-transform infrared spectroscopy, and chemical analysis of degradation products. Quantitative analysis showed that the strains degraded the PU foams, with up to 10.05 % degradation of PS-PU by IBT73 and 6.81 % by IBT82, while PE-PU degradation reached 3.23 % and 4.33 %, respectively. The purified esterases showed even higher activity, achieving 89.76 % (from IBT73) and 73.21 % (from IBT82) degradation of a PAU suspension within 48 h. Transcriptome analysis revealed distinct transcriptional responses: IBT73 strain enhanced small molecule metabolic pathways, while IBT82 strain activated stress response pathways under PAU exposure. Structural analysis and metabolite identification suggested cleavage of urethane, ester, and aromatic structures, supporting active microbial degradation. These findings highlight the broad degradation potential of insect gut microbes IBT73 and IBT82 across chemically diverse PU materials, suggesting their applicability for sustainable PU waste management." (Authors)] Address: Kim, J.H., Dept of Biotechnology, Pukyong National University, Busan, 48513, Republic of Korea. Email: kjh1018@pknu.ac.kr

25143. Lehká, Z.; Janto, A.; Svitok, M.; Novikmec, M. (2025): Morphometric analysis of exuviae suggests sexual dimorphism and induced morphological plasticity in pond-dwelling dragonflies. Limnology 26: 283-291. (in English) ["The study of dragonfly exuviae is an effective tool that provides noninvasive insight into many aspects of their population biology or interspecific interactions with their predators or prey. Here, we analysed morphometric parameters of the exuviae of five dominant dragonfly species in three central European ponds characterized by different fish populations and generated a robust set of morphometric data. We hypothesized that sexual dimorphism may occur at least in some taxa, and we assumed that the presence of fish may induce phenotypic plasticity – differences in some morphological parameters (e.g., larger abdominal spines in Anisoptera). Except for one, all of the studied species showed significant sexual size dimorphism that was species-specific. In Aeshna cyanea, Pyrrhosoma nymphula and Coenagrion cf. puella female exuviae were generally larger than male exuviae, whereas the exuviae were larger for males than for females in Sympetrum cf. vulgatum. We suppose that sexual selection but also other selection mechanisms, such as phenotypic adaptation to different microhabitats, underlie the observed patterns. The morphometric characteristics of the dragonfly nymphal populations also differed geographically, most likely as a trade-off between induced defence against fish predation and predation by other invertebrates, and adaptations for fish fry

capture. Sexual dimorphism and between-site variability can have important ecological consequences for dragonfly nymphs in freshwater food webs. However, both may arise from a complicated tangle of factors that need further study." (Authors)] Address: Janto, A. Faculty of Ecology & Environmental Sciences, Technical University in Zvolen, T. G. Masaryka 24, 960 01 Zvolen, Slovakia. Email: adamjanto@gmail.com

25144. Leiza, L.P.; Conesa García, M.A.; López de Uralde, X.V.; Aguinagalde, M.E. (2025): Nuevas localizaciones de Gomphus vulgatissimus (Linnaeus, 1758) y Gomphus simillimus Selys, 1840 (Odonata: Gomphidae) en el País Vasco y Navarra. - New locations of Gomphus vulgatissimus and Gomphus simillimus in the Basque Country and Navarre. Munibe, Cienc. nat. 73: 7 pp. (in Spanish, with English and Basque summaries) ["New records are reported for G. vulgatissimus and G. simillimus. Their larvae were identified in river samplings carried out in the Autonomous Community of the Basque Country (provinces of Gipuzkoa and Alava) and in the Foral Community of Navarre between 2018 and 2025, thus expanding the distribution area of both species known in these territories." (Authors)] Address: Leiza, L.P., EKOLUR. Asesoría ambiental S.L.L. Camino de Astigarraga 2, Pl. 4ª dcha.-Of. 8. 20180 Oiartzun, Spain. Email: leire@ekolur.com

25145. Lévêque, A.; Arnaud, J.-F.; Vignon, V.; Mazoyer, C.; Godé, C.; Duputié, A. (2025): Development of a panel of SNP loci in the emblematic southern damselfly (Coenagrion mercuriale) using a hybrid method: pitfalls and recommendations for large-scale SNP genotyping in a non-model endangered species. Journal of Heredity 116(3): 255-271. (in English) ["Genomic markers are essential tools for studying species of conservation concern, yet non-model species often lack a reference genome. Here we describe a methodology for identifying and genotyping thousands of SNP loci in C. mercuriale, a bioindicator of freshwater stream quality classified as near-threatened, with locally declining populations. We used a hybrid approach combining reduced representation sequencing and target enrichment. First, we identified putative SNP loci using ddRADseq and de novo assembly. Then, single primer enrichment technology targeted 6,000 of these SNPs across 1,920 individuals. Challenges encountered included sequence recapture failure, coverage depth discrepancies, and aberrant FIS values. We provide recommendations to address such issues. After multiple filtering steps, 2,092 SNPs were retained and used to analyse the genetic structure of 131 individuals belonging to 11 populations in France, comparing central and marginal populations. Genetic differentiation was lower among central populations, with no sign of inbreeding. As compared to microsatellite loci, SNPs exhibited greater resolution in detecting fine-scaled genetic structure, identifying putative hybrids in adjacent populations. In this study, we emphasise the difficulties of large-scale SNP genotyping in non-model species via a hybrid method that ultimately did not offer the expected cost and time saving compared to classical ddRAD approaches. However, SNPs showed greater power than previously available markers in identifying conservation units or admixture events, and the panel of reusable probes we describe here offers the potential to improve conservation efforts through future diachronic studies or finer estimations of key parameters like effective population size." (Authors)] Address: Arnaud, J.-F., Univ. Lille, CNRS, UMR 8198 – Evo-Eco-Paleo, Lille 59000, France. Email: jean-francois.arnaud@-univ-lille.fr

25146. Li, B.W.; Du, S.W.; Wang, H.L.; Jiang, C.; Zhang, X.-K.; Liu, K. (2025): Community structure of macrozoobenthos in two typical habitats of Caizi Lake during the early period of the "10-Year Fishing Ban". Acta Hydrobiologica Sinica 49(8): 082517: 12 pp. + Appendix 1 (in Chinese, with English summary) ["In order to understand the community structure of macrozoobenthos in Caizi Lake during the early period of the "10-year fishing ban", seasonal investigations of two typical habitats (littoral area and offshore area) were conducted during 2022—2024. The results showed that a total of 83 macrozoobenthos species were collected, belonging to 3 phyla, 7 classes, 17 orders, and 32 families. Among these, Novaculina chinensis and Lamprotula leai were the first recorded national second-class protected species in Caizi Lake. The average density and biomass of macrozoobenthos in the whole survey area were 208 ind./m² and 75.8 g/m², respectively, revealing obvious spatial distribution differences. Biomass was obviously higher in the western lake area and the Changhe River. In terms of species number and predominance, 66 macrozoobenthos species were collected in the littoral area, where Micronectra sp. and Cricotopus sp. were the predominant taxa; 44 species were collected in the offshore area, where the Microchironomus sp. and Tanypus sp. were the predominant taxa. Decapoda (shrimp) contributed the highest proportion of the average biomass in the offshore area, whereas, the relative abundance of different functional feeding groups varied greatly. In contrast, Mollusca contributed the highest proportion to the littoral average biomass, and the relative abundance of different functional feeding groups was comparatively constant. As to the statistical analysis, the results of the Two-way ANOVA showed that none of habitat, season, and the interactions of the two significantly affected the biomass of macrozoobenthos in Caizi Lake. Analyses of similarity showed that the macrozoobenthos communities in two typical habitats differed significantly. Although the macrozoobenthos communities in different seasons had a certain overlap, significant differences were revealed. Vegetation coverage, substrate type, and water temperature were the main influencing factors resulting in the differences of macrozoobenthos communities in two typical habitats among different seasons. Comparing with the historical data before the "10-year fishing ban" policy implemented, the species number and standing crop of macrozoobenthos in this study increased obviously. However, the predominant taxa in the offshore area had changed from the coexistence of chironomidae larvae, oligochaeta, and mollusca to chironomidae larvae. Future studies should focus on continuous monitoring to provide a scientific basis for the restoration of macrozoobenthos resources and ecological evaluation of the "10-year fishing ban" policy." (Authors) The following odonate taxa are listed: Coenagrionidae, Ischnura sp., Cercion sp., Gomphidae sp.] Address: Li, B.W., Engineering Technology Research Center for Aquatic Organism Conservation and Water Ecosystem Restoration in University of Anhui Province, College of Life Science, Anqing Normal University, Anqing 246133, China

25147. Li, G.; Zi, D.-D.; & Yang, G.-H. (2025): Description of the final instar larvae of Anisopleura yunnanensis. International Journal of Odonatology 28: 124-131. (in English) ["The larva of Anisopleura yunnanensis Zhu & Zhou, 1999 was identified by DNA barcode matching with the adult, and the morphology of the final instar larva is described and illustrated in color. Differences among known larvae of this genus is discussed, and a comparative table is provided." (Authors)] Address: Guo-Hui, G.-H., College of Agriculture & Life Sciences, Dali Univ., Yunnan 671003, China. Email: yanggh727@sina.com

25148. Li, H.; Wu, Y.; Tu, H.; Chen, M.; Zhou, S.; Wu, L. (2025): Dragonfly-inspired transparent superhydrophobic coatings with low haze and high mechanical robustness.

ACS Applied Materials & Interfaces 16(50): 70138-70145. (in English) ["Transparent superhydrophobic coatings hold significant potential for applications such as windows and reflectors. However, issues such as fragility and high haze have limited their practicality. Drawing inspiration from dragonfly structures, we developed a transparent superhydrophobic coating by etching the polystyrene microsphere array semi-embedded on a silicon oxide matrix and subsequently depositing the methyltrichlorosilane-derived nanofilaments. The resulting coating features silicon oxide craters and nanofilaments inspired by dragonfly wings. Due to the coating's small, multiscale nanostructures, it has a high average visible light transmittance of 90.4% and a low average haze of 4.0%, comparable to the substrate glass. It also exhibits exceptional superhydrophobic properties, with a contact angle of 161.5° and a sliding angle of 1.5°. Notably, the coating retains its superhydrophobicity even after withstanding impacts from 5 kg of water and 500 g of sand, thanks to its robust wing vein-inspired protected structure. Additionally, it shows strong resistance to acids, alkalis, and temperatures up to 400 °C. The coating maintains a high transmittance and low haze after 67 days of UV irradiation or 300 days of outdoor exposure. The combination of low haze and robustness in this transparent superhydrophobic coating highlights its promising potential for applications in related fields." (Authors)] Address: Wu, L., Dept of Materials Science & State Key Laboratory of Molecular Engineering of Polymers, Advanced Coatings Research Center of Ministry of Education of China, Fudan University, Shanghai 200438, China. Email: lmw@fudan.edu.cn

25149. 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, 123152: (in English) ["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 of Water Conservancy & Transportation, Zhengzhou University, Zhengzhou 450001, China. Email: sunbin@zzu.edu.cn

25150. Liberal, M.E.C; Pinto Leao, C.; Silva de Oliveira, J.; Valente-Neto, F.; Godoy, B.S. (2025): Environmental impacts shape the density-size relationship of benthic macroinvertebrates in Amazonian streams (Serra dos Carajás, Pará, Brazil). Acta Limnologica Brasiliensia 37, e18: 12 pp. (in English, with Portuguese summary) ["Aim: Streams are small lotic ecosystems essential for aquatic biodiversity and nutrient cycling. However, they are highly susceptible to anthropogenic pressures, such as the replacement of native vegetation by plantations, which can affect aquatic communities—especially benthic macroinvertebrates, due to their sensitivity to environmental changes. While most studies rely on taxonomic metrics, there is growing evidence that changes in riparian vegetation can alter size-density relationships. We hypothesized that impacted streams would exhibit shifts in macroinvertebrate size-density patterns reflecting environmental degradation. Methods: We sampled 15 Amazonian streams in the Serra dos Carajas region, southeastern Para State, Brazil, an area influenced by agriculture, livestock, and mining. Sampling occurred during the dry season across two campaigns. Macroinvertebrates were collected using a kick-net, and physical-chemical variables were measured with a multiparameter probe and turbidimeter. Environmental variables were analyzed using principal component analysis, and size-density relationships were evaluated with a second-order polynomial model. Results: Agricultural impact altered size-density relationships. Impacted sites showed reduced macroinvertebrate density across all size classes and a concentration of individuals in intermediate sizes. These changes suggest a simplification of trophic networks and decreased energy transfer efficiency. Conclusions: Anthropogenic impacts significantly alter aquatic communities in Amazonian streams. The study demonstrates that agricultural activity reduces macroinvertebrate density in all size classes, signaling a widespread collapse of trophic networks. These findings highlight the vulnerability of Amazonian streams to human disturbances and underscore the importance of monitoring size-density relationships as indicators of ecosystem integrity." (Authors) All odonatological data are documented in the Supplemental Material] Address: Liberal, Maria, Instituto de Ciencias Biologicas, Universidade Federal do Para ¡V UFPA, Rua Augusto Correa, 01, Campus Universitario do Guama, CEP 66075-110, Belem, PA, Brasil. Email: maria.liberal@icb.ufpa.br

25151. Liu, Z.; Han, B.-P.; Soininen, J. (2025): Tropical niche conservatism and dispersal limitation jointly determine taxonomic and phylogenetic beta-diversities of Odonata in eastern China. Global Ecology and Biogeography, 2025; 34:e70018: 15 pp, Suppl. (in English) ["Aim: Tropical niche conservatism (TNC) and dispersal limitation (DL) are major ecological and evolutionary mechanisms in shaping taxonomic and phylogenetic beta-diversities. While these mechanisms have been studied in plants and vertebrates, their roles in freshwater taxa remain unclear. We leveraged Odonata species distribution and phylogenetic data to map geographical patterns of taxonomic and phylogenetic beta-diversities, and to determine whether Odonata beta-diversity is primarily shaped by TNC or DL and whether temperature seasonality is a key driver determining TNC. Location: Eastern China. Time Period: Present. Major Taxa Studied: Odonata. Methods: A moving window containing nine grids of 50 x 50 km was employed to quantify taxonomic and phylogenetic beta-diversities, including their turnover and nestedness components. A null model was utilised to calculate randomly expected phylogenetic beta-diversity based on observed taxonomic beta-diversity and site-specific regional species pools. The generalised dissimilarity model was used to assess the roles of climatic and geographic distances shaping beta-diversity and to identify the key climatic factors. Results: Taxonomic total beta-diversity and its turnover component were generally higher than phylogenetic beta-diversity in most Odonata communities, with phylogenetic beta-diversity being relatively higher mainly in tropical regions. Current climatic factors independently explained slightly more

of the variation in total beta-diversity than geographic distance alone, while geographic distance independently explained slightly greater proportions of deviance in turnover components. However, their joint effects accounted for an even larger part of the variation in beta-diversity. The key climatic predictors were temperature seasonality. Main Conclusions: Current climatic factors, particularly temperature seasonality, largely shape taxonomic and phylogenetic beta-diversities of Odonata communities. Spatial turnover along the climatic gradient tends to involve phylogenetically related taxa, resulting in overall higher taxonomic than phylogenetic beta-diversity, supporting the TNC. The joint effects of climatic and geographic distances highlight the roles of climate, interacting with topographic complexity, shaping taxonomic and phylogenetic beta-diversities of Odonata in eastern China." (Authors)] Address: Han, B.-P., Dept of Ecology, Jinan University, Guangzhou, China.E mail: tbphan@126.com

