Odonatological Abstract Service

published by the INTERNATIONAL DRAGONFLY FUND (IDF)

Editor:

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Published in Zerf, Germany

ISSN 1438-0269

1996

24453. Utzeri, C.; Cobolli, M. (1996): Alcune considerazioni sul popolamento a Odonati delle piccole isole circumsarde. Biogeographia, Lavori della Società italiana di Biogeografia (n.s.) 18: 377-383. (in Italian, with English summary) ["25 dragonfly species (11 Zygoptera and 14 Anisoptera) were recorded from 27 of the circum-sardinian islets. A partial correlation test, applied to islets' numbers of species and either islets' surface and distance from the mainland of Sardinia or surface and height, shows that surface is the only one variable significandy correlated to number of species. The same is shown by a stepwise multiple regression analysis, with number of species as the dependent variable and islets' surface, height and distance from the Sardinian coast as the independent variables. In determining dragonfly population abundance and variety, the presence of water, as well as water stability, are probably factors of major importance. In fact, while only the larger islets, in which somewhat larger and permanent water bodies are present, possess a relatively abundant and diversified dragonfly population, even some very small islet, in which only small temporary ponds were recorded, guested a greater number of species in rainy than in dry years. Also, the dragonfly population of these islets was more abundant and diversified than that of those in which water bodies were absent at all." (Authors)] Address: Utzeri, C., Dipartimento di Biologia Animale e deWUomo, Universitä «La Sapienza», Viale dell'Universitä 32, 00183 Roma, Italy

2004

24454. Averill, M. (2004): Dragonflies in 2004. Worcestershire Record 17: 19. (in English) [Verbatim: It wasn't a bad year weather-wise for observing insects with many of the summer months dry and warm and the only blemish was August which was exceptionally wet in the first week. This good weather was fitting for what was the 21st anniversary of the British Dragonfly Society and many events marking the occasion were held throughout the country. In Worcestershire there were none of the expected visits from Anax ephippiger and searches for Sympetrum fonscolombii at Pirton and Kinsham proved fruitless. It appears that Worcestershire is not yet quite suitable to sustain the continued presence of this dragonfly as it does in Southern England. A concerted effort was made to look for Erythromma viridulum which has made a rapid spread from Essex in the last five years. This was prompted by a site being found in East Warwickshire. However, it was perhaps too early for it to have spread so far west just yet. Next year it will be useful to keep an eye out for this species as it is only a matter of time before it appears in Worcestershire. Other more common species did well, starting with Calopteryx virgo which seamed to be found in many new locations and in good numbers. Later in the year Aeshna cyanea were to be seen just about everywhere, even in to late October. One species that had another disappointing year was Gomphus vulgatissimus which once again emerged in low numbers. It is hoped that some survey work can be carried out next year to try and determine whether this is just a trend or something more worrying. … Most interesting of all was the discovery of Libellula fulva which suddenly was to be found along the Avon [at Eckington] as if it had always been there, but more of that elsewhere in this issue.] Address: Averill, M., 49 James Rd, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

24455. Averill, M. (2004): Scarce Chaser Libellula fulva makes a surprise addition to county list. Worcestershire Record 17: 17-18. (in English) [Verbatim: L. fulva is classed as scarce in the Red data book of insects in Great Britain and Ireland being found in only 42 of all the 10 Km squares (1.33%). It was with some surprise that in 2004 this dragonfly was suddenly noticed and indeed was found to be very much at home in Worcestershire. In Europe the distribution is widespread but local from France eastwards through Germany towards Russia. It is on the IUCN European species list of concern. Here in Britain L. fulva is restricted to ten scattered river systems in southern England yet it can be locally quite numerous. The six main localities are in Norfolk, Suffolk, Sussex, Cambridgeshire, Somerset, Avon, Dorset and Hampshire. Recently there have been signs of some expansion in to the River Wey on the Surrey/Hampshire border and the River Stour, Colne and Chelmer in Essex. What is surprising is how many individuals were present in Worcestershire and the fact that they looked very established. While nationally the distribution in Britain of this dragonfly remains scarce, as of this year it stands as the 6th rarest in Worcestershire out of a total of 27 species. How could this fairly obvious dragonfly be overlooked?

It may well have been establishing itself for some years as there was in fact an unreported sighting of a specimen seen in 1998 at Strensham by Peter Garner. It was however a keen eyed fisherman who noticed its presence this year. Survey work this summer soon established that the dragonfly was easily seen along the River Avon from Pershore to Tewkesbury through Worcestershire and in to Gloucestershire. Finding the insect was not hard as it could be found in all the fishing bays, often with the similar looking Orthetrum cancellatum. It is this species which could have led to the newcomer not being noticed as they are superficially similar. Telling them apart is not difficult as on closer examination L. fulva has a conspicuous dark triangle at the base of the hind wings unlike O. cancellatum which has no such marking. Adult females are more distinguishable because they have an orange brown colour with black triangles on most abdominal segments. The males often exhibit the characteristic rubbing marks due to mating where the legs of females rub the blue pruinescence off the sides of the abdomen of the male. In terms of habit the familiar O. cancellatum is nearly always alighted on a wooded platform or flat bare earth, whereas L. fulva prefers to perch on vegetation. L. fulva frequents slow flowing lowland rivers in nutrient rich water with prolific stands of Common Club Rush Schoenoplectus lacustris, Branched Bur-reed Sparganium erectum and Reed Sweet grass Glyceria maxima. The choice of smaller quieter streams means that the choice of the River Avon is not surprising. The discovery of this species certainly must make us view the Avon with increased interest and it cannot be dismissed just because the water quality has been poor in the past and because boats are present. It will be interesting to see how this species fares in the future. Please be on the look out for larval cases, they are very distinctive in that they are libellulid in shape but have very prominent curved dorsal spines. The emergence period is mid May and the adult should be on the wing until mid July.] Address: Averill, M., 49 James Rd, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

24456. Jolivet, S.; Masselot, G. (2004): Substrats artificiels et évaluation biologique des étangs: (1) etude preliminaire sur St-Quentin-en-Yvelines (78, France). Ephemera 2003 (2004) 5(1): 47-62. (in French, with English summary) ["The biological assessment of the quality of Standing waters is less developed compared to running waters. Our aim was to identify indicator taxa, as a first Step to elaborate a biotic index. The pond of Saint-Quentin-en-Yvelines (78, France) has been sampled during two years. This pond (surface = 135 hectares, elevation = 163 m) is located in a large urban area, and its water supply receives both sewage and phytosanitary products. Sampling was achieved using artificial Substrates (as used by Jolivet et al. 2001), containing stones and cord. They were raised every six weeks in Winter, Spring and Summer. 108 taxa were collected, among which 49 ETDO (Ephemeroptera, Trichoptera, Diptera and Odonata [Chalcolestes viridis, Sympecma fusca, Coenagrionidae, Cordulia aenea, Aeshna affinis, A. mixta, Aeshna sp., Anax imperator, Orthetrum cancellatum, Libellula depressa, L. quadrimaculata, Crocothemis erythraea, Sympetrum sanguineum, Sympetrum sp.]). These four taxonomic groups were used in a synecoparsimony analysis. That method permitted to distinguish 7 indicator taxa belonging to three saprobic levels (α, αß and ß mesosaprobes). There is congruence between the 2001 single biocenogram of sites and the concentration classes in ammonium (NH4+)." (Authors)] Address: Masselot, G., Laboratoire d'Entomologie, Muséum National d'Histoire Naturelle, 45, rue Buffon, 75005 Paris, France. E-mail: gm@invfinr.org

2007

24457. de Boer, E.P. (2007): Libellenrijk Fryslân. TWIRRE natuur in Fryslân 17(4): 110-123. (in Dutch) ["Conclusions and future prospects: Fryslân is an important province for dragonflies. Our province is relatively rich in watery ecosystems of sufficient quality, as evidenced by the presence of several critical dragonfly species. For a number of species, our province is the largest and most important habitat in the Netherlands and even in Western Europe. At present, Fryslân is an important stronghold for Aeshna viridis and the Delleboersterheide is home to the only lowland population of Western Europe of the Leucorrhinia albifrons. Of the eight dragonfly species included in the Habitats Directive, four occur in Friesland. In addition to the two previously mentioned species, these are Leucorrhinia pectoralis and the L. rubicunda. For the latter species, the southeastern corner is an important wintering and, since 2005, breeding area. In addition to these Habitats Directive species, many critical and nationally rare dragonfly species occur in Fryslân. Species such as Aeshna subarctica and Somatochlora flavomaculata are less rare in our province than in the rest of the Netherlands. The current distribution of most Frisian dragonfly species is now reasonably well known. Thanks to intensive, species-oriented research, knowledge of the Frisian dragonfly fauna has increased significantly in recent years and the distribution of various, difficult to recognize and rare species has also been well mapped. Since 2001, five new species have been identified for the Frisian fauna and a number of species that were previously considered very rare or disappeared appear to occur (still or again) in our province. Of the 72 dragonfly species in the Netherlands, 55 have now been found in Friesland. Of these, 43 species reproduce in our province, one species is extinct and eleven species are vagrants or invasion guests. With the publication of the 'Provisional distribution atlas' (De Boer & Van Hijum 2005), an important basis has been laid for a province-wide overview of Frisian dragonflies. Most species are found in the southeast corner. Of the nature reserves with the highest diversity, the Delleboersterheide (44) and the Lendevallei (38) are among the top ones, but diversity is also high in many other areas. Dragonfly species from peat bogs and fens are doing very well, but dragonflies from flowing waters, such as Calopteryx splendens and Platycnemis pennipes, are doing considerably less well. This is probably purely due to the fact that Fryslân has a poor supply of running water, but the poor water quality and rigorous sanitation management also play a role. In the last five years, a number of southern, heat-loving species have invaded our province. The establishment of these new species will obviously influence the competitive relationships between the various dragonfly species. For example, the increasing presence of Anax imperator (both

larvae and adults) in the last 20 years has most likely resulted in formidable competition with our 'native' glaziers for food and breeding sites. The persistent warm summers have been very favorable for southern vagrants, as evidenced by observations in Fryslân in 2005 and 2006 of Crocothemis erythraea, Aeshna affinis and Sympetrum meridionale. Northern species are expected to have a more difficult time if the trend of this climate change continues in the coming years. Yet this is not (yet) really noticeable in Fryslân. The estimate is that we are witnessing a transition phase in which southern and northern species coexist. As a result, diversity may have reached an exceptional peak at this time. It is difficult to predict whether the newcomers will succeed in gaining a foothold, how long the northern species can survive and whether more new species will be added in the coming years. But one thing is certain: the speed of change in recent years is unique. Never before in the history of field biology have such rapid changes been observed and recorded in the Netherlands. It remains very interesting to closely monitor developments in the future." (Author/Google translate)] Address: de Boer, E.P., coördinator 'De Hynstebiter', Libellenwerkgroep Friesland, Stokkershagen 1, 8406 GA Tijnje, The Netherlands. E-mail: anax@home.nl

24458. Jourde, P.; Hussey, R. (2007): Quelques cas d'émergences distantes de l'eau chez Ladona fulva (Müller, 1764) Libellulidae). Martinia 23(2): 67-69. (in French, with English summary) ["Distant emergence in L. fulva and Orthetrum albistylum "During a period of drought, the dragonfly larvae that live in Allas lake, Charente-Maritime (South-West France), must travel significant distances to find suitable supports for metamorphosis. Two exuviae from L. fulva were discovered 21 meters from the water. In addition, 7 exuviae of O. albistylum were found at a distance of 19 meters. For both species, these distances far exceed those usually quoted in literature." (Authors)] Address: Jourde, P., LPO, La Corderie Royale, BP 90263, 17305 Rochefort, France. E-mail: philippe.jourde@lpo.fr

2008

24459. Averill, M. (2008): Black Darter dragonfly at Hartlebury Common. Worcestershire Record 25: 8-9. (in English) ["Lowland bog and that is at Hartlebury Common, Worcestershire, UK.; in September 2008, a lone female Sympetrum danae was spotted at the bog. This is the first S. danae record for the site and bodes well if water can be retained for longer periods." (Author)] Address: Averill, M., 49 James Rd, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

24460. Averill, M. (2008): The National Dragonfly Atlas Project - 2008 to 2013. Worcestershire Record 24: 16. (in English) [Introduction in the National Dragonfly Atlas Project - 2008 to 2013.] Address: Averill, M., 49 James Rd, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

24461. Faton, J.-M.; Schleicher, J. (2008): Découverte de Somatochlora flavomaculata (Vander Linden, 1825) dans le département de la Drôme (Odonata, Anisoptera, Corduliidae). Martinia 24(1): 30-32. (in French, with English summary) ["Discovery of S. flavomaculata in Drôme department: 7-VII-2007, Marais des Bouligons reedbed, located on the banks of the river Drôme river in the Haut-Diois region (Beaurières commune).] Address: Faton, J.-M., Les Garis, F-26120 La Baume Cornillane, France. Email: fatonjm@aol.com

24462. 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) ["39 species - 64 % of the Lithuanian Odonata fauna - have been recorded from 108 sites sampled between 28 June 2005 and 5 July 2008. Eight species found are listed in the Lithuanian Red Data Book: Aeshna viridis, Anax parthenope, Gomphus flavipes, Ophiogomphus cecilia, Cordulegaster boltonii, Leucorrhinia albifrons, L. caudalis, L. pectoralis. The following species are listed in Annex II and/or Annex IV of the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora: A. viridis (IV), G. flavipes (IV), O. cecilia (II, IV), L. albifrons (VI), L. caudalis (VI), L. pectoralis (II, IV). Lithuania has a substantial role on a pan-European level in the protection of a number of important Odonata species. ... It is to be emphasized that our samplings took place only on 108 sites on altogether 24 sampling days. In our opinion the inventory and research of the Lithuanian Odonata fauna still has a promising perspective, since most of the water bodies of the country are of good or excellent quality, being relatively free from negative civilization influences like pollution and water regulation." (Authors)] Address: Kovacs, T., Mátra Museum., Kossuth Lajos u. 40, 3200 Gyöngyös, Hungary. E-mail: koati@matavnet.hu

2009

24463. Luthardt, V.; Brauner, O.; Hoffmann, C.; Kabus, T. (2009): Ausgewählte Ergebnisse der Ökosystemaren Umweltbeobachtung in den Brandenburger Biosphärenreservaten. Fachbeiträge des Landesumweltamtes, Heft Nr. 112: 24 pp. (in German) ["The biotic studies of the field pools conducted as part of the ÖUB (Austrian Biodiversity Conservation Union) revealed a high level of species diversity, particularly among dragonflies and herpetofauna. At the same time, the development of the communities in these highly dynamic habitats was strongly influenced by the development of the water balance. This was determined, on the one hand, by the development of specific vegetation structures, such as reed beds, submerged vegetation, and mudflat communities, as well as by the current water supply for successful larval development. Thus, the exceptionally species-rich dragonfly community in the Brodowin field pool in the first two ÖUB survey years of 2000 and 2004 also showed a strong dependence of the current community on the water balance. This was also confirmed by studies conducted in the intervening years. In the dry years of 2000 to 2002, the pool was almost exclusively dominated by species characteristic of pond waters. Among them was Aeshna affinis, which in the past was primarily distributed in southern Europe and which achieved enormous hatching numbers of several thousand animals in 2002 in the microclimatically

particularly favorable Feldsoll (cf. Brauner 2005). During a phase of permanent water balance from the end of 2001 to the summer of 2006 (Fig. 4.2), moorland species, reed species, and species of emergent structures with more demanding habitat requirements then increasingly appeared. Of outstanding conservation importance during this period were the large hatching abundances of Leucorrhinia pectoralis, listed in Annexes II and IV of the Habitats Directive. In 2004, more than 250 exuviae of this species were found, and in 2006, at least 1,000. This is probably one of the largest hatching colonies of Leucorrhinia pectoralis ever observed in Germany. As early as 2003, a one-year development cycle was demonstrated for a small portion of the larval populations of this species and of Brachytron pratense in the water body for the first time in Central Europe (Brauner 2006). In addition to the above-average warm summer of 2003, the particularly favorable microclimatic conditions of the Feldsoll may have been a key factor. Following the dry period that began in the summer of 2006, 2007 saw a stronger succession of floodplain vegetation, silt meadows, and reedbed communities. This drying trend was likely further exacerbated in 2005 and 2006 by winter soil furrowing on the surrounding fields to improve frost protection and thus reduce meltwater runoff. As a result, the Feldsoll was no longer suitable as a breeding habitat for semi-aquatic or other ponds, the current community also showed a strong dependence on the current and previous water balance. During dry periods, the ponds were almost exclusively dominated by species characteristic of pond waters. During the perennial phases, 21 dragonfly species were recorded in the Schmiedeberg field pond in 1999 alone, and a total of 23 in 2004." (Authors) https://lfu.brandenburg.de/sixcms/media.php/9/Fachbeitrag-%20112_Ergebnisse%20%C3%96UB%20in%20BR %202-009.pdf] Address: Landesumweltamt Brandenburg, Seeburger Chaussee 2, OT Groß Glienicke, 14476 Potsdam

24464. Trapero-Quintana, A.; Tabet, M.A.; Tur, B.R.; Jiménez, Y.A.; López, M. (2009): Notes on the Odonata of Refugio de Fauna Monte Cabaniguán, Las Tunas, Cuba. Bulletin of American Odonatology 11(1): 26-28. (in English) ["The Odonata fauna at Refugio de Fauna Monte Cabaniguán (Las Tunas Province) in eastern Cuba is brought on record. A total of 19 species in four families (Lestidae, Coenagrionidae, Aeshnidae, Libellulidae) were collected; 15 were libellulids." (Authors)] Address: Trapero-Quintana, A., Departamento de Biología, Universidad de Oriente, Patricio Lumumba s/n, C.P. 90500, Santiago de Cuba, Cuba. Email: atrapero@cnt.uo.edu.cu

2010

24465. Averill, M. (2010): The New UK Dragonfly Atlas – Progress in Worcestershire. Mike Averill. Worcestershire Record 29: 10-11. (in English) [The second of a five-year survey has been completed now in Worcestershire (UK) and the results are summarised in a map and a spreadsheet. 2009 added 981 new records. Amongst the 24 species recorded were some interesting records including Sympetrum danae, S. fonscolombii and Erythromma viridulum.] Address: Averill, M., 49 James Rd, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

2011

24466. Averill, M. (2011): Worcestershire and the new Dragonfly Atlas of England, Wales & Scotland. Worcestershire Record 30: 28-28. (in English) [The number of records of dragonflies in Worcestershire for each 2x2 km square collected in the first three years (2008-2010) of the project are mapped. In addition, a table shows the number of records for each species (n=25) per 10x10 km square in Worcestershire for 2008-10.] Address: Averill, M., 49 James Rd, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

2012

24467. Averill, M. (2012): The new Dragonfly Atlas of England, Wales & Scotland. Worcestershire Record 32: 17. (in English) [The author gives a status quo report summarising the results from the last four years in Worcestershire, UK in the map (2×2 km square). In 2011, 86 recorders gathered 1312 new records which added to the previous three years to give 4588 in total. The project will be finalised in 2012.] Address: Averill, M., 49 James Road, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

24468. de Boer, E.P. (2012): Een virus om van te dromen! Brachytron 15(1): 71-73. (in Dutch) [Verbatim: A virus to dream about! The year is 2001. In the spring, Robert Ketelaar, who at the time worked for the Butterfly Foundation, visited Friesland and gave a lecture on Coenagrion armatum. Following the rediscovery in the Weerribben, Robert visited all former and potential sites in the Netherlands to find out whether this hidden “lantern” could be hiding in more places. Robert’s research sounded like a great adventure and I was more than happy to join him when he also went looking in the Alde Feanen and Lindevallei. As you can imagine… Robert infected me with the dragonfly virus. I was wildly enthusiastic and quickly started to familiarize myself with the various species, with Robert always as a source of information and inspiration in the background. And I could never have imagined what consequences this infection would have on my life. This virus, this wonderful disease, has given me endless joy, exciting quests and wild adventures and taught me to see and appreciate the beautiful Frisian landscape through dragonfly eyes. Over the years I would become acquainted with a number of very special and rare dragonfly species, of which the first encounter with Somatochlora flavomaculata is still very clear in my mind. The circumstances were therefore quite exceptional, because this encounter was preceded by a special dream… It was a beautiful sunny day on 26 June 2001 and I had arranged to meet Tom Jager in the Lindevallei. Tom is the supervisor of It Fryske Gea and a great nature lover with a wide range of interests. We would go in search of S. flavomaculata together, because Tom had caught a male here the year before. Would we encounter this rarity again this year? We were both full of anticipation. In those years, very little was known about this mysterious dragonfly. In the early nineties, this species was only known in the Netherlands from a small population near Budel-Dorplein; as far as everyone knew, an extremely rare species in our country. But that changed after the first

reports from the Wieden and Weerribben and the Lindevallei. Whether there were breeding populations in these large lowland bogs was still completely unknown at the time. Before this day, I had studied the species through all kinds of literature. Of course, I wanted to know everything about it. I was so obsessed with it that I even dreamed about it at night. The night before, I dreamed that I was sitting with Tom at a table on a sun-drenched terrace. On the table was the field guide to dragonflies, opened to the pages of the S. flavomaculata. The craziest thing about this dream, however, was that there were two live S. flavomaculata sitting very quietly on the table. It was a very cheerful affair in this dream; Tom and I had a cold drink with it and were having a great time. Strange, because I hardly knew Tom and had never seen S. flavomaculata in the flesh. Back to reality. Tom turned out to live in a beautiful little house next to the river Linde, in the Driessenpolder, one of the most beautiful parts of this beautiful marshland in the valley of the Linde. When I visited his house for the first time that day, I was amazed and thought: what a beautiful place this man lives, what a divine place! The dragonflies and swallows flew around our ears and the air buzzed with insects and the song of hidden marsh birds. In high spirits we entered the Driessenpolder and enjoyed the clouds of Libellula fulva, Brachytron pratense, Aeshna isoceles, Silver moons (Boloria selene) and special plants. In the meantime, Tom told me about this unique lowland peat reserve and I devoured it all and stared at it with my eyes wide open. I confided in Tom and told him about my crazy dream. Tom, a down-to-earth Frisian, had his own thoughts about it. After walking for about an hour, a suddenly suspicious dragonfly flew before our eyes. The animal was calmly cruising back and forth at a height of two meters above a stripe (legakker) where the air vibrated from heat and humidity. We both had very little experience with dragonflies and I decided to catch the animal. After a few attempts, the animal ended up in the net and I very carefully and with hands trembling with tension pulled it up. We jumped for joy; it was a beautiful dragonfly with small triangular spots on its abdomen. We admired this magnificent animal, and it really could not be missed; this had to be the much sought-after flavomaculata! But we had no field guide or camera with us to definitively determine and prove that it was really so. In the meantime, another dragonfly flew above our heads and with a good blow this one also ended up in the net. This one also appeared to have yellowish spots. We decided to take the animals to Tom's cottage to photograph them. It was only a short walk away. We put our gear and the nets with the shiny dragonflies on a table in the garden. He poured two glasses of soda while I opened the field guide to the flavomaculata page. On the table were the nets with the two shiny dragonflies… And then something "clicked". This was exactly what I had dreamed! Luckily I had shared my dream with Tom in advance and he looked at me with astonished eyes. We took a few pictures and released the animals unharmed. Before they flew away they sat on our table for a while while we quenched our thirst. After being refreshed we went back to the Driessenpolder and that same day we saw about ten more Spotted shiny dragonflies. In the following years we were able to demonstrate through tag research and skin counts that there is a large and healthy population of Spotted shiny dragonflies in the Lindevallei. The Lindevallei and S. flavomaculata have been inextricably linked for us ever since!] Address: Eduard Peter de Boer, E.P., Alde Dyk 31, 8407 AD Terwispel, The Netherlands. Email: info@-faunax.nl

2013

24469. Averill, M (2013): Dragonflies in Worcestershire 2013. Worcestershire Record 35: 20. (in English) [Phenological data are documented, emergence of Gomphus vulgatissimus and range extension in Calopteryx splendens and Libellula fulva are discussed, and dragonflies attracted to moth traps light are reported: Aeshna grandis and Sympetrum striolatum. In addition, Erythromma viridulum and Libellula quadrimaculata are mentioned.] Address: Averill, M., 49 James Rd, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@-blueyonder.co.uk

24470. Whitehead, P.F. (2013): Emperor Dragonfly Anax imperator Leach, 1815 (Odonata, Aeshnidae) taking Peacock Butterfly Inachis io (L., 1758) (Lep., Nymphalidae) in flight. Worcestershire Record 35: 34. (in English) ["On a warm 26 July 2013 at Wick Worcestershire (SO94 23 m O.D.) I observed two A. imperator coursing across a weedy field. Without any reduction in speed one of these caught a I. io flying at a height of some three metres which was later consumed in low herbage.] Address: Whitehead, P.F., Moor Leys, Little Comberton, Pershore, Worcestershire WR10 3EH, UK. Email: paul@thewhiteheads.eu

2014

24471. Emiliyamma, K.G. (2014): Systematic studies on Odonata (Insecta) of southern Western Ghats. Rec. zool. Surv. India 114(1): 57-87. (in English) [The Odonata of southern Western Ghats comprise of 169 species. All species are documented in detail by literature review and own collections.] Address: Emiliyamma, K.G., Western Ghat Regional Centre, Zoological Survey of India, Kozhikode-673006 (Kerala), India

24472. Klimsa, E. (2014): Insekten und Spinnen: Feststellungen in der mittleren Oberpfalz 2016 (I). Mitt. Zool. Ges. Braunau 11(2): 33-64. (in German) [Bavaria, Germany. The following records are documented: Erythromma najas ♀, 26.05.16; E. najas ♂, 26.05.16; E. viridulum ♂; 09.09.09; Pyrrhosoma nymphula ♀, 21.05.16; Coenagrion pulchellum ♀, 26.05.16; C. pulchellum ♂, 26.05.16; Cordulia aenea ♂; 07.05.16; Ischnura pumilio ♀; 26.06.16; Orthetrum coerulescens ♀; 26.06.16] Address: Klimsa, E., Zeisigstr. 2, 92421 Schwandorf, Germany

24473. Nicolai, B. (2014): In memoriam Kuno Handtke (1935 – 2014). Abh. Ber. Mus. Heineanum 10: 133-138. (in German) [K. Handkte published in the 1960th three papers on the regional odonate fauna of the Harz region, Sachsen-Anhalt, Germany.] Address: Nicolai, B., Mus. Heineanum, Domplatz 36, 38820 Halberstadt, Germany. E-mail: nicolai@halberstadt.de

24474. Scholz, A. (2014): Eisige Drachenfliege. Auf der Suche nach den geheimnisvollen Winterlibellen in Hohenlohe. Schönes Schwaben Januar 2014: 26-29. (in German) [Story in a regional magazine about the research of Bernd Kunz to study the genus Sympecma (see also Scholz 2025).]

24475. Tennessen, K. (2014): An intergeneric gomphid tandem. Argia 26(3): 19. (in English) [Tandem pair of Ophiogpmphus smithi male and Gomphus quadricolor female, Eau Claire River, Wisconsin, 12 June 2014.] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

2015

24476. Averill, M. (2015): Dragonflies in Worcestershire 2015. Worcestershire Record 39: 40-41. (in English) ["Overall we had 22 of the normal total of 28 species recorded but there was an exciting new addition taking the Worcestershire (UK) total to 29, when Cordulia aenea was seen in Grafton Wood (01). Gomphus vulgatissimus had a poor year and was hard to find along the Avon and even in its core area at Bewdley the counts were the lowest for eight years. Comparing counts to previous years, winners from the transects at Pershore, Eckington and Croome Court are Erythromma viridulum, E. najas, Sympetrum sanguineum and Pyrrhosoma nymphula. Losers were Calopteryx splendens, Enallagma cyathigerum, Aeshna mixta and Sympetrum striolatum. Mention has been made in previous issues of the Worcestershire Record about the blue coloured Aeshna cyanea that are occasionally seen and there have been a number of reports from John Lane in Malvern who seems to have a garden especially attractive to these individuals. He reports a number of males and females arriving to sit on a sunny wall, many showing the blue colours along the whole abdomen instead of just the usual end segments (03 and 04). It is not sure whether these are still going through a maturing phase or whether they can be considered as a separate colour form and perhaps the only way to be sure will be to take a leg and do some DNA analysis." (Author)] Address: Averill, M., 49 James Rd, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

2016

24477. Korosi, J.B.; Eickmeyer, D.C.; Chin, K.S., Palmer, M.J., Kimpe, L.E.; Blais, J.M. (2016): Examining spatial patterns in polycyclic aromatic compounds measured in stream macroinvertebrates near a small subarctic oil and gas operation. Environmental Monitoring and Assessment 188(3): 189. doi: 10.1007/s10661-016-5175-9. Epub 2016 Feb 25.: 10 pp. (in English) ["The Cameron River runs through a small, remote petrochemical development in the Cameron Hills (Northwest Territories, Canada). In order to evaluate the exposure of aquatic biota to contaminants from oil and gas activities, we measured polycyclic aromatic compounds (PACs) in macroinvertebrates collected from sites and tributaries along the Cameron River, including upstream and downstream of the development, and sites located near drilled wells (developed). Macroinvertebrate tissue PAC burdens ranged from 0.2-2.8 μg g^{-1} lipid for unsubstituted compounds, and from 4.2-63.2 μg g^{-1} lipid for alkylated compounds, relatively low compared to similar studies from more industrialized regions in North America. There was no significant difference in tissue PAC burdens between upstream, downstream, or developed sites (p=0.12), although alkyl PACs in five out of seven developed sites were higher than the regional average. Petrogenic PACs were dominant in most samples, including alkyl fluorines, alkyl phenanthrene/anthracenes, and alkyl dibenzothiophenes. Minimal changes in PAC composition in macroinvertebrate tissues were detected along the Cameron River, with the exception of the two sites furthest downstream that had high concentrations of C3-C4 naphthalene. Overall, our results suggest that oil and gas development in the Cameron Hills has not resulted in substantial increases in PAC bioaccumulation in stream macroinvertebrates, although the potential that alkyl naphthalenes are being transported downstream from the development warrants further attention." (Authors) Odonata were also present in small abundances, but have been not further studied.] Address: Korosi, Jennifer, Department of Biology, University ofOttawa, 30Marie Curie Pvt., Ottawa, ON K1N 6N5, Canada. Email: jennifer.korosi@gmail.com

2017

24478. Averill, M. (2017): Dragonflies in Worcestershire 2017 with the spotlight for the second year on the Common Clubtail Dragonfly Gomphus vulgatissimus. Worcestershire Record 43: 6-7. (in English) [The early start to the year meant that many species peaked in the last week in May and not in June as would be expected. Some damselflies like Pyrrhosoma nymphula, Calopteryx splendens, C. virgo and Erythromma viridulum all emerged earlier than in any of the last 11 years. Some years ago in the annual dragonfly report for 2012 there was a reference to a blue coloured form of Aeshna cyanea and once again one was seen on the dragonfly walk in Monkwood in the summer. This is particularly interesting because Paddy Harrison noticed these aberrations several times when he was the warden and in exactly the same place. There is still no definitive explanation for the colour difference and a project has been proposed for consideration by a university department. Libellula fulva continued to do well on the River Avon and surprisingly single individuals were seen at Hilldtch Pool for the second year running, posing the question how long can such a small population sustain itself so far from the main group at Pershore. In all 24 species were recorded this year out of the county total of 29 with the rarest being Anax parthenope (Ph) (01) seen at Fox Hollies, Acocks Green by Des Jennings on the 4th August making it only the fifth time it has been seen since the first sighting in 2000. After a gap of two years a more regular visitor, Sympetrum fonscolombii (Ph) (02) was seen at Pirton Pool on the 20th June. Attempts were made to find emerging adults in September but without success. Presence and absence of Gomphus vulgatissimus for 2016-17 is mapped.] Address: Averill, M., 49 James Rd, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

24479. Mauersberger, R.; Brauner, O.; Günther, A.; Kruse, M., Petzold, F. (2017): Rote Liste der Libellen (Odonata) des Landes Brandenburg 2016. Naturschutz und Landschaftspflege in Brandenburg 26(4): 36 pp. (in German) [Red List of threatened Odonata of the Federal State Brandenburg, Germany] Address: https://lfu.brandenburg.de/sixcms/media.php/9/-NundL%20Beilage%20Heft%204_2017_Libellen.pdf

24480. Rokh, O. (2017): Recensement de l'Odonatofaune dans différentes zones humides de la région de Béjaia. MSc thesis, Supérieur et de la Recherche Scientifique, Faculté des Sciences de la Nature et de la Vie, Département de Sciences Biologiques, Université Abderrahmane MIR: 67 pp. (in French) ["Conclusion: The odontological study in some wetlands of the Bejaia region is an initiative that will pave the way and serve as a reference for future studies on the populations of aquatic ecosystems. Indeed, good knowledge of the flora and fauna of these environments will allow them to be well managed and better preserved. In particular, we realized that the prospecting period was too short, and that we probably missed late species. However, we certainly contacted most of the species present in the region. Despite the short duration devoted to this study and the limited number of prospected environments; it still remains a first in this vast territory of Kabylie. This study allowed us on the one hand to have a global idea of this fabulous entomological group considered as one of the good indicators of the health of wetlands, on the other hand, it brought us a lot of answers on the behavior and distribution in these environments. This study revealed that Bejaia contains about 30% of the Algerian odonatfauna with the 19 species recorded in the study environments. These species are divided between 7 families belonging to the Anisoptera with 14 species and Zygoptera with only 5. The Libellulidae family is the most represented in the entire population with 09 species which represents 47%, it is almost half of the odonatological fauna of the region. The lentic environment seems the richest in species; with a total richness of 13 species in Lake Mézaia. Some species show a requirement for the living environment, this is the case for example of Selysiothemis nigra which prefers stagnant waters. Furthermore, Platycnemis pennipes frequents running waters. While others do not have any particular preferences, as in the case of Ischnura elegans, Anax imperator and Crocothemis erythraea. Out of the 19 species inventoried, 6 are common to the 4 stations; these are Anax imperator, C. erythraea, Trithemis annulata, Orthetrum cancellatum, O. coerulescens, and Ischnura elegans. These same species are constant in the 4 study stations except Trithemis annulata which is constant at Lake Mézaia, behaves in an accessory manner in the other stations. In any case, these results will constitute a database for future assessments. But to have a clear idea of the odonatofauna of the Bejaia region, it is necessary to continue the surveys over several years and in other environments such as mountain lakes and salt marshes. Indeed, several recent discoveries in areas already surveyed show that the complete inventory is nowhere complete and that the effort must be continued to better know and understand the population dynamics of these fabulous insects." (Author/Google translate)] Address: https://bucket.theses-algerie.com/files/repositories-dz/9134473702459860.pdf

2018

24481. Averill, M. (2018): Worcestershire Dragonfly Roundup 2018. Worcestershire Record 45: 17-18. (in English) ["Although it had been a poor start to the season, reasonable weather in May and the hot dry June brought other species forward and some like Lestes sponsa, and Sympetrum sanguineum made it the earliest emergence date for many years. This was definitely the case with two late season species Erythromma viridulum and Aeshna mixta which were also the earliest for years. One way to get a feel for how dragonfly numbers have fared is to look at the Eckington transect data. Here we see (01) that Libellula fulva had the best year for the last ten years and that may be due to the fact that its flight period exactly coincided with the hot spell and so males were particularly evident this year. It was also the best year for ten years for Pyrrhosoma nymphula and Aeshna grandis. Calopteryx splendens, Erythromma najas and Ischnura elegans had a reasonable year but Enallagma cyathigerum was conspicuously absent this year. Another casualty was Platycnemis pennipes which has been the subject of concern by the British Dragonfly Society. Looking at the graph this species does fluctuate from year to year and did have a good year in 2011 and in 2017 but it was noticeably absent this year despite the good weather. The reason for that is not clear, but it is particularly puzzling why the numbers had built to for four years to 2017 then plummeted." (Author) Emergence numbers of Gomphus vulgatissimus at Bewdley 2011-2018 are figured.] Address: Averill, M., 49 James Road, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

24482. 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 study includes data on Odonata as prey

of fishes.] Address: Orsi, M.L., Laboratório 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

24483. Leprêtre, A.; Létienne, H. (2018): II. Les odonates. Parc du Marquenterre. Saison 2016-2017. Bulletin annuel Parc Ornithologique 2 (nouvelle série): 18-21. (in French) [Verbatim/Translated with DeepL.com (free version): In 2016, the first dragonflies to be spotted were Sympecma fusca and Brachytron pratense, both from the beginning of May. The last observations concern Sympetrum striolatum, which can be seen until the end of November. Historical data from the Nature Reserve show 30 species (accumulated from 1994 to 2016). Some data, undocumented and highly unlikely, have not been included in this article. Despite poor weather conditions this spring, 23 dragonfly species were found during surveys carried out from May to September on the Nature Reserve. Of particular note were the sightings of 2 species uncommon to the park: a female and a male Calopteryx splendens and a male and a female Sympetrum meridionale. In conclusion, additional net surveys would have enabled us to look for other species such as Sympetrum fonscolombii or S. vulgatum. Note 2017: This year, the status of the S. meridionale has changed: from a species rarely encountered on the site, 2017 saw the sighting of several individuals in late spring. In future, it will probably be considered “uncommon”. A new species was also added to the Park's list of odonates, with the observation of a female Gomphus pulchellus in spring during a banding session. This is the only record we have: it is probably an erratic individual passing through the site.] Address: https://www.marquenterrenature.fr/wp-content/uploads-/2018/08/bulletin-annuel-2016-2017-VF.pdf

24484. Subramanian, K.A.; Emiliyamma, K.G.; Babu, R.; Radhakrishnan, C.; Talmale, S.S. (2018): Atlas of Odonata (Insecta) of the Western Ghats. Zoological Survey of India: 417 pp. (in English) [https://ia802900.us.archive.org/31/items/westernghatsodonata/Western%20Ghats%20Odonata.pdf] Address: Subramanian, K.A., Zoological Survey of India, Prani Vigyan Bhavan, M-Block, New Alipore, Kolkata-700 053, India. E-mail: subbuka.zsi@gmail.com

24485. Veeramani, A.; Ramasubramanian, V.; Ravichandran, S.; Pazhanisamy, S.; Rajalakashmi, C. (2018): Diversity and habitat use of odonates in Cauvery Basin, Tamil Nadu, India. Journal of Zoological Research 2(2): 1-9. (in English) ["The odonates were collected by hand, sweep net and random field sampling method. A total of 20 species of dragonflies were recorded during the period of study. Maximum of 17 species falls under family Libellulidae and one each under Gomphidae, Aeshnidae and Cordulidae respectively. Similarly, 8 species of damselflies were recorded of which 6 species were falls under the family Coenagrionidae and one each of under the family Protoneuridae and Lestidae respectively. The results of habitat usage of dragonflies and damselflies shows that they mainly used the wetlands of pond ecosystem and agricultural fields than that of the riverside and shrub land. Future work should explore the biogeography of lesser studied Anisoptera and Zygopteran groups from Cauvery basin." (Authors)] Address: Veeramani, PG and Research Department of Zoology, Government Arts College (Autonomous), Kumbakonam –612 002, Tamil Nadu, India

2019

24486. Alves-Martins, F.; Calatayud, J.; Medina, N.G.; De Marco, P.; Juen, L.: Hortal, J. (2019): Drivers of regional and local diversity of Amazonian stream Odonata. Insect Conservation and Diversity 12(3): 251-261. (in English) ["Large Amazonian rivers may act as dispersal barriers for animals with low dispersal abilities, limiting their distribution to certain interfluves. Consequently, the distribution of these taxa would be less affected by macroclimatic gradients. Conversely, high-dispersal taxa would be less constrained by large rivers and may track suitable climates. We evaluate whether Zygoptera and Anisoptera, two Odonata suborders with different dispersal abilities, show differences in distribution patterns across Amazonian interfluves. We further assess the relative importance of macroclimatic and habitat factors in their community assembly. We used network modularity analyses to identify biogeographic species pools and spatial buffers to define metacommunity species pools. Then, we used structural equation models to estimate the relative importance of multi-scale factors on species richness patterns. Zygoptera communities are more similar in species composition within than between interfluves, suggesting that large Amazonian rivers indeed limit the distribution of Zygoptera species. Conversely, the distribution of Anisoptera extends across Amazonian interfluves. Seasonality has a strong positive effect on Zygoptera and Anisoptera richness across scales. In addition, habitat integrity is negatively correlated with the regional species richness and abundance of Anisoptera and positively correlated with Zygoptera local richness. The contrasting effects of habitat integrity on Anisoptera and Zygoptera suggest that the former is favored in open habitats, whereas the latter is so in forests. Despite these differences, both suborders appear to follow similar community assembly mechanisms in Amazonia, with a strong climatic control across scales and an effect of habitat filters on local communities." (Authors)] Address: Alves-Martins, Fernanda, Departamento de Ecologia, Instituto de Ciências Biológicas, Universidade Federal de Goiás, Goiânia, Goiás, Brazil. Email: fernandaalvesmartins@yahoo.com.br

