

Odonatological Abstract Service

published by the INTERNATIONAL DRAGONFLY FUND (IDF)

Editor:

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Published in Zerf, Germany

ISSN 1438-0269

1997

22610. Jakab, T. (1997): Könyvismertetés: GIBBONS, R.B. 1986: Dragonflies and damselflies of Britain and Northern Europe. - The Hamlyn Publishing Group Limited, Twickenham, 144 pp. *Studia odonologica hungarica* 3: 83-84. (in Hungarian) [review] Address: Jakab, T., Kossuth Lajos Secondary Grammar School, Baross Gábor út 36, 5350 Tiszafüred, Hungary

22611. Litsinger, J.A.; Batrion, A.T.; Bumroongsri, V.; Morrill, W.L.; Santhoy, O. (1997): Natural enemies of the rice greenhorned caterpillar *Melantis leda ismene* (Lepidoptera: Satyridae) and rice skipper *Pelopidas mathias* (Lepidoptera: Hesperidae) in the Philippines. *Philipp. Ent.* 11(2): 151-181. (in English) ["The natural enemy complex of the two most common rice butterflies in the Philippines, namely, *M. leda ismene* and *P. mathias*, was described. More predators (83 species) were recorded than parasitoids (30 species) or pathogens (4 species). Of the predators, 59% preyed on both butterflies, whereas only 37% of the parasitoids shared hosts. Among the predators 52% attacked larvae, 28% the eggs, 19% adults, and 1% pupae. One-third of the parasitoid records were each larval and larval-pupal, 21% egg, and 13% pupal. From 1977-91, periodic collections in 12 locations representing three rice environments recorded parasitization rates averaging 12.2% vs 14.5% for egg and 11.0% vs 12.6% for larval-pupal stages of *M. leda ismene* and *P. mathias*, respectively. Monthly *P. mathias* egg and larval-pupal parasitization levels for 1988-89 were consistent between life stages but ranged from 10-80%. The impact of parasitoids was concluded to be insufficient alone to cause the observed low population densities of both butterflies. While the role of pathogens was judged minimal, greenhouse studies indicated predators had high potential and have been overlooked as regulatory agents of rice butterflies." (Authors) In Table 3, ten natural enemies of *P. mathias* and *M. leda ismene* recorded in the Philippines, 1977-91 are listed, including *Agriocnemis femina*, *Pseudagrion pilidorsum*, *Ischnura senegalensis*, *Orthethrum sabina*, and *O. testaceum*.] Address: Litsinger, J.A., Entomology & Plant Pathology Division, IRRI, P.O. Box 933, 1099 Manila, Philippines

1998

22612. Devai, G.; Müller, Z. (1998): Characterisation of natural endowments and evaluation of environmental quality in the active area of River Tisza between Tiszabercel and

Gávavencsello (NE-Hungary). *Studia odonologica hungarica* 4: 83-97. (in Hungarian, with English summary) ["This paper was made with the aim to satisfy that right and more and more widely accepted demand by which the ecological viewed odonatology and the modern biodiversity monitoring require equally the comprehensive evaluation of the natural endowments and the environmental quality conditions of the examined area. For the complete and authentic characterisation of the area first it needs to develop the starting state as accurately as it is possible. For this the authors - basing on the retraceable earlier documents (descriptions, maps, photos, manuscripts) - from the end of the 18th century recite the changes occurred in the face of the area, first of all the natural movements of the River Tisza and the changes of the bed connected with the river-control. Analysing the present situation take it as a starting point that it is definitely needed to give real and characteristic picture of those attributes for the ecologically viewed and based environmental qualification which determine the state of the given object and living organisms belonging to it for a longer period or at least for a vegetation period. Namely in these integrated variables more features of the wider and narrower surroundings (appearing as an exterior complex for living organisms) amalgamate in a special unit. The description of the today's state is made by the static attribute-groups worked well in the ecological water-qualification (cf. DÉVAI, GY. et al 1992, 1999), first of all on the basis of the following main features and properties: natural geographical attributes (landscape unit, landscape type, climate, relief and height relations, bedrock, soil, hydrological capacity), attributes of nature conservation and environment economy (conservation state, sensitivity to pollution, its position according to social utilisation, its state according to environment-technical inventions, the degree of degradation)." (Authors)] Address: Devai, G., Dept of Ecology, L. Kossuth University, P.O. Box 71, H-4010 Debrecen, Hungary

2001

22613. Dévai, G.; Miskolczi, M. (2001): Fundamental knowledge to the long term biodiversity monitoring on the basis of dragonfly (Odonata) fauna in the inundation area of River Tisza between Tiszabercel and Balsa (HNBM Programme, Pilot Project). *Studia odonologica Hungarica* 7: 13-37. (in Hungarian, with English summary) ["The aim of this paper is to summarise the results of odonotological collections and observations performed up to 31st December 1996 in the Pilot Project area of the Hungarian National Biodiversity Monitoring (HNBM) Programme located between the settlements

Tiszabercel and Balsa along the River Tisza. The collection, summation and evaluation of faunistical data found in 15 references were made in the frame of the Hungarian Odonatological Database. At the beginning of the paper the authors review the results of each reference related to this area and then they report and evaluate faunistical data in a summarised form according to specification of references, species and localities. On the basis of exactly known data summation of each evaluable (i.e. not repeated published) collection and observation they state that the 18 persons who took part in the fieldwork during surveys performed on 26 places and 42 days between April and November in a 37-year period (1961-1996)." (Authors) *Coenagrion pulchellum*, *Erythromma najas*, *E. viridulum*, *Anax ephippiger*, *Stylurus flavipes*, *Sympetrum depressiusculum*, *S. flaveolum*, *Leucorrhinia pectoralis*.] Address: Devai, G., Dept of Ecology, Kossuth L. Univ., 4010 Debrecen, P.O. Box 71, Hungary

22614. Müller, Z.; Jakab, T.; Szállassy, N. (2001): Faunistical data on dragonflies (Odonata) from the inundation area of River Tisza between Tiszabercel and Balsa. *Studia odonatologica Hungarica* 7: 39-58. (in Hungarian, with English summary) ["The paper presents faunistical data on dragonflies (larvae, exuvia and adults) collected and (adults) observed in the inundation area of River Tisza between Tiszabercel and Balsa, Hungaria. The fieldwork was carried out in water bodies and their skirts situated in the inundation (active and ancient floodplain) area of River Tisza along both sides between settlements Tiszabercel and Balsa. Collections and observations were made in two years (1998-1999), with the participation of 8 specialists on 38 days and 23 localities altogether. 22 of the localities are found in the EU 43 and 1 in the EU 53 cell of the UTM grid map." (Authors) *Coenagrion pulchellum*, *Erythromma najas*, *Lestes virens*, *Stylurus flavipes*, *Epitheca bimaculata*, *Brachytron pratense*, *Sympetrum meridionale*, *S. flaveolum*."] Address: Müller, Z., Dept of Ecology & Hydrobiology, Fac. Natural Sciences, Univ. of Debrecen, P.O. Box 71, 4010 Debrecen, Hungary

22615. Nagy, S.; Dévai, G.; Delaune, R.D.; Dévai, I.; Kis, B.; Grigorszky, I. (2001): Aqualex: sampling device for quantitative collection of macroscopic organisms in densely vegetated emergent and/or submerged aquatic environments. *Studia odonatologica Hungarica* 7: 5-11. (in Hungarian, with English summary) ["Studies of macroscopic organisms in emergent and/or submerged aquatic environments including numeration surveys, biodiversity assessments and productivity estimates etc., are often challenged by the fact that the water column and/or the surface of such environments are filled in and/or covered by dense mats of aquatic vegetation. The emergent and/or submerged vegetated aquatic environments are inhabited by a large diversity and abundance of macroscopic metaphytic organisms. A lack of a sampling methodology to collect various species of metaphytic organisms in such wetland or shallow water environment with equal efficiency, irrespective of size and taxonomy or behavior motivated us to develop a sampling device 'Aqualex' and associated collection procedure. Field testing of the method demonstrated that besides an unbiased sampling of the metaphytic community the procedure allows for the quantitative assessment of macrophyte biomass and the collection of metaphytic and/or benthic organisms for laboratory analysis." (Authors) Taxa - including Odonata - are treated at family level.] Address: Devai, G., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary

22616. Barrera Tomayo, C.A. (2004): Revision taxonomica de los odonatos de una region de pie de monte Llanero (San Martin-Meta). Universidad de Los Andes, Facultad de Ciencias, Departamento de Ciencias Biológicas, Bogota DC: 42 pp. (in Spanish) ["Conclusions. A total of 4 families, 9 genera, of which 5 belonged to the Libellulidae family, were identified. Three genera in the family Coenagrionidae and one genus in the family Lestidae. The Corduliidae family is yet to be registered and confirmed for Colombia. The vast majority of the identified specimens were males, with females only present in the genera *Erythemis* and *Ischnura*. This is perhaps due to the fact that in many cases sexual dimorphism occurs due to coloration, making the females more cryptic, and it is possible that territorial behaviors of the males added to the fact that some females do not approach the water except to mate and lay eggs. will contribute to this result. Taking live and preserved photographs showed that color loss is inevitable, so it would be recommended for future studies to take many live photos to allow more ideality in colors when identifying in the field. To take live photographs, it is recommended to capture the specimens and subject them to low temperatures for a few minutes and once the low temperature prevents them from flying, then take the photographs. The number of genera in each family is not a reference to their abundance in the field since some are simply more difficult to capture than others, as is the case with the Corduliidae family. The most relevant factor of this work was the proposal made to identify some genera even in the field with coloration patterns; It is important to highlight that it is a new method that we could boldly call one. new "visual key". (Author/Google translate)] Address: <https://repositorio.uniandes.edu.co/server/api/core/bitstreams/aba7d09b-6543-421b-9289-2b58e49aa5a7/content>

22617. Dévai, G.; Miskolczi, M.; Kátai, J.; Jakab, T.; Müller, Z. (2005): Fundamental knowledge on the dragonfly (Odonata) fauna of the active floodplain area Boroszló-kerti-hullámteröblözet. *Studia odonatologica Hungarica* 8: 29-44. (in Hungarian, with English summary) ["The paper presents faunistical results based on collections of larvae, larval skins, exuviae and adults in odonatological studies carried out in the active floodplain area of River Tisza, situated in the geographical microregion Bereg-Szatzmári-síkság (NE-Hungary) over the administrative area of the settlements Gulács and Panyola. Initially the authors take in the situation of preliminary odonatological research, present the methods employed in the collection of the specimens and in data processing, and introduce the literature they have considered in the identification of species and in reporting faunistic data. Thereafter they provide a detailed survey of the results from the area and finally summarize and evaluate the data on the dragonfly fauna. Collections were made in five years (1993, 1997-1998, 2004-2005), with the participation of 10 specialists on 29 days and 23 localities altogether, in 1 cell (FU 02) of the UTM grid map." (Authors) *Aeshna viridis*, *Epitheca bimaculata*, *Anax parthenope*, *Stylurus flavipes*, *Sympetrum flaveolum*, *S. meridionale*, *Leucorrhinia pectoralis*] Address: Jakab, T., Kossuth Lajos Secondary Grammar School, Baross Gábor út 36, H-5350 Tiszafüred, Hungary

22618. Egyed, M.; Krupinszki, L. (2005): Faunistical data on dragonflies (Odonata) from the shallow lake type reservoir Tisza-tó and its surrounding. *Studia odonatologica Hungarica* 8: 5-27. (in Hungarian, with English summary)

["The paper presents the faunistical results based on collections of larvae, exuviae and adults in odonatological studies carried out in the area of the shallow lake type reservoir Tisza-tó (Kiskörei-tározó) and its surrounding. Initially the authors present the methods employed in the collection of specimens and in data processing, and introduce the literature they have considered in the identification of species and in reporting faunistical data. Thereafter they provide a detailed survey of collection results from the area. Finally they summarize and evaluate the data on the dragonfly fauna. Collections were made in two years (1993–1994), with the participation of 3 specialists on 33 days and 82 localities altogether, in the seven cells (DT 65, DT 66, DT 76, DT 77, DT 78, DT 87, DT 88) of the UTM grid map." (Authors) The records include *Coenagrion scitulum*, *Aeshna viridis*, *Stylurus flavipes*, *Sympetrum depressiusculum*, *S. meridionale*, *S. pedemontanum*, *Leucorrhinia pectoralis*] Address: Egyed, Mónika, Tátra u. 12, H-4030 Debrecen, Hungary

22619. Jakab, T.; Müller, Z.; Dévai, G.; Miskolczi, M. (2005): Faunistical data on dragonflies (Odonata) from the shallow lake type reservoir Tisza-tó and its surrounding based on collections and observations of the years 2000–2004. *Studia odonologica Hungarica* 9: 33-55. (in Hungarian, with English summary) ["The paper presents faunistical data on dragonflies collected (larvae, exuviae and adults) and observed (adults) from the shallow lake type reservoir Tisza-tó and its surrounding (in- and outflows, leaking canals). Initially the authors present the methods employed in the field work and data processing and introduce the literature they have considered in the identification of species and in reporting faunistic data. Thereafter they provide a detailed survey of collection and observation results from the area. Finally they summarize and evaluate the data on the dragonfly fauna. Collections and observations were made in five years (2000–2004), with the participation of 3 specialists on 129 days and 38 localities in the seven cells (DT 67, DT76, DT77, DT78, DT87, DT88 and DT98) of the UTM grid map." (Authors) *Aeshna viridis*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Stylurus flavipes*, *Epithea bimaculata*, *Libellula fulva*, *Sympetrum meridionale*, *Leucorrhinia caudalis*, *L. pectoralis*] Address: Jakab, T., Kossuth Lajos Gimnázium, 5350 Tiszafüred, Baross Gábor út 36, Hungary

22620. Maezono, Y.; Kobayashi, R.; Kusahara, M.; Miyashita, T. (2005): Direct and indirect effects of exotic bass and bluegill on exotic and native organisms in farm ponds. *Ecological Applications* 15(2): 638-650. (in English) ["Exotic largemouth bass (*Micropterus salmoides*) and bluegill (*Lepomis macrochirus*) are thought to threaten native aquatic organisms worldwide, but few studies have demonstrated their community-wide impacts, including the interaction between these fish and other exotic organisms. We tested the hypothesis that bass and bluegill in Japanese farm ponds will reduce some native organisms (fish, shrimp, odonates) as well as exotic crayfish (*Procambarus clarkii*) via top-down effects, whereas other native organisms (chironomid larvae, oligochaetes, and macrophytes) will increase as a result of trophic cascades. To test this hypothesis, we conducted three types of field experiments. In the first experiment, we estimated predation pressure in ponds with and without bass and bluegills by using predator exclusion cages. This experiment revealed that predation on native odonates and exotic crayfish was greater in ponds with bass or bluegills, whereas predation on chironomids, oligochaetes, and macrophytes was lower in ponds with bass or bluegills. In the second experiment, we estimated the impact of bass and bluegills at the community level using four large mesocosms in a pond.

Bass or bluegill were introduced into two mesocosms (treatment), but were absent in the other two mesocosms (control). We found that bass reduced native fish, exotic fish, shrimp, odonates, and exotic crayfish, while chironomids, oligochaetes, and macrophytes increased; however, introducing bluegill reduced only shrimp and odonates. In the third experiment, we established small mesocosms with and without exotic crayfish. This experiment showed that crayfish were responsible for a reduction of macrophytes. All three field experiments supported our hypothesis for bass effects, but not for most of the bluegill effects. The results provide important implications for strategies to eradicate exotic fish; when exotic crayfish are present, bass removal is likely to reduce macrophytes that perform important functions in freshwater ecosystems. To conserve macrophytes we propose that reduction of exotic crayfish should be considered when eliminating bass." (Authors)] Address: Maezono, Y., Laboratory of Biodiversity Science, School of Agriculture and Life Sciences, University of Tokyo, Tokyo 113-8657, Japan. E-mail: zephyrus3@nifty.com

2006

22621. Gregoire, J.A.; Gregoire, S (2006): Removing dragonflies from mist nets. *North American Bird Bander* 31(1): 1-4. (in English) ["Increasing awareness and interest in Odonata has prompted a desire within the ornithological Community to contribute to a relatively young and unexplored Science. Bird banders are uniquely positioned to add to the discipline by monitoring and reporting odonates mist netted incidental to banding. Dragonfly anatomy poses challenges to the bander who wishes to maintain the structural integrity of the insect caught in a mist net. Safe extraction techniques and associated anatomy are presented." (Authors) Available at: <https://digitalcommons.usf.edu/nabb/vol31/iss1/1/> Address: GregoireJ.A., Kestrel Haven Avian Migration Observatory, 5373 Fitzgerald Road, Burdett, NY 14818-9626, USA. Email: khmo@att.net

2007

22622. Callejas, B.G. (2007): Los Odonata (Insecta) del Río San Pedro, Parque Nacional Laguna del Tigre (San Andrés, Petén): Taxonomía, Diversidad e Historia Natural. Tesis, Universidad de San Carlos de Guatemala, Facultad de Ciencias y Farmacia, Escuela de Biológica: 74 pp. (in Spanish) [Guatemala "The present study was carried out in the San Pedro River and its surroundings in the months of October to December 2004 and from January to August 2005. This is located on the southern limit of the Laguna del Tigre National Park (PNLT), San Andres, Peten. The PNLT is one of the freshwater wetlands of global importance and the largest protected freshwater wetland in Central America, recognized in the RAMSAR convention. The main objective was to prepare a taxonomic study of the insects of the Order Odonata (dragonflies and devil's needles) present in the San Pedro River and surrounding areas, which will include a diagnosis and comments on natural history and biology for each species. In the same way, it was intended to evaluate that the richness of this group of insects is much greater than that established in previous studies. For the present study, 3 trails adjacent to the San Pedro River were traveled. Each trail was traveled 7-8 hours a day, once a month; for 11 months. Within these, and with the help of an entomological net 12 inches in diameter, all the odonates that could be found were captured. Five sampling points were also established on the banks of the river and other tributaries close to it, collecting at each point

7-8 hours a day, 5 times (1 point per day) each month. 47 species representing 7 families of the order Odonata (4 from the suborder Zygoptera and 3 from the suborder Anisoptera) were reported. An annotated list was prepared which includes a diagnosis of each species as well as natural history notes. In the same way, a dichotomous key was created to identify the species found in said area. This confirms that there is greater richness than that previously established in the study of the Rapid Biological Assessment Program - RAP carried out in 1999 at the PNL (Herrera et al., 2000), where they reported only 7 species. The richness and abundance of the odonate community assembly in the study area is similar to that reported in other sites studied in the Yucatan Peninsula, Belize and Tikal. The odonates found in this area represent a very important component within the total wealth of this group found in the country, so it is of great importance to carry out taxonomic and ecological studies on them, thus covering most of the Reserve. of the Mayan Biosphere (RBM)." (Author/Google translate)] Address: http://biblioteca.usac.edu.gt/tesis/06/06_2544.pdf

22623. Gregoire, J.; Gregoire, S. (2007): Atlantic Flyway Review: Spring 2006: Kestrel Haven 422-0764. Avian Migration Observatory, Burdett, Schuyler County, NY. North American Bird Bander 32(1), Article 15.: 34-35. (in English) ["We continued our dragonfly studies and netted an early *Cordulegaster obliqua* as well as a *Libellula lydia*. We documented a mass emergence of *Celithemis elisa* from a single pond, with numbers exceeding 10,000 as of this writing." (Authors)] Address: Gregoire, Sue. Email: khmo@att.net

2008

22624. Hill, C.E.; Hill, A.B. (2008): Didymops and *Macromia* go walkabout: Long distance crawls by odonate larvae to emergence sites. *Argia* 20(3): 16-17. (in English) ["On 14 June 2008, we discovered a fresh-appearing exuvia of *Didymops transversa* under the eaves of a summer house by Long Lake, Traverse City, Michigan (44.742° N, 85.753° W). The emergence site was 50.3 m (165 ft) from the lake edge and 2.7 m above the ground. [...] In June and July 2008 we found over 100 exuviae and emerging adults of those two species. Larvae presumably emerge more often on natural Vegetation than on man-made structures, but we found only three *M. illinoensis* (and no *Didymops*) emergence sites on trees: one 18.3 m from the lake and 4.0 m up, another 34.4 m in and 0.8 m up, a third 36.6 m in and 5.1 m up. Exuviae were so much more conspicuous on structures that most of the exuviae we found were on sheds and houses. We found exuviae commonly at bath/boathouses 2-8 m from the lake edge and 2-3 m above the ground. Farther back, on a house that ranged from 17.8 m from the lake (at the closest Corner) to 29 m (at the far corners), emerging adults could be seen on most days, and on 29 June we counted 39 accumulated exuviae on that house, between 1 and 4 m above the ground (and between 4.4 and 7.4 m above the lake, since that house is up a steep bank from the water). We found a few exuviae on another house about 10 m from the lake, but up a steeply sloping 8 m bank, so 10 m above the water. The longest distance traveled by a *D. transversa* is listed at the top of this note. For *M. illinoensis*, the "record" was 46.3 m from the lake and 2.8 m up. Those two trips were the only two exuviae we observed on that particular structure—larvae seem to travel that far only occasionally. All the figures above except the three tree sites were influenced, of course, by the availability and location of the structures."] Address: Hill, Amy, 1003 Wake Forest Rd., Conway, SC 29526, USA. Email: chill@coastal.edu

22625. Plambeck, G. (2008): Untersuchung des eulitoral-en Makrozoobenthos an zehn Seen in Schleswig-Holstein. Endbericht. Auftraggeber: Landesamt für Natur und Umwelt des Landes Schleswig-Holstein: 24 pp, app. (in German) [https://umweltanwendungen.schleswig-holstein.de/Seen/-Berichte_Gutachten/Makrozoobenthos/MZB_Seen_SH__08.pdf] Address: Leibniz-Institut für Gewässerökologie und Binnenfischerei im Forschungsverbund Berlin e. V., Abt. Limnologie von Flusseen, Müggelseedamm 301, 12587 Berlin, Germany

22626. Stoll, C.; Weißmann, K. (2008): Erfolgskontrolle „Libellengräben im Donauried“. Auftraggeber: Donautal-Aktiv e.V., Hauptstr. 16, 89431 Bächlingen. Auftragnehmer: Dipl. -Biol. Carolin Stoll, Am Bächle 6, 89426 Wittislingen: 23 pp. (in German) [Bavaria, Germany "The natural area-specific ditches of the Donauried in the Dillingen/Donau district are of national and international importance due to their species- and individual-rich dragonfly communities. Along with the Bavarian Danube moss, the Donauried population of the azure damselfly is one of the most populated populations in Bavaria, with the Bavarian populations forming the main occurrence in Germany. *Coenagrion ornatum* and *C. mercuriale*, both RL By 1, FFH Guideline Annex II are threatened with extinction in Bavaria and nationwide. In addition, the ditch system in the Donauried is very important for numerous other dragonfly species, including the Red List species *Orthetrum coerulescens* (RL By 2) and *O. brunneum* (RL By 3). In 2008, 17 different species of dragonflies and damselflies were identified. The dragonfly species in this habitat are seriously endangered due to unsuitable ditch maintenance measures. Traditionally, the ditches were mowed by hand with a scythe. Since this maintenance method is no longer feasible for personnel and financial reasons, as part of the Donauried Habitat initiative (implementation of the Donauried overall ecological report) and in cooperation with the affected communities, ditch mowing is carried out using knife bars and belt rakes as well as time adjustments to the biology of birds and birds Helmet Azure Maiden performed. In order to check the success of the measures implemented, the current population of the dragonfly community was recorded through monitoring and compared with the results of previous mapping. Starting from the 1990s, the population reached a minimum in 2001. This decline in numbers could be explained by the massive ditch clearances in 1999/2000 and 2000/2001. From 2004 onwards, there seems to be signs of a slight regeneration of the stocks thanks to gentle ditch maintenance with cutter bars and mowing baskets." (Author/Google translate) https://www.die-natur-ge-winnt-immer.de/fileadmin/_migrated/content_uploads/Libellengraeben_im_Donauried_01.pdf] Address: Stoll, Carolin, Am Bächle 6, 89426 Wittislingen, Germany. Email: carolin.stoll@freenet.de

2009

22627. Bankuti, K. (2009): Data on the dragonfly (Odonata) fauna of Hungary according to my scatter-collections by December 31, 1987. *Studia odonatologica Hungarica* 10: 5-10. (in Hungarian, with English summary) ["This is the 6th paper of a series directed at communicating faunistic data of Hungary which had been unpublished until December 31, 1987 (cf. DÉVAI, GY. et al. 1993). The author presents 61 faunistic data of his own scattercollections and one specimen captured and transferred by his student. The dragonfly series, collected by 2 experts, is from 13 localities throughout the country, but mostly from the sampling sites of the western part of the North-Hungarian Mountains (mountain

Börzsöny, basin Nógrádi-medence, valley Ipoly-völgy). The localities are situated in 7 cells according to the 10×10 km UTM grid map. Collections were made on 12 days between 1985 and 1987. " (Authors) *Coenagrion pulchellum*, *Erythromma viridulum*, *Sympetma fusca*, *Sympetrum flaveolum*, *S. meridionale*, *S. vulgatum*.] Address: Bánkúti, K., József Attila u. 4, H-2651 Rétság, Hungary

22628. Devai, G.; Miskolczi, M. (2009): Odonatological results of the hydroecological state estimation at the main canal Lónyay-focsatorna in 2003. *Studia odonologica Hungarica* 10: 21-38. (in Hungarian, with English summary) ["The paper presents faunistical data on dragonflies collected (exuviae and adults) and observed (adults) by 31 reaches of main canal Lónyay-focsatorna and its watercourse system, situated in the area of the northern part of the geographical mesoregion Nyírség (NE-Hungary). Firstly the authors present the methods employed in the collection and observation of the specimens and in data processing, and introduce the literature they have considered in the identification of species and in reporting faunistic data. Thereafter they provide a detailed survey of the results from the watercourse reaches and finally summarize and evaluate the data on the dragonfly fauna. Collections and observations were made in one year (2003), with the participation of 2 specialists on 5 days and 31 localities altogether, in 18 cells (ET 58, ET 59, ET 79, EU 41, EU 42, EU 43, EU 50, EU 51, EU 52, EU 60, EU 61, EU 62, EU 71, EU 72, EU 73, EU 80, EU 81, EU 82) of the 10×10 km UTM grid map." (Authors) *Somatochlora flavomaculata*, *Sympetrum meridionale*, *Libellula fulva*] Address: Devai, G., Dept of Hydrobiology, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

22629. Devai, G.; Miskolczi, M.; Jakab, T. (2009): Results of the odonatological surveys in the landscape Bodroghöz in 2006. *Studia odonologica Hungarica* 10: 91-114. (in Hungarian, with English summary) ["The paper presents faunistical data on dragonflies collected (larvae, exuviae and adults) and observed (adults) at 76 water bodies of the landscape Bodroghöz (one of the geographical microregions inside the mesoregion Felso-Tisza-vidék, NE-Hungary). Firstly the authors present the methods employed in the collection and observation of the specimens and in data processing, and introduce the literature considered in the identification of species and in reporting faunistic data. Thereafter they provide a detailed survey of the faunistical results from the water bodies and finally summarize and evaluate the data on the dragonfly fauna. Collections and observations were made in one year (2006), with the participation of 3 specialists on 19 days and 76 localities altogether, in 11 cells (EU 23, EU 33, EU 34, EU 43, EU 44, EU 45, EU 54, EU 55, EU 65, EU 74, EU 75) of the 10×10 km UTM grid map." (Authors) *Stylurus flavipes*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Epithea bimaculata*, *Sympetrum flaveolum*, *S. meridionale*, *Leucorrhinia caudalis*, *L. pectoralis*] Address: Devai, G., Dept Hydrobiology, Fac. Science & Technology, Univ. Debrecen, Egyetem tér 1, 4032 Debrecen, Hungary

22630. Devai, G.; Miskolczi, M.; Wittner, I. (2009): Odonatological results of the state estimation on the backwaters of the Upper-Tisza-Region (NE-Hungary) in 2003. *Studia odonologica Hungarica* 10: 57-70. (in Hungarian, with English summary) ["The paper presents faunistical results of dragonflies based on observations of adults in the state estimation studies carried out in 78 backwaters of the geographical region Felso-Tisza-vidék (NE-Hungary), situated in the active and ancient floodplain area of both sides of the Hungarian

river reaches of Upper-Tisza between the settlements Tarpa and Cigánd (on the right riverside) furthermore Tiszabecs and Dombrád (on the left riverside).“ (Authors) *Anax parthenope*, *Libellula fulva*, *Sympetrum meridionale*] Address: Devai, G., Department of Hydrobiology, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

22631. Devai, G.; Miskolczi, M.; Jakab, T.; Csépes, E.; Mádi, P.P.; Mátyus, B.I.; Schmidt, A. (2009): Faunistical data on dragonflies (Odonata) along the River Tisza. *Studia odonologica Hungarica* 10: 39-55. (in Hungarian, with English summary) ["The paper presents faunistical data on dragonflies collected (larvae, exuviae and adults) and observed (adults) along the River Tisza. The collections and observations were made in characteristic reaches of the river [Upper-Tisza between Tiszabecs and Dombrád, the bed dammed water bodies by two barrages (Tiszalöki-vízlépcső and Kiskörei-vízlépcső) between Dombrád and Kisköre, Middle-Tisza between Kisköre and Tiszaföldvár, Lower-Tisza between Tiszaföldvár and Tizzasziget], inclusive of the active floodplain area in the immediate neighbourhood." (Authors) *Gomphus vulgatissimus*, *Stylurus flavipes*, *Ophiogomphus cecilia*, *Onychogomphus forcipatus*, *Epithea bimaculata*, *Sympetrum flaveolum*, *S. vulgatum*] Address: Devai, G., Dept of Hydrobiology, Faculty of Science & Technology, Univ. Debrecen, Egyetem tér 1, 4032 Debrecen, Hungary

22632. Devai, G.; Miskolczi, M.; Jakab, T.; Wittner, I. (2009): Faunistical data on dragonflies (Odonata) from 11 backwaters of the Upper-Tisza-Region (NE-Hungary). *Studia odonologica Hungarica* 10: 71-89. (in Hungarian, with English summary) ["The paper presents faunistical data on dragonflies collected (larvae, exuviae and adults) and observed (adults) at 11 backwaters of River Tisza, situated in the active and ancient floodplain area of the geographical region Felso-Tiszavidék (NE-Hungary). " (Authors) *Coenagrion pulchellum*, *Anax parthenope*, *Epithea bimaculata*, *Sympetrum meridionale*, *Libellula fulva*, *Sympetrum flaveolum*, *Crocothemis erythraea*] Address: Devai, G., Dept of Hydrobiology, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

22633. Hiroshi, J.; Ueda, T.; Goka, K.; Hidaka, K.; Matsura, T. (2009): Effects of Imidacloprid and Fipronil insecticide application on the larvae and adults of *Sympetrum frequens* (Libellulidae: Odonata). *Proceedings of the Society of Agricultural and Rural Engineering* [Trans. of JSIDRE] 259: 35-41. (in Japanese, with English summary) ["The insecticides fipronil and imidacloprid are effectively used against sucking insect pests of rice. Since these agents are absorbed by rice seedlings and stored in their tissues, they are usually applied to nursery boxes before planting. The effects of imidacloprid and fipronil on the life history of *Sympetrum frequens* larvae and adults were monitored using an experimental micro-paddy lysimeter (350mm×500mm>300mm (H)) for the duration of the cultivation period. Three lysimeters were treated with imidacloprid, three with fipronil, and the remaining three were left untreated and were used as controls. Three hundred eggs were laid on the soil surface of each of the nine lysimeters and the larval populations, larval development, and emergence patterns of *Sympetrum frequens* were observed in each lysimeter. The absence of *Sympetrum frequens* larvae from fipronil-treated-lysimeters was most remarkable and exuviae were not observed. Imidacloprid-treated-lysimeters had approximately 60% of the larvae observed in control lysimeters. In addition, larvae in the imidacloprid lysimeter had lower mean specific growth

rates and the length of adult wings was decreased relative to those observed in the control lysimeter. Emergence in imidacloprid lysimeters was also significantly lower than it was in the control. The application of fipronil and imidacloprid to seedling in the nursery box, and the subsequent transplanting of these into an experimental lysimeter, was associated with a decrease in the abundance of *Sympetrum frequens* larvae and adults." (Authors)] Address: Hiroshi, J., Miyagi Univ., 2-2-1 Hatatate, Sendai, Miyagi 982-0215, Japan

22634. Vass, I. (2009): A new occurrence of *Hemianax ephippiger* (BURMEISTER, 1839) in Hungary. *Studia odonatologica Hungarica* 10: 115-119. (in Hungarian, with English summary) ["A considerable swarming of *Hemianax ephippiger* was observed on the south-facing slopes of a hill called Kopasz, next to Tokaj (NE-Hungary), in mid September 1986. Because of the great number of individuals and the quality of material collected (they were newly emerged, 1-2-day-old specimens), one may come to the conclusion that their breeding-site is close to the hill. It can probably be found on the marshlands of the geographical regions Taktaköz and/or Bodrogeköz. Investigations directed to collect larvae and exuviae will be continued." (Author)] Address: Vass, I., Bozót u.15, H-4481 Nyíregyháza, Hungary

22635. Vass, I.; Szilágyi, G. (2009): *Hemianax ephippiger* (BURMEISTER, 1839) in Hungary. *Studia odonatologica Hungarica* 10: 121-130. (in Hungarian, with English summary) ["*Anax ephippiger* reappeared in Hungary in great numbers. On the basis of the new collections and observation given in this paper the species is thought to reproduce in Hungary both with short and long type of larval development." (Authors)] Address: Vass, I., Bozót u.15, H-4481 Nyíregyháza, Hungary

2010

22636. Dévai, G.; Miskolczi, M. (2010): Data on the dragonfly (Odonata) fauna of two South-West-Hungarian mountain areas (Mecsek-vidék and Villányi-hegyvidék). *Studia odonatologica Hungarica* 11: 77-83. (in Hungarian, with English summary) ["This is the 14th paper of a series directed at communicating faunistic data of Hungary which had been unpublished until December 31, 1987 (cf. DÉVAI et al. 1993). The authors present faunistic data from 20 localities in 7 10×10 km UTM grid map cells (BR 98; BS 71, 80, 81, 92; CS 02; YM 30) of two geographical mesoregions (mountains Mecsek-vidék and Villányi-hegyvidék) in SW-Hungary. Collections were made between 1971–1985, with the participation of 4 specialists on 6 years and 17 days." (Authors) *Coenagrion ornatum*, *Epithea bimaculata*] Address: Devai, G., Dept of Hydrobiology, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

22637. Dévai, G.; Miskolczi, M. (2010): Data on the dragonfly (Odonata) fauna of the shallow lake Balaton and its surroundings. *Studia odonatologica Hungarica* 11: 85-92. (in Hungarian, with English summary) ["This is the 15th paper of a series directed at communicating faunistic data of Hungary which had been unpublished until December 31, 1987 (cf. DÉVAI et al. 1993). The authors present faunistic data from 22 sampling sites in 11 10×10 km UTM grid map cells (XM 08, 18, 19, 29, 39, 49, 66, 77, 78, 88, 98) of two geographical mesoregions (Balaton-medence and Zalai-dombvidék) in the catchment area of the shallow lake Balaton. Collections were made in 6 years between 1976 and 1987 on 27 days, with the participation of 7 known specialists

and unidentified persons." (Authors) *Aeshna viridis*, *Somatochlora flavomaculata*, *Libellula fulva*, *Leucorrhinia pectoralis*] Address: Devai, G., Dept of Hydrobiology, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

22638. Dévai, G.; Miskolczi, M. (2010): Data on the dragonfly (Odonata) fauna of a South-West-Hungarian hilly region (Zselic). *Studia odonatologica Hungarica* 11: 69-76. (in Hungarian, with English summary) ["This is the 13th paper of a series directed at communicating faunistic data of Hungary which had been unpublished until December 31, 1987 (cf. DÉVAI et al. 1993). The authors present faunistic data from 17 localities in 9 10×10 km UTM grid map cells (YM 01, 02, 03, 10, 11, 12, 13, 21, 22) of a geographical microregion (Zselic) in the SW-Hungarian hilly area. Collections were made between 1976–1987, with the participation of 5 specialists on 4 years and 8 days." (Authors) *Coenagrion ornatum*, *C. pulchellum*, *Erythromma najas*, *E. viridulum*] Address: Devai, G., Dept of Hydrobiology, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

22639. Dévai, G.; Miskolczi, M. (2010): Data on the dragonfly (Odonata) fauna of a South-West-Hungarian flatland region (Drávamelléki-síkság). *Studia odonatologica Hungarica* 11: 61-68. (in Hungarian, with English summary) ["This is the 12th paper of a series directed at communicating faunistic data of Hungary which had been unpublished until December 31, 1987 (cf. DÉVAI et al. 1993). The authors present faunistic data from 18 sampling sites in 11 10×10 km UTM grid map cells (BR 68, 77, 78; YL 08, 18, 28, 29, 38; YM 00, 10, 20) of a geographical mesoregion (Drávamelléki-síkság) in the SW-Hungarian flatland area. Collections were made in 5 years between 1972 and 1984 on 17 days, with the participation of 3 specialists." (Authors) *Coenagrion ornatum*, *C. pulchellum*] Address: Devai, G., Dept of Hydrobiology, Fac. Science & Technology, Univ. of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

22640. Dévai, G.; Miskolczi, M. (2010): Results of the dragonfly (Odonata) collection carried out in the Juniper Woodland Landscape Protection District of Barcs (SW-Hungary) in 1987. *Studia odonatologica Hungarica* 11: 53-59. (in Hungarian, with English summary) ["This is the 11th paper of a series directed at communicating faunistic data of Hungary which had been unpublished until December 31, 1987 (cf. DÉVAI et al. 1993). The authors present faunistic data from 11 localities in 1 10×10 km UTM grid map cell (XL 99) of a geographical microregion-group (KeletBels-Somogy) in the SW-Hungarian hilly area. The sampling sites are located in the area of the Juniper Woodland Landscape Protection District near Barcs. Collections were made in 1987 on 6 days, with the participation of 4 specialists." (Authors) *Coenagrion scitulum*, *Sympetrum meridionale*, *Somatochlora flavomaculata*] Address: Devai, G., Dept of Hydrobiology, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

22641. Lajter, I.; Móra, A.; Grigorszky, I.; Nagy, A.S.; Dévai, G. (2010): Characterization of the Hungarian section of River Tisza and its major tributaries near their confluences to the mainstream on the basis of aquatic macroinvertebrate communities. *Studia odonatologica Hungarica* Suppl. 1 2010: 9-122. (in Hungarian, with English summary) ["On two occasions (in summer and autumn 2004 by low discharge) qualitative samples were taken from 25 sampling sites of the Hungarian section of River Tisza (16 sites) and its major tributaries

near their confluences to the mainstream (9 sites). The „kicking and sweeping” technique was used for sampling. In addition specimens were collected by manual singling from surface of submerged stones, plants, roots, pieces of woods. Samples were taken from all habitats of the river reach to collect as many species as possible. The Oligochaeta, Hirudinea and some Diptera (Limoniidae, Culicidae, Dixidae, Ceratopogonidae, Simuliidae, Stratiomyidae) were identified to family level. The Mollusca, Crustacea, Ephemeroptera, Odonata, Heteroptera, Coleoptera, Trichoptera and Diptera: Chironomidae were identified to species level and taken into consideration for characterization of sampling sites. The baseline of the evaluative work based on an ecological water body typology. Within the division „rivers” three classes have been defined on the basis of three major features (length, surface of catchment area, mean discharge): little, medial and grand river. The investigated river reaches were characterized by the composition of their aquatic macroinvertebrate fauna, and the longitudinal distribution, functional feeding guilds and saprobic indices of the collected species. The indices were calculated by three ways: on the basis of all taxa, only the non-chironomid taxa and only the chironomids. These characters are also illustrated with column diagrams and pie charts, in the cases of all sampling sites and in the cases of the hydroecologically representative four sections of the River Tisza [Upper-Tisza (Tiszabecs–Dombrád), Dammed-Tisza (reaches with retained water above barrages between Dombrád–Tiszalök and Tiszalök–Kisköre), Middle-Tisza (Kisköre–Csongrád), Lower-Tisza (Csongrád–Tiszasziget)] and the main tributaries (Túr, Szamos, Kraszna, Lónyay-főcsatorna, Hármaskörös, Maros, Bodrog, Sajó, Zagyva)] as well. Based on the species composition and the calculated indices there were significant differences between the individual sampling sites, but a pronounced tendency was detectable according to the main sections of the River Tisza. In the case both the River Tisza and its major tributaries the same status was shown by the indices calculated on the basis of all taxa and nonchironomid taxa, but based on chironomids these indices showed a different state. It suggests that the species level identification of chironomids will be necessary for the representative assessment of the ecological state of water bodies.” (Authors) <https://epa.oszk.hu/02900/02988/00018/pdf/> Address: Devai, G., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary

2011

22642. Goergen, G.; Dupont, P.; Neuenschwander, P.; Tchibozo, S.; Le Gall, P. (2011): 7 Insectes/Insects. In: Neuenschwander, P., Sinsin, B. & Goergen, G. (eds). 2011. Protection de la Nature en Afrique de l'Ouest: Une Liste Rouge pour le Bénin. Nature Conservation in West Africa: Red List for Benin. International Institute of Tropical Agriculture, Ibadan, Nigeria. 365 pages: 67-93. (in French, partly English) [“*Ceriatrigon citrinum*: “This dragonfly was recently discovered in the inundated Lokoli forest and is otherwise known only from an old specimen from Lagos in the British Museum. It might well be a Dahomey Gap endemic. Further populations of this species should be searched for.” *Lestonogomphus minutus*: “Outside the type locality in Nigeria, only one specimen of this species has been captured on the edge of the Sota River in the north of Benin, a habitat that is threatened by over-fishing and pesticide pollution. Its potential presence in other savanna rivers is well possible.” (Authors)] Address: Tchibozo, S., Centre de Recherche pour la Gestion de la Biodiversité (CRGB) 04 B.p. 0385 Cotonou, Bénin. E-Mail: s.tchibozo@crbj.org

22643. Jakab, T. (2011): Könyvismertetés/Book review 2011 [Kalkman, V.J. – Boudot, J-P. – Bernard, R. – Conze, K-J. – De Knijf, G. – Dyatlova, E. – Ferreira, S. – Jovic, M. – Ott, J. – Riservato, E. – Sahlen, G. (comp.) 2010: European red list of dragonflies. – Publications Office of the European Union, Luxembourg, VIII + 28 pp. *Studia odonotologica*. 13: 99-104. (in Hungarian) [review] Address: Jakab, T., Kossuth Lajos Secondary Grammar School, Baross Gábor út 36, H-5350 Tiszafüred, Hungary

22644. Thanasingh, A.D.; Ambrose, D.P. (2011): Biodiversity and distribution of entomofauna in three ecosystems in Thoothukudi District, Tamil Nadu. *Insect Pest Management, A Current Scenario, 2011* (ed.), Dunston P. Ambrose, Entomology Research Unit, St. Xavier’s College, Palayamkottai, India: 38-57. (in English) [“This study documents biodiversity and distribution of entomofaunal complex in three different ecosystems: an agroecosystem, a semiarid region and a scrub jungle, all located in Thoothukudi District of Tamil Nadu. Insect collections were carried out once in every fortnight from microhabitats such as arboreal, aerial, litter, bark and boulder bed microhabitats using the collection tools, light traps, sweep nets and beating sheets. The data on the total number of families, genera, species and individuals from all the microhabitats of the three ecosystems studied were analyzed with indices such as richness, evenness, diversity and similarity. Correlation and regression analyses were made to examine the role of chosen abiotic factors and distribution of insects. The Sawyerpuram Agroecosystem yielded 244 species from 106 families and 211 genera; the Vagaikulam Semiarid Zone yielded 195 species from 165 genera and 96 families and the Vallanad Scrub Jungle contributed 185 species from 91 families and 163 genera. Homoptera and Blattaria were abundant in the semiarid zone; Orthoptera and Isoptera in the scrub jungle and Coleoptera, Heteroptera, Lepidoptera and Odonata were dominant in the agroecosystem. The results of this study justified that agroecosystem stands first with high species richness and diversity for five major orders viz., Odonata, Heteroptera, Coleoptera, Lepidoptera and Hymenoptera. The semiarid zone is graded second for having two highly speciose orders (Blattaria and Homoptera) and five moderately species-rich orders. The scrub jungle although presented two highly speciose orders (Isoptera and Orthoptera), stands third for having five least speciose orders. Conservation guidelines are suggested. ... Odonata: A total number of 8069 individuals belonging to 18 species (56.25%), 13 genera (54.17%) and 3 families (42.86%) was collected from agroecosystem. Comparing the total individuals collected in semiarid zone (4539 individuals; 26.30%) and the scrub jungle (4649 individuals; 26.94%), agroecosystem ranked first. Although the species number was greater for agroecosystem, the H' showed moderate value (0.860). The low H' values of 0.377 and 0.637 for semiarid zone and scrub jungle respectively proved that they were poor ecosystems for species of odonates (Table 1).” (Authors) The only odonate species listed are *Diplacodes trivialis* and *Pantala flavescens*.] Address: Thanasingh, A.D., Entomology Research Unit, St. Xavier’s College (Autonomous), Palayamkottai - 627 002, Tamil Nadu, India. E-mail: eruxavier@gmail.com

2012

22645. Bönsel, A. (2012): Ergebnisse aus 10 Jahren Verbreitungskartierung und Monitoring der 6 Libellenarten aus den Anhängen II und IV der FFH-Richtlinie in Mecklenburg-Vorpommern (Odonata). *Natur und Naturschutz in Meck-*

lenburg-Vorpommern 41: 110-121. (in German) ["The dragonfly species from the FFH-RL in particular have increasingly become the focus of many dragonfly scientists, which is why new finds have been made known in MV almost every year and will certainly continue to be known. As of December 2011, 431 recent occurrences of *Leucorrhinia pectoralis* are now known, of *Leucorrhinia caudalis* 46, of *Leucorrhinia albifrons* 17, of *Aeshna viridis* 29, of *Gomphus flavipes* 1 location on the Elbe near Dömitz and of *Sympecma paedisca* 13. The first monitoring results of the species can be interpreted ambivalently, which also applies to the future forecasts. Urgent protective measures have been established for *L. pectoralis* and *A. viridis*, otherwise subpopulations of the nationwide monitoring will expire and inaction will have to be explained at the next reporting requirement." (Author/Google translate).] Address: Bönsel, A., Vasenbusch 15, 18337 Marlow, OT Gresenhorst, Germany. Email: Andre.-Boensel@gmx.de

22646. Céréghino, R.; Oertli, B.; Bazzanti, M.; Coccia, C.; Compin, A.; Biggs, J.; Bressi, N.; Grillas, P.; Hull, A.; Kaletka, T.; Scher, O. (2012): Biological traits of European pond macroinvertebrates. *Hydrobiologia* 689: 51-61. (in English) ["Whilst biological traits of river macroinvertebrates show unimodal responses to geographic changes in habitat conditions in Europe, we still do not know whether spatial turnover of species result in distinct combinations of biological traits for pond macroinvertebrates. Here, we used data on the occurrence of 204 macroinvertebrate taxa in 120 ponds from four biogeographic regions of Europe, to compare their biological traits. The Mediterranean, Atlantic, Alpine, and Continental regions have specific climate, vegetation and geology. Only two taxa were exclusively found in the Alpine and Continental regions, while 28 and 34 taxa were exclusively recorded in the Atlantic and Mediterranean regions, respectively. Invertebrates in the Mediterranean region allocated much energy to reproduction and resistance forms. Most Mediterranean invertebrate species had narrow thermal ranges. In Continental areas, invertebrates allocated lesser energy to reproduction and dispersal, and organisms were short lived with high diversity of feeding groups. These characteristics suggest higher resilience. The main difference between ponds in the Alpine and Atlantic regions was their elevation. Alpine conditions necessitate specific adaptations related to rapid temperature fluctuations, and low nutrient concentrations. Even if our samples did not cover the full range of pond conditions across Europe, our analyses suggest that changes in community composition have important impacts on pond ecosystem functions. Consistent information on a larger set of ponds across Europe would be much needed, but their low accessibility (unpublished data and/or not disclosed by authors) remains problematic. There is still, therefore, a pressing need for the incorporation of high quality data sets into a standardized database so that they can be further analyzed in an integrated European-wide manner." (Authors)] Address: Céréghino, R., EcoLab, Laboratoire Ecologie Fonctionnelle et Environnement, UMR 5245 CNRS-INP-UPS, Univ. de Toulouse, 118 route de Narbonne, 31062 Toulouse, France. Email: cereghin@cict.fr

2013

22647. Anonymus (2013): Obituary for Gordon Pritchard. *Argia* 25(1): 24. (in English) [February 9, 1939 - December 23, 2012. „Gordon Pritchard passed away suddenly at the Foothills Hospital on Sunday 23 December at the age of 73. Gordon was born in Burton upon Trent, England, received his undergraduate training at Imperial College, London and

his PhD from the University of Alberta, after which he had a 30 year career in the Department of Biological Sciences at the University of Calgary. He will be forever remembered by his loving wife Valerie; his sister Gillian Chambers; his children Tracy (Darren) Carmelo and Darren (Andrea) Pritchard; his grandchildren Nicola and Abelynn; and his extended family Mark (Sheryl, Ryan, Janine) Preuter and Leonard (Jeri-Lynn) Preuter. A celebration of Gordons life will be held at McInnis 8c Hol-loway s Chapel of the Beils (2720 Centre Street North) on Friday 11 January 2013 at 3 p.m. Condolences may be forwarded through <www.mcinnisandhollo-way.com>. If friends desire, memorial tributes may be made directly to the Alberta Cancer Foundation, c/o Tom Baker Cancer Centre, 1331-29 Street NW, Calgary, Alberta T2N 4N2, (1-866-412-4222, <www.albertacancer.ca/memorial>. The family wishes to extend their heartfelt thanks and gratitude to the doctors and nurses of the Tom Baker Cancer Centre who helped Gordon through the years, but especially to Dr. Karen Valentine for the special care and friendship she gave to Gordon. In living memory of Gordon, a tree wIU be planted at Big HiU Springs Park, Cochrane. V] Address: not stated