25152. Liu, Z.Y.; Ji, X.; Sui, G.H.; Yang, D. Li, X.K. (2025): Invertebrate diversity in buffalo grass and weedy lawns at Beijing Capital International Airport. Biodiversity Science 33, 24456. doi: 10.17520/biods.2024456; cstr: 32101.14.biods.-2024456: 13 pp. (in Chinese, with English summary) ["Aims: Lawns in airport environments play an important role in visual navigation, noise reduction, and soil erosion prevention. However, they can also provide shelter and foraging opportunities for birds, thereby increasing the risk of bird strikes. Selecting appropriate turf species is essential for effective bird strike prevention. This study aims to evaluate the effects of Buchloe dactyloides (buffalo grass) lawns on invertebrate diversity and abundance, exploring its potential to reduce bird foraging opportunities and lower bird strike risks. Methods: From April to October 2023, we surveyed invertebrate diversity on six lawns at Beijing Capital International Airport (three weedy lawns and three buffalo grass lawns) using sweep netting and trapping methods. Specimens were identified to species level using taxonomic monographs. T-tests were used to assess the significance of differences in individual counts, family-level diversity, and species-level diversity between the two lawn types. The á diversity was evaluated using the Simpson dominance index, Shannon-Wiener diversity index, Pielou evenness index, and Margalef richness index. The Bray-Curtis distance was applied to assess invertebrate community similarity across different months and lawns types. Results: A total of 4,395 invertebrate individuals were collected, belonging to six classes, 15 orders, 75 families, 101 genera, and 146 species. Among them, Diptera and Hemiptera exhibited the highest species richness and individual abundance, respectively. The shared dominant species between both lawn types included Geocoris pallidipennis, Psammotettix alienus, Nysius sp.1, and Trigonotylus caelestialium. In buffalo grass lawns, species diversity peaked in August, with two peaks in individual numbers observed in May and August. In weedy lawns, species diversity peaked in June and August, while individual abundance was highest in June. Although weedy lawns exhibited generally higher species diversity, individual abundance, and Margalef richness index compared to buffalo grass lawns, the differences were not statistically significant. This may be due to the sampling sites and the clustered distribution of collected samples. The Bray-Curtis similarity analysis showed that species composition similarity across all month-lawn combinations ranged from moderate to extreme dissimilarity. Unweighted pair group method with arithmetic mean (UPGMA) clustering, based on Bray-Curtis distances, grouped samples from April to July into one cluster and samples from August to October into another. However, there was no clear grouping based on lawn type, indicating that temporal variation had a greater influence on community composition than lawn type. Conclusion: This study suggests that buffalo grass lawns in airport environments may help reduce invertebrate abundance, thereby potentially decreasing bird foraging opportunities. However, due to limited sampling sites and range, the results were not statistically significant. Future studies should expand the sampling area and increase replicates to obtain more reliable results. Long-term monitoring and multi-year studies at airports in different regions would further clarify the effect of buffalo grass on invertebrate control, providing scientific evidence for bird strike prevention strategies." (Authors) Two odonate specimens without further details are listed.] Address: Liu, Z., College of Plant Protection, China Agricultural University, Beijing 100193, China

25153. Lu, Q.; Duan, L.; Liu, Y.; Zhang, C.; Zhang, Z.; Luo, Z.; Li, C.-H.; Luo, Y. (2025): Dragonfly wing-inspired reticular hierarchical structure enables strong and tough supramolecular elastomers. Advanced Functional Materials 35(36), 2506282: (in English) ["Dragonfly wings possess exceptionally high strength, toughness, and fatigue resistance due to their unique hierarchical structure from the micro to macro scale. Inspired by this, mismatched supramolecular interactions (MMSIs) are introduced into the dynamic acylsemicarbazide groups, constructing an interconnected hybrid network of soft and hard segments in the SPUU-DS elastomer. This design, featuring a dense array of hydrogen bonds, achieves exceptional mechanical properties: a true stress at breaks of 1.1 GPa comparable to that of typical spider silk (0.8–1.5 GPa); toughness of 325.54 MJ m^{-3}, twice that of typical spider silk (˜160 MJ m^{-3}); and a fracture energy of 232.83 kJ m^{-2}, surpassing many metals and alloys. Furthermore, a monitoring device with a “hamburger” structure is developed by integrating SPUU-DS with a conductive graphene film. When placed inside a tire, this device enhances the tire's puncture resistance by approximately twofold. By correlating the resistance signals with puncture angles, the system enables the detection of damage at various locations on the tire, allowing for timely repair of damage and preventing traffic accidents. This novel biomimetic approach, inspired by dragonfly wings, provides valuable insights for designing healable elastomers with superior mechanical properties." (Authors)] Address: Luo, Y., College of Science, Nanjing Forestry University, Nanjing, 210037 P. R. China. Email: luoyanlong@njfu.edu.cn

25154. Mahesh, R.; Gopinath, R.; Joshi, G.; Upadhaya, R. (2025): First record of the Coeliccia svihleri Asahina, 1970 (Odonata: Platycnemididae) in Arunachal Pradesh, India. Journal of Threatened Taxa 17(8): 27363-27370. (in English) ["This communication reports the first confirmed sighting of C. svihleri in Arunachal Pradesh, India, based on photographic evidence collected in the presence of forest personnel at Deban in the Namdapha Tiger Reserve during October 2024. Environmental conditions in the region that may support the presence of this species are discussed, with an emphasis on the potential impact of climate change on species distribution and habitat stability. The discovery of C. svihleri adds a significant new record to the biodiversity of the region, outlining the further need for continuous monitoring and habitat conservation for sustaining in-situ biodiversity." (Authors)] Address: Mahesh, R., Kattiparambu Madam, Thekumbhagam, Tripunithura, Ernakulam, Kerala 682301, India. Email: maheshgreen96@gmail.com

25155. 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., Doctoral Program in Quantitative and Terrestrial Ecology, Pál Juhász-Nagy Doctoral School of Biology and Environmental Sciences, Faculty of Science and Technology, University of Debrecen, Debrecen 4032, Hungary. Email: rjmaliao@mailbox.unideb.hu

25156. Mandal, A.H.; Sadhu, A.; Ghosh, S.; Saha, N.C.; Mossotto, C.; Pastorino, P.; Saha, S.; Faggio, C. (2025): Evaluating the impact of neonicotinoids on aquatic non-target species: A comprehensive review. Environmental Toxicology and Pharmacology 113, 104606: 15 pp. (in English) ["Neonicotinoid insecticides (NNIs) are the fastest-growing class in agricultural protection. They target nicotinic acetylcholine receptors (nAChR) in pests, stimulating the nervous system at low doses and causing paralysis and death at higher concentrations. NNIs are used in crop protection, seed treatment, forestry, agriculture, and flea control in domestic cattle. Effective at lower concentrations and offering long-term control, NNIs are favoured for their systemic activity. However, due to their water solubility, mobility, and moderate persistence, NNIs easily contaminate adjacent aquatic environments via runoff, leaching, or spray drift. While less toxic to vertebrates, their widespread use poses threats to aquatic and terrestrial organisms, causing neurotoxicity, nephrotoxicity, cytotoxicity, genotoxicity, immunotoxicity, hepatotoxicity, endocrine disruption, and reproductive malformations. This review synthesizes research to address knowledge gaps on the environmental impact of NNIs and proposes policies to mitigate their harmful effects on aquatic non-target species." (Authors) The study includes references to Odonata.] Address: Shubhajit Saha, S., Fishery & Ecotoxicology Research Lab., Dept of Zoology, Univ.f Burdwan, Burdwan, India. Email: s.saha.bgc.wbsu@gmail.com

25157. Márquez-Rodríguez, J. (2025): Sobre la población de Lestes macrostigma (Eversmann, 1836) (Odonata: Lestidae) en la ciudad de Sevilla, sur de España. Arquivos Entomoloxicos 32: 405-406. (in Spanish, with English summary) ["On the population of Lestes macrostigma from the city of Seville, Southern Spain - A high count of L. macrostigma in an artificial wetland integrated into a shopping center is presented. The absence of ruminants has favoured the definitive establishment of a significant population. This is an exceptional case in the human/odonate interaction of a sustainable relationship for biodiversity." (Author)] Address: Márquez-Rodríguez, J., Lab. de Zoología. Facultad de Ciencias Experimentales. Universidad Pablo de Olavide. A-376, Km 1. E-41013 Sevilla, Spain. Email: jmarrod1@admon.upo.es

25158. Martín, A.R.; Márquez, F.J.; López Montoya, A.J.; Rus, J.D.G. (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) ["Biometric characterization of Cordulegaster boltonii larvae in Sierra Nevada (Southeast of Iberian Peninsula). – 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: Rus, D.G., Depto de Biología Animal, Biología Vegetal y Ecología, Universidad de Jaén. Campus Las Lagunillas, 23071 - Jaén, Spain. Email: dgilbert@ujaen.es

25159. 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: 14 pp. (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)] Address: Mayer-Goyenechea, Irene Goyenechea, Centro de Investigaciones Biológicas (CIB), Univ. Autón. del Estado de Hidalgo, Mineral de la Reforma, Hidalgo, Mexico. Email: ireneg@uaeh.edu.mx

25160. Maynou, X.; Martín, R.; Norling, U.; Múrria, C. (2025): Water temperature drives local variability in the life cycle of Onychogomphus forcipatus (Odonata: Gomphidae) in a Mediterranean river. Limnetica 44(2): 333-344. (in English, with Spanish summary) ["Water temperature drives local variability in the life cycle of O. forcipatus in a Mediterranean river. Geographic variation in life history traits of dragonflies has been extensively studied, mainly along latitudinal clines, but life history variation at a local scale has received less attention. We describe the life cycle differences between two populations of O. forcipatus unguiculatus located in close proximity in a small Mediterranean river basin in the northeast of the Iberian Peninsula. While the larval growth pattern recorded in the middle course of the river showed an exclusively univoltine pattern, the one found in one of its tributaries revealed a mixed pattern of uni- and semivoltinism. The difference in water temperature between these sites, especially during the cold months, is probably the environmental factor underlying the differences in voltinism. Given the spatial proximity between the two populations, 7.5 km apart on a straight line, our finding suggests phenotypic plasticity of this taxon as the mechanism of adjustment of its life cycle to small variations in water temperature. Overall, our results may help to understand how this species can respond to variations in water temperature under climate change or other human-mediated impacts." (Authors)] Address: Maynou, X., Dept of Evolutionary Biology, Ecology & Environmental Sciences. Univ. Barcelona. Avda. Diagonal 643, 08028 Barcelona, Catalonia, Spain. Email: xavier.maynou@gmail.com

25161. Mendoza-Penagos, C.C.; Koroiva, R.; Juen, L.; Vilela, D. (2025): A new genus of Coenagrionidae from a Brazilian Amazon protected area. Breaking the mold: a new genus of Coenagrionidae (Odonata: Zygoptera) from a Brazilian Amazon protected area, with preliminary phylogenetic insights: 83-100. (in English) ["A new genus and species of Coenagrionidae is described from a remote and protected area in the Brazilian Amazon. Kuiagrion hamadae gen. n. et sp. n., displays a unique combination of morphological features, including a caudally projected pronotum in both sexes, fused ventrobasal and dorsal branches of the cerci, a genital ligula with distinctive lateral lobes, and reduced paraprocts. Diagnostic features, illustrations of both sexes, and molecular data based on COI sequences are provided. Phylogenetic analyses using Maximum Likelihood and Bayesian Inference place this new taxon within the core Coenagrionidae, although its morphological traits suggest affinities with the 'ridged frons' clade. This incongruence between molecular and morphological data raises new questions regarding character interpretation and phylogenetic signal within the family. This discovery highlights the importance of systematic surveys in understudied Amazonian ecosystems. Moreover, it underscores the relevance of longterm research and monitoring programs, such as ICMBio's Monitora Aquático, in advancing biodiversity knowledge and reducing existing knowledge gaps." (Authors)] Address: Mendoza-Penagos, C.C., Associate Researcher (Collaborating), Laboratorio de Ecología e Conservação – LABECO, Universidade Federal do Pará (UFPA), Instituto de Ciências Biológicas, Rua Augusto Correia, No. 1 Bairro Guamá, CEP 66.075–110 Belém, Pará, Brazil. Email: ccamilomendozap@gmail.com

25162. Mercan, D.; Saber, A.A.; Solak, C.N.; Özel, G.; Alharbi, H.M.; Abu-Elsaoud, A.M.; Arslan, N. (2025): Environmental drivers of benthic macroinvertebrate assemblages in Mediterranean river basins of Türkiye. Diversity 2025, 17, 624. https://doi.org/10.3390/d17090624: 18 pp. (in English) ["This study investigated the influence of physicochemical water parameters on benthic macroinvertebrate communities across 11 sampling stations located in the Western, Antalya, and Eastern Mediterranean Basins of Türkiye. Field studies were conducted in April, July, and October of 2018–2019. Water quality variables, such as temperature, pH, electrical conductivity, salinity, dissolved oxygen (DO), biological oxygen demand, ammonia nitrogen, total nitrogen, and total phosphorus, were measured. A total of 177 taxa and 5331 individuals were identified, with Insecta being the most dominant class, especially the order Diptera. … This study emphasizes the importance of specific macroinvertebrate taxa as indicators of environmental conditions and suggests that certain species may serve as bioindicators for ecological monitoring and management in Mediterranean freshwater ecosystems in the context of ongoing global climate change." (Authors) The list of odonate taxa in Supplemental Material includes Platycnemis pennipes, Orthetrum cancellatum, Crocothemis erythraea, Ischnura sp., Ischnura elegans, Epallage fatime, Gomphus sp., Calopteryx sp. and C. virgo] Address: Mercan, D., Dept of Biology, Faculty of Science, Eski¸sehir Osmangazi Univ., 26040 Eski¸sehir, Türkiye. Email: dkara@ogu.edu.tr

25163. Mir, A.H.; Khan, S.; Bashir, B.; Hussain, M.; Dar, T.A. (2025): Sympetrum orientale (Selys, 1883) (Odonata: Libellulidae): a new addition to the Odonata fauna of Kashmir Himalaya, India. Journal of Threatened Taxa 17(8): 27396-27399. (in English) ["Odonata ... serve as indicators of ecosystem health and their population declines are often considered an indication of pollution or environmental degradation. The present study focuses on S. orientale, a new addition to the Odonata fauna of Kashmir Himalaya, India. It has been recorded from the Boniyar and Uri Regions of Baramulla District." (Authors) Material examined: 4 ♀♀, 2 ♂♂, 34.081 0N, 74.072 0E, Boniyar, Baramulla, UT of Jammu & Kashmir, India, 1,577 m, 24.vii.2023, collected by Sahiba Khan. 2 ♀♀, 2 ♂♂, 34.088 0N, 75.034 0E, Uri, Baramulla, UT of Jammu & Kashmir, India, 1,721 m, 16.ix.2023, collected by Sahiba Khan and Beenish Bashir.] Address: Mir, A.H., Entomology Research Laboratory, Dept of Zoology, University of Kashmir, Jammu & Kashmir 190006, India

25164. Monferran, M.D.; Penalver, E.; Nel, A. (2025): New damselflies (†Mesostictinae and Platycnemidinae) from Cretaceous Burmese amber. Palaeoentomology 8(5): 502-511. (in English) ["Zygoptera are very diverse in extant ecosystems and contain more than 20 fossil species into eleven families in Burmese amber. Here we describe two fossil damselflies from the Cenomanian Burmese amber that we attributed to the families Platystictidae and Platycnemididae. The research focused on specimens housed at the Geominer Museum of the Instituto Geológico y Minero de España, Consejo Superior de Investigaciones Científicas (IGME, CSIC) in Madrid. The results of the study identified two new taxa, Mesosticta garciavallsi sp. nov. and an undetermined Platycnemididae species, or new morphotype, which have been studied based on their fore- and hind wing venations, being the wings the only parts preserved. These new specimens represent the fifth species described of the extinct genus Mesosticta Huang, Azar, Cai & Nel, 2015 and the putative oldest fossil record of Platycnemidinae.