24487. Averill, M. (2019): Worcestershire Dragonfly Roundup 2019. Worcestershire Record 47: 21. (in English) [A melanistic species of Libellula fulva is documented. Records of the following species are briefly outlined: Aeshna mixta, Anax parthenope, A. ephippiger, Sympetrum fonscolombii, Erythromma viridulum, Libellula fulva, Gomphus vulgatissimus, and Platycnemis pennipes.] Address: Averill, M., 49 James Rd, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@-blueyonder.co.uk

24488. Jödicke, R.; Borkenstein, A. (2019): Ungewöhnliches Fortpflanzungsverhalten bei Orthetrum cancellatum (Odonata: Libellulidae) – Fotonotizen zur Biologie heimischer Libellen. Libellula Supplement 15: 93-102. (in German, with

English summary) ["Unusual reproductive behaviour in Orthetrum cancellatum (Odonata: Libellulidae) – photographic notes on the biology of native dragonflies – After completed copulation, a female O. cancellatum remained sitting at the site where the couple had landed. She immersed the tip of her abdomen as far as S5. Several males attacked her but she successfully repelled them by stretching her fore legs upwards and clinging to the substrate. After immersion of the abdominal tip for a duration of ca 75 s, the female took off and left the water. We interpret this behaviour as sitting oviposition, caused by the high abundance of males and their high activity level in the heat. Another female sat on floating substrate, which she touched with all six legs and her abdominal tip. Although she was not attacked by males, she took off within 1 min. We interpret this behaviour as a resting period with no further release of eggs." (Authors)] Address: Borkenstein, Angelika, Lebensborner Weg 5, 26419 Schortens, Germany. Email: angelikaborkenstein@t-online.de

24489. Lourenço, P.M. (2019): Internet photography forums as sources of avian dietary data: bird diets in Continental Portugal. Airo 25: 3-26. (in English, with Portuguese summary) ["Knowing animal diets is key ecological information, required for understanding the dynamics of ecosystems as a whole, as well as the ecology of individual species. However, for many species/regions such information is not available. Here I explore the potential use of internet photography forums to describe the diet composition of birds by analysing photographs posted on the “Aves de Portugal Continental” Facebook page. A total of 909 photographs were found to show identifiable food items being taken by 144 different avian species. These included 78 regularly occurring species for which there were no available dietary data for Portugal according to Catry et al. (2010). The photographs were obtained in 262 different locations, covering all the 18 districts of Continental Portugal. They exhibited a total of 206 different food item categories, their taxonomic rank ranging from species (n=97) to class (n=3), as well as some non-taxonomic groupings such as unidentified berry or human refuse. The avian species with the most dietary information were European Bee eater Merops apiaster (n=68), Osprey Pandion haliaetus (n=59) and Common Kingfisher Alcedo atthis (n=40). Although this type of data are affected by several biases, namely a geographic bias in favour of areas closer to human settlements and human-altered habitats, and a possible bias favouring larger food items that are more easily identifiable in photographs, it could provide an invaluable source of avian dietary data. In the future, these data could be gathered through an open web-enabled platform which would include photographers and biologists who would provide identifications of the food items being taken." (Author) The compilation contains many records of Odonata as bird prey.] Address: Pedro M. Lourenço, P.M., Centro de Estudos do Ambiente e do Mar (CESAM)/Depto de Biologia Animal, Faculdade de Ciências da Univ. de Lisboa, 1749-016 Lisboa, Portugal. Email: p.m.g.lourenco@gmail.com

2020

24490. Carrillo-Muñoz, A.I. (2020): Evolución de rasgos morfológicos y conductuales en libélulas y caballitos del diablo (Insecta: Odonata). Tesis que para obtener el grado académico de Doctor en Ciencias Biológicas Universidad Autónoma de Tlaxcala: 202 pp. (in Spanish & English) ["Biological, morphological (shape, size or colour), behavioural (specific behaviours to access energy resources or potential mates), or molecular (differential expression of certain proteins or the specific sequence of nitrogenous bases in each individual) characteristics are under natural and sexual selective pressures. The changes that can generate these pressures can be observed at different levels, in the differences between sexes of the same species, between individuals of the same sex, or the patterns of evolutionary change between different lineages of organisms. Dragonflies and damselflies are an ideal study model to understand the differences between organisms and the evolution of their traits. A large amount of data can be obtained regarding their life histories and the variation of their biological traits. These organisms are associated with bodies of water, so it is easy to find them. They generate a large number of individuals in a single reproductive season, which usually lasts a few months, depending on each species or population. Due to their size, they can be monitored in the wild, as adults can be marked and followed individually. In this thesis I use comparative phylogenetic methods and classical statistical methods to test the relationships between several species of these insects regarding the variation of some of their traits. In general, I address the differences in the sexual proportions of adults and the difference in flight agility throughout the Order, the selection on body size and its variation using two species of territorial damselflies, and I also include works that deal with the life histories of some species of these insects. We can observe that biological traits are strongly associated with reproductive strategies in these insect species, responding to the intensity of selection that each species presents. By integrating phylogenetic variation, we observe that sexual behavior influences the evolutionary patterns of change in their sexual proportions and in the variation of flight agility. We can also notice that body size is under sexual pressures related to the ability to find potential partners over time." (Author/Google translate) https://repositorio.uatx.mx:8443/bitstream/DSyTI_-UATx/608/1/Carrillo%20Mu%C3%B1oz%20Aldo%20Isaac-.pdf] Address: Carrillo-Muñoz, A.I., Centro Tlaxcala de Biol. de la Conducta, Univ. Autónoma de Tlaxcala, Carretera Tlaxcala-Puebla km 1.5, C.P. 90070 Tlaxcala, México. E-mail: aicarrillomz@gmail.com

24491. Jödicke, R.; von Ellenrieder, N.; Garrison, R.W. (2020): Reversal of precedence of the names Lestes dryas Kirby, 1890, and Agrion forcipula Charpentier, 1825 (Odonata: Lestidae), to preserve current usage. Notulae odonatologicae 9(6): 229-275. (in English) ["The name L. dryas Kirby, 1890, is potentially threatened by its senior objective synonym, Agrion forcipula Charpentier, 1825. The purpose of this publication is to reverse their order of precedence preserving the current widespread usage of the junior name in accordance with Article 23.9.1 of the International Code of Zoological Nomenclature." (Authors)] Address: Garrison, R.W., California Dept of Food and Agriculture, 3294 Meadowview Rd, Sacramento, California 95832, USA. Email: argiavivida@gmail.com

24492. Mammen, K., Baumann, K.; Matthias Dumjahn, M.; Huth, J.; Nicolai, B.; Schulze, M. (2020): Rote Listen Sachsen-Anhalt: 28. Libellen (Odonata) (3. Fassung, Stand: August 2019). Berichte des Landesamtes für Umweltschutz Sachsen-Anhalt Halle, Heft 1/2020: 477-496. (in German) [Red List of endangered Odonata of the Federal State Sachsen-Anhalt, Germany. https://lau.sachsen-anhalt.de/fileadmin/Bibliothek/Politik_und_Verwaltung/MLU/LAU/PUBLIKATIONEN/Berichte_ und_Fachinformationen/Berichte_des_-LAU/Dateien/2020_Rote_Listen_Sachsen-Anhalt_2020/Kapitel_28_Libelle n_Rote_Listen_LSA_BF.pdf] Address: Mammen, Kerstin, ÖKOTOP GbR – Büro für angewandte Landschaftsökologie, Willy-Brandt-Str. 44/1, 06110 Halle (Saale), Germany. Email: kerstin.mammen@oekotop-halle.de

24493. Nicolai, B. (2020): Zur Nahrung der Purpurarien-Eidechse Gallotia atlantica mahoratae auf Fuerteventura (Kanarische Inseln, Spanien). Die Eidechse 31(2): 41-50. (in German, with English summary) ["The author reports on the food and the analysis of faecal pellets of G. atlantica on Fuerteventura. The results show that this lizard is omnivorous, but feeds predominantly insects. It uses a wide range of food, especially Diptera, Coleoptera and Hymenoptera (Formicidae), and adapts quickly to natural changes in food resources. After rainfall and the emergence of new growing vegetation, insect larvae (especially caterpillars) are increasingly eaten be lizards. Finally, in one of the faecal samples little bones and scales were found and revealed a case of cannibalism in this species." (Authors) Odonata account to 0,3% of 3613 studied prey items.] Address: Nicolai, B., Herbingstr. 20, 38820 Halberstadt, Germany. Email: nicolaibea@gmx.de

24494. Slovenian Academy of Sciences and Arts (2020): Report on the work of SASA. The Slovenian Academy of Sciences and Arts in the year 2019. The yearbook of the Slovenian Academy of Sciences and Arts 70/2019: 432 pp. (in Slovenian) [References are made to Boštjan Kiauta on pages 11, 149, 192, and 386.] Address: Slovenian Academy of Sciences and Arts, Novi trg 3, SI-1000 Ljubljana, Slovenia

24495. Tamiru, S.M. (2020): The impact of water quality deterioration on macroinvertebrate communities in the Lake Tana, northwestern Ethiopia - Analysis using tolerance level approach. Life Sciences Leaflets 121: 14 pp. (in English) ["Lake Tana is a biodiversity reservoir and freshwater supplier that contribute significantly to the economy of Ethiopia and downstream recipient countries (Sudan and Egypt). Due to human activities, water quality and biodiversity of the lake was threatened. Some of the most significant contributors to the lake pollution include domestic sewage, agricultural inputs and outputs, industrial inputs and outputs, silt from the agricultural activity, etc in the catchment. To assess the impact of anthropogenic activities of Lake Tana, macroinvertebrates were analysed in dry and wet seasons at 11 sampling sites. In the analysis, literatures indicated that the presence of more Odonata [treated at family level], Coleoptera and Hemiptera larvae is the indication of water quality deterioration due pollution. From the collected organisms, total numbers of tolerant individuals were 303 (48.2 %) and Facultative individuals were 243 (38.7 %) while intolerant individual organisms were 80 (12.7 %). Most of the taxa (48.2 %) had tolerance scores ranging from 7 to 10. In general, all the sampling stations show the degradation of options to save Lake Tana." (Author)] Address: Tamiru, S.M., Department of Development & Environmental Management Studies, University of Gondar, Postbox 196, Gondar, Ethiopia. Email: sisymis27@gmail.com

2021

24496. Abd-El-aziz, M.F. (2021): Entomofauna in Egyptian saltwater habitats. International Journal of Tropical Insect Science 41(4): 2297-2311. (in English) ["The entomofaunas of salty Egyptian environments are reviewed in the present paper according to the available data. Most saltwater habitats were poor with insect fauna. Class Insecta was represented in seven lakes and completely disappeared in two hypersaline lakes, Bitter and Temsah. Chironomid larvae were the most abundant insects in the seven lakes followed by the mosquito larvae, especially in Suez Canal and Wadi El-Rayan. Other aquatic insects include Odonata, Hemiptera, Coleoptera, Trichoptera, and Collembola were represented as extremely low or completely absent. The richness of insect diversity was observed in Burullus and Wadi El-Rayan Lakes as well as the Red Sea coast (swamps and mangroves). It has also been observed that the physical and chemical characteristics of these habitats were changed due to the environmental and climatic changes. Consequently, led to changes in the insect species and other communities. Generally, the data and the studies of insect fauna in Egyptian saltwater are very poor. Also, the taxonomic identification to the level of genus and species is almost non-existent. This paper recommended more studies of insect fauna in these environments with more precise classification." (Author)] Address: Abd-El-aziz, M.F., Benha University, Faculty of Science-Entomology Department, Benha, Egypt

24497. Arranz Fernandez, G (2021): Fluid structure interaction in bioinspired locomotion problems. Tesis doctoral Universidad Carlos III de Madrid. Departamento de Bioingeniería e Ingeniería Aeroespacial: XIV + 166 pp. (in English) ["Nature offers a vast amount of examples of efficient locomotion. Millions of years of evolution have allowed animals … to achieve outstanding locomotive skills. Therefore, it is not a surprise that scientists and engineers have tried to replicate the flight and swimming capabilities of the former examples in order to develop efficient aerial and nautical robots. In fact, these efforts have led to the design and development of several successful bioinspired robots. However, their performance is still far below their living counterparts. One of the main reasons is that the understanding of the physics underlying biological locomotion is still limited. This is due to the complexity of the problem under consideration: the locomotion of a body through a fluid medium. This can be considered fluid structure interaction (FSI) problem where the dynamics of the specimens is the result from the hydrodynamic interaction with the surrounding fluid, which in turn is modified by the motion of the specimens. Consequently, the resulting problem is highly nonlinear and complex

from a mathematical standpoint. This dissertation attempts to contribute to further understand the fluid structure interactions in bioinspired locomotion problems. To that end, direct numerical simulations of several examples of bioinspired FSI problems are performed. These examples include the auto-rotation of a winged-seed, the flow interactions between the wings of a dragon y, and the schooling patterns that emerge between two fish. In the first part of this dissertation, the algorithm which has been developed to perform part of the aforementioned studies is presented. The proposed algorithm allows the study of the FSI of systems of connected rigid bodies {which serve as a model for the actual specimens} immersed in an incompressible fluid. It is built based on a preexisting flow solver, coupled with a robotic algorithm for the computation of the dynamics equations of the bodies. The use of robotic algorithms endows the proposed methodology with a great flexibility, allowing to simulate a large variety of problems with different geometries and congurations. The second part of the thesis is devoted to the analysis of the aforementioned examples. In this regard, we first consider the flight of a winged-seed. This is a very interesting, yet complex, problem of fluid-dynamic interaction; in which the auto-rotative motion is the result of a subtle equilibrium between the aerodynamic forces and the inertia properties of the winged-seed. In our study, the dynamics and the flow surrounding the auto-rotating seed are characterized in a range of Reynolds numbers, Re. Specifically, we focus on the study of the leading edge vortex (LEV) that is developed on the upper surface of the seed's wing as it auto-rotates. Our findings suggest that, in the explored range Re = [80 - 240], LEV's stability is not driven by vorticity transport along the spanwise direction nor viscous effects, as reported in the literature of rotating wings. Instead, fictitious accelerations (i.e., Coriolis and centrifugal accelerations) are the most suitable candidates to stabilize the LEV over the seed's wing. In the second example, we study the effect of the three-dimensional (3D) interactions in the performance of two tandem wings, resembling those of a dragonfly. To that end, the wings undergo a two-dimensional (2D) optimum kinematics which is a combination of heaving and pitching. We first analyze the effect of wings' aspect ratio, A, by comparing the 3D and 2D simulations. The results show that 3D vortical interactions are detrimental for the thrust production of the hindwing, but they do not significantly affect the propulsive efficiency of the tandem arrangement. Next, a more realistic flapping kinematics of the 3D is considered and compared to the previous heaving kinematics. We nd a decrease in the propulsive efficiency of the flapping wings compared to their heaving counterparts, which has been linked to a non-desired shedding of vorticity on the inboard region of the wings. The last bioinspired example corresponds to the collective motion of two selfpropelled three-dimensional bodies. These bodies are idealized as rectangular, at plates with flexibility along their chordwise direction, and that self-propels thanks to a prescribed vertical motion of their leading edges. We observe that tandem congurations emerge where both plates swim at a constant mean horizontal velocity and with a mean equilibrium horizontal distance. These congurations can be classified, attending to the resulting flow interactions, into compact and regular congurations. In the former, the performance of the upstream flapper is modified due to the close interaction with the downstream flapper. However, in the regular congurations, the performance of the upstream flapper is similar to that of an isolated flapper. Conversely, the performance of the downstream flapper is affected in both congurations by the interaction with the wake of the upstream flapper. We are able to link the changes in the downstream flapper's performance to its interaction with the vertical jet induced by vortex rings of the upstream flapper's wake. Finally, we propose a model to qualitatively predict the performance of a hypothetical downstream flapper based on the flow field of and isolated flapper, showing good agreement with the actual simulations." (Authors)] Address: https://e-archivo.uc3m.es/rest/api/core/bitstreams/028aa9-ca-2461-485a-b438-98b63447046e/content

24498. Averill, M. (2021): Worcestershire Dragonfly Roundup – 2020. Worcestershire Record 48: 28-29. (in English) [2935 records received for 2020 from 262 recorders for 27 species. Records of the following species are briefly discussed or documented including a distribution map for E. viridulum: Erythromma viridulum, Anax parthenope, Sympetrum fonscolombii, Brachytron pratense, Libellula fulva, Ischnura pumilio, Aeshna juncea, Cordulegaster boltonii, Gomphus vulgatissimus, and Coenagrion pulchellum.] Address: Averill, M., 49 James Rd, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill-@blueyonder.co.uk

24499. Nicolai, B.; Grimm, H.; Schütte, H.; Appeldorn, H. (2021): Libellen (Odonata) als Beute und Nahrung beim Steinschmätzer Oenanthe oenanthe. Ornithologische Mitteilungen 73(3/4): 101-112. (in German, with English summary) ["Odonata as prey and nourishment of Northern Wheatear Oenanthe oenanthe: The relevant literature to date contains hardly any reference to the capture and consumption of dragonflies by Wheatears. Northern Wheatears have a broad diet spectrum, and their choice of prey is mainly non-specific. Dragonflies were completely absent even in our previous studies of more than ten thousand items of prey. In 2013 and 2017, at a breeding site in Saxony-Anhalt with several breeding pairs of Wheatears, the multiple capture and consumption of adults of Zygoptera and Anisoptera and their larvae were documented by photo specimens, presented here. Dragonflies were processed and consumed whole with their wings. This behaviour is enabled by the special development of the Wheatears jaw muscles." (Authors)] Address: Nicolai, B., Herbingstr. 20, 38820 Halberstadt, Germany. Email: nicolaibea@gmx.de

24500. Nikolaus, R.; Schafft, M.; Maday, A.; Klefoth, T.; Wolter, C.; Arlinghaus, R. (2021): Status of aquatic and riparian biodiversity in artificial lake ecosystems with and without management for recreational fisheries: Implications for conservation. Aquatic Conservation: Marine and Freshwater Ecosystems 31(1): 153-172. (in English) [Niedersachsen, Germany "1. Humanity is facing a biodiversity crisis, with freshwater-associated biodiversity in a particularly dire state. Novel ecosystems created through human use of mineral resources, such as gravel pit lakes, can provide substitute habitats for the conservation of freshwater and riparian biodiversity. Many

of these artificial ecosystems are subject to a high intensity of recreational use, however, which may limit their biodiversity potential. 2. The species richness of several taxa (plants, amphibians, dragonflies, damselflies, waterfowl, and songbirds) was assessed and a range of taxonomic biodiversity metrics were compared between gravel pit lakes managed for recreational fisheries (n = 16) and unmanaged reference lakes (n = 10), controlling for non-fishingrelated environmental variation. 3. The average species richness of all the taxa examined was similar among lakes in both lake types and no substantial differences in species composition were found when examining the pooled species inventory. Similarly, there were no differences between lake types in the presence of rare species and in the Simpson diversity index across all of the taxa assessed. 4. Variation in species richness among lakes was correlated with woody habitat, lake morphology (surface area and steepness), and land use, but was not correlated with the presence of recreational fisheries. Thus, non-fishingrelated environmental variables had stronger effects on local species presence than recreational fisheries management or the presence of recreational anglers. 5. Collectively, no evidence was found that anglers and recreational fisheries management constrain the development of aquatic and riparian biodiversity in gravel pit lakes in the study region; however, the conservation of species diversity in gravel pit lakes could benefit from an increasing reliance on habitat enhancement activities." (Authors) 33 odonate species were recorded, but no species details are given.] Address: Nikolaus, R., Dept Biol. & Ecol. of Fishes, Leibniz Inst. Freshwater Ecology & Inland Fisheries, Berlin, Germany. Email: nikolaus@igb-berlin.de

24501. Warr, A. (2021): Scarce Blue-tailed Damselfly Ischnura pumilio first record for Worcestershire 22nd August 2020. Worcestershire Record 48: 26-27. (in English) [22-VIII-2020, Worcestershire Wildlife Trust reserve, Feckenham Wylde Moor, UK] Address: not stated.

2022

24502. Averill, M. (2022): Worcestershire Dragonfly Roundup 2022. Worcestershire Record 50: 41-43. (in English) [2,200 records received so far, for 27 species from 128 recorders. Two new species for the county: Orthetrum coerulescens and Chalcolestes viridis.] Address: Averill, M., 49 James Road, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill-@blueyonder.co.uk

24503. Averill, M. (2022): Worcestershire Dragonfly Roundup 2021. Worcestershire Record 49: 24-25. (in English) [Impact of climate change on Lestes sponsa and Sympetrum danae is discussed. Notes on Gomphus vulgatissimus, Cordulegaster boltonii, Platycnemis pennipes and Ischnura pumilio are given. A case of Anax imperator eating a G. vulgatissimus at Ripple 07.07.21 was photographed. Records of Anax parthenope are documented in more details, and "What was interesting this year was the blue male that was spotted by Andy Warr. Initially looking like our regular Emperor close examination of photos showed it was a male Lesser Emperor with an all blue abdomen (03)." Proof of breeding for Brachytron pratense and Libellula fulva is documented.] Address: Averill, M., 49 James Road, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

24504. Averill, M. (2022): The difficulty of identifying some damselfly species. The Variable Damselfly Coenagrion pulchellum. Worcestershire Record 48: 30-31. (in English) [Morphological differences between Coenagrion puella and C. pulchellum are figured and discussed.] Address: Averill, M., 49 James Rd, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

24505. Badu, I.K. (2022): The effects of habitat disturbance on adult Odonata assemblages in urban freshwater habitats of southern Cape Coast metropolis of Ghana. University of Cape Coast: i, xiv; 129 pp. (in English) ["Odonata have been widely used as indicators of the integrity of freshwater ecosystems. However, the effects of anthropogenically induced factors continue to affect their assemblages especially in urban areas. As such, this study was conducted to investigate the influence of human and natural habitat conditions on Odonate assemblages in freshwater habitats of southern Cape Coast Metropolis in the Central Region of Ghana. This was important to address the existing gap in knowledge on the Odonata species within the Metropolis and consequently, the effects of urban habitat conditions on Odonate assemblages in a tropical ecosystem. A total of four sampling visits per each of the 16 sites used for the study from January to June 2022, provided data on Odonata species. A habitat integrity index was generated for each site and used to categorise sites into 3 levels of disturbance: high, moderate, and least. Local climatic variables were measured and recorded for each study site. 26 species of Odonata were recorded within the Metropolis. Generalised mixed effect model showed a varying significant effect of pH, water retention mechanism, condition of the riparian vegetation, preservation of the riparian vegetation and the presence or absence of cropland on dragonfly and damselfly abundance, diversity and compositions. A dragonfly biotic index was developed for habitat quality assessment within the Metropolis which showed that freshwater habitats within the Metropolis are experiencing some level of disturbance. There is therefore the need for conservation efforts to restore the integrity of the habitats surveyed and the entire Metropolis and the success of these actions can be monitored using the DBI." (Author)] Address: https://ir.ucc.edu.gh/xmlui/bitstream-/handle/123456789/11161/BADU%2c%202022.pdf?sequence=1&isAllowed= y

24506. Brauner, O.; Hirsch, N. (2022): An der Kleinen Elster. naturmagazin 2/2022: 18-19. (in German) [Verbatim/-Google translate: "Measures on the Little Elster (Brandenburg, Germany): Primarily due to river straightening and the separation of meanders, the course of the Little Elster has been significantly shortened over the last 100 years. This led to an increase in the riverbed gradient and thus to an increase in flow velocity, erosion, and thus to a progressive deepening of the river. In addition, there was severe drainage of the floodplain, resulting in a lack of water dynamics (monotonous trapezoidal profile) and a lack of structural diversity in and

around the water. In recent years, the Brandenburg Area Agency and the Brandenburg Nature Conservation Fund (NSF) have therefore carried out extensive renaturation measures on the Little Elster between Schadewitz and Doberlug-Kirchhain. Several old river loops were reactivated and reconnected to the watercourse. In 2014, a total of 25 so-called watercourse initiators (gravel and sand fills, log groynes, root stump groynes, and rough-cut tree groynes) were introduced into the riverbed. As a supplement to the river loops, these increase the different flow velocities in the river by narrowing the water profile at certain points and thus the habitat quality and diversity for fish and the macrozoobenthos such as mussels, snails, insects and worms that colonize the riverbed. Positive results: As part of the NSF Foundation's success monitoring, the dragonfly fauna was recorded as an "indicator species group" in nine 100-meter-long sections in 2015, 2016 and 2021. A total of 36 dragonfly species were found there in these three years. This corresponds to just over half of the 70 species known in Brandenburg. With 20 to 24 species that could be classified as (potentially) native there in individual years, the dragonfly community of the Kleine Elster can be classified as relatively species-rich for all study years to date. The status of five species is still unclear, and a further seven species were recorded as guests from neighboring standing waters, such as the Elstersee. B. of newly created small water bodies as part of the floodplain project. The results so far show an overall positive impact, particularly on the development of characteristic dragonfly species. A total of five indicator species of flowing waters have been recorded so far. Among them, Sympetrum pedemontanum is one of the species on the early warning list in Brandenburg. Nationwide, it is considered critically endangered. During the course of the study, several of these species were able to benefit, at least in small areas, from the installation of water initials. Among them, Libellula fulva, a characteristic species of flowing waters with structurally rich reed vegetation, showed a clear positive development. In 2016, it was observed for the first time during egg-laying in two sample sections. In 2021, the species was already recorded comparatively frequently in eight of nine sample sections. Numerous developmental records were also recorded in exuviae in 2021, particularly in the Klosterschleife section. Orthetrum coerulescens also saw a significant increase. In 2015, the species was recorded in five sections, in 2016 in six, and in 2021 in seven. This also resulted in a significant increase in individual densities. Calopteryx splendens, which was recorded in all nine sections, was also observed to occur more frequently in the area influenced by the initial flow of the stream, with increased flow.] Address: Brauner, O., Büro für Zoologie, Vegetation & Naturschutz, Rudolf-Breitscheid-Str. 62, 16225 Eberswalde, Germany. Email: oliver.brauner@-gmail.com

24507. Brauner, O. (2022): Erfolgskontrolle zur Amphibien- und Libellenfauna revitalisierter Feldsölle bei Felchow und Crussow (Nationalparkregion Unteres Odertal). Nationalpark-Jahrbuch Unteres Odertal 19: 132-148. (in German) ["In contrast to the amphibians, no previous data were available for dragonflies from the study area. In the two years 2021 and 2022, the author recorded a total of 29 dragonfly species at the eight water bodies). This corresponds to slightly more than 40 percent of the 70 species now known for Brandenburg (Mauersberger et al. 2016, Günther & Schulze 2016, Günther 2019). In the first year of the study, a total of 20 species were recorded in the two project areas, and 28 species in the second year. Of these, a total of 19 species were recorded in 2021 at the five ponds in the northern part of the UG that were desilted in autumn 2019, and a total of 21 species in the following year. The proportion of species that could be classified as definitely native "A" (exuviae, newly hatched animals) and three species each that could be classified as at least potentially native "B" (mating, egg-laying, high abundances) was also relatively similar between the two years, with 12 (2021) and 13 (2022) species, respectively. A predominantly slight increase in species numbers was recorded at four of the five sölle between 2021 and 2022. Only in the sölle LE2, which was already dry at the end of June/beginning of July in both years, was the number of species very low, with four (2021) and two (2022) species. During the mapping on July 14, 2022, quite surprisingly, well over 100 exuviae of Aeshna affinis were found for the relatively small, already completely dry sölle of this size. The species is one of the characteristic species of shallow waters that dry up in summer and, like many other characteristic pond species, overwinters in the egg stage. During the breeding season, the adults already colonize partially or completely dry waters. Egg laying occurs preferentially at the borders between reed beds and open soil areas (Mauersberger et al. 2013). A larger number of dragonfly species were able to colonize the three ponds in the southern part of the project area, which were only revitalized in August/September 2021, by the following year. There was a significant increase from seven species before the intervention in 2021 (including three species definitely resident, three with uncertain status, and one guest) to a total of 24 species in 2022 (including four species definitely resident, 15 potentially resident, and five species with uncertain status). This significant increase was also evident at the individual water bodies FS1 (6 out of 20 species), FS2 (4 out of 15 species), and FS3 (1 out of 15 species). Successful egg laying of Lestes sponsa, Sympetrum sanguineum and S. striolatum, as well as S. sanguineum and S. striolatum, occurred in the same year after desludging, so that exuviae and newly hatched individuals of these three species, each with a univoltine development cycle, could already be found in 2022. Numerous exuviae and immature individuals of the Sympecma fusca, whose larvae develop within only a few weeks after egg laying in spring, were also observed at water bodies FS1 and FS2 in summer 2022. On July 5, 2022, the number of currently hatching specimens at FS2 was estimated at at least 300 individuals. Most of the recorded dragonfly species are among the characteristic species of pond waters (21 species), emersed structures (three species), and waters with reed beds (four species) and are classified as non-threatened both statewide and nationally. A notable feature of the mapping in August/September 2022 was the relatively high occurrence of Sympetrum danae, a species on the statewide early warning list, particularly at the three small water bodies that had only been desilted the previous year. On August 31, 2022, at least 20 adults were observed at FS1, some in tandem and during egg-laying. At the

same time, six and eight adults exhibiting reproductive behavior were recorded at the water bodies FS2 and FS3, respectively. Also noteworthy in summer 2022 were two isolated sightings of juvenile Sympecma paedisca, each in the buffer strips along the water bodies KG11 and LE1 in the northern part of the project area. This species, listed in Annex IV of the Habitats Directive, is strictly restricted to the more subcontinental northeastern part of Brandenburg, with lower mean temperatures and higher global radiation (Mauersberger et al. 2013). It has likely declined significantly over the past two decades due to global warming. It prefers reed beds and silting zones for reproduction and is possibly native to the project area." (Author/Google translate)] Address: Brauner, O., Büro für Zoologie, Vegetation & Naturschutz, Rudolf-Breitscheid-Str. 62, 16225 Eberswalde, Germany. Email: oliver.brauner@gmail.com

24508. Grinang, J.; Dow, R.A.; Chee, Y.C.; Lupiyanngdyah, P. (2022): Revised checklist of the Odonata (dragonflies and damselflies) of Borneo. The Malayan Nature Journal 74(2): 217-240. (in English) ["The previous checklist of the Odonata of Borneo, in A.G. Orr's "A guide to the dragonflies of Borneo: their identification and biology" published in 2003, is now almost 20 years old. A considerable amount of work on Borneo's Odonata has been done since 2003 and 52 new species have been described from the island in the intervening years. Here we present an updated checklist of the Odonata of Borneo, listing 371 species and subspecies. The parts of the island, using national boundaries and administrative regions within countries: Brunei; the five provinces of Kalimantan (Indonesian Borneo); Sabah and Sarawak and also the Federal Territory of Labuan (Malaysian Borneo), from which each taxon has been recorded are indicated and notes are included on some taxa. The records are drawn from published literature, but some unpublished records from the work of the authors and based on material in museums and other collections are also included, also a few records from the iNaturalist website (where there is no doubt over the identification) are also included; none of the latter are additions to the known fauna of Borneo. A few recent novel records for Borneo that we regard as in need of confirmation are discussed. The history of research on Odonata in, and the current state of knowledge of the Odonata of, each of the regions of Borneo is briefly discussed. The high percentage of Odonata species endemic to Borneo approximately 51% overall, 73% for the Zygoptera and 23% for the Anisoptera) is highlighted. It is noted that, all else remaining equal, a small drop in the numbers of endemic species is expected due to suspected synonyms and discoveries of species that had been regarded as endemic outside of Borneo, but on the other hand most new species discovered on the island in future will be endemic to Borneo. The importance of basic data collection and alpha taxonomy in research into Borneo's Odonata is emphasized." (Authors)] Address: Dow, R.A., Institute of Biodiversity and Environmental Conservation, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia. Naturalis Biodiversity Centre, P.O. Box 9517, 2300 RA Leiden, The Netherlands. Email: rory.dow230@yahoo.co.uk

24509. Jennings, D. (2022): Willow Emerald Chalcolestes viridis, the first recorded sighting in VC37. Worcestershire Record 50: 50-52. (in English) [Saturday 3-IX-2022, Fox Hollies Pool in Acocks Green, Birmingham, UK, Grid Ref. SP123 822]

24510. Matsui, A. (2022): Drainage canal system survey. In: A. Matsui, (Ed.): Wetland Development in Paddy Fields and Disaster Management, https://doi.org/! 0.1007/978-981 -19-3735-4J0. Publisher: Springer Singapore: 133-178. (in English) ["The importance of paddy field ecosystems is being emphasized in consideration for biodiversity. However, we do not know what kind of paddy ecosystem is most effective for biodiversity. To research this problem, I investigated the distribution and life history of aquatic animals in a consolidated paddy field. I surveyed various aspects of the paddy field, such as canal levels with the main, lateral and farm drains, areas with the presence or absence of a year-round water flow, as well as sections with different canal bed materials. These findings provide knowledge for determining an agricultural and rural development project that can be harmonized with the environment. In this study, I selected six survey sites for drainage canals in Shimodate City (now Chikusei City), Ibaraki Prefecture, Japan. The sampling interval was one month from April 2001 to March 2002. A survey of fishes revealed that Opsariichthys platypus and Misgurnus anguillicaudatus were concentrated in the main drains and the lateral and farm drains, respectively. Among aquatic insects, Calopteryx atrata and Orthetrum albistylum speciosum were observed in the lateral drains and the farm drains, respectively. Thus, the drainage canal system was believed to function as a spawning ground and habitat for four species. It is especially important for four species to have a year-round water flow and natural materials for canal beds. To enrich biodiversity in consolidated paddy fields, it is effective to create a wetland as a wintering site for four species." (Author)] Address: https://www.researchgate.net/publication/362955708_-Drainage_Canal_System_Survey

24511. McGee, K (2022): Golden-ringed Dragonfly Cordulegaster boltonii (Donovan, 1807) at Shakenhurst, Worcestershire. Worcestershire Record 50: 16. (in English) [Wissetts Wood, Shakenhurst, UK, 3-VIII-2022] Address: McGee, K., Gardeners Cottage, Shakenhurst, Nr Kidderminster, Worcestershire, DY14 9AR, UK. Email: kevinmcgeeandrena@-live.co.uk

24512. Medina-Espinoza, E.F. (2022): La especie en portada: Zenithoptera lanei Santos, 1941. Hetaerina 4(1): 14-16. (in Spanish) [Verbatim/google translate: Perhaps one of the most striking genera of dragonflies from the Neotropics is Zenithoptera. Adults measure 2 to 3 cm and are characterized by having eyes that come into contact on the back of their head forming a line, the wavy costa of the forewing and the free supratriangle (Garrison et al., 2006). In addition, they stand out for their metallic blue wings on their dorsal surface and metallic black/red on the ventral surface (Guillermo-Ferreira et al., 2015). A characteristic that distinguishes them from other American dragonflies is their ability to fold

their wings over their back in a manner similar to zygopterans (Garrison et al., 2006). This genus is composed of only four species: Z. anceps Pujol-Luz 1993; Z. fasciata (Linnaeus, 1758); Z. lanei Santos, 1941 and Z. viola Ris, 1910 (Paulson & Schorr, 2021). Interspecific discrimination can be made by examining the coloration pattern of the synthorax in adults (Pujol-Luz & Fonseca, 1997). However, the aforementioned authors indicate that this is only possible if the specimens are alive, have recently died or have been correctly preserved. Otherwise, they mention that the accessory genitalia of the males must be studied. Regarding their larvae, only those of Z. anceps and Z. lanei are known (Rippel et al., 2020). The adults of Z. lanei Santos, 1941 have an antehumeral stripe and two transverse yellow bands between the meso- and metaepimeral (Pujol-Luz & Fonseca, 1997). This species was described from captured material in Brazil (Santos, 1941). However, it is currently also recorded in Bolivia, Argentina, Colombia, Ecuador, French Guiana, Paraguay, Peru and Venezuela (Lozano, 2021). This zenitopteran presents a great variability in wing coloration patterns throughout its distribution, having at least eight morphospecies (Pujol-Luz & Fonseca, 1997). Additionally, research has been done on how a diversity of components are involved in wing color: a double layer of wax crystals determines the blue color, while some pigments are responsible for the dark colors, and iridescence derives from multilayer interference (Guillermo-Ferreira et al., 2015). This hierarchization of wax layers had not been previously recorded in insects according to the same authors. The degree of coloration of the wings of this anisoptera responds to sexual selection mechanisms (Ancco-Valdivia et al., 2020). The optical properties of the wings vary according to the thickness and concentration of the pigments, which indicates the individual quality of the males and impacts the choice by the females (Guillermo-Ferreira et al., 2015). Another factor that influences sexual selection is the fat content and size of the male individuals, since it would be related to the ability to defend the territories suitable for oviposition (Ancco-Valdivia et al., 2020), which is exophytic (Vilela et al., 2016). Adults also possess a system of tracheae submerged in a spongy matrix in the wing membrane similar to that present in the wing pads of larvae (Guillermo-Ferreira et al., 2017), which allows the loss of body heat (Guillermo-Ferreira & Gorb, 2021). In addition to this, the position of the wings when perched is related to the regulation of body temperature in Z. lanei: if the back of the wing is exposed, its high reflectivity would contribute to cooling the thorax; while when the ventral surface is exposed, it acts as a solar panel and heat loss would occur by convection (Guillermo-Ferreira & Gorb, 2021). The differences in the reflectivity of the wing surfaces are due to the dissimilarities in their wax layers (Guillermo-Ferreira et al., 2015). Regarding its habitat, it has been recorded in both lotic (Batista et al., 2010; Veras et al., 2020) and lentic (Vilela et al., 2016) systems and is a common resident of palm swamps in southeastern Brazil (Ancco-Valdivia et al., 2020). Its larvae have been found in ponds with herbaceous vegetation on the margin and in backwater areas within a temporary stream that were also surrounded by grasses and plants (Rippel et al., 2020). The wide distribution of this species, together with its presence in protected natural areas and the lack of major threats to its populations, has granted it the status of "Least Concern" on the Red List of the International Union for Conservation of Nature (Lozano, 2021). However, Veras (2017) reported that there is a significant decrease in its abundance in places with values less than 0.79 of the Habitat Integrity Index ("HII" for its acronym in English; HII values close to zero indicate sites with low environmental integrity and those close to one, sites with high integrity). Indeed, the species was unlikely to be found if the HII value decreased to a number less than 0.5. Therefore, the increasing change in land use in the Amazon would denote a clear threat to Z. lanei.] Address: Medina-Espinoza, Emmy F., Depto de Entomología, Museo de Historia Natural de la Universidad Nacional

24513. Stübing, S. (2022): Erneute Beobachtung der Schabracken-Königslibelle (Anax ephippiger) in Hessen (Odonata: Aeshnidae). Libellen in Hessen 15: 103-118. (in German) [Hesse, Giessen District, July 10, 2021, "Mittlere Horloffaue" nature reserve, at midday over meadow areas that had been shallowly flooded due to rainfall since the previous day. A total of about ten A. ephippiger were observed. These included four largely fully colored males and one or two lighter, still uncolored, territorial males, as well as two tandems during egg-laying.] Address: Stübing, S., Am Eichwald 27, 61231 Bad Nauheim. E-mail: stefan.stuebing@gmx.de

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24514. Averill, M. (2023): Dragonfly recording in the Wyre Forest 1895-2023. Wyre Forest Study Group annual Review 2023: 44-47. (in English) [Here, the records of dragonflies since 1895 have been examined, whilst there has been a reduction on the number of individuals recorded the number of species has increased significantly. The Nationally scare Gomphus vulgatissimus has been monitored in Bewdley since 1988, the annual emergence count shows that numbers are declined after the Foot and Mouth outbreak in 2001.] Address: Averill, M., 49 James Road, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

24515. Averill, M. (2023): What is the minimum number of dragonflies necessary to sustain a viable local population in isolation? Worcestershire Record 51: 11. (in English) [The paper discusses range extension, dispersal and population size of Libellula fulva in Worcestershire, UK.] Address: Averill, M., 49 James Road, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

24516. Averill, M. (2023): A case of a vagrant Dragonfly sighting in Worcestershire - Ischnura senegalensis. Worcestershire Record 51: 12. (in English) [Ischnura senegalensis emerged in winter at a garden centre in Hagley 8th January 2020; UK] Address: Averill, M., 49 James Road, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

24517. Bari, M.N.; Haque, S.S., Nowrin, F.; Ali, M.P.; Kabir, M.M.M.; Akter, S.; Roy, t.K.; Afrin, S. (2023): Eco-engineering for managing insect pests in rice fields. Bangladesh Rice