22648. Arthur, N. (2013): An unusual form of the Hoary Skimmer (*Libellula nodisticta*) from the northern California coast ranges. *Argia* 25(1): 12. (in English) ["On 3 July 2012, while observing dragonflies at a small private lake near Willits, California, I photographed an unusual *Libellula* perching in tules (*Schoenoplectus*) at the edge of the lake. The very small black nodal spots differentiated it from the abundant *L. forensis*, and I immediately assumed it to be *L. nodisticta* based on these spots. However, I subsequently looked at illustrations of *L. nodisticta* in *Odonata of California* (Manolis, 2003), and they didn't seem to match my dragonfly, which had much more white suffusion on the wings. On 5 July I found and collected two more males of the unusual skimmer, and photographed a third. All were along the lake's shoreline near large Stands of tule, in the Company of many *L. forensis*. The specimens were patterned essentially like a typical *L. nodisticta*, but had greatly extended white suffusion reaching from the base nearly to the tip of each wing, and somewhat larger black basal spots. *L. forensis* was abundant at the lake, and all individuals of that species showed less white and much larger nodal spots than the specimens in question." (Author)] Address: Arthur, N., 648 Nevil St., Oakland, California, USA. Email: semirelict@yahoo.com

22649. Farkas, A.; Mérő, T.A.; Móra, A. (2013): Nagyvárosi szitakötök: folyami szitakötök (Odonata: Gomphidae) a Duna budapesti szakaszán. In: Akvatikus és teresztris kutatások kapcsolata: Hidrobiológus Napok programfüzete / szerk. Bíró Péter, Reskóné Nagy Mária, Kiss Keve Tihmér, Magyar Hidrológiai Társaság Limnológiai Szakosztálya; Tihany : MTA Ökológiai Kutatóközpont Balatoni Limnológiai Intézet; Veszprém: Veszprémi Területi Bizottsága, Budapest, 40, 2013: 31. (in Hungarian) [Verbatim/Google translate: According to our previous investigation, all four Hungarian river dragonflies (*Gomphidae*: *Gomphus flavipes*, *G. vulgatissimus*, *Onychogomphus forcipatus*, *Ophiogomphus cecilia*) can be found in the section of the Danube above Budapest, of which the Natura 2000 community importance *G. flavipes* is especially abundant. Based on our previous knowledge, in 2013 we set the goal of investigating the nearby section of the Danube in Budapest, where a number of unfavorable effects (e.g. water pollution, river bed arrangements, paving, boat traffic) prevail from the point of view of dragonflies. In the course of our work, we

sought answers to the following questions: firstly, how do metropolitan conditions affect the species composition of the river dragonfly assemblage and the quantitative relationships of the species; on the other hand, how much anthropogenic mortality occurs during the flight. To do this, we collected the exuvium of river dragonflies on a total of four different types of coast and counted the cases of death. Based on our results, *G. flavipes* occurred in much lower numbers in the Danube section of the city than in the section of the river above Budapest. At the same time, a few individuals of *O. forcipatus* and *O. cecilia*, which are quite rare in the Danube, were also found in the river section of the city. In the case of *G. flavipes*, frequent waves caused by ship traffic caused a very significant loss in the flyaway population. A particularly high mortality rate occurred on heavily modified (rock-strewn and built-up) shorelines, where the larvae molted into adults close to the water's edge.] Address: Farkas, Anna, Dept Hydrobiol., Centre of Arts, Humanities & Sciences, Fac. Sci. & Tech., Univ. Debrecen, Egyetem tér 1, 4032 Debrecen, Hungary. E-mail: flavipes@gmail.com

22650. Houard, X. (2013): Analyse d'ouvrage: Libellules d'Ardèche. Atlas des libellules du Parc naturel des Monts d'Ardèche et du département de l'Ardèche de Alain Ladet, Pierre Juliard et Cyrille Deliry. *Martinia* 29(2): 86. (in French) [Verbatim/Google translát: FRAPNA 07, GRPLS, Monts d'Ardèche Regional Natural Park (Edit.) with the financial participation of the Ardèche Department, the Rhône-Alpes Region and the DREAL Rhône-Alpes. Text in French. Series: Monts d'Ardèche – Heritage horizon. Printed by ALPHA (Peaugres 07). Soft cover in color. Format: 162x242 mm, 240 illustrated pages. ISBN 978-2-916505-17-6. Price 20€. Order to be sent to: Maison du Parc - Domaine de Roche-more 07380 Jaujac <www.parc-monts-ardeche.fr>. This richly illustrated work presents in a simple and didactic manner, a complete and detailed review of the odonatological richness of the Ardèche department and particularly of the Monts d'Ardèche Regional Natural Park (PNR). It is aimed at a broad audience of naturalist sensibilities, wishing to improve their knowledge of the dragonflies of this contrasting territory between continental and southern influences. Indeed, with 69 species recorded in 2009 across the entire department, including 63 for the PNR, Ardèche is one of the departments in mainland France richest in dragonflies. After a rather poetic first part of a dozen pages presenting "the world of dragonflies", the second part of the work focuses on describing the context of this atlas by describing "the territory", the "general results" and the local "habitats" of the Ardèche Odonates. With around forty pages, this second part transcribes, on the one hand, in a simple and accessible way, all the parameters which govern the diversity of dragonflies (landscapes, natural regions and habitats). Then on the other hand, it traces the excellent collective dynamic which made it possible to compile more than 25,000 departmental data to produce this work. The most scientific readers may nevertheless regret the absence of some geological and hydrological details and some more detailed descriptions of habitats... Even if a second level of reading, provided by small footnotes, usefully clarifies the elements presented in the main text. With 146 pages, the third part is the most substantial and represents the heart of the work. This is the compilation of species monographs. We will first find the species listed within the PNR of the Monts d'Ardèche then the other species of the department. The structure of the monographs is relatively classic and includes the elements and indications (scientific and vernacular names, status, distribution, frequented environments, threats, etc.) from the departmental inventory. Here again, footnotes complete

and even support the main text. However, the most academic readers will be left unsatisfied by the size of the maps or the absence of phenology and altimetry histograms, which are very useful for guiding surveys. The layout graphics remain very pleasant and the photographic illustrations are remarkable. Finally, this departmental atlas succeeds in the challenge of reconciling aesthetics, discoveries of knowledge accessible to a wide audience and technical restitution of a departmental inventory program carried out over 25 years. This success demonstrates successful editorial design. This work will undoubtedly delight dragonfly lovers and will encourage any reader to enjoy odonatological tourism across the Ardèche and its mountains, as suggested in the fourth part of the book (6 pages) which selects some remarkable sites to discover.] Address: Houard, X., Groupe CERCION (Collectif d'Etudes Regional pour la Cartographie et l'Inventaire des Odonates de Normandie), France. Email: x.houard@gmail.com

22651. Málnás, K.; Harangi, S.; Balogh, Z.; Baranyai, E.; Nagy, D.; Braun, M.; Tóthmérész, B.; Dévai, G.; Edina, S. (2013): Heavy metal analytical tests on the domestic section of upper Tisza and Számos rivers. In: *Akvatikus és teresztrisz kutatások kapcsolata: Hidrobiológus Napok programfüzete / szerk. Bíró Péter, Reskóné Nagy Mária, Kiss Keve Tihamér, Magyar Hidrológiai Társaság Limnológiai Szakosztálya; Tihany: MTA Ökológiai Kutatóközpont Balatoni Limnológiai Intézet; Veszprém: Veszprémi Területi Bizottsága, Budapest, 40, 2013: 37. (in Hungarian) [Verbatim (Google translate): We carried out water and sediment analysis on the Hungarian section of the Upper Tisza (Tokaj-Tiszabecs) and Szamos rivers. The aim of our research was to map the current heavy metal contamination of the Upper Tisza. In the course of the tests, we selected sampling locations below the mouths of major tributaries of the Upper Tisza to detect the source of the pollution. Samples were also taken from additional sections on the Szamos, the tributary with the largest water flow of the section. Water samples and soft sediment samples were collected from all sampling points. In addition to the water and sediment samples used as abiotic indicators, the larvae of Gomphidae, which are common throughout the entire stretch of the river, were used to examine heavy metal accumulation. Heavy metal analysis was performed with Microwave Plasma Atomic Emission Spectrometry (MP-AES). With the help of principal coordinate analysis (PCA), based on both sediment and water analysis, we established that heavy metal pollution reaching the Upper Tisza mainly comes via the Szamos river. It can also be concluded that the accumulation of heavy metals in river dragonfly larvae is primarily related to the degree of pollution of the sediment, while analytical analysis of heavy metals in water samples primarily provides information on momentary pollution.] Address: Málnás, K., BioAqua Pro Kft., 4032 Debrecen, Soó Rezső utca 21, Hungaria*

22652. Nagy, E.; Kis, O.; Miskolczi, M.; Dévai, G. (2013): A csermelyszitaköto [*Onychogomphus forcipatus* (Linnaeus, 1758)] elofordulási sajátosságai [Characteristics of the occurrence of *O. forcipatus*]. In: *Akvatikus és teresztrisz kutatások kapcsolata: Hidrobiológus Napok programfüzete / szerk. Bíró Péter, Reskóné Nagy Mária, Kiss Keve Tihamér, Magyar Hidrológiai Társaság Limnológiai Szakosztálya; Tihany: MTA Ökológiai Kutatóközpont Balatoni Limnológiai Intézet; Veszprém: Veszprémi Területi Bizottsága, Budapest, 40, 2013: 40. (in Hungarian) [Verbatim: Google translate: There are four species of Gomphidae in Hungary, and of them the literature so far based on data, the dragonfly [*Onychogomphus forcipatus* (Linnaeus, 1758)] is the rarest.*

In Europe, three subspecies are considered: in the largest part of the area (from the Urals to the Pyrenees, from Central Finland to Greece), and thus in our country as well, the main form is found (*O. f. forcipatus*), while in the western Mediterranean region the western dragonfly [*O. f. unguiculatus* (Van der Linden, 1823)], and in the eastern Mediterranean area the eastern honeysuckle dragonfly (*O. f. albotibialis* Schmidt, 1954) is endemic. In our country, the species is protected, with a conservation value of HUF 5,000, and the local subspecies is relatively less endangered according to the IUCN classification, and its population trend can be said to be stable. Its habitats are primarily clean and fast-flowing streams in the foothills and hills, small and medium-sized rivers, and it is only rarely found in the higher regions of the central mountains and lowland areas (e.g. due to its wandering imagos). They mainly populate sections of the watercourse where the bed is mostly covered with gravel and coarse sand, but there are sections of the bed (e.g. quieter outcrops, large stones or shady corners of submerged seaweed beds) where the larvae can stay, as well as open, sunny, pebbly sections, where the male adults can sit out. Larvae are mostly absent from streams that are polluted, carry a lot of fine sediment, and have a low or highly fluctuating dissolved oxygen content. The development time of the larvae is between 2 and 5 years, mainly depending on the temperature conditions of the watercourses. The hatching of adults usually begins in mid-May and continues almost throughout June. Their maiden flight often takes place in forested and bushy places further away from the place of larval development. After their return, almost exclusively the males fly at the water area, maneuvering moderately quickly over the riverbed, the females tend to hide, and can mostly only be observed during mating and egg-laying. Being warm-loving, the adults are mainly active in sunny weather and avoid heavily shaded riverbed sections, but the presence of rich coastal vegetation is vital for them from the point of view of escape, nutrition, perching and hiding. They react sensitively to any disturbance, and thus quickly disappear from watercourse sections exposed to such an effect. Their flight time can be long, sometimes you can meet old specimens even in August. The dragonfly is one of the sporadically occurring species in Hungary. Out of the 313 publications processed so far in the Hungarian Odonatology Database, we found its locality data in 64. The vast majority of those in previous source works refer to images, and settlements are usually included as topographical names as well. From the 1990s, however, more and more larval and exuvium data appeared, which can now be clearly assigned to watercourses, and most of the adult data also became of a similar type. Instead of the earlier scattered collections, regular surveys, often faithfully reflecting the quantitative conditions, gained more and more space, and thus we got an idea of some beautiful populations of the species (e.g. the domestic upper section of the Tisza, Kerka, Kerca, Rába, Ipoly, Bódva). The following are considered to be the most important risk factors for domestic stocks: improper water management interventions (primarily eliminating the possibility of natural river bed development, dredging the entire cross-section of the river bed over a long section, reduction of water volume due to water extraction and water storage, cutting of coastal vegetation), water pollution (mainly eutrophication the introduction of causative chemicals), frequent and strong disturbances due to outdoor animal husbandry and recreational use.] Address: Nagy, Erika, Debreceni Egyetem TEK TTK Hidrobiol. Tanszék, Debrecen, Hungaria

22653. Oliveira-Junior, J.M.B. (2013): O efeito da alteração ambiental sobre assembleias de Odonata na Amazônia

Oriental. Dissertação (Mestrado) - Universidade do Estado de Mato Grosso, Programa de Pós-Graduação em Ecologia e Conservação, Nova Xavantina: XI, 67 pp. (in Portuguese) ["In this study we demonstrate the structuring environmental factors of the Odonata community, highlighting species that can be used as environmental indicators, given that in the Amazon region they are highly associated with the degree of integrity of streams. The work is divided into two chapters: The first lists the main structuring factors of the Odonata community and the second deals with the relationship between Odonata species and the degree of integrity of aquatic ecosystems, evaluating whether these insects can be used as environmental indicators. We carried out the study in the municipality of Paragominas, PA, Brazil, where 50 streams were sampled. We collected 1,769 specimens, distributed across 11 families, 41 genera and 97 species. We demonstrated, in the first chapter, that the richness of Zygoptera decreases and that of Anisoptera increases with the decrease in environmental integrity, with the main structuring factor of the Odonata community being changes in the structure of riparian vegetation. In the second chapter we indicate some species of Anisoptera as indicators of degraded environments, while species of Zygoptera tend to be indicators of preserved environments. Therefore, a prediction of what happens in the environment with the modification of environmental factors reinforces the premise that identifying the association of Odonata with different habitats is an essential tool to characterize the response of these organisms to changes in the environment. Therefore, we also propose that Odonata is an efficient group for assessing environmental quality, as in addition to being fast and requiring little financial resources for collection and identification, it also allows us to make different predictions for each suborder due to the group's ecophysiological differences." (Author/Google translate); http://portal.unemat.br/media/files/Jose_Max_Barbosa_Oliveira_Junior.pdf Address: Oliveira-Junior, J.M.B. de, Programa de Pós-Graduação em Ecologia e Conservação, Universidade do Estado de Mato Grosso, Nova Xavantina, Mato Grosso, Brazil. E-mail: josemaxoliveira@gmail.com

22654. Park, S.-J.; Kwon, H.; Park, S.-K.; Kim, D.S.; Park, D.-S. (2013): Comparative insect faunas between Ganghwado and six others islands of west coastal in Incheon, Korea. *Journal of Asia-Pacific Biodiversity* 6(2): 197-219. (in English) ["This study was conducted to investigate the biogeographic characteristics of the insect faunas of the seven islands of the west coast of Incheon, Korea, using a quantitative analysis method. The faunal similarity was examined using the Bray & Curtis similarity. The obtained similarity value matrix was examined with cluster analysis using the UPGMA method. The recorded number of each species in the areas was 1,001 from 12 orders and they were distributed on the seven islands surveyed. Among the surveyed islands, Seokmodo had the highest number of species with 497, while Yeonpyeongdo had the lowest with 136 species. The species composition of insects reported in Ganghwado was 309 species belonging to seven orders. The similarity values between the seven localities investigated ranged from 24.907 (Gyodongdo to Yeonpyeongdo) to 49.899 (Baengnyeongdo to Ganghwado). That is, the species composition of Baengnyeongdo (47.90%) was similar to that of Ganghwado, while it was different from that of Yeonpyeongdo (25.28%). The cluster analysis using a similarity index shows that all the islands in these areas can be divided into 3 groups at the level of 30.97%." (Authors) In Appendix 1 the following odonate species are listed according their occurrence at the six islands: *Davidius lunatus*, *Ischnura*

asiatica, Lyriothemis pachygastra, Orthetrum albistylum speciosum, O. triangulare melania, Pantala flavescens, Pseudothemis zonata, Sympetrum darwinianum, S. depressiusculum, S. eroticum eroticum, S. infuscatum, S. parvulum, S. pedemontanum elatum, and S. uniforme] Address: Park, S.-J., National Institute of Environmental Research, Incheon 404-708, Korea. Email: antstudy1@korea.kr

22655. Parr, A.J. (2013): Migrant dragonflies in 2012 including recent decisions and comments by the Odonata Records Committee. *Atropos* 48: 13-21. (in English) [Records of the following species are discussed: *Lestes barbarus*, *Chalcolestes viridis*, *Calopteryx splendens*, *Erythromma viridulum*, *Coenagrion scitulum*, *Ischnura pumilio*, *Pyrrhosoma nymphula*, *Aeshna cyanea*, *A. mixta*, *Anaciaeschna isoceles*, *Anax parthenope*, *Crocothemis erythraea*, *Libellula quadrimaculata*, *Sympetrum danae*, *S. fonscolombii*, *S. sanguineum*, *S. striolatum*, and *Leucorrhinia pectoralis*. In addition a probably *Crocothemis servilia* breed in an aquarium is discussed.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

22656. Paulson, D. (2013): *Argia johannella*, new for Panama. *Argia* 25(1): 10. (in English) [2-IX-2012 in a small marsh where a stream emptied into a lake at Altos del Maria (8.644°N, 80.073°W), elevation 940 m, Cocle. Female *A. johannella* on 1-IX-2012 at a tiny grassy stream and marshy pond at Canopy Lodge, El Valle de Anton (8.603°N, 80.130°W), 590 m, Cocle.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dennispaulson@comcast.net

22657. Paulson, D. (2013): First record of *Argia terira* from Panama. *Argia* 25(1): 11. (in English) ["Although it was not previously reported from the country, I found *A. terira* common at a small cloud-forest stream above Guadalupe, Chiriqui Province, Panama, on a trail near the Los Quetzales Cabanas at 7700-8000 feet elevation. Males perched on a stone fence, leaves, and the ground in the late-morning sun where the stream crossed the trail." (Author)] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dennispaulson@comcast.net

22658. Qvarfordt, S.; Wallin, A.; Borgiel, M. (2013): Inventering av vegetation och bottenfauna i nyanlagda och naturliga gölar i Forsmark 2012. SKB P-13-06. Svensk Kärnbränslehantering AB, Swedish Nuclear Fuel and Waste Management Co, Box 250, SE-101 24 Stockholm: 51 pp. (in Swedish, with English summary) ["SKB plans to build a repository for the spent nuclear fuel. The repository is planned to be built in Forsmark and constitutes installations above and below ground. The building and operation of the construction will involve activities that might affect the nature in the area. The impact means, among other things, that a small water body, which today is a reproduction site for the red listed pool frog (*Rana lessonae*), will disappear. The lost locality for the pool frog has been compensated by creating four new ponds in the Forsmark area. This study is part of the follow-up of these new habitats. The aim is to describe the plant and animal communities in the ponds, and follow the succession, i.e. the development of the habitats. The study also includes two natural ponds that will serve as reference objects. The survey of vegetation and invertebrate fauna in the ponds was conducted in October 2012. The results show that the new ponds had low coverage of submerged vegetation and the species composition in the plant communities differed between the ponds. The reference ponds

also had different plant communities, both in terms of species composition and coverage. This indicates that the species composition of the plant communities in the new ponds will likely depend on physical factors specific to the respective pond, but that higher vegetation coverage can be expected over time in all new ponds. The reference ponds had similar animal communities that differed from the animal communities in the new ponds. The similar species composition in the reference ponds, despite the variety of plant communities, suggests that similar animal communities are likely to develop in the new ponds, even if the plant communities continues to be different. Water chemical sampling has also been conducted in the ponds during 2012. A comparison of the inorganic environment (with regard to analysed ions) showed that the reference ponds had relatively similar ion compositions with little variation compared to the new ponds. The organic environment with respect to nutrients and organic carbon was similar in five of the ponds. The pond, AFM001420, differed from the others, with higher levels of total nitrogen, total organic carbon (TOC) and total phosphorus during the sampling period. The sampling methods used in the survey gave results that describe the ponds plant and animal communities well. The results are also suited for statistical analysis, which means that changes in communities over time is likely to be detectable." (Authors) Taxa (including Odonata) are treated at family level." (Authors) The study includes Odonata as follows: *Aeshna*, *Coenagrionidae*, *Libellulidae*, and *Somatochlora*.] Address: <https://skb.se/publication/2579948/P-13-06.pdf>

2014

22659. Dorji, T. (2014): Macroinvertebrate diversity in response to environmental variables in headwater streams. A Project Report. Royal University of Bhutan, Thimphu: V + 21 pp. (in English) ["Macroinvertebrate diversity in fresh water streams are impacted by many environmental variables including anthropogenic activities like land use changes. The current study was carried out in the head water streams of Toebringchhu sub-watershed within four streams, viz., Dorokna, Jichulum, Metshina and Toebringchhu streams. The aim of the study was to (i) study environmental variables among streams, (ii) study macroinvertebrate diversity among different streams, and (iii) to relate environmental parameters with macroinvertebrate diversity in the study area. The macroinvertebrates were sampled from eight reaches within each stream once each during post monsoon and pre-monsoon seasons, and within each reach four samples were taken, except for Jichulum stream during post monsoon where only two samples per reach were taken. Environmental variables were recorded during both pre-monsoon and post monsoon field visits. There was no significant difference in environmental variables between pre-monsoon and post monsoon seasons except for pH ($U=284$, $p<.05$), yet among the streams the variables differed significantly, except for pH and velocity. The study recorded 56 taxa of macroinvertebrates in the whole study area, and among the streams Dorokna and Jichulum had higher Shannon diversity than Toebringchhu and Metshina streams, and macroinvertebrate richness ($\chi^2 =13.227$, $p=.004$), abundance ($\chi^2=9.771$, $p=.021$) and Shannon diversity index ($\chi^2=13.088$, $p=.004$) differed significantly among streams. The Hydropsychidae family was the most abundant taxa among the streams and within the study area, while presence of *Epiophlebia laidlawi* belonging to family Epiophlebiidae is an important record for the study area. There were significant negative correlation between temperature and Shannon diversity index ($t=-.219$, $p=.013$), and abundance and velocity

($t=-.260$, $p=.003$) making these variables important determinants of macroinvertebrate diversity within the study area." (Author)] Address: https://www.researchgate.net/publication/263315533_MACROINVERTEBRATE_DIVERSITY_IN_RESPONSE_TO_ENVIRONMENTAL_VARIABLES_IN_HEADWATER_STREAMS_A_PROJECT_REPORT

22660. Dziekonska-Rynko, J.; Rokicki, J.; Mierzejewska, K. (2014): In vitro infection experiments with eggs of the nematode *Contraecaecum rudolphii* Hartwich, 1964 (sensu lato) targeting aquatic insect larvae (Odonata: Coenagrionidae and Libellulidae; Trichoptera: Integripalpia) as possible intermediate hosts. *Oceanological and Hydrobiological Studies* 43(2): 165-169. (in English) ["The availability of aquatic insects (Coenagrionidae, Libellulidae and Integripalpia) as potential intermediate hosts for the nematode *Contraecaecum rudolphii* Hartwich, 1964 sensu lato was studied under laboratory conditions. The infective material consisted of nematode eggs, newly hatched larvae, as well as in vitro infected cyclopoid copepods. High prevalence and intensity of infection associated with a low mortality of aquatic insect larvae suggests that they may serve as intermediate hosts for *C. rudolphii* and constitute a major reservoir of *C. rudolphii* larvae in aquatic habitats." (Authors)] Address: Rokicki, J., Department of Invertebrate Zoology and Parasitology, University of Gdansk, ul. Wita Stwosza 59, Gdansk, Poland. Email: rokicki@univ.gda.pl

22661. Ortega, A.E. (2014): Comparative dynamics of larval and adult dragonfly populations of a northern Illinois pond and effects of larval dragonfly morphology on prey capture. M.Sc. thesis, Department of Biological Sciences, Northern Illinois University: 117 pp. (in English) ["Anisoptera are hemimetabolous insects with a complex life cycle. Community assemblages of dragonflies may be regulated by both local and regional processes affecting different life stages. Dragonfly larvae are top invertebrate predators in fishless habitats and consume a variety of prey; coexisting species from different families can differ in the morphology of the labium and eyes as well as activity rates. There were two aspects of this study, a field portion and a laboratory portion. The purpose of the field portion was to compare the temporal patterns of species composition, population abundances, and spatial abundance patterns of the juvenile and adult stages of the dragonfly community of a pond across three years. The purpose of the lab study was to test experimentally whether morphological differences between larvae of two dragonfly families affected aspects of predation that characterize the predatory niche these taxa may fill. The experiments were designed to compare capture efficiencies, functional responses, predation rates in light and dark conditions, and predation rate in increasing plant density on three prey species, *Daphnia pulex*, *Hyaella azteca*, and *Chaoborus americanus*. Across three years the dragonfly community consisted of ten larval and fourteen adult species. *Anax junius* and *Tremea lacerata* were common as both larvae and adults. Some species, such as *Erythemis simplicicollis* and *Libellula quadrimaculata*, were common as larvae but uncommon as adults. Conversely, species like *Libellula pulchella* were common as adults though uncommon as larvae. Four species, *Celithemis elisa*, *Plathemis lydia*, *Perithemis tenera*, and a species of *Sympetrum*, were only observed as adults and were absent as larvae. Population abundance for most species was generally greatest in the fall for larvae and in the summer for adults. Due to a drought in 2012 the pond volume was significantly reduced and was likely a factor in many of the population trends observed in that year. The field data illustrate the importance

of studying both dragonfly life stages simultaneously, which showed trends that would otherwise be obscured. In the laboratory experiments, capture efficiency of larval *A. junius* was positively correlated with prey size, whereas it was negatively correlated for *T. lacerata*. Both species had similar functional response curves: consumption rates increased with increasing density for all prey species. Predation rates of *A. junius* decreased significantly from lighted to dark conditions; predation rates of *T. lacerata* also decreased, but not significantly. The predation rates of both species on *H. azteca* were negatively correlated with increasing plant density. The laboratory results indicate that these species may occupy different predatory niches, though with some overlap. *A. junius* is a mobile species that depends on light conditions for successful prey capture and has a greater capture efficiency with large prey. In contrast, *T. lacerata* is a less active species than *A. junius* that is not fully dependent on visual cues to detect prey and has a greater capture efficiency with small prey. However, both species have similar functional response curves with certain prey and consume prey at similar rates. The combination of field data and laboratory experiments provide insight into how dragonfly communities form and how dragonflies within these communities interact and coexist." (Author)] Address: Ortega, A.E., Northern Illinois Univ., 300 Normal Rd, DeKalb, IL 60115, USA

22662. Park, J.-J.; Lim, H.-M.; Kim, D.-S. (2014): A survey on insect diversity of Baengnyeongdo, Korea. *Journal of Asia-Pacific Biodiversity* 7 (2014) 268e280: 268-280. (in English) ["We investigated the biodiversity in Baengnyeongdo Island and also tried to clarify the relationship between surrounding environment and ecosystem of other Islands, in order to, eventually, contribute to biodiversity conservation as well as to management of West-coastal islands in Incheon, Korea. Insect was collected from April to October, 2011. As a result of all the collections were examined, 388 species of 75 family under 9 order were identified. Therefore, the species composition of insect over each result from Baengnyeongdo was a total of 9 orders, 124 families, 642 species including 7 species of IUCN Red list, 3 Endemic species, 23 Management of exportable species, 4 species of Korean Red list, 1 species of Climate-sensitive Indicator species and 70 Designated species; 286 species of Lepidoptera (44.55%) which is the highest, 153 species of Coleoptera (23.83%), 66 species of Hemiptera (10.28%) and 44 species of Hymenoptera (6.85%)." (Authors) The following Odonata are listed: *Ischnura asiatica*, *Lyriothemis pachygastra*, *Orthetrum albistylum speciosum*, *Pantala flavescens*, *Sympetrum infuscatum*, *S. parvulum*, *Copera annulata*.] Address: Kim, D.-S., The Inst. for Conservation of Wild Species, Daejeon, Republic of Korea. E-mail: bremeri2000@hanmail.net

22663. Teder, T. (2014): Sexual size dimorphism requires a corresponding sex difference in development time: a meta-analysis in insects. *Functional Ecology* 28: 479-486. (in English) ["1. The degree and direction of sexual size dimorphism (SSD) vary greatly between animal species. At the ontogenetic level, SSD may result from sex differences in birth size, growth rate and/or development time. Nevertheless, evidence concerning proximate causation of SSD is scattered, and the data used to infer ontogenetic determinants of SSD have not always been appropriate for this purpose. 2. I use a comprehensive literature-derived data base of relevant sex-specific traits on 169 species to address the significance of sex differences in larval development time (SDTD) as a proximate source of SSD in insects. 3. In a clear majority of species (79%), SSD and SDTD were qualitatively congruent, that is the larger sex had also a longer

larval development. In strongly size-dimorphic species, the qualitative correspondence between SSD and SDTD was nearly universal. Consistently, in a phylogenetically diverse array of insect clades, SDTD increased with increasing SSD across species. 4. The results indicate that the evolution and maintenance of high SSD values are rarely possible without a prolonged development of the larger sex. 5. The role of sex differences in growth rate as the ontogenetic determinant of SSD in insects requires further studies that should ideally be based on detailed monitoring of larval growth schedules. 6. The increase in SDTD with increasing SSD is consistent with the idea that the widespread phenomenon of protandry (the emergence of male adults before females) may not be selected for per se, but rather may primarily be an incidental by-product of other selection pressures." (Authors) The study includes data on *Coenagrion puella*, *Chalcolestes viridis*, and *Libellula depressa*.] Address: Teder, T., Department of Zoology, Institute of Ecology and Earth Sciences, University of Tartu, Vanemuise 46, Tartu, Estonia. Email: tiit.teder@ut.ee

2015

22664. Kizek, T. (2015): Notable species of invertebrates, amphibians and reptiles at selected sites surrounding Kremnica, Slovakia. Proceedings of the conference «Roubal's Days I», Banská Bystrica, 27. 1. 2015, Matthias Belivs Univ. Proc. (Faculty of Natural Sciences UMB) 5, Suppl. 2, p. 51-70; ISBN 978-80-557-0937-6: 51-70. (in English) [17 odonate species have been recorded, but only *Somatochlora metallica*, *Libellula quadrimaculata*, and *Cordulegaster bidentata* are briefly documented and discussed. *C. bidentata* 48°66'728" 18°88'295", *S. metallica* 48°64'752" 18°88'497" Odonata] Address: Kizek, T., Central Slovak Museum, Námestie SNP 4, 975 90 Banská Bystrica, Slovakia. E-mail: kizek@ssmuzeum.sk

22665. Ott, J. (2015): Libellen in Reisfeldern Asiens – nur bunte Dekoration oder ein wichtiger Bestandteil des Ökosystems? Pfälzische Gesellschaft zur Förderung der Wissenschaften Schriftenreihe 116: 327-334. (in German) ["Conclusion: Although there is an almost unmanageable amount of studies and publications on the use and ecology of rice fields and new ones are constantly being published, dragonflies in the rice fields of Vietnam and the Philippines have hardly been studied at all. This is all the more surprising since their usefulness as predators for harmful insects is generally well known; they can be found as "beneficial insects" on information posters from PhilRice (a national rice research institute in the Philippines). With the odonatological studies within the LEGATO project and the associated public relations work, the "rice dragonflies" are being brought into focus for the first time, their ecology is being examined in more detail and the dragonflies are generally becoming better known to the public. Dragonflies are an important part of the "rice field" ecosystem and are therefore much more than just a colorful decoration!" (Author/Google translate) In Table 1, 25 odonate species recorded up to 2014 are listed.] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

2016

22666. Gyulavári, H.A. (2016): Multivariate sexual selection on performance related traits in scrambling and territorial damselflies. Dissertation to obtain the double doctoral (PhD) degree Doctor in Science (Biology) (from the KU Leuven) and Doctor in Environmental Sciences (from the Univ.

of Debrecen): IX + 113 pp + app. (in English, with Dutch and Hungarian summaries) ["Sexual selection is a powerful force directing evolution which can vary in strength (strong or weak), direction (positive or negative) and form (linear or nonlinear). Despite the many studies on sexual selection, three aspects remain understudied, yet very relevant to fully understand sexual selection on the traits of a given species. (1) While most of the studies on sexual selection focused on a single or few phenotypic traits, a minority of studies followed a multivariate approach. This is important to disentangle direct selection versus indirect sexual selection on a trait. (2) Most studies focused on morphological traits (mainly body size) and ignored physiological traits, for example related to energy reserves, and locomotor performance. (3) Finally, recent studies suggest that sexual selection may vary both among populations and among time periods within a given population. Paying attention to such spatiotemporal variation in sexual selection will learn whether the same traits are preferred across populations and seasons which is directly relevant to understand the evolutionary dynamics of these traits. To study these aspects in-depth we used damselflies, upcoming model systems in ecology and evolution. In this thesis we combined field and laboratory studies to obtain a multivariate picture of sexual selection on whole-organism performance and the underlying morphological and physiological traits in *Coenagrion puella* and *Chalcolestes viridis*. In addition, we performed a detailed morphometric analysis and reconstructed phylogenetic trees to resolve the position of *C. viridis* and its eastern form, *C. parvidens*." (Authors) <https://dea.lib.unideb.hu/server/api/core/bitstreams/907dd576-31fe-466e-a883-e43f181704cd/content>] Address: Gyulavári, Hajnalka Anna, Dept of Hydrobiology, University of Debrecen, Egyetem t. 1. 4032, Debrecen, Hungary. Email: hgyulavari@gmail.com

22667. Olsen, K. (2016): The effects of global change on the distribution, species richness and life history of European dragonflies. PhD thesis, Department of Bioscience - Ecoinformatics and Biodiversity, Department of Bioscience, Science and Technology, Aarhus University: 238 pp. (in English) ["Climate change and human land-use strongly impacts ranges and distributional borders of dragonfly (Odonata) species which are therefore a good model group for understanding how the strength of such impacts depend on species specific ecology and functional traits. The specificity of their larvae to habitat type, their amphibious life cycle, and the ease of identification of the adult, combined with the good knowledge of their distribution and ecological requirements, make dragonfly species particularly well suited for studying effects of climate change and human land-use in the short term - which is related to structural changes of running and standing waters - and in the long term - which is related to species conservation and biogeography. A major challenge in conservation ecology is to understand interspecific differences in response to climate change and human land-use, i.e., what enables some species to persist while others decline? In this context, the main objective of my research was to investigate how current climate change and human land-use shape large scale distribution patterns of European dragonflies and whether these macroecological pattern and changes can be linked to functional traits such as taxonomy, habitat specificity, metabolic plasticity, and biogeographic traits such zoogeographical origin. In Paper I we describe how changes in species richness pattern across Europe correlate with range changes in different taxonomic and biogeographic groups of dragonflies. We found that Anisoptera species are driving local turnover in species ranges to a greater extent than Zygoptera species.

We found that Tropical and Mediterranean species have expanded their distributional range to a much larger extent than the Eurasian and Boreo-alpine species. In Paper II we describe how the strength of impacts from current climate change and human land-use depend on habitat specificity of the dragonfly larvae. We found that species adapted to permanent standing (perennial lentic) water and temporary (running or standing) water, had larger ranges than the more specialized species adapted to permanent running (perennial lotic) water habitats. We found that species reproducing in temporary water track climate changes better than species adapted to permanent water. In Paper III we explore the relationship between metabolic plasticity (expressed as the ability to shift in voltinism) and latitudinal range of the distribution of European dragonfly species. We reviewed the relationship and found that latitudinal range increased with voltinism span, i.e., a considerable voltinism span allows certain species to occur under a larger range of climatic conditions than species with less metabolic plasticity. We conducted experimental ex-situ measurements of metabolic rates measured as respiration rates at 10°C and 20°C, respectively, of four Scandinavian dragonfly species. We used two species with a northern distribution, one with a southern distribution and one ubiquitous species. We found that the ubiquitous species was the only being able to regulate the metabolic rate along with the experimental temperature. The northern species had consistently low metabolic rates, and the southern had consistently high metabolic rate across the experimental temperatures. This indicates that one mechanism controlling the present distribution of dragonfly species in Europe is their ability to adjust metabolic rate along with a change in temperature. In Paper IV we present preliminary results of the first two years of the national dragonfly atlas survey about the distribution of all dragonfly species occurring in Denmark. During the past decades, changes have differed somewhat from the major trends of the last century. There has been a striking expansion of southern species until recently only rarely seen in Denmark, and also an obvious expansion of a number of less rare thermophilic species. However, the diverse fauna of standing mesotrophic and oligotrophic waters seems to some extent to have undergone a decline which may have been caused by habitat degradation and eutrophication. In Paper V we present the current status of the true dragonfly species *Aeshna serrata* in Denmark. It is known from a relatively wide geographical range, though in Europe it is mainly found around the Baltic Sea in Estonia, Finland and Sweden, and locally, away from the coast, in the remaining Fennoscandia. In recent decades, it has expanded westwards across the mainland in Sweden and the occurrence in Denmark is a likely result following a possible case of jump dispersal by individuals from the westward expanding Swedish populations. After it was found in Northern Jutland in 2006 it has expanded its range further and occurs now in several small populations. Our results suggest that especially Boreo-alpine species and habitat specialist, especially those in permanent running water habitats but also species in standing mesotrophic and oligotrophic water could face severe challenges in response to rapid climate change combined with ongoing loss and deterioration of habitat due human land-use, and this effect may also apply to the distribution of species from various functional groups in Southern Europe." (Authors)] Address: Olsen, K., Research and Collections, Natural History Museum Aarhus, Wilhelm Meyers Allé 10, DK-8000 Aarhus, Denmark. Email: kent@nathist.dk

22668. Böhme, F.; Brockhaus, T. (2017): Erstnachweis von *Gomphus pulchellus* in Sachsen (Odonata: Gomphidae). *Libellula* 36(3-4): 159-161. (in German, with English summary) ["First record of *Gomphus pulchellus* for Saxony – The discovery of a female specimen of *G. pulchellus* from the Vogtland (SW Saxony) on 23 June 2017 is reported. This is the first record for Saxony." (Authors).] Address: Böhme, F., Altmannstr. 3a, D-82256 Fürstenfeldbruck, Germany. Email: FerryFotoBruck@gmx.de

22669. Freienstein, F.M.; Fartmann, T.; Gabel, F.; Löffler, F. (2017): Erstnachweis von *Orthetrum albistylum* in Sachsen (Odonata: Libellulidae). *Libellula* 36(3-4): 149-158. ["First Record of *Orthetrum albistylum* in Saxony – In June 2016, during an odonatological study in the Upper Lusatian Heath and Pond Landscape, we recorded *O. albistylum* for the first time in Saxony (Germany). In a fishpond complex near Riettschen (Administrative District of Görlitz), we detected several adult males and one female at a fishpond used for juvenile carp breeding. The occurrence of the species in the study area is very likely the result of a range expansion from southeast driven by climate warming." (Authors)] Address: Felix Maximilian, F., Universität Osnabrück, Abteilung für Biodiversität und Landschaftsökologie, Barbarastr. 11, 49076 Osnabrück, Germany. Email: max.freienstein@email.com

22670. Garrison, R.W.; von Ellenrieder, N. (2017): New species of the damselfly genus *Argia* from Mexico, Central America and Ecuador with an emphasis on Costa Rica (Insecta: Odonata: Coenagrionidae). *Zootaxa* 4235(1): 1-93. (in English) ["Seven new species of *Argia* are described, five of which occur in Costa Rica: *Argia calverti* n. sp. (Holotype male, Costa Rica, Cartago Prov., Tapanti Reserve, 1,310 m, 6 vii 1963, F. G. Thompson leg., in FSCA); *Argia carolus* n. sp. (Holotype male, Costa Rica, San Jose Prov., El Rodeo Biological Reserve, 7 km W of Villa Colon, 9°54' N, 84°16' W, 561 m, 10.13 vii 1990, T. W. Donnelly leg., in FSCA); *Argia elongata* n. sp. (Holotype male, Costa Rica, Cartago Prov., Reventazon river, SE of Turrialba by highway 10, 9°52'56" N, 83°38'49" W, 561 m, 10 viii 1979, R. W. & J. A. Garrison leg., in CSCA); *Argia haberi* n. sp. (Holotype male, Costa Rica, San Jose Prov., Bosque del Tolomuco, km 118 on Pan American highway, in seeps and trickles through brushy pasture on forested hillside, 9°28'18" N, 83°41'48" W, 1,710 m, 27 iii 2006, F. Sibley leg., in FSCA); *Argia schorri* n. sp. (Holotype male, Costa Rica, Puntarenas Prov., 2.8 mi E of Golfito, 8°39' N, 83°7' W, 35 m, 4 vii 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg., in USNM), and two which are so far only known from Mexico and Ecuador respectively: *Argia rudolphi* n. sp. (Holotype male, Mexico, Puebla State, Zihuateutla, Sierra de Huauchinango, La Union, in drainage area, 20°14'25" N, 97°53'38" W, 596 m, 21 v 1987, R. Novelo & A. Gomez leg., in CSCA) and *Argia schneideri* n. sp. (Holotype male, Ecuador, Napo Prov., Las Palmas, on Anzu river in Napo river watershed, 11 xii 1936, W. Clark-MacIntyre leg., in UMMZ). All the new species, as well as closely related species needed for diagnosis including *A. anceps* Garrison, *A. cupraurea* Calvert, *A. cuprea* (Hagen), *A. extranea* (Hagen), *A. fissa* Selys, *A. fulgida* Navas, *A. oenea* Hagen in Selys, *A. popoluca* Calvert, *A. rhoadsi* Calvert, and *A. westfalli* Garrison, are illustrated and diagnosed from their congeners and their known distribution areas are mapped." (Authors)] Address: Garrison, R.W., Plant Pest Diagnostic Center, California Department of Food and Agriculture 3294 Meadowview Road, Sacramento, CA 958321488, U.S.A. Email: argiavivida@gmail.com

- 22671.** Jablotschkin, D. (2017): Naturschutzfachlich wertvolle Libellengewässer in Nordrhein-Westfalen – Methodik zur Ermittlung von Libellen-Hotspots auf der Basis heterogener Datenbestände. *Libellula* 36(3/4): 67-88. (in German, with English summary) ["Dragonfly habitats with particularly high value for nature conservation in North Rhine-Westphalia – An approach for prioritizing dragonfly habitats on the basis of heterogeneous data – Efforts to protect and conserve dragonflies depend on a good data basis. Not least thanks to Citizen Science Projects there are big data collections in many places. These data often provide the potential for an analysis on the level of specific habitats. However, there is a lack of appropriate methods to assess the big number of dragonfly observations in a meaningful and comprehensive way. This paper presents a possible method to detect habitats of high importance to dragonflies and damselflies. The presented methodology was designed with the intention of being flexible, to be used on data collections of different origins and any sizes. This was achieved by a high degree of automation, among other things. Challenges, especially those based on the heterogeneity of the data, are discussed. The results of the procedure provide information about which biotopes are a constant reproduction site of a significant number of species or of endangered species. Furthermore those species occurrences are highlighted that are of high importance to the species survival." (Author) The method is applied using *Sympetrum flaveolum*.] Address: Jablotschkin, D., Geographisches Institut, Ruhr-Universität Bochum, Universitätsstr. 150, 44780 Bochum, Germany. Email: dominik.jablotschkin@rub.de
- 22672.** Jerabek, L.; Forstmeier, W. (2017): Erster sicherer Nachweis von *Ceriagrion georgifreyi* für das griechische Festland (Odonata: Coenagrionidae). *Libellula* 36: 145-148. (in German, with English summary) ["First record of *Ceriagrion georgifreyi* for the Greek mainland (Odonata: Coenagrionidae) – European records of *Ceriagrion georgifreyi* have hitherto been limited to four Greek islands (Kerkyra 1971, Thássos 1997, Zakynthos 1998, and Lesbos 2016). Here we report for the first time a record from the Greek mainland. Four individuals of *Ceriagrion georgifreyi* were seen on July 21st 2017 at Schinias National Park near Athens. Photos showing the site of observation and the diagnostic features of a male and a female are presented." (Authors)] Address: Forstmeier, W., Glatzer Straße 2, 82319 Starnberg, Germany. Email: wolfgang.forstmeier@t-online.de
- 22673.** Mercado, W.A.A.; Adorada, J.R. (2017): List of zygopteran naiads in the midstream and upstream of Pinacanauan de Tuguegarao (Lagum area) in Peña Blanca, Cagayan province, Philippines. *The Philippine Entomologist* 31(2). Journal Article. 4122.: 158. (in English) [Verbatim: A preliminary survey to determine the zygopteran naiads present in the Lagum area of Pinacanauan de Tuguegarao was studied. Naiads were collected using surber, kicknet and D-frame samplers. Six families were identified, namely: Platycnemididae, Protoneturidae, Platystictidae, Chlorocyphidae, Euphaeidae, and Coenagrionidae. These insects are important bioindicators known to be pollution-sensitive particularly Euphaeidae and Chlorocyphidae. On the other hand, Platystictidae are forest species and bioindicators of fresh water. A key to the zygopteran naiads is provided. Further studies on conservation is recommended for Lagum Area.] Address: Mercado, W.A.A., IWEP, CAFS, UPLB, College, Laguna, Philippines. Email: wamercado@up.edu.ph
- 22674.** Schardt, L. (2017): Emergenznachweise von Libellen am Spiegelweiher von Schloss Benrath, Stadt Düsseldorf (NRW). Emergence of Odonates on the Mirror Pool of the Castle Benrath, Düsseldorf (NRW). *Entomologie heute* 29: 35-55. (in German, with English summary) [Germany; "The Spiegelweiher in the park of Schloss Benrath is located in a nature conservation area of approximately 44 hectare in size that has been a former forest-like hunting park. The sun-exposed water body is characterized by a channel-like, elongate north-south location and a marginal forest area separated from the water body by a grass border and a path. Between mid-May and early August of 2016 a total of 757 exuviae were collected along the Spiegelweiher belonging to five species of dragonflies and six species of damselflies. This is the first documentation of the odonate fauna on this artificial water body allowing to monitor possible changes of species composition in the future." (Author) *Chalcolestes viridis*, *Coenagrion puella*, *Enallagma cyathigerum*, *Erythromma najas*, *E. viridulum*, *Ischnura elegans*, *Anax imperator*, *Crocothemis erythraea*, *Libellula quadrimaculata*, *Orthemum cancellatum*, *Sympetrum striolatum*.] Address: Schardt, Lavinia, Oderstraße 3, 65201 Wiesbaden, Germany. Email: Lavinia.Schardt@gmx.de
- 22675.** Stalder, G. (2017): Verhalten von *Sympecma fusca* und *S. paedisca* in ihrem Winterhabitat 2014 bis 2017 (Odonata: Lestidae). *Libellula* 36(3-4): 89-108. (in German, with English summary) ["Behaviour of *Sympecma fusca* and *S. paedisca* in their hibernation habitat during 2014 and 2017 (Odonata: Lestidae) – I observed at least 128 specimens of *S. fusca* and 11 specimens of *S. paedisca* during three winters 2014/2015, 2015/2016 and 2016/2017 at a fen meadow at Lengwil, Switzerland close to Lake Constance (47°37'44.89"N, 9°10'52.62"E, 502 m a.s.l.). In November and December there were only a few specimens detectable, because they were hidden in the lower ground vegetation layer. From the end of December to the end of February the number of detectable specimens increased in the winters 2015/2016 and 2016/2017 – influenced by the weather conditions of the respective year – more or less abruptly. The movement from the lower to the higher ground vegetation layer, where the specimens were more easily detectable, coincided both with wetness in the lower vegetation layer caused by rainfall or wet snowfall and mild winter temperatures with sunshine, which enabled the *Sympecma* species to warm up. A third reason to leave the hiding places in the lower ground vegetation layer was the melting of a closed snow cover. Furthermore, the observation of eight individually marked specimens of *S. fusca* showed an intraspecific variance in behaviour and hibernation site choice. In all survey years, both *Sympecma* species left the hibernation habitat from mid-march.] Address: Stalder, G., Hueb 6, CH-8580 Sommeri, Switzerland. Email: info@libellen.ch
- 22676.** Tamm, J. (2017): Zur Beeinträchtigung und Gefährdung von *Cordulegaster bidentata* unter Berücksichtigung von Kartierungen der Imagines in einigen deutschen Mittelgebirgen (Odonata: Cordulegastridae). *Libellula* 36(3-4): 1-21. (in German, with English summary) ["On impairment and endangering of *Cordulegaster bidentata* in consideration of mapping imagines in central German highlands – *C. bidentata* (imagines) has been mapped in several highland forests of Central Germany in the years 2008 to 2016. It was found at 89 of 726 spring sites mapped. On this basis, knowledge could be gained about the structures of both populated and unpopulated habitats and moreover about important human impact. The latter mainly was evident in the form of large-scale coniferous forests, ponds close to the springs, crossing spring areas by heavy forest harvesters and by forest roads and in the form of massive deposits of

branch wood wastes on the springs and streams. The threat situation of the species resulting from these impairments is analysed. Future developments are estimated. *C. bidentata* is classified as "endangered" in Germany and in some regions even "critically endangered" in its present situation." (Author)] Address: Tamm, J., Elgershäuser Str. 12, 34131 Kassel, Germany. Email: jochen.tamm@t-online.de