Our findings increase the known diversity of damselflies during the mid-Cretaceous." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, 75005 Paris, France. E-mail: anel@mnhn.fr, A.

25165. Mrowiñski, P.; Kozlowska, A.; Sobolak, K.; Rusiniak, O.; Miesza³a, A.; Bañkowska, A.; Krakowiak, M.; Szlauer-Lukaszewska, A.; Stepieñ-Zawal, E.; Asif, M.; Zawal, A. (2025): Habitat selectivity of odonata (Odonata) faunas in the Barlinecko-Gorzowski Landscape Park. In: Pešic, V. (Ed.), Book of Abstracts, 10th International Symposium of Ecologists of Montenegro, 13-14 October 2025, Budva, Montenegro. Ecologica Montenegrina 90: 154. (in English) [Verbatim: Between 1999 and 2004, research was conducted on the occurrence of Odonata in the Barlinek-Gorzów Landscape Park (B-GPK) and its protection zone. The monitoring covered 65 sites representing various types of water bodies and terrestrial environments. A total of 37,065 specimens (imagines, larvae, and exuviae) were collected, representing all nine families and 48 species of Odonata found in Poland. All were considered autochthonous. Three eudominants were distinguished in the dominance structure: Platycnemis pennipes, Enallagma cyathigerum, and Ischnura elegans, as well as two dominants – Coenagrion puella and Sympetrum sanguineum. A high amount of samples was recorded in lakes and fens, while species associated with acidic and flowing waters comprised a smaller amount, which was due to the limited area of suitable habitats. Analysis of larvae (3,332 individuals, including 3,094 identified to species) confirmed the dominance of I. elegans. The high diversity of the B-GPK Odonata fauna is documented by the PIE = 0.885 and H' = 2.605 indices. The results indicate that this area is characterized by a high diversity of dragonfly species, which emphasizes its importance as a biodiversity conservation site on a national scale.] Address: Zawal, A., Dept of Environmental Ecology, Institute of Marine & Environmental Sciences, University of Szczecin, Waska 13, 71-415 Szczecin, Poland. Email: andrzej.zawal@usz.edu.pl

25166. Mueller, A.S.; Demers-Potvin, A.V.; Larsson, H.C.E. (2025): New family of fossil dragonfly (Odonata, Cavilabiata) from the late Cretaceous (Campanian) Dinosaur Park Formation, Alberta, Canada. Canadian Journal of Earth Sciences 62(8): 1373-1381. (in English) ["Cordualadensa acorni gen. et sp. nov., assigned to Cordualadensidae fam. nov. (Odonata, Cavilabiata), is described from Dinosaur Provincial Park (DPP). The taxon represents the oldest known North American fossil taxon within Cavilabiata and the only Mesozoic dragonfly for Canada. This discovery provides a missing link in the evolutionary transition from the early Cretaceous Cavilabiata to extant families and introduces one of the few dragonflies known from the late Cretaceous fossil record. The specimen described herein also confirms that insect impression fossils can be preserved in the Dinosaur Park Formation (DPF) and suggests that the diversity of the entomofauna preserved in DPP's fossil assemblage is only beginning to be fully appreciated. The presence of dragonflies in the DPF also supports the hypothesis that Campanian Alberta had a sufficiently high insect biomass to support insect predators at higher trophic levels."] Address: Mueller, A.S., Dept Biology, McGill Univ., Montréal, QC, Canada. Email: andre.mueller@mail.mcgill.ca

25167. Nabila, S. (2025): Teknik pembenihan ikan maskoki (Carassius auratus) di balai benih ikan ciganjur. Peraut: Jurnal Perikanan dan Kelautan 2(2): 18-24. (in Indonesian, with English summary) ["Fish breeding techniques for goldfish (Carassius auratus) at the Ciganjur Fish Hatchery - Discusses the techniques of hatchery for goldfish (Carassius auratus) at the Ciganjur Fish Seed Center (BBI), Center for Production, Inspection and Certification of Fishery Products (PPISHP), DKI Jakarta Province. The objectives were to understand the hatchery techniques and the factors influencing its success. The methods included observation, interviews, and active participation in the hatchery process. The results showed that goldfish hatchery involves preparing spawning ponds, selecting broodstock, spawning, egg collection, hatching, larval rearing, and initial nursing. The fecundity was 4,510 eggs, with a fertilization rate of 83.6%, a hatching rate of 74.8%, and a survival rate of 10%. Pests and diseases encountered included dragonfly larvae and Argulus, which were controlled through direct removal, pond cleaning, and water quality management. Regular water quality monitoring and optimal pest and disease control are recommended to improve the success of goldfish hatchery." (Author)] Address: Nabila, Salwa, Akuakultur, Fakultas Pertanian Perikanan dan Kelautan, Universitas Bangka Belitung, Bangka, Indonesia. Email: salwanabila.0179@gmail.com

25168. Ndatimana, G.; Dusabe, M.C.; Albrecht, C. (2025): Bridging riverine and lacustrine systems: Macroinvertebrate indicators of ecological health in the Rwandan Congo basin. Environ. Monit. Assess. 197:1218: 21 pp. (in English) ["Connectivity between lakes and tributaries is essential for freshwater ecosystem health. However, integrated studies of macroinvertebrate assemblages across these interconnected systems remain limited in tropical Africa. This study examined the structure of the macroinvertebrate community and the ecological health of Lake Kivu and its tributaries using multimetric indices. Macroinvertebrates were collected from 23 lake sites and 53 tributary sites between 2010 and 2022. Diversity indices were quantified, community differences were tested using permutational multivariate analysis (PERMANOVA), whereas Indicator value analysis (Indval) was performed to identify ecosystem-taxa associations. The ecological health status of the lake was assessed using the Multimetric Index for Lake Hawassa (MMIH), and the Macroinvertebrate-Based Multimetric Index for Biotic Integrity (MMIBI) for tributaries. Lake and tributary systems exhibited distinct community compositions, with molluscs dominating the lake and insects prevalent in tributaries. Families Thiaridae, Bithyniidae and Planorbidae were prevalent in the lake, while Baetidae and Chironomidae were common in the tributaries. Indicator species analyses revealed strong habitat affinities of Melanoides tuberculata and Gabbiella humerosa to the lake, and Radix natalensis and Pisidium kenianum to the rivers. The diversity indices indicated significantly higher macroinvertebrate diversity in the tributaries ($p<0.001$), whereas molluscan diversity was greater in the lake ($p<0.05$). The results classified the lake sites as having "fair" to "good" ecological status, while the tributaries ranged from "poor" to "moderate", reflecting the varying levels of anthropogenic pressure. These findings highlight the ecological distinctiveness of lacustrine and riverine systems, and demonstrate the effectiveness of using macroinvertebrates for integrated, basin-scale monitoring and management." (Authors) Odonate taxa are treated at family level.] Address: Ndatimana, G., Dept Animal Ecology & Systematics, Justus Liebig Univ. Giessen, Heinrich-Buff-Ring 26 (IFZ), 35392 Giessen, Germany. Email: ndatimanagilbert@gmail.com

25169. Nederstigt, T.A.P.; Frische, R.K.M.; Ouwehand, J.; Vijver, M.G. (2025): Impacts of a nano-enabled pesticide formulation (nTiO2-coated carbendazim) and its constituents on the freshwater snail Lymnaea stagnalis & damselfly Ischnura elegans assessed via in-situ bioassays. Ecotoxicology and Environmental Safety 303, 118809: 10 pp. (in English) ["Novel pesticidal products in which active substances

are delivered via nanoscale carrier systems have been suggested to offer functional and environmental benefits over conventional pesticide formulations. Nevertheless, non-target impacts associated with such nano-enabled pesticides remain largely unexplored. The current study compares effects from a nano-TiO_2-coated formulation of carbendazim (i.e., nTiO_2-coated carbendazim) with those of its active substance (i.e., the fungicide carbendazim), coating material (i.e., nanoscale TiO_2), and a treatment in which the latter two are combined, by means of in-situ bioassays. Bioassays focused on the freshwater snail Lymnaea stagnalis and larvae of Ischnura elegans, two invertebrate species representing different niches. For L. stagnalis, effects on survival, growth, and feeding were assessed over 29 days, and resource utilization rates of microbial communities present on its provided food source were analyzed to determine feeding-related indirect effects. For I. elegans, survival, feeding, emergence (i.e., development into imagines), and body size upon emergence were assessed over 57 days. Mortality rates of L. stagnalis increased by ~40 % in nTiO_2 and ~50 % in combined (i.e., carbendazim & nTiO_2) treatments applied at environmentally realistic concentrations, but insignificantly in nTiO_2-coated carbendazim treatments. We argue that differences in this regard are likely to have arisen from contrasting photocatalytic activity of the nTiO_2 utilized in respective treatments. Microbial community carbon utilization profiles exhibited minimal differences between treatments. I. elegans survival, feeding and growth rates were unaffected, but a slight decrease in emergence time was observed across treatments. The findings of the current study highlight that photocatalytic properties of nanomaterials can be an important factor for consideration regarding non-target impacts of nano-enabled products with agricultural applications." (Authors)] Address: Nederstigt, T.A.P., Institute of Environmental Sciences (CML), Leiden University, Leiden, The Netherlands

25170. Nel, A.; Nam, G,-S.; Jouault, C. (2025): A new Early Cretaceous 'megapodagrionid' genus (Zygoptera: Coenagriomorpha) from the Jinju Formation of the Republic of Korea. Palaeoworld 34(4), 200908: (in English) ["Koreapodagrion coloratus n. gen. n. sp. represents the third known Cretaceous 'megapodagrionid' taxon and is described from the lower Albian of the Korean Peninsula. The other two were described from Barremian and Barremian–Aptian deposits from China and Democratic People's Republic of Korea, respectively. This distribution in East Asia, suggests that the area was favorable to these damselflies during the Early Cretaceous. Koreapodagrion coloratus n. gen. n. sp. is characterized by a distinctive coloration pattern, colored zones on the wing membrane, and a particular wing venation, inter alia, characterized by an elongate pterostigma, a very long postnodal area, and IR1 with a strong curve below pterostigma. This new taxon highlights the underestimated diversity within the 'megapodagrionid' sensu lato." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@mnhn.fr

25171. Nicolai, B.; Grimm, H.; Appeldorn, H.; Fischer, S. (2025): Libellen (Odonata) als Beute vom Bienenfresser Merops apiaster – Gelegenheit macht Diebe. Conference: 158. Jahrestagung der Deutschen Ornithologischen Gesellschaft [Erfurt, 17.-21. September 2025]: Poster- (in German) ["The dragonfly prey was evaluated from photos or observations (n = 110) and pellet analyses (n = 129) of the authors, as well as photos submitted by third parties (n = 62) and published lists that name dragonfly prey with information on species (n = 569; Berndt & Borkenhagen 1989, Brandt et al. 2024, Buczynski & Sobus 2024, Fuisz et al. 2013, Krištín, 1994, Krüger 2017) from Central Europe." (Authors/Google translate)] Address: https://www.researchgate.net/publication/395704629_Libellen_Odonata_als_Beute_vom_Bienenfresser

25172. Nicolai, B. (2025): Libellen am Leth (Nordharzvorland, Sachsen-Anhalt) im Klimawandel Hotspot der Odonatenfauna und seine Wiederbesiedlung. Abhandlungen und Berichte aus dem Museum Heineanum 14: 115-136. (in German, with English summary) ["Dragonflies on the Leth (Northern Harz Foreland, Saxony-Anhalt) in climate change – Hotspot of the Odonatenfauna and its recolonisation: The Leth is a small isolated subsurface lake in the arable landscape of the north-eastern Harz foreland. The hot summers and lack of rainfall in recent years led to the very shallow lake completely drying out in 2020. After the increased precipitation in the winter half-year 2023/24, it formed again. The recolonisation by dragonflies in the 2024 season is described here. Between the beginning of May and mid-October, a total of 36 dragonfly species (17 Zygoptera, 19 Anisoptera) were recorded on 27 days, of which 9 species (5 Zygoptera, 4 Anisoptera) were recorded for the first time. For 19 species there was evidence of reproduction at the water body (mating, oviposition, exuviae or emergences). These (8) species were regular and relatively common: Chalcolestes viridis, Sympecma fusca, Erythromma viridulum, Coenagrion puella, Ischnura elegans, Enallagma cyathigerum, Orthetrum cancellatum and Crocothemis erythraea. The species S. fusca, Coenagrion mercuriale, Erythromma lindenii, Ischnura pumilio and Anax ephippiger are new for MTBQ 4033-3, while Lestes sponsa, L. dryas, Aeshna affinis, Libellula depressa, Leucorrhinia rubicunda and Sympetrum danae were only recorded once in the 2024 season. The occurrence of two annual generations was proven for S. fusca and I. elegans and considered probable for E. cyathigerum." (Author)] Address: Nicolai, B., Herbingstr. 20, 38820 Halberstadt, Germany. Email: nicolaibea@gmx.de

25173. Nikolic, M.; Samardzic, A. (2025): First record of Lindenia tetraphylla (Vander Linden, 1825) (Odonata: Gomphidae) in Serbia. Acta Entomologica Serbica 30(1): 77-81. (in English, with Serbian summary) ["In this paper, the first records of L. tetraphylla in Serbia are presented, based on field surveys conducted in 2024 and 2025 at the Dobrotin locality (42.9309°N, 22.0265°E), southeastern Serbia. This observation expands the known range of L. tetraphylla in the Balkans, although its breeding status in the area remains to be confirmed. With this record, the total number of dragonfly species documented in Serbia reaches 70. The discovery underscores the value of ongoing faunistic surveys, particularly in underexplored habitats, and highlights the potential for climate change to drive shifts in species composition." (Authors)] Address: Nikolic, M, University of Niš, Faculty of Sciences & Mathematics, Višegradska 33, 18000 Niš, Serbia. Email: marko@bddsp.org.rs