Journal 27(1): 49-60. (in English) ["This study was consisted of eight experiments across Boro and Transplanted Aman seasons in various locations in Bangladesh to explore eco-friendly insect pest control methods in rice fields. The primary objectives were to safeguard natural-enemies through ecological engineering techniques and minimize the use of insecticides in rice farming. Ecological engineering aimed to boost biodiversity in the rice environment, fostering both plant and animal diversity to offer extra support for natural enemies in terms of sustenance and shelter. To fulfill these objectives, nectarrich flowering plants such as marigold, cosmos, sesame and sunflower were planted strategically in rice bunds ensuring habitats by establishing crucial sources of food and protection for beneficial insects. These beneficial insects, in turn, contribute to biological pest control by establishing an equilibrium between harmful and beneficial insects within the rice ecosystem and consequently reducing the dependency on insecticides. The study consisted of two treatments, T1: Rice fields with flowering plants on bunds; and T2: Farmer's practice of prophylactic insecticide use. The study observed a significant increase in the predators and parasitoids abundance in ecoengineering field (T1) compared to insecticide-treated fields (T2). Across seasons and locations, T1 consistently showed higher populations of various beneficial insects such as spiders, damsel flies, dragon flies, ladybird beetles, carabid beetles, staphylinid beetles, green mirid bugs, and parasitic wasps compared to T2. Notably, despite maintaining insect infestation below the economic threshold level in both T1 and T2, T1 exhibited significantly higher egg parasitism rates of rice hispa, brown planthopper, yellow stem borer, and rice leafroller compared to T2. Remarkably, on average while achieved statistically similar yields between T1 and T2 (5.99 t/ha and 5.93 t/ha, respectively), the study highlights the efficacy of manipulating habitats to enhance biocontrol services in rice fields. By providing nectar sources, alternative prey, and refuges for natural enemies, this approach offers promising prospects for reducing insecticide usage in rice fields by maintaining or potentially increasing rice yield equivalents." (Authors)] Address: Bari, M.N., Entomol. Division, Bangladesh Rice Res. Inst., Gazipur 1701, Bangladesh. E-mail: nbarienson@gmail.com

24518. De los Ríos-Escalante, P.R.; Wilson, R.; Norambuena, J.-A.; Esse, C.; Baaloudj, A. (2023): Null model for explain benthic macroinvertebrates communities in Salado River, (23ºS, Antofagasta Region, Chile). - Uso de Modelo nulo para explicar las comunidades de macroinvertebrados bentónicos en el río Salado, (23ºS, Región de Antofagasta, Chile). IDESIA 41(3): 115-121. (in English, with Spanish summary) ["The invertebrate fauna in Northern Chilean inland waters has poorly studied due the difficult access, and there are only studies on crustacea species based in scarce expeditions. The aim of the present study is to do a first community study on aquatic invertebrate communities reported in Salado River, a subsaline river in north of Chile, that is a tributary of Loa River the most long river in Chile (23ºS, Antofagasta region), based on size overlap null models. The results revealed the presence of Diptera larvae (Simulium sp., Gigantodax sp., and Ortochladinae), coleoptera larvae (Elmidae), Odonata larvae, Aranae, and amphipod Hyalella kochi. The results revealed that there is a size overlap, this means that the reported species would share their ecological niches. It is the first description of niche overlap for invertebrate Chilean rivers, and the exposed results are similar for descriptions for decapods in marine environments." (Authors)] Address: De los Ríos-Escalante, P.R., Univ. Católica de Temuco, Fac. de Recursos Naturales, Depto de Ciencias Biológicas y Químicas, Casilla. Temuco, Chile

24519. González-Acuna, D.; Ravanal, F.; Barrientos, C.; Ardiles, K.; Moreno, L.; Torres-Fuentes, L.G.; Figueroa, R.A. (2023): Breeding biology of the Many-colored rush-tyrant (Tachuris rubrigastra) in a natural lagoon at the Ñuble region, south-central Chile. Revista Chilena de Ornitología 29(2): 83-101. (in English, with Spanish summary) [Between 2005 and 2009, the authors studied the breeding biology of T. rubrigastra in a 2-ha tall-rush patch in south-central Chile. They monitored the nesting activity by visiting 59 active nests at 2-3 days intervals. Nesting was markedly seasonal, concentrating during spring months. Most prey delivered to nestlings were aquatic insects (92.5% of all prey individuals), including Odonata, dipterans, scorpion flies, stoneflies, and mayflies. Among these, Oxyagrion rubidium and crane flies of the genus Tipula together accounted for two-thirds of all prey items. O. rubidum totalled to 36.2% of all identified prey idem plus 18.7% of unidentified Odonata. In addition two larvae very delivered to the nesting.] Address: Figueroa, R.A., Unión de Ornitólogos de Chile, Valdivia, Chile. Email: ra_figueroa_rojas@yahoo.com

24520. Hartung, M. (2023): Contribution to the Calopteryxforms of the Peloponnesus (Odonata: Calopterygidae). SCIREA Journal of Biology 8(4): 99-117. (in English) ["44 specimens of the Calopteryx splendens/ balcanica complex of the Peloponnesus and adjacent areas have been found and were analyzed by different methods. The aim of this study is to characterize a Calopteryx form with broad wings found 1979 in the Peloponnesus. The length and width of the fore wings of all found specimens were measured. A resulting quotient was used in our analysis. This analysis recovered two principal groups of Calopteryx, one mainly from the Southern Peloponnesus and one with specimens of C. balcanica from other locations in Greece and other Calopteryx species from other countries North, West and East of Greece. Some other structures of the wings have also been analyzed. Calopteryx specimens from Southern Peloponnesus have broad fore wings; and in some areas of the wings typical structures may be observed. The status of the Calopteryx form from the Southern Peloponnesus is discussed. The results lead to the conclusion, that the specimens from the South of the Peloponnesus may be an atavistic population of C. balcanica resulting from glacial periods. The Northern forms of C. balcanica may be influenced by other forms of Calopteryx. The Northern form was named C. balcanica by Fudakowski (1930) from Bosnia and Herzegowina. The status of this Calopteryx form of the Southern Peloponnesus should be further investigated.] Address: Hartung, M., Hauptstr. 62, D-16866 Kyritz, Germany. Email: aeh.matthias.hartung@t-online.de

24521. Umpelby, R. (2023): Emperor Dragonfly Anax imperator eating butterfly. Worcestershire Record 35: 33. (in

English) [Verbatim: 20 August 2013, warm (25°C-ish) sunny day with little wind. “On the western edge of Bredon Hill I was walking across an open grass field and could hear a whirring noise what I assumed to be a dragonfly to my right, nothing unusual, so I carried on walking and then there was a ‘thwack’ sound which I turned to watch and saw a dragonfly labouring across in front of me flying to the left of the path, gradually loosing height grasping something large and white. I watched where it landed 20m or so away on the open grass area so rushed over and 30 seconds later started taking photographs. In probably less than two minutes from the initial catch, the meal was completed and off the Emperor Dragonfly went. I never found the wings so which species of white butterfly it was I cannot confirm, but the size and the difficulty the dragonfly had in remaining air-borne suggests it was a Large White butterfly [Pieris brassicae] – ‘circumstantial evidence and not admissible as proof!’.”] Address: not stated

24522. Ventura, I.M.C. (2023): Influência do gradiente de urbanização sobre as comunidades de odonatos (Insecta: Odonata) em lagoas de Aracaju, Sergipe. Universidade Federal de Sergipe, Centro de Ciencias Biologicas e da Saude, Departamento de Ecologia, Sao Christovao 2023.2: 51 pp. (in Portuguese) [Brazil; "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,...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

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24523. 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: Abdullah, M.I., Institute of Biological Sciences, Faculty of Science, Universiti Malaya, Malaysia

24524. Adak, R.; Mandal, A.; Saha, S. (2024): Aerodynamic performance of a tandem wing configuration inspired from dragonfly gliding flight for MAV application. In: Singh, K.M., Dutta, S., Subudhi, S., Singh, N.K. (eds) Fluid Mechanics and Fluid Power, Volume 2. FMFP 2022. Lecture Notes in Mechanical Engineering. Springer, Singapore. https://doi.-org/10.1007/978-981-99-5752-134: 409-418. (in English) ["The design of micro air vehicles (MAVs) involves optimizing aerodynamic performance challenges due to the small size and, consequently, the low Reynolds number (O($10^{4–5}$)). MAVs are often inspired by the flight capability of insects and birds; and are mimicked for the design of MAVs. The dragonfly frequently uses a gliding flight mode relative to the other small fliers and operates at a range of O ($10^{2–4}$). The literature suggests that the corrugated profile improves the aerodynamic efficiency around Reynolds number at 104. It allows us to investigate the aerodynamic advantages of tandem corrugated airfoil inspired by the dragonfly wing. In this paper, we perform direct numerical simulations of flow past bio-inspired corrugated wing to understand the impact of the tandem wing configuration. The horizontal distance between the wings is fixed, and the vertical distance varies. The results reveal that the forewing/hindwing interaction increases the lift of the forewing relative to the isolated wing for all the case studies. The combined drag coefficient drops by ≈7%, and overall efficiency drops by ≈13% relative to an isolated wing for a case study with zero vertical spacing between forewing and hindwing at 3° angle of attack, fixed for both wings. With no vertical gap, the aerodynamic efficiency matches close to the isolated wing with the decrease in tandem wing combined drag coefficient

compared to an isolated wing." (Authors)] Address: Saha, S., Dept of Aerospace Engineering, IIT Kharagpur, Kharagpur, 721302, India

24525. Adedapo, A.M.; Akindele, E.O. (2024): New records of some aquatic insect species in Nigeria: a need to intensify field expeditions in West Africa. International Journal of Freshwater Entomology 45(4): 493-508. (in English) ["A number of expeditions to eight freshwater systems within and around protected areas in the southern region of Nigeria were carried out between 2019 and 2022, with a view to re-discovering relict, rare, and poorly known aquatic invertebrate species. A total of 167 species from 10 orders were collected. Four species were recorded for the first time from Nigeria: Chlorocypha luminosa Karsch, 1893 and C. glauca Selys, 1879 (Odonata: Chlorocyphidae), Ephoron savignyi Williamson, 1802 (Ephemeroptera: Polymitarcyidae), and Cylindrostethus quadrivittatus Bergroth, 1916 (Hemiptera: Gerridae). Findings from this study also revealed that the distribution ranges of Elattoneura girardi Legrand, 1980 (Odonata: Platycnemididae) and Eurymetropsiella schoutedeni Poisson, 1950 (Hemiptera: Gerridae) extend to the southeastern region of Nigeria from the southwestern and northeastern regions, respectively. Rare and/or endemic species of Gerridae (Hemiptera) such as Eurymetra pauliani Poisson, 1941, Eurymetropsiella schoutedeni and Eurymetropsis carayoni Poisson, 1948 were also recorded in this study after several decades of paucity of information on their occurrence. The implications of aquatic invertebrate taxonomy and systematics on conservation in West Africa are discussed, and recommendations are provided." (Authors)] Address: Adedapo, A.M., Dept of Zoology, Obafemi Awolowo University, Ile-Ife, Nigeria. Email: abiodunadedapooau@gmail.com

24526. 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. (in English) ["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) Coenagrionidae, Libellulidae] Address: Ahmednur, M., Dept of Environmental Health Sciences & Technology, Institute of Health, Jimma Univ., Jimma, Ethiopia. Email: mahmudahmednur@gmail.com

24527. Ait Taleb, L.; Sadoudi, D.A.A.; Bensidhoum, M.; Houhamdi, M. (2024): Altitudinal pattern of Odonata diversity in Kabylia (Algeria): a contrasting pattern in lotic and lentic habitats. Aquatic Insects 45(4): 473-485. (in English) ["Environmental conditions change rapidly across altitude, shaping diversity and structure of communities. Because lotic and lentic communities are often distinct and experience different environmental and anthropogenic conditions, understanding whether the diversity of these communities changes similarly across altitude is fundamental to determine how biota responds to ecological gradients in a human-dominated landscape. In this study, we carried out a comparative analysis of the altitudinal pattern of the diversity of odonates in lotic and lentic ecosystems in Kabylia (north-central Algeria) across 16 sites (eight lotic and eight lentic sites). We estimated species richness, abundance, and Shannon index as well as three environmental factors (water temperature, pH, and human disturbance) in each site. We recorded a total of 33 species (10 Zygoptera and 23 Anisoptera) with 20 species in lotic sites and 28 species in lentic sites. We recorded a similar decreasing altitudinal pattern of water temperature and human influence, but no pattern in pH. Interestingly, species richness, abundance, and Shannon index increased with altitude in lotic sites, but showed a weak negative correlation in lentic sites. These contracting patterns could be due to the interplay of a geographic gradient in anthropogenic pressure and habitat-specific species sensitivity to anthropogenic stress." (Authors)] Address: Ait Taleba, Lamia, PSEMRVC Laboratory, Dept Biology, Fac. Biol. Sciences & Agronomic Sciences, Mouloud Mammeri Univ., Tizi-Ouzou, Algeria. Email: lamia.aittaleb@ummto.dz

24528. Alarcón-Elbal, P.M.; Rodríguez Sosa, M.A.; Durán Tiburcio, J.C.; Rueda Sevilla, J.; van Ee, B.W. (2024): Diversity of aquatic macroinvertebrates associated with Bromeliaceae plants in Jarabacoa, Dominican Republic. Caribbean Journal of Science 54(2): 369-406. (in English, with Spanish summary) ["Among the different ecosystems colonized by aquatic macroinvertebrates, phytotelmic habitats, those that form in water retained within various plant structures, represent ample opportunity for study. In the case of plants from the

Bromeliaceae family, morphological characteristics such as rosettes of leaves allow for the formation of reservoirs that store water and detritus, which also harbor a diverse fauna of aquatic macroinvertebrates. Some of these invertebrates are of medical relevance because they serve as vectors of pathogens. In this study, we set out to document the biodiversity of phytotelmic systems at the level of aquatic macroinvertebrates, particularly mosquitoes, that colonize different bromeliad species in the municipality of Jarabacoa, Dominican Republic. In addition to sampling macroinvertebrates, various morphometric characteristics of the plants, as well as physical-chemical parameters of the water contained in the bromeliads, were recorded. Insects were identified to the family level, while other invertebrates were identified to order, except for flatworms, which were identified to class. Specimens from the Culicidae family were identified to species. A total of 10,500 individuals were collected, corresponding to three phyla, seven classes, and 12 orders. Phylum Arthropoda accounted for 88.7% of all the captured organisms, followed by Annelida (10.8%); the remaining (0.5%) belong to phylum Platyhelminthes. At the rank of Class, Ostracoda accounted for 53.8% of all captured organisms, followed by Insecta (26.9%). In terms of orders, Podocopida (which includes all Ostracoda) represented 53.8% of the captured individuals, followed by Diptera (26.4%). Within Diptera, five different families were identified; Chironomidae was the most abundant with 43.9%, followed by Culicidae with 38.4%. Six species of culicids were identified, of which 74.9% were Wyeomyia mitchellii, with the remainder consisting of Aedes aegypti, A. albonotatus, A. albopictus, Culex biscaynensis, and W. vanduzeei. Family Pseudostigmatidae (Odonata) is documented for the first time in Hispaniola [Salto Baiguate (19°5'35.88"N, 70°36'58.29"W, 611 m), 04/12/2020, 35A = 1. Total = 1 nymph specimen], and family Scirtidae (Coleoptera) for the second time." (Author)] Address: Alarcón-Elbal, P.M., Dept Animal Production & Health, Public Veterinary Health & Food Science & Technology, Fac. Vet. Medicine, Univ. Cardenal Herrera-CEU, CEU Universities, Alfara del Patriarca (Valencia), Spain. Email: pedro.alarconelbal@uchceu.es

24529. Azkia, P.; Kurnia, I.; Yudiarti, Y. (2024): Dragonflies and damselflies (Ordo Odonata) diversity in Rancah District Ciamis Regency West Java province. Spizaetus: Jurnal Biologi dan Pendidikan Biologi 5(1): 141-153. (in Indonesian) ["The research was carried out in March-May 2022 in 10 habitat types covering 152 locations and 677 routes. Dragonfly data was taken using a 100x20 meter strip method. Quantitative analysis was carried out using (1) chi-square test, (2) species diversity index (H'), (3) species evenness index (E), and (4) community similarity index (IS). There were 17 odonate species found from two sub-orders and five tribes. The most common species are found in river habitats (14 species) while the least common are found in cassava plantations, cocoa plantations and residential habitats, namely four species each. The chi-square test for the number of species and number of individuals differed significantly between habitat types. The H' value for all locations is 1.72 and the E value is 0.61. The IS value ranges from 0.27-1.00. Three types of habitat, namely talun garden, sengon forest and field habitats have an IS value = 1.00. The IS value depicted with a dendogram shows two groups of dragonfly communities, namely the aquatic habitat dragonfly community and the terrestrial habitat dragonfly community." (Authors/Google translate)] Address: Kurnia, I., Program Studi Ekowisata, Sekolah Vokasi IPB University, Bogor, 16151, Indonesia. Email: insankurnia@apps.ipb.ac.id

24530. Baattrup-Pedersen, A.; Friis, K.B.; Friberg, N.; Riis, T. (2024): Inter-linkages between in-stream plant diversity and macroinvertebrate communities. Hydrobiologia 852: 235-247. (in English) ["Evidence of freshwater biodiversity decline, species extinction and severe alterations in the biological structure and function of freshwater ecosystems is accumulating. Here we explore the role of macrophyte diversity in lowland streams for the abundance, taxon richness and composition of macroinvertebrate communities also including the abundance of different functional feeding groups. We applied a controlled in situ experiment in four small lowland stream reaches situated in rural landscapes in Denmark. We were able to explain a major fraction of the variability in the macroinvertebrate communities by differences in total macrophyte surface areas among treatments, but the number of macrophyte species in the experimental treatment also played a highly significant role (i.e. one, two or three plant species) for both the abundance, richness and composition of the macroinvertebrate community. We strongly encourage managers to protect plant diversity in streams, not only because the plants themselves constitute an important part of the biodiversity, but also because they positively affect the macroinvertebrate community. Moreover, macrophyte-friendly management can be seen as a nature-based solution to mitigate the degraded physical conditions characterising many streams in agricultural catchments." (Authors) Calopteryx splendens is listed in the supplementary material, and is were rare.] Address: Riis, Tenna, Dept Biol., Aarhus Univ., Ole Worms Alle 1, 8000, Aarhus, Denmark

24531. Balázs, A.; Brochard, C.; Šipoš, J. (2024): 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 collected in Iran, the Netherlands and France. Fifty 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 Zoology, Fisheries, Hydrology and Apiculture, Mendel university in Brno, Zemedelská 1665/1, Brno, 613

00, Czech Republic. Email: balazsaeko@gmail.com

24532. Baumann, K.; Lohr, M. (2024): Leucorrhinia pectoralis und Coenagrion hastulatum (Odonata) in niedersächsischen Mittelgebirgen – zwei Arten mit syntopen Vorkommen, aber gegenläufiger Entwicklung? Libellula Supplement 17: 87-107. (in German, with English summary) ["Leucorrhinia pectoralis and Coenagrion hastulatum (Odonata) in the low mountain ranges of Lower Saxony, Germany – two species with syntopic occurrences but opposing trends? – C. hastulatum and L. pectoralis both mainly inhabit mesotrophic-dystrophic waters with riparian reed vegetation in Lower Saxony, but show opposing population trends throughout the state. For both species, the current database of the NGO Working Group of Dragonflies in Lower Saxony and Bremen was used to analyse whether population changes can be observed in the highest low mountain ranges of the state – the Harz and the Solling region. The calculated trends especially for the Solling are influenced by a lack of consistency in survey activities in the different periods considered and are therefore not very robust. In the Harz, a moderate decline in C. hastulatum has been recorded, which presumably results from the silting up and overgrowth of some small water bodies formerly colonised by the species. This in turn is the result of increasing summer drought in recent years and thus climate change. A similar situation can be assumed for the Solling, where water bodies formerly used for reproduction by C. hastulatum have repeatedly dried up in recent years. A decline in the species solely due to the rise in temperature, as is assumed for the lowlands of Lower Saxony, cannot be detected in either the montane Harz or the submontane Solling. For L. pectoralis, which is regarded as a climate change winner in Central and Northern Europe, different population trends are calculated in the two regions. No increase is recognisable in the Harz; observations are still primarily limited to single individuals. In contrast, the species appears to be increasing in the Solling, although what was previously its “best” water body with reproduction has failed in recent years due to drying out. However, the calculated very strong positive trend is methodologically overestimated, as Odonata inventories in the Solling have been largely limited to targeted surveys of this Habitats Directive species over the past ten years. The species is certainly much more common in the Solling, situated in lower altitudes, than in the Harz, although the Harz has various water bodies with structures suitable for the species. At least for the Harz, the question of an opposing trend development of C. hastulatum and L. pectoralis must be ruled out according to the current state of knowledge. In the submontane zone of the Solling, on the other hand, the trend analysis indicates an increase in L. pectoralis and a shift in abundance between the two species in favour of L. pectoralis. The importance of the Harz and Solling as refugia for C. hastulatum, which is now classified as threatened with extinction in the lowlands of Lower Saxony, should be emphasised. Due to gaps in the data, studies are necessary for both species in the Solling, especially in areas where no surveys have been carried out for more than ten years. Finally, some recommendation are given on how to promote both species in the Harz and Solling." (Authors)] Address: Baumann, Kathrin, ALNUS Ökologie und Naturschutz, Lärchenweg 15a, 38667 Bad Harzburg, Germany. Email: alnus-k.baumann@t-online.de

Bedjanic, M. (2024): [Friedrich Moritz Brauer (1832-1904) – one of he leading Austrian entomologists of the second half of the 19th century]. Erjavecia 39: 1-8. (in Slovenian) ["In the 19th century, during the Austrian Empire and later the Austro-Hungarian Empire, entomology also experienced great progress in our former country. Austrian entomologists were among the leading ones in Europe. Among the most eminent is certainly the zoologist and entomologist Friedrich Moritz Brauer, who gained worldwide fame for his research on dipterans, net-winged insects and dragonflies. He was born on May 12, 1832 in Vienna. He collected and observed insects as a child, inspired by his father Anton Justus, uncle Daniel Baum and teacher Anton Löw. In 1846, he received a small collection of exotic insects, which he helped to identify by curator Vinzenz Kollar at the Court Museum of Natural History in Vienna. In 1848, he founded his own collection of insects, which he kept for the rest of his life. In his early youth, he collected and bred mainly net-winged insects and described and drew their larvae. He was one of the founders of the Austrian natural science society Zoologisch-Botanische Gesellschaft (1851). In 1853 he enrolled in the study of medicine at the University of Vienna, completed his first rigor in 1860 and his second in 1971. In 1872 he was habilitated, and in 1884 he became a full professor at the University of Vienna. Although Brauer had already been a regular visitor to the entomological department of the then court natural history cabinet during his high school days, he only joined the Natural History Museum in Vienna (K.k. Naturhistorisches Hofmuseum) in 1861, as a mature and established entomological researcher. He was assigned to the department of molluscs and related groups, headed by curator Georg Ritter von Frauenfeld, and after his death Brauer took over the care of organizing the very extensive collection. This work demonstrated his conscientiousness and exceptional systematic view even for a group of animals that was not his main field of interest. In March 1876 he was appointed curator and after 16 years at the museum he was finally able to devote all his energy to entomology. He took over the management of the extensive collections of the groups Diptera, Neuroptera and Pseudoneuroptera, i.e. those groups of insects for whose research he had already gained a worldwide reputation. In February 1898 he was appointed director of the Zoological Department of the Natural History Museum. As he himself is said to have stated several times, Brauer was not born to be an administrative officer and found the many duties of his new position a heavy burden. Already in the middle of 1902 his strength began to fail and towards the end of 1904 he decided to apply for retirement. Unfortunately, fate had other plans – he died on 29-XII-1904, at the age of 73. As an entomologist, Brauer focused mainly on research on dipterans, reticulated insects and dragonflies, and also worked on fossil insects. He published almost 200 scientific papers, among which the most famous are the neuropterological monograph "Neuroptera austriaca" (Brauer & Löw 1857), the dipterological monograph "Monographie der Oestriden" (Brauer 1863), and a series of several extensive dipterological papers "Die Zweiflügler des Kaiserlichen Museums zu Wien"

(e.g. Brauer 1880, Brauer & von Bergenstamm 1895), and the list goes on. Brauer also published many very important works in the field of odontology. He described over 100, mostly tropical, species of dragonflies (e.g. Brauer 1864, 1865, 1867a, 1867b, 1868a, 1868b), of which 69 are now valid, and 38 of his taxon names are either classified as subspecies or have been synonymized (Paulson et al. 2024). He also described numerous new genera of dragonflies, of which 19 are now attributed to Brauer: Staurophlebia, Gomphomacromia, Agrionoptera, Brachydiplax, Brachythemis, Crocothemis, Diplacina, Erythrodiplax, Lyriothemis, Macrodiplax, Nannodiplax, Nannothemis, Neurothemis, Onychothemis, Orchithemis, Pachydiplax, Tetrathemis, Trithemis and Urothemis. Among the many species described by Brauer, only a few are "European", e.g. the eastern winter moth Sympecma paedisca (Brauer, 1877), while, as mentioned above, the more well-known genera of cicadas Crocothemis Brauer, 1868 and the cicadas Trithemis Brauer, 1868 bear his authorship. Brauer's early fundamental works – Verzeichniss der in Kaiserthume Österreich aufgefundenen Odonaten und Perliden (1856) and Die Neuropteren Europas und insbesondere Österreichs mit Rücksicht auf ihre geographische Verbreitung (1876) – are also relevant for Slovenian odontology and were included in the Slovenian odontology bibliography by Kiauta (1994). In the first part (Brauer 1856, Fig. 3) he gives information for the species Crocothemis erythraea “near Gorizia”, while for Sympetrum danae he gives “Carniola (Schiner)” (Note Fig. 3, below: Libellula scotica Donovan is a synonym for Sympetrum danae Sulzer; Ignaz Rudolf Schiner (1813–1873) was an Austrian entomologist, specialist in dipterans). In the second part (Brauer 1876, Fig. 4) he mentions the species Ceriagrion tenellum “already near Trieste”, which is taken from H. A. Hagen’s work “Synonymia Libellularum Europaearum” (Hagen 1840, Kiauta 2017). In conclusion, I would like to add that Brauer held numerous honorary positions and received high honors during his lifetime. He was a full member of the Imperial Academy of Sciences in Vienna and an honorary member of twelve entomological societies, including the most prestigious ones abroad (Berlin, Brussels, London, Paris, St. Petersburg, Washington). As early as 1868, he was awarded the Gold Medal for Arts and Sciences, in 1894 the Knight's Cross of the Royal Family, and a few days before his death he received the Commander's Cross of the Order of Franz Joseph. Since 1998, the Austrian Entomological Society – Österreichische Entomologische Gesellschaft has been awarding a special award for outstanding work in the field of scientific entomology – the Friedrich Brauer Medal." (Author/Google translate)] Address: Bedjanic, M., Rakovlje 42a, 3314 Braslovče oz. Email: matjaz_bedjanic@yahoo.com.

24533. Belevitch, O.; Yurchenko, Y.; Kharlamova, D.; Shatalova, E.; Agrikolyanskaya, N.; Subbotina, A.; Ignatieva, A.; Tokarev, Y.; Martemyanov, V. (2024): Ecological safety of insecticide based on entomopathogenic virus DsCPV-1 for nontarget invertebrates. Scientific Reports | (2024) 14:29093: 10 pp. (in English) ["For the first time under laboratory conditions, the virulence of a unique cypovirus strain, DsCPV-1, which has broad host specificity, was tested on nontarget aquatic organisms (natural species: Gammarus lacustris, Anopheles messeae, Coenagrion lunulatum, Cloeon robusta, Chironomus sp., Ilyocoris cimicoides, and Plea minutissima; laboratory species: Aedes aegypti and Daphnia magna), a terrestrial pollinator species (Apis mellifera), and an entomophage (Podisus maculiventris). The probability of this virus¡¦s accumulation in the bodies of invertebrates and of its transmission along a trophic chain was evaluated by two approaches: bioassays and a molecular diagnostic analysis. In the bioassays, there was no significant increase in mortality among all the tested aquatic and terrestrial nontarget species exposed to DsCPV-1 as compared with control groups (no virus). When we fed Podisus maculiventris with caterpillars having active DsCPV-1 infection (i.e., with the virus replicating in the host) no viral replication was observed in bug. No replication was also observed in mosquitos as well as in bee after viral treatment. Thus, the results show that the DsCPV-1 virus has excellent environmental safety toward many invertebrate species and can be recommended for the control of lepidopteran pests in forestry and agriculture as insecticide with light effect on environment." (Authors)] Address: Belevitch, Olga, Institute of Systematics and Ecology of Animals SB RAS, Frunze Str. 11, Novosibirsk 630091, Russia. Email: belog@ngs.ru

24534. Bhende, R.B.; Payra, A.; Tiple, A.D. (2024): Notes on the final emergence and moulting pattern of Ischnura senegalensis Rambur, 1842 (Zygoptera, Coenagrionidae) and Anax immaculifrons Rambur, 1842 (Anisoptera, Aeshnidae). Entomon 49(4): 487-494. (in English) ["The complete emergence of I. senegalensis and A. immaculifrons were studied at Wardha district of Maharashtra, India. The average time to complete emergence in I. senegalensis was 92.2 minutes and in the case of A. immaculifrons the average time for the (F-0) stage larvae for emergence it into fully flying adult was 40 days. I. senegalensis emerges in a vertical posture and emerges between 8 00 h and 16 00 h during the day. Emergence of the A. immaculifrons was observed at night, with times ranging from 21h to 01h and it emerges in a vertical posture. The (F-1) stage larva of A. immaculifrons was cannibalised by the (F-0) stage larva by only cutting the thorax and separating the head and abdomen. One unsuccessful emergence was observed in A. immaculifrons, where one of the wings remain wrinkled and unstretched." (Authors)] Address: Tiple, A.D., PG Dept of Zoology, Dr. R.G. Bhoyar Arts, Commerce and Science College, Seloo, Wardha, Maharashtra 442104, India. Email: ashishdtiple@gmail.com

24535. Biddy, A.R.; Manthey, J.D.; Ware, J.L.; McIntyre, N.E. (2024): Species distribution models predict genetic isolation of Hetaerina vulnerata Hagen in Selys, 1853 (Odonata, Calopterygidae). Ecology and Evolution 14(8), 2024, e70107: 23 pp. (in English) ["Understanding how past and current environmental conditions shape the demographic and genetic distributions of organisms facilitates our predictions of how future environmental patterns may affect populations. H. vulnerata is an insect with a range distribution from Colombia to the arid southwestern United States, where it inhabits shaded mountain streams in the arid southwestern United States. Past spatial fragmentation of habitat and limited dispersal capacity of H. vulnerata may cause population

isolation and genetic differentiation, and projected climate change may exacerbate isolation by further restricting the species' distribution. We constructed species distribution models (SDMs) based on occurrences of H. vulnerata and environmental variables characterizing the species' niche. We inferred seven current potential population clusters isolated by unsuitable habitat. Paleoclimate models indicated habitat contiguity in past conditions; projected models indicated some habitat fragmentation in future scenarios. 78 H. vulnerata individuals from six of the current clusters were sequenced via ddRADseq and processed with Stacks. Principal components and phylogeographic analyses resolved three subpopulations; Structure resolved four subpopulations. FST values were low (<0.05) for nearby populations and >0.15 for populations separated by expanses of unsuitable habitat. Isolation by distance was an existing but weak factor in determining genomic structure; isolation by environment and the intervening landscape explained a significant proportion of genetic distance. H. vulnerata populations were shown to be isolated by a lack of tree canopy coverage, an important habitat predictor for oviposition and territoriality. Thus, H. vulnerata populations are likely separated and are genetically isolated. Integrating SDMs with landscape genetics allowed us to identify populations separated by distance and unsuitable habitat, explaining population genetic patterns and probable fates for populations under future climate scenarios." (Authors)] Address: Biddy, A.R., Dept of Biology, Univ. of Alabama at Birmingham, Birmingham, Alabama, USA. Email: abiddy@uab.edu

24536. Butler, D. (2024): 2023 England. Country Dragonfly. Record Reports. British Dragonfly Society: 75 pp. (in English) [Records of Odonata from 33 counties in UK are documented and discussed.] Address: https://british-dragonflies.org.uk/wp-content/uploads/2024/08/2023-England-report-2023.pdf

24537. Casanueva, P.; Santamaría, T.; Sánchez-Sastre, L.F.; Campos, F. (2024): Nuevas localidades de Erythromma viridulum (Charpentier, 1840), Aeshna affinis Vander Linden, 1820 y Anax parthenope (Selys, 1839) (Odonata: Coenagrionidae, Aeshnidae) en la provincia de Ávila (centro de España). Boletín de la Sociedad Entomológica Aragonesa 74: 205-206. (in Spanish, with English summary) ["Data are provided from new places where the presence of E. viridulum, A. affinis and A. parthenope has been recorded in the province of Ávila, central Spain. For E. viridulum they represent the first published records from this province. For the other two species, they represent an expansion of their known area of distribution and confirm the expansion trend of A. parthenope recorded in recent decades." (Authors)] Address: Casanueva, Patricia, Dept of Experimental Sciences, European University Miguel de Cervantes, Cl Padre Julio Chevalier 2, 47012 Valladolid, Spain. E-mail: pcasanueva@uemc.es

24538. Costa, J.S.; Hahn, S.; Alves, J.A. (2024): Variation of parental and chick diet in opportunistic insectivorous European Bee-eaters. Avian Research 15, 100211: 9 pp. (in English) ["Insectivorous Palaearctic bird species associated with open habitats rely on high prey abundances, which are currently declining due to habitat loss and intensive agricultural practices. M. apiaster is an opportunistic insectivore of open habitats, preying mainly on medium to large-sized flying insects. Its diet composition received some attention in the past, but the current variation in diet composition of birds breeding across different habitats, and between adults and chicks remains poorly known. In this study, we determine variation in bee-eaters' diet in colonies located in five common habitats at the Iberian Peninsula. We also assess differences in the diet composition of chicks and adults and investigate seasonal diet selectivity of adults. Finally, we explore the variability in the size of prey provided to chicks throughout their growth period. Hymenoptera and Coleoptera were the most important groups for bee-eaters, with adults and chicks consuming 58.8% and 64.1% of hymenopterans and 37.6% and 28.6% of coleopterans, respectively. The proportion of Hymenoptera (42.3–55.7%) and Coleoptera (43.3–53.5%) in the diet was similar in colonies in pasture and oak habitats. But Hymenoptera dominated (83.8% and 95.7%) in meadow and mixed forest colonies. Despite being a generally opportunistic predator, adult bee-eaters provide their progeny with an increasing proportion of larger insects through chick development. Moreover, they equally take Hymenoptera and Coleoptera for themselves and their chicks, even when the abundance of these insects decreases seasonally. Overall, these results suggest that local prey availability associated with specific habitats influences diet composition and that regional declines in certain groups may, therefore, affect insectivore species differently according to their dietary and habitat preferences." (Authors) "Odonata were completely absent in the diet at our study sites." (Authors) The paper includes many references to Odonata.] Address: Costa, Joana, Dept Biology & CESAM – Centre for Environmental & Marine Studies, University of Aveiro, Portugal. Email: joana.santcosta@gmail.com

24539. Couturier, T.; Badré-Greuzat, A.; Gérard, A.; Hingray, T.; Dabry, J.; Chesnais, M.; Jailloux, A.; Besnard, A. (2024): Suivi des tendances de l'occupation des libellules par récolte d'exuvies dans les tourbières des Hautes-Vosges dans un contexte de changement climatique. Rapport méthodologique, protocole version 1. Coopération OFB-CEFE: 54 pp. (in French) ["The life cycle of dragonflies is closely linked to the presence and quality of water, which is essential for the development of their larvae and their metamorphosis into adults (imagos). Some ubiquitous species can develop in a wide variety of aquatic environments. Others, on the contrary, are specialists in certain environments. This is particularly the case for tyrphobiont species, i.e. those dependent on peat bogs, environments in sharp decline in France. Global warming and recurring droughts could amplify this decline, thus threatening dragonflies and other groups of species linked to these environments. The Vosges peat bogs, still numerous and some well-preserved, are home to several species of tyrphobiont dragonflies, as well as ubiquitous species. These sites are mostly protected by the status of national or regional nature reserve, but also Natura 2000 sites, and are managed by the Ballons des Vosges Regional Natural Park, the Conservatoire d'espaces naturels (CEN) of Lorraine and the National Forestry Office (ONF). Imagos can travel long distances by flight and be observed far from their preferred habitats. This is not the case

for exuviae (molts from larvae), the presence of which attests to reproduction of the corresponding species on the site where they are found. The larval stages are closely dependent on the environmental conditions of their living environment: water and air temperature, frost period, available prey, etc. Changes in these factors could therefore have strong impacts on the occupation of peat bogs by the dragonfly species most sensitive to these factors. The objectives of this study are: 1) to develop a protocol to establish an initial state and then monitor the evolution of the spatial occupation of dragonflies based on the search for exuviae and 2) to identify the potential factors causing possible changes in the procession in the future. To do this, we used a site-occupancy analysis method, which makes it possible to jointly estimate the probability of occupation and the probability of detection. This method thus makes it possible to take into account the imperfect detection of exuviae. A pilot study, conducted in 2021, initially made it possible to determine the variations in spatial occupation of different species of dragonflies within 237 circular plots with a radius of 2.5 m, arranged in the peat habitats of three nature reserves. We thus showed that the average probabilities of occupation and detection of tyrphobiont species within the plots were almost twice those of generalist species. Depending on the species groups, the estimated detection probabilities varied according to the period and water coverage. The occupation probabilities varied according to the habitat typologies. Based on the results produced during this pilot study, an initial status was launched in 2022 and 2023 on 239 plots within these three nature reserves. This protocol will be repeated in the medium and long term to characterize changes in peatland occupation by tyrphobiont and ubiquitous dragonflies. This document justifies the methodological choices made and proposes a framework for collecting, storing and analyzing data. It also sets out the logistical means necessary for implementing the proposed protocol. All of this information guarantees the sustainability of the study in the long term. The development of this protocol is part of a cooperation between the French Office for Biodiversity and the Center for Functional and Evolutionary Ecology. This cooperation launched in 2018 aims to establish methodological and statistical support for a continuous transfer of skills, knowledge, and methods to protected area managers." (Authors/Google translate)] Address: https://ofb.hal.science/hal-04796808v1/file/241121_-rapport_odonates_Vosges.pdf

24540. 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 references to Odonata.] Address: www.pelagicpublishing.com

24541. Dicol, J.P.; Mondejar, E.P.; Villanueva, R.J.T. (2024): Species diversity of Odonata in Mt. Gutom Protected Landscape, Zamboanga del Norte, Philippines. Biodiversitas 25: 4479-4486. (in English) ["Mount Gutom Protected Landscape is one of the remaining natural forests and one of the most important watersheds in the province of Zamboanga del Norte, Philippines. This study aimed to assess the species diversity and endemism of Odonata on Mt. Gutom. The field sampling was conducted on 7-20 December 2022. A combination of sweep netting and opportunistic sampling methods were used to collect samples. The five sampling sites were established in the forested and agricultural areas where water bodies and open areas are present. A total of 331 individuals belonging to 27 species of Odonata and representing 9 families and 18 genera were recorded at the five sampling sites. The endemism of Odonata was recorded at 59.26%, including two species under the near threatened category of the International Union for Conservation of Nature (IUCN). Also, the Philippine endemic Diplacina bolivari Selys, 1882 and Euphaea amphicyana Ris, 1930 were the most dominant and abundant Odonata species in three sampling sites, respectively. All sampling sites recorded moderate diversity, with a diversity index (H') value ranging from 1.724 to 2.694. Analysis of Similarity (ANOSIM) and dissimilarity between sampling sites showed that the highest average similarities were observed in the sampling sites located along the Sikitan River, agroecosystem, and Lower Gutom (67.41%), while sampling sites in Malikas and Upper Gutom had 90.59% dissimilarity. The results advocate the importance of protecting and conserving Mt. Gutom Protected Landscape to sustain the availability of resources required to support the different taxa present." (Authors)] Address: Dicol, Jalilah, Department of Biological Sciences, College of Science and Mathematics, Mindanao State University - Iligan Institute of Technology. Andres Bonifacio Avenue, Tibanga, Iligan City 9200, Philippines

24542. Fitzgerald, K.V.; Ammerman, L.K. (2024): 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) Odonata are represented by records of Enallagma sp., in some cases identified on species level. In total, Odonata amount to 2% in 66 fecal samples of Myotis velifer captured at Fort Leaton State Historic Site, Presidio, Texas, from March to October 2021] Address: Fitzgerald, Katheryn, Dept of Ecology, Evolution & Conservation Biology, University of Illinois Urbana-Champaign, Urbana, IL 61801, United States. Email: kvf2@illinois.edu

24543. Fliedner, H. (2024): Überlegungen zur Herkunft des Namens Aeshna (Odonata). Libellula Supplement 17: 11-16. (in German, with English summary) ["Considerations on the origin of the name Aeshna (Odonata) – The first time that the International Commission on Zoological Nomenclature had to deal with dragonflies was due to the name of the second genus introduced in this order: The question was whether the genus was to be called Aeschna or Aeshna. In this article, the complex scientific-historical and etymological background will be discussed." (Author)] Address: Fliedner, H., Louis-Seegelken-Straße 106, 28717 Bremen, Germany. Email: H.Fliedner@t-online.de