2018

22677. Ternois, V (coord.) (2018): Pré-atlas des Odonates de Champagne-Ardenne. Bilan cartographique des programmes INVOD et CILIF (Actualisation 2015). Observatoire des Odonates de Champagne-Ardenne. Société française d'Odonatologie (Champagne-Ardenne)/CPIE du Pays de Soulaines: 28 pp. (in French) [https://data.over-blog-kiwi.com/1/52/77/96/20180202/ob_862876_sfo-atlas-2017.pdf] Address: https://data.over-blog-kiwi.com/1/52/77/96/2018-0202/ob_862876_sfo-atlas-2017.pdf

22678. von Ellenrieder, N.; Garrison, R. (2018): Dragonflies and damselflies of the Upper Berbice River region. In: Alonso, L.E., J. Persaud and A. Williams (eds). 2018. Biodiversity Assessment Survey of the Upper Berbice Region, Guyana. BAT Survey Report No. 3. WWF-Guianas, Guyana Office, Georgetown, Guyana: 34-54, 166-172. (in English) ["Odonata species from the Upper Berbice watershed in south-central Guyana were surveyed along various forested blackwater creeks, associated flooded forest, side pools, and the Berbice River, for three days at the Berbice River camp and surroundings and for four days at the Berbice White Sands camp and surroundings. A total of 72 odonate species were recorded, including 31 species of damselflies and 41 species of dragonflies, and the estimated species richness for the total area surveyed was 87.29. This represents the first inventory list completed for this region. None of the 72 species found is endemic to the study area or to Guyana, but six species constituted new records for the country at the time the survey took place: *Neoneura bilinearis*, *Protoneura paucinervis*, *Phyllogomphoides atlanticus*, *P. undulatus*, *Perithemis cornelia*, and *P. mooma*. The number of odonate species found at the Berbice White Sands camp area was almost twice as high as that from the Berbice River camp area, and the species composition of the two areas differed considerably with only 16 shared species and a resulting complementarity of 77.77%, which can be explained by the different types of aquatic habitats sampled at each site and the higher diversity of microhabitats and larger area surveyed at the Berbice White Sands camp. Odonate diversity and abundance at the Berbice River camp area creeks, especially of damselflies, was lower than expected for a primary forest system, which could be explained at least in part by the lower diversity and abundance characteristic of tropical rainforests during the dry season. The Odonate assemblage of the Upper Berbice indicated a healthy environment, including several species (26%) characteristic of the Guiana Shield. The main threat to the diversity of odonates is habitat degradation. To preserve the integrity of this pristine forest and its freshwater habitats necessary to maintain the current odonate diversity, it is essential that approved practices for reduced impact of logging and mining are enforced in this area. In particular, we recommend creating and preserving 200 m buffer zones along margins of the Berbice River and streams in the Upper Berbice region, and building catchment ponds to contain tailings of mining operations." (Authors)] Address: Ellenrieder, Natalia von, California State Collection of Arthropods, CDFA, 3294 Meadowview Rd, Sacramento, CA 95832. Email: natalia.ellenrieder@gmail.com

2019

22679. Conniff, K.; Sasamoto, A.; Futahashi, R.; Limbu, M.S. (2019): Revision of the status of *Anaciaeschna donaldi* and *A. martini*, with allied species, and distributional notes (Odonata: Aeshnidae). *Odonatologica* 48(3/4): 265-284. (in English) ["The taxonomic status of four Asian *Anaciaeschna* species, viz. *A. donaldi*, *A. kashmirensis*, *A. martini*, and *A. montivagans*, has not yet been fully settled. Each of them is often treated as a good species in the major catalogues of World Odonata. However, the taxonomic relationship especially of *A. donaldi* and *A. martini* remains problematic, i.e., the attribution of Indian and Nepalese populations is still confusing. This even includes museum collections which have used different references for identification. In this paper we review the complex background of the taxonomical history of *A. donaldi*, including *A. martini*, with distributional notes, and present the first record from Bhutan. A morphological comparison was made based on specimens from Nepal and Japan, including photographic analysis of *A. donaldi* type specimens from India. To support our morphological analysis, we also analysed nuclear and mitochondrial DNA from Japanese and Nepalese material. Our results showed there are no significant differences in morphological or molecular genetic differences between *A. donaldi* and *A. martini*; therefore we conclude that *A. donaldi* is a junior synonym of *A. martini*. Additionally, we confirmed the status of *A. montivagans*, once wrongly synonymised with *A. martini*, as a valid species." (Authors)] Address: Conniff, Karen, ICIMOD, GPO Box 3226, Kathmandu, Nepal. Email: karoconniff@gmail.com

22680. Station biologique Naturpark Our (2019): Tätigkeitsbericht Biologische Station Naturpark Our 2019. Station biologique Naturpark Our: 36 pp. (in German) [Page 15: In 2019, the Biologische Station supported the Büro EcoTop (Roland Proes) to develop an action plan to protect *Oxygstra curtisii*.] Address: <https://naturpark-our.lu/wp-content/uploads/2021/05/00465.pdf>

2020

22681. Beketov, D.; Genkin, V.; Zayets, M.; Nachatoy, V.; Khorkhordina, P. (2020): Fauna strekoz (Insecta: Odonata) Nizhne-Svirskogo gosudarstvennogo prirodnogo zapovednitsa i opredelitel'nyye priznaki lichinok nekotorykh vidov Vypolnilii [Fauna of dragonflies (Insecta: Odonata) of the Nizhne-Svirsky State Nature Reserve and identifying characteristics of the larvae of some species]. Moscow School in the South-West No. 1543: 17 pp. (in Russian) ["Fauna of dragonflies (Insecta: Odonata) of Nizhne-Svirsky state natural reserve and defining signs of larvae of some species: Conclusions 1. The annotated list of dragonfly species of the Nizhne-Svirsky State Nature Reserve includes 8 families and 29 species, of which four were added during our research. 2. The distinctive feature of the species *Leucorrhinia dubia* and *Leucorrhinia rubicunda* by the length of the lateral spine on the ninth segment relative to the length of the visible part of the tenth segment does not work for larvae of most instars except the very last. Also, the larvae of *Leucorrhinia rubicunda* have a number of small spines present on the proximal margin of the fifth segment. ... Discussion: Based on the results of a study of the dragonfly fauna in the Nizhne-Svirsky State Nature Reserve in June and July 2017-2020, an annotated list of dragonfly species of the Nizhne-Svirsky State Nature Reserve was compiled, including 29 species of adults and dragonflies, four of which were added by us. Of the eight families to which all noted species belong, the families Coenagrionidae and Libellulidae have

the greatest species diversity, and the first of them includes the majority of dragonflies we caught. It can also be argued that in June and July 2020, in the reservoirs we studied, the species composition of dragonflies was quite different compared to previous years. Of all the reservoirs, only the Pilchuzhnya River and Lakhta Bay had a similarity of more than or equal to 50% (50% according to Jaccard and 67% according to Sørensen, the distance between the reservoirs is 6 km), the rivers Sitika and Pilchuzhnya (50% according to Sørensen, the distance between the reservoirs is 3.2 km). It is interesting that these reservoirs are located at a fairly large distance from each other, which dragonflies rarely overcome in one generation (with the exception of individual individuals and, in some cases, species of Heteroptera dragonflies). And reservoirs with a shorter distance between each other, for example, the Gumbarka and Sitika rivers, which are less than one kilometer apart, are only 10-18% similar (depending on the specific quantitative coefficient). A similar example is the rivers Gumbarka and Pilchuzhnya, the distance between which is slightly less than two kilometers, but the similarity in species richness is only 16-27%. Therefore, we can conclude that the similarity in the number of species between two bodies of water practically does not depend on the distance between them. It is interesting that the species composition of the Vodny Stadium hollow in 2019 and 2020 is only 42-59% similar. Such a noticeable difference is difficult to explain based on the available data, because studies in 2019-2020 were carried out on similar dates (the last week of June and the first week of July), and the temperature was also similar, often exceeding 20 °C. However, at the beginning of July 2020, the air temperature dropped noticeably and the amount of precipitation increased, which cannot be said about the same period in 2019. Unfortunately, we do not have specific data on changes in temperature and humidity, so it is difficult to draw clear conclusions. It can also be tentatively said that the length of the lateral spines relative to the length of the visible part of the tenth segment is not a reliable distinctive feature of the species *Leucorrhinia dubia* and *L. rubicunda*, since in both species quite often the lateral spines do not reach or, less often, barely reach the distal edge of the tenth segment, and in *L. rubicunda* lateral spines often exceeded the tenth segment in length, which completely contradicts the identifying feature. It is worth noting that larvae of all ages were measured, in which the length of the lateral spines exceeded 1 mm, and larvae of different ages were in approximately equal proportions. For individuals close to the last molt, the trait was fulfilled quite often, but still not always. Also no proximal spines were found in any species, and distal ones were in fact present in the majority of *L. rubicunda* specimens measured." (Authors/Google translate)] Address: <https://bioclass.ru/wp-content/uploads/2022/02/Odonates2020.pdf>

22682. Chandran, V.A; Jose, S.K. (2020): Odonates of Irinjalakuda ponds of central Kerala, India. *Zoos' Print Journal* 35(10): 26-33. (in English) ["The diversity of Odonata of 20 public ponds in Irinjalakuda and its relation with selected habitat parameters were studied. All sampled ponds are polluted and pollution tolerant species dominate in them. Conclusion: There has been an increased tendency among the local self-governments in Kerala to 'clean' the man-made ponds and revive their water storage role as there is scarcity of potable water during the summer months in many parts of the state. Although such revival of ponds can stop dumping of waste and increase the water quality, it often involves removal of aquatic vegetation and vegetation along the banks of the ponds also. It is proposed that such activities focus on increasing the water quality of the ponds and spare

the vegetation along their banks to conserve the odonate diversity they sustain." (Authors)] Address: Chandran, A.V., Aqua Research Lab, Dept Geology & Environmental Science, Christ College (Autonomous), Irinjalakuda, Thrissur, Kerala 680125, India. Email: avivekchandran2@gmail.com

22683. Dev, S.; Hassan, K.; Claes, J.; Mozahid, M.N.; Khatun, H.; Mondal, Md F. (2020): Practice of entomophagy and entomotherapy in Bangladesh. *Journal of Insects as Food and Feed* 6(5): 515-524. (in English) ["Aspects of entomophagy and entomotherapy of ethnic people in Bangladesh are documented as this practice is believed to ensure future food security. A comprehensive survey was conducted involving six insect-consuming ethnic groups: Garo, Chakma, Tanchangya, Marma, Mro, and Tripura. A total of 36 insect species of 19 families and 7 orders were consumed by them. In terms of species, those of the Coleoptera ranked highest (14), followed by Hymenoptera (7), Orthoptera (5), Hemiptera (5) and Blattodea (3 species); one species each belonged to Ephemeroptera and Odonata. The field cricket (*Brachytrupes* sp.), short-horned grasshopper (*Oxya* sp.) and giant water bug (*Lethocerus indicus*) were most preferred, reaching respective acceptance levels of 84%, 83%, and 79% by the respondents of all ethnic groups taken together. The total number of species used as human food by the Chakma, Marma, Mro, Tanchangya, Tripura, and Garo was 32, 22, 29, 21, 26, and 14, respectively. Nine species were used to treat coughs, fevers, nocturnal emissions, burning and gastroenteritis. People gathered the insects mainly from the insects' natural habitat and consumed them as snacks or part of a meal. The availability of edible insects depended on the season. Despite consumer demand, insect consumption is decreasing, apparently due to the unavailability of insects because of the random application of pesticides and fertilizers. The top three entomophagy constraints include lack of knowledge to farm insects, to harvest them, and to effectively store and preserve them. By overcoming these constraints, practice of entomophagy might play additional role in increasing future food security in Bangladesh through developing edible insect industry." (Authors)] Address: Mondal, M.F., Dept of Entomology, Sylhet Agricultural Univ., Sylhet-3100, Bangladesh. Email: mondalmfentom@sau.ac.bd

22684. Kita, H.; Suda, S. (2020): Habitat and conservation status of *Pseudocoptera tokyoensis* (Asahina, 1948). *Tombo* 62: 4-8. (in Japanese, with English summary) ["In the Red Data Book of the Ministry of the Environment, *Pseudocoptera tokyoensis* (Asahina, 1948), is classified as endangered Class B (EN) category. Recently, many of the existing production areas have been lost and many of them are in crisis. The authors looked at the current status of habitats and conservation. To date, *P. tokyoensis* has been found in nine prefectures in Miyagi, Niigata, and Kanto regions, of which Kanagawa Prefecture has become extinct and many habitats in other areas are at risk. In addition, hybrids with *P. annulata* (Selys, 1863) have been increasing in Miyagi and Niigata Prefectures, and in particular, it has been difficult to find pure *P. tokyoensis* in the Miyagi Prefecture since the Great East Japan Earthquake. The reasons for the decrease is vary depending on the habitat, such as deteriorating water quality, destruction of habitats due to artificial development, and the effects of crayfish and predatory alien fish. Therefore, the large number of habitats that are close to cities and that are easily affected by development can lead to difficulties in conservation. It is no exaggeration to say that almost all of the nine documented prefectures are at risk of extinction." (Authors)] Address: Kita, H., Takiyama 6-2-15-308, Higashikunime City, Tokyo, 203-0033, Japan

22685. Koene, E. (2020): Emergenzerfassung von Gomphiden an fünf Badeplätzen des Wohlensees bei Bern, Schweiz (Odonata: Gomphidae). *Libellula* 39(3/4): 105-122. (in German, with English summary) ["Northwest of Berne (Switzerland), exuviae of three gomphid species were collected almost daily in 2018, 2019, and 2020 at the middle reaches of the Aare, in the transition to the dammed Wohlensee. A total of 1,579 exuviae of *Ophiogomphus cecilia*, 3,458 exuviae of *Gomphus vulgatissimus* and seven exuviae of *Onychogomphus f. forcipatus* were recorded. Most of *O. cecilia* emerged at Stägmatsteg and *O. f. forcipatus* emerged only there. Most of *G. vulgatissimus* emerged at Wohleibrügg 3 km below, where the water flows more slowly. For the latter species the earliest start of emergence occurred on May 7th 2020, for *O. cecilia* on May 29th 2020, and for *O. f. forcipatus* on June 22th 2018. The emergence period lasted 41–57 days for the earliest species, *G. vulgatissimus*, 52–63 days for the latest species, *O. cecilia*, and 9–11 days for the few *O. f. forcipatus* emerging in the overlapping period. In *G. vulgatissimus* the sex ratio was balanced, however in *O. cecilia* many more females emerged. The most important emergence dates are related to the water temperature." (Author)] Address: Koene, Elisabeth, Schlossmatte 51, CH-3032 Hinterkappelen, Switzerland. Email: elisabeth.koene@gmx.ch

22686. Pertin, M.; Upadhaya, R.; Yomcha, T.; Payra, A. (2020): The dragonfly *Atratothemis reelsi* Wilson, 2005 in Namdapha Tiger Reserve, northeast India - An addition to the Indian Odonata fauna. *Bionotes* 22(3): 153-154. (in English) [A single male of *Atratothemis reelsi* was recorded and photographed on 19.v.2019 in Namdapha Tiger Reserve, Arunachal Pradesh, India, along the Miao to Vijaynagar road at around the 12th Mile (27.507205 N, 96.328768 E). This record represents the western most range of the genus and species, also an addition for the Indian Odonata fauna." (Authors)] Address: Payra, A., Ramnagar, Purba Medinipur, West Bengal 721441, India. Email: arajushpayra@gmail.com

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22687. Chandran, R.; Saburaj, T.; Kurup, S.V.; Chandran, A.V. (2021): Observation of *Orolestes selysi* (Insecta: Odonata: Lestidae) from Assam, India. *Bionotes* 23(2&3): 107-108. (in English) [21.ii.2021, Dehing-Patkai National Park, Assam, India (27.316124° N; 95.476927° E)] Address: Chandran, A.V., Dept of Geology and Environmental Science, Christ College, Irinjalakuda, Thrissur, Kerala 680125, India. Email: avivekchandran2@gmail.com

22688. Kiany, M.; Sadegi, S. (2021): Fars dragonflies and protection of their habitats. 1st Fars Biodiversity Conference, March 2021, Shiraz University, Iran: 1 p. (in Farsi & English) [Verbatim: "Fars province is the fourth largest province in the country which includes high habitat diversity. Dragonflies are a group of amphibiotic insects that depend on freshwater habitats for a part of their life. However, brackish, temporary, artificial and even effluent habitats can be suitable for compatible species. Kariz (Qanat) and water reservoirs in hot and dry climate are suitable man-made habitats for the species of these areas. More than 10 years of observation, sampling, and photography of this group have been done in habitats of Fars province and according to these data, 57 species of dragonflies have been recorded which 50 species are related to the Palearctic fauna, two species are Afrotropical and Arabia, three Oriental species and three Endemic species for the country. Two species are in a VU position in the IUCN global. The expansion of agriculture,

the harvesting of riparian vegetation and the grazing of livestock have a great pressure on aquatic habitats. In recent years, many habitats in this province have been destroyed or are in poor condition. Reconstruction and dredging of historical water resources such as Kariz, constant usage of artificial wetlands to treat and improve wastewater quality, agricultural and livestock management for minimal damage to water resources and vegetation along with awareness of the use of pesticides and fertilizers and encourage for using Integrated Pest Management (IPM) and biological control of pests, along with informing the vital role and beauties of this group of insects, will lead to protection of the sensitive species and their habitats." (Authors)] Address: Sadegi, S., Biology department, Faculty of science, Shiraz University, Iran. E-mail: ssadeghi@shirazu.ac.ir

22689. Kietzka, G.J.; Pryke, J.S.; Gaigher, R.; Samways, M.J. (2021): Webs of well-designed conservation corridors maintain river ecosystem integrity and biodiversity in plantation mosaics. *Biological Conservation* 254, 108965: 12 pp. (in English) ["Landscape transformation and subsequent habitat loss locally extirpate populations and threaten ecosystem health. Timber plantations are a major threat to grassland ecosystems globally. An effective mitigation measure is the instigation of webs of large conservation corridors as ecological networks in plantation mosaics. These ecological networks incorporate natural water courses along with their matrices of natural grassland. Dragonflies are highly sensitive to habitat condition and are effective bioindicators of water quality. Here, we compare dragonfly diversity in conservation corridors, with nearby protected areas as controls, to determine the effectiveness of ecological networks for maintaining river ecosystem integrity, in the KwaZulu-Natal Midlands, South Africa. We also investigate the effect of ecological network corridor width on dragonfly assemblages. Lastly, we explore the importance of 18 environmental variables as drivers of dragonfly diversity. Dragonfly abundance, species richness, and Dragonfly Biotic Index scores (a scoring system based on dragonfly range of extent, threat status, and environmental sensitivity) did not differ between ecological network and protected area sites. Dragonfly abundance and species richness were positively correlated with ecological network corridor width. Landscape and water variables were the most important drivers of dragonfly assemblage composition in both ecological networks and protected areas. Management variables and those related to anthropogenic disturbance were not as important. This highlights the conservation success of these well-managed ecological networks for maintaining dragonfly biodiversity in forestry plantations, provided that corridors are wide enough. Implementation of ecological networks as a mitigation measure for plantation forestry is highly effective for lotic systems, and should be implemented more widely in environmental protection plans for transformed landscapes." (Authors)] Address: Kietzka, Gabriella, Dept of Conservation Ecology & Entomology, Stellenbosch University, Stellenbosch 7602, South Africa

22690. Kumar, V.; Mishra, H.; Kumar, A. (2021): Foraging behavior in river lapwing, *Vanellus duvaucelii* (Lesson, 1826) (Charadriiformes: Charadriidae): Differences in technique, prey, and habitat. *Journal of Asia-Pacific Biodiversity* 14(1): 33-39. (in English) ["A total of 415 individuals of river lapwing were counted in four habitats namely open, unvegetated river bank, vegetated river bank, river island and crop field, whereas foraging behavior was observed by focal observation. River lapwings used walk-halt-peck technique most frequently throughout the year in all the four habitats. Our study suggested that foraging techniques in all the four

habitats were non-significant whereas foraging success varied significantly ($p=0.049$, $df = 3$). During summer, the feeding rate was significantly different ($p < 0.0001$, $F = 12.43$, $df = 2$) at open, unvegetated, river bank from other habitats. Moreover, foraging success rate was observed to be varied significantly ($p < 0.0001$, $F = 13.52$, $df = 2$) in all the seasons and across all the habitats. The present study suggests that open, unvegetated river bank was most preferred habitat since foraging success was significantly different in this habitat." (Authors) Lapwings also preyed on odonate larvae.] Address: Kumar, V., Animal Diversity & Ecology Laboratory, Department of Zoology, University of Lucknow, Lucknow, 226007, U.P., India. Email: adellu111@gmail.com

22691. Pereira-Moura, L.; Silva de Sena, W.; Neiss, U.G.; Marques Couceiro, S.R. (2021): Environmental integrity as a modeler of the composition of the Odonata community. *Environmental Monitoring and Assessment* 193(160): 12 pp. (in English) ["Human actions often alter natural environments, causing homogenization of micro-habitats and, consequently, the loss or replacement of species. Our research evaluates how the effects of environmental integrity and the physical and chemical characteristics of streams influence the adult Odonata community in a region of the Amazon, in western Pará. The data were obtained in 15 streams of first and second order in the municipality of Santarém, Pará, between October and December 2014 (dry season) and between March and May 2015 (rainy season). A total of 544 specimens were collected, distributed in 23 genera, 35 species. Significant differences were observed in the composition of Odonata based on the integrity of streams, and species are replaced as the habitat integrity gradient is reduced, with species that need more preserved conditions extinct locally, making room for generalist species. However, only *Psaironeura tenuissima* was an indicator of more preserved sites, while *Argia* sp.1 and *Mnesarete smaragdina* were indicative of altered sites. None of the variables had any influence on the richness or abundance of Odonata." (Authors)] Address: Neiss, U.G., Instituto Nacional de Pesquisas da Amazônia/INPA, Coordenação de Pesquisas em Entomologia/CPEN, Caixa Postal 478, CEP 69011-970, Manaus, AM, Brazil. E-mail: ulisses.neiss@gmail.com

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22692. Chetia, A. (2022): A checklist of odonates (dragonflies & damselflies) of Upper Brahmaputra valley zone of Assam, India. *International Journal of Innovative Science and Research Technology* 7(11): 748-760. (in English) ["A checklist of the odonates occurring in the upper Brahmaputra Valley Zone of the state Assam from gathered published work is presented in this paper. The scientific name, common name, distribution and the conservation status of the species were compiled in tabular form. Odonates diversity in the upper Brahmaputra Valley zone of Assam comprised of 101 species under 11 families. In the region, Anisoptera were dominant with 55 species over Zygoptera with 46 species." (Authors)] Address: Chetia, A., Moran Phatikachowa Chakalia Village, District-Dibrugarh, Assam, India

22693. Ding, Y.; Zheng, X.; Yu, L.; Lu, R.; Wu, X.; Luo, X.; Mai, B. (2022): Occurrence and distribution of persistent organic pollutants (POPs) in amphibian species: Implications from biomagnification factors based on quantitative fatty acid signature analysis. *Environmental Science & Technology* 56(5): 3117-3126. (in English) ["Contaminants pose a great threat to amphibian populations, but the bioaccumulation and distribution of contaminants in amphibians are still

unclear. Polychlorinated biphenyls (PCBs) and polybrominated diphenyl ethers (PBDEs) had median concentrations of 468–3560 ng/g lipid weight (lw) and 206–2720 ng/g lw in the muscle of amphibians, respectively. BDE 209 was the predominant PBDE congener, while CBs 118, 138, 153, and 180 were the main PCB congeners. The diet compositions of amphibians were estimated by quantitative fatty acid signature analysis (QFASA). Dragonfly contributed the most to the diet of amphibians. Biomagnification factors (BMFs) based on quantitative amphibian/insect relationships showed more credible results than BMFs based on amphibian/each insect or amphibian/combined prey relationships. BMFs derived from QFASA declined with $\log K_{ow}$ from 5 to 6.5 and then showed a parabolic relationship with $\log K_{ow}$ greater than 6.5. BMFs of PCBs were significantly influenced by the elimination capacity of PCBs in amphibians. Less-hydrophobic PCBs preferentially accumulated in the skin than in muscle, which was probably due to the dermal exposure of less-hydrophobic PCBs for amphibians. The biomagnification and distribution of contaminants may be affected by multiple exposure pathways and the toxicokinetics of contaminants in various life stages of amphibians." (Authors) The paper includes a reference to *Eopthalmia elegans*.] Address: Zheng, X., College of Resources & Environment, South China Agricultural University, Guangzhou 510642, China. Email: zhengxiaobo@scau.edu.cn

22694. Huang, Q.; Tian, F.-B.; Young, J.; Lai, J.C.S.; Ravi, S. (2022): Numerical modelling of under-actuated flapping wings inspired by the indirect-flight muscles of insects. 23rd Australasian Fluid Mechanics Conference - 23AFMC Sydney, Australia Paper No: AFMC2022-81 4 – 8 December 2022: 9 pp. (in English) ["Insects are the only group of invertebrates that have evolved wings and flight. Their flight mechanisms have been studied extensively by researchers worldwide. Insects can be generally divided into two groups based on flight mechanisms. The first group is insects with direct-flight actuation, such as dragonflies and mayflies, whose flight muscles insert directly into the hinged base of their wings and cause the wings to flap by initiating movements in the base. The other group is the insects with indirect-flight actuation, such as bumblebees and butterflies, whose flight muscles attach to the walls of their thorax instead of the wings. The muscle contractions distort the thorax shape, which in turn causes the wings to move since the wings are extensions of the thoracic exoskeleton. Direct-flight actuation has been widely studied, while flight via indirect actuation remains poorly explored. In this study, we propose a fluid-structure interaction (FSI) model that couples two elastic wing-hinge dynamics and unsteady flapping aerodynamics to explore passive flapping and pitching mechanisms. An immersed boundary-lattice Boltzmann method based FSI solver was used to simulate the passively flapping and pitching wing in hover. The results provide validation data for benchmarking computational fluid dynamics solvers in the simulation of passively flapping and pitching wings. The proposed FSI model will be used in future works for parametric study (e.g., effects of different material elasticity) and for obtaining insight into the flow physics of indirect-flight actuation." (Authors)] Address: Huang, Q., School of Engineering & IT, The University of New South Wales Canberra, ACT 2600, Australia. Email: qiuxiang.huang@adfa.edu.au

22695. Kath, J.A. (2022): Species Status Assessment for Hine's Emerald Dragonfly (*Somatochlora hineana*). Illinois Department of Natural Resources, Division of Natural Heritage: 20 pp. (in English) [Status assessment for *Somatochlora hineana* in Illinois, USA from July 2022] Address:

<https://naturalheritage.illinois.gov/content/dam/soi/en/web/naturalheritage/speciesconservation/recovery/documents/hinesemeralddragonflyssa-kath-redacted.pdf>

22696. Loock, V. (2022): Die Libellenfauna des Grotmoores (Kreis Segeberg). Faunistisch-Ökologische Mitteilungen 11: 53-66. (in German, with English summary) ["The dragonfly fauna of Grotmoor (Segeberg district, Schleswig-Holstein, Germany) has been mapped on the basis of records of adults during 23 site visits between June and October 2021. Seven water bodies (including two ditches) and three terrestrial habitats were investigated. Including historical data, 36 species were determined. Of these 27 are possibly, probably or definitely breeding on site. Ten of the 36 recorded species are listed in the Schleswig-Holstein red data book. Of these species *Lestes virens*, *Ceriagrion tenellum*, *Aeshna juncea*, *A. subarctica*, *Leucorrhinia dubia*, *L. pectoralis* and *L. rubicunda* are believed to breed regularly on site. Whereas, *Lestes dryas*, *Somatochlora favomaculata* and *Sympetrum faveolum* are classed as rarely-breeding vagrants. A comparison with another twelve raised bogs in Schleswig-Holstein shows that Grotmoor has a species-rich dragonfly fauna and thus richly-deserves protection." (Authors)] Address: Email: Loockalv@gmx.de

22697. Santos, L.R.; Rodrigues, M.E. (2022): Dragonflies (Odonata) in cocoa growing areas in the Atlantic Forest: Taxonomic diversity and relationships with environmental and spatial variables. *Diversity* 2022, 14, 919. <https://doi.org/10.3390/d14110919>: 18 pp. (in English) ["In the south of Bahia state, a large part of the native Atlantic Forest areas has been modified for the cultivation of cocoa (*Theobroma cacao*). These crops are cultivated under the shade of the canopy of native trees, a system locally known as the "cabruca" agroforestry system. This study aimed to evaluate the relationship of Odonata assemblages (adults and larvae) in cocoa farming areas and to identify the relationships of these species with local and spatial environmental variables of the monitored sites. Altogether, adult and larvae were sampled at 22 sites. Physical and physicochemical water variables were recorded for each site. A total of 1336 dragonflies were collected, of which 20 were Zygoptera species and 30 were adult Anisoptera representatives. The different life stages were related to environmental variables such as conductivity, watercourse channel width, and dissolved oxygen. The space predictors were also associated with the assemblages, mainly for adults. The present study identified that cabruca areas maintain a great diversity of dragonflies, including species that are considered to be forest specialists and more sensitive to landscape changes. The characteristics of this cropping system are considered to be favorable for the conservation of the biodiversity of the Atlantic Forest." (Authors)] Address: Santos, L.R., Laboratory of Aquatic Organisms ("LOA"), Dept of Biological Sciences, Santa Cruz State University (UESC), Ilhéus 45662-900, Bahia, Brazil

22698. Standing, S.; Sánchez-Herrera, M.; Guillermo-Ferreira, R.; Ware, J.L.; Vega-Sánchez, Y.M.; Clement, R.; Drury, J.P.; Grether, G.F.; González-Rodríguez, A.; Mendoza-Cuenca, L.; Clement, R.; Drury, J.P.; Grether, G.F.; González-Rodríguez, A.; Mendoza-Cuenca, L.; Bota-Sierra, C.A.; Bybee, S. (2022): Evolution and biogeographic history of rubyspot damselflies (Hetaeriniinae: Calopterygidae: Odonata). *Diversity* 2022, 14, 757. <https://doi.org/10.3390/d14090757>: 16 pp. (in English) ["Hetaeriniinae, a subfamily of Calopterygidae, comprise four genera distributed from North to South

America: Hetaerina, Mnesarete, Ormenophlebia and Bryoplathanon. While several studies have focused on the intriguing behavioral and morphological modifications within Hetaerina, little of the evolutionary history of the group is well understood. Understanding the biogeographical history of Hetaeriniinae is further complicated by uncertainty in important geological events, such as the closure of the Central American Seaway (CAS). We generated a phylogenetic hypothesis to test the relationships and divergence times within Hetaeriniinae using IQtree and BEAST2 and found that Mnesarete and Ormenophlebia render Hetaerina paraphyletic. Reclassification of the genera within Hetaeriniinae is necessary based on our results. We also tested the fit to our dataset of two different hypotheses for the closure of CAS. Our results supported a gradual closure, starting in the Oligocene and ending in the Pliocene. Using Ancestral Character State Reconstruction, we found that the rubyspot, which is associated with higher fecundity in several species, was ancestral for Hetaeriniinae and subsequently lost four times. Estimates of diversification in association with the rubyspot are needed to understand the plasticity of this important character. Forest habitat was the ancestral state for Hetaeriniinae, with transitions to generalist species of Hetaerina found primarily in the Mesoamerican region. These results add to our understanding of the relationship between morphology, biogeography and habitat in a charismatic group of damselflies." (Authors)] Address: Standing, Samantha, Entomology Department, University of California Riverside, Riverside, CA 92521, USA. Email: ssmit038@ucr.edu

22699. Wang, L.-J.; Chou, Y.-W.; Huang, J.-P. (2022): Testing the effect of sampling effort on inferring phylogeographic history in *Psolodesmus mandarinus* (Calopterygidae, Odonata). *Diversity* 2022, 14, 809. <https://doi.org/10.3390/d14100809>: 19 pp. (in English) ["Phylogeographic studies have revealed spatial genetic structure and inferred geographical processes that may have generated genetic diversity and divergence. These study results have implications not only on the processes that generate intraspecific and interspecific diversity but also on the essential integrals for defining evolutionary entities (e.g., species). However, the resulting phylogeographic inferences might be impacted by the sampling design, i.e., the number of individuals per population and the number of geographic populations studied. The effect of sampling bias on phylogeographic inferences remains poorly explored. With a comprehensive sampling design (including 186 samples from 56 localities), we studied the phylogeographic history of a Taiwanese endemic damselfly, *Psolodesmus mandarinus*, with a specific focus on testing the impact of the sampling design on phylogeographic inference. We found a significant difference in the genetic structure of eastern and western populations separated by the Central Mountain Range (CMR) of Taiwan. However, isolation by the CMR did not lead to reciprocally monophyletic geographic populations. We further showed that, when only a subset of individuals was randomly included in the study, monophyletic geographic populations were obtained. Furthermore, historical demographic expansion could become undetectable when only a subset of samples was used in the analyses. Our results demonstrate the impact of sampling design on phylogeographic inferences. Future studies need to be cautious when inferring the effect of isolation by a physical barrier." (Authors)] Address: Wang, L.-J., Division of Forest Protection, Taiwan Forestry Research Institute, Taipei 10066, Taiwan. Email: ljwang23@ms17.hinet.net

22700. Wang, S.; Wu, L.; Le, Z.; Zhang, S.; Yu, L.; Fang, J.; Chen, Z. (2022): Discovery of two dragonflies from Zhejiang

province. *Guangxi Forestry Science* 51(6): 850-852. (in Chinese, with English summary) ["Two new recorded species of Odonata, *Planaeschna skiaperipola* Wilson & Xu, 2008 [2021-IX-17] and *Neurothemis fulvia* Drury, 1773 [2021-VII-05] in Kaihua county of Zhejiang province (China) have been reported. Their morphologies, life habits and distributions were described." (Authors)] Address: Wang S., School of Resources & Environmental Engineering, Anhui University, Hefei, Anhui 230601, China

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22701. Ab Hamid, S.; Jumaat, A.H. (2023): Toxicity assessment on Odonata larvae survivability in monitoring heavy metal contaminations. *Malaysian Applied Biology* 52(6): 47-56. (in English) ["The aquatic ecosystem has been suffering a continuous increase of metal contamination such as Cadmium (Cd), Zinc (Zn), and Manganese (Mn) due to their inadequate high potential to disturb the aquatic organism population. Meanwhile, some insects such as *Pseudagrion microcephalum* and *Ischnura senegalensis* can be used as biological indicators to determine stream health. Therefore, this study was conducted to determine the relationship between the heavy metal concentration and its effect on the survivability of two different species of damselfly larvae from the family Coenagrionidae; *Pseudagrion microcephalum* and *Ischnura senegalensis*. In this study, there is a significant effect of three heavy metal exposures on the survivability of *P. microcephalum* ($F_{11,180}=14.50, P=0.00$) and *I. senegalensis* ($F_{11,180}=15.10, P=0.00$). *Pseudagrion microcephalum* is more tolerable towards Mn ($F_{3,60}=13.19, P=0.00$) and Zn ($F_{3,60}=16.07, P=0.00$) at different concentrations compared to *I. senegalensis*. In the meantime, *I. senegalensis* was tolerable to Cd exposure. The LC50 value of Cd was much lower than other heavy metals. Besides, the LT50 value of Cd at 200 mg/L was the lowest on *P. microcephalum* (31 hr) and *I. senegalensis* (36 hr) compared to other heavy metals. Cd was the most toxic to *P. microcephalum* and *I. senegalensis* larvae followed by zinc and manganese ($LC_{50} \text{ \& } LT_{50} = Cd > Zn > Mn$). It is concluded that *I. senegalensis* was tolerant towards Cd, Mn, and Zn compared to *P. microcephalum* and Cd had the fastest-acting toxicity and significantly reduced the lethal time of mortality on both species." (Authors)] Address: Ab Hamid, Suhaila, School of Biological Sciences, Universiti Sains Malaysia, 11800 Minden, Penang, Malaysia. Email: ahsuhaila@usm.my

22702. Adambukulam, S.P.; Kakkassery, F.K. (2023): Description of the final instar larva of *Burmogomphus laidlawi* Fraser, 1924, an endemic of the Western Ghats, India (Odonata: Gomphidae). *Odonatologica* 52(3-4): 247-254. (in English) ["The final instar larva of *B. laidlawi* is described for the first time based on one larva and several exuviae collected from the Tejaswini River, Kannur district of Kerala, India. The larva is distinguished by the presence of well-developed abdominal dorsal spines on S7-9." (Authors)] Address: Adambukulam, S.P., Research & Postgrad. Dept Zool. St Thomas College (Autonomous), Thrissur (Affiliated to University of Calicut), Kerala, India. Email: shaunpaultcr@gmail.com

22703. Adambukulam, S.P.; Kakkassery, F.K. (2023): Taxonomical studies of dragonfly nymphs (Odonata, Libellulidae) by using their exuviae. *Entomon* 48(4): 497-510. (in English) ["Taxonomic studies of dragonfly nymphs were done up to species level using their exuviae. Exuviae, being the last instar larval skin, possess all larval features. [Neurothemis tullia; Acisoma panorpoides, Bradinopyga geminata, Orthetrum sabina, Tholymis tillarga, Rhyothemis variegata, Zyxomma

petiolatum] were identified using the features present on exuviae. ... The study describes the morphological features ... A taxonomic key for the identified exuviae is also provided." (Authors)] Address: Adambukulam, S.P., Research & Postgraduate Department of Zoology, St. Thomas College (Autonomous) (Affiliated to University of Calicut), Thrissur 680001, Kerala, India

22704. Adhurya, S.; Lee, D.-Y.; Lee, D.-S.; Park, Y.-S. (2023): Functional trait dataset of benthic macroinvertebrates in South Korean streams. *Scientific Data* volume 10, Article number: 838 (2023): 8 pp. (in English) ["Functional traits are the result of evolution and adaptation, providing important ecological insights into how organisms interact with their environment. Benthic macroinvertebrates, in particular, have garnered attention as biomonitoring indicators for freshwater ecosystems. This study presents a functional trait dataset for benthic macroinvertebrates [including Odonata], comprising 447 taxa (393 at genus level, 53 at family level and one at class level) from five phyla (Annelida, Arthropoda, Mollusca, Nematomorpha, and Platyhelminthes), categorized into nine traits related to life history, morphology, and habit. To account for variation in available trait information, we assigned confidence levels to each taxon and functional trait based on the level of evidence using fuzzy coding. Our dataset provides an important resource for understanding the ecology of benthic macroinvertebrates in South Korea, serving as a valuable baseline dataset for studying their biodiversity, conservation, and biomonitoring in freshwater ecosystems." (Authors)] Address: Park, Y.-S., Ecology & Ecological Informatics Lab., Dept of Biology, College of Science, Kyung Hee University, Seoul, 02447, Republic of Korea. Email: parkys@khu.ac.kr

22705. Agustin, E.P.; Zahro, M.; Rani, T.E.; Dwi, A.D.; Permatasari; Susanto, M.A.D. (2023): Diversity of dragonflies (Odonata) In Puthuk Panggang Welut waterfall area, Mojokerto district. *Al-Hayat: Journal of Biology and Applied Biology* 6(2): 171-181. (in English) ["Puthuk Panggang Welut is a natural tourist attraction in Mojokerto Regency, located on the slopes of Mount Penanggungan. The area includes a waterfall as its water source. This study aimed to determine the diversity of Odonata in the Puthuk Panggang Welut Waterfall area. The sampling method employed was a sweeping net. The research conducted in three locations revealed 12 species belonging to six families, comprising 265 individuals. The calculated species diversity value for this location was $H' = 1.52$. The waterfall location recorded 10 species, comprising 54 individuals from five families. The upper stream location exhibited four species, with a total count of 164 individuals from four families. In the lower stream location, there were five species from five families, with 47 individuals. The variation in dragonfly species and individual counts across the three research locations could be attributed to each area's differing vegetation, canopy, and environmental conditions." (Authors)] Address: Susanto, M.A.D., Dept of Biology, Universitas Brawijaya. Jl. Veteran, Malang 65145, Gedung Biologi, Indonesia

22706. Ahmed, B.; Amin, M.; Zia, A.; Qasim, M.; Khan, M.; Ullah, Z.; Khan, M. (2023): Dragonflies fauna (Odonata: Anisoptera) of Kech Balochistan, Pakistan. *Jammu Kashmir Journal of Agriculture* 3(3): 215-220. (in English) ["District Kech of the Balochistan province of Pakistan is explored in present study for exploring Odonata fauna. It is the baseline work conducted in this area for Odonata diversity. Baluchistan occupies an important geographic as well as geo political positioning being bordered with Iran and representing

palaearctic as well as traces of Afrotropical fauna. Current study revealed 11 species (*Pantala flavescens*, *Diplacodes lefebvrei*, *Trithemis kirbyi kirbyi*, *T. aurora*, *T. festiva*, *Brachydiplax sobrina*, *Crocothemis servilia*, *Sympetrum fonscolombii*, *Onychogomphus bistrigatus*, *Orthetrum sabina* and *Anax parthenope*) ... *Onychogomphus bistrigatus*, *Brachydiplax sobrina*, *Trithemis festiva*, *T. aurora*, and *Diplacodes lefebvrei* are first time reported from Balochistan province of Pakistan. ...” (Authors)] Address: Ahmed, B., Dept of Entomology, Balochistan Agriculture College, Quetta, Balochistan, Pakistan. Email: bejarahmed77@gmail.com

22707. Aiswaryalakshmi, A.R.; Abhin, M.S.; Bharath, M.R.; Firosh, R.; Habeel, S.; Sabu, T.; Nameer, P.O. (2023): A biodiversity assessment report of Poredam Temple Sacred Grove, Chadayamangalam, Kollam, India. *Ecology, Environment & Conservation* 29 (November Suppl. Issue): S240-S248. (in English) [“Sacred groves are areas of vegetation that have been conserved because of a religious or cultural custom. Spiritual convictions safeguard them. The biodiversity of the area where sacred groves are located benefits greatly from their exceptional habitat. Very few studies have been of the fauna from India’s holy woods. The study is based on the documentation of faunal diversity in Poredam Temple Sacred Grove, Chadayamangalam, Kollam. 127 faunal species were recorded in the study area. The faunal diversity consisted of 4 Mammals, 52 Aves, 8 Amphibians, 10 Reptiles and 27 Odonates and 29 Butterflies.” (Authors)] Address: Aiswaryalakshmi, A.R., College of Forestry, Kerala Agricultural University, Thrissur 680 656, India

22708. Aker, B.G.; Husseneder, C.; Foil, L.D. (2023): The influence of salinity and vegetation texture on the ecological roles of insects in tidal marshes in Louisiana. *Ecosphere* 14 (12), e4692: 13 pp. (in English) [“Tidal marsh insect communities are influenced by both salinity and aspects of vegetation texture (vegetation diversity, plant density, and architectural structure). These factors affect the abundances and intra- and interguild interactions of these insects and should result in broad-scale variation in the distribution and ecological functioning of tidal marsh insect communities along these gradients. However, this assumption has not been tested within Gulf Coast marshes, and the insect communities and their ecological roles are not well known. This study identifies how family-level insect biodiversity varies by salinity and which factors are most important in affecting the distribution of insect functional feeding groups within Louisiana’s coastal marshes. Insect family diversity was found to decrease as salinity increased for several indices. Vegetation texture and the underlying salinity gradient were found to be important factors affecting the distribution of free-living sucking, stem-boring, parasitic, and filtering functional feeding groups. ... During the study, 71 insect families were collected with 61 families collected from the low salinity zone, 64 from the mid salinity zone, and 39 from the high salinity zone. Across all salinity levels, individuals from the orders Diptera and Hemiptera were the most abundant although individuals from the orders Hymenoptera, Coleoptera, Thysanoptera, and Odonata [Coenagrionidae, Libellulidae] were additionally common.” (Authors)] Address: Aker, B.G. Dept of Entomology, Louisiana State University Agricultural Center, Baton Rouge, Louisiana, USA. Email: akergb@gmail.com

22709. Aleshina, D.G. (2023): Odonatofauna of the Oryol region. Natural and humanities sciences in the modern world, materials of the VI International Scientific and Practical Conference dedicated to the 115th anniversary of G.F. Lakin. Orel, 2023, Publisher: Oryol State University named after

I.S. Turgenev: 40-46. (in Russian, with English summary) [Oryol region, south of Moscow, 17 odonate species are listed, including *Nehalennia speciosa* and *Aeshna viridis*; *Calopteryx virgo*; *C. splendens*; *Enallagma cyathigerum*; *Coenagrion pulchellum*; *C. hastulatum*; *Nehalennia speciosa*; *Platycnemis pennipes*; *Lestes sponsa*; *Sympetma fusca*; *Aeshna grandis*; *A. juncea*; *A. viridis*; *Libellula depressa*; *Sympetrum flaveolum*; *Somatochlora metallica*; *Cordulia aenea*; *Gomphus vulgatissimus*] Address: Aleshnida, D.G., Federal State Budgetary Educational Inst. of Higher Education “Oryol State Univ. named after. I.S. Turgenev”, Orel

22710. Alzughoul, K.; Alhejoj, I. (2023): Aquatic macroinvertebrates as bioindicators of water quality in Wadi Mujib and Wadi Shueib, Jordan. *International Journal of Design & Nature and Ecodynamics* 18(6): 1325-1331. (in English) [“This study investigates the utility of macroinvertebrate assemblages as bioindicators for the environmental health of freshwater bodies in Wadi Mujib and Wadi Shueib. Twelve sampling stations were strategically selected along these wadies, and water quality was evaluated in relation to the occurrences of aquatic macroinvertebrates and specific environmental variables. Results demonstrate that the presence of sensitive macroinvertebrates, including *Theodoxus*, *Melanopsis*, *Turbellaria*, and *Amphipoda*, is indicative of good and clean water quality. In contrast, the existence of *Physa acuta*, tubifex worms, *Isopoda*, and *Simuliidae* suggests organic pollution. These macroinvertebrate assemblages establish themselves as valuable indicators of water pollution. A clear correlation was observed between distinct macroinvertebrate groups and water quality, underscoring the potential of these organisms as effective bioindicators, particularly in semi-arid regions experiencing high population growth, expanding industrialization, and increased use of agrochemicals and pharmaceutical products. Although the study validates the use of macroinvertebrates as water quality indicators, it also emphasizes the need for future studies to include other taxonomic groups as potential bioindicators. The inclusion of such groups could potentially refine the use of macroinvertebrate assemblages for water quality assessment.” (Authors) References to Odonata are made, but no details are given.] Address: Alhejoj, I., Dept of Geology, The Univ. of Jordan, Amman 1194, Jordan. Email: i.alhejoj@ju.edu.jo

22711. Amaral, L.G.R.; Oliveira, T.M.D.; Vilela, D.S.; Souza, M.M. (2023): Novos registros e significado ecológico de *Mecistogaster mielkei* Lacerda & Machado, 2019 (Odonata) em fragmentos de Mata Atlântica NO. josifii 2023. 15a Jornada Científica e Tecnológica 12o Simposio de Pós-Graduação do Ifsuldeminas: 4 pp. (in Portuguese) [“Therefore, the objective of the present work is to present new records of *M. mielkei* in the south of Minas Gerais and discuss its possible ecological significance. Collections were carried out randomly between 2018 and 2023 in the municipalities of Inconfidentes and Ouro Fino with the help of entomological networks. All records occurred at the end of the rainy season, which is interpreted as evidence of seasonality in the species' occurrence. It is believed that this seasonality is linked to the oviposition habit in phytotelmata. In this way, the work reflects the importance of conserving fragments of Atlantic forest associated with bamboo groves in the south of Minas Gerais, for the maintenance of *M. mielkei* populations, since the species depends on phytotelmata plants for its reproduction.” (Authors/Google translate) <https://josif.-ifsuldeminas.edu.br/ojs/index.php/anais/article/view/858/-1255>] Address: Amaral, Lara, Bolsista PIBIC/CNPq, IFSULDEMINAS – Campus Inconfidentes. E-mail: laramara.13@gmail.com

22712. Amusan, B.O.; Adeleke, S.O.; Abubakar, A.M. (2023): A survey of Odonata fauna of Obafemi Awolowo University along sites of varying degrees of human impacts. *Environ-tropica* 18: 55-65. (in English) ["Odonata are good indicators of habitat quality as the highest abundance and diversity are found in habitats with environmental heterogeneity. Odonate fauna was studied in five sites on Obafemi Awolowo University, Ile-Ife with the aim of determining the species composition and diversity of the Odonates. Odonata specimens were collected fortnightly from January to August, 2023 with the aid of aerial nets. A total of 238 individuals of Odonates representing 31 species distributed in 6 families were recorded in this study. Libellulidae was the most abundant and diverse family as it accounted for the highest number of species and 63% of the entire collection. *Palpopleura lucia* was the most abundant species and it was recorded in all the sampled sites. The highest abundance of Odonate specimens was recorded in Parks and Garden, a site with heterogeneous microhabitats. Odonata collection in this study was dominated by generalists and pollution tolerant species. This suggests a considerable level of habitat fragmentation brought about by uncontrolled anthropogenic disturbances within the University. It is therefore important that management and conservative practices are put in place to mitigate further degradation of the environment." (Authors)] Address: Amusan, B.O., Dept of Zoology, Obafemi Awolowo Univ., Ile-Ife, Nigeria. Email: tundeamusan5@yahoo.com