25174. Ningrum, D. (2025): Diversity and dominance of dragonfly species (Odonata) in the Karungan waterfall agrotourism area and their potentials as a learning resource in biology education. Thesis, Jurusan Pendidikan Biologi, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Borneo Tarakan [Biology Education Department, Faculty of Teacher Training and Education, University of Borneo, Tarakan]: XI+57 pp. (in Indonesian, with English summary) ["This study aimed to describe the diversity and dominance of dragonfly species in the Karungan Waterfall Agrotourism Area, Tarakan City, and to analyze their potential as a learning resource in biology education. The research employed an exploratory field method,

using insect nets for dragonfly collection and measuring environmental factors Data were analyzed descriptively by calculating species diversity and dominance indices. The results identified 10 dragonfly species from two families, Libellulidae and Coenagrionidae, with a total of 348 individuals. The diversity index (H') was 1.85, categorized as moderate, while the dominance index (C) was 0.19, categorized as low. These values indicate that the study area possesses a relatively stable ecosystem with fairly even species distribution and no species showing excessive dominance The findings highlight the potential of this research as a contextual learning resource, particularly in teaching topics related to biodiversity and ecology." (Author) Regrettably, the study includes the North American Ischnura verticalis, which clearly is a misidentification.] Address: https://repository.ubt.ac.id/repository/UBT08-10-2025-141-507.pdf

25175. O'Connor, M.; Lancaster, L.T. (2025): Guild diversity impacts demographic outcomes of novel species interactions following range shifts. Journal of Animal Ecology 94(10): 2062-2078. (in English) ["Novel competitive interactions between native and range shifting species can precipitate local extinction of native species. However, increased biological complexity within recipient communities may prevent native species loss by decreasing the strength of novel competition experienced by any one species. This phenomenon, termed 'biotic resistance', is commonly applied in invasion ecology, but has received little attention in the context of climate induced range shifts. Here we investigate the effects of biotic resistance in competition between resident native and range-shifting damselflies in a region of Scotland newly colonised by the range-shifter, using competitive mesocosm treatments across multiple life stages and experimental temperatures. Our focal native species (Lestes sponsa) was unaffected by increasing competitive complexity as larvae, showing no fitness benefits in multispecies treatments compared to intraspecific or even interspecific scenarios in the presence of the range shifter. However, multispecies competition with both native and range-shifting species improved adult survival of our focal native species at higher temperatures, compared to interspecific competition with just the range shifter. For our focal range-shifting species (Ischnura elegans), larval growth rate was significantly reduced in multispecies treatments compared to intraspecific or two-species interspecific scenarios, yet adult range shifter survival showed no decrease in multispecies treatments. Furthermore, range shifter larvae displayed improved survival and growth in colder temperatures, compared to a lack of any temperature effects on adult survival. These results suggest that biotic resistance may alleviate the competitive impacts of range shifters on native communities by providing a life stage-dependent benefit to native species while simultaneously decreasing the fitness of range shifters. However, shifting temperatures can cause this interaction to swap between competition and facilitation, creating an environmentally dependent scenario that may benefit both range shifters and resident species, promoting the maintenance of diversity in high latitude communities." (Authors)] Address: O'Connor, M., School of Biological Sciences, University of Aberdeen, Aberdeen, UK. Email: mo044@uark.edu

25176. Olthoff, M.; Ikemeyer, D. (2025): Ausbreitung von Leucorrhinia pectoralis in Westfalen (Odonata: Libellulidae). Libellula 44(1/2): 99-114. (in German, with English summary) [Expansion of Leucorrhinia pectoralis in Westphalia, Germany) – In the period 2019–2024, a survey of L. pectoralis was carried out in 18 bog and heathland areas in the Münsterland region. The species was found in 16 areas with ten indigenous and four potentially indigenous populations. In the nature reserves Burlo-Vardingholter Venn (51–100 individuals) and Eper Venn (21–50 individuals), records were made on a scale previously not known in North Rhine-Westphalia. Until now, L. pectoralis was regarded as a very rare species in this federal state with only a few records. The study confirms a spread and increasing establishment of the species. The rise in temperature due to climate change, which favours the thermophilous species, is seen as a major reason for this. The species also benefits from nature conservation measures such as the rewetting of bogs or the desludging of heathland ponds. Diffuse nutrient inputs into oligotrophic bogs and the associated change in vegetation structure also appear to be beneficial to the species. It is necessary to check whether the NATURA 2000 network in its current form does justice to the protection of this Annex II species in North Rhine-Westphalia. The majority of populations were found in Special Areas of Conservation (SAC), what can generally be regarded as a success of the designation of these protected areas. However, only a small proportion of these SAC are designated for the protection of L. pectoralis. A subsequent registration of the species within existing SAC and thus consideration of the species in the context of future management is recommended." (Authors).] Address: Olthoff, M., Naturschutzzentrum Kreis Coesfeld e.V., Am Hagenbach 11, 48301 Nottuln-Darup, Germany. Email: matthias.olthoff@naturschutzzentrum-coesfeld.de

25177. Outdoor Wildlife Learning Hong Kong Limited (2025): Little dragonflies, it's time to change! Publisher: Agriculture, Fisheries and Conservation Department, 7/F, Cheung Sha Wan Government Offices, 303 Cheung Sha Wan Road, Kowloon, Hong Kong: 23 pp. (in Bilingual in Chinese and English) [A lovely illustrated book on dragonflies directed to children.] Address: https://bih.gov.hk/filemanager/newsletter/en/upload/40/AFCD%20Little%20Dragonflies,%20It's%20Time%-20to% 20Change.pdf

25178. Panchana, K.; Herrera, I.; Vargas, A.; Mella-Méndez, I.; Flores-Peredo, R. (2025): Whiskers in the city: domestic cat predation in Ecuadorian coastal cities and associated factors. Urban Ecosystems 28: 1-18. (in English) ["Domestic cats pose a latent threat to wildlife that lives within the remnants of natural vegetation in urban ecosystems. Both intrinsic (e.g., age, weight, sterilization status) and extrinsic factors (e.g., night confinement, interaction time with owners at home) can influence the number of prey items caught by cats. We assessed the fauna predation by domestic cats in three cities on the coast of Ecuador. We aimed to: (i) evaluate the composition of the prey brought home by cats, counting the taxa number and their capture frequency, as well as their conservation status, and (ii) identify the intrinsic and extrinsic factors that influence the quantity of prey brought home by cats (henceforth referred to as 'prey captured'). A citizen science approach was employed to gather information about wildlife taxa caught and brought home by 100 cats in 50 households between March and October 2023. Cats captured 132 prey items, of which 53.8% were invertebrates, 27.3% reptiles, 8.3% birds, 6.8% small mammals, and 3.8% amphibians. These prey items belonged to 53 taxa, 56.6% native and 15.1% non-native. Non-native reptiles Hemidactylus sp. and Anolis sagrei were the most frequently captured taxa, and ten native taxa were among the most commonly captured, particularly odonates. This is the first study to register predation of cats on amphibians in northwestern South America. The capture by cats of Coniophanes dromiciformis, a vulnerable and probably endemic snake, is noteworthy. Three factors—age, nocturnal confinement, and the presence of toys in their homes—were the most important factors that contributed to predation events. We recommend controlling

these factors to reduce the potential impacts caused by domestic cats on wildlife." (Authors) The list of taxa includes Erythemis vesiculosa, Erythrodiplax umbrata, Pantala flavescens, Tholymis citrina, Tramea darwini, Coryphaeschna adnexa, Dythemis sterilis, and Gynacantha sp.] Address: Herrera, Ileana, Escuela de Ciencias Ambientales, Univ. Espíritu Santo, Guayaquil 091650, Ecuador. Email: herrera.ita@gmail.com

25179. Pano, R.; Juario, J. (2025): Diversity of Odonata in selected freshwater ecosystems of Bunawan, Agusan del Sur, Philippines. Journal of Agro-Industrial Research and Development 10(1): 43-56. (in English) ["Odonates, are important indicators of freshwater health. Studying where they live and how many species are present can help us understand habitat quality and guide conservation efforts. This study assessed the diversity, classification, and conservation status of Odonata in four freshwater sites in Bunawan, Agusan del Sur: Bulong-bulongan Falls, Tagbayangbang Falls, Tagbanaba Creek, and Imelda Watershed. Specimens were collected by hand and with nets, and identified using photographs and expert advice. A total of 16 species from eight families were recorded: Libellulidae (6), Calopterygidae (1), Chlorocyphidae (2), Coenagrionidae (2), Euphaeidae (1), Platycnemididae (2), Platystictidae (1), and Protoneuridae (1). The highest Shannon diversity index (H') was recorded at Imelda Watershed (2.471), followed by Bulong-bulongan Falls (2.065), Tagbayangbang Falls (1.793), and Tagbanaba Creek (1.743). Species richness was highest in Imelda Watershed (14 species) and lowest in Tagbayangbang Falls and Tagbanaba Creek (8 species). The relatively high diversity in these sites suggests favorable environmental conditions, influenced by clean waterways, adequate canopy cover, and the presence of perching substrates such as rocks. Lower diversity areas are affected by anthropogenic disturbances like habitat destruction and pollution. These findings show the that Bunawan's freshwater ecosystems are important for the survival of Odonates. They support the need to protect Odonates and their habitats through long-term conservation. Future researches should study how environmental factors like anthropogenic activities, water quality and vegetation structure influence their distribution over time." (Authors)] Address: Juario, J., Agusan del Sur State Coll. Agriculture & Technology, Philippines. Email: jjuario@asscat.edu.ph

25180. Papazian, M.; Filippi, G.; Bastide, N. (2025): Contribution à la connaissance des Odonates de l'archipel de Sao Tomé-et-Príncipe. 6. Présence de Gynacantha cylindrata Karsch, 1891 sur l'ile de Príncipe (Odonata Aeshnidae). L'Entomologiste 81(2): 81-84. (in French, with English and Portuguese summaries) ["A new expedition, carried out in Príncipe in October-November 2024 as part of the São Tomé and Príncipe «Biodiversity Archipelago» project, allowed the observation of G. cylindrata on this island, three males and one female, after the discovery of a female on March 9, 2022 in the municipality of São João dos Angolares, south of the island of Sao Tomé; 152 km separate the two islands, 350 km separate the archipelago from Gabon. Príncipe is a UNESCO biosphere reserve covering 71,500 ha, of which 5,670 ha are occupied by the Príncipe Natural Park, the island having an area of 136 km²] Address: Papazian, M., Opie-Provence-Alpes-du-Sud, Muséum d'histoire naturelle de Marseille, palais Longchamp, f – 13233 Marseille cedex 20, France. Email: michelpapazian7@gmail.com

25181. Park, M.W.; Park, J.S.; Pyo, J.-Y.; Kim, S.-S.; Kim, I. (2025): Population genetic study of the common bluetail, Ischnura senegalensis (Odonata: Coenagrionidae), a climate-sensitive indicator species in South Korea, based on mitochondrial DNA sequences. International Journal of Industrial Entomology and Biomaterials 49(3): 109-131. (in English) ["Northward range expansion is one of the fundamental response in organisms against global warming. The newly expanded populations are apt to experience genetic drift driven by founder effects and bottlenecks. Ischnura senegalensis is listed as a climate-sensitive biological indicator species in South Korea and has recently been expanded northward in South Korea. To investigate the population genetic characteristics associated with this range expansion, we sequenced a total of 1,230 bp of mitochondrial COI (DNA barcoding region) and ND4 for 212 individuals collected from 13 South Korean localities, including three most recently expanded ones. Moreover, we combined current data with the corresponding 379 bp of worldwide COI data obtained from the public database (499 sequences from 13 countries) to supplement our findings. Analyses of population genetic aspects using our own sequences provided three notable results. First, the newly expanded Hwaseong, Ansan, and Anseong located at about 37° in latitude or north did not show any notable genetic difference and any reduced genetic diversity, suggesting a strong dispersal and exploration of suitable habitats. Second, these newly expanded populations had several unique haplotypes, implying genetic inflow outside country. Third, Namhae located in the southern region showed the highest genetic diversity and one additional genepool unique to this population, also implying genetic inflow outside country. An incorporation of worldwide data, which shows a high genetic similarity between South Korea and China supports that the northward range expansion could have been accelerated by long distance dispersers possibly from China. Similarly, sharing of a genepool only between Namhae and Japan including the Ryukyu Islands also suggests genetic inflow from Japan. These results collectively suggest that global warming not only facilitate range expansion, but also prompt inflow of foreign individuals of I. senegalensis." (Authors)] Address: Kim, I., Dept Applied Biology, College of Agriculture & Life Sciences, Chonnam National Univ., Gwangju 61186, Republic of Korea. Email: ikkim81@chonnam.ac.kr

25182. Parmar, D.; Payra, A.; Paranjpe, A.; Khangar, S.; Patchaiyappan, A.; Ganguly, J.; Koparde, P. (2025): Odonata of Puducherry, Union Territory of Puducherry, India: an updated checklist and distributional insights. Natura Somogyiensis 46: 37-48. (in English) ["Puducherry, one of the four regions of the Union Territory of Puducherry located along the east coast of India, was surveyed during March, June, and July 2024 to ascertain the present status, diversity, and distribution of odonate species in the region. Surveys were carried out in 27 localities consisting of habitats such as lakes, ponds, rivers, canals, agricultural fields, mangroves, lagoons, sacred groves and tropical dry evergreen forests. The present study documented 30 odonate species under 27 genera and four families, adding 17 new odonate records for the region, increasing the known species count to 31 under 28 genera and five families. The study provides critical baseline data for the future taxonomic and faunistic surveys, as well as it will be valuable for the implementation of conservation strategies to protect these ecologically important insects and their habitats." (Authors)] Address: Payra, A., Dept of Zoology, School of Science, Dr. Subhash University, Juangadh, Gujarat, India

25183. Pawar, M.; Patwardhan, A. (2025): Spatio-temporal dynamics of the odonates in semiurban and agricultural habitats near Alibag, Maharashtra, India. Journal of the Bombay Natural History Society 122(2): 105-114. (in English) ["The conversion of agricultural lands and meadows into resorts, residential buildings, and villas is increasing around Alibag, a

popular tourist destination near Mumbai. We report 26 odonate species from agricultural and semi-urban areas near Alibag. The study area included a residential area in Poynad, the Amba tributary at Pandavadevi, Poynad Lake, and agricultural areas in Navenagar and Shrigaon. Data were collected from May 2023 to April 2024 using the belt transect method. The Shannon-Wiener Index (H'), Menhinick's Index (DMn), and Pielou's Evenness (J) were highest at the Amba tributary (H' = 2.32, DMn = 0.73, J = 0.88) and lowest at Poynad Lake (H' = 0.97, DMn = 0.41, J = 0.47). Presence-absence matrix analysis provided insights into spatial distribution, species richness, and range size. Significant temporal variation ($p < 0.05$) was observed in species richness ($F(11,48) = 6.38$, $p < 0.05$) and abundance ($F(11,48) = 7.83$, $p < 0.05$). Anthropogenic activities at the sites that impact odonate populations are discussed." (Authors)] Address: Pawar, M. Dept of Zoology, K.J. Somaiya College of Science & Commerce, Vidyavihar, Mumbai 400 077, Maharashtra, India