24544. García Gonzalez, J.; Márquez, J.A. (2024): Depredación de Oxyagrion rubidum (Rambur 1842) por una araña de la familia Trechaleidae y nuevos registros de Odonata para Córdoba, Argentina. Hetaerina 6(2): 6-11. (in Spanish) [Verbatim: "Predation of O. rubidum by a spider of the family Trechaleidae and new records of Odonata for Córdoba, Argentina: Insects of the order Odonata have a two-phase life cycle, which occurs mainly in aquatic environments in their larval stage and in terrestrial environments in their adult stage (Muzón et al., 2023). A critical moment in their life cycle is emergence, that is, when the larva becomes an adult, leaving the water and moving to the terrestrial environment (Jakob & Suhling, 1999). One of the main causes of mortality at the time of emergence is predation, caused mainly by birds, ants and spiders (Gribbin & Thompson, 1990). In the world, there is a great diversity of spiders that show an affinity for riparian habitats, even some species are exclusive to this aquatic-terrestrial ecotone, where energy flows in both directions between the two types of ecosystems (Akamatsu et al., 2004; Richardson, 2008). For example, in Argentina, seven families have been documented that have representatives related to riparian habitats (Griotti et al., 2017), among which the great diversity of predatory habits that characterizes this order of arthropods is evident (Dias et al., 2009). Predation of odonates by spiders is well documented and occurs mainly by species with a hunting strategy called "sit and wait" through the construction of webs (Rehfeldt, 1992; de Armas, 2023; Palacino et al., 2023). However, among the spiders that inhabit the riverbanks there are species with hunting strategies "on the lookout" on the ground or on vegetation, although with few records of predation of odonates (Gouvêa et al., 2023). The province of Córdoba, located in central Argentina, has 58 species of Odonata, which represents 20.6% of the fauna of the order in the country (Márquez et al., 2019, Lozano et al., 2020, Molineri et al., 2022). Among the most common Zygoptera in the lotic ecosystems of the region, there is O. rubidium, which also has a long flight season, being one of the first species to be recorded with the rise in temperature in spring. The objective of this contribution is to describe the observation of an individual of O. rubidum emerging and being preyed upon by a spider of the Trechaleidae family in central Argentina. The record is relevant in incorporating spiders with a "stalking" hunting strategy as an important cause of mortality at the time of emergence of this zygopteran. Additionally, it is intended to update the list of Odonata in the province of Córdoba, incorporating two new species records. Description of the predation record The observation was carried out on November 24, 2022 at 12:30 p.m. on the banks of the De La Cruz River (Ctalamochita River Basin), in the town of Paso Cabral (32°24'42.90" S; 64°29'58.55" W; 617 m a.s.l.). It is a foothill river located in the Pampeana Biogeographic Province, specifically in the Espinal District (Arana et al., 2021). The observation site had an intermediate riverbank quality according to the CBR index (Rivera Forest Quality, Principe et al., 2022), with the presence of exotic tree species. The bed is composed of sand and gravel. At the time of observation, the following conditions were recorded; air temperature of 25.3°C, water temperature of 25.5°C, pH of 8.31 and conductivity of 445 µS. During the survey, a spider from the family Threchaleidae (Fig. 3) was seen catching a female O. rubidum (Fig. 4), which had recently emerged and was perched strengthening its exoskeleton on the roots of a tree, about 15 cm from the water surface. Once its prey was captured, the arachnid held it by its thorax at the height of its wings and with the help of its pedipalps, manipulated it to insert its chelicerae (see Supplementary Video). Both individuals were collected, preserved in 70% alcohol and classified using specialized taxonomic keys. O. rubidum can be distinguished from other species of the genus in Argentina by the interlaminal mesepisternal sinus of the female, which is approximately rectangular (Costa, 1978). While the spider was classified within the family Trechaleidae (Grismado et al., 2014). It was a juvenile specimen, so it did not have the reproductive structures necessary for its classification as a species developed (Carico, 2005). It should be noted that, at the time of observation, additional individuals of the spider Paratrechalea ornata (Mello Leitão, 1943) were collected, which were lurking near water and in great abundance. Given the similarity in their coloration pattern and high abundance, there is a high probability that the specimen observed preying on the odonata belongs to this species. Regarding their biology, spiders of the family Trechaleidae are predators

lurking on vegetation (Dias et al., 2009). They are associated with bodies of water, preferring riparian habitats (Carico, 2005), suggesting that predation of odonates emerging from the body of water could be frequent. The present record is novel in terms of predation of odonates by the family Trechaleidae. Although Gouvêa et al. (2023) reported the predation of Odonata by this family of spiders, in that case it was an Anisoptera preyed upon at night, attributing the hunting to the low light. Our record differs in that it is a newly emerged Zygoptera preyed upon at midday. The observation expands the causes of mortality at the time of emergence of the species, adding predation by hunting spiders on the lookout. New records for the province of Córdoba Anax amazili (Burmeister, 1839) (Fig. 5). A male. M. Barchiesi col. 8-III-2024. The specimen was caught in a mist net used for bird surveys on the campus of the National University of Río Cuarto, Río Cuarto, Córdoba, Argentina (33°06'52" S, 64°18'04" W; 424 m a.s.l.). HE AERINA Vol. 6 (2): 6 — 11 Figure 4. O. rubidum habitus. Female collected on the bank of the Río de La Cruz, Paso Cabral, Córdoba, Argentina. Scale: 10 mm. The site is located in the Pampeana biogeographic province, more specifically in the Espinal district (Arana et al., 2021) and is located in a straight line 630 m from the Chocancharava River. Anax amazili can be distinguished from its American congeners by its triangular black mark on the upper region of its forehead, which is not surrounded by a black ring (Fig. 6) (Calvert, 1906). Of the American species of the genus, A. amazili is the third most widely distributed, with a range of 165,000 km^2 (Paulson & Schorr, 2020) and also shows evidence of migratory behavior (Clement et al., 2022). In Argentina, there are records in the Espinal ecoregion (Lozano et al., 2022), so its presence in the area was expected and contributes to the knowledge of the odonates that inhabit the province. Enallagma novaehispaniae Calvert, 1907 (Fig. 7). A female and a male in tandem. L. D. Marquez col. 30-III-2024. Quilpo River, San Marcos Sierras, Córdoba, Argentina (30°49 '02" S, 64°39' 29" W; 556 m a.s.l.). The Quilpo River is a mountain river that runs through the Chaco Serrano Forest. It has a bed composed mainly of rocks and blocks, and an alternation of rapids with areas of low current speed. E. novaehispaniae is the only species of the genus in Argentina. Males can be identified by their cercus that presents a basal ventral process and its horizontal branch that narrows to its pointed apex which ends in a medially directed tooth. Females have the anterior margin of the median keel of the mesostigmal plate transverse (Calvert, 1906; von Ellenrieder & Garrison, 2007). The record of the species for Córdoba represents the southernmost locality where the species lives and is the first for the Chaco Serrano Forest ecoregion. Chaqueño Serrano. With the addition of these two new records, the list for the province of Córdoba now consists of 60 species (Table 1)." (Authors/Google translate)] Address: García Gonzalez, J, Depto de Ciencias Naturales, Universidad Nacional de Río Cuarto. Córdoba, Argentina. Email: jeregarciagg@gmail.com

24545. 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

24546. Jödicke, R. (2024): Libellen im Flug fotografieren. Aus der Praxis der Naturfotografin Angelika Borkenstein. fotoforum 1/2024: 39-45. (in German) [Photographing dragonflies in flight. From the practice of nature photographer Angelika Borkenstein: The article shows some extraordinary pictures of flying dragonflies and gives practical, photo-technical tips on how to successfully photograph flying dragonflies.] Address: Jödicke, R., In der Baumschule 10, D-26655 Westerstede, Germany. E-mail: reinhard.joedicke@@magenta.de

24547. Kriska, G. (2024): Vízirovarok polarizációérzékelése, poláros ökológiai csapdák = Polarization vision of aquatic insects, polarized ecological traps. Állattani Közlemények 109(1-2): 25 pp. (in Hungarian, with English summary) ["The research presented in this review paper provided new data on the polarization vision of different aquatic insect taxa and its biological role. It has also demonstrated the effects of different artificial polarized light sources and their polarization patterns on aquatic insects. In the first part we summarize the light polarization vision-based behaviour of mayflies (Ephemeroptera), dragonflies (Odonata), non-biting midges (Chironomidae) and horseflies (Tabanidae) that play a crucial role in the survival of each taxon. Research presented in the second thematic unit has shown that polarotactic aquatic insects often prefer artificial surfaces that are totally unsuitable as habitat and reflect strongly and horizontally polarized light, rather than the water surface. The striking levels of insect mortality frequently observed near such artificial surfaces have played an important role in the scientific definition of the term ecological trap. A specific form of ecological traps is polarized light pollution, which is a threat to aquatic insects, and whose typical sources are oil lakes, asphalt roads, black plastic sheeting used in agriculture, glass surfaces of greenhouses and buildings, car bodies, black tombstones, solar

panels and solar collectors. If a polarotactic aquatic insect has a choice between these horizontally polarizing surfaces and a water surface, it will not choose water because of the supernormal polarization signal of the former. The exploration of this phenomenon has led to the recognition and definition of a new type of ecological light pollution, polarized light pollution." (Author)] Address: Kriska, G., HUN-REN Ökológiai Kutatóközpont, Vízi Ökológiai Intézet, Lendület Folyóvízi Ökológia Kutatócsoport, 1113 Budapest, Karolina út 29-31, Hungary. Email: kriska.gyorgy@ttk.elte.hu

24548. Krivan, V. (2024): Vážky (Odonata) lokality Na Skrivánku v k.ú. Jirín v okrese Jihlava. Branches of the Czech Ornithological Society in the Highlands (project no. 132424), Biodiversity Protection program, Czech Union of Conservation of Nature, funded by the Ministry of the Environment of the Czech Republic and co-financed by the Veolia Endowment Fund: 17 pp. (in Czech) ["Odonata of the Na Skrivánku locality in the cadastral area of Jirín in the Jihlava district: The Na Skrivánku site is located in the central part of the Vysocina Region, west of the city of Jihlava. An inventory survey of dragonflies was conducted in 2024 in order to map the occurrence of species of this taxonomic group at the site and to obtain data for the care of local biotopes and possible restoration interventions. 4) Results 8 species of dragonflies were recorded at the site in 2024. These are common species widespread in water bodies around the site. It would be appropriate to support the diversity of dragonflies by implementing measures such as pools in suitable unshaded places in the floodplain of the Maršovský stream.] Address: https://www.prirodavysociny.cz/pdf/NaSkrivanku-Vazky2024.pdf

24549. 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

24550. Li, K.; Xu, N.; Zhong, L.; Mou, X. (2024): Corrugation at the trailing edge enhances the aerodynamic performance of a three-dimensional wing during gliding flight. Biomimetics 2025, 10(5), 329; https://doi.org/10.3390/biomimetics10050329: 22 pp. (in English) ["Dragonflies exhibit remarkable flight capabilities, and their wings feature corrugated structures that are distinct from conventional airfoils. This study investigates the aerodynamic effects of three corrugation parameters on gliding performance at a Reynolds number of 1350 and angles of attack ranging from 0° to 20°: (1) chordwise corrugation position, (2) linear variation in corrugation amplitude toward the trailing edge, and (3) the number of trailing-edge corrugations. The results show that when corrugation structures are positioned closer to the trailing edge, they generate localized vortices in the mid-forward region of the upper surface, thereby enhancing aerodynamic performance. Further studies show that a linear increase in corrugation amplitude toward the trailing edge significantly delays the shedding of the leading-edge vortex (LEV), produces a more coherent LEV, and reduces the number of vortices within the corrugation grooves on the lower surface. Consequently, the lift coefficient is maximized with an enhancement of 28.99%. Additionally, reducing the number of trailing-edge corrugations makes the localized vortices on the upper surface approach the trailing edge and merge into larger, more continuous LEVs. The vortices on the lower surface grooves also decrease in number, and the lift coefficient is maximally increased by 20.09%." (Authors)] Address: Li, K., School Electromechanical & Automotive Engineering, Yantai Univ., Yantai 264005, China. Email: likaipeng@s.ytu.edu.cn

24551. Manh, V.Q.; Xuan, P.T.; Long, L.T.; Phuc, T.B. (2024): Fifty-one Vietnamese traditional medicines derived from invertebrate arthropods (Arthropoda) and annelids (Annelida). Hoa Binh University Journal of Science and Technology - No 14 - 12.2024: 112-122. (in English, with Vietnamese summary) ["To develop the Bio-pharmacology major at the university level, a comprehensive survey of Arthropoda and Annelida utilized as Vietnamese traditional medicines was conducted. The survey was organized according to six criteria: (1) Vietnamese and medicinal name, (2) classification and scientific name, (3) distribution and habitat, (4) medicinal properties, (5) pharmaceutical effects, (6) discussion and comments. A total of 51 invertebrate species were identified, comprising 46 arthropod species and five annelid species used in traditional medicine." (Authors) Anax parthenope and Crocothemis servilia are documented in a table.] Address: Manh, V.Q., Hoa Binh University, Vietnam. Email: vqmanh@gmail.com

24552. 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 ordears, 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.

24553. Mossioli de Souza, Y.C.; Annibale, F.S.; Pelinson, R.M.; Rossa-Feres, D. (2024): Behavioral responses of benthic and nektonic tadpoles to the presence of a benthic predator. Hydrobiologia 851(20): 4955-4964. (in English) ["We experimentally tested whether the presence of a free benthic predator (Odonata naiads) alters the displacement time, the position occupied in the water column, and the proportion of food consumed by benthic and nektonic tadpoles. The presence of predators did not influence the displacement time or the proportion of food consumed by any of the two species. In the presence of predators, benthic tadpoles avoided the benthic microhabitat, increasing their time in the middle of the water column. This behavior was unexpected since the previous studies indicate that the morphology of benthic tadpoles restricts them to the bottom of water bodies. We, thus, hypothesize that such a drastic behavior change was a consequence of the real risk of predation to which the tadpoles were exposed. Our results are in accordance with the threat-sensitivity hypothesis, in which prey behave flexibly when exposed to different degrees of predation threats. Nektonic tadpoles, however, slightly increased their permanence in the water column in the presence of the same benthic predators. Therefore, we provide support for the hypothesis that predators induce greater behavioral changes in prey that exhibit patterns of microhabitat use similar to theirs." (Authors)] Address: Mossioli de Souza, Yasmim Caroline, Graduate Program in Biodiversity, São Paulo State University – UNESP, São José do Rio Preto, SP, 15054-000, Brazil

24554. 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. https://doi.org/-10.3390/insects15110896: 12 pp. (in English) ["Simple Summary: 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 & Nematodes, Agriculture & Agri-Food Canada, 960 Carling Avenue, Ottawa, ON K1A 0C6, Canada. Email: bmotamed@uoguelph.ca

24555. 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(6): 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 Biol. Sc., Coll. of Basic & Applied Sciences, Glorious Vision Univ., Ogwa, Edo State, Nigeria

24556. Olivencia, K.; Grausgruber, E.E.; Fincel, M.J.; Weber, M.J. (2024): Smallmouth Bass and Walleye predation on stocked age-0 Walleye in Lake Oahe, South Dakota. North American Journal of Fisheries Management 44(3): 620-636. (in English) ["Objective: Walleye Sander vitreus are important sport fish that are commonly stocked to supplement populations. Increases in M. dolomieu abundance have prompted concerns regarding potential predation by these and other piscivores on stocked Walleye. Our objectives were to assess the timing and duration of predation on stocked Walleye, the frequency of occurrence and percent composition of Walleye in predator diets, and the percentage of stocked Walleye consumed. Methods: We collected Smallmouth Bass, adult Walleye, Largemouth Bass M. nigricans, and Northern Pike Esox lucius diets in May (prestocking) and June–September (poststocking) 2019 and 2021 from three bays in Lake Oahe, South Dakota. We stocked two bays with Walleye (30–32 mm; 255–1649 Walleye/ha), whereas one bay was unstocked and served as a reference. We estimated Smallmouth Bass population abundance using Schnabel capture–recapture models, and we used bioenergetics to estimate the percentage of stocked age-0 Walleye consumed. Result: We found age-0 Walleye in up to 11.4% of Smallmouth Bass diets and 14.6% of adult Walleye diets during the poststocking period. A single Largemouth Bass consumed one Walleye at 3 days poststocking (DPS), whereas we did not identify Walleye in Northern Pike diets. Daily mean percent composition by weight (±95% confidence interval) of age-0 Walleye in diets peaked at 43.2 ± 35.1% at 3 DPS for Smallmouth Bass and 49.8 ± 97.7% at 14 DPS for adult Walleye. Following the peaks, age-0 Walleye percent composition by weight rapidly declined and was generally 0% after 25 DPS. Smallmouth Bass abundance was 0.4–5.6 fish/ha, whereas recaptures of other predator species were insufficient for reliable population estimates. We estimated that Smallmouth Bass consumed 29,930 age-0 Walleye in 2019 and 12,535 age-0 Walleye in 2021 (up to 14.7 ± 4.7% of stocked fish), potentially representing an important source of stocking mortality. Conclusion: Our research provides insights into the effects of poststocking predation on age-0 Walleye by Smallmouth Bass and, to a lesser extent, Walleye, Largemouth Bass, and Northern Pike. Managers should consider predation on stocked fingerling Walleye from resident predators and should contemplate alternative stocking locations or timing to reduce potential predation. ...After Walleye stocking in 2019, Hemiptera occurred most frequently in Smallmouth Bass diets (58.0%), followed by Ephemeroptera (20.5%) and Odonata (19.3%)....From 1 to 25 DPS in Spring Creek, the top-three prey items by weight (±95% CI) in Smallmouth Bass diets were Hemiptera (27.9 ± 5.2%), Ephemeroptera (16.2 ± 4.0%), and Odonata (12.2 ± 3.5%), whereas Walleye comprised 9.0 ± 3.4% of the diets. From 1 to 15 DPS in Okobojo Bay, the top-three prey items by weight in Smallmouth Bass diets were Hemiptera (51.7 ± 7.7%), Odonata (8.4 ± 3.8%), and Cyprinidae (8.0 ± 4.1%), whereas Walleye only comprised 2.2 ± 1.5% of the diets." (Authors)] Address: Weber, M.J., Dept of Natural Resource Ecology and Management, Iowa State University, Ames, Iowa, USA. Email: mjw@iastate.edu

24557. Phan, Q.T.; Zhang, H.; Keetapithchayakul1, T.S.; Song, R.; Tuan, P.Q.; Lam, N.B.V. (2024): Contribution to the dragonflies and damselflies (Insecta: Odonata) of Bach Ma National Park, central Vietnam. International Dragonfly Fund - Report 190: 21-40. (in English) ["A checklist of 131 dragonfly and damselfly species from Bach Ma National Park of central Vietnam is provided. Of these, 102 species are newly recorded for the National Park. The regional status of Periaeschna magdalena Martin, 1909 is discussed and, based on detailed morphological examination, corrected to Periaeschna yazhenae Xu, 2012. Morphological differences between Coeliccia schorri Phan & To, 2019 from the type locality and specimens from Bach Ma NP are also discussed. Notes on conservation and the regional distribution of dragonflies and damselflies in Bach Ma are included." (Authors)] Address: Phan, Q.T., The Center for Entomology & Parasitology Research, College of Medicine and Pharmacy, Duy Tan University, 120 Hoang Minh Thao, Lien Chieu, Da Nang, Vietnam. Email: pqtoan84@gmail.com

24558. Phan, Q.T.; Keetapithchayakul, T.S. (2024): Description

of the final stadium larva of Cryptophaea vietnamensis (van Tol & Rozendaal, 1995) (Odonata: Euphaeidae) from Vietnam. Zootaxa 5512(1): 93-102. (in English) ["The final stadium larva of the C. vietnamensis Vietnam is described and illustrated based on specimens reared to adulthood. This is the first record of a larva of the genus Cryptophaea Hämäläinen, 2003. The larvae of C. vietnamensis are seldom encountered, but where present they may co-occur with larvae of the genera Anisopleura Selys, 1853, Bayadera Selys, 1853, and Euphaea Selys, 1840. The larvae of Cryptophaea are very similar to those of Bayadera but can be separated from known larvae of that genus by the distal margin of the ligula being a pronounced bilobed structure and the spurs on outer margin of mandible being poorly developed." (Authors)] Address: Keetapithchayakul, T.S., The Center for Entomology & Parasitology Research, College of Medicine & Pharmacy, Duy Tan University, 120 Hoang Minh Thao, Lien Chieu, Da Nang, Vietnam. Email: Keetapithchayakul.TS@gmail.com

24559. Pires, M.M.; Renner, S.; Sahlén, G.; Périco, E. (2024): Taxonomic ratios of Odonata (Insecta) indicate anthropogenic landscape disturbances in Subtropical grassland streams. International Review of Hydrobiology 109(4): 61-70. (in English) ["Streams in South American subtropical grasslands are under increasing environmental pressure. The development of biological indices to assess impacts on streams in this region is important from both conservation and applied perspectives. Metrics based on the Odonata community structure are useful for assessing anthropogenic disturbances in tropical forest streams. However, little is known about the potential of Odonata-based metrics to assess impacts on streams in non-forest landscapes. Here, we assess the potential of taxonomic ratios of Odonata as tools to assess anthropogenic disturbances in streams across the South Brazilian grasslands. We tested the relationships of ratios between the number of taxa from each suborder ("Zygoptera/Anisoptera" ratios) and between families and genera within each suborder with anthropogenic land cover surrounding each stream. "Zygoptera/Anisoptera" ratios and ratios of the damselfly genus Argia ("Argia/Zygoptera") were negatively related to anthropogenic land cover, while "Libellulidae/other Anisoptera" ratios were positively related. In addition, threshold analysis found that "Argia/Zygoptera" ratios were negative indicators of anthropogenic land cover. Our study expands the potential of taxonomic ratios of Odonata as a biomonitoring tool for the integrity of subtropical non-forest streams, such as those of the South Brazilian grasslands. Moreover, taxonomic ratios based on the richness of lotic-specialist taxa within the suborder Zygoptera can reflect the degree of anthropogenic landscape disturbances. Our results contribute to developing biological indices to assess the environmental impacts of land-use changes in streams in the Global South." (Authors)] Address: Pires, M.M., Univ. do Vale do Taquari—UNIVATES, Lajeado, Rio Grande do Sul, Brazil. Email: marquespiresm@gmail.com

24560. Pryke, J.S.; Samways, M.J.; New, T.R.; Cardoso, P.; Gaigher, R (Eds.) (2024): Routledge Handbook of Insect Conservation. Routledge. ISBN 9781032259505: 586 pp. (in English) ["This handbook presents a comprehensive overview of insect conservation and provides practical solutions to counteract insect declines, at a time when insects are facing serious threats across the world from habitat destruction to invasive species and climate change. The Routledge Handbook of Insect Conservation consists of six sections, covering all aspects of insect conservation, and containing contributions from academics, researchers and practitioners from across the globe. Section I addresses the fundamentals of insect conservation and outlines the reason why insects are important and discusses the greatest drivers of insect decline. The chapters in Section II examine the approaches that can be used for insect conservation globally, such as protected areas and agroecology, while highlighting the importance of insects in the composition and function of ecosystems. The chapters in Section III focus on insect populations in the major biomes around the world, from temperate and tropical forests to savannas and grasslands, with the chapters in Section IV focusing on natural and manmade ecosystems of the world, including mountain, soil, urban, island and agricultural habitats. They discuss the unique pressures and challenges for each biome and ecosystem and offer practical solutions for conserving their insect populations. Section V focuses on the assessment and monitoring of insects for conservation, discussing how we can implement practical monitoring protocols and what options are available. A wide variety of methods and tools are examined, including citizen science, bioindication, the role of taxonomy, drones and eDNA. The book concludes by examining policy and education strategies for insect conservation in Section VI. The chapters discuss key issues around social and policy strategies and conservation legislation for ensuring the long-term protection of insects. This book is essential reading for students and scholars of biodiversity conservation and entomology as well as professionals and policymakers involved in conservation looking for real-world solutions to the threats facing insects across the globe." (Publisher)] Address: https://www.routledge.com/Routledge-Handbook-of-Insect-Conservation/Pryke-Samways-New-Cardoso-Gaigher/ p/book-/9781032259505?srsltid=AfmBOorBUzUHFupcIkD0PFI5-mSgHBonXOzVPqZYPdd_lxx8yGX6YPMSB

24561. Reyes-Avila, A.D.; Moore, B.C.; Jones, B.W.; Taylor, T.N. (2024): 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 ($\delta^{15}N$, $\delta^{13}C$) 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

24562. Sánchez Herrera, M.; Forero, D.; Calor, A.R.; Romero, G.Q.; Riyaz, M.; Callisto, M.; Roque, F.; Elme-Tumpay, A.; Khan, M.K.; Justino de Faria, A.P.; Pires, M.M. (2024): Systematic challenges and opportunities ininsect monitoring: a Global South perspective. Phil.Trans. R. Soc. B 379: 20230102.https://-doi.org/10.1098/rstb.2023.0102: 13 pp. (in English) ["Insect monitoring is pivotal for assessing biodiversity and informing conservation strategies. This study delves into the complex realm of insect monitoring in the Global South—world developing and least-developed countries as identified by the United Nations Conference on Trade and Development—highlighting challenges and proposing strategic solutions. An analysis of publications from 1990 to 2024 reveals an imbalance in research contributions between the Global North and South, highlighting disparities in entomological research and the scarcity of taxonomic expertise in the Global South. We discuss the socio-economic factors that exacerbate the issues, including funding disparities, challenges in collaboration, infrastructure deficits, information technology obstacles and the impact of local currency devaluation. In addition, we emphasize the crucial role of environmental factors in shaping insect diversity, particularly in tropical regions facing multiple challenges including climate change, urbanization, pollution and various anthropogenic activities. We also stress the need for entomologists to advocate for ecosystem services provided by insects in addressing environmental issues. To enhance monitoring capacity, we propose strategies such as community engagement, outreach programmes and cultural activities to instill biodiversity appreciation. Further, language inclusivity and social media use are emphasized for effective communication. More collaborations with Global North counterparts, particularly in areas of molecular biology and remote sensing, are suggested for technological advancements. In conclusion, advocating for these strategies—global collaborations, a diverse entomological community and the integration of transverse disciplines—aims to address challenges and foster inclusive, sustainable insect monitoring in the Global South, contributing significantly to biodiversity conservation and overall ecosystem health." (Authors) The paper includes references to Odonata.] Address: Sánchez Herrera, Melissa, Lab. de Zool. y Ecol. Acuática (LAZOEA), Biol. Sci. Dept, Univ. de los Andes, Bogotá, 111711, Colombia. Email: melsanc@gmail.com

24563. Santos Ferreira, V.R.; Cunha, E.J.; Batista Calvão, L.; Luiza-Andrade, A.; Oliveira de Resende, B.; de Carvalho, F.G.; Bomfim, F.F.; Fares, A.L.; Sampaio Cabral, G.; Lima, M.; Montag, L.F.; Michelan, T.S.; Juen, L. (2024): Amazon streams impacted by bauxite mining present distinct local contributions to the beta diversity of aquatic insects, fish, and macrophytes. Science of The Total Environment 955, 10 December 2024, 177292: (in English) ["Highlights: •Beta diversity metrics identify priority sites for conservation in mining-impacted Amazon streams. •Unique species assemblages in degraded streams are linked to specific physicochemical conditions. •pH and conductivity strongly influence local contribution to beta diversity in aquatic biota. •Different biological groups respond uniquely to local and landscape environmental factors. •Low species richness in unique communities suggests an urgent need for environmental restoration. Integrating the physicochemical characteristics of aquatic environments with their biotas is essential for the conservation and monitoring of biodiversity, given the sensitivity of both the biotic and the abiotic components to environmental changes linked to water quality and human activities. In the present study, we evaluate how the contributions of different taxa to beta diversity, through local and species effects, can indicate the priority sites for conservation and ecological restoration in an Amazon region impacted by bauxite mining. We also investigate how environmental conditions at local and landscape scales influence the beta diversity of the aquatic biota. We hypothesize that unique species assemblages (a high local contribution) are more likely to be found in more degraded streams, with these assemblages being influenced strongly by local conditions and landscape characteristics. Our findings indicate that local contributions to beta diversity can be explained significantly by physicochemical variables, such as the pH and electrical conductivity of the water, with streams impacted by mining exhibiting distinct species compositions. The environmental factors affected different biological groups in distinct manners, including fish, aquatic insects (water bugs, and the larvae of mayflies, stoneflies, caddisflies, and dragonflies), adult dragonflies, and macrophytes. Streams with unique communities also often exhibited low species richness, which highlights the need for environmental restoration. These results reinforce the value of the use of beta diversity metrics as guidelines for conservation and restoration efforts in aquatic ecosystems that have been affected by anthropogenic disturbances. Furthermore, our findings underscore the importance of a multitaxon approach to ensure the formulation of a more comprehensive picture of the responses of a region's biodiversity to anthropogenic impacts." (Authors)] Address: Santos Ferreira, V.R., Lab. of Ecology & Conservation (LABECO), Graduate Program in Ecology, Instituto de Ciências Biológicas, Univ. Federal do Pará, Rua Augusto Corrêa, 1, Belém, PA 66075-110, Brazil. Email: victor_rennan890@hotmail.com

24564. Schmidhauser, N.R.M.M.; Finsinger, W.; Cagliero, E.; Heiri, O. (2024): Holocene ecosystem and temperature development inferred from invertebrate remains in Zminje Jezero (Dinaric Alps, Montenegro). Journal of Paleolimnology 72(3): 343-361. (in English) ["Lake Zminje Jezero (1535 m a.s.l.) in Montenegro was studied for chironomid and

other aquatic invertebrate remains in a sediment sequence dating back to 12,000 calibrated 14C years before present (cal yr BP), providing, to our knowledge, the first lake-sediment record studied for chironomids and other associated chitinous aquatic invertebrate remains in the Dinaric Alps. Changes in chironomid and other invertebrate remains along the record make it possible to constrain changes of relevant environmental variables for aquatic invertebrates in the lake including temperature, oxygen availability, trophic status and water depth. The results suggest moderate changes in trophic conditions with chironomid assemblages indicating meso- to eutrophic conditions during the analysed interval. Invertebrate assemblages were typical for lakes with relatively high oxygen availability with a minor trend during the middle to late Holocene to conditions observed in lakes that are more hypoxic. A change in temperature is suggested in the earlier part of the record when the share of chironomid taxa adapted to warmer conditions increased, at the Younger Dryas to Holocene transition, whereas later no particularly pronounced shifts in temperature-sensitive taxa were observed. July air temperatures were estimated based on chironomid assemblages using a transfer function based on calibration data consisting of 117 lakes sampled in the Swiss Alps and northern Switzerland. The results suggest that temperatures rapidly increased by 5 °C at the onset of the Holocene (11,500 cal yr BP) leading to a relatively warm early to mid-Holocene and thereafter slightly decreased during the late Holocene. Reconstructed temperatures are discussed together with a previously published pollen record for our study site and are broadly consistent with other chironomid-based temperature reconstructions from Central, Eastern and Southern Europe. From ca. 3000 cal yr BP sedimentation rates increased and from ca. 500 cal yr BP onwards pollen data suggest that the vegetation and lake catchment were affected by human activities, possibly influencing chironomid and other invertebrate assemblages in the lake and thereby also reconstructed temperatures. Overall, our results show that combining analyses of chironomid and other invertebrate assemblages can provide valuable insights into long-term environmental changes and can provide temperature reconstructions for small mountain lakes in the Balkans, such as Zminje Jezero." (Authors) In Supplementary file4 "Odonata" are documented.] Address: Schmidhauser, Noé, Geoecology, Dept of Environmental Sciences, Univ. Basel, 4056 Basel, Switzerland. Email: noe.schmidhauser@unibe.ch

24565. Schwarz, M.B.; O'Carroll, D.C.; Evans, B.J.E.; Fabian, J.M.; Wiederman, S.D. (2024): Localized and long-lasting adaptation in dragonfly target-detecting neurons. eNeuro 11(9): 14 pp. (in English) ["Some visual neurons in the dragonfly (Hemicordulia tau) optic lobe respond to small, moving targets, likely underlying their fast pursuit of prey and conspecifics. In response to repetitive targets presented at short intervals, the spiking activity of these 'small target motion detector' (STMD) neurons diminishes over time. Previous experiments limited this adaptation by including inter-trial rest periods of varying durations. However, the characteristics of this effect have never been quantified. Here, using extracellular recording techniques lasting for several hours, we quantified both the spatial and temporal properties of STMD adaptation. We found that the time course of adaptation was variable across STMD units. In any one STMD, a repeated series led to more rapid adaptation, a minor accumulative effect more akin to habituation. Following an adapting stimulus, responses recovered quickly, though the rate of recovery decreased nonlinearly over time. We found that the region of adaptation is highly localized, with targets displaced by approximately 2.5° eliciting a naïve response. Higher frequencies of target stimulation converged to lower levels of sustained response activity. We determined that adaptation itself is a target-tuned property, not elicited by moving bars or luminance flicker. As STMD adaptation is a localized phenomenon, dependent on recent history, it is likely to play an important role in closed-loop behavior where a target is foveated in a localized region for extended periods of the pursuit duration. Significance statement: The dragonfly is an effective and efficient predator, with specialized target-detecting neurons located within the brain's optic lobe. When presented with repeated targets, the spiking activity of these target-detecting neurons is reduced. Such adaptation to repeated stimulation is a common property of neurons across diverse species. Our results show that target-induced adaptation is constrained to the location of the presented targets. Furthermore, we have quantified the degree to which neuronal responses to moving targets are reduced and then recover over time. This adaptation in a visual feature-discrimination pathway raises important questions about the functional implications of neuronal adaptation on the crucial behavior of target pursuit." (Authors)] Address: Evans, J.E., School of Biomedicine, The University of Adelaide, Adelaide, Australia

24566. Siddiqui, S.A.; Asante, K.; Ngah, N.; Saraswati, Y.R.; Wu, Y.S.; Lahan, M.; Aidoo, O.F.; Fernando, I.; Povetkin, S.N.; Castro-Muñoz, R. (2024): Edible dragonflies and damselflies (order Odonata) as human food – A comprehensive review. Journal of Insects as Food and Feed 10: 1947-1972. (in English) ["The rapid growth of the human population leads to a big concern about the food y and demand worldwide. However, due to the reduction in global arable land area, humans need to find alternative food sources to fulfil their needs. Consequently, edible insects have been identified as a promising solution to ameliorate food security and increase global nutrition. Among more than 2,100 identified edible insect species, dragonflies and damselflies (order Odonata) are considered as one of nutritious food resources. Nevertheless, detailed information on the frequency and distribution of consumption of odonatans around the world is scattered and poorly documented. Based on this review, at least 61 out of 1,964 species of odonatans were reported consumed by people worldwide. The most consumed dragonflies (suborder Epiprocta; infraorder Anisoptera) are from the family of Libellulidae, followed by Aeshnidae and Gomphidae, whereas the most consumed edible damselflies (suborder Zygoptera) are from the Coenagrionidae family. Many nutrients, including proteins, lipids, energy, fibre, vitamins, and minerals are abundant in edible odonatans. Moreover, studies reported that humans employed these insects as therapeutic agents to remedy various ailments. Challenges associated with the consumption

of edible odonatans include safety concerns, legal frameworks, and limited information on their bioecology which become barrier for their successful mass-rearing. However, because entomophagy is gradually gaining recognition, new and more improved methods of rearing are now being developed including for edible odonatans, encouraging sustainable insect farming. As the world strives to achieve the sustainable development goals, insect farming will pave a way for resources to be utilised for sustainable economic development." (Authors)] Address: Siddiqui, S.A., Technical Univ. of Munich Campus Straubing for Biotechnology and Sustainability, Essigberg 3, 94315 Straubing, Germany. Email: s.siddiqui@dil-ev.de

24567. Sigutová, H.; Pyszko, P.; Bílková, E.; Dolný, A. (2024): Highly conserved ecosystems facing climate change: Rapid shifts in Odonata assemblages of Central European bogs. Global Change Biology 31(4), e70183: 14 pp. (in English) ["Freshwater diversity is declining at an alarming rate worldwide, and climate change is a key driver. However, attributing biological shifts solely to climate warming remains challenging because of confounding anthropogenic stressors. Peatbogs, being highly conserved, strictly protected, and minimally disturbed, offer a unique study system to isolate climate effects. We compared odonate assemblages in 27 Central European raised and transitional bogs between two sets of standardized surveys approximately 20 years apart (1998–2006 and 2020–2024). During this period, the mean annual air temperature has increased by 1.23°C. We tracked species richness, composition, taxonomic diversity, and functional traits (thermal tolerance, conservation value indicators, and selected morphological and life-history traits) and also examined phylogenetic patterns of species turnover. Although species richness remained stable, assemblage composition shifted markedly from cold-adapted, vulnerable bog specialists toward warm-adapted habitat generalists with lower conservation value. Notably, Ponto-Mediterranean species and those with a lower upper elevational limit increased their occupancy. Although the phylogenetic signal across the evolutionary tree of odonates was low, implying that the responses of the species to climate change were independent of their phylogenetic position, we revealed frequent genus-level replacements. These findings reinforce the position of odonates as a model group for detecting climate-driven changes in freshwater communities. Our study has revealed that climate warming alone can trigger profound reorganization of insect communities in inherently stable peatbog habitats. Specific traits linked to vulnerability (e.g., thermal index, red list status) and specialization proved to be promising predictors of future shifts in odonatofauna of temperate peatlands. The pronounced changes documented here may precede irreversible transformations of these unique ecosystems, highlighting the urgency of monitoring bog habitats and maintaining their stability under ongoing global change." (Authors)] Address: Dolný, A., Dept of Biology and Ecology, Faculty of Science, University of Ostrava, Ostrava, Czechia. Email: ales.dolny@osu.cz

24568. Tesfazion, F. (2024): If you give a tadpole a chemosensory stimulus: Detection of invasive predatory cues and signs of conspecific communication In Pseudacris sierra tadpoles. Senior Thesis, Department of Organismal Biology, Claremont University: 26 pp. (in English) ["Amphibians are at disproportionately higher risks of extinction than all other vertebrate classes, and a major causing factor is invasive predation. The American bullfrog (Lithobates catesbeianus), native to Eastern North America, is a notorious invasive species which preys on native Sierran treefrogs (Pseudacris sierra) in Northern and Central California. These treefrogs have yet to be placed on any Special Animals List, suggesting the presence of adopted behaviors against predation. Past studies have documented the importance of chemical sensing in anuran tadpoles as predator detection tools. This study tests if Sierran treefrog tadpoles can recognize invasive chemical cues by measuring antipredator behaviors, defined as decreased activity and increased crouching, in tadpoles against cues from invasive bullfrogs. Responses are compared to those displayed against a native predator: dragonfly nymphs. It also tests whether these behaviors are exacerbated by the absence of nearby conspecifics, as a predator threat may be magnified amongst lone tadpoles. Our results show a significant decrease in activity and a significant increase in crouching behavior in tadpoles presented with bullfrog chemical cues, which are indicators of antipredator behaviors being utilized against this non-native threat. We also found that, while there was a significant decrease in activity levels in the presence of dragonfly nymph chemical cues, there was no significant crouching behavior under these conditions, which may be explained by an adaptation to dragonfly nymph hunting behavior. Finally, we found a significant decrease in activity level in tadpole groups compared to individuals, which may indicate conspecific communication." (Author)] Address: https://-scholarship.claremont.edu/cgi/viewcontent.cgi?article=36-23&context=scripps_theses

24569. 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) Data of 16 odonate species are

documented; in most cases specimens are from Mexico, a few are from Colombia and Arizona (USA).] Address: Novelo-Gutiérrez, R., Inst. Ecol., 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

24570. Vinko, D. (2024): [Updated European Red List of dragonflies]. Erjavecia 39: 9-19. (in Slovenian) [Extensive review of the current European Red List of Odonata: De Knijf, G.; Billqvist, M.; van Grunsven, R.H.A.; Prunier, F.; Vinko, D.; Trottet, A.; Bellotto, V.; Clay, J.; Allen, D.J. (2024): Measuring the pulse of European biodiversity. European Red List of Dragonflies & Damselflies (Odonata). Brussels, Belgium: European Commission. 46 pp.] Address: Vinko, D., Slovene Dragonfly Society, Verovškova 56, 1000 Ljubljana, Slovenia. Email: damjan.vinko@gmail.com