22713. Arnaud, J.-F.; Duputié, A.; Vignon, V. (2023): Dossier technique: Étude génétique de l'Agrion de Mercure à l'échelle de l'agglomération Strasbourgeoise et de son autoroute de contournement. Université de Lille – UMR CNRS 8198 Evo-Evo-Paléo / Bureau d'études O.G.E.: 17 pp. (in French) ["The purpose of this thesis work is to study on a fine and large spatial scale the genetic and genomic structure of populations of *Coenagrion mercuriale*, a species protected by the Habitat Directive and essentially dependent on the topography of the courses. water (Lorenzo-Carballe et al. 2015). This description of spatial genetic structuring will make it possible to infer the intensity of gene flow occurring between populations of *C. mercuriale*. This study is placed in the directly applied context of the study of the effects of watercourse modifications and habitat recreations as part of the Strasbourg bypass motorway project. *C. mercuriale* is in fact present at several watercourses crossed by the highway, some of which were redeveloped during its construction." (Authors)] Address: https://www.grand-est.developpement-durable.gouv.fr/IMG/pdf/3_dossier_agrion-25-01-2021.pdf

22714. Baird, I.R.C.; Burgin, S. (2023): Monitoring within-patch, flying season population dynamics of an endangered mire-dwelling dragonfly, *Petalura gigantea* (Odonata: Petaluridae). *Australian Zoologist* 43(2): 368-389. (in English) ["Understanding within-patch seasonal demographics of patchily distributed odonates is fundamental to understanding aspects of their behaviour, ecology, and landscape-scale population dynamics. Such knowledge underpins effective conservation management and is dependent upon appropriate survey methods. The objective of this study was to understand the within-patch, flying season, population dynamics of imagoes of the endangered mire-dwelling dragonfly, *Petalura gigantea*, using a modified Pollard Walk, a line transect survey technique. Relative abundance of imagoes was monitored at nominally weekly intervals, by sex, across the duration of the flying season in six mire patches in the Blue Mountains, New South Wales. There was a preponderance of adult males and a relatively consistent trend in changing relative abundance of adult males compared to females within mire

habitat across all surveys, with a marked seasonal peak in male abundance, confirming that surviving adult females generally occupy non-mire habitat other than for reproduction. This study confirmed the utility of this technique to monitor changing relative abundance of adult males within mire patches across a flying season, and potentially, for comparison among years for a separate, longitudinal, landscape-scale study. Successful use of the technique is contingent upon a sound understanding of the species' habitat preferences and behaviour, with caveats for survey timing and weather protocols, to satisfy minimum requirements for detectability, repeatability, and replicability. The technique could be used, with species- and habitat-specific modifications, for monitoring other patchily distributed odonates, including petalurids, and contribute to their improved conservation management." (Authors)] Address: Baird, I.R.C., Waimea St, Katoomba NSW 2780, Australia. Email: petalurids@gmail.com

22715. Baker, J.D. (2023): Patterns of gregarine parasitism in damselflies. MSc. thesis, Faculty of the Department of Biological Sciences, Sam Houston State University: 47 pp. (in English) ["Gregarines are a type of intestinal parasite found in invertebrates and are prevalent in damselflies. In this study, data was collected to examine patterns of prevalence and intensity and identify patterns of infection in damselflies. Three factors were studied to determine their effects on gregarine infections. The factors were season, sex, and pollution. This study examined gregarine infections in 242 individuals. The two most common species *Enallagma civile* and *Ischnura posita* were represented in two primary locations. These sites were the rural environment of Cook Pond, and the suburban environment of Elkins Lake. Damselflies were dissected and examined for gregarine infection from March 2022 through October 2022. The collection process was complicated by a drought that occurred during the middle season, which likely affected the results. Despite this, the collected data yielded several noteworthy results. The first was that infection rates shifted across seasons, with intensity and prevalence varying greatly at different points. Though these findings could have been influenced by the drought, it would take a longitudinal study to conclude. The second noteworthy finding was that females had a higher prevalence in Elkins, while males had a higher prevalence in Cook Pond. The final noteworthy finding was that Cook Pond had a higher prevalence and intensity, despite water data showing it to be less polluted of the two sites." (Author)] Address: <https://shsu-ir.tdl.org/server/api/core/bitstreams/00d1d2e0-1ab9-46bc-9a87-7682af6d8c07/content>

22716. Bernal Sanchez, A.; Conesa García, M.A. (2023): Confirmación de la reproducción de *Orthetrum ransonnetii* (Brauer, 1865) (Odonata: Libellulidae) en Fuerteventura (Islas Canarias). *Boletín de la Sociedad Entomológica Aragonesa* 73: 199-201. (in Spanish, with English summary) ["Confirmation of the reproduction of *O. ransonnetii* Fuerteventura (Canary Islands). The first record of an exuvia of *O. ransonnetii* on the island of Fuerteventura is reported ... During the sampling of its banks we found an exuvia of *O. ransonnetii* sheltered from the wind and sunlight. It was attached to a rock about 50 cm from the water surface. (record at 11:15 GMT on 04/22/2023 in UTM coordinates 28 R 607140 3150459, Datum: WGS84, at 100 m.a.s.l.)." (Authors)] Address: Bernal Sanchez, A., C/ Juan Ramón, Jiménez, 28, 11160-Barbate. Cádiz, Spain. Email: arturo.libelula@gmail.com

22717. Buczynski, P.; Biczynska, E.; Tarkowski, A.; Tanczuk, A.; Bojar, P. (2023): Wazki (Odonata) Kotliny Sandomierskiej (Polska południowo wschodnia): stan poznania i nowe

dane. Nowy Pam. Fizjogr. Warszawa 8(1–2): 21-65. (in Polish, with English summary) [Dragonflies (Odonata) of the Sandomierska Valley (south-eastern Poland): state of knowledge and new data: "The authors summarize data on dragonflies of the Sandomierz Basin – the largest of the Polish Subcarpathian basins. New materials from 78 sites are analysed as well as information derived from 64 publications and the so-called grey literature. Data on the occurrence of 68 species (92% of the national fauna) were compiled and commented, of which 67 have been contemporary found. The state of knowledge of individual areas of the region and its role in the protection of dragonflies was evaluated. The most urgent research needs and optimal directions for further research were given." (Authors)] Address: Buczynski, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

22718. Chandran, A.V.; JOSE, S.K.; DAWN, P. (2023): Description of the last instar larva of *Platylestes platystylus* (Rambur, 1842) from Kerala, India (Odonata: Lestidae). *Zootaxa* 5380(6): 587-594. (in English) ["The description of the final instar larva and the subsequent exuvia of *Platylestes platystylus* (Rambur, 1842) is given based on a single male larva collected from Kerala and reared in the laboratory. A brief account of the habitat of the damselfly and an updated key to the larvae of genera of Family Lestidae Calvert, 1901 are also provided." (Authors)] Address: Chandran, A.V., Aqua Research Lab, Department of Geology and Environmental Science, Christ College (Autonomous), Irinjalakuda, Thrissur, Kerala, 680125, India

22719. Chovanec, A. (2023): Die Libellenfauna von Leitenbach, Sandbach und Aschach (Oberösterreich) im Jahr 2022: aktueller Status und Vergleich mit 2015 (Insecta: Odonata). *Beiträge zur Entomofaunistik* 24: 3-31. (in German, with English summary) ["The dragonfly fauna of Leitenbach, Sandbach, and Aschach in Upper Austria, 2022: current status and comparison with 2015 (Insecta: Odonata). – From 2010 to 2014, at three small and medium-sized rivers in Upper Austria, Leitenbach, Sandbach, and Aschach, rehabilitation measures were implemented. From a river-typological point of view, the river sections are classified as transition zone between hyporhithron and epipotamon. An investigation of the Odonata, carried out in 2015, aimed at the evaluation of these measures. The paper at hand presents the results of an odonatological survey of these rivers, which was performed in 2022 to document changes of the habitat conditions reflected in the dragonfly fauna since 2015. In 2022 24 species were recorded, which corresponds to 31% of the species inventory of Austria (2015: 25 spp.). Nineteen of these species (2015: 21) were certainly, probably or possibly autochthonous at least at one river stretch. Nine of the 24 species are listed in the Austrian Red List with seven of them certainly, probably or possibly autochthonous at least at one of the river sections. As in 2015 *Ophiogomphus cecilia*, listed in the Annexes II and IV of the EU Habitats Directive, was certainly autochthonous. According to the EU Water Framework Directive, the evaluation of the dragonfly-based ecological status of the sections subjected to rehabilitation measures was based on comparing the current dragonfly fauna with a river type-specific reference community. Differences were assessed by the Odonata River Zonation-Index. The results of the index calculations were transformed into one of the five classes of the dragonfly-based ecological status. All five river type-specific target reference species autochthonously appeared at Leitenbach, Sandbach, and Aschach: *Calopteryx splendens*, *C. virgo*, *Gomphus vulgatissimus*, *Onychogomphus forcipatus*, and *Ophiogomphus*

cecilia. As in 2015, in 2022 the dragonfly-based ecological status of the rehabilitated sections of Leitenbach and Sandbach was classified as "high", in the case of the Aschach the evaluation revealed a "good status" (2015: "high"). The survey carried out in 2022 revealed changes in the composition of the dragonfly community: The strong development of aquatic and riparian vegetation resulted in the absence of several pioneer species found in 2015 and in records of species characteristic of habitats of advanced successional stages. The records of *E. lindenii* and *G. pulchellus* in 2022, both species not observed in 2015, are indicating these species' range expansion in Europe.] Address: Chovanec, A., Krottenbachgasse 68, 2345 Brunn am Gebirge, Austria. Email: andreas.chovanec@bml.gv.at

22720. Chovanec, A. (2023): Succession of the Odonata fauna at a small wetland in an overflow and seepage reservoir: results of a six-year study. *International Dragonfly Fund - Report* 182: 1-62. (in English, with German summary) ["An unintentionally created, small, permanent, groundwater-fed, and shallow wetland in Lower Austria was subject of an odonatological study carried out from 2016 to 2021. The water body (size 1.200 m²) was situated in an overflow and seepage reservoir created in 2014. As nobody - apart from the author - had access into the fenced area and as, therefore, there were no measures carried out, successional processes ran totally undisturbed. Main target of the study was to examine the odonate community's response to changing habitat conditions, in particular as far as the rapid development of helophyte stands is concerned. A high number of observation days (236) within the investigation period of six years allowed detailed phenological analyses, for example of emergence, maturation, and flight periods. Investigations were primarily focused on counting teneral, juveniles, and adults and on recording pairing wheels, tandems, and egg depositions. Exuviae, predominantly of Anisoptera, were sampled in the years 2016 and 2017. In the subsequent years, sampling of exuviae was widely waived in order to prevent damage to the reed stands associated with a "rejuvenation" of parts of the wetland and the unintentional creation of new small pioneer habitats. In 2016, the site could be characterised as a mosaic consisting of open water areas, open, sparsely and densely vegetated riparian areas, floating submerged macrophytes, and emergent amphibious vegetation of different heights. As of the summer 2018, the wetland was completely covered by the high-growing *Typha latifolia*, *hirsutum*, and *Phragmites australis*. Within the six years, a total of 32 species were recorded with the highest number (27) in 2016. Species with highest abundances were *Ischnura pumilio* with about 350 individuals in 2016 (sum of both generations), and *Sympetrum striolatum* with about 150 individuals also in 2016. *Orthetrum coerulescens*, in turn, was the only species colonising the site when completely covered by helophytes. Based on the findings of the study, it can be concluded, that *Pyrrhosoma nymphula* was the only species classified as permanently autochthonous in the period under scrutiny - even if only as a small population. The dragonfly community responded in various ways on changing, for most species deteriorating habitat conditions: decrease of the number of individuals and of the number of breeding species; increase of the species' number recorded only by single records; decrease of the duration of the species' presence at the site and, thus, reduction of the site-specific flight period compared with the species-specific flight period. In the third and fourth year of its appearance, the bivoltinous *I. pumilio* produced only the spring/early summer generation; the same occurred in *Ischnura elegans* in its second and third year. In several species changes in the reproductive behaviour were

observed. In this connection, key stimuli inducing and factors limiting pairing and egg deposition behaviour are discussed." (Author)] Address: Chovanec, A., Krotenbachgasse 68, 2345 Brunn am Gebirge, Austria. Email: andreas.chovanec@bml.gv.at

22721. Chovanec, A.; Hörweg, C. (2023): Beispiele der Räuber-Beute Beziehung zwischen Spinnen und Libellen (Araneae: Araneidae, Tetragnathidae; Odonata: Calopterygidae, Coenagrionidae, Libellulidae). *Mercuriale* 23: 1-19. (in German, with English summary) ["Examples of the predator-prey-relation ship between spiders and dragonflies (Araneae: Araneidae, Tetragnathidae; Odonata: Calopterygidae, Coenagrionidae, Libellulidae). – In this paper, the following interactions between spiders as predators and Odonata as prey are documented: Larinioides scolopetarius vs. Calopteryx virgo, Larinioides comutus vs. Orthetrum cancellatum, Argiope bruennichi vs. Sympetrum striolatum, A. bruennichi vs. Ischnura elegans, and Tetragnatha extensa vs. Ischnura pumilio. Larinioides scolopetarius is recorded for the first time as predator of an odonate species within scientific literature. Factors favouring the occurrence of the presented interactions are discussed." (Authors)] Address: Chovanec, A., Krotenbachgasse 68, A-2345 Brunn am Gebirge, Austria. Email: andreas.chovanec@bml.gv.at

22722. Chovanec, A.; Schaufler, K. (2023): Zwei individuenreiche Vorkommen von *Coenagrion scitulum* (Rambur, 1842) (Odonata: Coenagrionidae) in Niederösterreich, mit erstmaliger Dokumentation des Befalls durch *Limnochares aquatica* (Linnaeus, 1758) (Acari: Limnocharidae) sowie eines homospezifischen Triple-Tandems. *Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen* 75: 145-165. (in German, with English summary) ["Two occurrences of *Coenagrion scitulum* (Rambur, 1842) (Odonata: Coenagrionidae) rich in individuals in Lower Austria, with the first documentation of infestation by *Limnochares aquatica* (Linnaeus, 1758) (Acari: Limnocharidae) and of an anomalous tandem connection. – In 2021 and 2022, two populations of *C. scitulum* were found at two artificial ponds in Matzendorf-Hölles and Enzersdorf an der Fischa, both in Lower Austria. Both populations were rich in individuals, which is remarkable, because the majority of records comprise only single or small numbers of specimens. Characteristics of the two water bodies are compared to the species-specific habitat requirements described in the literature. For the first time, *C. scitulum* is documented as a host species for larvae of the water mite *L. aquatica*. Photos show different oviposition postures of *C. scitulum*; a special case is represented by a homospecific triple-tandem." (Author)] Address: Chovanec, A., Krotenbachgasse 68, 2345 Brunn am Gebirge, Austria. Email: andreas.chovanec@bml.gv.at

22723. Chovanec, A.; Kremsner-Kuhm, M. (2023): Eine Schlossauer als ungewöhnlicher Ort der Emergenz von Libellen (Odonata): *Enallagma cyathigerum* (Charpentier, 1840) (Coenagrionidae) und *Orthetrum cancellatum* (Linnaeus, 1758) (Libellulidae). *Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen* 75: 133-143. (in German, with English summary) ["One exuvia of *E. cyathigerum* and twelve exuviae as well as several teneral of *O. cancellatum*, were found fixed at a wall of Schönau castle (Lower Austria) nearby a large pond. The female of *E. cyathigerum* covered a total distance (calculated as a sum of the length of all horizontal and vertical stretches) of 6.7 m, which represents one of the longest walking distances of a damselfly species over land ever recorded. The maximum total distance measured for *O. cancellatum* was 6.3 m; the emergence place of this

specimen was a door in the wall which could be reached via three steps. Another exuvia of *O. cancellatum* was found at a tree trunk standing in front of the wall at a fixation height of 1.9 m. The lack of suitable emergence substrates in the breeding water, a large decorative basin made of concrete, may have caused the larvae to make these migrations." (Authors)] Address: Chovanec, A., Krotenbachgasse 68, 2345 Brunn am Gebirge, Austria. Email: andreas.chovanec@bml.gv.at

22724. Chovanec, A.; Schaufler, K. (2023): Libellenkundliche Untersuchungen an der Pram im Bereich Riedau / Zell und an Ausgleichsgewässern im Jahr 2023. Im Auftrag des Amtes der Oberösterreichischen Landesregierung, Dir. Umwelt und Wasserwirtschaft, Abt. Wasserwirtschaft, Kärntnerstr. 10-12, 4021 Linz. August 2023: 34 pp. (in German) ["The Pram in the Riedau / Zell area was the subject of extensive restructuring measures between 2011 and 2015. In addition, a chain of small, standing compensation bodies of water was created not far from the river. The impact of the measures was evaluated through a dragonfly study in 2016 (Chovanec 2016, 2017). The aim of this study from 2023 is to document interim changes in the dragonfly fauna and thus create a basis for any measures. The imaginary aspect-forming dragonfly fauna was surveyed over the course of five inspections. The basis for the evaluations of the species spectrum collected at the Pram was the methodological framework of the Rhithron-Potamon concept. Dragonfly ecological status was determined for both 2016 and 2023 based on the Odonata Stream Zonation Index (OFZI). In this, the proven inventory of certain, probable and possibly indigenous species is calculated and compared to a model of dragonfly science specific to the type of water. The calculated index value is assigned to one of the five classes of dragonfly ecological status. In the Riedau / Zell area, the Pram is part of the hyporhithral / epipotamal transition region. Ten species were detected on the Pram in 2023, eight of which were definitely, probably or possibly native. These eight species include the five water type-specific indicator species and three of the accompanying species. According to the Red List for Austria (Raab 2006), the three key species from the Gomphidae family are each classified as "endangered", the two *Calopteryx* species (also key species) are "potentially endangered". The occurrence of the species *Ophiogomphus cecilia*, which was listed in Appendices II and IV of the Fauna-Flora-Habitat Directive in 2016, was confirmed. However, in 2023 the population's occurrence was only limited to one of the three study sections; the number of individuals was lower than in 2016. The OFZI calculation resulted in a value of 1.7 for the entire section; This means that the dragonfly ecological status of the section of measures can currently be rated as "good". In 2016 he was "very good". The syntopic and individual-rich occurrence of *Calopteryx splendens* and *C. virgo* reflects the hyporhithral / epipotamal transitional character of the water section. From a dragonfly ecological perspective, a significant reduction in shading of the water by at least partially removing bank vegetation is recommended. This can, among other things, promote the population of the "FFH species" *O. cecilia*. In contrast to 2016, the compensation waters played no role as a habitat for dragonflies in 2023; They soon dried out completely and now represent more of an ecological trap (for example also for amphibians). A dotation regime is recommended that ensures a permanent water supply. Otherwise, no water should be discharged into the depressions in the terrain." (Author/Google translate)] Address: Chovanec, A., Krotenbachgasse 68, 2345 Brunn am Gebirge, Austria. Email: andreas.chovanec@bml.gv.at

22725. Chovanec, A. (2023): Ergebnisse einer libellenkundlichen Studie in Pöllau (Oststeiermark) mit Nachweisen zweier FFH-Arten: *Ophiogomphus cecilia* (Geoffroy in Fourcroy, 1785) (Odonata: Gomphidae) und *Cordulegaster heros* Theischinger, 1979 (Odonata: Cordulegastridae). Beiträge zur Entomofaunistik 24: 123-145. (in German, with English summary) ["Results of an odonatological survey in Pöllau (Eastern Styria, Austria) with records of two FFH-species: *Ophiogomphus cecilia* (Geoffroy in Fourcroy, 1785) (Odonata: Gomphidae) and *Cordulegaster heros* Theischinger, 1979 (Odonata: Cordulegastridae). – In the year 2023, a small rhithron river (Pöllauer Saifen) and a man-made standing water (Gruber-Teich) in Pöllau (Eastern Styria, Austria) were subject to an odonatological investigation. Records of orientating excursions carried out in 2021 and 2022 were included into the results. The survey revealed a total of 26 species, which corresponds to 33% of the Austrian and 40% of the Styrian species inventory. Each of the nine Odonata families occurring in Austria was represented by at least one species. The odonate community was characterised by high numbers of individuals: Seven species occurred in the highest abundance class. Twelve species are listed in the Red List of endangered Odonata for Styria from 2021: One species is "endangered", four are "vulnerable", and seven "near threatened". At the Pöllauer Saifen nine species were observed; most remarkable are the records of *C. heros* and *O. cecilia*, both are cited in the Annexes II and IV of the Habitats Directive of the EU. The river section investigated is characterised by a mosaic of different velocity and substrate patterns (from sand, fine, medium and coarse gravel to large stones). The Gruber-Teich, an artificial "swimming biotope" with a size of 4.000 m², was colonised by 22 species from various ecological guilds. The standing water body is characterised by an open water area, open littoral zones and areas sparsely and densely vegetated by reed and floating-leaved macrophytes. The resulting structural heterogeneity favours the occurrence of an odonate fauna rich in species." (Author)] Address: Chovanec, A., Krotenbachgasse 68, 2345 Brunn am Gebirge, Austria. Email: andreas.chovanec@bml.gv.at

22726. Chovanec, A. (2023): Libellen in Pöllau (Oststeiermark). Im Auftrag des Vereins Naturpark Pöllauer Tal, Schlosspark 50, 8225 Pöllau: 47 pp. (in German, with English summary) ["In the year 2023, a small rhithron river (Pöllauer Saifen) and a man-made standing water (Gruber-Teich) in Pöllau (Eastern Styria, Austria) were subject to an odonatological investigation. Records of orientating excursions carried out in 2021 and 2022 were included into the results. The survey revealed a total of 26 species, which corresponds to 33 % of the Austrian and 40 % of the Styrian species inventory. Each of the nine Odonata families occurring in Austria was represented by a least one species. Twelve species are classified in one of the threat categories of the Red List for Styria from 2021: One species is "endangered", four are "vulnerable", and seven "near threatened". At the Pöllauer Saifen nine species were observed; most remarkable are the records of *Cordulegaster heros* and *Ophiogomphus cecilia*, both are listed in the Annexes II and IV of the Habitats Directive of the EU. The river section investigated is characterised by a mosaic of different velocity and substrate patterns: from sand, fine, medium and coarse gravel to large stones. The Gruber-Teich, an artificial "swimming biotope" with a size of 4.000 m², was colonised by 22 species from various ecological guilds. Inter alia, a large population of the "endangered" *Coenagrion scitulum* was found. The standing water body is characterised by an open water area, open littoral zones and areas sparsely and densely vegetated by reed and floating-leaved macrophytes. The resultant structural

heterogeneity favours the occurrence of an odonate fauna rich in species." (Author)] Address: Chovanec, A., Krotenbachgasse 68, 2345 Brunn am Gebirge

22727. Craves, J.A.; O'Brien, D.S.; Hernandez, J. (2023): Plains Emerald (*Somatochlora ensigera*): New for Michigan. *Argia* 35(3): 34-36. (in English) ["*S. ensigera* is added to the Michigan list of Odonata based on nymphs collected in 2022 in the western Upper Peninsula. ... Collection sites and habitat notes: The two nymphs that resolved in the DNA analysis as Plains Emeralds were collected in the Little River southeast of the town of Wallace, ~8 km east of the Wisconsin border (Fig. 1). At this site, the riparian zone was >45 m and dominated by native vegetation including trees and shrubs. Canopy cover was estimated at 65% with mature trees observed along the stream banks. The average stream width was 5.75 m and the average depth was 0.33 m. The stream substrate composition was estimated to be made up of mostly sand (~50%), followed by silt (~30%), cobble (~10%), and gravel (~10%). Aquatic macrophytes were sparse. The third nymph, whose morphology suggested Plains Emerald but whose DNA failed to sequence, was collected further south, in Kelley Creek, northwest of the town of Birch Creek and ~5.5 km east of the Wisconsin border (Fig. 2). The forested riparian zone was >45 m and dominated by native vegetation including trees and shrubs, with agricultural fields outside the forested buffer. Canopy cover was estimated at 30% with fewer mature trees present than at the Little River site. The average stream width was 4.5 m and the average depth was 0.25 m. The stream substrate composition was estimated to be made up of mostly gravel (~40%), followed by cobble (~25%), sand (~20%), silt (~10%), and boulder (~5%). Aquatic macrophytes were sparse." (Authors)] Address: Craves, Julie, 12200 Centennial Lane, Ann Arbor, MI 48103, 2604 West Lapeer, Lansing, MI 48933, USA. E-mail: jcraves@umich.edu

22728. Da Silva Lima, L.; Da Silva, N.J.; Kowalczyk, V.G.L. (2023): Criação de larvas de Odonata no municípios do Cantá e de Boa Vista, Roraima, em condiaços de laboratório. *Zoologia: Divulgando o Conhecimento Científica*, Chapter 7. Editora Científica Digital: 105-116. (in Portuguese) [Brazil; "This work aims to understand the species of Odonata, through the rearing of larvae in laboratory conditions to reach the adult stage. Methods: For collection, a type D entomological net was used to collect individuals from streams in the municipalities of Cantá (N02°27.519'W060°44.433'; N02°22.803' W060°32.939) and Boa Vista (N 02°59.328' W 060°34.308'; N 02°59.313' W 060°34.358'). The net was passed over different types of substrates: sandy bottom, bottom leaves, macrophytes, decomposing trunk, branches and roots. The collected substrate was placed in plastic trays for on-site sorting of the material. At the Aquatic Invertebrate Laboratory, the larvae remained in individual Styrofoam boxes at an ambient temperature of 24°-25°C; to feed the larvae, sporadic collections of Diptera and Oligochaeta larvae were carried out. Results: 77 Odonata larvae were obtained (44 in the dry season and 33 in the rainy season). Of this total, 20 larvae reached the adult stage and 57 did not survive, although 23 underwent ecdysis, but did not complete the cycle. The larvae belonged to the Corduliidae, Gomphidae, Libellulidae, Coenagrionidae, Megapodagrionidae, Perilestidae, and Protoneuridae. Only larvae from Calopterygidae, Coenagrionidae, Libellulidae and Protoneuridae reached adulthood. The time taken for the larvae to emerge varied from two to 14 weeks. The present study demonstrates that traditional larvae rearing techniques are a viable procedure to expand knowledge of the biology of these organisms, as

well as to improve the taxonomic identification of Odonata in Roraima streams." (Authors/Google translate)] Address: <https://www.editoracientifica.com.br/artigos/criacao-de-larvas-de-odonata-no-municipio-do-canta-e-boa-vista-roraima-em-condicoes-de-laboratorio>

22729. del Val, L.; Murga, A.A. (2023): Primera cita de *Trithemis kirbyi* Sélys, 1891 (Odonata: Libellulidae) en Cantabria (norte de la península ibérica). *Boletín de la Sociedad Entomológica Aragonesa* 72: 213-214. (in Spanish, with English summary) ["First records in Cantabria: According to the aforementioned records (Navarra and Guipuzkoa in 2017 and Bizkaia in 2019) and the absence of them in Galicia and Asturias, it seems that the species is expanding through the north of the peninsula from the east. The first observations in Cantabria are from September 7, 2022, authored by Gabriel Esturo Rodríguez who observed and photographed an individual in an urban pond in the town of Colindres at 6:00 p.m. Subsequently, the authors of this manuscript observed in that same place an individual of *T. kirbyi* on September 13 and two specimens on September 14, both males, seen simultaneously. The last observation was on day 16, when the presence of a single individual was recorded. The following days there were no more sightings. The specimens were observed in the central hours of the day, between 12:30 and 16:00 (except the day when they were seen at 18:00), perched on one of the cement curbs of the pond. They sunbathed, in the typical obelisk posture (Fig. 1) and made small flights, to return to land in the same place. As for the place where the specimens were observed, it is a recently built cement urban pond about 40 cm deep (Parque de Viar, 2019). It has a small patch of cattails and yellow lilies on one side and the rest is a sheet of open water, with a pedestrian walkway that crosses it. It is located next to the Colindres Town Hall square, in the heart of the town (Fig. 2). Due to its location (coastal municipality) and the specific place of the sighting (geographic coordinates with WGS84 datum: 43.394623, -3.446746), it is the northernmost event to date in the Iberian Peninsula. In the same place, some specimens of *Ischnura graellsii* were observed (in the small patch of cattails) and several males of *Sympetrum fonscolombii*, among which interaction with *T. kirbyi* was observed in a form of brief confrontations in the air. With this new addition, there are now 52 (23 zygopterans and 29 anisopterans) species of odonates cited in Cantabria (de Vega & Aldama, 2019)." (Authors/Google translate)] Address: del Val, L., Técnico de la Sociedad Española de Ornitología en el P.N. Marismas de Santoña, Victoria y Joyel. Carretera de Soano, nº 4, 1º centro. 39180 Noja, Cantabria, Spain. Email: ludovicodevega@hotmail.com

22730. Demir, H.; Kaya, B. (2023): Investigation of the aerodynamic effects of bio-inspired modifications on airfoil at low Reynolds number. *Journal of Mechanical Engineering and Sciences* 17(4): 9715-9724. (in English) ["A numerical study was performed to investigate flow behaviors around bio-inspired modified airfoils compared with NACA 4412 airfoil at $Re=5.8 \times 10^4$ by solving the two-dimensional, RANS equations with $k-\omega$ STT turbulence model. The obtained results reveal a rather abrupt decrease of lift at stall for the NACA 4412 airfoil in contrast to the mild stall depicted by the top-modified airfoil. As compared to the experimental results of the profiled airfoil in the literature, the characteristic behavior of the variation in the lift coefficient shows resemblance. It is seen that from the velocity distribution results, fluid flowed smoothly along the streamlined nose of NACA 4412 airfoil until $\alpha=4^\circ$ and streamlines adhered well for both airfoils at low angles (0° , 2°). Smaller circulation

bubbles were noticed to settle in the canyons of the corrugated cross-section of the top-modified airfoil. In the wake region of the modified airfoil, there is no obvious large flow separation or circulation region at low angles of attack. However, the blue regions of the dimensionless velocity over the NACA 4412 airfoil and bottom-modified airfoil were narrower than over the top-modified airfoil. The recirculation zone over the airfoil started to enlarge, and the rolling up of the trailing-edge vortex appeared. After $\alpha=12^\circ$, the adverse pressure gradient on the suction side of the airfoils became more intense. In the wake zones, it was seen that the circulation regions grew remarkably and became largest as the angle of attack rose to $\alpha=16^\circ$, which pointed out increased drag forces of airfoils.] Address: Demir, H., Dept of Mechanical Engineering, Aksaray University, 68100 Aksaray, Turkey. Email: hmdemir@aksaray.edu.tr

22731. Deregnacourt, I.; Bardin, J.; Villier, L.; Julliard, R.; Béthoux, O. (2023): Disparification and extinction trade-offs shaped the evolution of Permian to Jurassic Odonata. *iScience* 26, 107420; <https://doi.org/10.1016/j.isci.2023.107420>: 18 pp. (in English) ["Highlights: • In 150 million years early dragonflies steadily lost morphological diversity. Permian–Triassic and Triassic–Jurassic transitions witnessed major restructurings. In both cases selective extinction of iconic groups was balanced by disparification. Early representatives of Odonata continuously evolved new shapes. Abstract: Owing to their prevalence in nowadays terrestrial ecosystems, insects are a relevant group to assess the impact of mass extinctions on emerged land. However, limitations of the insect fossil record make it difficult to assess the impact of such events based on taxonomic diversity alone. Therefore, we documented trends in morphological diversity, i.e. disparity, using wings of Permian to Jurassic Odonata as model. Our results show a decreasing trend in disparity while species richness increased. Both the Permian–Triassic and Triassic–Jurassic transitions are revealed as important events, associated with strong morphospace restructuring due to selective extinction. In each case, a recovery was assured by the diversification of new forms compensating the loss of others. Early representatives of Odonata continuously evolved new shapes, a pattern contrasting with the classical assertion of a morphospace fulfilled early and followed by selective extinctions and specialization within it." (Authors)] Address: Deregnacourt, Isabelle, Centre de Recherche en Paléontologie – Paris (CR2P), Sorbonne Université, MNHN, CNRS, 57 rue Cuvier, CP38, F-75005 Paris, France

22732. Devidas, B.A.; Rout, S.; Kumar, S. (2023): Odonates of Jamtara Forest Division, Jamtara, Jharkhand, India. *Journal of biodiversity and Conservation* 7(2): 52-59. (in English) [Between May 2023 and October 2023, 30 odonate species were documented in Jamtara Forest Division (JFD), Jharkhand.] Address: Kumar, S., Animal Science Division, Ambika Prasad Research Foundation, Odisha, India. Email: sanjeetaprf@gmail.com

22733. Dirisu, A.-R.; El Surtasi, E.I. (2023): Microhabitat associated macrofauna of lotic and lentic systems in the Agbede wetlands, southern Nigeria. *Tropical Ecology* 64: 543-557. (in English) ["Although studies on the macrofauna of lotic and lentic environments are common, investigations on microhabitat associated macrofauna of lotic and lentic systems are limited. Microhabitat associated macrofauna of lotic and lentic ecological systems within Agbede wetlands were investigated for eighteen months. Results revealed that most of the macrofauna were associated with the littoral

matrix rich in macrophytes (constituting about 70.75% of macrofauna in the littoral, with 3278 individuals) and about 29.25% in sediment matrix (with 1355 individuals). Higher population of macrofauna was recorded in the lotic systems. Dipterans were the dominant group (39.28%) while the sub-dominant groups were in the order: Ephemeroptera (14.46%) > Decapoda (10.96%) > Odonata (10.02%) > Coleoptera (8.63%) > Amphibians (7.42%). Littoral microhabitats rich in macrophytes and wood logs particularly in the lotic ecosystems were richer in taxa composition and population density when compared to the sediment matrix. Multivariate analyses were used to test for the associations between littoral-macrofauna and sediment-macrofauna across the study stations of the ecosystems. Meanwhile, water temperature, flow velocity and hardness of water were the major environmental variables correlated with littoral fauna. Likewise, infauna species were more correlated with total hydrocarbon content, concentrations of sodium and calcium, including cadmium and zinc. The ecological significance of this study is that the macrofauna of microhabitats within same wetlands catchment do have differential species composition and diversity, depending on the matrix, substrate condition and flow status." (Authors) The identification of Odonata is wrong resulting on South-American or European taxa.] Address: Dirisu, A.-R., Dept of Animal & Environmental Biol., Fac. Life Sci., Univ. of Benin, P.M.B 1154, Benin City, Edo State, Nigeria

22734. Dobovisek, M.; Ottolenghi, C.; Škerjanc, B.; Vadnjal, D.; Bahor, M.; Vinko, D. (2023): First records of Violet Dropwing (*Trithemis annulata*) (Palisot de Beauvois, 1807) (Odonata: Libellulidae) in Slovenian Istria. *Acta entomologica serbica* 31(2): 207-210. (in Slovenian, with English summary) ["The records of *T. annulata* at Fiesa Lake and Lake Vanganelso jezero in 2023 are the first for this dragonfly species for Slovenian Istria (SW Slovenia) and the 3rd and 4th known location for this species in Slovenia. First reported observations of juvenile specimens in Slovenia indicates that the species may be successfully developing in the country." (Authors)] Address: Dobovisek, Mitja, Cesta Alojza Travna 19, SI-4270 Jesenice, Slovenia. Email: mitjadobovisek006@gmail.com

22735. Döler, H.-P., (2023): *Lestes virens vestalis* und *Leucorrhinia pectoralis* breiten sich auf der Ostalb aus (Odonata: Lestidae, Libellulidae). *Mercuriale* 23: 37-55. (in German, with English summary) [Baden-Württemberg, Germany; "*Lestes virens vestalis* and *Leucorrhinia pectoralis* are spreading across the eastern Swabian Alb (Odonata: Lestidae, Libellulidae) - As part of the dragonfly species Conservation program, a total of 54 stillwaters were surveyed in the eastern Swabian Alb, Germany (in the following called Ostalb) in 2017 and 2018, as well as in 2021 and 2022. These habitats are pools, ponds and so-called Hülben - diggings, that originally served as cattle watering places in this dry karstified mountains. The project area is located on the plateau of the Ostalb and essentially belongs to the natural unit Albuch and Härtsfeld. The first record of *L. virens vestalis* near Ogenhausen dates back to 2010, and a clear spreading trend could be observed. The number of water bodies where *L. virens* was detected increased to 15 in 2018 and in 2021 and 2022 as many as 23 new sites were discovered. Overall, the number of record sites in this region increased to a total of 38, of which at least at twelve sites successful reproduction has been proofed. *L. pectoralis* has been observed firstly in 2009 in the nature reserve „Rauhe Wiese“. Since then, another ten locations were discovered. Nine of them represent current evidence (recording 2021 and 2022). These are meso- to dystrophic pools, hollows and ponds, that are

mostly located within forest areas. The increase in the number of records indicates that the species is spreading in the Ostalb. At least, in three water bodies *L. pectoralis* probably reproduces successfully. The increase in records of *L. virens* and *L. pectoralis* on the Ostalb is both climate related and the result of ongoing maintenance and habitat improvement measures, including the creation of new dragonfly waters. Despite optimal Conservation and enhancement measures, further climate-induced species shifts are to be expected. The possible losers could include *Coenagrion hastulatum*, because in contrast to *L. virens* and *L. pectoralis*, the spearhead bluet seems to be losing ground on the Ostalb." (Author)] Address: Döler, H.-P., Drei-Kreuz-Str. 22 78597 Im-dorf, Germany. Email: hp.doeler@t-online.de

22736. Dorji, U.; Wangchuk, K.; Moktan, S.; Tenzin, U. (2023): Freshwater metacommunity structure of Suchhu River, Haa District, Bhutan. *Bhutan Journal of Natural Resources & Development* 10(2): 28-40. (in English) ["Bhutan is endowed with rich river systems which inhabit a multitude of aquatic species. However, the increasing developmental activities, urbanization, rural-urban migration, growing water demand, and land use alterations pose substantial risks and imminent threats to freshwater biodiversity. The study aimed to evaluate the diversity and spatial distribution of fish and benthic macroinvertebrates in Suchhu river, Haa. Data collection for the study was conducted during the monsoon and post-monsoon seasons, in July and October of 2021. The data collection followed a systematic random sampling, with samples collected at 1-kilometre intervals spanning 30 sampling stretches, each measuring 200 metres in length. Overall, a total of 632 fishes were encountered belonging to 8 species under 3 families from 30 sampling stretches. The overall fish species diversity in the river was $H' = 0.68$, species evenness $E H = 0.33$, and species richness $S R = 2.50$. Concomitantly, a total of 265 samples of macroinvertebrates were collected belonging to 10 families under 8 orders. A total of 10 species were recorded and the species diversity for macroinvertebrates was found to be $H' = 1.73$, species evenness $E H = 1.57$ and species richness $S R = 0.83$. A total of 13 species (9 phytoplankton and 4 zooplankton) under 9 families and 9 orders were recorded. The species diversity was found to be $H' = 1.68$, species evenness $E H = 0.65$ and species richness $S R = 4.54$. The study emphasizes addressing environmental impacts from development, urbanization, and land use changes to protect freshwater biodiversity. Analyzing fish and macroinvertebrate metacommunity structure enhances our understanding of ecological consequences, promoting freshwater ecosystem sustainability." (Authors) "*Cordulegaster* sp." accounted with 7.92% to relative abundance of macroinvertebrates in Suchhu.] Address: Dorji, U., College of Natural Resources, Royal University of Bhutan. Email: ugyen.cnr@rub.edu

22737. Dosch, O. (2023): Libellenmonitoring Alp Flix 2021 & 2022. Schlussbericht. Bern, 28.03.2023. Auftraggeber: Verein Parc Ela, Stradung 11, 7450 Tiefencastel; Amt für Natur und Umwelt, Ringstr. 10, 7001 Chur; Stiftung Schatzinsel Alp Flix, c/o Gemeindevorstand Sur, 7465 Surses, Switzerland. Auftragnehmer: Atra Naturschutz GmbH, Felsenaustr. 17, 3004 Bern, Switzerland: 21 pp. (in German) ["Conclusion: Extreme weather events will continue to increase in the future due to climate change. As a result, alpine habitats could also come under increasing pressure. This was very clear in the field recordings in the extremely wet summer of 2021 and in the extremely dry & hot summer of 2022. The very warm water temperatures in 2022 and the high number of moors that have been dry for several weeks

are cause for concern. The species composition of dragonflies on Alp Flix appears to have changed since Wildermuth and Knapp's field recordings. Several species that were detected in the field recordings by Wildermuth and Knapp were no longer found in the 2021 and 2022 field recordings, such as *Lestes dryas*, *Aeshna caerulea* or *Sympetrum flaveolum*. Data collected in the 2021 and 2022 field surveys may indicate that *Somatochlora arctica* populations are also declining. In contrast, *Aeshna juncea*, *Somatochlora alpestris* and *Leucorrhinia dubia* appear to be spreading in particular. These species could potentially benefit from increasing warming caused by climate change. Reasons for a possible change in species composition could be, among other things, climate change. The temperature data collected seems to indicate this, as very high water temperatures were recorded for some bodies of water over a long period of time. It is conceivable that certain species could be increasingly displaced from Alp Flix, especially if the water balance of the moors on Alp Flix continues to be disturbed and degradation thus continues. The damage caused by footfalls in 2021 and 2022 could also prove fatal for dragonfly populations. In order to protect the dragonfly species, further measures must be taken to protect the moors from damage and to restore their water balance." (Author/Google translate)] Address: Atra Naturschutz GmbH, Dosch, O., Felsenaustr. 17, 3004 Bern, Switzerland

22738. Elme-Tumpay, A.; Zuñiga-Rivas, D.B.; Bustamante-Navarrete, A. (2023): Inventario preliminar de Odonata (Insecta) en el Área de Conservación Regional Choquequirao, Cusco, Perú. *Graellsia* 79(2): e204: 11 pp. (in Spanish, with English summary) ["The Choquequirao Regional Conservation Area (RCA) is a Protected Natural Area (PNA), located in the department of Cusco, Peru. The aim of this study is to present a preliminary inventory of Odonata in this PNA. We recorded 10 species belonging to four families and comments on their distribution are added. *Anax amazili*, *Tramea darwini*, and *Pantala hymenaea* are new records for the department of Cusco; in addition, the altitudinal range for *A. amazili* and *T. darwini* in the country is extended to 2580 m a.s.l. Finally, *Tramea rustica* is recorded for the first time in Peru. This study contributes to improving the knowledge of the Peruvian odonatofauna in this ACR; however, more research is required in this area and other unexplored departments." (Authors) Additional taxa listed: *Rhionaeschna marchali*, *Rhionaeschna peralta*, *Rhionaeschna obscura*, *Gomphomacromia fallax*, *Pantala flavescens*, *Oreiallagma* sp.] Address: Elme-Tumpay, Arseli, Univ. Nacional de Avellaneda, Laboratorio de Biodiversidad y Genética Ambiental (BioGeA), Mario Bravo 1460, CP1870 Piñeyro, Avellaneda, Buenos Aires, Argentina. Email: araselmt@gmail.com

22739. Felker, A.S. (2023): New Taxa of Damselflies (Protozoptera) from the Permian of the East European Platform. *Paleontological Journal* 57(8): 857-914. (in English) ["A new classification system for Protozoptera is proposed. It is based on mass material from the Isady, Chekarda and Soyana localities. The new system is based on a set of wing venation characters. The hypothesis on the division of Protozoptera based on their body structures is supplemented and confirmed (Nel et al., 2012). A three-segmented tarsal structure has been established for the archizyopteran family Kennedyidae. The infraorder Permagonomorpha infraordo nov. is established. An additional character has been proposed to separate archizyopterans and permagonomorphs based on the structure and morphology of the thorax. Lodeviidae is synonymized with Permagonoridae (junior synonym). Two new families, four new

genera and 14 new species are described. A new family Progoneuridae fam. nov. is described based on a significant reduction in the wing longitudinal and transverse venation. It includes the genera Progoneura Carpenter, 1931; Azaroneura Nel et al., 2012; Progophlebia Felker, 2021, and Issadoneura gen. nov. (with a new species *Issadoneura marilevorum* gen. et sp. nov.). Based on re-examination of the type material from Chekarda, the genus Engellestes Nel et al., 2012 is assigned to a new family Engellestidae fam. nov. The following voltzialestids are described from the Upper Permian of the Vologda Region: Prototerskeja dubia gen. et sp. nov., Permosticta elegans gen. et sp. nov., and Permosticta parva gen. et sp. nov. The diagnosis of the family Voltzialestidae is changed because of the inclusion of new genera. The genus Sushkinia Martynov, 1930 is transferred to Permagonoridae. The following permagonorids are described: Permagonion sharovi sp. nov., Permolestes obscurus sp. nov., P. vjatkensis sp. nov., Salagoulestes martynovi sp. nov., Solikamptilon aequus sp. nov., Sushkinia angulata sp. nov., Triadolestes sakmarensis gen. et sp. nov., and T. mutovkensis gen. et sp. nov. The new material from Isady and Kargala suggests closer relationships of the Permian Permagonomorpha and Triassic Triadophlebiomorpha. In the family Kennedyidae, Kennedyia sylvensis sp. nov. and K. volatica sp. nov. are described from Chekarda, and K. ivensis Nel et al., 2012 is redescribed from Soyana." (Author)] Address: Felker, A.S., Borissiak Paleontological Institute, 117647, Moscow, Russia

22740. Ferguson, D.G.; Marinov, M.; Saxton, N.A.; Rashni, B.; Bybee, S.M. (2023): Phylogeny and classification of Nesobasis Selys, 1891 and Vanuatubasis Ober & Staniczek, 2009 (Odonata: Coenagrionidae). *Insect Systematics & Evolution* 54: 555-572. (in English) ["Island archipelagos in the South Pacific have relatively high species endemism within the insect order Odonata, specifically damselflies. *Nesobasis* Selys, 1891, an endemic damselfly genus from Fiji, includes over 20 species, but a clear understanding of its evolutionary relationship to other damselflies in the region is lacking. Scientists have questioned the monophyly of *Nesobasis* due to variations within the genus leading to the establishment of three divisions provisionally named as: comosa-, erythrosp- and longistyla- groups. However, *Nesobasis* has shown to be monophyletic in previous phylogenetic analyses. Using additional species in this study, we investigate the phylogenetic relationships between *Nesobasis* and other damselflies from the region, specifically the endemic *Vanuatubasis* Ober & Staniczek, 2009 from the neighboring island archipelagos of Vanuatu. The relationship between these taxa has not yet been examined with molecular data. Five genes were used in a maximum likelihood phylogenetic reconstruction and examined morphological data to determine the relationship between these genera. Our results recover three distinct clades overall with *Vanuatubasis* nested within *Nesobasis* (i.e., non-monophyletic). *Vanuatubasis* is sister to the longistyla and erythrosp groups. The third group, comosa, was found sister to the clade of *Vanuatubasis* (longistyla + erythrosp). As a result of these findings, we propose the new genus, *Nikoulabasis* gen. nov." (Authors) Erratum: The article "Phylogeny and classification of *Nesobasis* Selys, 1891 and *Vanuatubasis* Ober & Staniczek, 2009 (Odonata: Coenagrionidae)" by Daniel G. Ferguson, Milen Marinov, Natalie A. Saxton, Bindya Rashni and Seth M. Bybee, published in *Insect Systematics & Evolution* Volume 54, No. 5 (2023), DOI: 10.1163/1876312X-bja10049, contains an erratum. On p. 566, the description of Figure 5 should read: Fig. 5. Diagnostic features of *Nikoulabasis*: (A) pronotum without keel, N. comosa; (B–C) cerci and paraprocts, N. heteroneura;

(D–E) penises of *N. aurantiaca* (D), *N. malcolmi* (E); (F–G) mesostigmal plate without raised tubercle, *N. aurantiaca* (F) and with raised auricle *N. martina* (G). Thus replacing: Fig. 5. Diagnostic features of *Nikoulabasis*: (A) pronotum without keel, *N. comosa*; (B–C) cerci and paraprocts, *N. heteroneura*; (D–E) penises of *N. aurantiaca* (D), *N. malcolmi* (E); (F) ovipositor, *N. comosa*; (G–H) mesostigmal plate without raised tubercle, *N. aurantiaca* (G) and with raised auricle *N. martina* (H). The corrected version of the article has been published online. The Editors would like to apologize for any inconvenience.] Address: Ferguson, D.D., Dept Biology and Monte L. Bean Museum, Brigham Young Univ., 4102 LSB, Provo, UT 84602, USA. Email: danferg21@gmail.com

22741. Fischer, I.; Kargl, V.; Chovanec, A.; Haring, E. (2023): Endbericht – Krebse und Libellen in den ländlichen Gebieten Wiens und das Potenzial von DNA-Barcoding-Methoden für deren Erfassung und Management. Projektteil A – Libellen. Projekt im Rahmen des Österreichischen Programms für die ländliche Entwicklung 2014 – 2020. Projektdauer: 01.01.2020 – 31.12.2022: 135 pp. (in German) ["The results of the eDNA barcoding method and the traditional survey corresponded well. On flowing waters and small still bodies of water (< 10 m²), the results agreed almost 100%, with eDNA even being able to detect more native species in small still bodies of water than using traditional imaginary mapping. However, it should be mentioned that the investigation of the rivers was almost exclusively limited to the detection of the two *Cordulegaster* species (*C. heros* and *C. bidentata*). In larger water systems, such as eyewaters, the traditional survey had an advantage, but here too it was possible to detect species that only occur in very low abundances. In general, the frequency of a species in rivers and in the Lobau played a significant role in its detectability using eDNA. As the biomass of a species increased, its detection became more likely. If a target organism is in an early colonization stage and therefore only present in low abundance, special attention must be paid to technical replicas. The time of sampling also emerged as an important parameter. This should be in the phase of development when the larvae show high activity and thus a high metabolic rate. For dragonflies, based on the data generated, sampling between the end of April and mid-July can be recommended for all water types. Before the emergence period begins, the activity level is high and the biomass is greatest. The number of sampling runs that should be carried out during this period depends on the respective question and the type of water body. When it comes to standing water, the size of the water plays an important role. For larger still waters (> 10 m²), we recommend at least four samplings in the specified period. We recommend a number of three samplings for small bodies of water and two samplings for flowing waters shortly before and during the emergence period in order to be able to detect all target species. In addition to the total number of sampling runs, the number of water samples taken per sampling run and the number of PCR replicates in the laboratory are also essential. In many cases, the detection of dragonfly eDNA was based on only a fraction of the water samples taken and a few PCR repeats. Studies show that a larger number of water samples per pass increases the filtered water volume and thus increases the probability of detection. A significantly positive correlation of the water volume with the eDNA detections was found when all Lobau locations were included in the statistical analyses. In waters with a lot of suspended matter/fine sediment, it may make sense to use several filters per sampling and not to use them to the point that the pores become blocked. Increasing the number of PCR replicates to at least four further reduces the likelihood of false negative results.