25184. Phan, Q.T.; Keetapithchayakul, T.S.; Digma, J.R. (2025): Sulcosticta fliedneri sp. nov. (Odonata: Platystictidae), a new damselfly from Luzon, Philippines. Zootaxa 5701(5): 586-596. (in English) ["Sulcosticta fliedneri sp. nov. (holotype ♂, 15.25326° N. 121.39115° E. 65 m a.s.l.. Dingalan. Aurora. Luzon, deposited at Cavite State University, Philippines) is described from Luzon Island based on specimens of both sexes. The new species is diagnosed by the distinctive morphology of the male's anal appendages: cerci robust with a small distal tubercle and paraprocts black, acutely curved at the tip." (Authors)] Address: Phan, Q.T., Center for Entomology & Parasitology Research, Institute of Research &Training of Medicine, Biology & Pharmacy, Duy Tan University, Da Nang, 550000, Vietnam. E-mail: pqtoan84@gmail.com

25185. Piola, R.; Solihin, A.P.; Jamin, F.S. (2025): Pengaruh Penggunaan Tanaman Refugia terhadap Kelimpahan dan Biodiversitas Musuh Alami pada Tanaman Cabai Rawit (Capsicum frutescens L.) - The influence of refugia plants on the abundance and biodiversity of natural enemies in Cayenne pepper (Capsicum frutescens L.) cultivation. Research Review 4(1): 11 pp. (in Indonesian, with English summary) ["The effect of using refugia plants on the abundance and biodiversity of natural enemies in Chili pepper plants (Capsicum frutescens L.) "This study aims to determine the influence of refugia plants on the population, abundance, and biodiversity of natural enemies. The research was conducted from February to June 2024 in North Toto Village, Tilongkabila District, Bone Bolango Regency, Gorontalo Province. A randomized block design (RAK) was used with three treatments: control (P0), refugia (P1), and chemical insecticide (P2), each repeated four times. Data were analyzed using Analysis of Variance (ANOVA) and followed by Duncan's Multiple Range Test at a 0.05 significance level. Results showed that predator natural enemies consisted of 7 families in the control (P0), 9 families in the refugia treatment (P1), and 5 families in the insecticide treatment (P2). The dominant families were Coccinellidae (48.65%) in P0, Libellulidae (28.57%) in P1, and Sphecidae (44.44%) in P2. The population of natural enemies in refugia was higher at 21 and 35 HST. The diversity index in all treatments was categorized as moderate. For pollinators, P0 had 3 families, P1 had 7, and P2 had only 3, with Apidae dominating all treatments, particularly in P1 (27 individuals). The population of pollinators in refugia reached 3.50 individuals at 63 HST, higher than in other treatments. Refugia treatment was dominated by Apidae (35.06%), Nymphalidae (18.18%), and Andrenidae (15.58%). The findings highlight the positive role of refugia in supporting natural enemy populations and the negative impact of insecticides on biodiversity." (Authors) Tholymis tillarga] Address: Solihin, A.P., Fakultas Pertanian, Unveristas Negeri Gorontalo, Indonesia. Email: angrysolihin@ung.ac.id

25186. Pontes, J.A.L.; Couto, R.S. (Orgs) (2025): Relatório final do grupo de trabalho sobre espécies ameaçadas de extinção no municipio do Rio de Janeiro. Rio de Janeiro, Secretaria Municipal de Meio Ambiente e Clima, Gerência de Gestão de Unidades de Conservação: 34 pp. (in Portuguese) [Final Report of the working group on endangered species in the municipality of Rio de Janeiro. "In Table 6, a list of native species of vertebrate and invertebrate fauna in the municipality of Rio de Janeiro considered rare, are given. It includes the following odonate species: Castoraeshna castor, Coryphaeschna perrensi, Staurophlebia reticulata, Argia modesta, Argentagrion silviae, Nehalennia selysi selysi, Oxyagrion pavidum, Telagrion longum, Libellula herculea, Perilestes fragilis, and Idioneura ancilla.] Address: https://www.researchgate.net/publication/394485857_RELATORIO_FINAL_DO_GRUPO_DE_TRABALHO_SOB RE_ESPECIES_AMEACADAS_DE_EXTINCAO_NO_MUNICIPIO_DO_RIO_DE_JANEIRO_INTRODUCAO

25187. Prima, M.-C.; Oliveira-Cruz, L.; Miele, V.; Si-Moussi, S.; Rouveyrol, P.; Suarez, L.; Thuiller, W. (2025): Multilayer network analysis reveals connectivity synergies between protected area levels across various taxonomic groups. Conservation Letters 18:e13148: 9 pp. (in English) ["Assessing connectivity among protected areas (PAs) is vital for conserving species movement in fragmented landscapes; yet, most studies consider only a few taxa and ignore interactions between protection levels.We combined a recently developed framework to identify ecological continuities with a multilayer spatial network approach to quantify connectivity among strict and non-strict PAs, and their synergies, across metropolitan France. This was carried out for 397 vertebrate, invertebrate, and plant species from the national PA plan at an ecologically relevant 1-km² resolution. Results emphasized that non-strict PAs largely contribute to protected habitat accessibility across taxa, though connectivity patterns varied between taxonomic groups. Importantly, we showed that non-strict protections can synergize with strict protections to substantially enhance the amount of accessible protected suitable habitats. Our findings highlight the need for coherent PA expansion, strategically improving connectivity. Synergistic PA planning and corridor designation, leveraging new conservation tools, should notably provide viable solutions." (Authors) The study includes 27 not further detailed Odonata species] Address: Prima, Marie-Caroline, Univ. Grenoble Alpes, Univ. Savoie Mont Blanc, CNRS, LECA, Grenoble, France

25188. Puff, F.; Guariento, E.; Festi, A.; Larroux, N.; Assandri, G. (2025): Local habitat features, but not isolation, shape Alpine odonate assemblages: Implications for modelling and conservation. Diversity an Distributions 31(10), e70110: 17 pp. (in English) ["Aim: Human impacts and climate change are intensifying the fragmentation of freshwater habitats, raising concerns about the ability of aquatic species to disperse between increasingly isolated habitat patches. To explore these dynamics, we used Odonata as a model taxon to examine how two principles of island biogeography—habitat isolation and quality—shape the community assembly of freshwater insects in a topographically diverse mountainous landscape. Location: Central southern Alps, Italy. Methods: We make use of openly available geodata to quantify the isolation of 99 sites in an Alpine region with well-sampled odonate communities. We tested how isolation influences diversity, community composition, and the occurrences of

individual species. Results: Isolation did not affect species richness, community composition, and the occurrence of most species. Instead, site elevation, habitat composition, and area played a more important role in shaping odonate communities. Main Conclusions; Odonata can freely disperse within a heterogeneous alpine landscape at a regional scale, calling into question proposals of creating artificial habitats to increase connectivity. Instead, habitat composition and site area had a stronger effect than isolation on all investigated aspects. Thus, conservation efforts should prioritise the protection of existing natural habitats and corridors. Additionally, our findings provide empirical support for the assumption of no dispersal limitation at a regional scale, common in many ecological null models of community assembly." (Authors)] Address: Puff, F., Institute for Alpine Environment, Eurac Research, Bolzano, Italy. Email: felix.puff@hotmail.com

25189. Qi, L.; Qi, C. (coord.) (2025): Miyun District Biological Species List 2025 Edition. Technical Support Units, Chinese Academy of Sciences Beijing, Academy of Eco-Environmental Sciences, Beijing Forestry University: 110 pp. (in Chinese) [Miyun District is situated in northeast Beijing, China. It has an area of 2,227 km². According to preliminary statistics, a total of 3,945 species of organisms have been recorded in the area, including … 1,281 species of insects, and 243 species of macrofungi." (Authors/Google translate) 53 odonate species are listed on pages 95 and 96.] Address: https://www.bjmy.gov.cn/zwgk/ztbd/myqswdyx/sdzy/202505/P020250522496559638533.pdf

25190. Ramadhan, M.A. (2025): Keanekaragaman Jenis Capung (Odonata) Pada Kawasan Wisata Alam Waduk Cacaban Di Kabupaten Tegal Provinsi Jawa Tengah. EDUBIOPRENA: Jurn. Ilmiah Pend. Biologi, Biologi, & Bioentrep. 2(1): 19-24. (in Indonesian) [Indonesia, Java; "The Cacaban Reservoir nature tourism area in Tegal Regency is an area with environmental conditions suitable for dragonflies to breed. This study was conducted in March 2022. The research area around Cacaban Reservoir included three stations: Station I on the edge of the reservoir, Station II in the rice fields around the reservoir, and Station III in the forest around the reservoir. The research was conducted in the morning from 8:00 a.m. to 10:00 a.m. and in the afternoon from 3:00 p.m. to 5:00 p.m. The purpose of this study was to determine the diversity of dragonfly species in the Cacaban Reservoir nature tourism area in Tegal Regency. Data collection was carried out using the line transect method. The results of the study showed that the Cacaban Reservoir nature tourism area in Tegal Regency has a moderate level of species diversity. A total of 11 dragonfly species from 5 families were recorded at the research site. Station III (the forest around Cacaban Reservoir) had the highest species diversity compared to the other stations, with a value of H' = 1.66. “Abundance of Libellulidae was highest” with 7 species comprising 241 individuals." (Author/DeepL) Trithemis festiva, Orthetrum sabina, O. testaceum, Brachythemis contaminata, Tholymis tillarga, Neurothemis fluctuans, Zyxomma obtusum, Gynacantha dohrni, Vestalis luctuosa, Euphaea variegata, Ischnura senegalensis] Address: Ramadhan, M.A., Program Studi Pendidikan Biologi, FPMIPATI, Universitas PGRI Semarang, Indonesia. Email: m.afanramadhan50@gmail.com

25191. Rana, A.; Salunkhe, M.B.; Thakur, A. (2025): Predatory insects as indicators of environmental pollution: Implications for ecosystem health and monitoring. Uttar Pradesh Journal of Zoology 46(2): 163-174. (in English) ["Predatory insects are important bioindicators for monitoring environmental pollution and evaluating ecosystem health. Their sensitivity to chemical, biological, and physical stressors, along with short life cycles and trophic interactions, enables them to provide early warning signals of ecological disturbances. This review examines diverse predatory insect groups, including Coleoptera, Ephemeroptera, Odonata, and others, highlighting their roles across different ecosystems. Key criteria for selecting effective bioindicators such as species richness, ecological reliability, ease of management, and measurable responses are discussed alongside established classification frameworks. By considering ecological, physiological, and behavioural traits, predatory insects offer a practical and reliable approach to assess environmental quality. Their use supports conservation planning and promotes sustainable ecosystem management, particularly in the face of increasing anthropogenic pressures. Overall, predatory insects provide a cost-effective and scientifically robust tool for understanding and mitigating the impacts of environmental pollution on ecosystem integrity." (Authors)] Address: Rana, A., Dept of Entomology, College of Agriculture, CSK HPKV, Palampur (H.P.) 176062, India. Email: ankitarana974@gmail.com

25192. Raut, V.D.; Damahe, P.P. (2025): Arthropods biodiversity In and around Ramtek region, Maharashtra, India. Journal of Advanced Zoology 46(2): 126-130. (in English) ["The present study was carried out in and around Ramtek region of Maharashtra India. Total five spots were identified and study was undertaken in forest area, lake side area, agricultural farm, college campus and open land area of various vegetation. The study was conducted from January to April 2025 period. The collected insects were identified and maintain the record in tabulated form for analysis. Results shown that lepidopteran species were dominant followed by Odonata, Hymenoptera, Diptera, Orthoptera, Coleoptera, Isoptera etc. The objective of this study is to evaluate the dominance and abundance of various arthropods population in different region of Ramtek." (Authors) Taxa are treated at order level.] Address: Raut, V.D., Dept of Zoology, Tai Golwalkar Mahavidyalaya, Ramtek, Dist. Nagpur (M.S.), India. Email: vijayraut14@yahoo.co.in

25193. Remmel, N.; Enss, J.; Haase, P.; Sinclair, J.S. (2025): Are findings of key insect metrics generalizable across different taxa in malaise rrap samples? Ecology and Evolution, 2025; 15:e72006: 16 pp. (in English) [Hessen, Germany; "Recent reports of insect declines and drivers thereof are often based on total biomass from Malaise traps. However, it remains unclear whether these changes reflect shifts in other community metrics (e.g., total abundance) and important taxa, such as key pollinators. To address this question, we collected Malaise trap samples from four different habitats (forest, urban, agriculture and open land) and four seasons (early spring, late spring, midsummer and early autumn) during 2019–2021. We measured the total biomass of each sample, then morphologically identified the insects in each sample, comprising 533,128 total individuals. We determined whether changes in total biomass reflected changes in total community abundance, and whether community relationships to habitat characteristics of land cover, weather/climate, and flowering plants were the same between the most common insects (represented by 15 different taxonomic groups) versus relatively fewer focal pollinators, specifically bees, butterflies, and hoverflies. Biomass was generally related to abundance, except in a small subset of communities comprising more larger-bodied taxa. Additionally, both overall community composition and pollinator composition were explained by the same weather and climate variables and the same habitat characteristics. However, pollinator relationships to habitat were likely driven by different mechanisms, specifically covarying changes in

flowering plants. Our results suggest that patterns in Malaise trap biomass, and the relationships of prominent taxa to habitat characteristics, could be used to infer similar changes in other important community metrics and taxa, including pollinators. However, some insects responded to shifts in habitat characteristics for different underlying reasons, indicating the need for caution when using such inferences to inform conservation and management to ensure the correct mechanisms are being addressed." (Authors) Total individuals 2019–2021: 19 Odonata, without details.] Address: Remmel, Nicole, Dept River Ecol. & Conservation, Senckenberg Research Instit. & Natural History Museum Frankfurt, Gelnhausen, Germany

25194. Reyes-Avila, A.D.; Moore, B.C.; Jones, B.W.; Taylor, T.N. (2025): Food web ecology of Lahontan cutthroat trout. Lake and Reservoir Management 40(4): 390-403. (in English) ["The diet of the Lahontan cutthroat trout (LCT; Oncorhynchus henshawi) introduced in Omak Lake is an example of fish adaptation to new ecosystems, providing more information for successful stocking. Our research aimed to elucidate the role of LCT in the Omak Lake food web, identifying and quantifying the main prey taxa in LCT diets throughout life stages. We investigated potential dietary limitations to support the sustainability and subsistence of LCT and assist management decisions for the sport fishery. Samples were collected seasonally during spring (2018–2021), summer (2019–2021), and autumn (2019–2021). Trout were divided into groups by age. We identified and quantified short-term prey consumption via stomach content analysis (SCA). Stable isotope analysis (SIA) of nitrogen and carbon (d15N, d13C) elucidated longer term predator/prey food web relationships. We found that juvenile LCT (1–2 yr; 150–299 mm) diets included aquatic and terrestrial invertebrates (57%). We observed an ontogenetic dietary transition to piscivory at about 2–4 yr (300–450 mm). Fish were a primary diet source (64%) for adult LCT (>4 yr; >450 mm); however, aquatic, and terrestrial invertebrates were still utilized, particularly in the spring season. The largest LCT (>600 mm) consumed mainly fish (>72%). According to SCA, the 5 largest dietary sources for LCT of all ages were peamouth > Coleoptera > LCT-cannibalized > longnose sucker > Odonata. Diptera were found in all LCT age groups, and terrestrial macroinvertebrates were an important seasonal food source. The SIA and SCA results revealed LCT's dietary plasticity and suggested prey fish scarcity may limit the growth of larger LCT (Beauchamp et al. 2007)." (Authors)] Address: Reyes-Avila, A.D., School of the Environment, Washington State Univ. at Pullman, Pullman, WA, USA. Email: alexander.d.reyes@wsu.edu