24571. Vukoja, A.; Bogdanovic, T.; Rašeta, D.; Miljanic, N.; Risek, I.; Ilic, K.; Pavicic, I.; Marjanovic Cermak, A.M.; Petrinec, B. (2024): Dragonflies (Odonata) as bioindicators of radioactivity. Isotopes in Environmental and Health Studies 61(2): 230-238. (in English) ["Bioindicators are living organisms that are successfully used for monitoring changes in the environmental health due to natural and/or anthropogenic influences. Odonata are considered to be good indicators of water quality; however, research on dragonflies as potential indicators of radioactivity is scarce. The aim of this study was to evaluate dragonflies as potential biological indicators of ionising radiation in nature by measuring ^{137}Cs activity concentrations in the dragonfly and river water samples. Altogether, 11 collective samples of dragonflies were collected from the bank of the Mura–Drava–Danube Biosphere Reserve, in the area of Virovitica–Podravina County. Following the initial sample preparation, the gamma spectrometry technique, employing an ORTEC HPGe detector system, was utilised to determine the activity concentrations of 137Cs. The results show that the activity concentrations of ^{137}Cs in the river water were in the range from 4 to 13 Bq/m³. The results of dragonfly samples showed that 137Cs was in the range from 1.7 to 3 Bq/kg. This was more than a hundred times higher than in the river Drava water. According to the obtained results, we conclude that dragonflies could be used as potential bioindicators of radioactivity." (Authors)] Address: Petrinec, B. Fac. of Dental Medicine & Health, Josip Juraj Strossmayer University of Osijek, Osijek, Croatia. Email: petrinec@imi.hr

24572. Watanabe, R.; Kubo, S.; Fukuoka, T.; Takahashi, S.; Kobayashi, K.; Ohba, S.-y. (2024): Do fallow field biotopes function as habitats for aquatic insects similar to rice paddy fields and irrigation ponds? Wetlands 44(68): 15 pp. (in English, with Japanese summary) ["In Japan, abandonment of rice fields has rapidly increased, resulting in biodiversity loss. Fallow field biotopes are attractive measures for compensating wetland species habitats in paddy environments. However, effective management practices of fallow field biotopes for biodiversity conservation are largely unknown, especially for lentic aquatic insects (Odonata, Hemiptera, and Coleoptera). We conducted field experiments in abandoned rice terraces in western Hyogo Prefecture, central Japan. We plowed and flooded nine abandoned paddy fields and divided them into three types: paddy fields, biotopes, and mixed fields. We also surveyed irrigation ponds. To assess the function of the four habitat types, we examined how species richness, abundance, and community composition of aquatic insects differed among habitat types. Aquatic insect assemblages in biotopes differed from paddy fields and ponds and resembled that in a mixed field. The effects of environmental factors on the abundance and species richness of aquatic insects differ according to their order or life stages. The abundance of aquatic insects increased with surface area. The abundance of Odonata nymphs increased with water depth, whereas that of Hemiptera nymphs and Coleoptera larvae decreased. The abundance of Odonata nymphs and Hemiptera adults increased with increasing vegetation cover, whereas the species richness of aquatic insects decreased. Thus, it is important to prevent high vegetation cover by plowing and create a water depth gradient for creating habitats for multiple taxa. We suggest that creating or maintaining mosaic habitats, including paddy fields, biotopes, and ponds could enhance aquatic insect diversity in abandoned rice terraces." (Authors) The following Odonate taxa are listed in the supplementary material: Indolestes peregrinus, Lestes sponsa, Lestes temporalis, Pseudocopera annulata, Paracercion calamorum, Paracercion hieroglyphicum, Ischnura senegalensis, I. asiatica, Anax parthenope julius, Trigomphus citimus, T. ogumai, Anotogaster sieboldii, Epophthalmia elegans, Rhyothemis fuliginosa, Sympetrum frequens, S. darwinianum, S. kunckeli, Crocothemis servilia, Pseudothemis zonata, Pantala flavescens, Lyriothemis pachygastra, Orthetrum albistylum] Address: Watanabe, R., Graduate School of Regional Resource Management, Univ. of Hyogo, 128, Shounji, Toyooka, Hyogo, 668–0814, Japan

24573. Zuliyanti Siregar, A.; Tulus; Yunilas; Joshi, R. (2024): Insights from insect diversity and functional roles in sorghum pest management: A case study from northern Sumatra, Indonesia. Southeastern Philippines Journal of Research and Development 29(2): 31-46. (in English) ["This study, conducted in Lalang Village, Tebing Tinggi, Indonesia, from August to October 2021, aimed to investigate the insect diversity and functional roles relevant to Sorghum (Sorghum bicolor) monoculture. Employing a purposive random sampling method, we utilized four trapping techniques (yellow sticky trap, pitfall trap, light trap, and sweep net) according to standard protocols. Analysis revealed insects recorded from S. bicolor, representing seven orders (Coleoptera, Diptera, Hemiptera, Hymenoptera, Lepidoptera, Odonata, Orthoptera), 28 families, 32 species, totaling 10,022 individuals. We identified 32 species, classified into four insect functional groups: parasitoids (3 families), pollinator (1 family), predators (12 families), and pests (12 families). The Importance Value Index (IVI) values were compared among the functional groups, collectively indicating that Apis mellifera was the most prevalent pollinator, followed by parasitoids comprising three families (Ichneumonidae, Ceraphronidae, and Tachinidae). Pest species, including Agrotis ipsilon, Helicoverpa armigera, Mythimna separata, Eublemma silicula, and Spodoptera frugiperda, exhibited the highest IVI value of 27.14%. Predators were led by Podisus maculiventris (Family Pentatomidae) with an IVI value of

9.19%. Pests dominated with an abundance of 62.09%, followed by predators (31.49%), pollinators (5.98%), and parasitoids (0.44%). The t-test results were significant across day after sowing (DAS) and different traps with scores such as t-day after sowing (t-DAS)=22.051; t-yellow sticky trap (t-YST)=12.311; t-pit fall trap (t-PFT)=10.271; t-light trap (t-LT) =12.403; t-sweep net (tSN)=12.99, where h<0.01). Biological indices indicated a low species richness (R1=2.11), high species evenness (E=0.824), and moderate Shannon-Wiener diversity score (H'=2.27). Understanding the functional roles of these insects in S. bicolor cultivation emphasizes the necessity of integrated pest management for effective pest control strategies. Our findings stress the importance of biodiversity conservation and effective management practices for sustainable sorghum cultivation in Northern Sumatera, Indonesia." (Authors)] Address: Zuliyanti Siregar, Ameilia, Dept of Agro-Technology, University of Sumatera Utara Medan, Indonesia. Email: ameilia@usu.ac.id

2025

24574. Abidin, Z.; Ali, M.A.; Kartikasari, D.; Nurdianyoto, I.; Maulana, M.I.; Muslimin, A.I.I. (2025): Community structure and diversity of dragonflies (Odonata) as bioindications of water quality In Telaga Aqua, Tulungagung district. El-Hayah 10(2): 59-69. (in English) ["The study aims to determine the community structure and diversity of dragonflies in Lake Aqua [East Java Province, Indonesia]. The study was conducted in April 2021. Type of qualitative descriptive research, with visual day flying method with 3 observation locations based on vegetation composition and ease of access. Sampling using insect nets, documentation and identification. Based on the results of the study, 10 species of Odonata were obtained ... The total number of dragonflies found in 3 locations was 337 individuals from 6 families, including Euphaea variegata, Heliocypha fenestrata, Rhinocypha heterostigma, Vestalis luctuosa, Coeliccia membranipes, Onychogomphus [Nepogomphus] fruhstorferi, Orthetrum glaucum, O. pruinosum, O. sabina, and Pantala flavescens. The results of the diversity index (H') showed 2.04 medium categories, the highest abundance was found in the species Euphaea variegata which was valued at 24.9% and the lowest abundance was found in Coeliccia membranipes worth 1.2%. The evenness index of 0.9 is high, the dominance index of 0.2 is low, which means dragonflies have the same opportunity to utilize resources. The calculation of the Family Biotic Index (FBI) to 3 locations of 0.02 is included in the category of very good water quality. The higher the number of dragonflies in the ecosystem, indicating that the ecosystem is still natural and environmental sustainability is maintained. When pollution occurs in the waters, it causes the life cycle of dragonflies to be disrupted and their population to decline." (Authors)] Address: Abidin, Z., Fac. Sciences & Technology, Raden Rahmat Islamic University, Jl Raya Mojosari No.02, Kepanjen, Malang, East Java, 65163, Indonesia. Email: zainal.abidin@uniramalang.ac.id

24575. Adamson, Q.R.; Ginn, K.A.; Fisher, O.N.; Verspui, K.; Kalkman, V.J. (2025): Identification and distribution of Indaeschna baluga (Odonata: Aeshnidae). Odonatologica 54(1/2): 119-126. (in English) ["I. baluga was described by Needham & Gyger (1937) based on a male specimen collected from Mount Banahaw, Luzon, the Philippines. We show that the characters mentioned in the original description of I. baluga do not allow separation from the widespread Indaeschna grubaueri. However, the male superior appendages of the two species are morphologically distinct. Material of male I. grubaueri from Negros and Samar, Philippines, is found to belong to I. baluga. For Mindanao only females are available, which can at present not be identified to species level. Based on this, I. baluga is considered the only species of Indaeschna occurring in the Philippines (Luzon, Negros, and Samar), while its close relative I. grubaueri is restricted to Sundaland, distributed as far north as the Krah Isthmus." (Authors)] Address: Adamson, Q.R., Dept Biology, Brigham Young Univ., Provo, UT, 84602, USA. Email: quinnadamson05@gmail.com

24576. Adubor, C.; Ekperusi, A.O.; Michael, A.; Olomukoro, J.O. (2025): Physicochemical properties of surface water, heavy metals levels in sediments and macrobenthic invertebrate community of Ikpoba River, Benin City, Edo State, Nigeria. Journal of Applied Sciences and Environmental Management 29(5): 1653-1663. (in English) ["The objective of this paper was to investigate the physicochemical properties of surface water, heavy metals levels in sediments and macrobenthic invertebrate community of the Ikpoba River, Benin City, Edo State, Nigeria using appropriate standard methods. Data obtained show that the pH in the surface water ranged between 4.30 and 8.90 with a mean of 5.23. There was no significant difference (p > 0.05) in the physicochemical properties of surface water across the three stations. The mean values of heavy metals for iron, zinc, copper, lead and cadmium in sediments ranged from 22.30 - 45.30, 8.46 - 27.10, 1.80 - 12.40, 0.01 - 4.75 and 0.00 - 1.15 mg/l with a mean of 32.71±2, 17.62±1, 7.24±1, 1.29±01 and 0.17±0.1 mg/l respectively. However, metals such as iron, zinc, copper and lead were above the recommended limit for freshwater ecosystems. A total of 482 individual macrobenthic organisms were recorded in the study. The benthic organisms were dominated by the orders Ephemeroptera (23.03%), Diptera (22.61%), Hemiptera (18.26%) and Odonata (17.01%) [all identified at family level] with Baetis sp (6.02%), Velia sp (5.60%), Heptagenia sp (5.39%) and Lestes sp (4.36%) as the major representative species. For the biological indices, station 1 had the highest diversity, species richness and evenness. Station 3 had the lowest diversity and richness while the lowest species evenness was recorded in station 2. A weak correlation between the physicochemical parameters and the macroinvertebrate fauna was recorded. The calculated EPT Index for the macrobenthic fauna was 31.67 % indicating a fairly polluted river." (Authors) The plausibility of the identification must be poor as for example in spite of 'Lestes' mentioned in the text, Lestidae are not listed in the table...] Address: Ekperusi, A.O., Depts of Environmental Management & Pollution, Fac. of Environmental Management, Nigeria Maritime Univ., Okerenkoko, 335102, Delta State, Nigeria. Email: ekperusiab@gmail.com

24577. Aghababyan, K.; Akopian, J.; Hakobyan, S.; Kalashian, M.; Ghazaryan, A.; Aghasyan, L.; Pipoyan, S.; Zarikian, N.;

Jenderedjian, K.; Book Editor(s): (2025): Wetlands of Armenia. Biodiversity, livelihoods, and conservation. Thammineni Pullaiah (Ed): Wetlands of Mountainous Regions. Wiley: 103-128. (in English) ["Wetlands of Armenia have occupied a significant area in the past; however, during the last century, they declined critically. The swamps and marshes of the country are represented by two general types: the brackish marshes and the reedbeds of Ararat Plain, and the grassy marshes located on the mountain plateaus. The wetlands consist of a rich biological diversity. Thus, the marshes and reedbeds of Ararat Plain host 7 species of mammals, 234 species of birds, 7 species of reptiles, 4 species of amphibia, 1 species of fish, and 755 species of plants. The fauna of invertebrates is unevenly studied, so the information is known for 30 species of beetles, 30 species of Odonata, 15 species of butterflies, and 44 species of Arachnidae. The grassy marshes of Shirak, Lori, Aparan, and Sisian Plateaus host 3 species of mammals, 252 species of birds, 15 species of reptiles, 7 species of amphibia, 6 species of fishes, and 187 species of plants. As in the previous case, a few data are known for the invertebrates: 120 species of beetles, 10 species of Odonata, 17 species of butterflies, 58 species of Arachnidae, 65 species of Gastropoda, and 30 species of Bivalvia. There are several threats, which affect the wetlands of the country: uncontrolled water acquisition, purposeful drainage of wetlands, reed burning, nonregulated reed harvesting, and poorly controlled waterbird harvesting. The proposed conservation measures include (1) evaluation of the wetlands as potential Ramsar sites; (2) official adoption of the wetland areas initially evaluated as candidate Emerald Sites and development of the management plans for those Emerald Sites; (3) identification of mutually beneficial solutions for the exploitation of the wetlands, based on rational use of water and the development of wildlife tourism; (4) development of a nationwide strategy for wetland restoration; (5) development of a nationwide program on education and awareness raising aimed at changing the attitude and perception toward wetlands among policymakers, decision-makers, local administrations, rural communities, and the general public." (Authors)] Address: unknown

24578. Ahmed, G.; Das, A.; Das, A.N.; Gogoi, B. (2025): Entomofaunal diversity of aquatic insects in Hakama Beel wetlands: A study in Assam. Biodiversity Wealth of Northeast India. Dean College of Horticulture and Forestry Central Agricultural University, Pasighat, Arunachal Pradesh-791102, India: 51-60. (in Eglish) ["Hakama Beel, a vital wetland in maintaining ecological balance, serves as a rich biodiversity site, hosting diverse flora and fauna. This study identified 22 aquatic insect species, with dominant groups including Hemiptera, Odonata, and Coleoptera, reflecting the wetland's high biodiversity and favorable environmental conditions. Seasonal variations in species richness were observed, peaking during the pre-monsoon and monsoon seasons due to optimal habitat and resource availability, while postmonsoon diversity declined due to reduced water levels and temperature fluctuations. The study recorded 22 aquatic insect species from Hakama Beel, Assam, across four major orders: Coleoptera, Hemiptera, Odonata, and Diptera, along with Ephemeroptera. These species, representing 16 families, highlight the wetland's ecological diversity. Coleoptera included families like Gyrinidae and Dytiscidae, with notable species such as the Whirligig Beetle. Hemiptera featured species like the Giant Water Bug, while Odonata [Ischnura aurora, Neurothemis fulvia], played critical roles as predators. Diptera species, such as Chironomus plumosus and Culex spp., indicated areas of eutrophication and stagnant water. Seasonal variations influenced species richness, peaking during monsoon and pre-monsoon due to favorable conditions, while diversity declined post-monsoon. The presence of pollution-sensitive taxa (e.g., Odonata, Ephemeroptera) and pollution-tolerant taxa (e.g., Chironomidae) reflected varying water quality. The presence of pollution-sensitive taxa indicates areas of good water quality, while pollution-tolerant species suggest localized anthropogenic impacts such as eutrophication. These findings underscore the ecological significance of Brahmaputra floodplain wetlands as biodiversity hotspots. However, Hakama Beel faces threats from agricultural runoff, habitat degradation, and encroachment, jeopardizing its ecological integrity. Aquatic insects are highlighted as reliable bioindicators for wetland health. The study emphasizes the need for long-term monitoring, molecular taxonomy, and trophic studies to inform sustainable management and conservation strategies." (Authors)] Address: Ahmed, Golphina, Dept Zool., Univ. of Science & Technology Meghalaya, Ri-Bhoi, Meghalaya-793101, India

24579. al-Jamal, A.M.; Ruhi, A.; Mohammadi, R.M.; Bogan, M.T.; Fournier, R.J. (2025): Aquatic top predator prefers terrestrial prey in an intermittent stream. Ecology. 2025;106:e4518: 6 pp. (in English) ["Importantly, isotopic signatures confirmed that Belostomatid predators in the wild have less depleted $\delta^{13}C$ signals (.27.5 ± 1.39) than predators that are known to rely on aquatic prey, such as Aeshnidae odonates (.31.4 ± 0.608). Notably, $\delta^{13}C$ values of Aeshnidae, but not of Abedus indentatus, were similar in range to those of an abundant periphyton grazer in the system, Lymnaeidae snails (.30.6 ± 1.525;)" (Authors)] Address: Fournier, R.J., Dept of Environ.Science, Policy, & Management, Univ. of California, Berkeley, Berkeley, California, USA. Email: robertfournier@berkeley.edu

24580. Alvarez-Alvarez, K.L.; Bota-Sierra, C.A.; Molineri, C. (2025): Description of the last instar larva of Acanthallagma caeruleum Williamson & Williamson, 1924 (Odonata: Coenagrionidae). Zootaxa 5637(2): 374-382. ["The last larval instar of A. caeruleum is described and illustrated for the first time based on a reared female collected in the Colombian Amazon region (Caquetá department). This is the first larva known for this genus. The general aspect of the larva resembles that of some Oxyagrion Selys, 1876 and Acanthagrion Selys, 1876 species and presents the following unique combination of features: 1 pair of premental setae, stout spines mounted on elevated sockets in body and legs, caudal lamellae lanceolate and 0.86–0.90 the length of abdomen, with marked nodus and sulcus." (Authors)] Address: Alvarez-Alvarez, Karen, Instituto de Biodiversidad Neotropical, CONICET-Universidad Nacional de Tucumán, Facultad de Ciencias Naturales e IML, San Miguel de Tucumán, Argentina

24581. Arfiati, D.; Zakiyyah, U.; Rusydi, A.N.; Rachmawati,

R.; Orchida, K.; Andhani, T.D.; Ulya, W.H.; Sahal, A.A.; Al Athor, M.Z.; Nur Inayah, Z.; Pratiwi, R.K. (2025): Community structure of benthic macroinvertebrates as bioindicators of water quality in the upstream Setail River, Banyuwangi, East Java, Indonesia. Egyptian Journal of Aquatic Biology & Fisheries 29(3): 1133-1153. (in English) ["Setail River is the longest river in Banyuwangi Regency, East Java. The current condition of Setail River is experiencing an alarming decline in water quality due to the activities of the surrounding community. This decline in water quality can have a negative impact on aquatic biota. To assess water quality, one of the methods used is to use biological indicators, namely benthic macroinvertebrates. The purpose of this study was to assess water quality in the upstream to middle reaches of the Setail River using benthic macroinvertebrates as bioindicators. The assessment was carried out based on community structure, the Biological Monitoring Working Party-Average Score Per Taxon (BMWP-ASPT) method and water physicochemical parameters. This study was conducted at 5 sampling points. Upstream to midstream of the Setail River waters, benthic macroinvertebrate communities were found consisting of 3 classes, 25 families from 10 orders, namely Trichoptera, Ephemeroptera, Diptera, Coleoptera, Plecoptera, Odonata, Lepidoptera, Lumbriculida, Littorinimorpha and Basommatophora. The abundance of benthic macroinvertebrates ranges from 62-451 individuals/m². The diversity of benthic macroinvertebrates ranges from 0.85-2.55 (low-moderate). The evennes index value ranges from 0.43-0.88 (low-high), while the dominance index at station V (0.66) is classified as high (C > 0.5) since at this station there is dominance by one family, namely Hydrobiidae from the Gastropoda class. The ASPT value for each sampling point ranges from 4.4 - 6.9, indicating that the water conditions vary from clean water, doubtful quality to probable moderate pollution depending on the sampling point. These results indicate that the water quality ranges from very good to moderate pollution, especially at Sampling Points III and V. Based on the analysis of the effects of activities around the river, it causes changes in the composition and structure of benthic fauna. Management activities (campaigns for the community to avoid river pollution) are needed to restore and maintain the quality of the environment and our results can contribute information to these activities." (Authors) Taxa, including Odonata, are treated at family level.] Address: Arfiati, Diana, Faculty of Fisheries & Marine Sciences, Universitas Brawijaya. Jl. Veteran, Malang 65145, East Java, Indonesia. Email: d-arfiati@ub.ac.id

24582. Averill, M. (2025): Worcetershire gets a first for an exotic dragonfly - The Slender Skimmer. Dragonfly New 87: 6. (in English) [Verbatim: Before you read on, the dragonfly in question (Orthetrum sabina) hadn't flown in but was found emerging from an aquarium in Bromsgrove. However, it's still the first record for the UK, adding to eight other nonnative dragonflies and 5 damselflies that have arrived in foreign water weed over the years. Dean Amess from Bromsgrove noticed the freshly emerged dragonfly on the 11th October 2024, and called Jared Tibbetts to have a look and decide what it was.Jared was able to see it was something unusual as he had found a Marsh Bluetail (Ischnura senegalensis) at a garden centre where he worked, once before. The skimmer was alive and well but wouldn't have lasted long if let out in our climate and to do that would, strictly speaking, be illegal anyway, so it was decided that Mike Averill would take it to the Oxford University Museum of Natural History to be preserved. The species which is a medium-sized dragonfly with a wingspan of 60-85 mm, is quite common in the tropical to sub-tropical zone from North Africa to S.E. Asia. It lives in drains, ponds, and marshes. A relative of our Black-tailed Skimmer [Orthetrum cancellatum], the larvae would appear like our species if found in an aquarium. Imported goods like waterweed are checked by border authorities but of course this is very much a sampling technique so everything could not be minutely checked, meaning many creatures must enter the country unseen. Checks on imported goods are carried out by several Agencies in the UK. The UK Border Agency Enforces controls under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Waterweed would be covered by The Animal and Plant Health Agency (APHA), formerly known as the Anima! Health and Veterinary Laboratories Agency (AHVLA), which is an executive agency of the Department for Environment, Food and Rural! Affairs (Defra) of the United Kingdom.] Address: Averill, M., 49 James Road, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

24583. Averill, M. (2025): Dragonflies and you. Dragonfly News 87: 6-7. (in English) [Beware the Great Diving Beetle [A female Sympetrum danae had been ovipositing when she was grabbed by two Dytiscus marginalis; Award winning Southern Hawker [Youth Panel member, and budding photographer, Samuel Norris won the Young Photographer category as well as Cornwal! Wildlife Trust's Young Photographer of the Year with his amazing garden snaps, including this Aeshna cyanea crawling through the grass.]; Becoming an Emperor's lunch [Anax imperator preyed upon Aeshna mixta]] Address: Averill, M., 49 James R, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

24584. Baeta, R.; Léauté, J.; Sansault, E.; Pincebourde, S. (2025): Detecting the effect of intensive agriculture on Odonata diversity using citizen science data. Ecological Applications 35:e3057: 16 pp. (in English) ["Agricultural areas represent one of the major ecosystems of the world. Intensification of agricultural practices produced openfields characterized by low biological diversity. Nevertheless, the distance up to which intensive agricultural fields alter surrounding natural systems is rarely quantified. We determined the spatial scale at which agricultural landscapes alter the diversity of Odonates, a key taxon in wetland ponds, and we tested to what extent citizen science data can be used reliably for this purpose. We compiled 7731 observations made in a portion of the region Centre-Val-de-Loire (France) over 10 years by naturalists on 729 water bodies to analyze the effect of agricultural landscapes (mainly wheat, rapeseed, sunflower) on the species richness of both damselflies and dragonflies in lentic systems. 60 species were reported over the 10-year period. For dragonflies, intensive agricultural landscapes best explained their richness at the scales of 800 and 1600 m for overall and autochthonous species, respectively, when using the full dataset. The spatial scale was smaller for damselflies, at 200 m for both overall and

autochthonous species. These distances were not severely impacted when constraining the data to consider several biases. Multimodel averaging showed that the proportion of intensive agriculture decreased species richness, despite the potential biases inherent to an imperfect database acquired by citizens. This imperfect citizen dataset allows to infer the lowest effect size of agriculture on species richness. Quantitatively, this effect was more important for autochthonous species. Interestingly, both relatively rare taxa and common or generalist species can be under threat in intensive agricultural landscapes, calling for more ecotoxicological studies. The influence of agricultural practices from a distance implies that conservation and management plans of wetland ponds should consider the landscape ecological characteristics and not only the pond features. Conservation efforts focusing too locally on a site may be undermined because intensive agriculture from a distance limits the potential for the site to recover highly diverse communities. These distant effects should be integrated by policy-makers when deciding which wetland pond should benefit from a conservation plan or which conservation action may be planned, implementing, for instance, buffer zones and/or ecological corridors composed of natural vegetation." (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

24585. Banerjee, D. (2025): Adding a Dragonfly to my menu. Zoo's Print 40(1): 153-155. (in English) ["Hey there! I'm Orthetrum sabina, but folks call me the Green Marsh Hawk or the Slender Skimmer. I'm a medium-sized dragonfly, and I love to hang around calm water … Paper directed to kids for foster interest in dragonflies.] Address: not stated

24586. Bílková, E.; Kornová, V.; Ožana, S.; Pyszko, P.; Schindlerová, H.; Chytilová, R.; Dolný, A. (2025): Dragonfly larvae rearing: experimental insights and best practices. Environmental Entomology 54(2): 394-406. (in English) ["Understanding and optimizing rearing conditions for dragonfly larvae is crucial for ecological research and conservation efforts, yet optimal rearing conditions and general rearing practices are lacking. In this study, we investigated the effect of temperature, amount of oxygen in water, presence of (artificial) plants, and age of eggs on hatchability, survival, and development of dragonfly larvae using the model species Sympetrum striolatum. We conducted three independent experiments and assessed variability between egg clutches of individual females, as well as the occurrence of cannibalism among larvae. Our results showed that egg hatchability varied significantly between individual females and was negatively affected by egg aging and the presence of artificial plants. Larval survival was negatively affected by water temperatures above 24°C, the presence of artificial plants, and egg aging, and positively affected by high feeding frequency, in certain instars. Notably, cannibalism was observed among later instar larvae, especially under higher density conditions. Based on these findings, we provide practical recommendations for optimizing dragonfly larvae rearing protocols, emphasizing the importance of maintaining optimal temperature, appropriate feeding regimes, and managing larval density to reduce cannibalism. This study offers experimental, evidence-based guidelines for dragonfly larvae rearing, contributing to improved research methodologies and conservation efforts." (Authors)] Address: Ožana, S., Dept of Biology and Ecology, Faculty of Science, University of Ostrava, Ostrava, Czech Republic. Email: stanislav.ozana@osu.cz

24587. Biswas, J.; Nath, A.; Akter, A.; Nipun, A.S.; Shihan, T.R. (2025): The diversity of Odonata of Jagannath University New Campus, Keraniganj, Bangladesh. Hexapoda 32(1): 91-95. (in English) ["A survey was conducted to study the diversity of Odonata at Jagannath University's New campus, Keraniganj, for a period from November 2023 to December 2023. A total of 20 species, belonging to 19 genera ... of odonates were recorded. Libellulidae are recorded as the most dominant family of the order Odonata by contributing 15 species over Aeshnidae and Coenagrionidae." (Authors)] Address: Biswas, J., Dept of Zoology, Jagannath University, Dhaka - 1100, Bangladesh. Email: joybw4067@gmail.com

24588. Bota-Sierra, C.A. (2025): Description of the first species of the genus Archaeopodagrion (Philogeniidae: Odonata) from the Colombian Central Andes. Zootaxa 5620(4): 582-588. (in English, with Spanish summary) ["Archaeopodagrion oelmannae sp. nov. is described from the northern Central Colombian Andes, representing the first record of the genus in the Central Cordillera. The species seems to be very rare, only one male specimen found after an extensive sampling effort. The species is probably endangered, as it has been found only in a small protected forest in a region where the habitat is threatened by agricultural expansion. This paper also presents a novel taxonomic key for the genus based on the prothorax of the males and a distribution map for all species in the genus." (Author)] Address: Bota-Sierra, C.A., Grupo de Entomología Universidad de Antioquia (GEUA), Medellin 50010, Colombia. Email: corneliobota@gmail.com

24589. Brkic, M.; Bajric, A.; Skenderovic, I.; Hajdarevic, E.; Adrovic, A. (2025): Assessment of water quality of the Gostelja River based on the composition of macrozoobenthos communities. Croatian Journal of Fisheries 83(2): 93-98. (in English, with Croatian summary) ["The collection of macrozoobenthos from the Gostelja River was conducted in May 2022. Sampling was carried out at 7 locations. Through qualitative-quantitative analysis of macrozoobenthos, a total of 19 taxa or 355 individuals belonging to different taxonomic groups such as Mollusca, Turbellaria, Ephemeroptera, Plecoptera, Trichoptera, Diptera, and Odonata [Gomphus vulgatissimus] were recorded. Based on the conducted research and index calculations, we can conclude that different water quality classes can be observed along the course of the Gostelja River." (Authors)] Address: Bajric, A. University of Tuzla, Faculty of Natural Sciences and Mathematics, Department of Biology, Urfeta Vejzagica 4, 75000, Tuzla, Bosnia and Herzegovina. Email: alenbajra@gmail.com

24590. Casanueva, P.; Sánchez-Sastre, L.F.; Campos, F.; Hernández, M.A. (2025): Identification criteria for exuviae of male Anax imperator and A. parthenope (Odonata: Aeshnidae).

Odonatologica 54(1/2): 107-118. (in English) ["The accurate identification of species is critical for any biological study. Sometimes the morphological similarity between species in the same genus makes this difficult, as with the male larvae and exuviae of Anax imperator and A. parthenope, two dragonflies that often occur syntopically. This paper examines the utility of 13 numerical criteria (based on nine measurements of the mentum, anal pyramid and femur in the metathoracic legs) and one morphological criterion (shape of the margin of the epiproct expansion: straight or notched) to separate exuviae of both species. The shape of the margin of the epiproct expansion provided correct identification of 89% of exuviae and the ratio between length and width of the epiproct expansion was the most reliable of the criteria used." (Authors)] Address: Hernández, M.A., Depto de Biología Ambiental, Facultad de Ciencias, Univ. de Navarra, 31080 Pamplona, Spain. Email: mahermin@unav.es

24591. Cazzola, M.; Viliani, L.; Hardersen, S. (2025): What is the best time of the day to monitor Odonata? An investigation into changes in the abundance and species richness of dragonflies in ponds in northern Italy. Journal of Insect Conservation 29, 12: 13 pp. (in English) [Odonata "are sensitive bioindicators of wetland ecosystem health, and thus a useful taxon for monitoring these threatened habitats. Extensive monitoring programs are essential to assess current and future wetland conditions and to implement effective conservation strategies. Dragonflies respond to changes in wetland environmental conditions and habitat integrity by changes in their abundance and diversity. Therefore it is of vital importance to apply standard monitoring methods which guarantee, as far as possible, reliable data on abundances and diversity. However, the extent to which community assemblages of Odonata change throughout the day is still poorly understood. We examined the temporal trends in the abundance and species richness of adult dragonflies across five ponds in the northwestern part of the region Lombardy, Italy. We also compared the abundance trends of the four most common species throughout the day [Ischnura elegans, Coenagrion puella, Anax imperator and Libellula depressa]. Our findings showed that between 13:00 and 17:00 the highest abundance and species richness was observed, while surveys conducted outside this time frame resulted in significantly lower values. To ensure data comparability, sampling methods must be standardized in both space and time and optimized to maximize species detectability. Implications for insect conservation: By identifying the optimal sampling period for dragonfly surveys, this study provides valuable insights for improving monitoring programs and targeted conservation actions for these important wetland indicators." (Authors)] Address: Cazzola, M., Zoolab, Dipto di Scienze della Vita e Biologia dei Sistemi, Univ. of Turin, Turin, Italy

24592. Chagas, F. S. das; Omena, P. M. de; Costa, L. C. da; Serpa, K. V.; Moretti, M. da S. (2025): Size-mass relationships of aquatic insects in forest streams: addressing a knowledge gap in Neotropical communities. Revista Brasileira De Ciências Ambientais 60, e2253.: 9 pp. (in English, with Portuguese summary) ["Determining individuals' dry mass is crucial for better understanding community structure in terrestrial and aquatic ecosystems. The establishment of size–mass relationships for different populations constitutes a helpful tool for indirectly determining the total biomass of freshwater communities. In this study, we determined the size–mass relationships of 14 genera from the orders Ephemeroptera, Plecoptera, Trichoptera, and Odonata commonly found in leaf patches in Atlantic Forest streams (SE Brazil). We used individual body length as a size measure and three mathematical models (linear, exponential, and power) to establish the best-fitting equations. The equations described by the power model showed the best fit (coefficient of determination [r^2]=0.80) for the genera Anacroneuria, Macrogynoplax (Plecoptera), Smicridea (Trichoptera), Archaegomphus, Idiataphe, Hetaerina, Heteragrion, and Neocordulia (Odonata); the exponential model presented the best fit for Phylloicus (r^2 = 0.74), Triplectides (Trichoptera, r^2 = 0.60), Enderleina (r^2 =0.96), and Tupiperla (Plecoptera, r^2=0.60); and the linear model exhibited the best fit for Elasmothemis (Odonata, r^2=0.85) and Massartella (Ephemeroptera, r^2=0.63). Our findings demonstrated that body length is a strong predictor of dry mass for most of the studied genera but some exceptions suggest that it may not fully capture biomass variation. The power models performed better in general, whereas the exponential and linear models were optimal for specific genera, indicating diverse influences on taxa allometry. This study reinforces the need to evaluate different approaches for estimating the dry mass of aquatic insects and underscores the caution required when using indirect methods for biomass determination." (Authors)] Address: Moretti, M., University of Vila Velha – Avenida Comissário José Dantas de Melo, 21 – CEP: 29102-920 – Vila Velha (ES), Brazil. E-mail: marcelo.moretti@uvv.br

24593. Chai, C.M.; Morrow, C.M.; Parikh, D.D.; Von Reyn, C.R.; Leonardo, A.; Card, G.M. (2025): Shorter-duration escapes driven by Drosophila giant interneurons promote survival during predation. Proc. R. Soc. B 292: 20241724: 11 pp. (in English) ["Large axon-diameter descending neurons are metabolically costly but transmit information rapidly from sensory neurons in the brain to motor neurons in the nerve cord. They have thus endured as a common feature of escape circuits in many animal species where speed is paramount. Though often considered isolated command neurons triggering fast-reaction-time, all-or-none escape responses, giant neurons are one of multiple parallel pathways enabling selection between behavioural alternatives. Such degeneracy among escape circuits makes it unclear if and how giant neurons benefit prey fitness. Here we competed Drosophila melanogaster flies with genetically silenced giant fibres (GFs) against flies with functional GFs in an arena with wild-caught damselfly predators and found that GF silencing decreases prey survival. Kinematic analysis of damselfly [Ischnura sp.] attack trajectories shows that decreased prey survival results from predator capture of GF-silenced flies during some attack speeds and approach distances that would normally elicit successful escapes. In previous studies with a virtual looming stimulus, we proposed a model in which GFs enforce the selection of a short-duration take-off sequence as op-

posed to reducing reaction time. Our findings here demonstrate that, during real predation scenarios, the GFs indeed promote prey survival by influencing action selection as a means to increase escape probability." (Authors)] Address: Card, Gwyneth, School of Biomedical Engineering, Science & Health Systems, Drexel Univ., Philadelphia, PA, 19104, USA. Email: gc3017@columbia.edu

24594. Cham, S. (2025): Species Review 13: Coenagrion pulchellum (Vander Unden) (Variable Damselfly). Br. Dragonfly Society 41(1): 1-50. (in English) ["This species review provides a synopsis of the natural history and conservation of Coenagrion pulchellum (Variable Damselfly) in Great Britain and Ireland, examining its habitat requirements and distribution, insights into its life cycle and behaviour and variation in morphology, markings and colour. The colouration and markings on the head, thorax and abdomen are described and compared with those of the closely related Coenagrion puella (Azure Damselfly) with which it is often confused." (Authors)] Address: Cham, S., 2 Hillside Road, Lower Stondon, Bedfordshire SG16 6LQ, UK

24595. Chandran, A.V.; Muneer, P.K.; Madhavan, M.; Jose, S.K. (2025): Odonata diversity of the Kuruva Islands, southern India, with notes on the ecology of Disparoneura apicalis (Fraser, 1924) (Odonata: Platycnemididae). Journal of Insect Biodiversity and Systematics 11(1): 207-226. (in English) ["Odonata diversity of the Kuruva Islands in Wayanad, a part of the Western Ghats Biodiversity Hotspot in southern India, was studied for a year using transect counts. A total of 59 species were recorded of which 7 are endemic to the Western Ghats. Herb cover, shrub cover, open space, water pH, air temperature, and a composite water chemistry variable incorporating conductivity, TDS, and salinity emerged as the most important predictors of Odonata diversity. The distribution of the endemic and Vulnerable D. apicalis in the islands is influenced by particular species of plants that act as their perching posts and ovipositing sites. It is recommended that the tourists visiting the Kuruva Islands be sensitized about the importance of the place as an odonate habitat. The highly range-restricted D. apicalis can be made a flagship species for the conservation of this unique ecosystem." (Authors)] Address: Chandran, A.V., Aqua Research Lab, Department of Geology and Environmental Science, Christ College (Autonomous), Irinjalakuda, Thrissur, the University of Calicut, Thenhipalam, Kerala, India. Email: avivekchandran2@gmail.com

24596. Chen, Z.; Xia, Y.; Lei, J.; Zhang, Z.; Zhao, Z. (2025): Analysis of the aerodynamics of dragonfly flapping wings in phase and out of phase. Journal of Physics: Conference Series, Volume 3006, 012013: 11 pp. (in English) ["Because the dragonfly has two pairs of wings, its flight has extremely high mobility. Dragonfly can achieve hovering, sharp turns, backward, and other flight models, and the flight speed is fast (50 km/h). Therefore, studying the aerodynamics of different flight models of dragonflies is helpful to the aerodynamic layout design and control of biomimetic micro aircraft. Two flight models of dragonflies, in phase and out of phase, were studied by numerical simulation under three-dimensional conditions, and the unsteady aerodynamics and flight efficiency were analyzed at different flapping angles (±20°, ±30°, ±40°), different flight elevation angles (2°, 9°, 16°), and Reynolds number Re = 6,750. The results show that when the forewing and hindwing wings are in phase (phase difference is 0), it can provide a large lift to meet the power demand during climbing. When the two wings fly out of phase (phase difference is 0.5 period), the average lift and drag are small because the forces provided by the forewing and hindwing wings cancel each other, but it is enough to support the body weight and the thrust required for flight, which is the main flight model of dragonfly stabilized flight." (Authors)] Address: Zhao, Z., State Key Lab. of Mechanics & Control for Aerospace Structures, Nanjing University of Aeronautics & Astronautics, Jiangsu, Nanjing 210016, China. Email: zhenyu_zhao@nuaa.edu.cn

24597. Chhetri, A.; Miya, M.S. (2025): Diversity and seasonal abundance of dragonflies and damselflies in the lake cluster of Pokhara valley, Nepal. Psyche: A Journal of Entomology, Article ID 9368532, https://doi.org/10.1155/psyc/9368532: 12 pp. (in English) ["Odonata are among the oldest and most well-studied insects worldwide; however, very few studies on this group have been conducted in Nepal. There was a lack of information on Odonata of Lake Cluster of Pokhara Valley (LCPV), one of the vital Ramsar sites in Nepal. Therefore, this study aimed to evaluate the diversity of Odonata and monthly variations in diversity in the three lakes (Maidi, Gunde, and Kamalpokhari) of LCPV. Odonates were sampled by the direct observation method along the transects laid on the existing trails around the lakes (three transects in each). A total of 27 species of Odonata from six families were documented. Of these, 15 were Anisoptera and 12 were Zygoptera. Species richness and abundance were the highest in Maidi and lowest in Kamalpokhari. However, there was no statistically significant difference in species richness and Shannon and Simpson's diversities between the lakes, showing similarities in odonates' community composition. Libellulidae and Coenagrionidae were the three lakes' most diverse and abundant families. Shannon and Simpson's diversities significantly differed between families in all lakes. September and November have the highest diversity and abundance. A significant difference in Odonata composition was found between the months. This research provides valuable insights into Odonata's diversity at a Ramsar site in Nepal and underscores the potential for further ecological research and conservation efforts." (Authors)] Address: Chhetri, Apeksha, Institute of Forestry, Pokhara Campus, Tribhuvan Univ., Pokhara 33700, Nepal. Email: apeksha5747@gmail.com