Of the physico-chemical parameters, only the water temperature in the rivers had a positive effect on the detection, which is probably more related to the higher activity of the larvae mentioned above. Conductivity and pH value did not show a significant connection with the detectability of dragonflies using eDNA in any type of water body. The evaluation of the remaining habitat parameters clearly showed the difficulty of evaluating individual parameters separately. Basically, the correlation matrix hardly shows any strong connections between the individual parameters of a study area. If you look at the locations individually, depending on the parameters, connections sometimes show different directions, which makes it clear that complex relationships in ecological systems often cannot be fully understood. In the Lobau waters, for example, there was a positive connection between emerged vegetation and positive eDNA detection at the Panozzalacke; at the Kühwörther water, in the area of the Gänsewolke traverse, this was slightly negative. In the rivers, the bed substrate (fine sediment/sand and mesolithic), leaf litter and the measured flow had significant effects on the eDNA results. The more leaves and fine sediment/sand there was at a location, the lower the number of detections. A larger proportion of mesolithic had a positive effect, as there were probably more *Cordulegaster* larvae in this substrate due to its ability to dig. Spring damselfly were also detected more frequently in sections with less flow. The study shows that it is difficult to make general statements about habitat parameters and their influence on eDNA detection in a specific type of water, as a separate consideration is often not possible due to the strong interaction of the parameters. Nevertheless, it is possible to take specific circumstances into account in order to optimize eDNA sampling for a higher probability of detection. Conclusion: The experience gained in the present project may support tailoring sampling methods to the respective research question, the target organism or group of organisms and the type of water body. Expertise about the target organism and its ecology, as well as the hydrology, dynamics and morphology of the body of water to be examined is essential, especially if the eDNA barcoding approach is to be used in the area of monitoring protected species or assessing the status of bodies of water. It is equally important to interpret the results taking all aspects into account (and to take into account the different specificity of the primers on a case-by-case basis). We recommend the use of eDNA barcoding as a supplement to traditional mapping, for example for pre-screening before a traditional survey. This would be absolutely recommended for a targeted search of FFH species, especially in flowing waters, due to the maximum agreement with traditional mapping. However, a subsequent traditional survey is indispensable as abundance plays an essential role in assessing both population and ecological water status. Additional screening using eDNA also makes sense for rare or non-local species, as the example of *I. pumilio* from the Lainzer Tiergarten shows. eDNA barcoding can also be used as a helpful method to clarify whether a dragonfly species is potentially native to a body of water. In summary, we see eDNA barcoding as a valuable complement to traditional mapping, but by no means a replacement for traditional surveys." (Authors/Google translate)] Address: Fischer, Iris, Naturhistorisches Museum Wien, Zentrale Forschungslaboratorien, Austria. Email: iris.fischer@nhm-wien.ac.at

22742. Fujita, Y.; Lima, M. (2023): Dynamic lift enhancement mechanism of dragonfly wing model by vortex-corrugation interaction. *Phys. Rev. Fluids* 8, 123101: ["The wing structure of several insects, including dragonflies, is not smooth, but corrugated; its vertical cross-section consists of a connected series of line segments. Some previous studies

have reported that corrugated wings exhibit better aerodynamic performance than flat wings at low Reynolds numbers (ten to the third). However, the mechanism remains unclear because of the complex wing structure and flow characteristics. Although a complex corrugated structure modifies the aerodynamic characteristics and flow properties during unsteady wing motion, for example, leading-edge vortex (LEV) dynamics, which are key to lift enhancement in many insects; the details have not yet been studied. In this study, we analysed the flow around a two-dimensional corrugated wing model that started impulsively by direct numerical simulations. We focused on the period between the initial generation of LEVs and subsequent interactions before detachment. For the flat wing, it is known that a secondary vortex with a sign opposite to that of the LEV, the lambda vortex, develops and erupts to discourage lift enhancement. For corrugated wings, such an eruption of the lambda vortex can be suppressed by the corrugation structure, which enhances the lift. The detailed mechanism and its dependence on the angle of attack are also discussed." (Authors)] Address: lima, M., Program of Mathematical and Life Sciences, Graduate School of Integrated Sciences for Life, Hiroshima University, Japan

22743. Gänßler, R. (2023): Tandem aus Männchen der Gemeinen Binsenjungfer (*Lestes sponsa*) und der Westlichen Weidenjungfer (*Chalcolestes viridis*) (Odonata: Lestidae). *Mercuriale* 23: 79-80. (in German, with English summary) ["On 16 August 2023, a heterospecific tandem between *L. sponsa* and *C. viridis* was observed and photographed. Both partners were males." (Author) 16-VIII-2023, Bulbachsee, Baden-Württemberg, Germany.] Address: Gänßler, R., Talstr. 231, 72250 Freudenstadt, Germany. Email: roland@roland-gaenssler.de

22744. Gómez Anaya, J.A.; Brug Aguilar, B.; Vázquez Hurtado, G.; Novelo Gutiérrez, R. (2023): Diversidad y distribución de larvas de Odonata (Insecta) en una laguna subtropical con diferentes usos de suelo en Veracruz, México – Diversity and distribution of Odonata (Insecta) larvae in a subtropical lagoon with different land uses in Veracruz, Mexico. *Revista Mexicana de Biodiversidad* 94(2), e945158: 1-17. (in English, with Spanish summary) ["Impacts caused to freshwater reservoirs by human activities have increased in tropical and subtropical regions in the last decades. We studied the effects of land use on the physicochemical properties of water and their effects on larval Odonata diversity in a subtropical lagoon. During 1 year, physicochemical variables were measured, and Odonata larvae were collected in 8 sites (4 in the urbane zone and 4 in the more conserved rural zone) with different land uses that cover the entire periphery of the lagoon. Physicochemically, no clustering of samples from urban and rural zones or by site was observed, rather clustering reflected temporal patterns. A total of 28 species were found and some of them showed a differential distribution between both zones, and between the 8 sites and samplings. The highest diversity was recorded in the rural zone. The site with domestic waste discharges had the lowest diversity and it showed high concentrations of nitrates and ammonium. We conclude that the effect of land use in this lagoon is still incipient on Odonata diversity. The diversion and treatment of urban waters and proper land management are recommended to ensure the maintenance of Odonata diversity." (Authors) Figure 6. Two-way hierarchical cluster analysis dendrogram showing the faunal relationships of the site-collecting Odonata larval assemblages from the Laguna Miradores del Mar, based on a Bray-Curtis similarity matrix and using the unweighted pair group method

with arithmetic mean (UPGMA).] Address: Novelo-Gutiérrez, R., Instituto de Ecología, A. C., Red de Ecología Funcional, Carretera Antigua a Coatepec 351, Congregación El Haya, 91070 Xalapa, Veracruz, Mexico. Email: roldolfo.novelo@inecol.mx (R. Novelo-Gutiérrez)

22745. Gonçalves, M.; Mendoza-Penagosa, C.C.; Vilela, D.S.; Ribeiro da Silva, S.; da Matta, A.; Juen, L.; Schlemmer Brasil, L. (2023): New records of Odonata (Insecta) for the extreme northwest of the Brazilian Amazon. *International Journal of Odonatology*, 26: 224-233. (in English) ["Brazil hosts a wide range of Odonata species, including many hitherto undescribed ones, especially in remote and unexplored regions where logistics are difficult. The northwestern Brazilian Amazon is an example of this situation, and many locations still need to be sampled there and have their taxonomic inventories compiled. Against this background, this study aimed to survey the Odonata species in the municipality of São Gabriel da Cachoeira, located in the extreme northwest of the Western Amazon. The survey was conducted at 11 water bodies, where 67 Odonata species were recorded, including four new records for the state of Amazonas and seven new records for Brazil. Pioneering studies like this are important for enhancing our understanding of the region's biodiversity and contribute to conservation efforts." (Authors) *Palaemnema cf. peruviana*] Address: Gonçalves, M., Programa de Pós-graduação em Zoologia – PPGZOO, Universidade Federal do Pará, Belém, Brazil

22746. Hayat, D.; Tariq, N.; Zia, S.A.; Makai, G.; Wali, S.; Shahwani, F.; Hakeem, A. (2023): Guardians of Quetta's skies: Aeshnidae dragonflies explored. *Pak-Euro Journal of Medical and Life Sciences* 6(3): 295-301. (in English) [Pakistan "Objective: With an emphasis on exploring the species richness of Aeshnidae throughout the city, this study aimed to improve knowledge of Odonate biodiversity in Quetta. ... Methodology: The surveys were conducted throughout the summer seasons spanning from 2022 to 2023. A total of 212 specimens of dragonflies were captured with the help of sweep nets. Identified specimens up to species level and then preserved. Results: *Anax partheope* 55% and *Anax immaculifrons* 45% Comprehensive information is available for each species, including their valid scientific names, habitat descriptions, ecological observations, and distributional ranges. Conclusion: *A. immaculifrons* is reported for the first time from Quetta Balochistan. ... (Authors)] Address: Hayat, D., Dept of Zoology, Sardar Bahadur Khan Women's University (SBKWU), Quetta, Balochistan, Pakistan. Email: dur_mengal@yahoo.com

22747. Hermans, J.T. (2023): The White-faced darter (*Leucorrhinia dubia*) in the Dutch Province of Limburg (Odonata: Libellulidae): Severe decline of a characteristic species of bog pools. Part 2: Habitat and its management. *Natuurhistorisch Maandblad* 112(12): 289-299. (in Dutch, with English summary) ["*L. dubia* needs acidic and oligotrophic habitats with abundant growth of peat moss (*Sphagnum spec.*) and a well-developed open vegetation with rushes and sedges. Most sites are unshaded and the water depth varies from a few centimetres to well over a metre. The range of habitats includes seasonally flooded depressions with peat moss or sites with open water with or without floating peat moss. Teneral darters disperse to nearby shrubs or woodland, which is also used by the adults for roosting. Mature males are less territorial than other darters. Females lay eggs in flight by flicking the tip of the abdomen into water-logged peat moss. The severe decline of the species in Limburg is discussed in relation to the habitat requirements of larvae and adults. The

article ends with proposals to maintain and restore the last remaining reproduction sites in Limburg." (Author)] Address: Hermans, J.T.; Hertestraat 21, NL-6067 ER Linne, The Netherlands. E-mail: j.hermans@triangel-linne.nl

22748. Hong, J.; Kwon, S.J.; Lee, C.-S.; Choi, J.-Y.; Cho, K.; Kim, H.G. (2023): Potential distribution of the critically endangered dragonfly *Libellula angelina* (Odonata: Libellulidae) under shared socio-economic pathways. *Entomological research* 53(10): 367-379. (in English) ["*L. angelina* is an endangered dragonfly species that is native to East Asia. Recently, their population has become severely reduced through habitat loss. To protect *L. angelina* populations, we need to understand which factors determine their distribution and how their potential habitats will change in the future. In this study, the habitat preference of *L. angelina* was identified through field surveys, and the potential distribution of *L. angelina* and the impact of integrated climate–land cover changes were simulated using the MaxEnt model. Furthermore, the wetland loss scenario was applied to areas where the current trend in wetland loss will continue in the future. The field survey identified that *L. angelina* prefers small inland wetlands: permanent freshwater, ponds; permanent rivers, ponds; irrigated land; and estuarine waters. From the MaxEnt results, altitude was the variable with the greatest contribution and distance from wetlands was the most unique variable. MaxEnt described the geographic pattern of occurrences under the current climate well, with few areas requiring any further survey. In the future projection, the potential habitat area was increased by up to 48.8% and 30.6% in the 2050s and 2080s, respectively. However, potential habitat loss was expected if wetlands continue to decline as they have done in the last 20 years. The wetland loss scenario resulted in potential habitat losses of 1.9%–2.3% and 4.5%–6.1% in the 2050s and 2080s, respectively. Therefore, to protect *L. angelina* populations we must minimize the loss of current populations, secure wetlands and strengthen the connectivity between wetlands." (Authors)] Address: Kim, H.G., Korean Entomological Institute, Korea Univ., Seoul 02841, Republic of Korea. Email: hgkimkr@korea.ac.kr

22749. Howarth, B. (2023): Chapter 17: Terrestrial arthropod diversity in the United Arab Emirates. In: J. A. Burt (ed.), *A Natural History of the Emirates*, <https://doi.org/10.1007/978-3-031-37397-817>: 531-556. (in English) [https://link.springer.com/content/pdf/10.1007/978-3-031-37397-8_17.pdf?pdf=inline%20link] Address: Howarth, Brigitte, Department of Culture and Tourism - Abu Dhabi, Natural History Museum Abu Dhabi, Abu Dhabi, UAE

22750. Huang, D.-Y.; Xu, M.-m.; Zhao, Q.; Gao, J.; Nel, A. (2023): New stem-anisopteran dragonflies in the Jurassic of China (Odonata: Epiroctophora). *Zootaxa* 5396(1): 26-34. (in English) ["The odonatan asiopterid *Turanopteron sinensis* sp. nov. and the juragomphid *Oxfordgomphus trescellulae* gen. et sp. nov. are described on the basis of two new fossil wings from the Middle-Upper Jurassic of Henan Province in China. These taxa belong to 'ancient', Toarcian epiroctophoran stem groups of Anisoptera Selys, 1854. They show important affinities with taxa from the Karatau entomofauna in Kazakhstan. These groups progressively decrease and were replaced by more 'modern' clades of Anisoptera during the Late Jurassic." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@mnhn.fr

22751. Hunger, H.; Gänßler, R.; Leinsinger, H.; Masur, H.-J.; Roland, H.-J.; Saldier, M.; Schmidt, B.; Seggewiß, E.;

Wildermuth, H.; Wunsch, H.W. (2023): Die Wespenspinne (*Argiope bruennichi*, Araneidae) als Prädatorin von Großlibellen - einige fotografisch dokumentierte Fälle (Anisoptera: Aeshnidae, Corduliidae, Libellulidae, Sympetrinae). *Mercuriale* 23: 63-72. (in German) ["The wasp spider (*Argiope bruennichi*, Araneidae) as a predator of dragonflies - some photographically documented cases (Anisoptera: Aeshnidae, Corduliidae, Libellulidae, Sympetrinae). The following species had been involved in predation by *A. bruennichi*: *Aeshna affinis*, *A. viridis*, *Anax imperator*, *Somatochlora arctica*, *S. flavomaculata*, *Crocothemis erythraea*, *Libellula fulva*, *Orthemtrum coerulescens*, *Sympetrum sanguineum*, *S. striolatum*.] Address: Hunger, H., INULA, Basler Landstr. 49e, 79111 Freiburg i. Br., Germany. Email: holger.hunger@inula.de

22752. Hwang, J.H.; Yim, M.-Y.; Yun, J.-H. (2023): Terrestrial insect fauna of the herbaceous stratum of reservoir embankment slopes, Korea. *Journal of Asia-Pacific Biodiversity* 16: 540-546. (in English) ["Herbaceous strata with a dominant plant community 50 m in size were selected from 10 reservoir embankment areas in Shinan-gun, a southwestern island region of South Korea. terrestrial insects were sampled 100 times with quantitative sweep sampling to investigate the insect fauna and their association with flora. The survey areas were mainly dominated either by *Phragmites japonica* or *Miscanthus sinensis* plant species. A total of 1,948 individual insects representing 173 species from 64 families within 9 orders were collected. The number of species was the highest at Jaeundo while the Shannon-Wiener diversity index was the highest at Saokdo. Similarity analysis showed that the insect species composition tended to be similar among survey sites with plant communities comprising the same dominant plant species. Species diversity was the highest in April while the number of individual insects was the highest in September. *Petaphora maritima* and *Ochetellus glaber* were the dominant and subdominant insect species, with a high frequency of occurrence at these sites. The results of this study could be applied towards biodiversity conservation and monitoring of reservoir embankment areas in the future" (Authors) The study includes Odonata, but without giving details.] Address: Hwang, J.H., Wetland Center, National Institute of Ecology, Changnyeong 50303, Gyeongsangnam-do, Republic of Korea. Email: chsh-123@naver.com

22753. Idilbi, I.; Ssymank, A.; Martens, A. (2023): Current water management of small lotic waterbodies in the context of nature conservation in Germany. *Environmental Management* 3: 162-176. (in English) ["Small lotic waterbodies are abundant and species rich habitats, offering refuges and microhabitats to protected species of the European Union Habitats Directive. Highly impacted by water management actions, it is essential to reveal the current status and challenges of water management. The present study aims to identify relevant issues by conducting a survey concerning water management authorities. Authorities were selected according to their involvement in the management of small lotic waterbodies within the actual range of a threatened species, *Coenagrion mercuriale*, which is highly dependent on water management actions and protected by the Habitats Directive. The survey involved three sets of questionnaires, (1) socio-demographic (personal) questions (2) specific questions about water management and (3) questions on the biological background. Out of 181 selected authorities, 75 participated in the survey. The results showed that though nature conservation interests are partially considered, they represented a minor factor in water management decision-making. In addition, knowledge exchange is insufficient between involved

stakeholders from policy, management practice and science, which was especially reflected in the case of equipment use and accruing material. The reconciliation of both, water management and nature conservation interests, can contribute to enhance the conservation status of key protected species of small lotic waterbodies under the Habitats Directive." (Authors)] Address: Idilbi, Isabelle, Institute for Biology, University of Education Karlsruhe, Karlsruhe, Germany. Email: isabelle.idilbi@t-online.de

22754. Irmawati, I.; Amrullah, S.H.; Zulkarnain, Z. (2023): Identifikasi jenis capung (Odonata) pada daerah persawahan di Somba Opu Gowa Sulawesi Selatan. *Filogeni: Jurnal Mahasiswa Biologi* 3(3): 136-142. (in Indonesian, with English summary) [Identification of dragonfly species (Odonata) in rice fields in Somba Opu Gowa, South Sulawesi, Indonesia: *Neurothemis fluctuans*, *Orthetrum sabina*, *Diplacodes trivialis*, *Tamea transmarina*, *Agriocnemis femina*] Address: Amrullah, S.H., Jl. HM. Yasin Limpo 36 Gowa, Sulawesi Selatan, Indonesia. 92113. Email: syarifhidayat.amrullah@uin-alauddin.ac.id

22755. Johnsen, P. (2023): Application of environmental metabolomics for assessment of aquatic invertebrate sensitivity to naphthenic acids. MSc thesis, Biology, University of Waterloo, Ontario, Canada: XIII, 87 pp. (in English) ["Naphthenic acids (NAs) are a class of chemicals found in oil sands process waters (OSPW) from the extraction of bitumen from surface mined oil sand. In Alberta, Canada, OSPW is currently stored indefinitely in tailing ponds and there are environmental concerns about seepage or spillage. NAs are known to be toxic to aquatic organisms. However, NA toxicity data are limited to primarily acute effects in a few species. Due to difficulties in comparing NA toxicity results, an extracted solution referred to as naphthenic acid fraction components (NAFCs) can be used as it is representative of OSPW toxicity and is well characterized. The goal of this research is to inform NA standards by performing chronic toxicity tests to derive metabolomic responses and estimates of survival. I exposed the ramshorn snail (*Planorbis* *corneus*), and nymphs of two dragonflies, the common whitetail (*Platthemis* *lydia*) and the eastern pondhawk (*Erythemis* spp.), to 0, 6, 12, and 25 mg/L NAFCs for 21-days (snails) or 14-days (dragonflies) in laboratory microcosm experiments. Survival was altered only in the common whitetail with NAFC exposure. Snails laid approximately double the number of egg masses at higher concentrations of NAFCs. The metabolome responded differently among taxa. NAFC exposure altered the metabolome of only the common whitetail. Metabolite analysis for the common whitetail found that most altered metabolites were amino acids. The identified metabolites were involved primarily in pathways related to energy metabolism and protection from oxidative stress. My findings indicate that sensitivity to NAFCs is taxon-specific and demonstrate that an organism's metabolome can provide insight into toxic effects of NAFCs." (Author)] Address: https://uwspace.uwaterloo.ca/bitstream/handle/10012/20165/Johnsen_Philip.pdf?sequence=1&isAllowed=y

22756. Joshi, S.; Sawant, D.; Dalvi, A.; Koli, Y.; Haneef, M.; Sanap, R.; Kunte, K. (2023): New records of *Lestes nigriceps* Fraser, 1924 (Odonata: Lestidae) from Maharashtra, India, with notes on *L. patricia* Fraser, 1924 and an updated key to *Lestes* of the Western Ghats, India. *International Journal of Odonatology* 26: 132-144. (in English) ["Damselflies of the genus *Lestes* Leach, 1815 are represented in India by 11 species. Using specimens collected over the last five years, we report on the rediscovery of *L. nigriceps* in India

after 98 years, at two new localities in the Western Ghats. This species was observed at the Aarey Milk Colony, Mumbai, and in the Sindhudurg District, Maharashtra, India. The diagnosis of the subspecies *L. patricia taampatti* Bhakare, Bhoite & Pawar, 2020 is re-assessed, found insufficient for differentiation, and this taxon is synonymized with *Lestes patricia* Fraser, 1924, as a consequence. We present an updated key to the species of *Lestes* of the Western Ghats biodiversity hotspot." (Authors)] Address: Joshi, S., Biodiversity Lab, National Centre for Biological Sciences, Tata Inst. of Fundamental Research, GKVK Campus, Bellary Rd, Bengaluru 560065, Karnataka, India. Email: sj058@uark.edu

22757. Jumaat, A.H.; Ab Hamid, S. (2023): Monitoring heavy metal bioaccumulation in rivers using damselflies (Insecta: Odonata, Zygoptera) as biological indicator. *Sains Malaysiana* 52(2): 321-331. (in English, with Malaysian summary) ["Contamination by pollutants in freshwater ecosystem has been identified extensively in river, sediments, and freshwater biota. Pollutants may have incorporated into the sediments and accumulated in tissue of aquatic organisms which persist as difficult to degrade matter in upper trophic level. Therefore, few selected heavy metals were measured from the river sediment and tissue of Odonata larvae collected from the selected rivers using inductively coupled plasma optical emission spectrometry (ICP-OES). The results showed metals in Odonata tissue were higher than in the sediments. Mn and Zn were found in greatest concentrations both in sediment and Odonata's tissue. Biota-sediment accumulation factors (BSAF) were computed based on these data, and it was discovered that all values of BSAF for Cd, Cu, Mn, and Zn were typically high (BSAF >1). In conclusion, the rivers contamination induced accumulation of heavy metal in the river sediments and Odonata larvae (*P. microcephalum*, *P. pruinosum fraseri*, and *C. marginipes*). The highest concentration value was calculated as 29.23 for Cd in the *C. marginipes*. The high concentrations of this element in the insect body tissue has shown a trace of bioaccumulation and may pose biomagnification to organisms in the upper trophic level. The results of this study indicated that damselfly is reliable to become a bioindicator for heavy metals particularly pollution in the river." (Authors)] Address: Ab Hamid, Suhaila, School of Biological Sciences, Univ. Sains Malaysia, 11800 Minden, Penang, Malaysia. Email: ahsuhaila@usm.my

22758. Kalkman, V.J.; Richards, S.J. (2023): New species of *Metagrion* Calvert, 1913 from New Guinea, with a key to the species east of the Bird's Head Peninsula (Odonata: Argiolestidae). *Odonatologica* 52(3-4): 277-304. (in English) ["Five new species of *Metagrion* are described from Papua New Guinea: *Metagrion annehueberae* sp. nov. (holotype male in RMNH), *Metagrion pseudolamprostoma* sp. nov. (holotype male in SAMA), *Metagrion furcatum* sp. nov. (holotype male in SAMA), *Metagrion lopau* sp. nov. (holotype male in RMNH), *Metagrion toxopeus* sp. nov. (holotype male in SAMA). New distribution records are provided for two poorly known *Metagrion* species, and a key to the mature males of *Metagrion* species occurring east of the Bird's Head Peninsula is given." (Authors)] Address: Kalkman, V.J., Natural Biodiversity Center, naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

22759. Karimovich, K.A.; Ganijonov, D.; Begizhonova, M.; Khotamova, Z.; Ibragimova, N. (2023): [About *Ischnura elegans* species widely distributed in Khojaabad and its bordering areas]. [Young Scientists] 1(20): 30-31. (in Uzbekian) [Uzbekistan, eastern part of Andijan province, Khojaabad and neighboring areas.; samples from *Ischnura elegans* done

in June 2022 are listed.] Address: Karimowitsch, C.A., Andijon Davlat Universit t, Uzbekistan. Email: info@in-academy.uz

22760. Karoza, S.E. (2023): Monitoring of aquatic ecosystems in the Brest region using two types of dragonflies. Educational Institution "Grodno State University named after Yanka Kupala" Zoological Readings. Collection of scientific articles, dedicated to the 125th anniversary Doctor of Biological Sciences Ivan Nikolaevich Serzhanin Grodno GrSU named after Yanka Kupala 2023: 127-129. (in Russian, with English summary) ["The fluctuating asymmetry of the venation of the wings of the dragonflies *Ischnura elegans* and *Enallagma cyathigerum* is considered. from the sites of the Brest region with varying degrees of anthropogenic load. There were no significant differences between the sites, which indicates the absence of a strong anthropogenic pressure." (Author)] Address: S. E. Karoza, Brest State A. S. Pushkin Univ. Brest

22761. Koch, H.-M. (2023): Nachruf Gerhard Feldwieser. *Mercuriale* 23: 82-83. (in German) [Obituary Gerhard Feldwieser, 28. Feb. 1931 - 2. Mar. 2023] Address: Koch, H.-M., Kr merstr. 40, 72764 Reutlingen, Germany

22762. Kostanjsek, R.; Moril, N.; Bedjanic, M.; de Groot, M.; Sajna, N.; Polajnar, J.; Zagmajster, M. (2023): 25 let revije *Natura Sloveniae*. *Natura Sloveniae* 25(2): 5-14. (in Slovenian, with English summary) ["The article presents the history of the journal *Natura Sloveniae* over the 25 years, from 1999–2023, of its publication. The main aim of the journal is highlighted, as well as a brief analysis of the number of contributions and authors, the taxonomic groups covered in the articles, including an overview of the citation success of the articles published in the journal. In 25 years, 286 articles by 320 authors have been published in the journal. Over the years, the geographical scope of published articles has expanded from Slovenia to SE and Central Europe. A brief statistical analysis of the published articles shows the highest popularity of articles presenting species lists or new records for Slovenia. A considerable share of the contributions are focused on individual taxa, mostly insects, including butterflies and dragonflies. In its 25th year of publication, the journal, which is jointly published by the Biotechnical Faculty at University of Ljubljana and the National Institute of Biology, is switching to the digital submission and review system of the University of Ljubljana Press. In this year, a third, thematic issue is being published for the first time. After a quarter of a century of continuous publication, the journal occupies an important niche among Slovenian scientific biological journals and continues its mission to publish original scientific contributions in the field of biogeographical, biodiversity and ecological research in Central and Southeastern Europe and to encourage young authors to publish their field observations." (Authors)] Address: Bedjanic, M., M., National Institute of Biology, Vecna pot 111, 1000 Ljubljana, Slovenia. Email: matjaz.bedjanic@nib.si

22763. Kov cs, T.; Theischinger, G. (2023): A new species of *Nososticta* Hagen, 1860, from Batanta Island, West Papua, Indonesia (Odonata: Platycnemididae). *Odonatologica* 52(3-4): 267-276. (in English) ["A new species of damselfly, *Nososticta peti* sp. nov., is described from Batanta Island, Indonesia. It belongs to a group of *Nososticta* in which the male synthorax exhibits discrete patches of blue, and the tip of the abdomen is blue. The new species differs from some of its congeners exhibiting these characters by lacking light postocular spots and lacking a transverse blue frontal bar from eye to eye. *Nososticta peti* sp. nov. represents the 90th species of the genus and is currently known only from a single

location on Batanta Island: Waibin River system. The distributions of *N. peti* sp. nov. and the other species discussed herein are illustrated. Among the dragonflies collected with the new species, *Diplacina cyrene* Lieftinck, 1953, is new to the fauna of the Batanta Island." (Authors)] Address: Kov cs, T., M tra Museum of the Hungarian Natural History Museum, Kossuth Lajos utca 40, H-3200 Gy ngy s, Hungary

22764. Lautenschl ger, T.; Aime, M.C.; Clausnitzer, V.; Langer, L.; Meller, P.; M ller, F.; Nuss, M.; Teutloff, N.; Ernst, R. (2023): Green gem of the Northern Escarpment: biodiversity and endemism of the Serra do Pingano Forest Ecosystem. *Namibian Journal of Environment* 8: 161-172. (in English) ["The highlands and escarpments of Angola extend into the country's northern province, U ge. The mountain ranges and scattered inselbergs there are characterised by small-scale geomorphological diversity that in turn supports a rich biodiversity, and together make up the Serra do Pingano Forest Ecosystem (SPFE). Drawing on previous studies, this paper briefly describes various taxonomic groups (fungi, Tracheophyta, Bryophytes, Odonata, butterflies, moths, amphibians, reptiles, birds and mammals) of the SPFE in terms of their diversity and endemism rates. The initial results presented show the need to fill the existing data gaps and point to the importance of a conservation status for the SPFE." (Authors)] Address: Lautenschl ger, Thea, Institute of Botany, TUD Dresden University of Technology, Dresden, Germany. Email: thea.lautenschlaeger@tu-dresden.de

22765. Li, Z.; Wang, B.; Wang, F.; Sun, B.; Zhao, S. (2023): A novel measure for long-term sediment reduction inspired by dragonfly wings. *Water Science & Technology* 2023403. <https://doi.org/10.2166/wst.2023.403>: 17 pp. (in English) ["The sediment accumulation in drainage pipes has long been recognized as a significant concern in the environmental field. This study addresses sediment accumulation in drainage pipes by introducing an innovative bioinspired approach using various shapes and angles of plates for long-term sediment reduction. Through experiments and numerical simulations, the velocity field, the turbulent kinetic energy, the head loss, and the dynamic pressure distribution in the pipeline with plates are analyzed. Results demonstrate significant increases in local velocity, dynamic pressure, and turbulence energy due to the presence of plates. The sediment reduction performance shows a positive correlation with the angle for folded plates and a non-linear relation with curvature for curved plates. Notably, the superior performance of folded plates is attributed to their exceptional ability to induce vortex formation. The head loss due to sediment reduction measures linearly as the angle and the curvature increase. Furthermore, the intentional induction of strong eddies and high shear flow using the undulating topography created by the locally installed folding plates in the pipeline was the main cause of sediment reduction. This novel approach holds promise for more efficient and sustainable sediment reduction in drainage systems." (Authors)] Address: Sun, B., School of Water Conservancy and Transportation, Zhengzhou University, Zhengzhou 450001, China. Email: sunbin@zzu.edu.cn

22766. Lingenfelder, U. (2023): Endbericht FFH-Monitoring (f r die Art *Oxygastra curtisii*). Durchf hrung und Ergebnisse 2022 und 2023. Auftragnehmer: Willigalla  kologische Gutachten, Am Groen Sand 22, 55124 Mainz. Bearbeiter: Uwe Lingenfelder unter Mitarbeit von Martin Schorr: 30 pp. (in German) [Rheinland-Pfalz, Germany] "The former main occurrence of *O. curtisii* on the Our below Vianden (Luxembourg) appears to have possibly become extinct

following the dramatic decline in 2011 and the subsequent complete collapse. As in 2016, there was no evidence of exuvia and no reliable evidence of adults (only a "suspected case"), although no significant habitat deterioration was observed, especially in the southern part. Only in the urban area of Vianden was at least one animal clearly observed in 2023. It is unclear whether there is still a residual population of the southern subpopulation here, but it is possible. Above the reservoir (northern subpopulation), evidence comes from Stolzenbourg up to Kohnenhaff (slightly above the previously known locations), including in sections where the species had not yet been identified. The evidence of a hunting animal in the terrestrial habitat approx. 1.5 km further upstream of Kohnenhaff marks the northernmost, furthest up-valley discovery point in the valley of Our. The occurrence of *O. curtisii* is tied to very specific structures that are not widespread and evenly distributed over the course of the river. According to the results of the survey, the keeled emerald dragonfly on the Our with an overall low individual density currently inhabits an almost 10 km long section of the river, where the occurrence of these structures, which can develop optimally, especially in deeper backwater areas, is due to the water morphology (comparatively small offering in such areas) is naturally limited. Therefore, even small groups of trees or even individual trees with the essential habitat structures are of outstanding importance as actual or potential reproductive habitat for the entire remaining population on the Our (key habitat), the impairment of which is caused by natural causes (e.g. mechanical damage from flooding, diseases) or through intentional or unintentional anthropogenic measures (e.g. lowering the water level by dismantling weirs) has a very significant influence on the state of the population or its preservation. Especially in the still populated area above the reservoir, since the last monitoring and also during the study period, there has been a gradual loss of vitality ("alder disease") in the woody structures that are essential for the keeled emerald dragonfly (alders with flooding fine root networks) on many bank areas (both banks). record. Fortunately, the situation south of the reservoir appears to have largely stabilized after a significant loss of vitality. The quantity and quality of the valuable root structures are in order, especially below the Bettel sewage treatment plant. However, along the entire section of the Our examined, at least a good 40 kilometers of the river, only a few younger trees can be found in which the formation of root networks can be seen and which can be used in the short to medium term as a "replacement" for those that may be failing due to illness or natural age. Trees could serve. The water flow of the Our is still problematic. Dry periods, as occurred in both study periods and are increasingly to be feared due to the predicted climatic development, lead to damage to the essential fine root structures and, due to the low water level, to egg-laying females avoiding otherwise suitable areas. The positive development at first glance compared to the last monitoring (without exuvia finds on the German bank) should therefore not be overestimated, especially since the assessment of the condition of an animal population that does not share the habitat (Our and both banks are together as an inseparable habitat), in the sense of a "reproductive site", but oriented towards political borders (the Our is a common national territory, but the banks are not...), is nonsensical. The conservation status of both subpopulations of the keeled emerald dragonfly on the Our must therefore again be classified in the lowest assessment category as "medium to poor". In addition to the possible extinction of the southern subpopulation, the continued existence of the northern subpopulation in the still populated section of the river is also at considerable risk due to the low population density and the

dependence on a few key habitats with partial habitat deterioration." (Authors/Google translate)] Address: Lingenfelder, U., Seebergstr. 1, 67716 Heltersberg, Germany. E-mail: u.lingenfelder@vr-web.de

22767. Mancu, C.-O.; Dumbrava, A.R. (2023): *Lindenia tetraphylla* (Odonata: Gomphidae) first record from Romania and future perspective in Romania. Conference: Ecology and protection of ecosystems, the Xth edition 2023. 2nd – 4th of November 2023, Bacau, Romania. Book of Abstracts: 30. (in English) [Verbatim: *L. tetraphylla* is a species with a huge areal in Euroasia from Spain to Afghanistan and western Pakistan and few known records from North Africa. In Europe the species is mostly known from Greece and especially close to shores of Mediterranean Sea. This paper purpose is to signal the first record of this species in Romania. *Lindenia tetraphylla* is a protected species of Community interest and it is included in the Annexes II and IV of Directive 92/43/EEC (known as Habitats Directive). This species is known to be highly nomadic and a strong flier migrating over long distances. The specimen found is probably just an erratic one that originate from populations located in Croatia or Bulgaria (where they are known to breed) but is not excluded that unknown breeding population exist closer to Romania. We discuss the possibility that this species establishes in Romania as a breeding species specially in connection with climatic changes.] Address: Mancu, C.-O., "Grigore Antipa" National Museum of Natural History, 1 Kiseleff, 011341 Bucharest, Romania. Email: cosminom@gmail.com

22768. Maoka, T. (2023): Carotenoids: Distribution, function in nature, and analysis using LC-photodiode array detector (DAD)-MS and MS/MS system. *Mass Spectrometry* 12: 13 pp. (in English) ["Carotenoids are tetraterpene pigments that are present in photosynthetic bacteria, some species of archaea and fungi, algae, plants, and animals. Carotenoids are essential pigments in photosynthetic organs along with chlorophylls. Carotenoids also act as photo-protectors, antioxidants, color attractants, and precursors of plant hormones in plants. Carotenoids in animals play important roles, such as precursors of vitamin A, photo-protectors, antioxidants, enhancers of immunity, and contributors to reproduction. More than 850 kinds of carotenoids are present in nature. The structures are similar and all of them are labile. Analysis of natural carotenoids requires the establishment of reliable methods for analyzing them. Liquid chromatography–mass spectrometry (LCMS) and mass spectrometry/mass spectrometry (MS/MS) coupled with photodiode array detector (DAD) is an important tool for analysis of natural carotenoids. Electrospray ionization and atmospheric pressure chemical ionization are commonly used for ionization of LC-MS of carotenoids. MS and MS/MS provide not only molecular weight information but also some structural information on carotenoids. Ultraviolet-visible spectra from DAD provide information on chromophore systems, which cannot be provided by MS spectral data. In the present review, I report the structural diversity and function of natural carotenoids, and also describe the techniques for analysis of natural carotenoids using the LC-DAD-MS and MS/MS system. ... The second example shows carotenoid analysis in *Sympetrum frequens*. Figure 11 shows an HPLC chromatogram of carotenoids in *S. frequens*. Eight carotenoids were identified by ESI MS, MS/MS, and UV-Vis spectral data and retention time in HPLC, as shown in Fig. 11A. Figure 11B shows ESI MS, MS/MS, and UV-Vis spectra of *â*-zeacarotene. High-resolution MS of molecular mass ion of this carotenoid showed the molecular formula of C₄₀H₅₈. The UV-Vis spectrum showed that this carotenoid possessed

eight conjugated double bonds in a polyene chain and one conjugated double bond in the end group. Product ions of MS/MS were also in agreement with published data of α -zeacarotene. Therefore, this carotenoid was identified as α -zeacarotene. Other carotenoids, excluding β , γ -carotene, were fully identified according to this method. Figure 11C shows ESI MS, MS/MS, and UV-Vis spectra of β , γ -carotene (molecular formula of $C_{40}H_{56}$). These spectral data closely resemble those of α -carotene, except for a slightly different retention time in HPLC. Therefore, this carotenoid could not be identified by LC-DAD-MS and MS/MS data. 1H -NMR (nuclear magnetic resonance) analysis was required to complete identification of this carotenoid." (Author)] Address: Maoka, T., Research Institute for Production Development, 15 Shimogamo-Morimoto Cho, Sakyo-ku, Kyoto 606-0805, Japan. Email: maoka@mbox.kyoto-inet.or.jp

22769. Marquez, J.A.; Rodriguez, J.S.; Hankel, J.; Molineri, C. (2023): Larval development of *Argia joergenseni* (Odonata: Coenagrionidae) at two different latitudes in Argentina. *Revista de la Sociedad Entomológica Argentina* 82(4): 24-30. (in English, with Spanish summary) ["Our aim was to investigate the larval development of *Argia joergenseni* Ris in three streams located at different latitudes and ecoregions (Yungas and Chaco) in Argentina. We measured the head width and the metathoracic wing sheath length, and classified larvae into five size classes. Our results showed different patterns of larval growth between the three study sites. At the Yungas sites (latitude 26° S), larvae exhibited a high proportion of small individuals throughout the year, suggesting a multivoltine life cycle. In contrast, larvae in the Chaco region (latitude 32° S) showed marked seasonality in growth. The findings indicate a negative correlation between voltinism and latitude in *A. joergenseni*. The species exhibited an almost continuous flight season in the Yungas, while at the southern limit of its distribution (Chaco), the flight season was limited to the warmest months. This study provides important information on the larval ecology of *A. joergenseni*, contributing to a better understanding of the dynamics of damselfly communities and facilitating the development of effective conservation measures." (Authors)] Address: Marquez, J.A., Depto de Ciencias Naturales, Instituto de Ciencias de la Tierra, Biodiversidad y Ambiente (ICBIA), Universidad Nacional de Río Cuarto- CONICET, Córdoba, Argentina. Email: javier.marquez.zoologia@gmail.com

22770. Muhammad, A.A.; Francis, O.R. (2023): Abundance and composition OF aquatic insects of Owena River, Ondo state, southwestern Nigeria. *Global Scientific Journal* 11(10): 485-490. (in English) ["Investigation on aquatic insect's composition of Owena River in Ondo state was carried out from march to April, 2021. Aquatic insects were collected from two sampling stations used in the study. A total of 187 aquatic insects individuals were collected consisting of five (5) orders and 15 families. The order Coleoptera was the most abundant order with a high number of individuals recorded in the two station while least individuals were recorded from the order Odonata. Hemiptera is the dominant order in which 6 different genera were collected during this study. Absence of Ephemeroptera and Plecoptera in station 2 indicate pollution in the station and therefore there is need for proper management." (Authors) Taxa are treated at family level.] Address: Muhammad, A.A., Dept of Biology, Adeyemi College of Education, Ondo, Nigeria.

22771. Muneer, P.K.; Babu S., N.; Chandran, A.V.; Jose, S.K. (2023): Odonata checklist of Wayanad Wildlife Sanctuary, Kerala State, Southern India. *International Journal of Tropical*

Insect Science 44(3): 369-384. (in English) ["A preliminary study of the odonate fauna of Wayanad Wildlife Sanctuary, Kerala, southern India was carried out from August 2020 to November 2020. Ponds, streams, and swamps in the sanctuary were sampled using Visual Encounter Surveys (VES). A total of 85 species (49 dragonflies and 36 damselflies) from 11 families were recorded, out of which 14 species are endemic to the Western Ghats. *Orthetrum pruinatum* was found to be the most common species in the sanctuary. *Indolestes pulcherrimus*, an endemic species with no recent records, is being reported for the first time with photographs from the wild. The highest number of species was recorded in the ponds (56 species), followed by streams (46 species) and swamps (33 species). However, the number of endemic species was highest in the streams (8 species), followed by swamps (3 species) and ponds (2 species)." (Authors)] Address: Chandran, A.V., Dept of Geology & Environ. Science, Christ College (Autonomous) Affiliated to the Univ. of Calicut, Irinjalakuda, Thrissur, 680002, India

22772. Nash, L.N.; Zorzetti, L.W.; Antikeira, P.A.P.; Carbone, C.; Romero, G.Q.; Kratina, P. (2023): Latitudinal patterns of aquatic insect emergence driven by climate. *Global Ecology and Biogeography* 32(8): 1323-1335. ["Aim: Emerging aquatic insects link aquatic and terrestrial ecosystems across the Earth. Their diversity, abundance and functional importance means their emergence is an important phenological event. Nevertheless, aquatic insect emergence is understudied at a global scale compared to other phenological events, despite changing phenology being one of the most significant ecological responses to climate change. Here, we quantitatively describe the global patterns, and key proposed drivers, of seasonal aquatic insect emergence, to further understand how these patterns might change in the future. Location: Global. Time Period: 1950–2018. Major Taxa Studied: Emerging aquatic insects. Methods: We extracted monthly emergence data from 86 studies across 163 sites to construct 1053 annual emergence curves. We parameterized the curves using two complementary metrics of seasonality, which were modelled against geographical and climatic variables to determine the direct and indirect relationships between them. Results: We found clear global trends in aquatic insect emergence patterns across latitude and underlying climates. Between-month variation and temporal restriction of emergence increased from the equator to the poles, going from small, aseasonal fluctuations in the warm, thermally stable tropics to large, seasonal peaks at cooler, thermally unstable higher latitudes. While emergence trends were associated with gradients of precipitation, temperature was the dominant climatic driver of the latitudinal trend. Main Conclusions: These findings suggest that with climate warming, aquatic insects will emerge over longer periods, diluted in abundances and displaying less seasonal emergence patterns with smaller between-month fluctuations. This may result in disruption of ecosystem functions seasonally dependent on aquatic insects, such as riparian predation, pollination and disease transmission. The cross-ecosystem life cycle of aquatic insects means changes to their seasonal patterns of emergence will have impacts in both aquatic and terrestrial ecosystems." (Authors) The study includes references to Odonata.] Address: Kratina, P., School of Biological and Behavioural Sciences, Queen Mary University of London, Mile End Road, London E1 4NS, UK. Email: p.kratina@qmul.ac.uk

22773. Novella-Fernandez, R.; Brandl, R.; Pinkert, S.; Zeuss, D.; Hof, C. (2023): Seasonal variation in dragonfly assemblage colouration suggests a link between thermal melanism and phenology. *Nature Communications* 14, 8427: 9 pp.

(in English) ["Phenology, the seasonal timing of life events, is an essential component of diversity patterns. However, the mechanisms involved are complex and understudied. Body colour may be an important factor, because dark-bodied species absorb more solar radiation, which is predicted by the Thermal Melanism Hypothesis to enable them to thermoregulate successfully in cooler temperatures. Here we show that colour lightness of dragonfly assemblages varies in response to seasonal changes in solar radiation, with darker early- and late-season assemblages and lighter mid-season assemblages. This finding suggests a link between colour-based thermoregulation and insect phenology. We also show that the phenological pattern of dragonfly colour lightness advanced over the last decades. We suggest that changing seasonal temperature patterns due to global warming together with the static nature of solar radiation may drive dragonfly flight periods to suboptimal seasonal conditions. Our findings open a research avenue for a more mechanistic understanding of phenology and spatio-phenological impacts of climate warming on insects. ... We used the publicly available database of occurrence records (observations) of Odonata from the British Dragonfly Society Recording Scheme." (Authors)] Address: Novella-Fernandez, R., Technical University of Munich, Terrestrial Ecology Research Group, Dept for Life Science Systems, School of Life Sciences, Freising, Germany. Email: r.novellaf@outlook.com

22774. Ostrovsky, A.M. (2023): New data on the fauna of dragonflies and damselflies (Insecta, Odonata) of southeastern Belarus. *Inland Water Biology* 16: 999-1010. (in English) ["Ecological and faunistic studies into members of the order Odonata in southeastern Belarus have been carried out. New data for 38 Odonata species are provided in the report; three species, *Erythromma viridulum*, *Epithea bimaculata*, and *Leucorrhinia pectoralis*, are new for the region. Zoogeographically, trans-Eurasian and European Odonata species predominate. The most numerous is the family Libellulidae. Most of the collected Odonata species are widespread and numerous on the territory of southeastern Belarus; rare for the region are *Sympetma fusca*, *S. paedisca*, *E. viridulum*, *Ophiogomphus cecilia*, *E. bimaculata*, *Somatochlora metallica*, *Orthetrum brunneum*, and *Leucorrhinia rubicunda*. The data on finding sites, distribution, and ecological and biological characteristics of each species is given." (Author)] Address: Ostrovsky, A.M., Gomel State Medical University, Gomel, Republic of Belarus. Email: Arti301989@mail.ru

22775. Ott, H. (2023): Libellen am Kranichwoog – Auswertung des Monitorings im ersten Erfassungsjahr 2022 – (Insecta: Odonata). *Fauna Flora Rheinland-Pfalz* 15(1): 153-165. (in German, with English summary) ["The article presents the recording of the dragonfly fauna of the "Kranichwoog", a wetland complex near Hütschenhausen/Palatinate (Germany). The Kranichwoog consists of three small and two large water bodies, which were created as mitigation measures from 2017 with the aim of nature conservation, environmental education and nature tourism. A total of 18 dragonfly species – nine damselfly and nine dragonfly species – could already be identified in 2022, with 14 species also being autochthonous in the waters. Above all, these are ubiquitous species, but some of them formed very large populations. In the next years, the development of the dragonfly fauna will be monitored." (Author)] Address: Ott, J., Friedhofstr. 28, 67705 Trippstadt, Germany. E-mail: ott@lupogmbh.de

22776. Ott, H. (2023): Zum Rückgang der Speer-Azurjungfer – *Coenagrion hastulatum* (CHARPENTIER, 1825) – im Raum Kaiserslautern in den letzten Jahrzehnten (Odonata:

Coenagrionidae). *Fauna Flora Rheinland-Pfalz* 15(1): 173-186. (in German, with English summary) ["The current distribution of *C. hastulatum* in the Kaiserslautern area is compared to its historical distribution. It is obvious that of eleven formerly populated waters, it can only be found presently in two waters. This sharp decline can be attributed to several factors. For example, one body of water has completely disappeared, while others faced impacts in the water regime, up to drying out completely. Climate change also has a synergistic effect. Recolonization seems difficult or even impossible under the current conditions." (Author)] Address: Ott, J., Friedhofstr. 28, 67705 Trippstadt, Germany. E-mail: ott@lupogmbh.de

22777. Ott, H. (2023): Kann die Vogel-Azurjungfer (*Coenagrion ornatum*) (SELYS, 1850) im Bienwald noch lange überleben? (Odonata: Zygoptera: Coenagrionidae). *Fauna Flora Rheinland-Pfalz* 15(1): 139-152. (in German, with English summary) ["The decline in the Bienwald of the strictly protected bird azure damsel (*Coenagrion ornatum*) – its only population – is shown, which now apparently only occurs in a small population in a ditch. This also appears to be severely threatened at the moment and it is unlikely that the species will be able to survive still for a long time. The causes are the declining water levels in the brooks, which even dry out for some time, the improper management of the vegetation and water level of the water courses, as well as the invasion of the invasive calico crayfish (*Faxonius immunis*)." (Author)] Address: Ott, J., Friedhofstr. 28, 67705 Trippstadt, Germany. E-mail: ott@lupogmbh.de

22778. Pavesi, A.; Aguzzi, S.; Battaglia, S.; Bianchi, J.; Cortemiglia, M.; Gatti, F.; Galli, G.; Pergolizzi, M.; Proserpio, N.; Rossi, R. (2023): Nuovi siti riproduttivi di *Oxygastra curtisii* (Dale, 1834) and *Boyeria irene* (Fonscolombe, 1838) (Odonata, Anisoptera) in Lombardia. *Rivista del Museo Civico di Scienze Naturali "Enrico Caffi", Bergamo* 36: 73-76. (in Italian, with English summary) ["New *Oxygastra curtisii* (Dale, 1834) and *Boyeria irene* (Fonscolombe, 1838) (Odonata, Anisoptera) breeding sites in Lombardia. - The Italian distribution of some odonate species still remains patchy. A new breeding site of *O. curtisii*, a species of conservation concern included in Annexes II and IV of the Habitats Directive, and a new breeding site of *B. irene*, both in Lombardy near the municipality of Brallo di Pregola, in Oltrepò Pavese, are reported here." (Authors)] Address: Pavesi, A., Società Italiana per lo Studio e la Conservazione delle Libellule ODV - Odonata.it, Via Elce di Sotto 8, 06123 Perugia, Italy

22779. Payra, A.; Deshpande, A.; Koparde, P. (2023): New spatial records of three Odonata species from the Western Ghats, India (Coenagrionidae, Aeshnidae). *Amurian Zoological Journal* 15(4): 847-853. (in English, with Russian summary) ["Opportunistic records can add valuable insights into the diversity and distribution of several taxa, especially those that are not captured well within a systematic framework of sampling. During our two-year-long surveys in the Western Ghats region, we came across notable spatial records of two damselflies belonging to Coenagrionidae family, and one dragonfly belonging to Aeshnidae. Here, we report for the first time the presence of *Agriocnemis keralensis* Peters, 1981, an endemic species of the Western Ghats, from the State of Karnataka. We also add *Pseudagrion spencei* Fraser, 1922 to the Western Ghats odonate species list. We further report the northernmost spatial record of *Gynacantha khasiaca* McLachlan, 1896 from the Western Ghats of the State of Maharashtra. Our new spatial records add valuable knowledge to the current Indian odonatological literature."