25195. 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., 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

25196. Rossi, S. (2025): Aquatic invertebrates and wastewater effluents: behavioral responses and ecological implications: examining habitat preferences in aquatic invertebrates in northern Sweden. Master's Programme, Examensarbete, Independent Degree project, Swedish University of Agricultural Sciences, SLU, Department of Wildlife, Fish and Environmental Studies, Management of Fish and Wildlife Populations: 50 pp. (in English) ["This study investigated the influence of wastewater discharges on the behavior and habitat choices of aquatic invertebrates in northern Sweden, including dragonfly larvae, caddisfly larvae, and crayfish (Decapoda). Furthermore, the potential role of ecological traps, where organisms may preferentially inhabit polluted habitats, potentially compromising their survival was explored. Four hypotheses were evaluated to assess whether and how these species react to wastewater effluent cues. For this, behavioral choice trials were conducted, where the tested animal could freely move between two water zones, a zone with clean tap water and a wastewater effluent zone. The analysis focusing on habitat preferences showed diverse preferences among the tested species. While caddisfly larvae and dragonfly larvae displayed fluctuating preferences across trials, crayfish did not exhibit distinct preferences across trials. However, not all behavioral analyses produced significant results. Exploration behaviors, measured by zone transitions, highlighted significant differences among species. The invertebrates' lack of a clear preference in this study is concerning. It implies that they might not be able to identify some hazards in their environment, leading them to persist in polluted waters for feeding and reproduction. This research enhances the understanding of how aquatic ecosystems function amid emerging pollutants." (Author)] Address: https://stud.epsilon.slu.se/21727/1/rossi-s-20250925.pdf

25197. 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." (Publisher)]

25198. Sacko, H. (2025): Contribution à l'étude des peuplements lotiques de la région du Nord-Est Algérien: Emphase sur l'implication des insectes vectoriels à intérêt médical et vétérinaire. MSc. thesis, Faculté des Sciences de la Nature et de la Vie, Sciences de la Terre et de l'Univers, Université 8 Mai 1945 Guelma: 127 pp. (in French, with Arabian and English summaries) ["This study aims to contribute to the faunistic analysis of benthic macroinvertebrates within the Kebir-

Rhumel hydrographic network, located in northeastern Algeria. The main objective is to inventory the recorded taxa and assess the ecological characteristics of the sampled stations. Sampling campaigns were carried out over four months, from December 2016 to June 2017, covering 22 lotic stations (streams and springs). A total of 5930 individuals were identified, belonging to 12 zoological groups, 54 families, 74 genera, and 17 species. The most abundant groups were Coleoptera, Diptera, Hemiptera, and Odonata. Some families, such as Culicidae, Simuliidae, and Chironomidae, have medical and veterinary relevance. The results reveal high faunal richness, varying between stations, and provide useful data for the conservation and sustainable management of aquatic environments in the Kebir-Rhumel watershed." (Authors) Odonate taxa are treated at genus level, including Leucorrhinia sp. which should be misidentified.] Address: https://dspace.univ-guelma.dz/xmlui/bitstream/handle/123456789/18049/SACKO_Hamidou.pdf?sequence=1&is Allowed=y

25199. Sadasivan, K.; Samuel, A.; Kochunarayanan, B.; Palot, M.J.; Nair, V.P. (2025): Taxonomic notes on Crocothemis erythraea from Peninsular India. International Journal of Odonatology 28: 101-111. (in English) ["The genus Crocothemis Brauer, 1868 (Odonata: Libellulidae) has two species distributed in the Indian region: Crocothemis erythraea (Brullé, 1832) and C. servilia (Drury, 1773). Crocothemis servilia is a common species in the lowlands of southern India, whereas C. erythraea appears to be a rare species restricted to the higher elevations of the southern Western Ghats. The differentiation of these closely similar species is somewhat problematic in the field, with some authors stating that only C. servilia is present in southern India. We provide taxonomic characteristics that are useful for diagnosing these altitudinally separated species based on their male genitalia. Molecular analysis based on the mitochondrial COI gene recovered high-elevation samples from the Western Ghats within the C. erythraea clade. Furthermore, samples from the lower elevations of the Himalayas and Western Ghats were retrieved within the C. servilia clade, confirming the presence of both species in the Western Ghats. Phylogenetic analysis of C. erythraea populations from the Western Ghats and Himalayas revealed high genetic similarity, with 99.5% identity in COI and ~98.95% identity in ITS2 sequences. This confirms that the taxon represented in the montane regions of the Western Ghats is C. erythraea, whereas the lowland taxon is C. servilia. Important morphological features for comparison of mature insects, field behavior, and the updated distribution of the two species in India are also discussed. The isolation of C. erythraea in the subtropical and temperate montane forests of the Southern Western Ghats, despite its phylogenetic similarity to Himalayan populations, suggests that a relict distribution was likely shaped during the Pleistocene glaciations." (Authors)] Address: Sadasivan, K., TORG (TNHS Odonate Research Group), Travancore Nature History Society (TNHS), MBRRA, Mathrubhumi Rd, Vanchiyoor P.O., Thiruvananthapuram, Kerala, India. PIN 695035. Email: kaleshs-2002in@gmail.com

25200. Saltos Navia, J.E.; Moreno, A.N.; Rosillo Rosillo, J.F. (2025): Diversidad y abundancia de macroinvertebrados acuáticos en Siete Ríos del Cantón Valencia (Los Ríos-Ecuador) como Bioindicadores de la Calidad de Agua. Ciencia Latina Revista Científica Multidisciplinar 9(5): 7055-7086. (in Spanish, with English summary) ["Diversity and abundance of aquatic macroinvertebrates in seven rivers of Valencia Canton (Los Rios, Ecuador) as bioindicators of water quality - In the present study, the diversity and abundance of macroinvertebrates in the rivers of the northern region of the province of Los Ríos were determined, and the water quality was assessed using biological indicators. For this purpose, the "D" network collection method was used during the dry season from 2013 to 2015 at the following EL Congo sampling sites; The Victory (LV); Toachi Chico (TC); Guantupí (GU); The Victory Intervened (LVI); The Congo Intervened (ECI); The Damita Plantations (LDP). A total of 16 orders, 70 families, were identified with 9843 macroinvertebrate individuals within the seven sampling points during the dry season, the families Aetidae, Chironomidae, Corydalidae, Elmidae, Hydrobiosidae, Hydropsychidae, Leptoceridae, Leptohyphidae, Leptophlebiidae, Libellulidae, Naucoridae, Ptilodactylidae and Tipulidae, were more frequent. The Shannon Diversity indices, the t-test, Jaccard similarity index, and Non-Parametric Multidimensional Scaling (NMDS) were calculated using PAST 4.17 software. The most significant diversity values were recorded at the Guantupi sampling site (2,856) unlike La Victoria with 2,406. The cluster analysis of the sampling units revealed a clustering of all 3 cluster above the 48.8% similarity using the Jaccard parameter. The Biotic Index of Families -El Salvador (IBF-SV-2010) that exposes values of water quality from regular to very good and coincides with the physical chemical parameters." (Authors) Taxa are treated at family level.] Address: Saltos Navia, J.E., Universidad Estatal Amazónica Ecuador. Email: je.saltosn@uea.edu.ec

25201. Sang, L.; Kim, H.-K. (2025): Interactive Gongbi: AR reconstruction of Wang Yuan's dragonfly painting. Journal of Digital Contents Society 26(8): 2027-2038. (in Korean, with English summary) ["This study reconstructs "Dragonfly" a gongbi painting by Wang Yuan from the Yuan Dynasty, into an interactive augmented reality (AR) experience. By applying subtle animations and interactive popups to segmented visual elements, the project investigates how traditional paintings can be extended through digital interaction without compromising their aesthetic integrity. Despite technical constraints of the AR platform, the interface and motion design were carefully calibrated to align with the original painting's visual rhythm. This study proposes a viewer-centered AR model that preserves the stillness and delicacy characteristic of gongbi, while also offering a potential framework for integrating traditional art with immersive digital media." (Authors)] Address: Kim, H.-K., Dept of Digital Contents, Kyung Hee Univ., Suwon 16710, Korea. Email: hkkim@khu.ac.kr

25202. Sankaranarayanan, S.R.; Ulmer, J.; Morch, A.; Ali-Ahmad, A.; Sekulice, N.; Drinnenberg, I.A. (2025): Insects evolved a monomeric histone-fold domain in the CENP-T protein family. EMBO Rep (2025), https://doi.org/10.1038/s44319-025-00603-5: 27 pp. (in English) ["The histone-fold domain (HFD) is a conserved protein interaction module that requires stabilization through a handshake interaction with an HFD partner. All HFD proteins known to date form obligate dimers to shield the extensive hydrophobic residues along the HFD. Here, we find that the lepidopteran kinetochore protein CENP-T is soluble as a monomer. We attribute this stability to a structural rearrangement, which leads to the repositioning of the HFD helix á3. This brings a conserved two-helical extension closer to the histone fold, where it takes over the position and function of the CENP-T partner CENP-W. This change has no effect on the DNAbinding ability of the lepidopteran CENP-T. Our analysis suggests that the monomeric HFD originated in the last common ancestor of insects, with a possible second independent origin in Acariformes, both of which lack CENP-W. Our study highlights an unexpected structural variation in a protein module as conserved and optimized as the HFD, providing a unique perspective on the evolution of protein structure and the forces

driving it." (Authors) The study includes a reference to Libellula vibrans.] Address: Drinnenberg, Ines, Molecular Medicine, Institute Basic Medical Sciences, Fac. Medicine, Univ. of Oslo, Oslo 0372, Norway. Email: ines.drinnenberg@curie.fr

25203. Sezimová, H.; Dolný, A.; Vánová, L. (2025): Poster Presentations, P24 | Pesticides, P24-31: Ecotoxicological evaluation of the insecticide Karate Zeon (Lambda-Cyhalothrin) on non-target organisms: Dragonfly (Odonata) larvae and Sinapis alba seeds. Toxicology Letters 411(Supplement): S313-S314. (in English) ["The rapid growth of the human population has been accompanied by increasing and often excessive pesticide use. These compounds are known for their environmental persistence, remaining active for several decades. Through food chains, pesticides are biomagnified in the tissues of organisms. As the trophic level of individuals is higher, these hazardous substances increase and accumulate, threatening especially organisms at the top of the food pyramid. Although pesticides are primarily intended for controlling pest species, they also exert adverse effects on non-target organisms. The aim of this study was to evaluate the effects of the insecticide Karate Zeon, which contains the active substance lambda-cyhalothrin, on non-target organisms - specifically, larvae of Anax imperator, Libellula, and Coenagrion. Additionally, the insecticide was assessed using a seed germination and root growth inhibition test with white mustard (Sinapis alba). Testing on dragonfly larvae was conducted in one-liter aquaria, where the insecticide was applied at concentrations ranging from 0.05 to 50 ng of lambda-cyhalothrin per ml dechlorinated tap water. To assess acute toxicity, changes in larval behavior and mortality were monitored at 1, 5, 24, 48 hours, as well as 5 and 7 days. Incubation was carried out at 20±2 °C under a standard light/dark cycle. Mortality curves were plotted and toxicological index values calculated. The experiments showed that Karate Zeon is highly toxic to dragonfly larvae. The pesticide exhibits neurotoxic effects, with affected larvae displaying from severe convulsions and paralysis. The 48-hour LC50 (lethal concentration for 50% of individuals) for lambda-cyhalothrin was determined to be 1.92 ng/ml. The Sinapis alba seed test was conducted in 150 mm Petri dishes. A series of test concentrations ranging from 3.125 to 50 ng of lambda-cyhalothrin per ml of dilution water was applied to the surface of filter paper placed in each dish, with a total volume of 5 ml per dish. Thirty white mustard seeds were then evenly distributed on the moistened paper. Incubation was conducted in the dark in a thermostat for 72±2 hours at 20±2 °C. The test parameter was the average root length of Sinapis alba seedlings after 72 hours, from which root growth inhibition was calculated. The 72-hour IC50 (inhibitory concentration for 50% root growth reduction) was determined to be 60.154 ng/ml. Based on the results of the acute toxicity tests on dragonfly larvae and white mustard seeds, it can be concluded that lambda-cyhalothrin - the active ingredient in the insecticidal product Karate Zeon - is toxic to these non-target organisms."] Address: Dolný, A., Dept of Biology & Ecology, Faculty of Science, University of Ostrava, Chittussiho 10, 710 00 Slezská Ostrava, Czech Republic. E-mail: ales.dolny@osu.cz

25204. Shaish, R- (2025): First evidence of autumn southwards migration of Sympetrum fonscolombii (Insecta: Odonata) from Europe and West Asia to the Levant using stable Hydrogen isotope analysis. MSc thesis, Faculty of Natural Sciences, Department of Evolutionary and Environmental Biology, University of Haifa: 25 pp. (in English, with Hebrew summary) ["Insect migration is a massive and ecologically influential phenomenon, yet there are major knowledge gaps regarding migration properties of this group. Many dragonfly species are considered migrants but only a few were thoroughly studied, none of which migrates from Europe to other areas. S. fonscolombii is a common and widespread species expending its range northwards in Europe and Asia. It was recently shown, using stable Hydrogen isotope analysis, that individuals originating from the Levant migrate into West Russia during spring, but no concrete evidence of a return southward autumn migration exists. Furthermore, no systematic phenological data on any Odonata species is available from the Levant. To clarify the migratory status and natal origins of S. fonscolombii in Israel, we collected observations from various sources, and provide a first phenological description for the species in the area. Natal origins of individuals appearing on the Israeli coastline during autumn were inferred using stable Hydrogen isotopes analysis from wing samples, and a spatially explicit origins assignment. We found that the phenological pattern fits a migratory influx represented by masses recorded in autumn. The stable isotopes analysis provides the first direct evidence for a southward migration out of Europe of S. fonscolombii or any other dragonfly species, with some individuals likely originated from the extreme north parts of the species' known range." (Author) https://haifa.primo.exlibrisgroup.com/discovery/fulldisplay/alma99202102485-02791/972HAI_MAIN:HAU] Address: Shaish, R., Dept Evolutionary & Environmental Biology, Fac. of Natural Sciences & Institute of Evolution, University of Haifa, Haifa, Israel