24598. Cleary, D.F.R., Bijlmer, A.M.; Wielakker, D.; de Voogd, N.J. (2025): Damselflies and dragonflies in distress: The impact of forest fires and logging on odonate assemblages. Ecological Indicators 173, 113382: 12 pp. (in English) ["Highlights: • Odonate richness was higher in primary, logged and once-burnt than multiply-burnt landscapes. • Odonate communities in burnt, logged and primary forest landscapes aligned with neutral model predictions. • Species traits were significantly associated with habitat and vegetation structure. • Primary forest landscapes had higher relative abundances of endemic

species and species associated with flowing water. • Logged and burnt landscapes had higher relative abundances of widely distributed species associated with standing water. Abstract: We assessed the impact of logging and forest fires on the species richness, evenness, and structure of odonate assemblages located on the island of Borneo. Landscape-scale species richness was highest in unburnt and once-burnt landscapes and lowest in two landscapes subjected to multiple burn events. These landscapes also had lower evenness compared to primary and once-burnt landscapes, highlighting the detrimental effects of repeated burn events on odonate species assemblages. There was significant geographic distance dependence in three of the six landscapes studied including primary and burnt landscapes. Odonate assemblages, furthermore, did not significantly deviate from Hubbell's neutral model predictions at metacommunity and local scales in any of the landscapes. Finally, we identified a significant association between species traits and environmental conditions, which appeared to be largely driven by disturbance. Landscapes subjected to multiple burn events in particular were largely populated by species associated with standing water bodies and with large geographical distributions. Our study emphasises how disturbances like burning and logging are associated with shifts in species composition, favouring species associated with disturbed environments, while reducing the prevalence of endemic species." (Authors)] Address: Cleary, D.F.R., Dept of Biology, CESAM, Univ. de Aveiro, Campus Universitário de Santiago, 3810-193 Aveiro, Portugal. Email: cleary@ua.pt

24599. Coates, M. (2025): Dragonfly Survey 2024. Vice County 66. Durham Wildlife Trust Region. Durham Wildlife Trust & British Dragonfly Society: 44 pp. (in English) ["The British Dragonfly Society works in conjunction with the Durham Wildlife Trust (DWT) to actively survey the region between the River Tees and the Tyne. This approach allows us to pay particular attention to a wide range of known sites via a dedicated app, and collect via iRecord & iNaturalist any other sightings within the region. For the second year in a row, the very wet and cool summer meant that observations (as opposed to how many Odonata emerged) were down from the last warm, dry year (2022), with 3932 sightings, to 2531. This was despite the addition of iNaturalist as a method of submitting sightings. In recent years, it has been apparent that there are 19 resident species in VC66, plus the occasional visitor that gets the local Odonata spotters excited. In 2024, we are now confident that Chalcolestes viridis is breeding at Joe's Pond (Rainton Meadows) as they have been observed at the same spot three years in a row, and this year, they were also spotted at other sites in both VC66 and just over the Tyne in VC67. Another high point was the quite dramatic spread in just one year of Erythromma viridulum. In recent years, they have been successfully breeding at Brasside Pond near Durham, with occasional other sightings. In 2024, they were spotted on 45 occasions at 15 locations, along with more in VC67, meaning that in 2024, they not only spread widely in VC66 but moved further north, too. It was particularly nice that they chose to breed in a brand new pond dug next to the main path at Rainton Meadows, allowing anyone to see them very close up. The season started, as always, with a Erythromma najas this year on 26th April at Langley Park Wetlands, and they were soon spotted around the region. The first week of May saw the arrival of Enallagma cyathigerum, Ischnura elegans and Coenagrion puella, with the first dragonfly (Libellula quadrimaculata) on May 13th, virtually a match to 2023. The wet winter of 2023/24 and the ongoing rain in 2024 meant that even the most shallow ponds retained water throughout the year, and boggy ground also appears to have supported breeding. This should all mean Odonata will be seen in good numbers in 2025." (Author)] Address: https://www.durhamwt.com/sites/default/files/2025-02/Dragonfly%20Survey%202024%20VC66%20Annual%20R eport.pdf

24600. Colamatteo, I.; Bravo, I.; Cappelli, L. (2025): Insect-based food products: A scoping literature review. Food Research International 200, January 2025, 115355: (in English) ["Highlights: •Entomophagy can have an enormous environmental and nutritional impact on society. •Production of edible insect-based products could reach 260,000 tonnes by 2030. •Consumer willingness to buy and consume is still limited due to Western neophobia. •Food safety risks associated with entomophagy require further research. Abstract: The potential use of edible insects as an alternative animal protein source has recently attracted a great deal of attention in Western countries. This is thanks to their numerous nutritional benefits, in particular in terms of vitamins and essential amino acids, and the need to guarantee food availability for the growing population. The aim of this scoping review is to analyse the current literature published in scientific journals regarding the main issues related to products containing edible insects, to map existing evidence and identify knowledge gaps. The information could serve as a guide for researchers and policy makers in the development of a sustainable innovative edible-insect farming business model. The PRISMA-ScR methodology was used to conduct this scoping review. The string of keywords was searched in three online databases and the screening process produced a total of 116 articles to be reviewed. These findings highlight the crucial issues concerning entomophagy that are currently under discussion, such as edible insect nutritional potential and functional properties, expected health benefits from consumption, consumer acceptability, and potential food safety issues that may arise. The study is limited by the number of databases referred to and by the consultation of papers written only in the English language. The available literature on insect-based food products revealed that edible insect consumption has the potential to bring about many benefits from an environmental, economic, and nutritional point of view. However, this industry faces many challenges in terms of difficulty in obtaining consumer willingness to buy insect-based products and the possibility of health and safety risks arising from their consumption.] Address: Colamatteo, Ilenia, Laboratory of Commodities & Territorial Analysis, Dept of Economics & Law, University of Cassino & Southern Lazio, Via S. Angelo, Loc. Folcara, 03043 Cassino, (FR), Italy

24601. Csutoros, A.; Berger, L.; Rochas, P. (2025): Sur une série d'observations de Tramea minuta De Marmels & Rácenis, 1982 en Guyane (Odonata: Libellulidae). Martinia 39(6): 39-44. (in French) [Records Tramea minuta in French Guiana

from 2009 (n=1), 2024 (n=5), and 2025 (n=1) are documented and possible regional reproduction is discussed.] Address: Csutoros, A., 48 mail Gaston Bardet, 35190 Le Rheu, France. Email: antoinecsutoros@gmail.com

24602. Cunningham, C.A.; Beale, C.M.; Bowler, D.E.; Pocock, M.J.O.; Hutchinson, R.; White, P.C.L.; Hunt, M.; Maskell, L.; Hill, J.K. (2025): Connectivity benefits most woodland invertebrate species but only in landscapes with low woodland cover. Ecology Letters, 2025; 28:e70131: 10 pp. (in English) ["Connectivity is widely assumed to benefit biodiversity, but this has not been extensively quantified across multiple taxa and landscapes. Focusing on the UK, where woodland cover is low (13%), we analysed species occurrence records from citizen science for over 800 broadleaf woodland-associated invertebrate species from 15 taxonomic groups [including Odonata and without further differentiation] in relation to woodland cover and connectivity. Overall, increased woodland connectivity positively affects broadleaf-associated species occurrence (effect of connectivity across species, accounting for positive effect of broadleaf cover). The benefits of connectivity varied considerably by species: 39% of species showed a significant positive effect, while for 3% it was significantly negative. However, the interaction between cover and connectivity revealed that, overall, connectivity benefits are only found in low cover landscapes. Our findings emphasise potential biodiversity benefits from maximising connectivity when increasing woodland cover and highlight the importance of spatial targeting in restoration efforts, especially in landscapes with low woodland cover." (Authors)] Address: Cunningham, C.A., Dept of Biology, Univ. of York, York, UK. Email: charles.cunningham@york.ac.uk

24603. Czerniawska-Kusza, I.; Brozonowicz, A. (2025): Macroinvertebrate diversity in post-exploitation limestone ponds over a 10-year period. Ecological Chemistry and Engineering S 32(1): 139-153. (in English) ["The study aimed to investigate the structure and diversity of macroinvertebrate assemblages in five small permanent water bodies within a limestone quarry area. Benthic samples were collected monthly from April to November in 2009 and 2019, and basic physicochemical water parameters were measured. The results showed that the assemblages were dominated by mayflies (Baetidae and Caenidae), damselflies (Coenagrionidae), and dipterans (Chironomidae), with a total of 42 taxa recorded. Over the ten years, taxon richness and diversity increased, especially in spring, and became more diverse among the ponds. The abundance and frequency of occurrence of hololimic organisms, such as snails (Lymnaeidae and Planorbidae), oligochaetes, and water mites, also increased. However, macroinvertebrate densities, although they doubled overall, remained low due to the nature of the sediments. The RDA analysis indicated that temperature, seasonality, pond margin shading, and morphometry were the main environmental factors influencing macroinvertebrates, which explained 38.6 % of the total variance in macroinvertebrate abundance. Further research, including analysis at lower taxonomic levels, will help us better understand the factors driving the observed patterns in macroinvertebrate assemblages in small anthropogenic water bodies." (Authors)] Address: Czerniawska-Kusza, Izabela, Inst. Biology, Univ. of Opole, ul. Oleska 22, 45-052 Opole, Poland. Email: kuszaiz@uni.opole.pl

24604. Das, S.; Koparde, P.; Dawn, P.; Barve, V.; Phillott, A.D. (2025): The current state of odonatology in India. International Journal of Odonatology 28: 40-49. (in English) ["In the past 50 years, odonatology has advanced on a global scale in phylogenetics, diversity, organismal and population ecology, and conservation biology. This study explored if such knowledge gains are perceived to have occurred in India, as they did worldwide, and identified knowledge gaps and challenges that might be hindering progress in Indian odonatology. Responses to an online questionnaire and semi-structured interviews with researchers in the country indicated that the majority of Odonata research had occurred regionally in the Western Ghats and in the areas of taxonomy and species distribution. Knowledge gaps included Odonata research in northeast India, known for its rich biodiversity, and conservation studies to ensure evidence-based ecosystem management. Respondents also identified a lack of studies on Odonata larvae despite this being the longest stage in the taxa's life cycle. Key challenges faced by Indian odonatologists were reported to be lack of funding and laboratory and field resources and poor access to research papers published in journals. Social media platforms could aid in addressing some knowledge gaps and challenges to researchers through engaging citizen scientists and facilitating skill-building and knowledge-sharing among odonatology researchers in the country." (Authors)] Address: Das, S., Dept of Physical & Natural Sciences, FLAME Univ., Pune, Maharashtra, India. Email: swagatadas898@gmail.com

24605. Divyasharada, N.S.; Kumar, V.; Joshi, G.N. (2025): Computational study on effect of free-stream turbulence on bio-inspired corrugated airfoil at different sections at low Reynolds number. Aerospace Systems 8: 219-235. (in English) ["During flight, dragonfly wings can be thought of as an extreme light-weight airfoil. Many of the flight properties of tiny dragonfly wings are also shared by micro aerial vehicles (MAVs), which are nowadays finding widespread use in military and other commercial applications. It is observed that dragonflies have distinct cross-sectional corrugation that function to produce different local-aerodynamic characteristics. Along the wing's longitudinal axis, there are significant variations in corrugation profile which adapts to different flight condition accordingly. Dragonflies fly in the extremely low-Reynolds-number zone, showcasing their outstanding flying characteristics even in turbulent conditions. The current study focuses on understanding the effect of free-stream turbulence on three distinct 2D corrugation profile located at 0.3, 0.5, 0.7 relative to wing span length during dragonfly's gliding phase. The corrugation pattern required for computational analysis was designed in CATIA and imported to the commercially available CFD software ANSYS. The computational study is conducted on 2D, static non-flapping three corrugated profile at 10,000 Reynolds number subject to turbulence intensity of 0.5%, 1–10% at various angle of attack. This study examines the aerodynamic performance of each corrugation profile. The

current numerical analysis shows that at a positive angle of attack, the increase in the lift coefficient remains largely unaffected by the corrugated pattern on the wing's suction area. Virtual airfoils are created by rotating vortices that are trapped in profile valleys of corrugation patterns." (Authors)] Address: Joshi, G.N., Department of Aerospace Engineering, Defence Institute of Advanced Technology, Pune, India

24606. Djene, K.R.; Allouko, J.R.; Kone, K.; Bony, K.Y. (2025): Influence of physico-chemical parameters on the diversity of benthic macroinvertebrates in the rivers of the Odienne Department in northwest Côte D'Ivoire. Journal of Materials and Environmental Science 16(4): 681-694. (in English) ["The aim of this study was to determine the relationships between the distribution of macroinvertebrates and the physico-chemical parameters that influence their distribution in four rivers (Tièkorodougou, Massadougou, Koungbeni and Zébenin) located in the north-west of Côte d'Ivoire. Macroinvertebrate sampling was carried out in the four rivers using a Van Veen bucket and a haul net over an area of 1 m² (2 m *0.5 m). The structure of the benthic communities was then studied using the Shannon-Weather diversity and Piélou equitability indices. Finally, a Canonical Correspondence Analysis (CCA) was carried out to highlight the relationships between the distribution of macroinvertebrate communities and physicochemical parameters. The results showed that a total of 117 macroinvertebrate individuals, divided into 3 Classes, 7 Orders and 13 families, were identified in these different rivers. The structure of this macrofauna indicates that it is made up of 73% arthropods, 15% molluscs and 12% worms. The insect class was the best represented, with several orders including Hemiptera, Coleoptera, Diptera and Odonata. The order Hemiptera is the most dominant. Jaccard's similarity index showed that the Tièkorodougou river is 90% similar to the Zébenin river. Analysis of diversity revealed that the macroinvertebrate communities of the Massadougou and Koungbeni rivers are not very diverse or balanced. The distribution of macroinvertebrates was strongly influenced by temperature, conductivity, nitrite, dissolved oxygen, transparency, nitrate and total phosphorus. These results lay the foundations for any action to biomonitor the ecological quality of the water in these rivers." (Authors) Coenagriocnemis reuniense are Zygonyx torridus, and may be misidentifications as the genus Coenagrioncnemis is endemic to the Mascarene Archipelago (Mauritius and La Réunion).] Address: Djene, K.R., Tropical Biodiversity & Ecology Laboratory, Jean Lorougnon Guédé University, Daloa, Côte d'Ivoire-BP 150 Daloa, Côte d'Ivoire. Email: dkouakouroland@gmail.com

24607. Durand, E. (2025): Nouvelles odonatologiques du Sahara Atlantique marocain. Martinia 39(4): 21-27. (in French) [New data on dragonflies of the Moroccan Atlantic Sahara: Records of Ischnura senegalensis, Diplacodes lefebvrii, Orthetrum trinacria, and Pantala flavescens are documented and discussed in details.] Address: Durand, E., Naturalia environnement: Site Agroparc, 60 rue Jean Dausset, 84911 Avignon cedex 9, France. Email: e.durand@naturalia-environnement.fr

24608. Elafri, A.; Halassi, I.; Aoues, A.; Ghomrassi, H. (2025): Odonata assemblages in highland hydrosystems of northeastern Algeria, with notes on elevational patterns: application of species occupancy models. Journal of Insect Biodiversity and Systematics 11(2): 391-405. (in English) ["We aim in this study to increase our knowledge of the Odonata in the Aures, an unexplored region of northeastern 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 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 C. 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 C. 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

24609. Ergovic, V.; Cerba, D.; Tubic, B.; Novakovic, B.; Koh, M.; Mihaljevic, Z. (2025): Seasonal dynamics and factors shaping aquatic insect assemblages in mountain streams of the Pannonian Lowland Ecoregion. Insects 2025, 16(4), 344; https://doi.org/10.3390/insects16040344: 19 pp. (in English) ["Simple Summary: Mountain streams are remarkable ecosystems characterized by particular ecological features that are highly sensitive to changes in temperature and water quality. Protection of such ecosystems and studies of their biodiversity is of great importance. This research on aquatic insect communities was conducted across three Croatian mountains: Papuk, Medvednica, and Psunj, located in the Pannonian Lowland Ecoregion, in 14 mountain streams. The ecoregion is an area with similar species assemblages and environmental characteristics for a specific geographical region. It focused on mayflies, stoneflies, caddisflies, beetles, and dragonflies, which are excellent bioindicators of water quality. In 675 samples, 130 insect taxa (with 60 species) were identified. Seasonal variations were tested and revealed unique patterns: different species dominated, like Baetis sp. in summer, Protonemura montana in spring, and Leuctra sp. in autumn. Streams on Papuk and Psunj showed greater ecological similarities, likely due to their proximity, and water quality, together with stream morphology, which strongly influenced insect communities. In addition to high biodiversity, two endangered species were

identified: dragonfly Cordulegaster heros and stonefly Taeniopteryx hubaulti. Our results emphasize the importance of understanding how environmental factors affect aquatic insect taxa richness and distribution in sensitive lotic mountain ecosystems. Abstract: This study focused on the aquatic insect orders that serve as biological indicators. Ephemeroptera, Plecoptera, Trichoptera, Coleoptera, and Odonata were studied with their relationships to physical, chemical, hydrological and morphological variables in 14 streams on three Croatian mountains: Papuk, Medvednica and Psunj. From 675 samples collected in three dominant sediment microhabitats (e.g., macrolithal and mesolithal) in each stream, we identified 130 macroinvertebrate taxa. The most abundant group was Ephemeroptera (36 taxa). Aquatic insect assemblages between Papuk and Psunj showed higher similarity due to the geographical proximity of these two mountains, which is expressed as spatial connectivity. In spring, greater variability and diversity of investigated aquatic insects were observed due to the phenology of studied insects. The combination of environmental and morphological properties (e.g., oxygen concentration and substrate type) had the most significant influence on shaping the assemblage of aquatic insects of Psunj, while morphological properties were the most important in shaping aquatic insect assemblages on Papuk (e.g., streambed width) and Medvednica (e.g., elevation). Baetis sp. was the dominant taxon in summer, Protonemura montana in spring, and Leuctra sp. in autumn. Seasonal shifts in environmental conditions lead to functionally unique communities that utilize the pool of available seasonal resources. The dominance of feeding groups varied by season, with scrapers and collector–gatherers being most prevalent in summer, while shredders were dominant in spring. The results on the relationships between environmental characteristics and species richness, functional structure, and distribution of aquatic insects in mountain streams provide important clues for future research and conservation strategies in these vulnerable ecosystems. ... The most abundant Odonata species in all studied streams were C. heros and Onychogomphus forcipatus." (Authors)] Address: Ergovic, Viktorija, Dept Biology, Univ. Osijek, Cara Hadrijana 8/a, 31000 Osijek, Croatia. Email: viktorija.ergovic@biologija.unios.hr

24610. Fleck, G.; Haber, W.A. (2025): A new species of the genus Navicordulia Machado & Costa, 1995 from Ecuador (Insecta: Odonata: Corduliidae s.str.). Zootaxa 5627(1): 193-200. (in English) ["Based on a single male specimen a new species of the genus Navicordulia from Ecuador is described and illustrated, representing the first described species for this country. The recent considerable westward expansion of the distribution of the genus is briefly discussed. The male of Navicordulia tangoyi sp. nov. can be separated from its congeners by the distinct shape and pilosity of the genital lobe and by the remarkable deflection of the distal fourth of the cerci. A differential diagnosis and an updated key to all known males of the genus are provided." (Authors)] Address: Haber, W.A., Oficina Postal 5655, Monteverde, Costa Rica 60109. Email: bill.haber01@gmail.com

24611. Fletcher, D.E.; Dirks, J.E.; Spivey, E.A.; Dharmarajan, G. (2025): Copper accumulation through diet versus direct water exposure routes in a dragonfly nymph/mosquito larvae laboratory food chain. Archives of Environmental Contamination and Toxicology 88: 277-288. (in English) ["Aquatic organisms can uptake metals directly from contaminated water or by consuming contaminated prey. Knowing the relative importance of these routes is critical to understand how metals enter and move through aquatic food webs. We previously established that nymphs of Erythemis simplicicollis accumulate elevated copper (Cu) concentrations when living in contaminated wetlands, but the route of uptake was not identified. In this study, we evaluate copper accumulation with a model two-trophic-level laboratory food chain comprised of E. simplicicollis nymphs as predators and Aedes aegypti larvae as prey to gain better insight into Cu accumulation dynamics in these aquatic insect predators. Treatments consisted of dragonfly nymphs exposed to copper through diet (A. aegypti larvae prey exposed to 100 µg/L Cu-contaminated water), water (100 µg/L Cu), diet + water, and a control. Each treatment included 15 replicates, and 10 pretreatment nymphs were analyzed. Exposures lasted 32 days or until nymph death. Copper accumulation in nymphs and nymph mortality was compared among treatments. Eating contaminated prey did not elevate copper concentrations in E. simplicicollis. In contrast, highest copper concentrations accumulated in E. simplicicollis when exposed to contaminated water, in both the water-only and in the diet + water treatments. Additionally, mortality was greater when exposed to copper-contaminated water. Even though the nymphs did not trophically accumulate Cu, direct uptake of Cu from water provides a point of Cu entry into a food chain." (Authors)] Address: Fletcher, D.E., Savannah River Ecology Lab., Univ. of Georgia, P. O. Drawer E, Aiken, SC, 29802, USA

24612. Haase, P.; Cortés-Guzmán, D.; He, F.; Jupke, J.F.; Mangadze, T.; Pelicice, F.M.; Palmer, M.A.; Rolls, R,J.; Schäfer, R.B.; Welti, E.A.R.; Sinclair, J.S. (2025): Successes and failures of conservation actions to halt global river biodiversity loss. Nature Reviews Biodiversity 1: 104-118. (in English) ["To address the losses of river biodiversity worldwide, various conservation actions have been implemented to promote recovery of species and ecosystems. In this Review, we assess the effectiveness of these actions globally and regionally, and identify causes of success and failure. Overall, actions elicit little improvement in river biodiversity, in contrast with reports from terrestrial and marine ecosystems. This lack of improvement does not necessarily indicate a failure of any individual action. Rather, it can be attributed in part to remaining unaddressed stressors driving biodiversity loss; a poor match between the spatial scale of action and the scale of the affected area; and absence of adequate monitoring, including insufficient timescales, missing reference and control sites or insufficient selection of targeted taxa. Furthermore, outcomes are often not reported and are unevenly distributed among actions, regions and organism groups. Expanding from local-scale actions to coordinated, transformative, catchment-scale management approaches shows promise for improving outcomes. Such approaches involve identifying major stressors, appropriate conservation actions and source populations for recolonization, as well as comprehensive monitoring, relevant legislation and engaging all stakeholders to promote the

recovery of river biodiversity." (Authors) The paper includes a reference to Odonata.] Address: Haase, P., Dept of River Ecology and Conservation, Senckenberg Research Institute and Natural History Museum Frankfurt, Gelnhausen, Germany. Email: peter.haase@senckenberg.de

24613. Holmes, A.S. (2025): Long term population trends in Sympetum danae (Sulzer) (Black Darter) compared with other heathland dragonfly species and some generalist species in the south of England. J. Br. Dragonfly Society 41(1): 59-80. (in English) ["All heathland species of Odonata have shown a decline in Southern England, more so than in the whole of England. S. danae has shown a strong decline while Aeshna juncea has been largely lost in Southern England. Orthetrum coerulescens and Ceriagrion tenellum are also in decline in Southern England. Lestes sponsa has suffered a loss of sites rather than decline at surviving sites. However, both S. danae and A. juncea have extended their ranges northward. Habitat loss has affected all odonate species but has particularly impacted those species subject to additional environmental constraints. S. danae, for example, being in the south of its range, has been additionally impacted due to increasing temperatures, drought and unstable water levels, whereas S. striolatum, which has no diapause at the egg stage, is at a competitive advantage. S. danae has extended its oviposition period more than S. striolatum and S. sanguineum." (Authors)] Address: Holmes, A.S., 10 Lockyer Cl. Winnersh. RG41 5RR, UK. Email: alansholmes@gmail.com

24614. Hopkins, P.; Kosterin, O.E.; Phan, Q.T.; Keetapithchayakul, S.T. (2025): Taxonomic reconsideration of Lestes dorothea Fraser, 1924, L. decipiens Kirby, 1893, bona species, L. praecellens Lieftinck, 1937 and L. praemorsus Hagen in Selys, 1862 (Odonata, Lestidae). Zootaxa 5642(5): 451-475. (in English) ["L. decipiens restored in the species rank upon reconsideration of the structure of its male paraprocts against those of L. dorothea and L. praemorsus 1862 s. str. The two latter names could be synonyms. Lestes praecellens Lieftinck, 1937 could be another synonym, which is a matter of further research. The strong differences between the males of L. dorothea and L. decipiens in the male paraprocts are illustrated and the unfortunate confusion concerning this valuable character in literature is discussed. The differences between females of L. dorothea and L. decipiens are outlined. L. dorothea is for the first time reported for the fauna of Cambodia, by a finding of the first author in 2024 and re-identification of a specimen in the collection of 2018 by the second author, both from Mondulkiri Province. Its presence also in Laos is inferred from literature. Potentially undescribed Lestes species were recognised in literature reports." (Authors)] Address: Hopkins, P., New street, Penryn, Cornwall, TR10 8EB, UK. Email: paulhopkins2@tinyworld.co.uk

24615. Hu, Y.; Zhu, C.; Liu, Q.; Zhu, D.; Xue, J.; Li, Q.; Zhou, X. (2025): Research on the aerodynamic characteristics of dragonfly leading edge. Microscopy Research and Technique 88(1): 181-201. (in English) ["Dragonflies are some of the most stable and maneuverable flying organisms. To explore the mechanism of how dragonfly leading edges enhance flight lift, this article conducts a detailed study on the leading edge veins and the microstructures on them of dragonfly wings. Observations have discovered the special leading edge vein and the regularly distributed microstructures on the leading edge vein. A biomimetic model has been established, and computational fluid dynamics (CFD) simulation analysis has been conducted on the biomimetic model. The analysis explores the effects of microstructure characteristics, distribution patterns, and positions on the aerodynamic characteristics of dragonfly gliding. The analysis shows that the leading edge structure influences the incoming flow, simultaneously promotes the formation of the leading edge vortex (LEV), and increases the lift-to-drag ratio by up to 4%. A wing prototype featuring biomimetic microstructures is subsequently fabricated and tested in wind tunnel experiments. Compared with a control group without leading edge structures, the airflow passing through the biomimetic structures is influenced by the shape and arrangement of these structures. The smoother transition of the leading edge vein's shape facilitates the flow of air. The microstructures primarily filter and accelerate the airflow. The spacing of the microstructures affects the stability of the airflow, thereby influencing aerodynamic performance. Additionally, the middle-row arrangement of microstructures is more beneficial for gliding conditions, while the upper-row arrangement is more advantageous for flapping conditions. These findings enhance our understanding of insect wings and advance micro aerial vehicle applications. Research highlights: This study observed the leading-edge veins and microstructures of dragonfly wings in detail. Using a biomimetic model and computational fluid dynamics (CFD) simulations, it was found that these leading-edge structures promote the formation of leading-edge vortices (LEV), increasing the lift-to-drag ratio by up to 4%. Wind tunnel experiments demonstrated that wings with biomimetic microstructures significantly improved airflow smoothness and lift compared with control wings. Additionally, the arrangement of microstructures greatly affects airflow stability and aerodynamic performance, with middle-row arrangements being more beneficial for gliding and upper-row arrangements for flapping conditions. These findings enhance our understanding of insect wings and provide innovative guidance for designing efficient micro aerial vehicles." (Authors)] Address: Liu, Q., School of Mechanical & Aerospace Engineering, Jilin University, Changchun, China

24616. Hurtado Ulloa, R. (2025): Patrones de actividad de Rhionaeschna peralta (Ris 1918) y Sympetrum gilvum (Selys 1884) (Odonata) según factores ambientales en un estanque de La Paz – Bolivia - Activity patterns of Rhionaeschna peralta (Ris 1918) and Sympetrum gilvum (Selys 1884) (Odonata) according to environmental factors in a pond in La Paz - Bolivia. Ecología en Bolivia 60(1): 13-22. (in Spanish, with English summary) ["A study was carried out to analyze the daily activity pattern of the number of active adult individuals of two dragonfly species, R. peralta and S. gilvum according to some microclimatic factors such as temperature, light intensity and wind speed during the wet to dry transition period of 2004 in an artificial pond of the La Paz Botanical Garden of Cota Cota. Data were taken on the number of individuals of each dragonfly species, temperature, light intensity and wind

speed every 15 minutes from 07:00 hr to 19:00 hrs. The activity of R. peralta presents a maximum of six active individuals in the lagoon, it starts its activity at 8:15 hr, until 18:30 hr, it is positively related to temperature (rs = 0.57, p <0.05), light intensity (rs = 0.62, p <0.05) and scarcely with wind speed (rs = 0.27, p= 0.013). The activity of S. gilvum recorded a maximum of 15 individuals, it starts its activity at 11:00 hr and ends at 15:00 hr, it is positively related to temperature (rs = 0.51, p<0.05), light intensity (rs = 0.72, p<0.05) and wind speed (rs = 0.49, p<0.05). The activity of both species is positively correlated with temperature, light intensity and wind speed. R. peralta is mainly related to temperature, while S. gilvum is mainly related to light intensity. The presence of green areas with water bodies in urban environments is important for dragonfly conservation." (Author)] Address: Hurtado Ulloa, R., Museo Nacional de Historia Natural, Cota Cota, calle Ovidio Suárez s/n. La Paz, Bolivia. Email: rosemberh@gmail.com

24617. Iversen, L.L.; Garcia-Marquez, J.; Grigoropoulou, A.; O'Connor, M.; Domisch, S.; Lancaster, L. (2025): Complex life cycles shape the functional biogeography of European dragonflies. Global Ecology and Biogeography 34(5), e70056: 10 pp. (in English) ["Aim: To investigate how trait correlations between life stages associated with complex life cycles (aquatic nymph and terrestrial adult) shape the functional diversity and trait-environment relationships of European Anisoptera. Location: European mainland. Time period: Pre-1990 and post-1990. Major taxa studied: Anisoptera. Methods: Based on functional traits linked to dispersal and microhabitat preference, we use trait hypervolumes and structural equation modelling to estimate spatial and temporal trait correlations between terrestrial (adult) and aquatic (nymphal) life stages, and potential complex trait-environment relationships across life stages. Results: Adult and nymphal functional diversity were positively correlated and trait variation between life stages did show reciprocal causality. Cross-lagged correlations showed that historical nymphal traits most strongly impacted present nymphal and adult diversity, suggesting that functional diversity patterns are influenced by carryover effects and differential selection pressures on nymphs relative to adults. Between the two life stages we find both parallel and contrasting patterns between direct and indirect trait – environment relationships. The effect of mean annual temperature on adult trait diversity is largely driven by its positive correlation with nymphal traits. Positive nymphal trait correlations with habitat availability and topography are reducing the direct negative effects these variables have on adult trait diversity. Main Conclusions: We show that constraints inherent to complex life cycles significantly influence functional diversity patterns in European dragonflies, creating indirect trait-environment relationships across life stages. Spatial patterns in functional diversity were decided by both life stages, not just adults or nymphs, via a combination of independent and interactive trait-environment relationships. These findings challenge conventional functional biogeography models focused solely on direct environmental filtering. Consequently, integrating reciprocal trait relationships enhances causal claims when predicting functional biodiversity responses to environmental changes." (Authors)] Address: Iversen, L.L., Freshwater Biological Laboratory, Biological Institute, University of Copenhagen, Universitetsparken 4, 2100 Copenhagen, Denmark. E-mail: lliversen@bio.ku.dk

24618. Jahangeer, M.; Awan, M.S.; Saleem, M.M.; Mughal, T.; Arshad, M.; Bashir, M.; Hussain, A.; Ali, U.; Minhas, R.A. (2025): Biodiversity and spatial distribution of dragonflies in the State Biosphere Reserve: Ghamot National Park, Neelum Valley, Pakistan. Journal of Wildlife and Ecology 9(1): 22-30. (in English) ["The research was carried out at Ghamot National Park (GNP), which is located in the upper Neelum Valley in the inner Himalayas, the state biosphere reserve-Neelum. The study was conducted in five different sites and three different types of aquatic ecosystems, including wetlands, streams, and riparian zones. Adult dragonflies were collected using the transect line approach. In the research region, 136 individuals from 14 dragonfly species from four families were recorded. The Libellulidae family was the most abundant (n=68; 50%) and had the most species (n=11; 78.57%). The remaining three families, Aeshnidae, Cordulegastridae, and Gomphidae, accounted for 21.42% (n=3) of the total species. The highest (3.38) value of diversity (H') was found along a fresh stream, while the lowest value was found in the riparian zone (2.76). The results of one-way ANOSIM using the Bray-Curtis technique revealed that dragonfly samples were different across all sites (R=0.44, p=0.077). Seasonal surveys and temporal data collection in this ecologically rich area may undoubtedly provide vital information for migratory odonate species between India and Pakistan. The area has a strong desire to investigate Zygoptera fauna as well as conduct more extensive Anisoptera surveys." (Authors) The following species are listed: Anax nigrofasciatus, Cordulegaster brevistigma, Onychogomphus bistrigatus, Orthetrum chrysostigma, O. triangulare, O. anceps, Brachythemis contaminate Crocothemis erythraea, C. servilia, Pantala flavescens, Sympetrum decoloratum, S. commixtum, Tramea virginia, Trithemis festiva.] Address: Jahangeer, M., Department of Zoology University of Okara-56300, Pakistan. Email: khushikhlaqjahangeer@gmail.com

24619. Jens Hering, J.; Geiter, O.; Kiepsch, S.; Krämer, N.; Rudolph, A.; Winter, M. (2025): Die 6. Nassersee-Expedition: Fieberwahn und Webervögel. Der Falke 72(5): 24-31. (in German) [Verbatim: Dragonflies in Focus: Since the beginning of our faunal studies in the Lake Nasser region, dragonflies have also been a focus. Thirteen different species of Odonata have been recorded so far. These include rare species for this region, such as Selysiothemis nigra, which we found only in a few locations around Abu Simbel. Brachythemis impartita, on the other hand, is one of the extremely common species. This dragonfly impresses with swarms of several thousand individuals. And now, in August, we were also able to observe the long-awaited Pantala flavescens for the first time, a cosmopolitan species with a pronounced migratory behavior. The fact that dragonflies play a crucial role as a food source for many bird species in the Lake Nasser region is not only demonstrated by the observation of these insects in birds' beaks. Fecal analyses, in particular, have provided considerable insight into this topic. We were able to demonstrate that dragonfly remains are often found in young bird droppings. This will ultimately

affect all songbird species breeding on the lake. Impressive results on the Clamorous Reed Warbler (Acrocephalus stentoreus) and the Eastern Olivaceous Warbler (Iduna pallida, syn.: Hippolais pallida) will be presented soon.] Address: not stated

24620. Jin, X.; Lin, X.; Wang, S.; Fang, J. (2025): Complete mitochondrial genome of Chlorogomphus papilio (Odonata: Anisoptera: Chlorogomphidae) and phylogenetic analyses. Biology 2025, 14, 493. https://doi.org/10.3390/biology14050493. 16 pp. (in English) ["Simple Summary: In this study, we sequenced and analyzed the mitochondrial genome of Chlorogomphus papilio (Ris, 1927). The genome was 15,251 bp in length and contained 13 protein-coding genes, 22 tRNA genes, two rRNA genes, and one non-coding region. The mitochondrial phylogenetic tree of Chlorogomphidae, constructed based on 16S rRNA and cox1 genes, indicated that C. magnificus and C. papilio are sister species. Divergence time analyses indicated that Chlorogomphidae originated around 111.04 Ma, with C. papilio diverging from the common ancestor shared with C. magnificus approximately 58.51 Ma, likely influenced by the Paleocene–Eocene Thermal Maximum and the tectonic uplift of the Himalayas. The data obtained from our study could serve as a valuable resource for future research on the evolution and conservation of C. papilio. Abstract: This study aimed to elucidate the mitochondrial genome organization of C. papilio and the phylogenetic relationships of Chlorogomphidae. We used the Illumina MiSeq sequencing platform to sequence the mitochondrial genome of C. papilio, which was subsequently assembled, annotated, and analyzed. Bayesian inference, maximum likelihood, and maximum parsimony methods were employed to construct the mitochondrial phylogenetic tree of 25 species of Chlorogomphidae based on 16S rRNA and cox1 genes. We observed that the mitochondrial genome of C. papilio is 15,251 bp in length and includes 13 protein-coding genes (PCGs), 22 tRNA genes, 2 rRNA genes, and a non-coding control region. All PCGs start with a typical ATN codon. While cox1, cox2, cox3, and nad5 end with an incomplete termination codon (T), the remaining PCGs terminate with TAG. The secondary structure of the 22 tRNAs showed that only the trnS1 gene lacked the dihydrouracil arm (DHU arm), whereas the rest formed a typical cloverleaf structure. Additionally, 32 G-U mismatches were observed in the secondary structure. Phylogenetic analyses indicated that C. papilio and C. magnificus are sister species. Divergence time analyses indicated that Chlorogomphidae originated around 111.04 Ma, with C. papilio diverging from the common ancestor shared with C. magnificus approximately 58.51 Ma. This divergence is likely linked to the Paleocene–Eocene Thermal Maximum (PETM) and the tectonic uplift of the Himalayas, which created warm, humid habitats and contributed to geographic isolation. This study contributes to a better understanding of the mitochondrial genome and phylogeny of C. papilio, providing valuable molecular markers for further genetic studies." (Authors)] Address: Fang, J., School of Life Sciences, Anhui University, Hefei 230601, China. Email: ahufangjie@126.com

24621. Jödicke, R.; Borkenstein, A.; Orr, A.G. (2025): The coloration of female Anax imperator: a possible case of sex-limited polychromatism (Odonata: Aeshnidae). Odonatologica 54(1/2): 85-106. (in English) ["Variation in female coloration of Anax imperator has been described and interpreted in several different ways. In particular it has been widely believed that at least some younger green females change colour to blue with increasing age. In this study, the coloration of mature females was analysed using our own photographs from north-western Germany as well as many sourced from the internet. Our results clearly contradict previous explanations of colour change. The existence of different colour forms can be better explained by a model of sex-limited polychromatism. We identified two colour forms of mature females: blue and green. We also tentatively differentiated between two differing forms among the blue females: a deep blue form matching the colour of the males, and a pale blue form, both of which begin oviposition early in the season. The pale form was seen most frequently in our study region and also in photographs on the internet from other regions in Europe, Africa, and Central Asia. By rearing a female of the pale blue form, we followed the development of the juvenile coloration and observed its variability depending on temperature. In pale blue females, S2 was still green at the time of mating when they were still immature, and became blue by the time oviposition had commenced. Although a colour change did occur, it only related to one abdominal segment. Due to their rarity in our study area, little is known about the deep blue androchrome females and those with a predominantly green abdomen. We have never seen gynochrome females with a pure green abdomen, which are known mainly from England, demonstrating that significant regional differences occur in the frequency of green phenotypes. Regional compositions of phenotypes presumably have also changed with time; there are indications that blue or partly blue females have also recently become common in the British Isles. The vast majority of photographs of mating showed females that were not yet fully coloured, with the exception of one old female. We suppose that the vast majority of all mating takes place in the immature stage." (Authors)] Address: Jödicke, R., In der Baumschule 10, 26655 Westerstede, Germany. E-mail: reinhard.joedicke@@magenta.de

24622. Johnson, J.E.; Yogurtçuoglu, B.; Kirankaya, S.G.; Ekmekçi, F.G. (2025): Feeding ecology of the critically endangered Gobio insuyanus (Gobionidae). Ecology and Evolution 15(3), e71156: 15 pp. (in English) ["Despite the critical conservation status of the endemic gudgeon Gobio insuyanus, its feeding ecology remained unstudied. This research addresses this gap by investigating the diet of G. insuyanus in the Insuyu spring–stream system of Central Anatolia (Turkey) analyzing spatial, temporal, and intraspecific variations. We compared two distinct habitats: a stable spring and its continuum, a fluctuating stream. Results indicate that G. insuyanus is an omnivore, consuming primarily detritus, Gammarids, and Diptera larvae. Feeding intensity was higher in the spring habitat, particularly in summer, possibly related to its stable temperature and lower turbidity. Dietary diversity was higher in the stream, potentially reflecting its greater habitat complexity, but decreased in both habitats in autumn, suggesting a

seasonal decline in prey availability. A significant ontogenetic shift in diet was observed; mature individuals exhibited a narrower niche and preferred larger prey, probably due to increased gape size, improved foraging ability, and higher energy requirements. No significant dietary differences were found between the sexes. The results have conservation implications, emphasizing the need to maintain the integrity of both habitats. Future research incorporating fish movement data with feeding ecology will further improve our understanding and inform more targeted conservation strategies." (Authors) The diet includes odonate species, which are not further specified.] Address: Yogurtçuoglu, B., Dept of Biology, Faculty of Sciences, Hacettepe University, Beytepe Campus, Ankara, Türkiye. Email: baranyog@hacettepe.edu.tr