(Authors)] Address: Payra, A., Department of Environmental Studies, Dr. Vishwanath Karad MIT World Peace University, Kothrud, Paud Road, Maharashtra, 411038, Pune, India. Email: arapayra@gmail.com

22780. Paz, M. (2023): Odonata (insecta) como bioindicadores em Unidades de Conservação na Amazônia. Monografia (Graduação). Departamento de Ciências Biológicas. Núcleo de Ciências Exatas e da Terra. Fundação Universidade Federal de Rondônia. Porto Velho: 29 pp. (in Portuguese, with English summary) ["Bioindicators are species, groups or biological communities that present the biological community's response to different factors that may be occurring in a system. Within the group of bioindicators we can list aquatic insects such as those of the order Odonata, whose composition and abundance have demonstrated a strong relationship with the integrity of the environment. Conservation Units (CU) are territorial spaces that ensure the preservation and conservation of their environmental resources, to ensure the preservation of existing biological heritage. Therefore, we investigated the descriptive characteristics of the Odonata assemblage in streams of Conservation Units in the Amazon in order to assess the integrity of streams within Conservation Units. Three UCs were selected (Matinguari National Park, Jaru Biological Reserve and Raimundo Paraguaçu de Oliveira Municipal Natural Park, Brazil). Four stretches of streams were selected within each UC to collect data on Odonata adults, characterize the environment and limnological data. For this purpose, the Igarapes Basic Protocol of the Monitora ICMBio Program was used. 359 Odonata were sighted, distributed in two suborders, with 309 from the suborder Zygoptera and 50 from the suborder Anisoptera. The physical and chemical parameters obtained were pH ranging from 4.7 to 6.6, dissolved oxygen ranging from 2.6 mg/l to 8 mg/l and temperature ranging from 22.6°C to 27.8°C. When we observed the variables that had greater significance in the suborder groupings, we found that temperature had the greatest influence in relation to Anisoptera, while canopy opening had a greater influence for the Zygoptera. We can conclude that the proportion of suborders reflected the conditions of habitat integrity, showing their efficiency as bioindicators." (Author)] Address: https://ri.unir.br/jspui/bitstream/123456789/4868/1/Monografia_Matheus_2023.pdf

22781. Phan, Q.T. (2023): Contribution on the dragonflies and damselflies (Insecta: Odonata) of six limestone forests of northern Vietnam. *Faunistic Studies in SE Asian and Pacific Island Odonata* 43: 1-22. (in English) ["A list is provided of 191 odonate species recorded from six National Parks and Nature Reserves with karst ecosystems situated in northern Vietnam. The checklist includes first records of odonates for Hang Kia Pa Co and Kim Hy Nature Reserves. Some rare or endemic species of these limestone forests are discussed." (Author)] Address: Phan, Q.T., The Center for Entomology & Parasitology Research, College of Medicine & Pharmacy, Duy Tan University, 120 Hoang Minh Thao, Lien Chieu, Da Nang, Vietnam Email: pqtoan84@gmail.com; phanquoctoan1@dtu.edu.vn

22782. Phan, Q.T. (2023): Two new records to the Vietnamese Odonata fauna: *Coeliccia loogali* Laidlaw, 1932 and *Rhipidolestes chaoi* Wilson, 2004 (Zygoptera: Platycnemididae, Rhipidolestidae) from a high limestone forest of northern Vietnam. *Faunistic Studies in SE Asian and Pacific Island Odonata* 43: 23-28. (in English) ["*C. loogali* and *R. chaoi* are new additions to the Vietnamese fauna. They were discovered on 1-VI-2022 in a high limestone forest in Lai Chau Province, northern Vietnam." (Authors)] Address: Phan, Q.T., The Center

for Entomology & Parasitology Research, College of Medicine & Pharmacy, Duy Tan University, 120 Hoang Minh Thao, Lien Chieu, Da Nang, Vietnam Email: pqtoan84@gmail.com

22783. Piguave Preciado, X. (2023): Estado poblacional de Lepidópteros y Odonatos presentes en un fragmento del bosque húmedo tropical Olón, provincia de Santa Elena, Ecuador. *La Libertad. UPSE, Matriz. Facultad de Ciencias del Mar*: 94pp. (in Spanish) ["Ecuador is a megadiverse country with characteristics of presenting ideal ecosystems for many species, including insects. This research work was developed during the dry season from August to December 2022, which aimed to determine the diversity of Odonata and Lepidoptera through the identification and population count of species present in three transects placed on the Las Cascadas trail, providing information on two bioindicator groups of the Olón tropical humid forest, Santa Elena. Two capture methods were applied: entomological net and V.S.R traps and they were established with 5 traps per transect. With the implemented methodology, a total of 897 individuals of the Order Lepidoptera and 351 individuals of the Order Odonata were recorded. The registered lepidopteran community is made up of 6 families consisting of Nymphalidae, Hesperidae, Papilionidae, Lycaenidae, Pieridae and Riodinidae, the first being the most abundant and diverse. The registered Odonata belong to five families consisting of Aeshnidae, Libellulidae, Coenagrionidae, Calopterygidae and Heteragrionidae, the third being the most diverse group and showing the most abundant genus *Argia* (121 ind), however, the diversity obtained from the Shannon indices (3.28 bit) and Margalef (6.12 bit) was high for Lepidoptera and for Odonata it was medium (2.00 bit) and low (1.75 bit) respectively. The presence and absence of organisms was taken into account to obtain Jaccard similarity indices that were relatively high (0.6), highlighting the similarity of transect 1 and 2 for both orders. This work aims to provide information on lepidopterans and odonates present in Ecuador for future research." (Author/Google translate) The following taxa are listed: *Rhionaeschna psilus*, *Erythrodiplax umbrata*, *E. fusca*, *Brechmorhoga praecox*, *Erythemis vesiculosa*, *Macrothemis* sp., *Orthemis* sp., *Argia inculta*, *A. acidens*, *Leptobasis linda*, *Ischnura* sp., *Acanthagrion* sp., *Telebasis brevis*, *Hetaerina occisa*, *Heteragrion cooki*.] Address: <https://repositorio.upse.edu.ec/bitstream/46000/9669/4/UPSE-TBI-2023-0035.pdf>

22784. Priyadarshana, P.H.M.G.C.; Rathnayake, W.A.S.P.P.; Janith, H.A.C.; Gunawardena, M.P.; Gunawardena M.P. (2023): Diversity of Odonata in Kirala Kele Sanctuary, Matara District, Sri Lanka. *Proceedings of the 27th International Forestry and Environment Symposium* 27: 118. (in English) [Verbatim: Kirala Kele sanctuary is a wetland ecosystem that is one of the most valuable conservation areas in the Matara. Odonates represent an important role as an indicator species of wetlands and therefore, a study was conducted to explore and investigate the diversity of Odonata species that inhabit Kirala Kele and identify its use as an indicator of environmental management in the area. The study was conducted in selected four different transects (200 m each) which focused on the micro-habitats, and anthropogenic activities. Individuals belonging to different species of dragonflies and damselflies were counted by visual observations and photographs were taken to identify using standard guidebooks. Data collection was carried out from April 2022 to September 2022 once a month from 8.00 am to 10.00 am and 3.00 pm to 5.00 pm. The results showed that there were 27 species of Odonata from 3 different families. *Neurothemis tullia* and *Rhyothemis variegata* are identified

as the most abundant species in the study area. One species namely, *Pseudagrion rubriceps ceylonicum* has been recorded as endemic. Species diversity measured within study sites using Shannon wiener index (H') and Simpson index (D) indicated that transect A (marshland) H'-2.08, D-0.82, transect B (paddy fields) H'-2.08, D-0.82, transect C (canal and cultivation area) H'-1.25, D-0.48 and transect D (open water and marshland) H'-1.65, D-0.69, respectively. Based on the study, the overall Shannon wiener index in the study area was 1.95 while Simpson Index (D) was 0.75, which concludes the sanctuary has a considerable diversity of Odonata. The number of dragonfly species and abundance is remarkably higher in transects along the canal, in presence of emergent aquatic reeds and surrounded by paddy fields. Along the transects which are mostly affected by anthropogenic activities such as vegetation clearing and pollution or less anthropogenic activities, but low water levels had a small diversity. The results reveal that the diversity of species depends on several factors like the presence or absence of aquatic habitats, level of human disturbances, presence of emergent aquatic reeds, and degree of pollution. Thus, understanding the diversity and distribution of Odonata in the sanctuary can provide important insight into effective ways to manage the environment, which is often overlooked in biodiversity conservation strategies.] Address: Priyadarshana P.H.M.G.C., Dept of Forestry and Environmental Science, University of Sri Jayewardenepura, Nugegoda, Sri Lanka. Email: priyadarshanachathura1@gmail.com

22785. Priyadarshana, P.H.M.G.C.; Ranaweera, S.R.D.; Shafa, S.M.R.; Gunawardena, M.P. (2023): Dynamics of Odonata in an agroecosystem: Effects of paddy cultivation phases on the diversity of dragonflies and damselflies. Proceedings of the 27th International Forestry and Environment Symposium 27: 119. (in English) [Verbatim: Wetlands represent a major part of biodiversity and provide habitat to many species which cannot succeed in other ecosystems. Man-made wetlands like Paddy fields represent a greater percentage of wetland ecosystems in Sri Lanka. However, there are only a few studies that observed the Odonata diversity in man-made wetland ecosystems in Sri Lanka. Therefore, this study was conducted to observe the effect of cultivation phases of a paddy-field ecosystem on the diversity of Odonata. The paddy culture period chosen for the study was started in June 2022 and ended in September 2022 and the study covered the Seeding, Tillering, Booting, Flowering, and Harvesting phases. Fixed-radius point count method was used for the data collection purpose and ten circular plots of 5m radius were laid maintaining a 50 m distance between two plots in the study area which had a total area of 785m². At all five successive stages of the cultivation cycle, the number of Odonata species and their abundance were recorded once a week in each plot. Data was recorded each day from 8.00 am to 10.00 am and from 3.00 pm to 5.00 pm. Odonata diversity was calculated separately at each of the stages of the paddy cultivation cycle using Simpson's index (D) and Shannon-Wiener index (H'). According to results, 592 individuals were recorded belonging to 14 species of Odonata in 2 families. Among the total recorded species, 64% of species belonged to the family Libellulidae. *Pseudagrion rubriceps ceylonicum* was the only endemic Odonata species that were recorded during the study. The overall H' and D diversity indexes were 1.71 and 0.75, respectively. Values of H' and D diversity indexes for these five stages (Seeding, Tillering, Booting, Flowering, and Harvesting) were 1.36 & 0.65, 1.59 & 0.72, 1.72 & 0.76, 1.81 & 0.79 and 1.59 & 0.78, respectively. The study revealed that among the index values of each cultivation phase, the flowering stage had the

highest diversity, while the seeding phase showed the lowest diversity. Therefore, it is evident that the transformation of land use/habitat in different stages plays a major role in the diversity of Odonata. and this study can be used to depict the impacts on biodiversity due to the degradation of wetlands.] Address: Priyadarshana P.H.M.G.C., Dept of Forestry & Environmental Science, Univ. of Sri Jayewardenepura, Nugegoda, Sri Lanka. Email: priyadarshanachathura1@gmail.com

22786. Prokop, J.; Rosová, K.; Leipner, A.; Sroka, P. (2023): Thoracic and abdominal outgrowths in early pterygotes: a clue to the common ancestor of winged insects? Communications Biology 6(1262): 10 pp. (in English) ["One of the fundamental questions in insect evolution is the origin of their wings and primary function of ancestral wing precursors. Recent phylogenomic and comparative morphological studies broadly support a terrestrial ancestor of pterygotes, but an aquatic or semiaquatic ancestor cannot be ruled out. Here new features of the branchial system of palaeodictyopteran larvae of several different instars of *Katosaxoniapteran brauneri* gen. et sp. nov. (Eugereonoidea) from the late Carboniferous collected at Piesberg (Germany) are described, which consist of delicate dorsolateral and lamellate caudal abdominal gills that support an aquatic or at least semiaquatic lifestyle for these insects. Moreover, the similar form and surface microstructures on the lateral abdominal outgrowths and thoracic wing pads indicate that paired serial outgrowths on segments of both tagmata presumably functioned as ancestral type of gills resembling a protopterygote model. This is consistent with the hypothesis that the wing sheaths of later stage damselfly larvae in hypoxic conditions have a respiratory role similar to abdominal tracheal gills. Hence, the primary function and driving force for the evolution of the precursors of wing pads and their abdominal homologues could be respiration." (Authors)] Address: Prokop, J., Dept of Zoology, Faculty of Science, Charles University, Vinická 7, 128 00, Praha 2, Czech Republic

22787. Puff, F.; Hilpold, A.; Schulze, C.H.; Guariento, E. (2023): *Trithemis annulata* (Insecta, Libellulidae) reaches the northernmost Italian region Trentino-Alto Adige/Südtirol. Gredleriana 23: 107-114. (in English, with Italian and Germany summary) ["*T. annulata* is first reported for the Region of Trentino-Alto Adige/Südtirol in the southern Alps. A large breeding population was observed at Lake Caldaro from August to October 2023, along with two solitary males at other lakes. No other records of *T. annulata* were made at 16 other locations within the region. This represents the first record of this species within the Alps and thus exemplifies the rapid range expansion this species has undertaken across Europe during recent years." (Authors)] Address: Puff, F., Inst. for Alpine Environment, Eurac Research, Viale Druso 1, 39100 Bolzano/Bozen, Italy. Email: felix.puff@hotmail.com

22788. Rachmawati, A.; Yustian, I.; Pujiastuti, Y.; Suparman Shk; Arinafril (2023): Biotic and dragonfly diversity indices as ecological quality evaluation in Lahat District Rivers, South Sumatra, Indonesia. Biodiversitas 24(11): 6059-6068. (in English) ["The Lematang, Sandaran, and Kungkulan rivers have been reported to be polluted by coal mining activities. This study aimed to evaluate the ecological conditions using a dragonfly as a bio-indicator. Dragonfly surveys were conducted using direct observation procedures in 11 research sites determined by purposive sampling based on positions of the upstream, midstream and downstream of the river entering the coal mining area, including settling ponds managing waste from post-mining activities (stockpiles and disposal).

Dragonflies were captured by visual observations, direct capture, and sticky traps. Data were analyzed by calculating the Dragonfly Biotic Index (DBI) and Diversity Index. The correlation between dragonflies and environmental factors was analyzed using Canonical Correspondence Analysis (CCA) according to Jaccard's index. The results showed there were 23 species of dragonflies. Larvae and exuviae were found in Aeshnidae and Libellulidae families. Dragonfly species with the highest DBI values were seen in *Rhyothemis triangularis*, *Tholymis tillarga*, *Zyxomma petiolatum*, *Atrocalopteryx atrata*, *Libellago lineata* and *Rhinocypha fenestrata*. Sandaran River had the highest DBI value and diversity index because of the undisturbed condition of the area, which had natural vegetation and unpolluted water conditions. The Kungkulan River will become the focus of river rehabilitation, starting with the reclamation of the river riparian area." (Authors)] Address: Pujiastuti, Y., Dept of Plant Protection, Universitas Sriwijaya. Jl. Palembang-Prabumulih, Indralaya, Ogan Ilir 30662, South Sumatra, Indonesia. Email: ypujiastuti@unsri.ac.id

22789. Rahmawati, M.D.; Wahyuningtyas, L.; Eginuranda, L.A. (2023): Inventarisasi Odonata di kawasan air terjun Roro Kuning bajulan loceret nganjuk. Prosiding Seminar Nasional Hasil Penelitian dan Abdimas 2: 259-262. (in Indonesian, with English summary) [Indonesia, Java, Roro Kuning Bajulan Loceret Nganjuk Waterfall; "Calopterygidae, Coenagrionidae, Rhinocypha anisoptera." (Authors)] Address: Rahmawati, Maylinda Dwi, STKIP PGRI Nganjuk, Indonesia. Email: maylindadwirahmawati@gmail.com

22790. Reinhardt, K. (2023): Weitere Beobachtungen der an Libellenflügeln saugenden Gnitz Forcipomyia 163 paludis (Macfie, 1936) in Brandenburg (Diptera, Ceratopogonidae) - Further observations of the dragonfly biting midge *Forcipomyia paludis* (Macfie, 1936) in Brandenburg / NE Germany (Diptera, Ceratopogonidae). Märkische Entomologische Nachrichten 25(1+2): 163-166. (in German, with title in English) ["On June 16, 2023, insects were observed and photographed on the banks of the Großer Gollinsee, 10 km southeast of Templin, and on the adjacent forest paths separated by 200-300 m of pine forest. Biting midges were noticed on all four dragonfly species that could be photographed directly on the water: 1 male of *Libellula fulva* (1 midge on the left forewing, Figure 1), 1 male of *Enallagma cyathigerum* (3 biting midges), a male of *Onychogomphus forcipatus* whose ability to fly was so poor due to a head injury that it could be grasped by hand (1 biting midge on the left, approx. 5 on the right forewing, approx. 8 on the left hindwing, at least 4 on the right), and *Ischnura elegans* (1 biting midge). Specimens of biting midges and the injured animal of *O. forcipatus* are in the author's specimen collection." (Author)] Address: Reinhardt, K., Angewandte Zoologie, Technische Universität Dresden, 01069 Dresden, Germany. Email: klaus.reinhardt@tu-dresden.de

22791. Samer, A.; Fadl, H.H.; El Hamouly, H.; El-Hassanorcid, G.M.M.A. (2023): Taxonomic studies of the two families Gomphidae and Macromiidae (Odonata: Anisoptera) from Egypt. Egyptian Academic Journal of Biological Sciences. A, Entomology 16(4): 83-91. (in English) ["Even though, works on the taxonomy of Odonata have acquired awareness worldwide, the African continent as well as Egypt is one of the least explored localities. Thus, there is an urgent need to conduct comprehensive taxonomic reviews of the order Odonata in Egypt. In the current work, the dragonflies of Gomphidae and Macromiidae are reviewed. Field trips in 49 localities inside 11 Egyptian governorates did not result in collecting any specimens. Therefore, the study is based only on the

materials that are preserved in the main Egyptian reference collections in addition to the previous literature. As a result, a total of two genera and four species for the two families were identified. Taxonomic keys with illustrations of Egyptian genera and species are provided. In addition, diagnosis, world distribution and material examined were given for each species. Also, type genera, type species and type locality are given. The status of the species was discussed." (Authors) *Paragomphus sinaiticus*, *P. pumilio*, *P. genei*, *Phyllomacromia africana*] Address: Samer, A., Department of Entomology, Faculty of Science, Ain Shams University, Abbassia- Cairo, Egypt. Email: Abdallahsamer0102219@sci.asu.edu.eg

22792. Sandall, E.L.; Maureaud, A.A.; Guralnick, R.; McGeoch, M.A.; Sica, Y.V.; Rogan, M.S.; Booher, D.B.; Edwards, R.; Franz, N.; Ingenloff, K.; Lucas, M.; Marsh, C.J.; McGowan, J.; Pinkert, S.; Ranipeta, A.; Uetz, P.; Wieczorek, J.; Jetz, W. (2023): A globally integrated structure of taxonomy to support biodiversity science and conservation. *Trends in Ecology & Evolution* 38(12): 1143-1153. (in English) ["All aspects of biodiversity research, from taxonomy to conservation, rely on data associated with species names. Effective integration of names across multiple fields is paramount and depends on the coordination and organization of taxonomic data. We assess current efforts and find that even key applications for well-studied taxa still lack commonality in taxonomic information required for integration. We identify essential taxonomic elements from our interoperability assessment to support improved access and integration of taxonomic data. A stronger focus on these elements has the potential to involve taxonomic communities in biodiversity science and overcome broken linkages currently limiting research capacity. We encourage a community effort to democratize taxonomic expertise and language in order to facilitate maximum interoperability and integration." (Authors) Taxa assessed include Odonata.] Address: Sandall, Emily, Dept of Ecology & Evolutionary Biol., Yale University, New Haven, CT 06520, USA. Email: sandall.emily@gmail.com

22793. Sankone, C.; Bedwell, C.; McCreadie, J. (2023): Regional β -diversity of stream insects in coastal Alabama is correlated with stream conditions, not distance among sites. *Insects* 2023, 14(11), 847; 12 pp. (in English) ["Simple Summary: Biodiversity is measured differently depending on the spatial scale of the study. Beta (β)-diversity, for example, is a calculated measurement that addresses changes in diversity across different assemblages in a specific region. Studies of β -diversity often address changes in diversity across gradients of environmental conditions and distance among sites. However, β -diversity of stream insects can be difficult to measure due to their hyper-diversity and challenging taxonomy. Our study investigated the association of β -diversity with habitat conditions and distance among these habitats for insects found in the coastal streams of Alabama, USA. Additionally, we looked for potential influences caused by seasonality (fall and summer) and the level of taxonomic identification (genus, species). Regardless of season, stream conditions were highly correlated with β -diversity. More specifically, stream size and water chemistry showed the highest associations with β -diversity. Changes in β -diversity were largely driven by species replacement (turnover) rather than species loss (nestedness). The taxonomic resolution had minimal effects on the calculations of β -diversity across environmental conditions. Distance among stream sites was never correlated with β -diversity. As we continue to face global insect declines, our study provides valuable insight into the patterns that drive changes in diversity across environmental gradients. Abstract: β -diversity is often measured over

both spatial and temporal gradients of elevation, latitude, and environmental conditions. It is of particular interest to ecologists, as it provides opportunities to test and infer potential causal mechanisms determining local species assemblages. However, studies of invertebrate β -diversity, especially aquatic insects, have lagged far behind other biota. Using partial Mantel tests, we explored the associations between β -diversity of insects found in the coastal streams of Alabama, USA, and stream conditions and distances among sites. β -diversity was expressed using the Sørensen index, β Sor, stream conditions were expressed as principal components (PCs), and distances as Euclidean distances (km) among sites. We also investigated the impact of seasonality (fall, summer) and taxonomic resolution (genus, species) on β Sor. Regardless of season, β Sor was significantly correlated ($p < 0.01$; $r > 0.44$) with stream conditions (stream size and water chemistry), while taxonomic resolution had minimal effect on associations between β Sor and stream conditions. Distance was never correlated with changes in β Sor ($p > 0.05$). We extended the use of the Sørensen pair-wise index to a multiple-site dissimilarity, β Mult, which was partitioned into patterns of spatial turnover (β Turn) and nestedness (β Nest). Changes in β Mult were driven mostly by turnover rather than nestedness." (Authors) The study includes Odonata at genus level.] Address: Sankone, C., Biology Dept, University of South Alabama, Mobile, AL 36688, USA. Email: cms1822@jagmail.southalabama.edu

22794. Sayer, C.D.; Biggs, J.; Greaves, H.M.; & Williams, P. (2023): Guide to the restoration, creation and management of ponds. University College London, London, UK: 48 pp. (in English) [The paper includes references to dragonflies.] Address: https://british-dragonflies.org.uk/wp-content/uploads/2024/01/UCL_FHT_pond_conservation_guide.pdf

22795. Schiel, F.-J. (2023): Breitet sich der Zweifleck (*Epi-theca bimaculata*) derzeit am Oberrhein nach Süden aus? (Odonata: Corduliidae). *Mercuriale* 23: 73-77. (in German, with English summary) [Baden-Württemberg, Germany; "Is the Eurasian baskettail (*Epi-theca bimaculata*) currently spreading southwards along the Upper Rhine? — In 2020 and 2023, individual males of *E. bimaculata* were observed flying patrols at two sites near Ichenheim and Appenweier, and two exuviae of the species were found at the northern of the two sites. Both sites are located in the natural area "Middle Upper Rhine Plain" about 45 and 70 km south of the so far southernmost site on the Upper Rhine in Baden-Württemberg near Au am Rhein and about 30 km southeast of the next known site near Haguenau in Alsace (France). These are the first records of the species from the middle Upper Rhine plain in Baden-Württemberg. As the region has been sampled relatively thoroughly for dragonflies, I suspect that the species is currently spreading southwards." (Author)] Address: Schiel, F.-J., INULA, Turenneweg 9, 77880 Sasbach, Germany. Email: franz-josef.schiel@inula.de

22796. Schiel, F.-J. (2023): Nachruf auf Gerhard Feldwieser im Namen der SGL. *Mercuriale* 23: 84-85. (in German) [Obituary Gerhard Feldwieser, 28. Feb. 1931 - 2. Mar. 2023] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenneweg 9, 77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

22797. Schiesari, L.; Saito, V.; Ferreira, J.; Freitas, L.S.; Goebels, A.J.; Leite, J.P.C.B.; Oliveira, J.C.; Pelinson, R.M.; Querido, B.B.; Carmo, J.; Espíndola, E.L.G.; Guedes-Munin, N.C.; Montagner, C.; Rossetto, R.; Taniwaki, R.; Martinelli, L.A. (2023): Community reorganization stabilizes freshwater

ecosystems in intensively managed agricultural fields. *Journal of Applied Ecology* 60(7): 1327-1339. (in English) ["Sustainable intensification may depend on associating precision farming with the harnessing of ecological principles in crop fields, and integrating farms and non-farmed land in productive landscapes. Small wetlands could play an important role in both pursuits for having high per-unit-area rates of element cycling and species richness while deeply penetrating crop fields. However, their potential for ecosystem service provisioning is unlikely to be met if land management intensification promotes ecosystem destabilization in biomass production. We tested the consequences of land use intensification on various dimensions of freshwater ecosystem stability by means of a large-scale field experiment converting extensive pastures to intensive pastures and sugarcane plantations in Southeastern Brazil. Nested within experimental plots were 4000 L mesocosms simulating ponds and puddles commonly found in productive landscapes. Mesocosms were monitored for basic physico-chemical parameters, nutrients, pesticides, phytoplankton standing crop, and the spontaneously colonizing biodiversity. Despite severe environmental change, the stability of sugarcane communities was no different from that of extensive and intensive pastures. This occurred because the local extinction of a sensitive top dragonfly predator [*Erythrodiplax* sp.] following the application of vinasse and insecticide was compensated by colonization of a suite of more tolerant invertebrate mesopredators such as beetles and bugs. Community stability tended to increase with biomass asynchrony and species richness, evidencing a portfolio effect of biodiversity. Unfortunately, the species richness necessary to stabilize biomass production is unlikely to be available in many sugarcane fields and several other row crops. Synthesis and applications. Ponds and puddles could be effective centers of irradiation of ecosystem service provisioning in agricultural fields in terms of pest control; nutrient accumulation, cycling and export back to fields; and habitat and stepping stones for freshwater biodiversity. However, the impoverished biodiversity that results from a combination of harsh local conditions and spatial isolation renders pond communities inherently unstable. Given the unlikely, immediate reduction in agrochemical use in much of the intensively managed crop area, a combination of large, protected source wetlands at the margin of fields and small constructed or naturally forming ponds and puddles in plantations could contribute to sustainable intensification." (Authors)] Address: Schiesari, L., Environmental Management, School of Arts, Sciences & Humanities, University of São Paulo, São Paulo, Brazil. Email: lschiesaria@usp.br

22798. Simonsen, T.J.; Djernæs, M.; Nielsen, O.F.; Olsen, K. (2023): The Grasshopper Paradigm in damselflies: evidence for phalanx-like postglacial recolonization of Europe from a Balkan refugium in *Platycnemis pennipes* Pallas (Odonata: Zygoptera: Platycnemidae). *Arthropod Systematics & Phylogeny* 81: 1019-1029. (in English) ["We explore haplotype diversity, phylogeography and phylogenetic relationships of the damselfly *Platycnemis pennipes* in Europe based on 618 bp DNA from the mitochondrial gene COI. A haplotype network analysis shows that the species is divided into two haplotype groups. One is restricted to the Italian Peninsula, while the other is found from the Black Sea region across eastern and central Europe to Scandinavia, England, and southwestern France. This pattern is recovered in a Bayesian phylogenetic analysis. Genetic distance (K2P) between the two groups is approximately 1.5%, while within-group variation is an order of magnitude lower. An analysis of the molecular variance (AMOVA) shows that variation between the two groups account for more than 96% of the total variation

within the dataset, adding to the evidence that they have been isolated for a considerable amount of time. The pattern we find is similar to the so-called Grasshopper Paradigm in European phylogeography, where a species has recolonized Europe after the last glaciation from a glacial refugium in the southeast, while other refugial populations in the Iberian and Italian peninsulas have remained isolated to this day. In *P. pennipes* there is only an isolated refugial population in Italy as the species does not have current populations in the Iberian Peninsula. By comparing the genetic distance between the two groups to a previously published divergence time analysis of European Odonata we estimate that they have likely been isolated since the onset of the Saale Glaciation ca 400 ky ago." (Authors)] Address: Simonsen, T.J., Dept of Research and Collections, Natural History Museum Aarhus, DK-8000, Aarhus C, Denmark. Email: t.simonsen@natlist.dk

22799. Smith, B.D.; Villalobos-Jiménez, G.; Perron, M.A.C.; Sahlén, G.; Assandri, G.; Vilenica, M.; Batista Calvão, L.; Juen, L.; Cerini, F.; Bried, J.T. (2023): Odonata assemblages in human-modified landscapes. Dragonflies and Damselflies. Second Edition. / Córdoba-Aguilar, Alex; Beatty, Christopher D.; Bried, Jason T. (ur.) Oxford: Oxford University Press, 2023. str. 247-259 doi: 10.1093/oso/9780192898623-003.0018: 247-259. (in English) ["Human activities such as logging, agriculture, and urbanization can drastically change and limit Odonata species distributions in aquatic and terrestrial environments. These modifications may culminate in extirpations of rare and resident species and homogenization of community composition across space. This chapter reviews how human land use is (re)shaping odonate assemblages and focuses on the impacts from logging, agriculture, and urbanization. Deeper appreciation and analysis of regulatory mechanisms (e.g. vulnerability traits, species interactions, phylogenetic niche conservatism) and background "noise" (e.g. natural heterogeneity, climate change, historical context) will be important in understanding and predicting odonate community responses to ongoing and future landscape alteration." (Authors)] Address: Vilenica, Marina, Faculty of Teacher Education, Univ. of Zagreb, Dept in Petrinja, Trg Matice hrvatske 12, 44250 Petrinja, Croatia

22800. Tolman, E.R.; Bruchim, O.R.; Driever, E.S.; Jordan, D.; Kohli, M.K.; Montague, L.; Park, J.; Park, S.; Rosario, M.; Ryu, J.L.; Ware, J.L. (2023): Changes in effective population size of Odonata in response to climate change revealed through genomics. *International Journal of Odonatology* 26: 205-211. (in English) ["The advent of third generation sequencing technologies has led to a boom of high-quality, chromosome level genome assemblies of Odonata, but to date, these have not been widely used to estimate the demographic history of the sequenced species through time. Yet, an understanding of how lineages have responded to past changes in the climate is useful in predicting their response to current and future changes in the climate. Here, we utilized the pairwise sequential markovian coalescent (PSMC) to estimate the demographic histories of *Sympetrum striolatum*, *Ischnura elegans*, and *Hetaerina americana*, three Odonata for which chromosome-length genome assemblies are available. *Ischnura elegans* showed a sharp decline in effective population size around the onset of the Pleistocene ice ages, while both *S. striolatum* and *H. americana* showed more recent declines. All three species have had relatively stable population sizes over the last one hundred thousand years. Although it is important to remain cautious when determining the conservation status of species, the coalescent models did not show any reason for major concern in any

of the three species tested. The model for *I. elegans* confirmed prior research suggesting that population sizes of *I. elegans* will increase as temperatures rise." (Authors)] Address: Tolman, E.R., American Museum of Natural History, Department of Invertebrate Zoology, New York, New York, USA. Email: etolman@amnh.org

22801. Tomabene, B.J.; Hossack, B.R.; Halstead, B.J.; Eagles-Smith, C.A.; Adams, M.J.; Backlin, A.R.; Brand, A.B.; Emery, C.S.; Fisher, R.N.; Fleming, J.; Glorioso, B.M.; Grear, D.A.; Campbell Grant, E.H.; Kleeman, P.M.; Miller, D.A.W.; Muths, E.; Pearl, C.A.; Rowe, J.C.; Rumrill, C.T.; Waddle, J.H.; Winzeler, M.E.; Smalling, K.L. (2023): Broad-scale assessment of methylmercury in adult amphibians. *Environmental Science & Technology* 57: 17511-17521. (in English) ["Mercury (Hg) is a toxic contaminant that has been mobilized and distributed worldwide and is a threat to many wildlife species. Amphibians are facing unprecedented global declines due to many threats including contaminants. While the bi-phasic life history of many amphibians creates a potential nexus for methylmercury (MeHg) exposure in aquatic habitats and subsequent health effects, the broad-scale distribution of MeHg exposure in amphibians remains unknown. We used nonlethal sampling to assess MeHg bioaccumulation in 3,241 juvenile and adult amphibians during 2017-2021. We sampled 26 populations (14 species) across 11 states in the United States, including several imperiled species that could not have been sampled by traditional lethal methods. We examined whether life history traits of species and whether the concentration of total mercury in sediment or dragonflies could be used as indicators of MeHg bioaccumulation in amphibians. Methylmercury contamination was widespread, with a 33-fold difference in concentrations across sites. Variation among years and clustered subsites was less than variation across sites. Life history characteristics such as size, sex, and whether the amphibian was a frog, toad, newt, or other salamander were the factors most strongly associated with bioaccumulation. Total Hg in dragonflies was a reliable indicator of bioaccumulation of MeHg in amphibians ($R^2 = 0.67$), whereas total Hg in sediment was not ($R^2 = 0.04$). Our study, the largest broad-scale assessment of MeHg bioaccumulation in amphibians, highlights methodological advances that allow for nonlethal sampling of rare species and reveals immense variation among species, life histories, and sites. Our findings can help identify sensitive populations and provide environmentally relevant concentrations for future studies to better quantify the potential threats of MeHg to amphibians." (Authors)] Address: Tomabene, B.J., U.S. Geological Survey, Northern Rocky Mountain Science Center, Missoula, Montana 59801, USA. Email: btomabene@usgs.gov

22802. Turnhout, S.; Halffman, W. (2023): Readjusting observational grids in dragonfly field guides. *Social Studies of Science* 54(1): 105-132. (in English) ["Wildlife field guide books present salient features of species, from colour and form to behaviour, and give their readers a vocabulary to express what these features look like. Such structures for observation, or observational grids, allow users to identify wildlife species through what Law and Lynch have called 'the difference that makes the difference'. In this article, we show how these grids, and the characteristics that distinguish species, change over time in response to wider concerns in the community that use and make the field guides. We use the development of Dutch field guides for dragonflies to show how the ethics of observing wildlife, the recreational value of dragonfly observation, the affordances of observational tools, and biodiversity monitoring and conservation goals all have

repercussions for how dragonflies are to be identified. Ultimately, this affects not only how dragonflies are to be observed and identified, but also what is taken to be 'out there'. The article is based on a transdisciplinary cooperation between a dragonfly enthusiast with emic knowledge and access, and an STS researcher. We hope the articulation of our approach might inspire analyses of other observational practices and communities.] Address: Halffman, W., Inst. for Science in Society, Radboud Univ., Mailbox 77, P.O. box 9010, Nijmegen, 6500 GL, Netherlands. Email: W.Halffman@science.ru.nl

22803. Vogt, T.E.; Kosterin, O.E.; Colby, J. (2023): Single syntypes of *Somatochlora exuberata* Bartenev, 1910 (Odonata: Corduliidae), discovered in both the Milwaukee Public Museum and the University of Michigan Museum of Zoology, U.S.A., with designation of the lectotype. *Zootaxa* 5380(6): 577-586. (in English) ["A male syntype of *S. exuberata*, from Kavykuchi Gazimurskie village, Transbaikalia, Siberia, June 24 (in Julian Calendar, July 7 in Gregorian Calendar) 1909, was discovered in the Milwaukee Public Museum, Wisconsin, USA., as received in exchange from A.N. Bartenev by Richard Anthony Muttkowski. Another male syntype with the same data later was found in the University of Michigan Museum of Zoology, Michigan, USA. The latter specimen is designated as the lectotype of *S. exuberata*. The description of *Somatochlora vera* Bartenev, 1914, a name currently considered a junior synonym of *S. exuberata*, is critically evaluated." (Authors) *Calopteryx amasina* Bartenev, 1912 = *Calopteryx splendens amasina*] Address: Vogt, T.E., Florida State Collection of Arthropods, SW 34th Street, Gainesville, Florida 32608, USA. Email: somatochlora_sp1@yahoo.com

22804. Wildermuth, H.; Schneider, B.; Borkenstein, A.; Quante, U. (2023): Sind intraspezifische Mehrfachverbindungen und Männchen-Tandems bei *Leucorrhinia*-Arten besonders häufig? (Odonata: Libellulidae). *Libellula* 42(3/4): 95-111. (in German, with English summary) ["Are intraspecific multiple connections and male-tandems in *Leucorrhinia*-species extraordinary common? (Odonata: Libellulidae) – In the context of mating behaviour, unusual intraspecific connections such as triple connections and male-male tandems occasionally occur in dragonflies. Based on the assumption that such connections occur quite often in *Leucorrhinia*, we searched specifically for corresponding data and documents in our photo archives, in the literature, and on the internet. In two of five European *Leucorrhinia* species we found previously undocumented types of connections and a total of 31 new cases in *Leucorrhinia*, much more than in other genera of the Libellulidae. Presumably, in representatives of the genus *Leucorrhinia*, there is a correlation between the occurrence of connections and male density, thus intrasexual competition for females at mating and oviposition sites. Attacks on mating wheels or tandems by rival males could be aimed at splitting the pair and snatching the female for themselves. Male-male tandems can occur when the non-contact guarding male of an egg-laying female attaches to a rival and drags it away while the female continues to oviposit." (Authors)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

22805. Wildermuth, H. (2023): Ökologische Infrastruktur am Beispiel Libellen (Odonata) im südlichen Kanton Zürich. *Ornithologischer Beobachter* 120: 350-367. (in German, with English summary) ["Ecological infrastructure using the example of dragonflies (Odonata) in two municipalities of the canton of Zurich (Switzerland): The demand of governmental and private nature conservation bodies for a nationwide Ecological Infrastructure – a network of natural and semi-

natural habitats – is a consequence of the ongoing biodiversity crisis. These demands are always general recommendations, but they must be implemented individually for each specific case. What this means is presented here using the example of the dragonfly fauna of a 4 square kilometre section of landscape in the canton of Zurich. In this area, intensively used agricultural land takes up more than half of the area. The remaining area consists of forests, settlements, farmsteads, recreational facilities, fens, a small lake, two reservoirs and some small water bodies. The linear landscape elements are dominated by forest edges. In addition, there are paths and roads, streams and ditches, hedgerows and creeks, and a disused railroad line with embankments and terrain cuts. There are 3400 records available for the dragonfly fauna of the area, from 14 aquatic and 11 terrestrial habitats from the period between 1995 and 2023. A total of 47 species have been identified, 38 of which are certain or likely to reproduce. Using three dragonfly species as examples [*Sympecma fusca*, *Platycnemis pennipes*, *Libellula fulva*]; the specific developmental waters and the associated terrestrial habitats are mapped. In terms of biodiversity in general and suitability for the dragonfly fauna in particular, all typical landscape elements of the rural parts of the Swiss Plateau are represented in the studied area. Near-natural areas make up only a small part, except for the fens. Based on the results, measures are proposed to enhance the existing ecological infrastructure, serving not only dragonflies but also other groups of regional biodiversity. Concrete proposals include, for example, the preservation, expansion and linking of protected areas, the creation of new groups of ponds and the damming of moorland ditches. Particularly important is the professional biotope maintenance such as the spatio-temporal staggered maintenance of wet and dry meadows, pond groups, stream courses and hedges. To achieve the goal of an expanded ecological infrastructure, public acceptance and the cooperation of all stakeholders are required] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

22806. Willbanks, P.; Hays, H.; Kabat, K.L.; Barnes, M.A. (2023): Preliminary analysis suggests freshwater invertebrate environmental DNA is more concentrated in surface water than in benthic sediments. *The Texas Journal of Science* 75(1): Article 5. <https://doi.org/10.32011/tjxsci751Article5>: 13 pp. (in English) ["The collection, identification, and census of freshwater invertebrates helps to increase understanding of the ecological function of lakes and streams. However, this work can be time-consuming and laborious because invertebrate identification often requires considerable taxonomic training and expertise. The collection and analysis of environmental DNA (eDNA), the genetic material that organisms shed into their surrounding environment, represents a potentially revolutionary approach for rapid and accurate invertebrate surveillance in freshwater environments. Previous studies have demonstrated that fish eDNA tends to be more abundant in freshwater lake sediments than the water column above, so we conducted an experiment to examine whether this pattern holds true for freshwater invertebrates. We collected paired samples from benthic sediments and the water column at ten sites around an urban playa lake in Lubbock, Texas. Based on cycle threshold values from quantitative PCR (qPCR) amplification with universal invertebrate primers targeting the COI gene, a paired Wilcoxon signed-rank test and Spearman rank-order correlation suggested that invertebrate eDNA quantities were correlated between the sediment and water column but consistently more concentrated in the water compared to the sediment below, directly contrasting with previous studies

of fish eDNA. Future work combining eDNA detection and high-throughput sequencing (i.e., metabarcoding) will increase understanding of how eDNA signals relate to local invertebrate pools and increase the utility of eDNA sampling for freshwater invertebrates. ... Odonata [Lestidae] and Trichoptera (1.3% each) were the least represented taxa." (Authors)] Address: Willbanks, P., Dept of Natural Resources Management, Texas Tech University, Lubbock, TX 79409, USA. Email: paton.willbanks@bsu.edu

22807. Yu, X.; Cordero-Rivera, A. (2023): Behavioural observation on *Platycnemis latipes* revealing novel function of males' patrol. *Zoological Systematics* 48(2): 140-146. (in English) ["Males of *P. latipes* have enlarged tibiae (fans) and patrol using a special longitudinal zig-zag flight. By means of focal observations and experimental manipulations of the colour of abdomen and fans of mature males, we suggest that the zig-zag flight is used to avoid unnecessary harassment from other males and has not the function to attract females. The fans of *P. latipes* are mainly used as a tool to threaten rivals, but their effectiveness seems limited. Both abdomen and fans of a mature male can reflect UV light strongly." (Authors)] Address: Yu, X., College of Life Sciences, Chongqing Normal University, Chongqing 401331, P.R. China. Email: lanysummer@163.com

22808. Yulita, R.; Satria, R. (2023): Inventory of dragonflies (Odonata) at Sarasah Aia Angek, Harau Valley Nature Park, West Sumatra. *Serambi* 8(3): 547-551. (in Indonesian, with English summary) ["Sarasah Aia Angek is one of the waterfalls in the Harau Valley Natural Tourism Park which is rarely visited by tourists because of its difficult location to reach. Even though Sarasah Aia Angek is rarely visited by tourists, there is still trash scattered there. It will damage the ecosystem and will affect the diversity of species there, one of which is dragonflies. This study aims to be able to monitor dragonfly species in Sarasah Aia Angek. Sampling of dragonflies within a 10 meter radius from the edge of the waterfall pool and in small rivers that are still connected to the waterfall by direct collection using an insect net. Sampling was carried out at 10.00-18.00 WIB. Dragonfly samples obtained will be preserved and identified. The total individuals found in Sarasah Aia Angek were 26 individual dragonflies which were identified into 5 species, 4 genera and 3 families. All dragonfly species found belong to the Zygoptera sub-order." (Authors) 5 odonate species are listed: *Heliocypha angusta*, *Sundacypha petiolata*, *Vestalis amethystina*, *Prodasineura notostigma*, and *P. interrupta*] Address: Satria, R., Biodiversity of Sumatra Research Group, Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Padang, West Sumatra, 25132, Indonesia. Email: rijalsatria@yahoo.co.id

22809. Zumar, M.R.; Romzalis, A.A.; Wibisana, O.R.; Susanto, M.A.D. (2023): Dragonfly (Odonata) species diversity in the Sigolo-Golo tourism area, Jombang, East Java. *Biosfer: Jurnal Tadris Biologi* 14(2): 261-270. (in English, with Indonesian summary) ["The sigolo-golo area is a tourist area with waterfalls and rivers. It is located in a secondary forest far enough from settlements, so it has the potential to be a habitat for dragonfly diversity. This study aims to analyze the composition and diversity of dragonflies in the Sigolo-golo tourist area. Data collection was carried out using the Visual Encounter Survey (VES) method. The results of research conducted in three locations showed that there were 12 species from five families, namely Libellulidae, Euphaeidae, Calopterygidae, Chlorocyphidae, and Platynemididae, with a total of 319 individuals. The species with the highest relative

abundance value in this study was *Pantala flavescens* with a value of 77.40%. The value of species diversity at this location is $H' = 0.984$, which indicates that the diversity index value is low." (Authors)] Address: Zumar, M.R., Universitas Islam Negeri Sunan Ampel Surabaya, Indonesia. Email: muhammadazmidwi@gmail.com

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22810. Aida, V.; Arias-Real, R.; Menéndez, M.; Muñoz, I. (2024): The role of seedbanks and hyporheic refuges in supporting benthic invertebrate community resistance and resilience to dry phases. *Aquatic Sciences* (2024) 86:16: 13 pp. (in English) ["In intermittent streams, aquatic organisms use various strategies to face dry phases, but the relative contribution of these strategies to persist during dry phase remains unclear. Here, we investigated the in situ persistence of benthic invertebrates in the saturated hyporheic sediments and the "invertebrate seedbank" that persists in dry sediments across six Mediterranean intermittent streams. Taxonomic and functional responses within hyporheic and seedbank assemblages were compared with those in the benthic assemblages under connected flow conditions by combining field and mesocosms data. The dry phase duration in each stream was calculated to assess the responses of hyporheic and seedbank assemblages. Taxonomic composition and abundance-weighted traits related to resistance and resilience to face the dry phase in each assemblage type (benthic, hyporheic, seedbank) were determined. Taxonomic (richness and diversity) and functional (richness and dispersion) metrics were also calculated. We found that seedbank and hyporheic assemblages supported up to 16% and 40% of the benthic taxa, respectively. Only taxonomic and functional richness differed between assemblage types. Contrary to previous research, no clear relationship was established between diversity or the abundance of resistance traits and the duration of dry phase; however, a negative linear relationship was identified between the abundance of resilience traits and the duration of the dry phase. The increase in the frequency and duration of drying events due to climate change will reduce water availability in both saturated and unsaturated streambed sediments, compromising the persistence of aquatic biodiversity in intermittent streams." (Authors) The supplementary material lists *Boyeria*, *Gomphus*, and *Onychogomphus*.] Address: Aida, Viza, Department of Evolutionary Biology, Ecology and Environmental Sciences, Faculty of Biology, Universitat de Barcelona, Av. Diagonal, 643, 08028 Barcelona, Spain. Email: aida.viza@ub.edu

22811. Amer, N.R.; Stoks, R.; Antol, A.; Sniegula, S. (2024): Microgeographic differentiation in thermal and antipredator responses and their carry-over effects across life stages in a damselfly. *PLoS ONE* 19(2): e0295707: 19 pp. (in English) ["Global warming and invasive species, separately or combined, can impose a large impact on the condition of native species. However, we know relatively little about how these two factors, individually and in combination, shape phenotypes in ectotherms across life stages and how this can differ between populations. We investigated the non-consumptive predator effects (NCEs) imposed by native (perch) and invasive (signal crayfish) predators experienced only during the egg stage or during both the egg and larval stages in combination with warming on adult life history traits of *Ischnura elegans*. To explore microgeographic differentiation, we compared two nearby populations differing in thermal conditions and predator history. In the absence of predator cues, warming positively affected damselfly survival, possibly because the warmer temperature was closer to the optimal temperature.