25205. Sharma, K.R.; Dutta, S.; Pradhan, S.; Jaiswal, S. (2025): Characterization of natural insect wings and thrust characteristics of bio-inspired flexible flapping wings. Sadhana 50, 290 (2025). https://doi.org/10.1007/s12046-025-02945-1: (in English) ["In the present work, an experimental study is carried out to analyse the microstructural characteristics and nanomechanical properties of the forewing membrane of three insect species: Bradinopyga geminata, Melanitis leda (butterfly) and Polistes flavus (wasp). Experiments are performed to obtain their mechanical properties, like Young's modulus, hardness using the nanoindentation technique, and their membranes' characteristic features using scanning electron microscopy. The uneven surface topography of these membranes shows different roughness measured by atomic force microscopy. The nanomechanical properties obtained are further used to design the flexible flapping wings of a micro aerial vehicle. The materials are selected for the flexible wings, which have the elastic modulus and the effective stiffness within the range of those of the natural wings tested in the present study. The aerodynamic loads of the flexible flapping wing micro aerial vehicle are measured using a six-axis load sensor for the flexible flapping wings of different chordwise effective stiffness in a quiescent environment. The aerodynamic lift is almost negligible for all wing cases due to symmetric flapping, leading to the dominance of the wing inertia over the aerodynamic forces. The mean aerodynamic thrust per wing beat cycle is positive for all wing cases, and the least stiff wing outperforms the stiffer wings." (Authors)] Address: Dutta, S., Department of Mechanical and Industrial Engineering, Indian Institute of Technology, Roorkee, 247667, India

25206. Siregar, A.Z.; Joshi, R.C.; Sri, L.D.; Panjaitan, H.N.; (2025): Ecological management of insect pests in rice (Oryza sativa L.) using refugia plants and biopesticides: A case study in northern Sumatra, Indonesia. BIO Web of Conferences 189, 01004 (2025) https://doi.org/10.1051/bioconf/202518901004: 12 pp. (in English) ["This study evaluated the ecological management of insect pests in rice through the integrated use of refugia plants (Zinnia elegans Jacq., Cosmos caudatus Kunth, Tagetes erecta L.), biopesticides (Carica papaya L. leaf extract, Cocos nucifera L., water, PGPR, and Beauveria bassiana),

and control in Lubuk Bayas Village, Northern Sumatra, Indonesia. A total of 21 insect species from 13 families and 6 orders were recorded across both treatment and control plots. Rice fields incorporating refugia and biopesticides demonstrated significantly higher insect abundance (2,686 individuals) compared to control plots (1,678 individuals). Furthermore, these ecologically managed fields exhibited greater species richness (R' = 0.29 vs. 0.14 in controls), greater evenness (E= 0.85 vs. 0.56 in controls), and increased diversity (H' = 2.86 vs. 2.27 in controls). The results showed that the ANOVA test was not significant between the use of refugia, but was significant for biopesticide and control. These findings highlight the substantial potential of integrating refugia plants with biopesticides as a sustainable strategy to enhance insect biodiversity and foster ecological pest regulation within rice agroecosystems. Ultimately, this approach can contribute to improved rice productivity and strengthen national food security in Indonesia." (Authors) The list of species includes Agriocnemis femina, Ischnura senegalensis, Pantala flavescens, and Orthetrum sabina.] Address: Ameilia Zuliyanti Siregar, Fac. Agriculture, Univ. Sumatera Utara, Jl. Dr. A. Sofyan No. 3, Medan 20155, Sumatera Utara, Indonesia. Email: ameilia@usu.ac.id

25207. Sisa, M.E.; Kamb, T.J.-C.; Lohaka, D.J.; Kiamfu, P.V.; Mutambel'hity, S.D.; Munganga, G.J.; Akatumbila, A. (2025): Biodiversity of odonates in the riparian strip of the Kimpoko River in Kinshasa/DR Congo. Journal of Entomology and Zoology Studies 13(4): 7-14. (in English) ["Odonates, occupy varied habitats such as forests, farmland, lakes, rivers and other aquatic environments. The present investigation aimed to study the biodiversity of odonates in the riparian strip of the Kimppoko River in Kinshasa/RD Congo. Environmental parameters recorded in the Kimpoko river watershed indicated air temperature, wind speed, humidity, UV index, atmospheric pressure and cloud cover respectively of 29.8±1.5°C; 11.27±1.8 km/h; 68.8±1.5%; 8.9±0.4; 1013.6±0.5mb and 54±1.6%. 774 individuals were captured, divided into 9 families and 53 species. The Libellulidae family was the most diverse, with 30 species out of 53 identified, followed by the Coenagrionidae (9), Lestidae (5), Macromoidae, Gomphidae, Calopterygidae, Chlorocyphidae and Platycnemidae (2 species each) and Aeshnidae (1 species) families. Shanonn-Weaver diversity ranged from H'=3.67 (Kimp3) to H'=3.27 (Kimp2). Hill's index ranged from Hill=0.83 (Kimp2) to Hill=0.71 (Kimp1). Piélou's equitability vacillated between E'=0.94 and E'=0.93. ANOVA revealed a p-value of 0.99 for abundance, species richness and diversity indices between stations, indicating that there was no significant difference between the stations studied. This suggests that environmental conditions have no significant impact on the variability of measurements within this hydrosystem." (Authors)] Address: Sisa, M.E., Hydrobiology & Ecology Laboratory, National Pedagogical University (NPU) P.O. Box 8815 Kinshasa I, DRCongo

25208. Sotério de Souza, D. (2025): Ciência Cidadã e seu potencial no envio de dados sobre libélulas (Insecta: Odonata) no bioma Caatinga. Educaçao Ciência de Saúde 12(1): 18-28. (in Portuguese, with English summary) ["The objective of this study was to explore the potential of citizen science in collecting data on insects of the order Odonata in the Caatinga biome. The study used data from the iNaturalist platform, whose analyses were performed using the R Studio and QGIS software. As a result, of a total of 477 records of odonates analyzed, the genera Erythrodiplax and Erythemis stood out with the highest number of observations for the Caatinga, demonstrating a considerable diversity of species for the biome. However, the study also highlighted gaps, such as the absence of records in some regions, which reinforces the need to expand the network of collaborators and observers. The research highlighted the importance of citizen science in obtaining data in large areas and at low cost. Therefore, the study showed the potential of citizen science in mapping odonates in the Caatinga." (Author)] Address: Sotério de Souza, Daniela, Licenciada em Ciências Biológicas, Unidade Acadêmica de Biologia e Química, Univ. Federal de Campina Grande, Cuité-PB, Brasil. Email: danielasoterios@gmail.com

25209. Stalet, M.; Hélis, S.; Convert, L.; Dreyfus, R.; Bryche, J.-F.; Leroy, L.; Charette, P.G.; Canva, M. (2025): Unraveling the complexity of surface antibacterial effects: A multifaceted evaluation of electrodeposited nanospikes. Applied Surface Science Advances 30, 100881: 15 pp. (in English) ["The intricate interaction between bacteria and surfaces, coupled with the complexity of biofilm formation, poses significant challenges in understanding and controlling microbial behaviour. To combat pathogen contamination and proliferation, bioinspired nanostructures as antimicrobial surfaces have gained prominence over the past decade. However, conflicting theoretical studies and experimental results have made it difficult to draw general conclusions about antibacterial mechanisms. To address these challenges, we have adopted an approach that provides access to deeper insights to characterize the performance of surfaces, by taking into account different modes of antibacterial action. To demonstrate the applicability of this strategy, nanostructured materials mimicking dragonfly wing, were evaluated. A gold electrodeposition process was optimized to create large-area, uniform nanospike arrays, ranging in height from 70 to 570 nm. Large sample area (12 cm²) was critical for ensuring statistically significant results in the analysis of antibacterial effects. Model surfaces with ~150 nm high spikes were tested, demonstrating significant efficacy in reducing bacterial proliferation for Escherichia coli and Staphylococcus epidermidis. Moreover, striking differences between strains were observed in biofouling (surface detachment and release of bacteria). These findings underscore the relevance of such a protocol in precisely characterizing bacterial interactions with antimicrobial materials. By providing a standardized characterization method, this study aims to facilitate a deeper understanding of antimicrobial surface interactions with bacteria and contributes to the development of more effective antibacterial surfaces." (Authors)] Address: Stalet, Marion, Laboratoire Nanotechnologies Nanosyst`emes (LN2 – IRL 3463), CNRS, Universit´e de Sherbrooke, Sherbrooke, QC J1K OA5, Canada. Email addresses: marion.stalet@usherbrooke.ca

25210. Storari, A.P.; Salles, F.F.; Guedes da Fonseca, J.L.; Saraiva, A.Á.F.; Rodrigues, T. (2025): Taphonomy of aquatic insects from the Crato Formation Lagerstätte (Aptian, Lower Cretaceous) under an actualistic look. PLOS ONE 20(9): e0331656. https://doi.org/10.1371/journal.pone.0331656: 31 pp. (in English) ["The Crato Formation (Aptian, Lower Cretaceous) is a fossiliferous deposit of global significance, representing a lacustrine palaeoenvironment which offers insights into aquatic insect taphonomy. Despite its importance, prior studies lacked an actualistic approach. Here, we analyze the preservation of Ephemeroptera and Odonata from this formation using experimental taphonomy on 253 extant Ephemeroptera and 236 Odonata, alongside 306 fossil specimens. Disarticulation experiments showed that the thorax of modern mayfly larvae disarticulated first, yet Crato Hexagenitidae larvae retained intact thoraces, indicating minimal disturbance and autochthonous deposition. Fossil alate specimens rarely exhibited decay-related wing damage, aligning with short decay times. Dragonfly carcasses exhibited a characteristic leg posture in death, also preserved in Crato fossils, further suggesting

minimal transport. Additionally, fossil dragonflies retained labial masks, the first structure to disarticulate experimentally, consistent with parautochthonous assemblages. Mayfly larvae exposed to low salinity during experiments exhibited excessive defecation before death, hinting at possible low salinity conditions in the Crato palaeoenvironment, though preservational challenges obscure confirmation. During experimentation, we also noticed that all carcasses immediately floated under hypersaline conditions, while carcasses immersed in non-hypersaline conditions went through slower decomposition. Thus, we can safely propose with experimental data that microbial biofilms on the surface of the water were acting during carcass sinking in this deposit." (Authors)] Address: Storari, Arianny, Dept Entomology, Staatliches Museum für Naturkunde Stuttgart, Germany. Email: arianny.storari@smns-bw.de

25211. Timm, R.; Pillukat, A.; Martens, M. (2025): Lestes barbarus als neu entdeckter Wirt der Libellengnitze Forcipomyia paludis (Odonata: Lestidae; Diptera: Ceratopogonidae). Libellula 44(1/2): 127-130. (in German, with English summary)) ["Lestes barbarus as a new host of Forcipomyia paludis - On 9 June 2024, in the Eschenrieder Moos west of Munich, Germany, a freshly emerged female of L. barbarus with one biting midge attached on the underside of the left hindwing was documented by photos. This is the first record of F. paludis as a parasite of L. barbarus." (Authors)] Address: Timm, R., St. Konrad-Str. 10, 85540 Haar, Germany. Email: rainer.timm@mineralienfreunde.de

25212. Tiwari, H.; Nandanwar, S.; Goswami, A.; Agase, D. (2025): Assessment of odonate diversity in the Wainganga river basin, Balaghat district, Madhya Pradesh. Zoological and Entomological Letters 5(2): 159-166. (in English) ["The present study, in the Wainganga River Basin, Balaghat District, Madhya Pradesh, from June to October 2024, aimed to assess odonate diversity and understand community structure. Field observations were established on marshes and waterways, and species were classified following wellknown field guides. Diversity was analyzed using ecological index calculations such as Simpson's Index, Shannon-Wiener Index and Pielou's Evenness Index to assess species richness, dominance, and distribution. The study indicated a stable and well-balanced odonate community that belonged to Libellulidae and Coenagrionidae. The data reinforce the ecological role of odonates, such as regulating insect populations and promoting ecosystem balance, as well as the important use of odonates as bioindicators of wetland health and conservation. Overall, the study provides baseline information on odonate diversity from Balaghat and can promote future ecological and conservation research in central India." (Authors)] Address: Tiwari, H., Department of Zoology, Lab. No. 104, PMCoE, Government J.S.T. Post Graduate College, Balaghat, Madhya Pradesh, India

25213. Tiwari, S.; Thakur, D.G.; Chandel, S. (2025): Aerodynamic effect of stroke amplitude on hovering performance of three-dimensional tandem flapping wing. Bioinspiration & Biomimetics 20(3), 036005: (in English) ["In the present numerical investigation we studied the effect of forewing and hindwing stroke amplitude (ϕo) on the aerodynamic performance of dragonfly (or damselfly) hovering flight. Three-dimensional numerical simulation was performed for two wings with a tandem arrangement flapping along an inclined stroke plane. Simulations were conducted for identical as well as non-identical stroke amplitudes of both wings, oscillating with three phase differences: γ= 0°, 90° and180°. For identical stroke amplitudes, the higher stroke amplitude reduces the vertical force coefficients of both wings. For γ= 0°, forewing lift is significantly enhanced for higher stroke amplitudes due to leading edge vortex interaction. For γ= 90°and180°◦, the wing-wing interaction is found to be detrimental to the vertical force coefficient of both wings. The presence of the forewing reduces hindwing lift for allγ, with maximum lift reduction observed for γ= 180°. The maximum hovering efficiency for identical stroke amplitudes is obtained for ϕo= 50° whenγ= 0°. For non-identical stroke amplitudes, the hindwing lift reduces with an increase in forewing stroke amplitude for allγ. Also, forewing lift increases with hindwing stroke amplitude when γ= 0°. However, for γ= 90° and180°, forewing lift is reduced for higher hindwing stroke amplitudes. It was found that non-identical stroke amplitudes are detrimental to the hovering efficiency of dragonfly flight. The present study will help us optimize wing kinematics during the development of dragonfly-inspired MAVs." (Authors)] Address: Tiwari, S., Dept of Mechanical Engineering, Defence Institute of Advanced Technology (DU), Pune – 411025, India. Email: shubh6tiwari@gmail.com

25214. Tomingas, P.; Kont, R.; Lõhmus, A.; Vaikre, M. (2025): Diversity of small waterbodies sustains aquatic biodiversity in drained forest landscapes. Hydrobiologia 852: 1677-1692. (in English) ["Small freshwater bodies (streams, pools, ponds, ditches) are biodiversity hotspots that are vulnerable to hydrological modification of landscapes. The impacts of landscape-scale modifications are difficult to study because multiple processes combine (loss, creation and modification of waterbodies and their surroundings). For an insight, we sampled sensitive insect orders (Ephemeroptera, Plecoptera, Trichoptera, Odonata) in small waterbodies in naturally comparable more and less drained forested catchments in Estonia. We asked how the landscape-scale species richness, abundance and assemblage composition are formed by contributions of different waterbodies. The mean abundances and assemblages were similar, but overall species richness was higher in more drained landscapes, primarily due to added man-made ponds (with distinct assemblages) and the heterogeneous surroundings of waterbodies. Ditches did not host specialist species and could not compensate for the loss of natural waterbodies. Natural pools supported the fewest species, but at a comparable mean abundance with the other waterbody types. The results indicate that a mid-term landscape-scale impact of forestry drainage on freshwater biota depends on which waterbodies and how abundantly are added and retained. To better regulate hydrological interventions, it is necessary to develop such regionally observed patterns into a functional understanding of long-term effects across different landscapes." (Authors)] Address: Tomingas, Piia, Institute of Ecology & Earth Sciences, Univ. of Tartu, J. Liivi 2, 50409, Tartu, Estonia. Email: piia.tomingas4@gmail.com