24623. Kamarajan, B.P., Murugan, R. & Ananthasubramanian, M. (2025): Bactericidal-nanopillars alter Acyl-Homoserine Lactones profile in Pseudomonas aeruginosa srains. BioNanoSci. 15, 364 (2025). https://doi.org/10.1007/s12668-025-01936-0: (in English) ["Nanopillars on insect wings have been identified to possess bactericidal properties. Nanopillars are bactericidal only to those bacteria that are attached to it. Our previous study analyzed the viability of Pseudomonas aeruginosa PAO1 and ATCC 9027 on the nanopillar topography of Pantala flavescens wing against flat control surfaces. P. aeruginosa PAO1 exhibited higher viability than ATCC 9027, as PAO1 restrained from attaching to the nanopillars, evading its bactericidal effect, unlike ATCC 9027. It was speculated that bacterial surface mechanosensing was a probable mechanism and that bacteria likely used quorum-sensing molecules such as Acyl Homoserine Lactones (AHLs) for communication. In the present study, two strains of Pseudomonas were allowed to interact with the control and the wing separately, and AHLs were extracted. The AHLs analyzed using GC-EI/MS facilitated the identification of key AHLs involved in bacterial attachment and biofilm formation such as 3-oxo-C_{102}-HSL, 3-oxo-C_{12}-HSL, and C_4-HSL. Besides, few other AHLs that were specifically expressed such as C_9-HSL, 3-OH-C_{11}-HSL, 3-OH-C_{13}-HSL, and 3-OH-C_{15}-HSL were likely responsible for higher bacterial attachment. The roles and implications of these AHLs could be further explored to facilitate attachment of P. aeruginosa strains onto the nanopillar topography to enhance its bactericidal efficiency." (Authors)] Address: Ananthasubramanian, M., Department of Biotechnology, PSG College of Technology, Coimbatore, 641004, India

24624. Keetapithchayakul, T.S.; Kim, J.; Lam, N.B.V.; Phan, Q.T. (2025): Description of the larva of Anotogaster klossi Fraser, 1919 (Odonata, Cordulegastroidea, Cordulegastridae), with a note on the known larvae of the genus Anotogaster Selys, 1854. Zootaxa 5632(2): 349-363. (in English) ["The final instar larva of Anotogaster klossi Fraser, 1919 is described and illustrated, based on reared specimens from Vietnam. The larva of A. klossi differs from its congeners in several morphological characteristics, including the manner of ligula, number of premental setae, and the presence of lateral spines on abdominal segments. A comparison with previously described larvae of Anotogaster Selys, 1854 species [A. chaoi, A. klossi, A. gregoryi, A. nipalensis, A. sieboldii] is provided. This study enhances the understanding of Anotogaster larval morphology and provides valuable insights into taxonomy and biological notes." (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. E-mail: Keetapithchayakul.TS@gmail.com

24625. Khedr, A.; Castellani, F. (2025): Dragonfly-inspired aerodynamics in horizontal axis wind turbines: Insights into fore-blade and hind-blade interaction through experimental and CFD studies. Wind Energy 28(7), e70033: 21 pp. (in English) ["Taking inspiration from dragonfly tandem wing aerodynamics, this study explores a novel wind turbine design featuring tandem blades. A 1-m diameter horizontal axis wind turbine is tested in a wind tunnel at wind speeds between 4 and 12 m/s. In addition, computational fluid dynamics simulations validated with the experimental data further investigated the bioinspired configuration, also with the aid of flow visualization, and compared it to two conventional turbines designed from each blade of the bioinspired tandem blade configuration ensuring an equal solidity ratio for the three rotors. The results showed significant advantages for the tandem configuration at low tip speed ratios (TSRs) with an increase of up to 31% in torque generation compared to the sum of the individual blades, with no penalties at high TSRs. This improvement is attributed to the fore-blade/hind-blade interaction, with flow visualization showing a significant aerodynamic performance change with respect to the performance of the isolated individual blades at all TSRs. The presence of the hind blade significantly augments the performance of the fore blade by lowering the flow stagnation point, thus increasing the flow curvature, and also promoting better attachment by sucking the flow downward. Although the hind blade itself suffers from the fore-blade wake, the tandem configuration showcased an overall enhancement in performance." (Authors)] Address: Castellani, F., Dept of Engineering, University of Perugia, Perugia, Italy. Email: Francesco.Castellani@unipg.it

24626. Koparde, P.; Payra, A.; Deshpande, A. (2025): Odonata diversity in the timescape of Pune district adjoining the Western Ghats Biodiversity hotspot. International Journal of Tropical Insect Science 45(1): 193-205. (in English) ["Odonates have increasingly been used in understanding species responses to habitat modifications. Here, we reviewed historic odonate records from a tropical district, Pune, from India, and investigated changes in Odonata composition based on primary and secondary data to recreate an account of 180 years of odonatological research. The primary survey was carried out in 52 localities of Pune district from January 2019 to December 2022. We retrieved secondary data from 25 published articles and citizen science records. The dataset was divided into geographical boundaries of Pune Municipal Corporation (PMC) and the rest of PMC. Further, we divided the dataset into two types of time boundaries, namely, pre-and post-2010 and time era-wise (mid-nineteenth century, early-twentieth century, late-twentieth century, and early-twenty-first century). We registered a total of 98 species belonging

to 52 genera and 10 families from the district (damselflies 36 and dragonflies 62). The PMC region represented 66 odonates under 36 genera and 7 families. Of the 98 recorded species, 70 species under 41 genera and 9 families were recorded during the present survey. Libellulidae was the most speciose family representing 38 species, followed by Coenagrionidae (21), Gomphidae (11) and Aeshnidae (8). Hills were found to be the biodiversity refugia with high species richness within the PMC boundary. Since the mid-nineteenth century there has been an increasing trend in reports of species records from the district primarily due to the rise of sophisticated citizen science platforms. Comparisons of pre-and post-2010 lists suggest the absence of 8 and the recording of an additional 27 odonate species. Perhaps changing land use, rapid urbanization, and data gaps are important factors giving rise to such patterns. Here, we uncover patterns in the odonate records from Pune city and recommend systematic long-term monitoring to identify areas of conservation concern. Our study provides data useful for planning management of urban green and blue spaces of the city." (Author) Special emphasis is given to Anax indicus, A. parthenope, Burmagomphus pyramidalis, Cyclogomphus heterostylus, C. ypsilon, Gomphidia kodauensis, G. t-nigrum, and Bradinopyga konkanensis] Address: Payra, A., Dept Environmental Studies, Dr Vishwanath Karad MIT World Peace University, Kothrud, Pune, 411038, Maharashtra, India

24627. Küttner, R. (2025): Beitrag zur Kenntnis der Wasserinsektenfauna zweier Erzgebirgsmoore: Hormersdorfer Hochmoor und Kleiner Kranichsee (Insecta: Ephemeroptera, Plecoptera, Odonata, Heteroptera, Coleoptera, Trichoptera). (Sachsen, Erzgebirge). Mitteilungen Sächsischer Entomologen 44 (151): 118-154. (in German, with English summary) ["From 2020 to 2023, the aquatic insect fauna of two raised bogs in the Erzgebirge (Hormersdorfer Hochmoor and Kleiner Kranichsee) was studied. A total of 131 species were recorded, including Ephemeroptera: 1 species, Plecoptera: 6 species, Odonata: 11 species [including Coenagrion hastulatum, Aeshna juncea, Somatochlora alpestris, Libellula quadrimaculata, Sympetrum danae, Leucorrhinia dubia], aquatic Heteroptera: 17 species, Megaloptera: 1 species, Neuroptera: 2 species, Trichoptera: 61 species, and aquatic Coleoptera: 43 species. Of these, 33 species are classified as tyrphophilous or tyrphobiontic. The occurrence of some remarkable species is analyzed from a local faunistic perspective. Additionally, the role of the dammed ditches in Kleiner Kranichsee as substitute habitats for bog-associated species is discussed." (Author)] Address: Küttner, R., Neue Heimat 18a, 09212 Limbach-Oberfrohna, Germany. Email: ralf.kuettner@woka-net.de

24628. Kwon, H.-y.; Joo, J.-w.; Seo, H.-s.; Ko, M.-h. (2025): Comparison of habitat selectivity and feeding by population of the endangered species, Rhynchocypris semotilus (Pisces: Cyprinidae). Journal of Korean Ichthyology 37(1): 36-50. (in Korean, with English summary) ["To compare habitat selectivity and feeding by population (Songhyeoncheon, Osodong, Gojindong) of the endangered endemic species Rhynchocypris semotilus, a survey was conducted in Goseong-gun, Gangwon-do, Korea, from July 2022 to October 2023. The age groups for R. semotilus populations, estimated by the frequency distribution of total length in May, indicated that those measuring 48~65 mm are 2 years old, the measuring 86~105 mm are more than 4 years old. The examination of habitat selectivity by population revealed that the flow rate was generally slow (6.2 to 9.9 cm/sec), but there were significant differences in the cover of aquatic plants, depth, and riverbed composition. Specifically, the Songhyeoncheon population had a high proportion of aquatic plants (42.2%) and a medium depth (average 51.7±12.43 cm), with the riverbed primarily consisting of cobbles (average particle size 16.2±18.67 cm). The Osodong population exhibited a low proportion of aquatic plants (7.1%) and a low depth (34.5±17.54 cm), with the riverbed mainly composed of boulders (60.8±16.68 cm). In contrast, the Gojindong population had no percentage of aquatic plants, a greater depth (65.6±9.86 cm), and a riverbed predominantly consisting of large rocks (101.5±27.83 cm). Feeding analysis using the relative importance index (IRI%) showed that the Songhyeoncheon population primarily consumed Trichoptera (46.6%), followed by Ephemeroptera (27.6%), Diptera (12.6%), and Odonata (9.7%). The Osodong population's diet was dominated by Trichoptera (83.7%) and Ephemeroptera (11.6%), while the Gojindong population primarily consumed Diptera (37.6%), Nematoda (23.6%), and Trichoptera (24.4%). Thus, while Trichoptera, Ephemeroptera, and Diptera were important food sources for all populations, there were significant differences in the key taxa and their relative ratios. Finally, the differences in feeding habits among populations were considered in relation to their habitat environments and the ecology of benthic macroinvertebrates." (Authors)] Address: Ko, M.-h., National Institute of Ecology, Seocheon 33657, Republic of Korea. Email: hun7146@gmail.com

24629. Lagrotteria, A.; Roccatello, S.; Doretto, A. (2025): Contribution of Citizen Science Data on the evaluation of local biodiversity of benthic macroinvertebrate communities. Ecologies 2025, 6, 31. https://doi.org/10.3390/ecologies6020031: 16 pp. (in English) ["Citizen science is increasingly utilized for environmental monitoring and educational purposes. For lotic ecosystems, this approach could be used to implement traditional methods and gain more data on local biodiversity, particularly in areas where professional monitoring is limited. This study, conducted in Italy, aimed to complement data on river macroinvertebrates collected by the Regional Environmental Protection Agency (ARPA) with additional data gained by volunteers. Our results revealed taxonomic differences between the macroinvertebrate communities of ARPA and citizen science sites. ARPA sites host 34.4% of the total biodiversity, with 22 exclusive taxa, while citizen science sites, with 6 exclusive taxa, represent 9.4% of the total gamma diversity. Compositional differences are mainly explained by taxa turnover between sites. ARPA sites, located along the main river stretches, are richer in alpha and gamma diversity, while volunteer-monitored sites, mostly in agricultural ditches, show lower richness at the local and regional scales but host some unique taxa, increasing the total biodiversity. This study supports the implementation of volunteer programs to increase the number of monitored rivers, enhancing information on macroinvertebrate diversity and distribution and

generating relevant data to support decision-making and develop strategies for river conservation and ecosystem restoration at a local scale." (Authors) Taxa including Lestidae, Aeshnidae and Corduliidae, are treated at family level.] Address: Lagrotteria, A., Dept for Sustainable Development & Ecological Transition, University of Eastern Piedmont, Piazza Sant'Eusebio 5, 13100 Vercelli, Italy

24630. Lambret, P.; Deleva, S.; zunov, S.; Popov, D. (2025): Status of Lestes macrostigma in Bulgaria, with annotations on its ecology (Odonata: Lestidae). Odonatologica 54(1/2): 53-84. (in English) ["Measuring population trends of freshwater insects helps to assess their conservation status and to design management protocols for wetlands. L. macrostigma is restricted to temporary brackish waters, a limited and fragmented habitat. Throughout its range this species is threatened at different levels, and, in Bulgaria, it has been assessed as "Critically Endangered". In the past, along the Black Sea coast, it was known to be abundant and reproducing at two sites: Shablenska Tuzla Lake and Poda Protected Area. At a third site, Pomorie Lake, only a few individuals were recorded without clear evidence of reproduction. We aimed at updating its distribution along the Bulgarian Black Sea coast and determining the conservation status of its populations by conducting surveys from 2021 to 2024 at 53 localities, mainly within coastal lagoons and estuaries. We recorded all Odonata species along with their various life stages and reproductive behaviour. Other resident species recorded in association with L. macrostigma were Lestes barbarus, L. dryas, Ischnura elegans, Aeshna affinis, Sympetrum fonscolombii, S. meridionale, and S. striolatum. We counted L. macrostigma adults along walks and extrapolated abundance over the entire sites and season. Lestes macrostigma population size reached hundreds of thousands of adults at Shablenska tuzla and Pomorie Lake. At Nanevska tuzla and Atanasovsko Lake, two new sites for the species, thousands of adults were present. However, we found that L. macrostigma had disappeared from at least a part of Poda Protected Area, most likely because of a change in water management practices. As the timing of the flooding period is a key feature of the species' habitat, we found that its presence in the temperate Bulgarian estuaries was unlikely. As conservation management plans are still lacking for Shablenska tuzla and Pomorie Lake, the future of the two largest L. macrostigma populations of Bulgaria of international importance seems tenuous and uncertain. Therefore, key actions for the conservation of L. macrostigma are the proper management of its existing reproductive sites and restoring or recreating temporary wetlands." (Authors)] Address: Lambret, P., du Valat, Research Institute for the Conservation of Mediterranean Wetlands, Arles, France. Email; lambret@tourduvalat.org

24631. Larsen, A.S.; Cole, M.; Rupp, C.L.; Simmons, T. (2025): The influence of catchment characteristics and water chemistry on invertebrate community composition in ponds and lakes in Subarctic Alaska. Freshwater Biology 70(4), e70024: 19 pp. (in English) ["Predicting the impacts of climate change on aquatic ecosystems in the Subarctic is challenging due to the presence of permafrost and the wide range of geomorphologic conditions found across this heterogeneous landscape. To accurately predict how fish and wildlife will be impacted by climate change, it is critical to identify the habitat requirements of important prey such as macroinvertebrates. To better understand spatial heterogeneity in macroinvertebrate populations and identify key habitat requirements, we compared taxonomic richness, relative abundance, and density of macroinvertebrate populations in seven different lake basin types, spanning a large latitudinal and elevational gradient of subarctic Alaska. We used nonparametric statistics and NMDS to relate macroinvertebrate community metrics to landscape characteristics such as sedimentary deposit type, permafrost extent, geomorphology, and lake basin type, as well as chemical conditions within the lakes. Macroinvertebrate richness was highest in areas with continuous permafrost, largely driven by richness in dipterans. Lake water chemistry influenced taxa richness, relative abundance, and densities of both macroinvertebrates and microcrustaceans. Invertebrate densities were greatest in regions (parks) with higher nutrient concentrations and specific conductance, with higher relative abundance of dipterans in older landscape terrains (Yedoma) while a higher relative abundance of microcrustaceans was found in landscapes with little peat accumulation (sand dunes). As climate-driven permafrost thaw continues across the subarctic, shifts in pH, specific conductance, and calcium are likely to occur due to changes in active layer thickness and surface and groundwater flow paths that drive nutrient and solute delivery. Changes in invertebrate relative abundance and density are most likely to occur in ETOC and Diptera, two of the most ecologically important invertebrate groups found in subarctic lakes." (Authors) The supplementary materials contains the following odonate taxa: Aeshna, Coenagrion/Enallagma, Lestes, Cordulia, Leucorrhinia, Libellula, Libellulidae/Corduliidae.] Address: Larsen, Amy, Yukon-Charley Rivers National Preserve & Gates of the Arctic National Park & Preserve, National Park Service, Fairbanks, Alaska, USA. Email: amy_larsen@nps.gov

24632. Lenzi, A.; Gisondi, S.; Bardiani, M.; Hardersen, S.; Maurizi, E.; Mosconi, F.; Nardi, G.; Campanaro, A. (2025): Protected insect species in Italy: occurrence data from a 10-year citizen science initiative. Biodiversity Data Journal 13: e151742: 18 pp. ["Background: Occurrence data provide an important baseline for the planning of conservation strategies and for the protection of species and habitats. However, collecting such data usually requires energy and it is time-consuming. Recently, citizen science has been shown to be a suitable approach for the study and monitoring of biodiversity, as it allows for the collection of a large number of records, distributed spatially and over time. Additionally, this approach enable the generation of new knowledge and fosters environmental awareness in the participating volunteers. New information: The present paper describes the data collected during the first citizen science project on protected insect species in Italy. The dataset contains occurrence records of 31 taxa observed all over Italian national territory in 10 years for a total of 5,975 records. The aim of the project was to increase the knowledge, to document the distribution of the target taxa and to provide valuable data useful for the reporting of these insects as required by Articles 11 and 17 of the Habitats Directive." (Authors) The following odonate taxa are treated: Coenagrion

mercuriale/castellani, Cordulegaster trinacriae, Gomphus flavipes, Leucorrhinia pectoralis, Ophiogomphus cecilia, Oxygastra curtisii, Sympecma paedisca] Address: Lenzi, Alice, Council for Agricultural Research and Economics, Research Centre for Plant Protection and Certification, Florence, Italy. Email: alice.lenzi@crea.gov.it

24633. Li, G.; Yang, G.-H. (2025): Descriptions of the last instar larvae of two species of Davidius Selys, 1878 from Erhai Lake Basin, Yunnan, China (Odonata: Gomphidae). Zootaxa 5633(3): 573-582. (in English) ["The last instar larvae of Davidius zallorensis Hagen in Selys, 1878 and Davidius davidii yunnanensis Yang & Davies, 1996 are described and illustrated for the first time from Erhai Lake Basin, Yunnan Province, China, based on the final stage larvae reared in laboratory; notes on their habitats are also provided. Differences among the larvae of this genus are discussed." (Authors) Characters of the larvae of nine species of the genus Davidius Selys, 1878 are compared: D. fruhstorferi, D. davidii yunnanensis, D. zallorensis, D. truncus, D. fujiama, D. nanus, D. moiwanus, Davidius spec 1 Davidius spec 2 (nonfinal instar larva).] Address: Yang, G.-H., College of Agriculture & Life Sciences, Dali Univ., Yunnan 671003, China. Email: yanggh727@sina.com

24634. 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 semiembedded 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 Lab. of Molecular Engineering of Polymers, Advanced Coatings Research Center of Ministry of Education of China, Fudan Univ., Shanghai 200438, China. Email: lmw@fudan.edu.cn

24635. Liang, J.; Zheng, M.; Pan, T.; Su, G.; Deng, Y.; Cao, M.; Li, Q. (2025): Development of a dragonfly-inspired high aerodynamic force flapping-wing mechanism using asymmetric wing flapping motion. Biomimetics 2025, 10(5), 309; https://doi.org/10.3390/biomimetics10050309: 25 pp. (in English) ["Bionic micro air vehicles are currently being popularized for military as well as civilian use and dragonflies display a wealth of skill in their remarkable flight capabilities. This study designs an asymmetric motion flapping-wing mechanism inspired by the dragonfly, using a single actuator to achieve the coupling of stroke and pitch motion. This study simulates the motion of the dragonfly's wings using the designed mechanism and experimentally validates the motion laws and aerodynamic characteristics of the mechanism. The analysis focuses on the asymmetry in the wing's stroke and pitch motion and their aerodynamic implications. The flapping-wing mechanism accurately replicates the wing motion of a real dragonfly in flight, and the maximum lift-to-weight ratio can reach up to 230.2%, demonstrating significant aerodynamic benefits. This mechanism provides valuable guidance for the structural design and kinematic control of future flapping-wing vehicles." (Authors)] Address: Liang, J., Research Institute of Aero-Engine, Beihang Univ., Beijing 100191, China. Email: liangjinze@buaa.edu.cn

24636. Liu, Q.; Zhu, C.; Ru, W.; Hu, Y. (2025): Dragonfly morphology-inspired wing design for enhanced micro-aircraft performance. Journal of the Brazilian Society of Mechanical Sciences and Engineering 47, 86: (in English) ["Flapping-wing micro-aircraft has broad application prospects in military and civil fields due to their outstanding advantages, but the problem of short endurance caused by low energy utilization rates needs to be urgently solved. In this paper, the dragonfly front wing is utilized as the bionic model to study the influence of morphological characteristics on the aerodynamic performance of wings. Subsequently, a bionic wing with good aerodynamic performance is designed. The geometric parameters of dragonfly wings are measured using various mathematical methods, and the basic size, weight, and area distribution are determined. Through macroscopic and microscopic observation, the basic configuration characteristics of the wing are analyzed, such as plane shape, grid distribution, and airfoil fold structure. The influence of these characteristics on the aerodynamic performance of the bionic wing is explored using computational fluid dynamics methods. The results demonstrate that the plane shape and airfoil fold structures differently affect the aerodynamic performance, but the grid distribution has minimal influence. Based on this, a dragonfly bionic wing is designed and simulated. The simulation results indicate that the average lift coefficient and average drag coefficient of the model in one cycle are both 17.45% higher than those of the prototype wing. Finally, its flapping device with three degrees of freedom and wing aerodynamic test experimental system are established to verify the wing's aerodynamic performance. The aerodynamic force of the bionic wing is measured in a wind tunnel. This study correlates dragonfly-inspired wing morphology with aerodynamic performance enhancement, exploring its principles, leveraging key three-dimensional morphological features to significantly improve aerodynamic performance, and inspiring the development of high-efficiency bionic wings for micro-flapping-wing aircraft.] Address: Hu, Y., School of Mechatronic Engineering, Changchun University of Technology, Changchun, 130012, China

24637. Liu, Y.-X.; Li, R.; Oestman, M.; Shi, C.-F.; Ren, D.; Yang, Q. (2025): New damselflies (Odonata: Zygoptera: Burmacoenagrionidae) from mid-Cretaceous Myanmar amber. Palaeoentomology 8(2): 157-165. (in English) ["A new species Electrocoenagrion rarissimum sp. nov. of Burmacoenagrionidae is described from mid-Cretaceous Burmese amber. It is assigned to this family by having its typical characteristics: 12–19 postnodal crossveins present; Pt 3–5 short cells long; pterostigmal part of RA and stigmal crossveins thickened to form U-shaped structure; RP1 with weak angle below Pt-brace. Electrocoenagrion rarissimum sp. nov. differs from the other two species of this genus by RP2 originating seven cells distad of Sn, 19–20 postnodal crossveins present basad of Pt in forewing, midfork distinctly distad of N and Arc distad of Ax2. A revised diagnosis of Electrocoenagrion is provided, with a detail description of head and wing base structure." (Authors)] Address: Liu, Y.-X., College of Life Sciences, Capital Normal Univ., Beijing 100048, China; School of Life Sciences, Key Lab. of Conservation & Application in Biodiversity of South China, Guangzhou University, Guangzhou 510006, China

24638. López Pardo, J.A.; Martínez, J.S.; Mahecha, O.J.; García García, A. (2025): From water to air: Thermal strategies of Erythrodiplax abjecta throughout its life. Proceedings of the 2nd International Electronic Conference on Entomology, 19–21 May 2025, MDPI: Basel, Switzerland: [Verbatim: "Thermoregulation in dragonflies is a key physiological process that influences their ecological performance and behavior. While adults can employ active thermal regulation strategies, larvae rely more on water temperature. In this study, we analyzed the thermal relationship of adult and larval individuals of E. abjecta to assess how their body temperature varies in response to environmental variables. To measure temperature in adults, individuals were captured using an entomological net and held ventrally with forceps. Body temperature (Tb) was recorded in the thorax (Tth), abdomen (Tab), and head (Th). A MAX6675 sensor with a type K thermocouple (±1.0°C) was used, operated via software based on an ARDUINO NANO, registering thermal values in real time every second. In the case of larvae, both water temperature and body temperature were measured. Adults exhibited a variable thermal pattern throughout the day, with temperature peaks around midday, showing a stronger correlation with solar radiation temperature. Thoracic temperature was consistently higher than that of the abdomen and head, suggesting a possible differential thermal control. In contrast, larvae displayed a close thermal coupling with water temperature, with minimal differences compared to the ambient temperature. Preliminary results indicate that E. abjecta employs distinct thermal strategies depending on its developmental stage. Adults actively regulate their temperature, whereas larvae rely mainly on the aquatic environment. These findings contribute to the understanding of thermal physiology in odonates and their responses to changing environmental conditions." (Authors)] Address: López Pardo, J.A., Univ.Distrital Francisco José de Caldas, Colombia

24639. Lou, K.; Yu, D.; Zhang, C.; Li, H. (2025): Characteristics of nocturnal insect communities in semi-arid regions: A case study at the Habahu National Nature Reserve of Ningxia, China. Forests 16(4), 659; https://doi.org/10.3390-/f16040659: 18 pp. (in English) ["To explore the spatiotemporal niche characteristics and changing regularities of insect communities under lamps in a semi-arid region, this paper analyzed Levins' niche breadth index and the Pianka niche overlap index of 10 orders and 19 selected common families or superfamilies of insect communities under lamps from April to September 2018 at six vegetation sites in the Habahu National Nature Reserve, a rare desert grassland–wetland reserve in China. The results indicated the following: (1) Different taxa possess varying spatiotemporal, temporal, and spatial niche breadths, suggesting that insects effectively utilized resources in the Habahu Nature Reserve. (2) Among these groups, in terms of the orders aspect, Lepidoptera had the largest temporal niche breadth, the Hemiptera had the largest spatial niche breadth, and Lepidoptera, Coleoptera, and Hemiptera had relatively large spatiotemporal niche breadths, while Odonata had the smallest niche breadth in all three aspects. The orders of Coleoptera and Lepidoptera had the largest spatiotemporal niche overlap value, while Odonata and Diptera had the smallest. (3) In terms of the common families (superfamilies) aspect, Noctuidae had the largest temporal niche breadth and spatiotemporal niche breadth, while Hydrophilidae had the smallest. The spatial niche breadth of Sphingidae was the largest, while Corixidae was the smallest. Noctuidae and Pyraloidea had the largest spatiotemporal niche overlap value among these herbivore groups, Miridae and Chrysopidae, among the herbivore to predatory groups, and Noctuidae and Braconidae, among the herbivore to parasitic groups. This lays a theoretical foundation for developing Chrysopidae and Braconidae as biological control taxa in the Habahu Nature Reserve." (Authors)] Address: Lou, K., College of Life Sciences, Zhengzhou Univ., Zhengzhou 450001, China. Email: lk1022816@163.com

24640. Makbun, N. (2025): Description of Protosticta jirapornae sp. nov. from northern Thailand (Odonata: Platystictidae). Zootaxa 5642(1): 59-67. (in English) ["Protosticta jirapornae sp. nov. is described and illustrated based on specimens of both sexes collected from Chiang Mai Province, Thailand. This taxon was previously recognised as the northern population of P. khaosoidaoensis Asahina, 1984, which is geographically isolated from its type locality in Chanthaburi Province, eastern Thailand. The new species can be distinguished from P. khaosoidaoensis and other closely related congeners by the distinctive markings on the prothorax and synthorax in both sexes, as well as the structure of the male anal appendages and the morphology of the genital ligula." (Author)] Address: Makbun, N., 211/5 Moo 4, Takhli, Nakhon Sawan, 60140 Thailand

24641. Marinov, M.; Rashni, B. (2025): A contribution to the Odonata fauna of Moala Island, Fiji. Part I: erection of three new species in genera Nesobasis Selys, 1891 and Nikoulabasis Ferguson et al., 2023 (Odonata: Coenagrionidae). Zootaxa 5637(2): 292-310. (in English) ["This study records the first members of Nesobasis Selys, 1891 and Nikoulabasis Ferguson et al., 2023 from Moala Island, Fiji. Three new species were erected for the following endemics: Nesobasis delai, sp. nov. (holotype male, headwater system, a tributary of Waitabu Lake), Nesobasis malokuensium, sp. nov. (holotype male,

tributary of Wailevu Creek above Maloku village) and Nikoulabasis pauta, sp. nov. (holotype female, section of Wailevu creek about 500 m above Maloku village up to the Savukaratu waterfall). Three discussion points are outlined for future studies: phenology, female bias sexual ratio and biogeography." (Authors)] Address: Marinov, M., Biosecurity Surveillance & Incursion Investigation Plant Health Team, Ministry for Primary Industries, 14 Sir William Pickering Drive, Christchurch 8544, New Zealand Email: milen.marinov@mpi.govt.nz

24642. Mårshagen, H. (2025): Att äta eller att inte äta sina släktingar: Kannibalism och aggression hos flicksländelarver med olika toppredatorer - To eat or not to eat your kin: Cannibalism and aggression in damselfly larvae with different top predators. Independent thesis Basic level (degree of Bachelor), Karlstad University, Faculty of Health, Science and Technology (starting 2013), Department of Environmental and Life Sciences: 13 pp. (in Swedish, with English summary) ["Predation and competition shape population dynamics, the structure of ecological communities and behaviours of organisms. Individuals can be both predators and competitors through intraguild predation and cannibalism. The level of cannibalism tends to be lower among closely related kin in species capable of kin recognition. This study investigated how kinship affects the level of cannibalism and aggression in two North American species of damselflies [Enallagma doubledayi, E. pollutum]. I hypothesize that damselfly larvae can recognise their kin, leading to lower levels of cannibalism and aggression among closely related kin. I further hypothesize that damselfly larvae living in environments without fish and with dragonflies as top predators exhibit more aggressive behaviours and cannibalism than those in habitats with fish, as they have shown more active behavioural patterns in previous studies. To test this, damselfly larvae were reared in petri dishes, with 1, 2 or 3 sibling groups per replicate. Data on survival and lost body parts were collected as measures of cannibalism and aggression. The results showed no effect of kinship on cannibalism or aggression. The species that coexists with fish had significantly more lost body parts than the species living in fish-free waters, and there was a tendency for lower survival in this species. One possible interpretation is that species coexisting with dragonflies have evolved an escape response from these predators, which also influences intraspecific interactions, making them less likely to fall victim to aggressive attacks and cannibalism. This suggests that top predators can influence ecosystems by regulating the level of aggressiveness and cannibalism in their prey." (Author)] Address: https://www.diva-portal.org/smash/get/diva2:1957557/FULLTEXT01.pdf

24643. Matushkina, N.; Gorb, S.N.; Krings, W. (2025): Material composition of the endophytic ovipositor in the damselfly, Calopteryx splendens (Odonata, Calopterygidae). Journal of Insect Physiology 163, June 2025, 104813: 9 pp. (in English) ["Highlights: • First examination of damselfly ovipositor using CLSM, EDX, and nanoindentation. • Young's modulus of ovipositor cuticle is 3.0–7.0 GPa and hardness is 0.1–0.3 GPa. • Stiffness and hardness of cuticle correlate with copper and magnesium content. • Mechanical property values and metals content increase in distal direction, potentially enhancing piercing ability during egg insertion. Abstract: Natural selection has favoured the incorporation of ions, including transition metals, in materials of various biological structures susceptible to mechanical fracture to enhance their failure and wear resistance. With regards to insects, only a few taxa have been investigated. The objective of this study was to analyse the biomechanical properties of the ovipositor in Calopteryx splendens through nanoindentation and to ascertain the elemental composition gradient within the cuticle using energy-dispersive X-ray spectroscopy. This research represents the first report indicating that the damselfly ovipositor exhibits a gradient in the mechanical properties of the cuticle, with Young's modulus ranging from approximately 3.0 to 7.0 GPa and hardness from 0.1 to 0.3 GPa. These properties are shown to highly correlate with the contents of copper and magnesium, both of which increase in the distal direction. The results also suggest that the mechanical properties of the cuticle are significantly influenced by the degree of sclerotization revealed by confocal laser scanning microscopy. These findings propose that the material properties of the ovipositor cuticle in C. splendens may have adapted to enhance piercing capability and to reduce the risk of structural failure during insertion of eggs in plant substrates." (Authors)] Address: Krings, Wencke, Dept of Functional Morphology & Biomechanics, Zoological Institute, Kiel University, Am Botanischen Garten 1–9, 24118, Kiel, Germany. Email: wencke.krings@uni-hamburg.de

24644. Matushkina, N.; Klass, K.-D.; Gorb, S.N.; Nadein, K.; Fleck, G. (2025): Female genitalia of Petaluridae provide evidence on the evolution of the reproductive biology in Odonata. Zoomorphology 144: 37: 21 pp. (in English) ["The small Pangean dragonfly family Petaluridae poses intriguing questions both on its own evolution and on the evolution of Odonata as a whole. Molecular studies suggest that it began its generic diversification in the Mesozoic and eventually formed two clades, one Laurasian (Tachopteryx and Tanypteryx) and one Gondwanan (Phenes, Uropetala and Petalura). We describe the female genitalia of three species of Petaluridae [Tachopteryx thoreyi (Selys 1858); Tanypteryx hageni (Selys 1879); Tanypteryx pryeri (Selys, 1889)] by light microscopy and scanning electron microscopy and micro-CT for the first time. An evolution from a plesiomorphic "cutting" (endophytic) ovipositor to an apomorphic "pushing" (endosubstratic) ovipositor is indicated in the Laurasian members, whereas a "pushing" ovipositor is found in all Gondwanan members. The "cutting" ovipositor morphology most fully preserved in Tachopteryx is interpreted as a plesiomorphic morphological trait that has been retained after the functional shift in the egg-laying strategy took place. The possible functions of the studied structures are discussed and the present findings are compared with those of other Odonata." (Authors) Phenes raptor Rambur 1842] Address: Nadein, K., Dept of Functional Morphology & Biomechanics, Zool. Inst., Kiel Univ., Am Botanischen Garten 1–9, 24118 Kiel, Germany. Email: k.nadein@gmail.com

24645. Mohamad Bukhori, M. F., Daud, R., Gintoron, C. S., Idris, M. I., Tawie Tingga, R. C., Abd Rahman, M. R., & Achmadi, A. S. (2025): Brief documentation of land and water ecosystem in Kubah and Santubong National Parks, Sarawak by

UNIMAS Centre for Pre-University Studies Students. Journal of Science and Mathematics Letters 13(1): 10-22. (in English) ["In order to impose effective learning of biodiversity and ecology in pre-university students, they have been introduced and led to experience biodiversity and ecology and impart to differentiate different components of ecosystem. Therefore, a field work was conducted to experience biodiversity and ecology of discerned organisms in various ecosystems in Kubah and Santubong National Park. The input was analysed and described selected ecosystem, plants, and animals and referred to previous scientific reports from various resources. Experiences of biodiversity and ecology at pre-university level seemed to be important for the future development of their understanding during the degree level. It is important, both to give the students early experiences of biodiversity and ecology in nature and to take students' early ideas into consideration in academic, research, and development for lifelong learning and for a sustainable future." (Authors) A picture of Euphaea impar cf is documented.] Address: Bukhori, M.F.M., Biology Division, Centre for Pre-University Studies, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia. Email: mbmfhaizal@unimas.my

24646. Molineri, C.; Rodríguez, J.S.; Nieto, C. (2025): First description of female and larva of Phyllocycla basidenta Dunkle, 1987 (Anisoptera: Gomphidae), and ecological niche modeling of Phyllocycla species in northwestern Argentina. Zoological Studies 64:19 (2025): 24 pp. (in English) ["We present the first description of female adult and larva of P. basidenta, collected in northwestern Argentina. The female and larva are described in detail, with diagnostic features that differentiate P. basidenta from other species like P. argentina and P. viridipleuris. Larvae of P. basidenta inhabit sandy-bottomed rivers alongside P. argentina. Additionally, we predict the potential distribution of both species using Ecological Niche Models under current and future climate scenarios. The models suggest that suitable habitats may shift to higher altitudes under moderate climate change, but significant losses are expected under severe warming scenarios. Climate change may threaten P. basidenta and P. argentina as its suitable habitats could shift to higher elevations. Conservation strategies should prioritize areas projected to become suitable under future conditions." (Authors)] Address: Molineri, C., Instituto de Biodiversidad Neotropical (IBN), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Fac. de Ciencias Naturales e Instituto Miguel Lillo, Universidad Nacional de Tucumán, Yerba Buena, Tucumán, Argentina. E-mail: carlosmolineri@gmail.com

24647. Nascimento, J.; Martins, R.; Hamada, N. (2025): As donzelinhas e os dragões do reino aquático. Editora INPA: 44 pp. (in Portuguese) ["The Damsels and the Dragons of the Aquatic Kingdom" is the newest work from the Laboratory of Cytotaxonomy and Aquatic Insects, in partnership with the INPA Publishing House. Aimed at children and young people, the book invites readers of all ages to embark on an enchanting journey through the world of dragonflies — incredible insects that have inhabited our planet since long before the dinosaurs! Following the curious Lili, we will discover how these animals are born, transform, feed and reproduce, in addition to exploring the main characteristics of their bodies, the environments where they can be found, their importance for aquatic ecosystems and many other curiosities. With accessible language, beautiful illustrations and many curiosities, reading is fun and full of learning! An adventure that combines science, imagination and respect for nature. Want to know all of this in full? Access and download the digital book through the link: https://repositorio.inpa.gov.br/handle/1/40792 The printed version of the book will also be available soon!" (Publisher"] Address: https://repositorio.inpa.gov.br/bitstream/1/40792/3/donzelinhas_e_os_dragoes_do_reino_aquatico.pdf

24648. 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: 10 pp. (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

24649. Nel, A.; Muller, V.N.; Garrouste, R.; Boderau, M. (2025): The first fossil representative of the dragonfly family Synthemistidae. Acta Palaeontologica Polonica 70(2): 253-258. (in English) ["Gallosynthemis bechlyi gen. et sp. nov., described from the Paleocene maar of Menat (Puy-de-Dôme, France) is the firstever fossil record of the dragonfly family Synthemistidae. It shows the main synapomorphies of the family, viz. hind wing with 3–5 costal braces (complete antenodal crossveins) alternating with non-aligned antenodals; presence of crossveins in median area and between CuP and PsA; absence of postsubnodal crossveins below first postnodal crossveins; in hind wing, a very large and elongate anal loop without a well-defined mid-rib; and CuAa without posterior branches. It belongs to the stem group of this family and is attributed to its own subfamily Gallosynthemistinae subfam. nov., characterized by a very long stem of hind wing cubitus anterior vein (autapomorphy), plus some symplesiomorphies such as sectors of arculus separated at their bases. While extant Synthemistidae sensu Bechly (2016) are Australasian, the present new taxon demonstrates that the family may have been much more widespread during the Paleocene. These dragonflies probably became extinct in the Northern Hemisphere in relation with the Cenozoic dramatic episodes of cooling." (Authors)] Address: Boderau, M., Inst. de Systématique, Évolution, Biodiversité (ISYEB), Muséum National d'Histoire Naturelle,

Centre National de la Recherche Scientifique, Sorbonne Université, École Pratique des Hautes Études, Université des Antilles, Paris, France

24650. Nelson, W.; Packer, S.; Hancock, C.; Bybee, S.; Schilder, R. (2025): Flyer/percher dichotomy is evident from flight muscle mitochondrial energetics. American Physiology 40(S1): (in English) [Verbatim: Dragonflies are prolific flyers; some species are known to fly a majority of time while other species spend significant amounts of time resting perched on objects. We sought to determine flight muscle mitochondrial energetics in dragonflies characterized as either flyers or perchers. We hypothesized that flyers, with their constant energy demands, would exhibit higher mitochondrial respiration than perchers that spend more time resting. We collected 16 perchers and 10 flyers in Provo, UT and Saint George, UT. Small bundles of flight muscle were permeabilized and subjected to a standard protocol in an Oroboros Oxygraph-2K to measure LEAK respiration with glutamate (G), malate (M) and succinate (S). Maximal coupled respiration was then evaluated with the addition of ADP (GMSP) and FCCP (GMSE) was subsequently added to determine maximal uncoupled mitochondrial respiration. GM LEAK was 130% higher in flyers than perchers while GMS LEAK was 108% higher in flyers. GMSP was 96% higher in flyers and GMSE was 77% higher in flyers compared to perchers. Using the respiratory control ratios of these values, we established the efficiency of flight muscle respiration in flyers and perchers. The 1-GM/GMSP ratio was 15% lower in flyers and the 1-GM/GMSE ratio was 18% lower in flyers. Ratios of 1-GMS/GMSP and 1-GMS/GMSE were both elevated in the perchers but not significantly different from flyers. Lastly, 1-GMSP/GMSE was no different between groups. Overall, our findings indicate flyers had elevated mitochondrial respiration compared to perchers. However, based on the respiratory control ratios using GM LEAK respiration, perchers were more efficient.] Address: Nelson, W., College of Life Sciences, Brigham Young University, Provo, UT, USA. Email: brad_nelson@byu.edu