In the presence of predator cues, warming decreased survival, indicating a synergistic effect of these two variables on survival. In one population, predator cues from perch led to increased survival, especially under the current temperature, likely because of predator stress acclimation phenomena. While warming decreased, predator cues increased larval development time with a proportionally stronger effect of signal crayfish cues experienced during the egg stage, indicating a negative carry-over effect from egg to larva. Warming and predator cues increased mass at emergence, with the predator effect driven mainly by exposure to signal crayfish cues during the egg stage, indicating a positive carry-over effect from egg to adult. Notably, warming and predator effects were not consistent across the two studied populations, suggesting a phenotypic signal of adaptation at a microgeographic scale to thermal conditions and predator history. We also observed pronounced shifts during ontogeny from synergistic (egg and early larval stage) toward additive (late larval stage up to emergence) effects between warming and predator stress. The results point out that population- and life-stage-specific responses in life-history traits to NCEs are needed to predict fitness consequences of exposure to native and invasive predators and warming in prey at a microgeographic scale." (Authors)] Address: Amer, N.R., Dept of Biodiversity, Inst. of Nature Conservation, Polish Acad. of Sciences, Krakow, Poland. Email: nraffatamer@gmail.com

22812. Beaujour, P.M.; Loranger-Merciris, G.; Cézilly, F. (2024): Sites and species contribution to the β -diversity of Odonata assemblages in Haiti: Implications for conservation. *Global Ecology and Conservation* 50, e02816: 16 pp. (in English) ["Understanding the ecological determinants of assemblage diversity in freshwater insects is of crucial importance for conservation biology and environmental management. This is particularly true in Haiti, where severe and ongoing environmental degradation of aquatic ecosystems is a major threat to the local invertebrate fauna. Here, using Odonates assemblages sampled from 67 waterbodies belonging to 14 different Haitian watersheds, we assessed species uniqueness (U) from both rarity based on spatial occupancy and taxonomic species distinctness (TSD), and species contribution to total β diversity (SCBD). We assessed between-site variation in species richness (SR), relative taxonomic distinctness (RTD), mean species uniqueness per site (Mean U), and the contribution of individual sites to total β diversity (LCBD), based on presence-absence data. We then examined the relationships between these variables and the physico-chemical characteristics of the sites. In total, we recorded 49 different odonate species (including two endemic species of conservation interest), belonging to 40 genera and 7 families, with a relatively high percentage (69.4%) of rare species (i.e. occurring in 10% or less of sampled water bodies). TSD was negatively correlated with spatial occupancy, while U was significantly higher in Zygopeteran species compared to Anisopteran species. SR varied among the 67 sites, ranging from 2 to 17 species, while SCBD was positively correlated with site occupancy. Differences in assemblage composition between sites were mainly due to species replacement, while only a few sites had assemblages consisting of a subset of larger assemblages found at other sites. The observed positive correlation between dissimilarity and geographic distance between sites further suggests that the turnover of species may take place over some ecological gradient and/or might be explained by species ecological requirements and limited ability to disperse. LCBD and Mean U increased with increasing altitude and decreasing temperature and conductivity, whereas SR and RTD did not. All variables were independent of pH. Overall, SR

and RTD were higher in lotic than in lentic sites, and in sites with natural riparian vegetation compared to sites with anthropogenic or mixed riparian vegetation. Mean U provided a relevant index for site selection for odonates conservation in Haiti, whereas β diversity appeared to be of limited interest for this purpose. Globally, our results advocate the importance of conserving a wide diversity of waterbodies to protect Odonate diversity in Haiti, and particularly in forested areas at > 1000 m altitude." (Authors)] Address: Beaujour, P.M., UMR ISYEB-MNHN-CNRS-Sorbonne Université e-EPHE, Université des Antilles, Campus de Fouillole, 97157 Pointe-a-Pitre Cedex, Guadeloupe, France. Email: pmichardb@gmail.com

22813. Boderau, M.; Engel, M.S.; Stössel, I.; Nel, A. (2024): The first fossil representative of the extant clubtail dragonfly genus *Lindenia* from the mid-Miocene of Öhningen, Germany. *Acta Palaeontologica Polonica* 69(1): 23-27. (in English) ["*Lindenia heeri* sp. nov., is described and figured as the first fossil representative of the extant lindeniine genus *Lindenia*, based on a finely preserved forewing from the mid-Miocene lacustrine maar of Öhningen, Germany. The new species differs from the type and only species of *Lindenia* tetraphylla in the dark brown pterostigma covering ten cells vs. only five. Otherwise its forewing venation is identical to that of the modern species. The paleoclimatic data fit well with the climatic preferences of extant *Lindenia* tetraphylla, consistent with the generally warmer climate of that region during that period of time, allowing for more Mediterranean or even subtropical elements of the flora and fauna to persist." (Authors)] Address: Boderau, M., Institut 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, CP50, 57 rue Cuvier, F-75005 Paris, France. Email: mathieuboderau@gmail.com

22814. Buczynski, P.; Tonczyk, G. (2024): Polish and dedicated to Poland odonatological papers. 22. The year 2023, and additions to the year 2022. *Odonatrix* 201 (2024): 6 pp. (in Polish, with English summary) ["The authors present a list of 45 Polish and dedicated to Poland odonatological works that appeared in the year 2023, and one PhD thesis, two MSc theses, and one diploma thesis. One paper and one dataset from the year 2022 are also given to supplement the previous list." (Authors)] Address: Buczynski, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

22815. Celedonio García-Pozuelo-Ramos (2024): Teratosis cefálica en un ejemplar de *Sympetrum sinaiticum* Dumont, 1977 (Odonata: Libellulidae). *Zootenia* 4: 1-11. (in Spanish, with English summary) ["Cephalic teratosis in a specimen of *Sympetrum sinaiticum* Dumont, 1977 (Odonata: Libellulidae). We report a teratosis affecting the head of an adult male *S. sinaiticum* captured in Chera (Valencia, Spain). Although the malformation occupies the entire frontal area between the compound eyes, it does not seem to affect their survival." (Author)] Address: Celedonio García-Pozuelo-Ramos: SEACAM. Sociedad Entomológica y Ambiental de Castilla-La Mancha. Email: pkymp@yahoo.es

22816. Chandran, A.V.; Chandran, R.; Suraj, S.R.; Jose, S.K.; Koparde, P. (2024): Description of *Phylloneura rupestris* sp. n. (Odonata, Platycnemididae) from the Western Ghats, India, with notes on its reproductive behaviour. *International Journal of Odonatology* 27: 26-36. (in English) ["*Phylloneura* Fraser, 1922 is a genus of damselflies that, to date, has been regarded as monotypic, represented solely by *Phylloneura*

westermanni (Hagen in Selys, 1860) which is endemic to the Western Ghats of India. In our study, we happened upon a population of *Phylloneura* near the Ponmudi Hills, Thiruvananthapuram, which was notable for displaying morphological and behavioural differences from *P. westermanni*. Here, we describe it as a species new to science, providing detailed photographs and illustrations. We also provide notes on its reproductive behaviour." (Authors)] Address: Chandran, A.V., Aqua Research Lab, Dept of Geology & Environmental Science, Christ Coll. (Autonomous), Irinjalakuda, Thrissur, Kerala 680125, India. Email: avivekchandran2@gmail.com

22817. Collins, C.M.; Audusseau, H.; Hassall, C.; Keyghobadi, N.; Sinu, P.A.; Saunders, M.E. (2024): Insect ecology and conservation in urban areas: An overview of knowledge and needs. *Insect Conservation and Diversity* Volume17(2): 169-181. (in English) ["Urban expansion across the globe profoundly impacts local biodiversity. The growing body of urban ecology research on animals has largely focused on mammals and birds, whereas knowledge of insect ecology and conservation in urban areas remains limited. To anchor this Special Issue (SI), we have taken a broad approach to editorial and conducted a structured literature search to set the scene. We provide here an overview of existing literature reviews on urban insect ecology and conservation, indicate where the articles included in this SI contribute to developing our understanding and point to priority areas for further investigation. Key themes in the growing literature (at individual, species, and/or community level) include the influence of habitat quality, quantity and land use type on insect diversity; the impacts of anthropogenic pollution (for instance, heat, noise, light and chemicals); habitat connectivity and changes in habitat structure and impacts of urban density on genetic diversity. Insect diversity and abundance broadly decline with urban density and loss of habitat. Beyond this, variation in responses of different taxa, or in different regions, and methodological limitations of individual studies make it challenging to identify general patterns. Insect ecology and conservation research in urban environments should focus on applying ecological theory to understand variation in diversity patterns; investigating interactions between climate change and urban contexts; identifying impacts of novel environments on insect biodiversity; addressing methodological limitations and harmonising methodological approaches; and exploring the influence of social and historical factors on urban insect biodiversity. Insect conservation must also consider research into how best to communicate the value of urban insects to urban humans." (Authors) Table 1 gives a summary of the 65 reviews identified as relevant to urban invertebrate ecology, and including 1 paper on Odonata. My database on Odonata in urban spaces includes more than 300 publications, and one questions how it can be that the authors tracked only one paper of relevance including Odonata ...] Address: Saunders, Manu, Ecosystem Management, School of Environmental & Rural Science, University of New England, Armidale NSW 2350, Australia. Email: manu.saunders@une.edu.au

22818. Cordero-Rivera, A.; Núñez, J. C.; Suriel, C. (2024): Let's wait for the evening: nocturnal copulation in a tropical damselfly *Phyllolestes ethelae* (Odonata, Synlestidae). *Animal Biodiversity and Conservation* 47.1: 19-32. (in English, with Spanish summary) ["Sexual selection is one of the main causes of the diversity of reproductive behaviours observed intra- and interspecifically. Here we study the reproductive behaviour of a unique species, *Phyllolestes ethelae*, the only member of the family Synlestidae (Odonata) found in America. Our hypothesis was that the phylogenetic uniqueness of this species and the fact that it lives on an island

would produce novel behaviours worth protecting as they are a part of the biodiversity. Between 2017 and 2019 we studied a population of *P. ethelae* in the National Park Armando Bermúdez in the Dominican Republic by means of mark-recapture techniques and focal observations." (Authors)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

22819. Coy, R. (2024): Observations on the breeding behaviour of *Austroargiolestes alpinus* (Zygoptera: Argiolestidae). *Agrion* 28(1) - January 2024: 5-10. (in English) ["Observations of *A. alpinus* on oviposition, emergence, copulation, female mating refusal, adult season length, and aggression, made at montane swamps/bogs in northeast New South Wales, are described, illustrated and discussed." (Author)] Address: Coy, R., PO Box 137, Dorrigo, New South Wales 2453 Australia. Email: ros.coy@gmail.com

22820. Cwikowska, B.; Buczynski, P. (2024): Records of dragonflies (Odonata) from southern and eastern Poland. *Odonatrix* 202: 4 pp. (in Polish, with English summary) ["Incidental records of dragonflies obtained in 2007-2023 from 16 localities in six geographical regions of southern and eastern Poland are summarized. The photographic records come mainly from various small water bodies and fish ponds. A total of 20 species were recorded, including *Orthetrum coerulescens* and *Sympetrum fonscolombii*. Some of the data are from two national parks and one landscape park. The first records of *Orthetrum brunneum* in the Bieszczady National Park and of *Gomphus vulgatissimus* in the protection zone of this park are given." (Authors)] Address: Cwikowska, Barbara, Bieszczadzki Park Narodowy, Ustrzyki Górne 19, 38-713 Lutowska, Poland. Email: bcwikowska@bdpn.pl

22821. Dayawansa, P.N.; Thattharani, W.A.P. (2024): Odonata diversity in a rapidly changing landscape: A case study in a land near Hambantota Port construction site. *Proceedings of the 28th Forestry and Environment Symposium / Biodiversity Conservation and Management* 28: 286. (in English) [Verbatim: Human-driven alterations of natural landscapes, particularly through infrastructure development, can exert significant ecological impacts on its ecosystem. Odonata, commonly known as dragonflies and damselflies, play an important role as biological indicators reflecting the health of the ecosystems they inhabit. The Hambantota port project, in Sri Lanka, offered a unique opportunity to examine the early ecological responses to land-use changes. Therefore, this preliminary study aimed to assess the diversity and evenness of Odonata species in a transitional habitat created by the clearing of previously inhabited land for the port construction site in Hambantota, covering an area of 0.02 km². Block count method was used as the sampling method and sweep nets were utilized to collect species for a sampling period of four weeks from November to December 2020. Species identity, abundance, and habitat characteristics were recorded. The collected data were subjected to the calculation of Shannon-Wiener Diversity Index (H') and Pielou's Evenness Index (J). A total of 69 Odonates, representing 12 different species belonging to two families, family Coenagrionidae (68%) and family Libellulidae (32%) were recorded. Notably majority of recorded species belong to the family Coenagrionidae with *Pseudagrion microcephalum* being the highest occurrence species (33%) while *Pseudagrion rubriceps ceylonicum* (1.4%) exhibited the lowest occurrence. This study unveiled a rich diversity of the Odonata community, indicating a high species diversity with a Shannon-Wiener

Diversity Index (H') of 2.105. Moreover, the calculation of Pielou's Evenness Index (J) of 0.402, suggests moderate evenness in species distribution. Despite the prior human occupation of the area and ongoing construction activities in proximity, the Odonata community manifested a robust species diversity within the area. This balance in species distribution during the early stages of habitat transition can likely be attributed to the presence of newly formed water bodies resulting from land changes, serving as suitable habitats for Odonata. These results underscore the adaptability and resilience of Odonata species in the face of transitional and disturbed environments.] Address: Dayawansa, P.N., Dept of Zool. & Environ. Sciences, Univ. of Colombo, Colombo 03, Sri Lanka. Email: nihal.dayawansa@sci.cmb.ac.lk

22822. de Vries, J.P.R.; Buesink, R.; van Leeuwen, J.; Ek-pah, O.; Adedapo, A.M.; Owolabi, B.A.; Erhomosele, E.I.; Adu, B.W.; Abike, K.K.; Ogbogu, S.; Dijkstra, K.-D.B. (2024): Dragonflies and damselflies in Cross River State, Nigeria (Odonata). International Dragonfly Fund - Report 184: 1-52. (in English) ["This report presents the results of a 17-day Odonata expedition to Cross River State, southeast Nigeria. The rainforest and highland habitats of this state and adjacent parts of Cameroon are thought to support the highest diversity of Odonata in Africa, with a particularly high share of threatened and range-restricted species. Nevertheless, field surveys in this region have been very scarce in recent decades, and knowledge from the Nigerian territory lags behind that from Western Cameroon. Yet, a growing interest in Odonata among Nigerian ecologists now creates opportunities for increased surveying of this region. A collaboration between Nigerian and Dutch students resulted in an extensive exploration of freshwater habitats across Cross River State during the dry season in January-February 2022. This team visited four sites in Cross River State where diverse running waters and occasionally stagnant waters were explored, both in formally protected forests and in adjacent human-influenced landscapes. Three sites fell in the lowland rainforest zone in the Cross River National Park - Oban Section (Aking and Ekang) and Afi River Forest Reserve (Buanchor), while the fourth site represents the highland habitats of the Obudu Plateau (1200-1700 m a.s.l.). Sampling emphasis was on rare and little-known Odonata, and special attention was paid to specimen collection and in-situ photography. This survey recorded 138 taxa, of which (preceding DNA-barcoding) 125 could be identified to species level, confirming the exceptional Odonata diversity of this region. These species represent twelve new country records for Nigeria, and three species new to science: a Tetrathemis species from Aking resembling the West African *T. godiardi*, and *Atoconeura* and *Neodythemis* species from the Obudu Plateau. 11 species were photographed in the field for the first time, including range-restricted ones such as *Allocnemis vicki*, *Neurolestes nigeriensis*, *Umma purpurea* and *U. mesumbei*. Furthermore, extensive photographic material provides increased insight in the extraordinary colour transformations of *Africocypha lacuselephantum* and *A. centripunctata* males and females. The highest local species diversity was observed at streams in the lowland sites of Aking and Ekang, while intermediately disturbed locations at Buanchor and the Obudu Plateau also held a relatively high species diversity. High diversities of Zygoptera, notably Calopterygidae and Platycnemididae, were recorded at forested streams, while sites with some human disturbances were richest in Libellulidae. Specialized relict species were recorded in small seepage-fed streams at Aking (*Neurolestes trinervis*, *Pentaplebia stahli* and *Stenocnemis pachystigma*) as well as at the edge of the Obudu plateau at 1200 m a.s.l. (*P. stahli* and *S. pachystigma*). Well-

preserved highland streams on the Obudu plateau support a small but distinct assemblage of specialized species including *A. vicki*, *N. nigeriensis* and *Nubiolestes diotima*. It is in this habitat that *Pentaplebia gamblesi* was collected in 1973. We could not find adults of this little-known species, which was a major target of the expedition, but collected larvae of *Pentaplebia spec.* at two sites. As the mystery surrounding *P. gamblesi* persists, many other promising sites remain unexplored, and an even greater species diversity (notably of Gomphidae and species of ephemeral waters) is expected during the rainy season, the scope for further exploration of Cross River State's Odonata remains. Widespread habitat degradation, especially on the Obudu plateau, increases the urgency of further research and conservation efforts in this region." (Authors)] Address: de Vries, J.P.R., Wageningen Univ. & Research, Nobelweg 50 6708GD Wageningen, Netherlands. Email: vries.reinier@gmail.com

22823. Dessau, C. (2024): Torfentnahmestellen für den Dammbau als Ersatzlebensraum für Libellen: Untersuchung am Beispiel einer Wiedervermässungsfläche im Otternhagener Moor bei Hannover. Bachelor Thesis, Institut für Umweltplanung, Gottfried Wilhelm Leibniz-Universität Hannover: XVII, 80 pp. (in German, with English summary) ["The water balance of the Otternhagener Moor has been disturbed by many years of extensive drainage, particularly since the 1950s, and large areas are now severely degraded. As part of the LIFE+ Projekt Hannoversche Moorgeest, extensive measures to rewet the raised bogs of the Hannoversche Moorgeest have been carried out since 2012 with the help of European Union funding, thus creating potential habitats for typical raised bog animal and plant species. These activities have already been realised out on a large scale in the Otternhagener Moor. The drainage ditches were closed and dams with local peat were built in several construction windows in the period from 2021 to 2023/24 to retain rainwater on that area. As part of this bachelor thesis, the suitability of these excavation pits as replacement habitats for dragonflies was investigated by recording the dragonfly fauna at six selected excavation pits in the south of the Otternhagener Moor. The investigated excavation pits were created during the construction windows in February 2022 and September/October 2022. A total of 18 dragonfly species were recorded during the survey period from May to September in 2023. It can be seen that the excavation pits were already suitable as a habitat for some dragonfly species after a short time. Exuviae of *Aeshna cyanea* and *Sympetrum striolatum* have already been found and for six other species reproductive behavior has been observed (*Anax imperator*, *Coenagrion puella*, *Lestes sponsa*, *Libellula quadrimaculata*, *Orthetrum cancellatum* and *Pyrrhosoma nymphula*). In addition, dragonfly species that prefer raised bogs (*Lestes virens*, *Ceriagrion tenellum*, *Libellula quadrimaculata* and *Sympetrum danae*) have already been detected at the investigated peat extraction sites. It can be assumed that future changes to the water body structures due to succession progress will improve the habitat structures for bog-specific dragonfly species, thus favoring the occurrence of raised bog dragonflies at the excavation pits." (Author)] Address: https://www.repo.uni-hannover.de/bitstream/handle/123456789/16494/Excavation_pits_for_the_construction_of_peat_bunds_as_surrogate_habitats_for_dragonflies_Chiara%20Dessau_2024.pdf?sequence=1&isAllowed=y

22824. El Yaagoubi, S.; Edegbene, A.O.; El Haissoufi, M.; Harrak, R.; El Alami, M. (2024): Odonata, Coleoptera, and Heteroptera (OCH) trait-based biomonitoring of rivers within the northwestern rif of Morocco: Exploring the responses of traits to prevailing environmental gradients. *Ecologies* 2024,

5(1): 132-154 (in English) ["This study aimed to determine the impact of various pressures on the functional composition of OCH (Odonata, Coleoptera, and Heteroptera) [treated at family level] in streams within the northwest Rif region of Morocco. We examined how OCH traits respond to human-induced pressures in selected stream sites in Morocco's north-western Rif region. OCH specimens were collected from 36 sites using a Surber sampler with dimension of 20 × 20 cm and mesh size of 500 µm over the course of two years, from 2021 to 2023. We measured physico-chemical and hydraulic parameters such as temperature, pH, DO, and NO₃. 67 trait attributes from 11 trait classes were assigned to the collected OCH taxa at the family level. Following the delineation of sites along the gradient of impacts in the study area, we categorized 7 sites as slightly impacted sites (SISs), 19 sites as moderately impacted sites (MISs), and 10 sites as heavily impacted sites (HISs). We successfully identified and categorized the traits as either vulnerable or tolerant based on RLQ models. Traits such as reproductive cycles per year and tegument respiration, which were positively correlated with SISs in the RLQ model and also positively correlated with depth and chlorine, were identified as vulnerable traits. Crawling locomotion and full water swimming were identified as tolerant traits. The distribution patterns of the OCH taxa revealed a robust correlation between the taxa and the sampling sites. Notably, taxa such as Nepidae, Naucoridae, and Corixidae exhibited widespread distribution and a strong association with the SISs. On the other hand, traits related to living macroinvertebrate food sources and reproduction in vegetation, specifically clutches, exhibited a negative correlation with total dissolved solids. Incorporating OCH functional traits into biomonitoring programs allows for a more comprehensive assessment of river ecosystems. This approach provides a nuanced understanding of how different stressors impact the community composition and overall ecological health." (Authors)] Address: El Yaagoubi, S, Laboratory of Ecology, Systematics & Conservation of Biodiversity (LESCB), URL-CNRST N°18, FS, Abdelmalek Essaadi University, Tetouan 93000, Morocco

22825. Espinoza Ricardo, N.G. (2024): Composición de los órdenes Lepidoptera y Odonata en el bosque húmedo tropical de la comuna Dos Mangas, Santa Elena - Ecuador. Trabajo de Integración Curricular, Previa a la obtención del Título de: Biología, Facultad de Ciencias del Mar de la Universidad Península de Santa Elena: XXIV, 179 pp. (in Spanish, with English summary) ["Within the phylum Arthropoda, lepidoptera and odonates are organisms of scientific and educational value, considered bioindicators due to their close relationship with plant cover and bodies of water, which is why the purpose of this study is to analyze the composition of the orders Lepidoptera and Odonata through the identification of species collected at four stations established on the Las Cascadas de Dos Mangas trail and their relationship with environmental factors. For the identification and registration of specimens, illustrated guides, taxonomic keys and the iNaturalistEc platform were used. For counting, two capture techniques were implemented: Entomological net for fast-flying insects and Van Someren Rydon (VSR) traps with fermented fruit bait and decomposed fish tissue, with a total of 32 traps distributed in the 12 transects of the 4 stations, allowing the accounting of 1 825 lepidopterans and 957 odonates with 65 and 12 species respectively. Based on the diversity of organisms per station using the Shannon index, average diversity levels were obtained for both orders; however, the stations differed: Lepidoptera (E2 H'=3.179) and Odonata (E1 H'=2.09), with dominance of the species *Heliconius erato cyrbia* and *Argia translata*, respectively. With

respect to the correlations between diversity and the different parameters, only the diversity of Lepidoptera obtained a significant association with pH and water temperature, rejecting the alternative hypothesis that there is a lower diversity of Lepidoptera and Odonates in relation to the physical, chemical and biological."(Author)] Address: <https://repositorio.upse.edu.ec/handle/46000/10841>

22826. Fabian, S.T.; Sondhi, Y.; Allen, P.E.; Theobald, J.C.; Lin, H.-T. (2024): Why flying insects gather at artificial light. *Nature Communications* 15: 689: 15 pp. ["Explanations of why nocturnal insects fly erratically around fires and lamps have included theories of "lunar navigation" and "escape to the light". However, without three-dimensional flight data to test them rigorously, the cause for this odd behaviour has remained unsolved. We employed high-resolution motion capture in the laboratory and stereo-videography in the field to reconstruct the 3D kinematics of insect flights around artificial lights. Contrary to the expectation of attraction, insects do not steer directly toward the light. Instead, insects turn their dorsum toward the light, generating flight bouts perpendicular to the source. Under natural sky light, tilting the dorsum towards the brightest visual hemisphere helps maintain proper flight attitude and control. Near artificial sources, however, this highly conserved dorsallight-response can produce continuous steering around the light and trap an insect. Our guidance model demonstrates that this dorsal tilting is sufficient to create the seemingly erratic flight paths of insects near lights and is the most plausible model for why flying insects gather at artificial lights. ... The insects we used in lab experiments were either field caught (Yellowunder wing moths, *Noctua pronuba* & *Noctua fimbriata*, *Sympetrum striolatum*, *Aeshna mixta* or reared from purchased pupae (Atlas Moth *Attacus lorquini*, and Oleander Hawkmoth *Daphnis nerii*). (Authors) Insects have other possible means of correcting and *Noctua* sp. showed strong and high bank near point sources. The larger *A. mixta* and *A. lorquini* showed less consistent body attitude but still shifted their bank-pitch distribution to higher values when near a point light source. All species showed some degree of higher bank when near a point light source (bank angle medians ± interquartile range: 43.8 ± 39.2° for *S. striolatum*, 48.0° ± 30.7° for *Noctua* sp., 29.3 ± 30.8° for *A. mixta*, and 30.7° ± 31.8° for *A. lorquini*) (Wilcoxon rank sum; *S. striolatum*, $z = 19.91$, $p < 0.001$, *Noctua* sp., $z = 11.18$, $p < 0.001$, *A. mixta*, $z = 4.32$, $p < 0.001$, *A. lorquini*, $z = 16.85.91$, $p < 0.001$). This data suggests that a point light source significantly alters attitude control, as the insects attempt to align their dorsal axis toward the light.] Address: Fabian, S.T., Dept of Bio-engineering, Imperial College London, London SW7 2AZ, UK. Email: s.fabian@imperial.ac.uk

22827. Farias, A.B.; Santos, J.C. (2024): Description of the female of *Leptagrion jeromei* Lencioni, Vilela & Furieri, 2021 (Odonata: Coenagrionidae) with taxonomic notes on the male. *Zootaxa* 5424(2): 243-250. (in English, with Portuguese summary) ["The female of *L. jeromei* is described, illustrated, and diagnosed based on a specimen collected in epiphytic bromeliads at the Federal University of Sergipe (female (B0545), BRAZIL, Federal University of Sergipe, Sao Cristovao, -10.92707, -37.10100, 30 m asl, 6.x.2023, A.B.S. Farias & J.C. Santos leg.). Additionally, we provide information on its biology, ecology, and taxonomic notes, along with illustrations of the collected males." (Authors)] Address: Farias, A.B., Programa de Pós-Graduação em Ecologia e Conservação, Universidade Federal de Sergipe, Sao Cristovao, Sergipe, Brazil. Email: antoniobrunofarias@gmail.com

22828. Fernandes-Pires, C.E.; Datto-Liberato, F.H.; Guillermo-Ferreira, R. (2024): Last instar larva of the critically endangered *Oxyagrion franciscoi* Machado & Bede, 2016 (Odonata: Coenagrionidae) from Serra da Canastra National Park. *Zootaxa* 5403(5): 587-591. (in English) ["*O. franciscoi* is a critically endangered damselfly species endemic to the Serra da Canastra National Park, Brazil, a vital environmental reserve within the Cerrado hotspot for biodiversity conservation. Here we reared, illustrated, and described the last instar larva of *O. franciscoi*." (Authors)] Address: Guillermo-Ferreira, R., Lestes Lab, Centre of Entomology & Experimental Biology, Federal Univ. of Triângulo Mineiro (UFTM), Uberaba, MG, Brazil. Email: rhainer.ferreira@uftm.edu.br

22829. Fernández-Martínez, M.; Barquín, J.; Bonada, N.; Cantonati, M.; Churro, C.; Corbera, J.; Delgado, C.; Dulsat-Masvidal, M.; Garcia, G.; Margalef, O.; Pascual, R.; Peñuelas, J.; Preece, C.; Sabater, F.; Seiler, H.; Zamora-Marín, J.M.; Romero, E. (2024): Mediterranean springs: Keystone ecosystems and biodiversity refugia threatened by global change. *Global Change Biology* 30(1), e16997: 22 pp. (in English) ["Mediterranean spring ecosystems are unique habitats at the interface between surface water and groundwater. These ecosystems support a remarkable array of biodiversity and provide important ecological functions and ecosystem services. Spring ecosystems are influenced by abiotic, biotic, and anthropogenic factors such as the lithology of their draining aquifers, their climate, and the land use of their recharge area, all of which affect the water chemistry of the aquifer and the spring discharges. One of the most relevant characteristics of spring ecosystems is the temporal stability of environmental conditions, including physicochemical features of the spring water, across seasons and years. This stability allows a wide range of species to benefit from these ecosystems (particularly during dry periods), fostering an unusually high number of endemic species. However, global change poses important threats to these freshwater ecosystems. Changes in temperature, evapotranspiration, and precipitation patterns can alter the water balance and chemistry of spring water. Eutrophication due to agricultural practices and emergent pollutants, such as pharmaceuticals, personal care products, and pesticides, is also a growing concern for the preservation of spring biodiversity. Here, we provide a synthesis of the main characteristics and functioning of Mediterranean spring ecosystems. We then describe their ecological value and biodiversity patterns and highlight the main risks these ecosystems face. Moreover, we identify existing knowledge gaps to guide future research in order to fully uncover the hidden biodiversity within these habitats and understand the main drivers that govern them. Finally, we provide a brief summary of recommended actions that should be taken to effectively manage and preserve Mediterranean spring ecosystems for future generations. Even though studies on Mediterranean spring ecosystems are still scarce, our review shows there are sufficient data to conclude that their future viability as functional ecosystems is under severe threat." (Authors) *Ischnura graellsii*] Address: Fernández-Martínez, M., CREA, Campus de Bellaterra (UAB), Cerdanyola del Vallès, Spain. Email: m.fernandez@creaf.uab.cat

22830. Fleck, G. (2024): A remarkable new synthemistid from New Caledonia (Odonata: Anisoptera: Synthemistidae s. str.). Taxonomic and phylogenetic note on New Caledonian Synthemistidae and erection of a new genus. *Zootaxa* 5403(3): 320-330. (in English) ["The new species, *Calesynthemis jeanlegrandi* sp. nov., dedicated to the late Jean Legrand, is described and illustrated based on a single pair of specimens from Mont Panié, New Caledonia. The male

of this large species has unusual strongly sinuous and distally down curved white cerci 7 mm long and exhibits on abdominal segment 10 a remarkable clump of strong setae mimicking a dorsal horn. The female wingspan slightly exceeds 100 mm. In addition, on the basis of adult and larval characters, *Neocalodosynthemis* gen. nov. is erected to accommodate two other New Caledonian synthemistids, *Synthemis fenella* Campion (type species) and *Synthemis ariadne* Lieftinck. New Caledonian synthemistids are probably more closely related to *Parasynthemis* Carle than to *Synthemis* Selys Longchamps, both from Australia." (Author)] Address: Fleck, G., 07150 Lagorce, France. Email: fleckgunther@gmail.com

22831. França, J.; Anderson Oliveira Latini, A.O.; Stein, K.; Barbosa, M.A.; Santos Araújo, G.S.; Pimenta Pereira, A.C. (2024): Enhancing rice yield in paddy fields through beneficial organisms. *Journal for Nature Conservation* 77, 126544: 5 pp. (in English) ["In recent years, the global food-insecure population has increased. To improve food production while safeguarding the environment, ecological intensification techniques have become crucial. Considering rice's significance in feeding half the world, here we focused on the role of weeds, birds, and dragonflies, organisms that naturally occur in crop fields, in a paddy field in Brazil. We observed no significant differences in rice production between areas with or without a second weeding. However, access restriction experiments revealed that the presence of birds and dragonflies led to a remarkable 37% increase in rice yield, equivalent to approximately 71.6 additional bags per hectare. Results reinforce that promoting biodiversity-friendly practices in agriculture is essential for sustainable farming and aligns with global biodiversity initiatives, including COP 15, the 43rd Conference of FAO, and the Sustainable Rice Platform's Standard for Sustainable Rice Cultivation. Emphasizing these practices will not only enhance food production but also contribute to a healthier environment for generations to come." (Authors)] Address: França, Jaciara, Lab. de Ecologia Aplicada, Depto de Ciências Exatas e Biológicas, Universidade Federal de São João del-Rei Sete Lagoas, 35701-883, Brasil

22832. García-García, C.; Gilbert, J.D.; Guerrero, F. (2024): Macroinvertebrate community in a Mediterranean mountain river: Relationship with environmental factors measured at different spatial and temporal scales. *Sustainability* 2024, 16, 1777. <https://doi.org/10.3390/su16051777>: 13 pp. (in English) ["The macroinvertebrate community, physical-chemical water variables and hydromorphological indices were studied in the Turón River (Málaga, Southern Spain). Our study aims to improve the knowledge of the most influential environmental factors at different spatial and temporal scales in Mediterranean rivers, in order to establish better management of Mediterranean river ecosystems. To this end, in this work, seasonal sampling was carried out for one year to evaluate the effect of the characteristics of the drainage basin (i.e., geology, topography, land use) on the macroinvertebrate community. To this end, the environmental variables of the catchment basins were evaluated at three different scales: (i) watershed level, (ii) valley segment level and (iii) local level. The results showed that 13 environmental variables, 3 at the watershed scale, 5 at the valley segment scale and 5 at the local scale, influenced the macroinvertebrate community. Land use is the main explanatory variable at the watershed scale, while stream channel curvature is the most common variable at the valley segment scale, and the habitat assessment index is the variable with the strongest influence at the local scale. The influence of different spatial scales presented a seasonal variation. During spring,

autumn and winter, the watershed scale exhibited the highest resolution (adjusted $R^2 = 0.20-0.29$), while in summer, the local scale became the most significant in explaining the presence of macroinvertebrate taxa (adjusted $R^2 = 0.17$). The obtained results emphasize the significance of temporal and spatial scales in Mediterranean rivers for adequate river ecosystem management." (Authors) The study includes Odonata at family level.] Address: Gilbert, J.D., Depto Bio. Animal, Biología Vegetal y Ecología, Campus de Las Lagunillas, s/n, 23071 Jaén, Spain. Email: fguerre@ujaen.es

22833. Golab, M.J.; Brodin, T. (2024): Looks or personality: what drives damselfly male mating success in the wild? *The European Zoological Journal* 91(1): 81-93. (in English) ["Understanding the connection between personality and fitness is an important topic in both behavioural and evolutionary ecology. Most of our current knowledge stems from lab-studies despite that studies in natural populations for most parts generate more ecologically relevant information on behavioural variation and mating success. Here, we quantified *Calopteryx splendens* male mating success across two behavioural axes: courtship and boldness-aggression, testing personality and plasticity of behavioural traits in a natural population situated in the central-core of the species distribution. We also measured wing patch area and body size as these traits are important in damselfly sexual selection. The only behavioural trait that positively affected mating success was consistency in courtship effort. Among morphological traits, smaller wing patch size was associated with greater male mating success, while thorax size was a better predictor of male mating success than either personality or plasticity in boldness and activity. Our results demonstrate the importance of behavioural consistency over plasticity in a wild insect population and support prior studies showing the importance of body size for mating success." (Authors)] Address: Golab, Maria, Institute of Nature Conservation, Polish Academy of Sciences, Kraków, Poland. Email: marysiagolab@gmail.com

22834. González Soriano, E.; Noguera, F.; Pérez-Hernández, C.X. (2024): Diversity of an Odonata assemblage from a tropical dry forest in San Buenaventura, Jalisco, Mexico (Insecta, Odonata). *Biodiversity Data Journal* 12: e116135: 26 pp. (in English) ["The patterns of richness, diversity, and abundance of an odonate assemblage from San Buenaventura, Jalisco are presented here. A total of 1087 specimens from seven families, 35 genera and 66 species were obtained through monthly samplings of five days each during a period of one year. Libellulidae was the most diverse family (28 species), followed by Coenagrionidae (21), Gomphidae (7), Aeshnidae (6), Calopterygidae (2), Lestidae (1) and Platystictidae (1). *Argia* was the most speciose genus. The highest species richness and Shannon diversity were found during August and September, whereas the highest abundance was observed in June and the highest Simpson diversity was recorded in September — all of which were associated with the rainy season. The highest values of phylogenetic diversity were found from June to October. The different diversity facets of this assemblage were positively correlated with precipitation and minimum temperature, whereas maximum temperature showed no influence. In addition, we found that this odonate diversity was higher than most Mexican localities with tropical dry forest (TDF) studied. We continue our efforts to describe the patterns of richness, diversity and abundance of some insect groups associated with the tropical dry forest ecosystem in Mexico, following a latitudinal gradient of the distribution of this ecosystem in the country. Our emphasis here was to evaluate the spatial and temporal patterns of richness and diversity

of an Odonata assemblage from Jalisco, Mexico." (Authors)] Address: Gonzalez-Soriano, E., Depto Zoología, Inst. Biol., Univ. Autónoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@mail.ibiologia.unam.mx

22835. Grether, G.F.; Finneran, A.E.; Drury, J. (2024): Niche differentiation, reproductive interference, and range expansion. *Ecology Letters* 27(1), e14350: 15 pp. (in English) ["Understanding species distributions and predicting future range shifts requires considering all relevant abiotic factors and biotic interactions. Resource competition has received the most attention, but reproductive interference is another widespread biotic interaction that could influence species ranges. Rubyspot damselflies (*Hetaerina* spp.) exhibit a biogeographic pattern consistent with the hypothesis that reproductive interference has limited range expansion. Here we use ecological niche models to evaluate whether this pattern could have instead been caused by niche differentiation. We found evidence for climatic niche differentiation, but the species that encounters the least reproductive interference has one of the narrowest and most peripheral niches. These findings strengthen the case that reproductive interference has limited range expansion, and also provide a counterexample to the idea that release from negative species interactions triggers niche expansion. We propose that release from reproductive interference enables species to expand in range while specializing on the habitats most suitable for breeding." (Authors) *Hetaerina titia*; *H. americana* spp.; *H. infecta*; *H. pilula*; *H. vulnerata*; *H. caja*; *H. capitalis*; *H. cruentata*; *H. fuscoguttata*; *H. majuscula*; *H. miniata*; *H. occisa*; *H. sempronina*; *Calopteryx aequabilis*; *C. amata*; *C. angustipennis*; *C. dimidiata*; *C. maculata*] Address: Drury, J., Dept of Biosciences, Durham Univ., Stockton Rd, Durham, United Kingdom DH1 3LE. Email: jonathan.p.drury@durham.ac.uk

22836. Gunawan; Anwar, K.; Triwibowo, D. (2024): Avifauna diversity in the mining area of PT Adaro Indonesia. *Russian Journal of Agricultural and Socio-Economic Sciences* 3(147): 85-93. (in English) ["The initial environmental condition or initial environmental hue is very important to know before land clearing activities for mining begin. The objective of the research was to record Avifauna diversity in the PT Adaro Indonesia project site area, Tabalong Regency. Avifauna data were collected from nine locations. The animals recorded are birds, butterflies, and dragonflies. Bird monitoring in the observation point area used the point count method combined with the transect method. Observations of butterflies and dragonflies also used the transect method. A total of 32 bird species were found with 308 encounters. Based on observations, 18 species of butterflies were found, with a total number of 367 butterflies. Observations on the dragonfly conducted in the survey area have encountered 18 species of dragonflies with 278 encounters. Each observation location has different avifauna diversity due to different types of vegetation. This initial hue is given as a consideration in the development of the area, especially in the aspects of biodiversity and environmental services. By using the initial environmental hue, land clearing activities can be measured properly." (Authors)] Address: Gunawan, Dept of Biology, Faculty of Mathematics & Natural Sciences, University of Lambung Mangkurat, Banjarbaru, South Kalimantan, Indonesia. Email: gunawan@ulm.ac.id

22837. Hill, M.J.; Wood, P.J.; White, J.C.; Thornhill, J.; Fairchild, W.; Williams, P.; Nicolet, P.; Biggs, J. (2024): Environmental correlates of aquatic macroinvertebrate diversity in garden ponds: Implications for pond management. *Insect Conservation and Diversity* 17: 374-385. (in English)

["Garden ponds are a ubiquitous feature of urban landscapes and have the potential to be an important resource for biodiversity. However, the environmental and spatial factors influencing ecological communities within garden ponds have been poorly quantified to date, despite such evidence being critical to the development of effective management strategies that support biodiversity. This study aims to identify the environmental and spatial factors influencing macroinvertebrate richness, abundance and compositional variation among garden ponds and provide management recommendations at the local and landscape scale. In total, 99 macroinvertebrate taxa were recorded from 30 garden ponds. A negative association was recorded between ecological uniqueness (measured as the Local Contribution to Beta-Diversity) and taxonomic richness among the garden ponds, and those ponds with high ecological uniqueness typically displayed high replacement (turnover) values. Surface area, total plant richness and non-native plant richness were positively associated with macroinvertebrate richness. Taxonomic richness and abundance predominantly displayed a negative association with conductivity levels. Current management practices for garden ponds are highly variable, often focussed on individual ponds. Based on the findings of this study, we recommend that management should focus on making garden pond surface areas as large as possible, ensure that there is a wide variety of native aquatic plant species present and manage conductivity levels. Garden ponds likely comprise a significant component of the urban freshwater network, and considering their management at both local and landscape scales will ensure that biotic communities inhabiting urban landscapes can be more effectively supported. ... *Pyrrhosoma nymphula* (Odonata: Coenagrionidae, 14 ponds)." (Authors)] Address: Hill, M.J., Dep of Life & Environmental Sciences, Faculty of Science & Technology, Bournemouth Univ. Poole, Dorset, BH12 5BB, UK. Email: mjhill@bournemouth.ac.uk

22838. Ishiwaka, N.; Hashimoto, K.; Hiraiwa, M.K.; Sánchez-Bayo, F.; Kadoya, T.; Hayasaka, D. (2024): Impact assessment of fipronil exposure and water temperature rise on Odonata species in experimental paddies under the worst scenario of a global warming? *Environmental Pollution* 341:122831: 6 pp. (in English) ["Highlights: • Agrochemicals and global warming are major threats to biodiversity/community. • Dragonflies sharply decreased due to synergistic effects of insecticide and warming. • However, not all Odonata taxa were synergistically impacted by the two stressors. • Insecticide exposure under warming can accelerate the decline of Odonata community. Abstract: Systemic insecticides are one of the causes of Odonata declines in paddy fields. Since rising temperatures associated with global warming can contribute to strengthen pesticide toxicity, insecticide exposures under increasing temperatures may accelerate the decline of Odonata species in the future. However, the combined effects of multiple stressors on Odonata diversity and abundance within ecosystems under various environmental conditions and species interactions are little known. Here, we evaluate the combined effects of the insecticide fipronil and warming on the abundance of Odonata nymphs in experimental paddies. We show that the stand-alone effect of the insecticide exposure caused a significant decrease in abundance of the Odonata community, while nymphs decreased synergistically in the combined treatments with temperature rise in paddy water. However, impacts of each stressor alone were different among species. This study provides experimental evidence that warming could accelerate a reduction in abundance of the Odonata community exposed to insecticides (synergistic effect), although the strength of that effect might vary with the community

composition in targeted habitats, due mainly to different susceptibilities among species to each stressor. Community-based monitoring in actual fields is deemed necessary for a realistic evaluation of the combined effects of multiple stressors on biodiversity." (Authors)] Address: Hayasaka, D., Fac. Agriculture, Kindai Univ. Nakamachi 3327-204, Nara, Nara 631-8505, Japan. Email: hayasaka@nara.kindai.ac.jp

22839. Issa, M.I. (2024): Egyptian Academic Journal of Biological Sciences. A, Entomology. Egyptian Academic Journal of Biological Sciences. A, Entomology 17(1): 1-9. ["Mark Release Re-capture studies used in the evolution of animals and animal ecology. While it is probably to be used in some animals, it is considerably more challenging in small fast-moving invertebrate species, especially insects. In these groups, low rates of recapture can bias estimates of demographic parameters, thereby handicapping effective analysis and management of wild animal populations. The author used the mark-recapture method and daily movement of *Ischnura elegans*. The retention rate probability was different between males and females of *Ischnura elegans*. 969 individuals of *I. elegans* (710 males and 259 females) were marked, recaptured and measured over the course of the study, of which 409 individuals (42.2%) 357 males and 52 females, were recaptured. The daily movement of *Ischnura elegans* shows, that 401 individuals were marked and 223 individuals were moved throughout the station or among stations." (Author)] Address: Issa, M.I., Zoology Dept, Faculty of Science, South Valley University

22840. Keetapithchayakul, T.S.; Orr, A.G.; Wongkamhaeng, K. (2024): Description of the final stadium larva of *Anisopleura furcata* Selys, 1891 (Odonata: Euphaeidae) from Thailand. *Zootaxa* 5415(4): 529-542. (in English) ["The final stadium larva of *A. furcata* is described and illustrated. The larva can be separated from all known *Anisopleura* Selys, 1853 larvae by the following characters: the profusion of elongated tubercles on the labrum and antefrons, the presence of a long bifid spur on the outer margin of the mandibles, presence of a row of claviform setae on dorsal apex of tarsus, and antennae 8-segmented. The inner lobe of the labial palps forms a tiny truncate tooth broadly similar to the condition in all other known members of the genus. Diagnostic features that separate this species from potentially syntopic euphaeid genera are discussed." (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

22841. Kiany, M., Sadeghi, S. & Ebrahimi, M. (2024): The first evidence of breeding by *Crocothemis sanguinolenta* and *Zygonyx torridus* (Odonata: Libellulidae) in Iran. *Journal of Insect Biodiversity and Systematics* 10(1): 161-175. (in English, with Farsi summary) ["For the first time, exuviae of *C. sanguinolenta* and *Z. torridus* were collected from southern parts of Iran. Females of *Z. torridus* were also observed mating and ovipositing in two habitats. According to our data, these two species successfully breed in some suitable microhabitats and are neither immigrants nor vagrants. Our findings based on this research and recent information showed that habitat dispersal for these two species is not limited to the Hormuz Strait region, as previously thought. Suitable habitats for *Z. torridus* expanded from the Southwest to the East of the country. For *C. sanguinolenta*, the habitat range covers the far southeastern parts of the country near the Pakistan border area. Based on the geological history of the Persian Gulf region in the last glacial period and similar African

coexisting species in these microhabitats, we suggest that these species are relict populations that survived in a few suitable habitats from a wider area in the past. This view seems more appropriate to explain the current distribution of these species than their recent migration from the UAE or Oman regions." (Authors)] Address: Kiany, M., Biol. Dept, Fac. Sciences, Shiraz Univ., Shiraz, Iran. Email: mohsen.kiany1@gmail.com

22842. Kozlu, A.; Ngasakul, N.; Klojdová, I.; et al. (2024): Edible insect-processing techniques: a strategy to develop nutritional food products and novelty food analogs. *European Food Research and Technology* 250(3), <https://doi.org/10.1007/s00217-024-04474-3>: 15 pp. (in English) ["Edible insects have been part of the eating habits of several cultures over the years. They are recognized as a promising nutritional and sustainable alternative food source. The transformation of insects into safer and more acceptable food ingredients depends on the processing techniques and the final food system. Conventional methodologies such as blanching, boiling, drying, and milling are primarily used for material pre-conditioning and powder preparation, mostly for preparing bakery products. Most advanced technologies are preferred for extraction of insect derivatives such as lipids, proteins, polyphenols, and chitosan due to their better-quality preservation, higher yield, and more environmentally friendly (solvent residues). Insect derivatives (mainly lipids and proteins) have been used to enhance the nutritional value of processed products and to produce food analogs, principally for meat and less investigated for milk and dairy products. This literature overview summarizes the effect of different processing techniques on edible insects' safety and quality and their use for the development of processed products and derivatives for food analogs production." (Authors) The paper includes a reference to Odonata.] Address: Baigts-Allende, Diana K., DRIFT-Food Center, Fac. Agrobiology, Food & Nat.Resources, Czech Univ. of Life Scien. Prague, Prague 16500, Czech Republic. Email: baigts_allende@af.czu.cz

22843. Kra, K.M.; Simmou, Y.J.; Yapo, M.L.; Bi, D.J.Y.: Diomandé, D. (2024): Preliminary data on the odonatofauna in Pelefero Gon Coulibaly University's forest reserve perimeter (Northern of Côte d'Ivoire). *World Journal of Advanced Research and Reviews* 21(1): 641-649. (in English) ["The ecological importance and diversity of Odonata are most often underestimated. However, their sensitivity to environmental conditions makes them excellent biological indicators of environmental conditions. The aim of this study is to explore the diversity of Odonata within and around Pelefero Gon Coulibaly University forest reserve, with a view to providing valuable data to guide conservation efforts. The Odonata were collected using a sweep net from May to August 2023. This study revealed a preliminary list of 28 species of Odonata including 26 species of Anisoptera and 2 species of Zygoptera belonging to 3 families (Libellulidae, Aeshnidae and Coenagrionidae). The Libellulidae family was the most diversify, comprising 25 species alone (or 98.66%). The Shannon-Weaver index and rarefied richness revealed that site S2 had significantly higher diversity values compared to other sites due to the different crops that provide favorable conditions for Odonata to survive. Site S1 proved to be the least inhospitable for the Odonata, because it was poor in vegetation. This result was also confirmed by the distribution profile of Odonata from the Self-Organising Map (SOM)." (Authors)] Address: Kra, K.M., Dept of Animal Biology, UFR Biological Sciences, Pelefero GON COULIBALY University, BP 1328, Korhogo, Côte d'Ivoire