25215. Tyrrell, M. (2025): Studies of water quality and habitats in relation to site selection in neighbouring and visually similar lakes by Coenagrion pulchellum (Variable Damselfly) (Vander linden) in Northamptonshire. Journal of the British Dragonfly Society 41(2): 147-165. (in English) ["Site selection by C. pulchellum has long presented a conundrum in our understanding of why this species breeds in some sites but not in others, even adjacent ones, despite them appearing the same. Differences in water quality have been proposed as an explanation for this, in relation to eutrophication and turbidity. Habitat differences are also thought to play a part. This study looks at water quality attributes and habitat differences in breeding sites in Northamptonshire, by comparing breeding sites with visually similar sites and with adjacent lakes in neither of which does C. pulchellum breed. The results show that

breeding sites shared a combination of high dissolved oxygen (DO), dead floating leaves and stems of Sparganium erectum (Bur Reed) and Typha latifolia (Bulrush), floating, near surface stems of Ceratophylum demersum (Rigid Hornwort) and the presence of Nymphaea sp. (Water Lily). However, several non-breeding sites also shared these characteristics so further work is required to understand more completely site selection cues." (Author)] Address: Tyrrell, M., 8 Warwick Close, Raunds, Northamptonshire, NN9 6JH. Email: mark.p.tyrrell@gmail.com

25216. Voronin, M.Yu.; Sazhnev, A.S.; Evdokimov, N.A.; Tkacheva, A.A.; Yaroshevskaya, V.V.; Skachkova, A.V. (2025): Materials on the invertebrates macrofauna of temporary roadside water bodies of the Saratov Trans-Volga region. Field Biologist Journal 7(3): 361-370. (in Russian, with English summary) [In 2023–2024, twelve temporary reservoirs that had emerged due to disruption of meltwater runoff at highway embankments were investigated in the Balakovsky, Marksovsky, Engelssky, and Rovensky districts of the Saratov Region, Russia. 51 taxa of aquatic organisms were recorded in the fauna of roadside puddles. Records of larvae of Lestes dryas, Sympecma fusca, Leucorrhinia pectoralis, and Cordulia aenea are listed.] Address: Voronin, M.Yu., Maksim Yu. Voronin, https://orcid.org/0000-0001-7992-4502, Saratov State University, 83 Astrakhanskaya St., Saratov 410012, Russia. E-mail: voroninmj@yandex.ru

25217. Wang, H.; Zhang, Z. (2025): Dragonfly visual attention-merged evolutionary neural network solving ultrahigh dimensional global optimization problems. International Journal of Intelligent Systems Volume 2025, Article ID 6614031, https://doi.org/10.! 155/int/6614031: 29 pp. (in English) ["Dragonfly visual systems intrinsically incorporate a variety of motion-sensitive neurons able to be well contributed to probe into bio-inspired computational models. However, it remains unclear how their visual response mechanisms can be borrowed to construct neurocomputational models for solving optimization problems. Hereby, a feedforward dragonfly visual attention-merged neural network (DVAMNN) with presynaptic and postsynaptic subnetworks is developed to output two types of online activities named learning rates in terms of the dragonfly visual information-processing and attention mechanisms. Integrated such learning rates into a new-type and metaheuristics-inspired state transition strategy', a dragonfly visual attention-merged evolutionary neural network (DVAMENN) with the unique parameter of input resolution is developed to solve ultrahigh dimensional global optimization (UHDGO) problems. The theoretical analysis implicates that the DVAMENN's complexity' is mainly decided by the optimization problem itself. Experimental results have confirmed that DVAMENN can successfully optimize the structures of two sixth-order active filters and discover the global or approximate solutions of the CEC' 2010 and CEC' 2013 benchmark suites with dimension 20,000 per example. Nevertheless, the compared metaheuristics encounter unprecedented troubles in the case of UHDGO." (Authors)] Address: Zhang, Z., College of Big Data and Information Engineering Guizhou University, Guiyang 550025, China. Email: zhzhang@gzu.edu.cn

25218. Wang, H.; Zhang, Z. (2025): Dragonfly visual multipath peak evolutionary neural network for solving constrained optimization problems. Proceedings Volume 13657, Second International Conference on Power Electronics and Artificial Intelligence (PEAI 2025); 136571V (2025) https://doi.org/-10.1117/12.3066842: 9 pp. (in English) ["Based on the information processing mechanism of the dragonfly visual system and population evolution concepts, this paper explores the Dragonfly Visual Multi-Path Spiking Evolutionary Neural Network (DVMPPENN) for solving strongly nonlinear constrained optimization problems. In the model design, a state matrix corresponding to candidate solutions and a function value matrix are used as inputs. The state update strategy is established based on the neural response characteristics of the Dragonfly Small Target Motion Detection (STMD) neurons and Wide-Field Motion Detection (WFMD) neurons, resulting in a visual evolutionary neural network with only two adjustable parameters. The computational complexity of this network is determined solely by its input resolution and leverages the visual neural network to handle the constraints of optimization problems. Comparative numerical experiments demonstrate that this neural network has a significant advantage in solving strongly nonlinear constrained optimization problems and provides important insights for solving engineering optimization problems." (Authors)] Address: Zhang, Z., Guizhou Provincial Characteristic Key Lab. System Optimization and Scientific Computing, Guizhou Univ., China

25219. Wang, J.-I.; Li, W.-Y.; Wei, S.-J.; Li, X.-G.; Liu, Y.-J.; Wang, J.; Yao, Y.; Wang, Q.; Wang, W.-M. (2025): Manipulation of two ß-diketone co-ligand to form Yb_2 and Yb_4 compounds: Structures, near-infrared luminescence properties, and biological activities. Inorganica Chimica Acta 579, 1 May 2025, 122563: (in English) ["Herein, two polynuclear Ln(III)-based clusters formulated as $[Yb_2L_2(dbm)_4]$ (1) and $[Yb_4(\mu_3\text{-}O)_2(acac)_4L_6]$ (2) have been obtained by using two different ß-diketones (dibenzoyl methane and acetylacetone) via solvothermal method. The crystal structures, near-infrared luminescent properties, and biological activities of the two Yb(III)-based clusters (1 and 2) have been studied systematically. The two Yb(III)-based clusters possess different geometric structures (The cluster 1 has a binuclear structure with a butterfly topology, while cluster 2 possess a tetranuclear structure with a dragonfly topology). The photoluminescence properties studies suggest that both clusters 1 and 2 display typical near-infrared luminescence of Yb3+ ions at room temperature. Moreover, biological activities researches suggest that cluster 1 and cluster 2 exhibit better antibacterial activity against three common bacteria: Escherichia coli, Staphylococcus aureus, and Candida albicans compared to the Schiff base ligand (HL) and the ß-diketone salts $(Yb(dbm)_3{\cdot}2H_2O$ and Yb(acac)3·$2H_2O)$. The interactions between clusters 1 and 2 and calf thymus DNA has been studied by UV spectroscopy, cyclic voltammetry and fluorescence spectrometry. The results suggest that both clusters 1 and 2 are mainly intercalated with calf thymus DNA. It is worth mentioning that both clusters 1 and 2 are rare multifunctional lanthanide compounds with simultaneously fluorescence properties and biological activity." (Authors)] Address: Wang, W.-M., College of Chemistry and Materials, Taiyuan Normal University, Jinzhong, Shanxi 030619, PR China. Email: wangwenmin0506@126.com

25220. Wang, Y.; Liu, X.; Jin, M.; Xie, G.-a.; Li, L.; Yu, A. (2025): Logging intensity reshapes insect biodiversity in pine wilt disease forests: a multi-trophic assessment from Jiangxi, China. Front. For. Glob. Change 8:1679737. doi: 10.3389/ffgc.2025.1679737: 13 pp. (in English) ["Introduction: Pine wilt disease (PWD), caused by Bursaphelenchus xylophilus, has led to widespread logging interventions in subtropical China, especially clearcutting, yet the ecological consequences for insect communities remain poorly understood. Insects play critical roles in ecosystem functioning, making it essential to quantify how different logging strategies shape their diversity, community composition, and functional guilds. Methods: We established 48 stratified plots across four PWD-affected counties in Jiangxi Province to

compare unlogged controls (UC), selection cutting (SC), and clearcutting (CC) treatments. Insect diversity was evaluated using Shannon and Simpson indices, while community structure was analyzed with PERMANOVA and NMDS ordinations. Indicator species were identified via IndVal analysis. Functional guild dynamics were measured across trophic groups, and structural equation modeling (SEM) was used to assess vegetation cover and litter thickness as mediators of diversity responses. Results: Clearcutting caused significant declines in insect diversity (Shannon index: UC 3.63 ± 0.02 vs. CC 3.14 ± 0.18; F = 19.17, p = 0.00057; Simpson index: UC 0.960 vs. CC 0.919). PERMANOVA attributed 60.7–89.5% of variation in insect community structure to logging treatment ($p < 0.05$), with NMDS ordinations showing distinct clustering: CC sites were dominated by disturbance-tolerant taxa (e.g., Cicindelidae, IndVal = 0.94), while UC sites harboured specialists (e.g., Libellulidae, IndVal = 0.95). Functional guild analysis revealed strong reductions in predators (-63.7%) and parasitoids ($p < 0.001$) under CC, whereas decomposers were relatively resilient. SEM demonstrated that vegetation cover (ß = 0.69, $p < 0.001$) and litter thickness (ß = 0.25, p = 0.041) acted as key mediators, with logging intensity indirectly depressing insect diversity via microhabitat degradation (model R2 = 0.81). Discussion and conclusion: Our findings show that intensive clearcutting exacerbates biodiversity loss and trophic collapse in insect communities of PWDaffected pine forests, largely through reductions in vegetation structure and litter. In contrast, lighter interventions such as selection cutting supported greater ecological resilience. To balance disease control with biodiversity conservation, retention forestry practices maintaining =30% canopy cover and 20–30 m³/ha deadwood are recommended to buffer microhabitats and sustain insect community functioning." (Authors)] Address: Wang, Y., Forestry Pest Control Research Institute, Jiangxi Academy of Forestry, Nanchang, China

25221. Wang, Y.; Yuan, X.; Li, H.; Zhang, Y.; Miao, T.; Xin, Y.; Hu, F. (2025): Community structure and influencing factors characteristics of macrozoobenthos in the upper Yellow River (Gansu section) and Taohe River. Journal of Desert Research 45(2): 284-293. (in Chinese, With English summary) ["This study investigates the characteristics of macrozoobenthos community structure in the upper reaches of the Yellow River Basin, as well as the distribution variability between the mainstem and tributaries. A total of 18 sampling sites on the main stream of the Yellow River and its tributary Taohe River in Gansu were investigated in July-August 2023 to study the composition and quantity of macrozoobenthos. 77 species of macrozoobenthos were collected, including 62 species of arthropods, 11 species of molluscs, and 4 species of annelids. The numbers of macrozoobenthos collected from the main stream and its tributaries were 32 and 66 species respectively, and there were 21 common species. Across the entire study area, the dominant species were Anisogammarus sp., Radix ovata, and Radix auricularia. Significant spatial variability in macrozoobenthos was observed in the study area. The density of macrozoobenthos in tributaries was higher than that in the main-stem, while the biomass in tributaries was lower than in the mainstem. Functional feeding taxa analysis revealed that longitudinal transport capacity in the mainstem was zero, while the tributaries exhibited |a more comprehensive range of parameters. Independent samples t-tests showed that the macrozoobenthos Margalef richness index was highly significant ($P<0.01$) between the mainstem and tributaries, indicating that macrozoobenthos richness was significantly higher in tributaries than in the mainstem. Pearson correlation analysis and redundancy analysis (RDA) demonstrated that among various environmental factors, dissolved oxygen (DO), water temperature (WT), total dissolved solids (TDS), salinity, altitude, and pH had a greater impact on the distribution of benthic animals in both the main stream and tributaries of the Yellow River Basin." (Authors) Agrion atratum (= Atrocalopteryx atrata (Selys, 1853)) is a dominant species in tributaries.] Address: Wang, Y., College of Energy & Power Engineering / Northwest Collaborative Innovation Center for Low Carbon Town Support Technolog, Lanzhou Univ. of Technology, Lanzhou 730050, China

25222. Ward, M.S.; Belskis, A.M.; Hermann, S.L.; Sweetman, J.N. (2025): Stability of macroinvertebrate communities in vernal ponds following natural drying and refilling events. Wetlands Ecology and Management 33:75: 10 pp. (in English) ["Vernal ponds are vital components of forest ecosystems in the eastern United States, providing biodiversity support, water filtration, and flood regulation. Climate change may exacerbate hydrological fluctuations, altering the communities these seasonal wetlands support. This study examines the effects of drying disturbances on macroinvertebrate communities in vernal ponds, focusing on comparing biodiversity metrics before and after hydrological drawdown. We conducted weekly monitoring of pond inundation and macroinvertebrate sampling in five vernal ponds in Central Pennsylvania during 2023. We measured alpha diversity using species richness and Shannon diversity, and calculated temporal beta diversity with Jaccard's dissimilarity index, examining turnover and nestedness. We found no significant changes in alpha diversity metrics between pre- and post-drying periods. However, we observed a trend toward greater species loss (77% of dissimilarity) compared to gains (23%). Beta diversity patterns of turnover and nestedness were stable across temporal and spatial scales, suggesting that drying disturbances did not significantly affect community structure. These findings contrast with previous studies reporting significant shifts in community composition, potentially due to the adaptive strategies of macroinvertebrates. This research highlights the need for long-term studies to assess drying intensity and informs conservation strategies for vernal pond ecosystems in the context of climate change." (Authors) The supplemental material includes data on Aeshna sp. and Boyeria sp.] Address: Ward, M.S., Dept Ecosyst. Science & Manag., The Pennsylvania State Univ., University Park, PA, USA. Email: msw5688@psu.edu

25223. Ware, J.; Simonsen, T.J.; Rasmussen, J.A.; Archibald, S.B. (2025): Systematics of the extinct suborder Cephalozygoptera (Odonata): a wing-based analysis comparing its genera with those of extant Zygoptera. American Museum Novitates 4043: 19 pp. (in English) ["We test the relationships of 31 genera of the extinct suborder Cephalozygoptera against those of 37 extant Zygoptera and Epiophlebia Calvert (Anisozygoptera). As the fossil record of Odonata is dominated by wings and wing fragments, we scored 21 wing characters and one head character. Maximum likelihood and maximum parsimony trees found Cephalozygoptera to be monophyletic with strong support and Zygoptera to be paraphyletic with respect to Epiophlebia, although the latter relationship is weakly supported and we reject it as an artifact. We treat Eodysagrioninae Rust, Petrulevicus, & Nel and Eodichromatinae Cockerell as families, Zacallatidae Cockerell as a subfamily of Eodichromatidae, and transfer these to the Cephalozygoptera. We treat Eodichromatidae, stat. rev., and Eodysagrionidae, stat. rev., as the superfamily Eodichromatoidea, supfam. nov., and the Dysagrionidae Cockerell, Sieblosiidae Handlirsch, and Whetwhetaksidae Archibald and Cannings as the informal sieblosioid family group." (Authors)] Address: Ware, Jessica, Dept Biol., 415 Boyden Hall, Rutgers Univ., Newark, NJ, 07102, USA. E-mail: jware42@andromeda.rutgers