24651. Nobili, E.; Gorfine, H.; Jakubaviciute, E.; Putys, Z.; Ložys, L. (2025): Diet composition of Twaite Shad, Alosa fallax (Lacépède, 1803), during the spawning migration to the Curonian Lagoon (Lithuania). Fishes 2025, 10, 256. https://doi.org/10.3390/fishes10060256: 14 pp. (in English) ["The nutritional needs of anadromous fish species must be met for successful annual spawning migration and reproduction. Despite its widespread distribution throughout Europe, little is known about the composition of the twaite shad, Alosa fallax, diet in freshwater ecosystems. To redress this, we studied the composition of stomach contents extracted from 287 A. fallax sampled during their spawning migration from the Baltic Sea to the Curonian Lagoon (Lithuania). We found that the diet comprised 32 types of prey, with Insecta (unknown Order), Chironomidae and Daphniidae being the most prevalent taxonomic categories consumed. Our analyses revealed significant differences in the abundance of prey categories (Chironomidae, Insecta — unknown order, and Mysidae) among several size groups of A. fallax, associated with stage of maturity inferred from body length. Despite this being a spawning aggregation, juveniles were also present among the A. fallax we collected. The results imply that feeding behavior and morphometry may be responsible for the differences observed, and further investigation of this topic is warranted." (Authors) The diet includes larvae and adult odonates.] Address: Putys, Z., State Scientific Research Institute Nature Research Centre, Akademijos St. 2, 08412 Vilnius, Lithuania. Email: zilvinas.putys@gamtc.lt

24652. Ohde, T.; Prokop, J. (2025): The transition to flying insects: lessons from evo-devo and fossils. Current Opinion in Insect Science 68, April 2025, 101332: 9 pp. (in English) ["Insects are the only arthropod group to achieve powered flight, which facilitated their explosive radiation on land. It remains a significant challenge to understand the evolutionary transition from non-flying (apterygote) to flying (pterygote) insects due to the large gap in the fossil record. Under such situation, ontogenic information has historically been used to compensate fossil evidence. Recent evo-devo studies support and refine a paleontologybased classical hypothesis that an ancestral exite incorporated into the body wall contributed to the origin of insect wings. The modern hypothesis locates an ancestral precoxa leg segment with an exite within the hexapod lateral tergum, reframing the long-standing debate on the insect wing origin. A current focus is on the contributions of the incorporated exite homolog and surrounding tissues, such as the pleuron and the medial bona fide tergum, to wing evolution. In parallel, recent analyses of Paleozoic fossils have confirmed thoracic and abdominal lateral body outgrowths as transitional wing precursors, and suggest their possible role as respiratory organs in aquatic or semiaquatic environments. These recent studies have revised our understanding of the transition to flying insects. This review highlights recent progress in both evo-devo and paleontology, and discusses future challenges, including the evolution of metamorphic development." (Authors) References to Odonata are made.] Address: Ohde, T., Dept of Appl. Biosciences, Graduate School of Agriculture, Kyoto Univ., Kitashirakawa Oiwakecho, Sakyo-ku, Kyoto 606-8502, Japan. Email: ohde.takahiro.4n@kyoto-u.ac.jp

24653. Olowo, U.C.; Egun, N.K.; Omoruwou, P.; James, E. (2025): Taxonomic structure of the benthic macroinvertebrate fauna from a tropical rainforest river in southern Nigeria. Journal of Limnology and Freshwater Fisheries Research 11(1): 66-77. (in English) ["The taxonomic structure of aquatic ecosystems in Nigeria is under threat from the over-exploitation of its natural resources and the discharge of pollutants into it. The impact of anthropogenic activities within the watershed of Owan River on the benthic macroinvertebrate community structure was investigated. A total of 513 individuals, comprising of of 11 species distributed in 9 families, 7 order and 2 phyla were recorded during the study. The distribution of benthic macro-invertebrate was in the order Station 1 > Station 2 > Station 3 000> Station 5 > Station 6 > Station 4, with species abundance highest in Station 1 (159) and lowest at Station 4 (28), while diversity was highest in stations 3 and 6. The observed phyla were Arthropoda (8 species) and Mollusca (3 species) from the orders Basommatophora, Caenogastropoda,

Decapoda, Diptera, Neotaenioglosa, Odonata and Trichoptera ..." (Authors) Odonata are identified as "Sympetrum sp.", and should be misidentified.] Address: Egun, N.K., TETFUND Centre of Excellence in Aquaculture & Food Technology, Univ. of Benin, Benin City, Nigeria. Email: kingsley.egun@uniben.edu

24654. Orr, A.G.; Burwell, C.J. (2025): A survey of ectoparasitic midges of the genus Forcipomyia Meigen (Diptera: Ceratopogonidae) on Australian Odonata. Australian Entomologist 52(1): 32-56. (in English) ["Ectoparasitic midges of the genus Forcipomyia, presumed subgenus Pterobosca, attached to the wings of Odonata are reported from Australia for the first time. Records are based on a survey of photographs of Odonata posted on iNaturalist, with over 100,000 observations representing 254 species being inspected, 81,034 of which were deemed valid replicates of good quality. A total of 590 individual odonates belonging to 72 species were recorded bearing 956 midges, representing a mean parasite load of 1.6. The data enabled the estimation of infestation rates on a taxonomic and geographical basis, as well as comparisons of parasite loads, and variation in attachment site on the wings of various Odonata species. The majority of infested individuals (75%) and nearly half the species belonged to Libellulidae found in palustrine habitats, and infestation rates were highest in the tropics. The midges were not identified to species but examination of midges on preserved odonate museum specimens indicate that at least two species of the subgenus Pterobosca are present, probably derived from the rich southeast Asian fauna." (Authors)] Address: Orr, A.G. Environmental Futures Centre & Griffith School of Environment, Griffith University, Nathan, Qld 4111, Adonata. Email: agorr@bigpond.com

24655. Pal, A. (2025): Rediscovery of Paragomphus lindgreni (Fraser, 1923) (Odonata: Gomphidae) from India, a century after its description. Notulae odonatologicae 10(5): 184-189. (in English) ["P. lindgreni was described in 1923 from Turzum, Darjeeling, West Bengal, India, based on O. Lindgren's collected specimen, and subsequently only reported from a single locality, in Nepal. The rediscovery of this species from the vicinity of the type locality is reported here, along with description, colour photographs, and diagnostic characters to distinguish it from sympatric Paragomphus. Probable reasons for the species' scarcity are discussed." (Authors)] Address: Pal, A., Kadamtala, Siliguri, Darjeeling, West Bengal – 734011, India. Email: aaratrikp05@gmail.com

24656. Pantiga-Tapia, A.; Rosas-Acevedo, J.L.; Guzmán-Martínez, M.; Solís-Navarrete, J.A.; Bedolla-Solano, R.; Anzaldúa-Soulé, K.R. (2025): Biological evaluation of water quality with the BMWP index in a section of the Tlapaneco River affected by two rural communities in the Guerrero Mountains, Mexico. Environments 2025, 12, 91. https://doi.org/10.3390/-environments12030091: 18 pp. (in English) ["Anthropic activities such as agriculture, livestock, and wastewater discharges affect water quality in the Tlapaneco River in the mountain region of the state of Guerrero, México, which is a tributary of the Balsas. The river flows from the mountain region and discharges into the Pacific Ocean; the water resource in the localities mentioned is used for agriculture, recreation, and domestic activities. The aim of this study was to evaluate water quality in the stretch of influence of two localities, Patlicha and Copanatoyac. The instrument used was the Biological Monitoring Working Party biotic index (BMWP) and physicochemical parameters. Nine sampling sites were selected according to the perception of the local community with respect to disturbance; the study area was divided into three parts: high, medium, and low. Twenty-seven collections of macroinvertebrates and water were analyzed, in dry and rainy seasons, through the presence–absence of these organisms and physicochemical analysis, to evaluate water quality. The results showed that the conditions of the riverbed associated with daily activities and domestic discharges are important factors in the composition of the families. Water quality was very poor to regular, according to the macroinvertebrate assemblages collected. The BMWP index was of acceptable quality when the orders (Family) Ephemeroptera (Leptohyphidae; Leptophlebiidae; Baetidae; Ephemerellidae), Diptera (Chironomidae; Simulidae), Trichoptera (Hydropsychidae), Hemiptera (Veliidae; Corixidae), Coleoptera (Hydrophylidae), and Odonata (Lestidae) were present; in sites with poor quality, the families Chironomidae, Leptophlebiidae, Veliidae, Corixidae, Hydropsychidae, Leptohyphidae, Hydrophilidae, Baetidae, and Simuliidae were found, while in very poor quality water, only family Corixidae was present." (Authors)] Address: Pantiga-Tapia, A., Centro de Ciencias de Desarrollo Regional, Univ. Autónoma de Guerrero, Privada de Laurel No. 13, Col. El Roble, Acapulco 39640, Mexico. Email: 07176737@uagro.mx

24657. Paunikar, S.D. (2025): Species composition and diversity of Odonata fauna in Gandhisagar Wildlife Sanctuary, Mandsaur and Neemach District of Madhya Pradesh, India. International Journal of Researches in Biosciences, Agriculture and Technology 8(1): 187-195. (in English) ["During the study period of 2022–2024 a total of 41 species of Odonata from 25 genera and eight families were recorded. Among these, 26 species and 17 genera were Anisoptera, and 15 and 8 genera were Zygoptera. ... The family Libellulidae had the maximum species richness 18 (43.90%), followed by Coenagrionidae 5 (12.19%)." (Author)] Address: Paunikar, S.D., Zoological Survey of India, Central Zone Regional Centre, Vijay Nagar, SBI, Square, Jabalpur-482 002, Madhya Pradesh, India. Email: sanjaypaunikar@gmail.com

24658. Pawar, M. (2025): Note on post-eclosion wing expansion anomaly in adult Bradinopyga geminata (Odonata: Libellulidae). Journal of Entomology and Zoology Studies 13(1): 51-52. (in English) ["In odonates, wing morphology plays a crucial role in their flight behavior, influencing aerial predation, reproduction, and dispersal. B. geminata, a species of dragonfly, was observed exhibiting a post-eclosion wing expansion anomaly, where one of the hindwings failed to expand fully. The observed individual, a female, was found perching on a stone wall in a residential area near open water tanks in Poynad, Alibag, Maharashtra, on 18th August 2023. The left hindwing of the dragonfly was noted to be shriveled with darkened, sclerotized veins, preventing full expansion. The length of the unexpanded wing was 9.7 mm, while the opposite hindwing measured within the normal range of 33-36

mm, as described by Fraser (1936). The occurrence of post-eclosion wing expansion anomalies is rare in odonates, though wing damage or failure to expand can severely affect their flight performance, predation abilities, and vulnerability to predators. Such anomalies are often caused by physical factors such as wind, rain, or competition for emergence sites. Damage to fully expanded wings is common in insects and can negatively impact fitness and locomotion. The study highlights the rarity of such post-eclosion anomalies in natural settings, although they can contribute to mortality and reduced ecological fitness in odonates. Further research is needed to understand the mechanisms behind these anomalies and their potential ecological consequences." (Author)] Address: Pawar, M., Dept of Zoology, K. J. Somaiya College of Science & Commerce, Vidyanagar, Vidyavihar, Mumbai, Maharashtra. India

24659. Pawlak, S. (2025): Records of dragonflies and damselflies (Odonata) in the vicinity of Wieruszów (Lódz Province) in 2021-2024. Odonatrix 217: 10 pp. (in Polish, with English summary) ["The publication presents new records on protected, endangered, rare and new as well as “southern” species of Odonata within Wieruszów District (Lódz Province, Central Poland) summarized from observations carried out in 2021-2024 at 20 sites. In total, 14 species were listed, including three under legal protection (Ophiogomphus cecilia, Leucorrhinia albifrons and L. pectoralis), three nationally and/or regionally endangered (Orthetrum coerulescens, L. dubia, L. albifrons), two species new for this district (Libellula fulva, L. albifrons). Additionally, new records on nine “southern” species were given, including species like Orthetrum brunneum and Sympetrum meridionale, which are still relatively uncommon in this region." (Author)] Address: Pawlak, S., ul. Konopnickiej 15, 98-400 Wieruszów, Poland. Email: slawieru@interia.pl

24660. Petrinec, B.; Bogdanovic, T.; Vukoja, A.; Miljanic, N.; Rašeta, D.; Ivanišic R.I.; Ilic, K.; Pavicic, I.; Marjanovic Cermak, A.M. (2025): Bioaccumulation of ^{137}Cs in Dragonflies (Odonata) In Virovitica-Podravina County. Proceedings of the 14th Symposium of the Croatian Society for Radiation Protection. Publisher: Zagreb: HDZZ-CRPA: 114-115. (in Croatian) [Verbatim: Odonata are considered to be good indicators of heavy metal presence in aquatic habitats, however they are rarely used as bioindicators of radionuclides in water. The aim of this study was to evaluate dragonflies as potential bioindicators of radionuclides by measuring 137Cs activity concentrations in dragonfly samples, as well as in river water samples. Dragonflies were sampled from 11 different locations inside the Mura-Drava-Danube Biosphere Reserve, in the area of Virovitica-Podravina County, from May to August 2022. Adult specimens were caught with an entomological net, whereas larvae were collected from their aquatic habitat using the "kick-sweep" method. A total of 20 liters of water were sampled in each location and evaporated to 1 L, after which the activity concentration of ^{137}Cs was measured in 1-liter Marinelli beakers. The activity concentrations of ^{137}Cs in collected animal samples were determined by gamma spectrometry method. The results show that the activity concentrations of ^{137}Cs in the river water were in the range from 4 to 13 Bq/m^3, whereas the activity concentrations of ^{137}Cs in dragonflies were significantly higher, ranging from 1.7 to 3 Bq/kg. These results have shown dragonfly ability to accumulate ^{137}Cs, and that dragonflies could be used as a potential bioindicator of ^{137}Cs in aquatic habitats.] Address: https://www.croris.hr/crosbi/publikacija/prilog-skup/880815

24661. Portocarrero Banda, A.A.; Arenazas Rodriguez, A.J.; Jiménez Pacheco, H.G. (2025): The microplastic exposure influence in aquatic macroinvertebrate diversity in Camana River basin. In: Vitor de Cinque Almeida · Katlin Ivon Barrios Eguiluz · Giancarlo Richard Salazar Banda · Taís Larissa da Silva · Hugo Guillermo Jiménez Pacheco (Editors): Research and Innovation in Renewable Energy and Environment. Proceedings for 1st International Congress on Research and Innovation in Renewable Energy and Environment. Springer: 131-144. (in English) ["Microplastic distribution and its several effects are some of the most challenging problems of humanity on these days and, due to the enormous plastic debris quantity in every ecosystem it’s imperative to find new solutions. On this research, it has been proved a method to isolate and identify microplastic in macroinvertebrate, besides, distribution of microplastics was determined for the first time in Camana river. The method consisted in sampling with surber nets of 500 µm, that is a usual method in macroinvertebrates sampling. Microplastic isolation was performed first by an organic matter digestion with peroxide at 35% for 7 days. The microplastics obtained were analyzed by a µFTIR obtaining the chemical structure and particles quantification by the OMNIC Picta software. It’s been found polyethylene, polyester, silicon polymer and silicon polymer into macroinvertebrates. To determine the sensitiveness of the macroinvertebrates was necessary to identify and apply the diversity indexes showing dominance in the sampling point 3 owing to the poor quality of water sampled, besides the indicator value showed Elmidae family as a potential environmental indicator of microplastic due to its sensitiveness of this pollutant. Finally, microplastic abundance was not relevant to macroinvertebrates diversity at this period and at this location, however it was possible for the first time to evidence the microplastic presence in macroinvertebrates in Camana river that was validated and revealed by infrared techniques." (Authors) Odonata (Coenagrionidae, Libellulidae) are very rare, each one specimens at sampling point 1.] Address: Portocarrero Banda, A.A., Universidad Nacional de San Agustín, Street Santa Catalina Nro. 117, Arequipa, 04000, Perú. Email: abdel.portocarrero@ucsm.edu.pe

24662. Prunier, F.; Ripoll, J.; Winter, P. (2025): A peri-urban population of Lestes macrostigma in Spain (Odonata: Lestidae). Notulae odonatologicae 10(5): 165-175. (in English) ["A small population of L. macrostigma was discovered on a peri-urban wetland in Andalusia (Spain). The study describes the ecological trajectory of the vegetation of the newly created habitat from 2008 to 2022 as well as the dragonfly community and the impact of incorrect management on L. macrostigma. The updated situation of the species in the province of Málaga highlights the importance of this new population. The Arraijanal canal is a case study for the conservation of threatened Odonata in the Mediterranean." (Authors)] Address: Prunier, F., Red de Observadores de Libélulas en Andalucía

(ROLA), C/ Toledillo, 14, 29490 Benarrabá, Spain. Email: aeaelbosqueanimado.info@gmail.com

24663. Quante, U.; Stumpner, A. (2025): Die falsche Braut – neue Beobachtungen zu Fehlverbindungen bei Libellen in Niedersachsen und Bremen (Odonata). Mitteilungen der AG Libellen in Niedersachsen und Bremen 7: 69-94. (in German) ["The wrong bride – new observations on anomalous connections in odonates in Lower Saxony and Bremen We report on the results of a survey of incorrect matings in dragonflies from Lower Saxony and Bremen over the last 20 years. 20 dragonfly observers reported 77 observations. These include 49 anomalous connections in Zygoptera and 28 in Anisoptera. Interspecific tandems were more often documented in Lestidae and Libellulidae than in other families. Interspecific copulation, on the other hand, occurred very rarely and was only detected in Sympecma and Sympetrum. There was no evidence of oviposition after interspecific copulation. Intraspecific male-male tandems were observed several times in Calopteryx splendens and twice in Leucorrhinia species. In addition, a relatively high number of connections, i.e. tridems and linkage of males with an existing mating wheel, were reported in Zygoptera. The potential causes of interspecific matings are discussed. Optical, ethological and mechanical isolation mechanisms do not always prevent erroneous tandem formation. Competition of males for females plays a significant role in causing anomalous connections, particularly, when there is a shortage of conspecific females. This explains also the frequent occurrence of mismatches at the end of the flight period in Lestidae and other odonates. The strikingly frequent wrong connections in Lestidae and Libellulidae are attributed to the fact that males apparently are unable to recognize conspecific females. Ethological, tactile and mechanical mechanisms largely prevent wheel formation and mating. Postcopulatory guarding is discussed as the cause of M-M tandems in the genus Leucorrhinia and possibly also Calopteryx. Multiple connections show efforts by males to break into existing mating wheels and find a sexual partner when there is a shortage of females." (Authors)] Address: Quante, U., Fischteichenweg 29, 21255 Dohren, Germany. Email: quante@aknaturschutz.de

24664. Roberts, N.S.; Svensson, E.I.; Liénard, M.A. (2025): Opsin gene expression plasticity and spectral sensitivity in male damselflies could mediate female colour morph detection. Proceedings of Royal Society B 292: 20242511. https://-doi.org/10.1098/rspb.2024.2511: 12 pp. (in English) ["The visual systems of Odonata are characterized by many opsin genes, which form the primary light-sensitive photopigments of the eye. Female-limited colour polymorphisms are also common in Odonata, with one morph typically exhibiting male-like (androchrome) coloration and one or two morphs exhibiting female-specific coloration (gynochromes). These colour polymorphisms are thought to be maintained by frequency-dependent sexual conflict, in which males form search images for certain morphs, causing disproportionate mating harassment. Here, we investigate opsin sensitivity and gene expression plasticity in mate-searching males of Ischnura elegans during adult maturation and across populations with different female morph frequencies. We find evidence for opsin-specific plasticity in relative and proportional opsin mRNA expression, suggesting changes in opsin regulation and visual sensitivity during sexual maturation. In particular, expression of the long-wavelength-sensitive opsin LWF2 changed over development and varied between populations with different female morph frequencies. UV-Vis analyses indicate that short- and long-wavelength opsins absorb wavelengths of light between 350 and 650 nm. Assuming opponency between photoreceptors with distinct short- and long-wavelength sensitivities, these sensitivities suggest male spectral visual discrimination ability of androchrome and gynochrome females. Overall, our results suggest that opsin sensitivity and expression changes contribute to visual tuning that could impact conspecific discrimination." (Authors)] Address: Liénard, Marjorie, Dept of Biology, Lund University, Lund, Sweden. Email: marjorie.lienard@biol.lu.se

24665. Rodrigues, T.H.; Hrenchuk, L.E.; Blanchfield, P.J. (2025): Spatially-explicit foraging by an apex predator linked to nearshore prey and their accessibility in lakes. Oikos 2025: e11066. doi: 10.1002/oik.11066: 17 pp. (in English) ["Habitat coupling – where mobile predators forage over broad spatial scales and, in doing so, link food webs from semi-discrete habitat patches – has emerged as a major structuring force in lake ecosystems. For the cold-water apex predator lake trout Salvelinus namaycush, food-web structure and morphometry-driven accessibility to nearshore areas in summer strongly determine the degree of littoral–pelagic habitat coupling across lakes. Much of the evidence for habitat coupling, however, is based on stable isotopes of carbon to estimate littoral energy acquisition, whereas spatial data directly linking fish movements and foraging behaviour in lakes – on which this theory is based – are limited. Here we estimated nearshore prey abundance at sites of different thermal accessibility and collected stomach content data, which we combined with three-dimensional acoustic telemetry positioning and acceleration data to directly measure the spatial location of summer foraging movements and habitat coupling by lake trout in lakes with and without an offshore prey fish. Both study lakes contained higher abundances of nearshore prey fish at the most thermally accessible (i.e. steep) sites monitored. Nearshore occupancy accounted for a small proportion of lake trout positions in both lakes (<5%), although prey fish were present in most (72%) diets sampled. High acceleration events indicative of foraging were concentrated in steep, thermally accessible nearshore areas in the lake where offshore forage fish were absent, but located further offshore in the lake with offshore prey fish. We directly demonstrate that habitat coupling by a wild, apex predator is driven by habitat and prey accessibility. ... Minnow traps set in the nearshore area (to a depth of 6.5 m) captured all known nearshore fish species in the lakes, as well as Northern crayfish Faxonius virilis, North American medicinal leeches Macrobdella decora, and immature odonates." (Authors) No further details on Odonata are given.] Address: Rodrigues, Tazi, Department of Biology, Queen's University, Kingston, ON, Canada. Email: 21ethr@queensu.ca

24666. Saksongmuang, V.; Michalko, R.; Petcharad, B.; Bumrungsri, S. (2025): Changes in community composition and

prey capture of web-building spiders during rice field development. Basic and Applied Ecology 79: 29-37. (in English) ["Understanding the effects of microhabitat changes on arthropod predator communities and their prey in agroecosystems is essential for field management and biocontrol. Few studies have investigated the trait composition of web-building spider communities in rice ecosystems. Here, we examined how temporal changes during the rice field development affect the abundance and traits of orb-web spiders, and how these effects consequently influence captured prey number and prey composition in irrigated rice ecosystems in southern Thailand. We used structural equation models to evaluate direct and indirect, spider-mediated effects of rice field development on captured prey numbers in each different guild. We found that the number of horizontal web-building spiders decreased during the rice field development, whereas there was no significant change in number of vertical webbuilding spiders. The number of captured detritivorous insects was positively related to the numbers of horizontal and vertical web-building spiders, while phytophagous insects and others were positively related only to the numbers of vertical web-building spiders. Moreover, the prey number captured by vertical web-building spiders seems to be indirectly increased through the decreasing number of horizontal web-building spiders in the late rice season. A fourth-corner analysis showed that spider species identity, spider traits (web type, web height and web diameter), vegetation height, and water level generally influenced the prey captured by webbuilding spiders. Horizontal web-building spider species with lower web placement during the flooding phase captured high numbers of detritus-feeding insects, while vertical web-building spider species with higher web placement captured high numbers of rice pests, predators and others. Our results suggest that the field development acted as an environmental factor that determined the species identity and traits of web-building spider communities. The findings of this study can help to predict the ecosystem services provided by the web-building spider community in rice ecosystems." (Authors) The study documents records of "Coenagrionidae" preyed by spiders.] Address: Bumrungsri, Sara, Division of Biological Science, Fac. of Science, Prince of Songkla Univ., Songkhla 90110, Thailand. Email: sara.b@psu.ac.th

24667. Sawant, D.; Joshi, S.; Pawar, U.; Nawge, V.; Kunte, K. (2025): Caliphaea sinuofurcata sp. nov. (Odonata: Zygoptera: Calopterygidae) from Arunachal Pradesh, India. Zootaxa 5637(1): 139-154. (in English) ["We describe a new species, Caliphaea sinuofurcata sp. nov., based on two male and one female specimens collected from Upper Siang District and Lower Dibang Valley District, Arunachal Pradesh, India. The newly described species can be distinguished from its congeners by characteristic shape of paraproct and genital ligula. Additionally, we provide illustrations of the male caudal appendages for all known Caliphaea spp. [C. sinuofurcata sp. nov., C. angka, C. confusa, C. consimilis, hermannkunzi, C. nitens, C. thailandica]" (Authors)] Address: Sawant, D., Grass Jewel Solutions and Shakambharee Clinic, Devgad, Sindhudurg, 416613 Maharashtra, India. Email: dattaprasad.101@gmail.com

24668. Scholz, A. (2025): Libellen bei Eis und Schnee. Naturgucker 76: 26-30. (in German) [Story in a popular magazine about the research of Bernd Kunz to study the genus Sympecma. (see also Scholz 2014)] Address: www.naturgucker.de

24669. Shanmugam, A.R.; Sohn, C.H.; Park, K.S. (2025): Aerodynamic characteristics of a tandem flapping wing in inclined stroke plane hovering with ground effect. Biomimetics 10(4), 212; https://doi.org/10.3390/biomimetics10040212: 31 pp. (in English) ["The present two-dimensional study investigates the ground effect on the aerodynamic characteristics of a tandem flapping wing in inclined stroke plane hovering using ANSYS Fluent. The role of various wing kinematics parameters (flapping frequency f, stroke amplitude Ao/c, and phase difference ψ = 0° and 180°), in combination with ground distance (D* = D/c), is studied. The results reveal that a large stroke amplitude Ao/c decreases vertical force generation for both in-phase and counter-stroking patterns. The vertical force notably increases for both in-phase and counter-stroking wings when D* is extremely small (D* = 0.5). A maximum vertical force enhancement of approximately 65% and 35% is observed for in-phase and counter-stroking patterns, respectively, at D* = 0.5. This enhancement is primarily attributed to the strengthening of detached vortices on the lower surface of the wings during the middle of the downstroke when flapping at extremely small ground distances. In addition, the wing–wing interaction and secondary rebound vortex, caused by wing–ground interaction, also play a key role in vertical force generation. The wing–ground interaction positively influences both vertical and thrust force generation for in-phase and counter-stroking wings at small ground distances. In general, the vertical and thrust forces generated by in-phase stroking wings are greater than those produced by counter-stroking wings." (Authors)] Address: Shanmugam, A.R., Department of Mechanical & Aerospace Engineering, United Arab Emirates University, Al Ain 15551, United Arab Emirates. Email: arunraj.v2009@gmail.com

24670. Sharma, S.; Dalal, J. (2025): Advances in aquatic forensic entomology: Promises, challenges and delivery. In: Dr. Amarjit S. Tanda (Ed): Advances in forensic entomology. Basic and applied aspects: 188-213. (in English) [The well-known application of forensic findings can be found in medico-legal investigations of human deaths. After death, many early changes occur inside the body, which leads to a pronounced shift in the structural and physical appearance of the body before the start of significantly noticeable decomposition changes. Forensic entomology is acknowledged as evidence in courts over the world and has been used in criminal investigations in North America for more than 15 years. Thus, forensic entomology consecutively becomes one of the most lucrative means for estimating the time since death, i.e., postmortem interval (PMI) on land and postmortem submergence interval (PMSI) in aquatic environments. The determination of (PMSI) is comparatively more complicated as there is a lack of experimental research in aqueous environments. Moreover, unlike terrestrial environments, the aquatic habitats have no exclusive entomofauna associated with carcasses but the most commonly associated insect orders are Ephemeroptera, Trichoptera,

Plecoptera, Diptera, Hemiptera, Odonata and Coleoptera. The succession of aquatic insects' species in the aquatic habitat, that can play a role in the determination of PMSI is not very well understood due to various influencing factors (i.e., temperature, humidity, presence or absence of clothing, physical conditions, types of environment, etc.) and general lack of knowledge about these insects. Consequently, it would be advisable to adopt an interdisciplinary approach, whereby a combination of aquatic entomofauna and body scoring methodologies may produce a better estimate of PMSI in the near future." (Authors)] Address: Sharma, Sapna, Department of Forensic Science, Maharshi Dayanand University, Rohtak, Haryana, India. Email: dreamshm@mdurohtak.ac.in

24671. Silva Farias, A.B.; Castro Ventura, I.M.; dos Santos, S.A.; Gonçalves, A.C.; Santos Silva, G.F.; Santos Costa, G.K.; Viana, G.M.; Bomfim Ribeiro, J.V.; Santiago Pereira, M.M.; Campos Gomes, T.; Santos, J.C. (2025): New record and updated distribution of Lestes tricolor (Odonata: Lestidae) in north-eastern Brazil. Notulae odonatologicae 10(5): 176-183. (in English) ["L. tricolor has been recorded in southern and south-eastern states of Brazil, as well as in Bahia in the north-east, and in Amazonas in the north. In this study, we expanded the knowledge of its distribution to Sergipe and reviewed its occurrence in other Brazilian states. The establishment of large populations of this species is uncertain owing to the low number of individuals collected. Therefore, we emphasize the importance of conservation efforts for the north-eastern remnants of the Atlantic Forest to ensure continuous monitoring of this species and its habitats." (Authors)] Address: Santos, J.C., Lab. de Ecologia e Biodiversidade, Depto de Ecologia, Universidade Federal de Sergipe, 49107-230, São Cristóvão, Sergipe, Brazil. Email: jcsantosbio@gmail.com

24672. Sin, S.; Meas, S.; Khin, C.; Uk, O.N.; Thi, S. (2025): Dietary habits of the wrinkle-lipped free-tailed bat Mops plicatus in Cambodia. Arxius de Miscel·lània Zooloògica 23: 77-85. (in English, with Spanish and Portuguese summary) ["Dietary habits of the wrinkle-lipped free-tailed bat Mops plicatus in Cambodia The role of bats in regulating pest insect populations in agricultural ecosystems has recently emerged as a topic of global interest to farmers and conservationists. However, the diet of bats in Cambodia remains largely unexplored. We analysed faecal pellets of Mops plicatus to understand the role of this bat species in suppressing agricultural pests. Faecal pellets were collected, during the late wet and early dry seasons, from La Ang Reach Trop and Phnom Preah Kuhear Luong in Battambang and Kampot Provinces, respectively. Seven insect orders and Acari were identified in the diet of M. plicatus individuals. This bat species mainly consumed Hemiptera (Delphacidae) with 76.78 ± 30.35% and Coleoptera with 13.02 ± 22.09% of its diet across all regions and seasons. The less frequent orders were Hemiptera (Cicadellidae), Lepidoptera, Diptera, Hymenoptera, Odonata, Siphonaptera, and Acari. We found a significant difference in the diet of M. plicatus between seasons, and between both areas. The results suggest that M. plicatus plays a significant role in the predation of Delphacidae, contributing to the pest regulation in rice paddy fields and increasing rice production. Prioritising the conservation and management of M. plicatus and its habitats is critical for maintaining its ecosystem services and economic value." (Authors)] Address: Sin, S., Centre for Biodiversity Conservation (CBC), Royal University of Phnom Penh, Cambodia. Email: sin.sopha.2020@rupp.edu.kh

24673. Somal, D.S.; Walia, G.K. (2025): Molecular characterization and genetic divergence among the species of families Aeshnidae and Macromiidae (Odonata: Anisoptera) based on mitochondrial COI gene. International Journal of Entomology Research 10(3): 132-138. (in English) ["DNA barcoding based on 23 COI sequences referable to 16 sequences of 10 species (Anaciaeschna jaspidea, Anax ephippiger, A. guttatus, A. immaculifrons, A. indicus, A. nigrofasciatus nigrolineatus, A. parthenope, Gynacantha bainbriggei, G. bayadera, G. subinterrupta) of family Aeshnidae and 7 sequences of 4 species (Epophthalmia vittata, Macromia ellisoni, M. flavicincta, M. moorei) of family Macromiidae have been done. Tramea carolina species of the family Libellulidae is considered as outgroup. Genetic divergence among the species of both the families based on variable, parsimony informative, conserved sites, nucleotide base composition of COI gene fragment and transversion/transistional bias have been calculated. COI gene sequences of three species A. immaculifrons, A. indicus and G. bainbriggei of family Aeshnidae and four species of E. vittata, M. ellisoni, M. flavicincta and M. moorei of family Macromiidae have been submitted for the first time to NCBI, while sequences of 5 species A. ephippiger, A. guttatus, A. nigrofasciatus nigrolineatus, A. parthenope and G. subinterrupta matched with corresponding sequences of the species of family Aeshnidae have been submitted for the first time from India." (Authors)] Address: Somal, D.S., Dept of Zoology & Environmental Sciences, Punjabi Univ., Patiala, Punjab, India

24674. Sousa, K.S.; Brito, J.S.; Cruz, G.M.; Bastos, R.C.; Mendoza-Penagos, C.C.; Silva, E.; Montag, L.; Oliveira-Junior, J.M.B.; Brejão, G.; Casatti, L.; Michelan, T.S.; Juen, L.; Dias-Silva, K. (2025): Odonata diversity and ecological thresholds in protected areas of the Brazilian Amazon. Neotropical Entomology 54(51): 14 pp. (in English) ["The establishment of conservation units (CUs) aims to preserve biodiversity, yet these areas are under great anthropogenic pressure, particularly from logging, mining, and cattle ranching. Considering this context, our study assesses the importance of the protected area (National Park) and habitat integrity using the Habitat Integrity Index (HII) for conserving Odonata assemblages. Our hypothesis is that (1) the sites within the national park would have higher HII scores and greater Zygoptera diversity metrics (species diversity, abundance, proportions, and composition) compared to the scores of the sites outside the park; and (2) considering the habitat integrity of the streams, Anisoptera and Zygoptera serve as indicators, with the former associated with lower scores and the latter with higher scores. We sampled 25 streams (both within and outside) of the Jamanxim National Park, identifying … 16 Anisoptera and 27 Zygoptera. Streams outside the national park harbored the highest number of exclusive Anisoptera and Zygoptera species. Linear models revealed a significant negative correlation between habitat integrity and Anisoptera abundance only. Moreover, significant

differences in Anisoptera abundance were observed between streams within and outside the national park, along with distinct heterogeneity in Anisoptera species composition. The decrease in Anisoptera abundance with increasing habitat integrity may be attributed to their preference for open areas for thermoregulation. Conversely, the positive response of Zygoptera species to habitat integrity underscores their reliance on more conserved environments, enhancing our understanding of their ecological requirements. These results reinforce the importance and efficiency of Odonata as a bioindicators of environmental quality and integrating the order into aquatic monitoring programs alongside the HII, provides a straightforward and objective measure of environmental disturbance." (Authors)] Address: Dias-Silva, Karina, Programa de Pós-Graduação em Ecologia, Belém, Pará, Brazil

24675. Stahlbauer, G. (2025): Beobachtungen zwischenartlicher Fehlgriffe von Kleinlibellen (Zygoptera) bei Bad Birnbach, Niederbayern. Mitteilungen der Zoologischen Gesellschaft Braunau 14(2): 105-109. (in German) [The paper documents several interspecific connections between (1) a ♂ Coenagrion puella with a ♀ C. scitulum, (2) a ♂ Calopteryx splendens with a ♀ Platycnemis pennipes, (3) a ♂ C. puella with a ♂ P. pennipes, and (4, 5) a ♂ C. puella with a ♂ P. pennipes.] Address: Email: georg.stahlbauer@t-online.de

24676. Suárez-Tovar, C.M.; Sandoval-Granillo, V.; Martínez-Castaneira, M.X.; Rivera-Duarte, J.D. (2025): Migratory mixed swarms of Miathyria marcella and Pantala flavescens in the Honduran Caribbean (Odonata: Libellulidae). Notulae odonatologicae 10(5): 161-164. (in English) ["While some odonate species migrations through Latin America have been documented, there is still a lack of knowledge of this phenomenon, especially in Central American countries. It is crucial to understand the complete migratory routes of these species and the specific times of year when these movements occur. In this short communication, we report the observation of migratory mixed swarms of M. marcella and P. flavescens at Laguna de Brus, Gracias a Dios, on the Caribbean coast of Honduras. We propose that our observation represents a stopover in a mixed north–south migration of these two species. This observation adds another point on the map within the route of these mixed swarms, helping to gradually piece together the puzzle of dragonfly migratory routes in the Americas." (Authors)] Address: Rivera-Duarte, J.D., Lab. de Hidrobiología, Depto de Ecología y Recursos Naturales, Escuela de Biología, Facultad de Ciencias, Univ. Nacional Autónoma de Honduras, Tegucigalpa, M.D.C., Francisco Morazán, Honduras. Email: jdr495@hotmail.com

24677. Sudarso, J.; Yoga, G.P.; Suryono, T.; Imroatushshoolikhah; Samir, O.; Ibrahim, A. (2025): Association of benthic macroinvertebrate organisms with plastic waste in small urban lakes. International Journal of Environmental Studies 82(2): 950-968. (in English) ["Most research on plastic waste has focused on lotic environments, with limited knowledge of still-water (lentic) ecosystems, especially small urban lakes. This study aimed to identify benthic macroinvertebrate communities associated with plastic waste and examine key factors regulating their structure. Conducted over 3 months in five small urban lakes, the research employed transects to collect benthic macroinvertebrates across 1 m² areas. A total of three sampling repetitions were performed at each site in inlet and outlet. The result showed that diversity based on the Shannon-Weiner index ranged from 0.3 to 3.07 bits, correlating with high plastic waste mass and organic matter enrichment. Plastic waste disrupted ideal habitats for collector-gatherers, although other benthic groups like scrapers persisted. Despite the adverse conditions, these species adapted and dominated the sediments of small urban lakes, heavily contaminated by plastic waste and organic matter. This research highlights the significant impact of plastic pollution on benthic macroinvertebrate diversity and community structure in urban lentic environments, emphasising the need for targeted conservation and pollution mitigation strategies." (Authors)] Address: Pratama Yoga, G.P., Research Centre for Limnology and Water Resources, National Research and Innovation Agency, Cibinong, Indonesia. Email: rgun002@brin.go.id

24678. Tanczuk, A.; Pielot, M. (2025): Wspomnienie o Marii Wiszniowskiej - Memory of Maria Wiszniowska. Odonatrix 21_4 (2025): 7 pp. (in Polish) [obituary; https://odonata.pl/odonatrix/odonatrix_pdf/Odonatrix_21_4.pdf] Address: Tanczuk, Agnieszka, Uniw. Marii Curie-Sklodowskiej, Instytut Nauk Biol., Katedra Zoologii i Ochrony Przyrody, ul. Akademicka 19, 20-033 Lublin, Poland. Email: atanczuk@gmail.com

24679. Tas-Divrik, M.; Çamur-Elipek, B.; Öterler, B.; Altynoluk-Mimiroglu, P. (2025): Investigation of benthic macroinvertable fauna and some environmental variables in Sýzýr Waterfall (Gemerek-Sivas). Aquatic Research 8(1): 12-25. (in English) ["In this study, the benthic macroinvertebrate fauna of Sýzýr Waterfall, which is located in Sivas Province (Türkiye) and has an important place in recreational activities, and some environmental variables (velocity speed, water temperature, pH, conductivity, dissolved oxygen, total hardness of water, Ca, Mg, Cl, salinity, total amount of dissolved matter, PO_4, SO_4, NO_2-N, NO_3-N contents) that may be effective in their distribution were investigated. Also, some elements (Li, B, Na, Al, K, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Se, Sr, Cd, Sb, Ba, Tl, Pb) and a total of 181 types of pesticides were investigated in the studied area. During the wet and dry seasons of 2022, samplings were made from a total of 3 stations: at the beginning of the waterfall (upstream), inside the waterfall (waterfall) and at the exit of the waterfall (downstream). While individuals belonging to Oligochaeta (Potamothrix sp.), Gastropoda (Physa sp.), Amphipoda (Gammarus pseudosyriacus), Ephemeroptera (Baetis sp.), Plecoptera, Trichoptera, Coleoptera, Diptera and Odonata [no details] were determined. Also the physicochemical analysis results were evaluated in terms of water quality. The physicochemical and biological data of the sampling stations were examined statistically, and based on the similarity obtained, the effects of environmental variables on the distribution of macroinvertebrates were evaluated. The relationship between physicochemical data was analyzed using Pearson Correlation Analysis." (Authors)] Address: Tas-Divrik, Meneske, Sivas Cumhuriyet University, Şarkışla Aşık Veysel Vocational School, Şarkışla, 58400, Sivas, Türkiye. E-mail: menekse.tas@cumhuriyet.edu.tr