22844. Kwon, H.-y.; Seo, H.-s.; Ko, M.-h. (2024): Feeding ecology of the endangered endemic species, *Rhynchocypris semotilus* (Pisces: Cyprinidae) in the Songhyeoncheon (Stream). *Korean Journal of Ichthyology* 36(1): 68-76. (in Korean, with English summary) ["To reveal the feeding ecology of *Rhynchocypris semotilus*, the survey was conducted in Songhyeoncheon, Songhyeon-ri, Hyeonnae-myeon, Goseong-gun, Gangwon-do in April 2022. As a result of analyzing the contents of the stomach using the index of relative importance (IRI), the important prey organisms were mainly Trichoptera (46.6%), Ephemeroptera (27.6%), Diptera (12.6%), Odonata (9.7%), Plecoptera (2.8%), Coleoptera (0.6%), and Hemiptera (0.1%) of Class Insecta, Phylum Arthropoda in that order. As a result of analyzing the trend by calculating the index of relative importance (IRI) for each age, it was found that those born in the same year mainly feed on relatively small Ephemeroptera and Diptera, but the proportion of these gradually decreases as they grow. And the proportion of relatively large Trichoptera and Odonata gradually increased, turning them into the most important food source for those over 3 years old. Additionally, prey size was the smallest at 2.8 ± 2.5 (0.6 to 9.0) mm for individuals born in the same year, but gradually increased to 5.1 ± 6.1 (1.1 to 17.0) mm for individuals born more than 3 years. As a result of examining prey selectivity, Plecoptera (+0.78), Trichoptera (+0.66), Coleoptera (+0.66), and Hemiptera (+0.03) showed positive selectivity, while Amphipoda (-1.00), Ephemeroptera (-0.24), Odonata (-0.13) and Diptera (-0.05) showed negative selectivity." (Authors)] Address: Ko, Myeong-Hun. E-mail: hun7146@gmail.com

22845. Lee, D.J.; Matthews, P.G.D. (2024): Oxygen extraction efficiency of the tidally-ventilated rectal gills of dragonfly nymphs. *Proc. R. Soc. B* 291: 20231699. <https://doi.org/10.1098/rspb.2023.1699>: 12 pp. (in English) ["Dragonfly nymphs breathe water using tidal ventilation, a highly unusual strategy in water-breathing animals owing to the high viscosity, density and low oxygen (O_2) concentration of water. This study examines how well these insects extract O_2 from the surrounding water during progressive hypoxia. Nymphs were attached to a custom-designed respiro-spirometer to simultaneously measure tidal volume, ventilation frequency and metabolic rate. Oxygen extraction efficiencies (OEE) were calculated across four partial pressure of oxygen (pO_2) treatments, from normoxia to severe hypoxia. While there was no significant change in tidal volume, ventilation frequency increased significantly from 9.4 ± 1.2 breaths per minute (BPM) at 21.3 kPa to 35.6 ± 2.9 BPM at 5.3 kPa. Metabolic rate increased significantly from $1.4 \pm 0.3 \mu l O_2 \text{ min}^{-1}$ at 21.3 kPa to $2.1 \pm 0.4 \mu l O_2 \text{ min}^{-1}$ at 16.0 kPa, but then returned to normoxic levels as O_2 levels declined further. OEE of nymphs was $40.1 \pm 6.1\%$ at 21.3 kPa, and did not change significantly during hypoxia. Comparison to literature shows that nymphs maintain their OEE during hypoxia unlike other aquatic tidal-breathers and some unidirectional breathers. This result, and numerical models simulating experimental conditions, indicate that nymphs maintain these extraction efficiencies by increasing gill conductance and/or lowering internal pO_2 to maintain a sufficient diffusion gradient across their respiratory surface." (Authors)] Address: Lee, D.J., Dept of Zoology, Univ. of British Columbia, Vancouver, British Columbia, Canada V6T1Z4. Email: danlee@zoology.ubc.ca

22846. Liu, Y.; Shi, C.; Shang, J.; Ren, D.; Yang, Q. (2024): New Euthemistid Damselfly-Dragonfly from the Middle Jurassic of Northern China (Odonata, Isophlebioidea, Euthemistidae). *Diversity* 2024, 16(4), 191; <https://doi.org/10.3390/d16040191>: 8 pp. (in English) ["A new genus and new species

of the eutthemistid, *Kidaneutthemis ningchengensis* gen. et sp. nov., is described from the Middle Jurassic of Inner Mongolia, China. It can be assigned to the Eutthemistidae by the several long intercalary veins between RP1 and IR1, IR1 and RP2, as well as between RP2 and IR2 and between IR2 and RP3/4. *Kidaneutthemis ningchengensis* gen. et sp. nov. distinguishes from the other two genera of this family by the presence of not less than eight intercalary veins between MP and wing margin; about three rows of cells in the distal part between MA and MP; the base of IR2 is two cells distal to that of RP3/4. In addition, a revision of the family Eutthemistidae has been proposed." (Authors)] Address: Liu, Y., College of Life Sciences, Capital Normal University, Xisuanhuanbeilu 105, Haidian District, Beijing 100048, China

22847. Lorenzo-Carballa, M.O.; Koroiva, R. (2024): Editorial for the Special Issue "Diversity, Ecology and Evolution of Odonata". *Diversity* 2024, 16, 117. <https://doi.org/10.3390/d160-20117>: 6 pp. (in English) ["The order Odonata, ... occurs practically throughout the entire planet, except the poles, currently representing about 6400 species distributed in 650 genera, with hundreds of species still to be described. Odonates are characterized by their extensive predatory habits and their important role in food chains in freshwater environments, and they are also considered excellent bioindicators of habitat quality. Despite having fewer species than other megadiverse groups, its position in the Pterygota phylogeny makes it a key group for understanding the evolution of insects. Therefore, and considering their ecological and evolutionary importance, we present this Special Issue focused on various aspects of the diversity of odonates." (Authors)] The complete set of papers can be downloaded: https://www.mdpi.com/journal/diversity/special_issues/diversity_odonata Address: Lorenzo-Carballa, Olalla, CRETUS, Dept of Zoology, Genetics & Physical Anthropology, Universidade de Santiago de Compostela, 15782 Santiago de Compostela, Spain. Email: m.o.lorenzo.carballa@gmail.com

22848. Mallick, M.A.I.; Mondal, A. (2024): A preliminary assessment: seasonal variations of damselfly and dragonfly abundance in Serampore, Jolkol, West Bengal, India. *Biodiversity* 25(1): 11-16. (in English) [Study area: Jolkollies at 12, William Carey Sarani, Maniktala, Serampore (22.7495033°N, 88.354230°E), suburban area of the Hooghly district of West Bengal, India. 29 odonate species were recorded. Seasonal variation and abundance of species is outlined.] Address: Imran Malkck, M.A.I., Dept of Zoology. West Bengal State Univ. Berunanpukurla. North 24 Pargaivas, West 700126. Bengal. India. Email: imranmallidi708@gmail.com

22849. McEachin, S.; Drury, J.P.; Grether, G.F. (2024): Competitive displacement and agonistic character displacement, or the ghost of interference competition. *The American Naturalist* 203(3): 335-346. (in English) ["Interference competition can drive species apart in habitat use through competitive displacement in ecological time and agonistic character displacement (ACD) over evolutionary time. As predicted by ACD theory, sympatric species of rubyspot damselflies (*Hetaerina* spp., [*H. occisa*, *H. fuscoguttata*, *H. cruentata*, *H. capitalis*]) that respond more aggressively to each other in staged encounters differ more in microhabitat use. However, the same pattern could arise from competitive displacement if dominant species actively exclude subordinate species from preferred microhabitats. The degree to which habitat partitioning is caused by competitive displacement can be assessed with removal experiments. We carried out removal experiments with three species pairs of rubyspot damselflies. With competitive displacement, removing dominant

species should allow subordinate species to shift into the dominant species' microhabitat. Instead, we found that species-specific microhabitat use persisted after the experimental removals. Thus, the previously documented association between heterospecific aggression and microhabitat partitioning in this genus is most likely a product of divergence in habitat preferences caused by interference competition in the evolutionary past." (Authors)] Address: McEachin, S., Dept of Ecology and Evolutionary Biology, Univ. of California Los Angeles, Los Angeles, CA, USA

22850. Mendoza-Penagos, C.C.; Pérez-Gutiérrez, L.A.; Muzón, J. (2024): A revision of Lestidae Calvert, 1901 (Odonata: Zygoptera) from Colombia, with the first record of *Lestes dichrostigma* Calvert, 1909. *Zootaxa* 5415(2): 201-240. (in English, with Spanish summary) ["The cosmopolitan family Lestidae Calvert, 1901 has two widely distributed genera in the Americas: *Archilestes* Selys, 1862, and *Lestes* Leach, 1815. In Colombia, this family is represented by 11 species. In this study, we present a diagnosis of Lestidae species in Colombia based on a thorough review of the country's main entomological collections. A total of 258 specimens representing ten species were examined. The species *L. dichrostigma*, is recorded for the first time. The presence of *L. henshawi* Calvert, 1907 is excluded, and the taxonomic status of *L. sternalis* (Navás, 1930) is discussed. Finally, we present distribution maps, photographs of Lestidae species, taxonomical important structures, and taxonomic keys for both males and females." (Authors)] Address: Mendoza-Penagos, C.C.L., laboratório de Ecologia e Conservação—LABECO, Univ. Federal do Pará, Instituto de Ciências Biológicas, Rua Augusto Correia, No. 1 Bairro Guamá, CEP 66.075-110 Belém, Pará, Brazil. Email: cristian.penagos@icb.ufpa.br

22851. Morrill, A.; Forbes, M.R.; Vesterinen, E.J.; Tamminen, M.; Sääksjärvi, I.E.; Kaunisto, K.M. (2024): Molecular characterisation of faecal bacterial assemblages among four species of syntopic odonates. *Microbial Ecology* 87(16): 13 pp. (in English) ["Factors such as host species, phylogeny, diet, and both timing and location of sampling are thought to influence the composition of gut-associated bacteria in insects. In this study, we compared the faecal-associated bacterial taxa for three *Coenagrion* and one *Enallagma* damselfly species. We expected high overlap in representation of bacterial taxa due to the shared ecology and diet of these species. Using metabarcoding based on the 16S rRNA gene, we identified 1513 sequence variants, representing distinct bacterial 'taxa'. Intriguingly, the damselfly species showed somewhat different magnitudes of richness of ZOTUs, ranging from 480 to 914 ZOTUs. In total, 921 (or 60.8% of the 1513) distinct ZOTUs were non-shared, each found only in one species, and then most often in only a single individual. There was a surfeit of these non-shared incidental ZOTUs in the *Enallagma* species accounting for it showing the highest bacterial richness and accounting for a sample-wide pattern of more single-species ZOTUs than expected, based on comparisons to the null model. Future studies should address the extent to which faecal bacteria represent non-incidental gut bacteria and whether abundant and shared taxa are true gut symbionts." (Authors)] Address: Kaunisto, K.M., Dept of Biology, Carleton University, Ottawa, Ontario, Canada. Email: kari.kaunisto@utu.

22852. Mukherjee, S.; Mandal, R. (2024): Assessment of diversity of Odonata fauna in selected sites of Purba Bardhaman district, West Bengal, India. *Journal of Threatened Taxa* 16(2): 24775-24785. (in English) ["Purba-Bardhaman, a newly emerged district of West Bengal was surveyed

for listing its odonate diversity. The district is located in southern West Bengal, and two major rivers, Damodar and Ajay, run through it. It also has a lot of small rivers, perineal and seasonal water bodies, grasslands, marshes, and agricultural fields, making it a great place for odonates. Five different sites of the district were surveyed by direct search and opportunistic sighting methods for a period of two years (March 2021 to February 2023) and odonate diversity was listed. We have found a total of 47 species belonging to 35 genera and six families from this district. The most diverse family was Libellulidae, with 24 species. A few major findings from this study were *Macrogomphus montanus*, *Platygomphus dolabratus*, *Lathrecista asiatica*, *Libellago indica*, and *Agriocnemis kalinga*. This is the first systematic study of odonates from this district, and it illustrates the value of this densely populated district for further exploration due to its high agricultural fertility." (Authors)] Address: Mukherjee, S., Dept of Zoology, The Univ. of Burdwan, Golapbag, Purba Bardhaman, West Bengal 713104, India. Email: sulagna211@gmail.com

22853. Narita, Y.; Chiba, K. (2024): Aerodynamics on a faithful hindwing model of a migratory dragonfly based on 3D scan data. *Journal of Fluids and Structures* 125, 104080: 12 pp. (in English) ["In this study, we examined the aerodynamics around the hindwing of a faithfully reproduced *Pantala flavescens* (globe wanderer) under gliding conditions. The dragonfly wing is corrugated, with numerous veins running through the entire wing. This convexoconcave geometry improves the lift-to-drag ratio under low Reynolds number conditions. However, until now, aerodynamic analyses have only been performed on 2D chordwise cross-sections of the wing and pseudo-3D shapes extending the profiles spanwise. The aerodynamic performance of a 3D geometry that faithfully replicates all wing veins has yet to be investigated. Therefore, we prepared a faithful analytical model by 3D scanning the hindwing of a *P. flavescens* specimen; as a migratory dragonfly, it is capable of long-duration and long-distance flight. In our simulation results, the V-shaped groove formed by the large wing veins was covered by separation vortices, resulting in a pseudo-smooth wing surface. The role of the differently-sized wing veins is supposedly to inhibit separation. The faithful reproduction of the wings provides a better understanding of the 3D flow structure and directly leads to a precise estimation of the underlying aerodynamic characteristics. Accurate performance must be evaluated by simulating a faithful geometry in low angle of attacks, where aerodynamic efficiency is required for long-distance flight." (Authors)] Address: Narita, Y., The Univ. of Electro-Communications, 1-5-1, Chofugaoka, Chofu, Tokyo, 182-8585, Japan. Email: n2332079@edu.cc.uec.ac.jp

22854. Nel, A.; Ji, G.; Gao, J.; Huang, D. (2024): A new griffenfly genus and species from the Early Pennsylvanian of the Xiaheyan locality (Ningxia, China) (Insecta: Odonoptera). *European Journal of Taxonomy* 925: 67-75. (in English) ["The erasipterid *Sinoerasipteron xiaheyanensis* Nel & Huang gen. et sp. nov. from the Moscovian Tupo Formation in Xiaheyan locality (China), is described and illustrated. It is the sixth species of the odonopteran griffenflies from this locality. This new discovery confirms the high diversity of these flying predators in the insect assemblage." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@mnhn.fr

22855. Nel, A.; Garrouste, R.; Kaya, M.; Licht, A.; Legal, S.; Coster, P. (2024): The second oldest representative of the genus *Aeshna* (Odonata: Aeshnidae) found in the lowermost Oligocene of Luberon (France) and revealed by UV

light. *Historical Biology* 36(2): 261-265. (in English) ["*Aeshna caseneuveensis* sp. nov., the second oldest representative of the genus *Aeshna*, is described and figured from the lowermost Oligocene of Luberon in southeastern France. The oldest described species in this genus is from the uppermost Eocene of Colorado in USA. Their occurrence in very distant areas in an interval of time of less than five millions years strongly suggests that the genus is older, possibly appearing during the middle Eocene, as it is still unknown in the early Eocene odonate faunas. The specimen could be studied thanks to a technique of photograph under UV light newly developed by one of us (RG)." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@mnhn.fr

22856. Nicoletti, R.; Russo, E.; Becchimanzi, A. (2024): Cladosporium—Insect Relationships. *Journal of Fungi* 10, 78. <https://doi.org/10.3390/jof10010078>: 26 pp. (in English) ["The range of interactions between *Cladosporium*, a ubiquitous fungal genus, and insects, a class including about 60% of the animal species, is extremely diverse. The broad case history of antagonism and mutualism connecting *Cladosporium* and insects is reviewed in this paper based on the examination of the available literature. Certain strains establish direct interactions with pests or beneficial insects or indirectly influence them through their endophytic development in plants. Entomopathogenicity is often connected to the production of toxic secondary metabolites, although there is a case where these compounds have been reported to favor pollinator attraction, suggesting an important role in angiosperm reproduction. Other relationships include mycophagy, which, on the other hand, may reflect an ecological advantage for these extremely adaptable fungi using insects as carriers for spreading in the environment. Several *Cladosporium* species colonize insect structures, such as galleries of ambrosia beetles, leaf rolls of attelabid weevils and galls formed by cecidomyid midges, playing a still uncertain symbiotic role. Finally, the occurrence of *Cladosporium* in the gut of several insect species has intriguing implications for pest management, also considering that some strains have proven to be able to degrade insecticides. These interactions especially deserve further investigation to understand the impact of these fungi on pest control measures and strategies to preserve beneficial insects." (Authors) Odonata contribute with 1,1% to the findings of insect-associated *Cladosporium* spp. grouped by insect orders.] Address: Nicoletti, Rosario, Council for Agricultural Research and Economics, Research Center for Olive, Fruit and Citrus Crops, 81100 Caserta, Italy. Email: rosario.nicoletti@crea.gov.it

22857. Orr, J.A.; Bussi, G.; Hughes, J. M.R.; Whitehead, P.G.; Jackson, M.C. (2024): Modelling the potential for local management practices to offset climate change impacts on freshwater macroinvertebrate communities. *Freshwater Biology* 69(3): 435-449. (in English) ["A robust understanding of the interactions between global and local anthropogenic stressors is crucial for ecosystem management in the Anthropocene. Manipulative experiments in the laboratory or in the field can be used to build knowledge about the physiological and ecological effects of stressors, but predicting the combined landscape-scale effects of global stressors such as climate change, and local stressors such as land-use change requires a different approach. Here we used water quality and hydrology process-based models of entire river catchments in combination with a large biomonitoring dataset to predict the responses of macroinvertebrate communities [including "Odonata"] under different climate change and land-use change scenarios. Using the River Thames in the U.K. as a

model system, we predicted changes in water quality (temperature, flow, phosphorus [P], nitrogen, dissolved oxygen [DO]) and subsequent changes in macroinvertebrate communities for two climate change scenarios, individually and in combination with intensified agriculture and reduced P pollution (representing improved wastewater treatment). Our models predicted that water-quality changes associated with climate change may not influence total species richness, but that community composition will shift towards more pollution-tolerant and common taxa based on responses of community indices and taxon-specific responses. We also found that the negative impacts of climate change on water quality (e.g., increased P concentration, decreased DO concentration) accumulate through the catchment, but that local land-use practices influencing P dynamics can modify this trend. Furthermore, although the intensified agriculture scenario was predicted to have minimal impacts on macroinvertebrate communities (a result potentially related to shifting baselines as the Thames is already heavily polluted), we found that reduced P pollution resulting from improved wastewater treatment was able to mostly offset the negative impacts of climate change on macroinvertebrate communities. Our results demonstrate that using process-based models to study networks of interacting stressors at a landscape scale can provide useful insights into the ecological impacts of anthropogenic global change, and adds support to the idea that management of local stressors has the potential to mitigate some of the impacts of climate change on ecosystems." (Authors)] Address: Orr, J.A., Dept of Biology, Univ. of Oxford, Oxford, UK. Email: james.orr@biology.ox.ac.uk

22858. Paganelli, D.; Bellati, A.; Gazzola, A.; Bracco, F.; Pelliteri-Rosa, D. (2024): Impacts, potential benefits and eradication feasibility of aquatic alien species in an integral natural State Reserve. *Biology* 2024, 13, 64. <https://doi.org/10.3390/biology13010064>: 13 pp. (in English) ["Simple Summary: Biodiversity is facing increasing threats and loss worldwide because of anthropogenic pressures. Natural reserves act as protected reservoirs for local biodiversity, and the management of alien species in these areas represents one of the main challenges for conservation biologists and environmental managers. We applied the Invasive Species Effects Assessment Tool (INSEAT) to quantify their impact and potential benefits on ecosystem services and the results indicated that all the assessed species had more negative impacts than benefits on the ecosystem services. Moreover, for each species, we evaluated the feasibility of the main eradication techniques currently proposed in the literature using the non-native risk management scheme (NNRM), with the final aim of suggesting effective actions for the management of aquatic invasive species in this kind of environment. As globalization is leading to the ever-growing spread of alien species worldwide, we stress the urgency of implementing risk assessment and management tools, particularly in protected areas, to highlight the multiple (sometimes unexpected) consequences of alien species introduction, that in turn will help address management decisions for effective conservation actions. Abstract: Riverine wetlands are stepping-stone environments for the protection of local biodiversity, but they are particularly vulnerable to biological invasions. In order to take action against biological invasions, it is crucial to assess the impacts of alien species. However, it is also important to assess the potential benefits on ecosystem services that alien species could have. Once it has been verified that negative impacts are higher than potential benefits, it is important to propose feasible actions to contrast them. In this study, we assessed eight freshwater alien species recorded in an integral protected wetland using the

Invasive Species Effects Assessment Tool (INSEAT) to quantify their negative impacts and potential benefits on ecosystem services. Moreover, for each species, we evaluated the feasibility of the main eradication techniques currently proposed in the literature using the Non-Native Risk Management scheme (NNRM), with the final aim of suggesting effective actions for their management. The INSEAT results indicated that all the assessed species had more impacts than benefits while NNRM provided useful indications on the best practical conservation actions to use for reducing the density, and therefore, the negative impacts on ecosystem services and the local biodiversity of the assessed alien species." (Authors) The study includes a passing reference to *Ophiogomphus cecilia*.] Address: Paganelli, D., Dept of Earth and Environmental Science, University of Pavia, Via Ferrata 1, 27100 Pavia, Italy. Email: daniele.paganelli@unipv.it

22859. Palacino Rodríguez, F.; Palacino, D.A.; Penagos Arevalo, A.; Cordero-Rivera, A. (2024): Demography and behavior of *Teinopodagrion oscillans* (Odonata: Megapodagrionidae) in a protected area of the Colombian Andean region. *Insects* 2024, 15, 125. <https://doi.org/10.3390/insects1502-0125>: 12 pp. (in English) ["Simple Summary: Basic information on the ecology and behaviour of many aquatic insects is lacking because of the absence of studies. Here, we investigated whether demographic aspects such as survival, sex ratio, and population size are different between sexes and individuals of different ages of *T. oscillans*, a damselfly species endemic to the Andean region, living in a protected area. We also recorded the behaviour of this species and the area frequented by the adults near the water. Survival, recapture, and lifespan (14.1 ± 0.59 days) were similar for both sexes and all age groups. Mature males were larger, while the distance from the water where animals perched was similar for all individuals. Weather variations affected the demography of this population in a significant way. Individuals perch on any available support (0.1–1.2 m high) and show high fidelity to their perch site, with mature males making short flights from the perch to intercept other individuals and to hunt prey. The tandem position was formed on macrophytes, and females lay eggs by submersion of their abdomen. Our results provide crucial information for short- and long-term conservation decisions of the biodiversity in ecosystems of the Andean region. Abstract: The demography and behaviour of *Teinopodagrion oscillans* was studied in a protected area in the Andean region of Colombia. Adult damselflies were individually marked, and using their recapture histories, we estimated survival, longevity, sex ratio, and population size using Cormack-Jolly-Seber models. Other aspects of their behaviour were recorded. Survival, recapture, and lifespan (14.1 ± 0.59 days) were similar for both sexes and all age groups. Mature males were larger, and the distance from the water was similar for all individuals. The most supported model was the time-dependent model for survival and recapture. This suggests that weather variations affect the demography of this population in a significant way. Individuals exhibited high fidelity to their site perch, perching with open wings near water on a variety of perches. Mature males make short flights from the perch to intercept conspecific and interspecific males and to hunt prey. The tandem position was formed on macrophytes, and then the pair flew away. Oviposition lasted for 11.23 min on average, with the females ovipositing by abdomen submersion. Our results offer insights into the demographic characteristics and behaviour of this species, providing crucial information for the short- and long-term, from the demography of one species to the conservation of ecosystems of the Andean region." (Authors)] Address: Palacino-Rodríguez, F., Etology Section,

Faculty of Sciences, Republic University, Montevideo 11200, Uruguay. Email: odonata17@hotmail.com

22860. Patterson, C.W.; Bonillas-Monge, E.; Brennan, A.; Grether, G.F.; Mendoza-Cuenca, L.; Tucker, R.; Vega-Sánchez, Y.M.; Drury, J. (2024): A chromosome-level genome assembly for the smoky rubyspot damselfly (*Hetaerina titia*). *Journal of Heredity* 115(1): 103-111. (in English) [*H. titia* is "one of the most commonly encountered odonates along streams and rivers on both slopes of Central America and the Atlantic drainages in the US and southern Canada. Owing to their highly variable wing pigmentation, they have become a model system for studying sexual selection and interspecific behavioural interference. Here, we sequence and assemble the genome of a female smoky rubyspot. Of the primary assembly (i.e., the principle pseudohaplotype), 98.8% is made up of 12 chromosomal pseudomolecules (2N = 22A + X). There are 75 scaffolds in total, an N50 of 120 Mbp, a contig-N50 of 0.64 Mbp, and a high arthropod BUSCO score (C:97.6% [S:97.3%, D:0.3%], F:0.8%, M:1.6%). We then compare our assembly to that of the blue-tailed damselfly genome (*Ischnura elegans*), the most complete damselfly assembly to date, and a recently published assembly for *H. americana*. Collectively, these resources make *Hetaerina* a genome-enabled genus for further studies of the ecological and evolutionary forces shaping biological diversity." (Authors)] Address: Drury, J., Dept of Biosciences, Durham University, Stockton Road, Durham, United Kingdom DH1 3LE. Email: jonathan.p.drury@durham.ac.uk

22861. Paul, S.; Rayhan, M.; Herberstein, M.E.; Khan, M.K. (2024): Cooler and drier conditions increase parasitism in a subtropical damselfly population. *Ecology & Evolution* 14(2), e10897: 7 pp. (in English) ["Host-parasite interactions are impacted by climate, which may result in variation of parasitism across landscapes and time. Understanding how parasitism varies across these spatio-temporal scales is crucial to predicting how organisms will respond to and cope under a rapidly changing climate. Empirical work on how parasitism varies across climates is limited. Here, we examine the variation of parasitism across seasons and identify the likely climatic factors that explain this variation using *Agriocnemis femina* damselflies and *Arrenurus* water mite ectoparasites as a host-parasite study system. We assessed parasitism in a natural population in Sylhet, Bangladesh which is located in subtropical climate between 2021 and 2023. We calculated prevalence (proportion of infected individuals) and intensity (the number of parasites on an infected individual) of parasitism across different seasons. Parasite prevalence and intensity were greater during cooler seasons (autumn and winter) compared to hotter seasons (spring and summer). Mean temperature and precipitation were negatively correlated with parasite prevalence, whereas only mean precipitation was negatively correlated with parasite intensity. Tropical, subtropical and mediterranean regions are predicted to experience extreme climatic events (extreme temperature, less precipitation and frequent drought) as a consequence of anthropogenic climate change, and our finding suggests that this might alter patterns of parasitism in aquatic insects." (Authors)] Address: Md Kawsar Khan, School of Natural Sciences, Macquarie University, Sydney, NSW 2109, Australia. Email: kawsar.khan@mq.edu.au

22862. Pereira Neves, M.; Delariva, R.L.; Perkins, D.M.; Filho, C.B.; Kratina, P. (2024): Trophic plasticity of omnivorous fishes in natural and human-dominated landscapes. *Limnology and Oceanography* 69(1): 189-202. (in English) ["The persistence of diverse communities and functioning ecosystems

under increasing anthropogenic pressure relies on food web rewiring and the ability of animals to expand or change their diet in disturbed ecosystems. We combined a suite of diet tracing techniques to study trophic plasticity in omnivorous fishes, ecomorphologically similar species with high competition potential, across different human land uses in subtropical streams. We found that the proportion of native forest cover, associated with intensive land use, altered the isotopic composition of fishes, which were more enriched in ^{13}C , without affecting the carbon isotope ratios of their prey and basal resources. There was also evidence for a nonlinear effect of native forest cover on the $\delta^{15}\text{N}$ values of basal resources, macroinvertebrates, and omnivorous fishes, indicating that nutrient pollution from agriculture propagated through stream food webs. The most widely distributed fish species shifted their diet from autochthonous resources to terrestrial invertebrates and sedimentary organic matter in disturbed streams. Moreover, the isotopic niche of this fish species was broader in streams with higher fish species richness, indicating the combined impacts of environmental change and competition on species coexistence. Therefore, our findings showed that the dominance and trophic niche breadth of dominant omnivores depend not only on the availability of resources but also on the interactions with their putative competitors." (Authors) The study includes "Odonata".] Address: Pereira Neves, Mayara, School Biol. & Behav. Scien., Queen Mary Univ. London, London, UK. Email: mayara-nevesbio@hotmail.com

22863. Piney, B.; Krieg-Jacquier, R. (2024): Nomenclature française des appendices anaux des imagos et larves d'odonates: pour l'abandon du terme «cercoïdes». *Martinia* 38(1): 1-19. (in French, with English summary) ["French nomenclature for the anal appendages of odonate imagos and larvae: in favour of abandoning the term "cercoïdes". The existing nomenclatures for odonates differs from one language and one country to another. For example, the French designation of the anal appendages of odonates varies from one publication to another, differs from that used in other languages and is not consistent between the larva and the imago. For the sake of consistency and to avoid misunderstandings in descriptions, we propose here to harmonise French usage with that prevailing internationally. The most exhaustive possible review of the different nomenclatures used around the world is followed by an argument on the relevance of this choice. Finally, dedicated figures summarise the selected terminology for the suborders Zygoptera and Eiproctophora." (Authors)] Address: Piney, B., Opie-odonates, 3, rue de la Frégate, 44470 Thouaré-sur-Loire, France. Email: bertrand.piney@gmail.com

22864. Prajapati, A.P.; Patel, J.J.; Trivedi, N.P.; Kachhadiya, N.M. (2024): Biodiversity of insects and mites in organic farming system of bottle gourd [*Lagenaria siceraria* (Molina) Standley]. *International Journal of Statistics & Applied Mathematics* SP-9(1): 43-47. (in English) [A total of 42 species of insects and mites belonging to 35 families of the 12 orders viz. ... *Odonata* [*Pantala flavescens*, *Orthetrum sabina*] ... was observed.] Address: Prajapati, A.P., Scholar, Dept of Entomology, NM College of Agriculture, Navsari Agricultural University, Dandi Road, Erugam, Navsari, Gujarat, India

22865. Richmond, I.C.; Perron, M.C.; Boyle, S.P.; Pick, F.R. (2024): Connectivity of stormwater ponds impacts Odonata abundance and species richness. *Landscape Ecology* 39, article number 63: 16 pp. (in English) ["Context: The successful dispersal of an animal depends, partly, on landscape connectivity. Urbanization poses risks to dispersal activities by increasing hostile land cover types. Objectives:

We investigated how connectivity of urban ponds impacted Odonata communities (dragonflies and damselflies), an order of semi-aquatic insects that actively disperse. Methods: We sampled 41 constructed stormwater ponds and 8 natural ponds in a metropolitan area. The effect of connectivity and the quantity of available adjacent habitats was tested at different scales for dragonflies (900 m) and damselflies (300 m), determined by a literature analysis, to account for differences in suborder dispersal capabilities. Results: Lower levels of connectivity and fewer nearest neighbours negatively impacted abundance, species richness, and composition of dragonflies (p values < 0.01 , $R^2 = 0.18-0.70$). Adult dragonfly abundance had a stronger positive relationship with connectivity than species richness. In particular, the abundance of adult *Leucorrhinia frigida*, found almost exclusively at natural ponds, had a positive relationship with connectivity. Connectivity and the number of nearest neighbours had no significant impact on damselflies apart from a slight negative relationship between connectivity and species richness (p value = 0.02, $R^2 = 0.11$). Natural ponds had significantly higher levels of connectivity when compared to stormwater ponds. Conclusions: Our results suggest that dragonflies are positively affected by increased connectivity in an urban landscape, with no benefit of connectivity to damselflies at the scale measured. We recommend intentional planning of urban stormwater pond networks, where individual ponds can act as stepping stones, incorporated with strategic inclusion of beneficial land cover types." (Authors)] Address: Richmond, Isabella, Dept Biol., Univ. Ottawa, 30 Marie Curie Private, Ottawa, ON K1N 6N5, Canada. Email: isabella.richmond@mail.concordia.ca

22866. Romera, V. (2024): Odonata of the Hlanzoun (Lokoli) swamp forest in Benin: updated checklist, new records and conservation concerns. International Dragonfly Fund - Report 185: 1-31. (in English) ["Between May 2021 and July 2021, 59 species of odonates were recorded in Hlanzoun swamp forest (Benin) - giving a total of 61 known species - representing an increase of 154% compared with the previous study, which reported 24 species. Of the 59 species observed in 2021, five are new to Benin and 14.75% of these species are strictly threatened (CR, EN, VU) according to the national expert-based Red List. With six odonates assessed as Critically Endangered in Benin, Hlanzoun is home to 75% of the country's CR species. In addition, Hlanzoun harbours the largest population of *Ceragrion citrinum* currently known in the world. Hlanzoun could therefore be a major hotspot for dragonfly conservation in West Africa. This article also reports on the threats to the Hlanzoun ecosystem and proposes some ideas for its conservation." (Author)] Address: Romera, V., HUMY NGO, 2 rue des Noisetiers, 95280 Jouy-le-Moutier, France. Email: vromera@humy.org

22867. Samraoui, B.; Touati, L.; Ferreras-Romero, M.; Alfahan, A.H.; Samraoui, F. (2024): Life cycle and seasonal regulation of *Onychogomphus forcipatus unguiculatus* in the Seybouse River, Algeria (Insecta: Odonata). International Journal of Odonatology 27: 1-10. (in English) ["Understanding the seasonal regulation and life cycle patterns of Odonata is critical to identifying the factors that influence their voltinism. While the life history and seasonal regulation of Odonata, particularly gomphids, has been studied extensively, few studies have focused on North African gomphids. This study aims to contribute to the understanding of the life cycle of *Onychogomphus forcipatus unguiculatus* (Vander Linden, 1823), a western Mediterranean gomphid, on the Seybouse River in northeastern Algeria and discuss its seasonal regulation. Our results imply that a generation of *O. f.*

unguiculatus requires two years to develop. The appearance of small (F-6) larvae in early spring can be attributed to the hatching of eggs in the previous year, followed by their overwintering in interstitial habitats. This abrupt appearance of small larvae is the result of their unique life history strategy of developing and surviving in specialized habitats during winter, then continuously growing and developing. The senior cohort overlaps with its junior counterpart, overwintering primarily in instars F-1, F-2, and, to a lesser extent, F-3, before beginning to emerge in late spring and early summer. By examining the voltinism and life cycle patterns of *O. f. unguiculatus*, this study contributes to our understanding of the reproductive strategies and population dynamics of this western Mediterranean gomphid, as well as of factors affecting the phenology and ecology of Odonata, particularly in North Africa, and in this manner contributes to overall efforts to protect and manage freshwater ecosystems in this region." (Authors)] Address: Samraoui, B., Laboratoire de Conservation des Zones Humides, Université 8 Mai 1945 Guelma, Algeria. Email: bsamraoui@gmail.com

22868. Simonsen, T.J.; Archibald, S.B.; Rasmussen, J.A.; Sylvestersen, R.L.; Olsen, K.; Ware, J.L. (2024): *Stolleagrion foghnielseni* (Odonata, Cephalozygoptera, Dysagrionidae) gen. et sp. nov.: a new odonatan from the PETM recovery phase of the earliest Ypresian Fur Formation, Denmark. Zootaxa 5415(3): 493-498. (in English) ["We describe the new genus and species *Stolleagrion foghnielseni* n. gen. et sp. from the Fur Formation in northwestern Denmark based on a single fossil wing. This is the first odonatan described from the earliest part of the PETM recovery phase of the early Eocene. A combination of nine wing character states are considered to be diagnostic of the Dysagrionidae Cockrell only together with the cephalozygopteran head; however, the combination of these nine plus the presence of Ax0 is also diagnostic without the head. By this, we assign *Stolleagrion foghnielseni* to the Dysagrionidae and reassess the position of other odonates previously treated as cf. Dysagrionidae." (Authors)] Address: Simonsen, T.J., Dept of Research & Collections, Natural History Museum Aarhus, Wilhelm Meyers Allé 10, Aarhus, DK-8000 Aarhus C, Denmark. Email: t.simonsen@nathist.dk

22869. Singh, K.; Sheikh, T.; Riyaz, M. (2024): *Anotogaster basalis* Selys, 1854: A noteworthy addition to the Odonata fauna of Jammu and Kashmir, India. Munis Entomology & Zoology 19(1): 514-517. (in English) [2022-2023, Malhar Tehsil (32.710765° N, 75.679725° E), district Kathua of Jammu and Kashmir, around 1970mal. "During our surveys, we encountered adult *Anotogaster basalis* individuals in several locations in Malhar area of Jammu and Kashmir, confirming their presence in the region for the first time. *Anotogaster basalis* was observed near slow-moving water body, particularly in areas with abundant aquatic vegetation. The male specimen was resting on grass." (Authors) No detailed recording dates are given.] Address: Riyaz, M., Xavier Research Foundation, St. Xavier's College, Palayamkottai-627002, Tamil Nadu, India. Email: bhatmuzaffar471@gmail.com

22870. Siregar, A.Z.; Herwina, H.; Trisnawati, I. (2024): Monitoring insect diversity with a variety of traps in rice plantations supports food security. Universal Journal of Agricultural Research 12(1): 1-12. (in English) ["The objectives of this study in Serbajadi Village, Sunggal District, Northern Sumatera were: 1) Map the diversity and functional role of local insects in paddy agroecosystems; 2) Determine the environmental variables in the rice field that form ecosystem services; and 3) Provide recommendations for the suitability

of local insect agrobiodiversity habitats that form ecosystem services, especially those capable of supporting food security. Insects caught at each trap sample point were determined diagonally with a size of 20 x 20 m in 3 plots, each plot using 5 traps (Sweep Net=SN with 10 swings, Color Pan Trap=CPT with 4 repetitions, Core Sampler=CR with 4 repetitions, and Yellow Sticky Trap=YST with 5 repetitions and Light Trap=LT with 1 repetition in the middle of the rice plant) with sampling 8 times at weekly intervals. The study's results indicated that YST traps captured the highest number of individuals and the greatest diversity of insect species, with 47 species and 479 individuals. LT traps collected 14 species with 288 individuals, and SN traps caught 236 individuals from 36 species. In contrast, the CPT tool had the lowest count of identified individuals, with 14 species and 66 individuals. Furthermore, the overall population is mainly comprised of six pest species, with *Chironomus* sp. being the most abundant at 421 individuals, followed by *Anopheles* sp. (129 individuals), *Tetraglathia* sp. (94 individuals), *Leptocoris* oratorius (73 individuals), *Chilo suppressalis* (42 individuals), and *Nilaparvata lugens* (39 individuals). Conversely, the smallest six species include *Euscirtus concinnus*, *Hesperia* sp., *Grylloblatta orientalis*, *Panstenon* sp., *Temelucha philippensis*, and *Thomisius* sp. The main predators identified are *Agriocnemis femina*, *Ischnura senegalensis*, *Orthetrum sabina*, *Pantala flavescens*, *Paederus* sp., *Ophionea* sp., *Conocephalus* sp., *Spheidea* sp., while *Ichneumonida* sp., *Tachnida* sp. act as parasitoids in rice cultivation. The calculation of the Biological index consists of the Richness index ($R1=2.78-3.29$), the Evenness index ($E=0.57-0.82$), the Diversity index ($H'=2.12-2.5$) and the Dominance index ($D=0.60-0.84$). Based on the proportion distribution of abundance of each functional role in each habitat, a tendency was obtained for the proportion of abundance of roles with high evenness in the rice field habitat." (Authors)] Address: Siregar, Ameilia Zuliyanti, Department of Agrotechnology, Faculty of Agriculture, University of Sumatera Utara, Indonesia

22871. Strutzenberger, P.; Gottsberger, B.; Bodner, F.; Bartusel, F.; Jerga D.; Fiedler, K. (2024): DNA metabarcoding of light trap samples vs. morphological species identification. *Ecological Entomology* 49(2): 245-256. (in English) ["DNA metabarcoding has developed into a commonly used tool for biodiversity assessment and monitoring. How results from DNA metabarcoding are compared with studies based on 'classic', in most cases morphological species identification, is still unclear. Studies investigating species detection against a known baseline are virtually non-existent. In this study, we used light trap samples collected in eastern Austria to investigate the concordance between morphological species lists and results obtained from COI metabarcoding using the Illumina MiSeq platform. Two primer combinations of different lengths (313 and 205 bp) were compared to assess the influence of amplicon length. Species detection rates ranged between 0.38 and 0.69; the shorter amplicon had on average higher species detection rates compared with the longer amplicon. Singleton species were less likely to be detected through metabarcoding. The major determinant for a species to be detected was its biomass, viz. smaller species had a lower chance to be detected. However, there is also evidence of taxonomic bias on the level of superfamilies. While the influence of biomass is to be expected, the presence of taxonomic bias gives reason for concern and requires further studies. Such a bias can be of significance when metabarcoding is used to determine conservation measures. Ordination analyses of all sampling sites showed that as far as community ecology is concerned, the overall pattern obtained from the full species list was

mostly preserved in our metabarcoding results. ... The unusual presence of Odonata was confirmed by visual observation prior to sample processing. While winged insects made up the vast majority of OTUs in the light trap samples, also some representatives of flightless arthropods were detected, such as mites, ticks and springtails, albeit at very low numbers." (Authors)] Address: Strutzenberger, P., Dept of Botany & Biodiversity Research, Univ. of Vienna, Rennweg 14, 1030 Vienna, Austria. Email: patrick.strutzenberger@univie.ac.at

22872. Suárez-Tovar, C.M.; Rocha-Ortega, M.; Juen, L.; Córdoba-Aguilar, A. (2024): From the forest to the city: the persistence of dragonflies and damselflies in the urban jungle. *Biodiversity and Conservation* 33: 91-113. (in English) ["Urbanization has driven one of the most substantial transformations in water bodies exposing groups such as aquatic insects to new challenging conditions. Some odonate species persist in these transformed environments, but it remains unclear which morphological or behavioral traits allow them to survive. Through a bibliographical review we identified 88 urbanization-tolerant and 87 urbanization-sensitive odonate species worldwide. We searched morphological and behavioral traits and used phylogenetic path analysis for Anisoptera and Zygoptera to test which traits make species more sensitive to urban environments. Our results show that habitat preference was not linked with the sensitivity to urbanization whereas larger species with weak sexual dimorphism stood out as consistently associated with sensitivity to urban environments. For dragonflies, species with yellow to red colorations tend to be less sensitive to urban areas while for damselflies, territorial species tend to be less sensitive to urban areas. We discuss the underlying mechanisms linked to such urban-surviving ability as well as how we can use such information for conservation purposes." (Authors)] Address: Córdoba-Aguilar, A., Instituto de Ecología, Universidad Nacional Autónoma de México, Apdo. Postal 70-275, Circuito Exterior, Ciudad Universitaria, Coyoacán, 04510 Mexico City, Mexico. Email: acordoba@iecolocia.unam.mx

22873. Szöke, V.; Vas, Z. (2024): New taxa described by the staff of the Hungarian Natural History Museum in 2023. *Annales Musei historico-naturalis hungarici* 116: 1-11. (in English) ["In this paper an overview and a list are given of the new taxa described by the scientific staff members and volunteer researchers of the Hungarian Natural History Museum in 2023. The list contains 115 species-group names, five genus-group names, and one family-group name proposed by the authors. With one figure." (Authors). Order: Odonata: Family: Platycnemididae: *Nososticta peti* Kovács et Theischinger, 2023 [Indonesia]] Address: Szöke, Viktória, Hungarian Natural History Museum, Department of Zoology, Collection of Smaller Insect Orders, H-1088 Budapest, Baross u. 13, Hungary. E-mail: szoke.viktoria@nhmus.hu

22874. Tabassum, S.; Kotnala, C.B.; Salman, M.; Tariq, M.; Khan, A.H.; Khan, N.A. (2024): The impact of heavy metal concentrations on aquatic insect populations in the Asan Wetland of Dehradun, Uttarakhand. *Scientific Reports* volume 14, Article number: 4824 (2024): 15 pp. (in English) ["This study, centered on the Asan Wetland in Uttarakhand, examines the ecological impact of heavy metals on aquatic insects biodiversity. It highlights the detrimental effects of metals like chromium, mercury, and lead, stemming from natural and anthropogenic sources, on aquatic insects diversity. Aquatic insects, particularly sensitive to water quality, are emphasized as key indicators of environmental health, illustrating the importance of understanding and managing the influences on wetland ecosystems. Wetland

ecosystems are vulnerable to various environmental stressors, including pollution from heavy metals. These toxic substances can alter water quality parameters, disrupt nutrient cycling, and negatively impact the biodiversity and ecological balance of the system. This study aimed to evaluate the impact of several heavy metals (namely Cd, As, Cu, Fe, Pb, Ni, Zn, Al, Cr) on the distribution and biodiversity of various aquatic insect species, including Coleoptera, Diptera, Ephemeroptera, Odonata [*Crocothemis* sp.], Plecoptera, and Trichoptera. The research utilized data collected between November 2021 and October 2022 from specifically chosen sites (S1, S2, S3) within the Asan Wetland in Dehradun, Uttarakhand. After collecting and identifying samples, various statistical (Sorenson, Shannon-Weiner diversity index, Margalef index) and multivariate tests (CCA, PCA, One-way Anova), have been applied to show the effects of these parameters. This study offers significant findings regarding the distribution patterns of heavy metals, the abundance of aquatic insects, and their interconnectedness within the ecosystem of the Asan Wetland. The abundance of aquatic insects, represented by 13 genera belonging to 6 orders, was assessed at three different sites (S1, S2, and S3) within the wetland. It was concluded that the heavy metals concentration and aquatic insects' density increases and decreases vice-versa in monsoon and winter seasons might be due to unfavourable factors. These findings contribute to the understanding of ecological dynamics and potential impacts of heavy metals on aquatic biota in wetland environments." (Authors)] Address: Tabassum, S., Ecology Lab, Dept of Zoology, HNB Garhwal University (A Central University), BGR Campus Pauri Garhwal, Pauri, Uttarakhand 246001, India. Email: saziatab20@gmail.com

22875. Tanczuk, A.; Tarkowski, A.; Rychla, A.; Buczynski, P.; Bojar, P.; Borejszo, J.; Czechowski, P.; Dubicka-Czechowska, A.; Dumanski, J.; Goc, M.; Golab, M.; Góral, N.; Harcinska, A.; Jędro, G.; Jędro, M.; Lewon, K.; Lewon, R.; Marzec, M.; Mikolajczuk, P.; Oldak, K.; Ozana, S.; Słupek, J.; Sniegula, S.; Tonczyk, G.; Wisniewski, K. (2024): New records of dragonflies (Odonata) from the Lithuanian Lake District (north-eastern Poland) including the Suwalki Landscape Park, obtained during the 19th Symposium of the Odonatological Section of the Polish Entomological Society in 2023. *Odonatrix* 203 (2024): 21 pp. (in Polish, with English summary) ["From 6-9 July 2023, the participants of the 19th Symposium of the Odonatological Section of the Polish Entomological Society carried out fieldwork on the dragonflies in and around the Suwalki Landscape Park (SPK) (NE Poland). The symposium was preceded by a field reconnaissance (8-10 June). The results of this fieldwork, which yielded 45 species at 22 sites, are presented and discussed. Three species new to the SPK were found: *Aeshna affinis*, *Orthetrum albistylum* and *Leucorrhinia dubia*, along with five legally protected species: *Cordulegaster boltonii*, *Somatochlora arctica*, *Leucorrhinia albifrons*, *L. caudalis* and *L. pectoralis*. The most interesting species from the environmental conservation, faunistic and zoogeographic perspectives are *Cordulegaster boltonii* and the five *Leucorrhinia* species. Especially valuable is the finding of a reproduction site of *C. boltonii* in the Czarna Hańcza River, which indicates that this site is in good ecological condition. The new records raise the total number of dragonfly species ever recorded in the SPK to 56 (75.7% of the Polish fauna). Characterised by highly diverse habitats, the SPK is the oldest landscape park in the country. In terms of dragonfly species richness and diversity, it is ecologically very valuable. Nevertheless, since the available data have almost certainly been underestimated, further wide-ranging studies are needed for a better understanding of odonate distributions

and to render conservation strategies for these insects more effective." (Authors)] Address: Tanczuk, Agnieszka, Uniwersytet Marii Curie-Skłodowskiej, Instytut Nauk Biologicznych, Katedra Zoologii i Ochrony Przyrody, ul. Akademicka 19, 20-033 Lublin, Poland. Email: a_tanczuk@gmail.com,

22876. Tennessen, K.J. (2024): *Gomphomacromia signata* sp. n. from the Andes Mountains in Ecuador (Odonata: Synthemistidae). *International Journal of Odonatology* 27: 19-25. (in English, with Spanish summary) ["*Gomphomacromia signata* sp. n. is described and illustrated based on a single male collected in Napo Province, Ecuador. The new species is distinct from its closest congener, *G. fallax* McLachlan, 1881, by having a pair of vivid yellow spots on the postfrons, a large isolated yellow spot on the anterolateral part of the mesepimeron, forked yellow stripes on the metepisternum and metepimeron, dark spots in the wing bases, epiproct as wide distally as basally, and minute details of the posterior hamules." (Authors)] Address: Tennessen, K.J., PO Box 585, Wautoma, WI 54982, USA

22877. Terán, J.L.E. (2024): Evaluación de la agrobiodiversidad funcional, relacionada con manejo de hábitats para artrópodos benéficos en Cotacachi, Imbabura. BSc thesis, Facultad de Ingeniería en Ciencias Agropecuarias y Ambientales, Universidad Técnica del Norte: 112 pp. (in Spanish) ["Functional agrobiodiversity has been revalued in recent years thanks to the ecosystem services they provide, in the chakras the diversity of plants and insects contribute to these services. The objective of this research was to evaluate the diversity of insects related to the diversity of plants present in chakras of Cotacachi, Imbabura. This study was carried out in three chakras belonging to the UNORCAC, where insects were collected using an entomological net and sticky traps, in addition to an inventory of plant species. The past4.0 tool was also used to calculate alpha (Margalef and Shannon-Wiener) and beta (Jaccard and Morisita-Horn) biodiversity indices. The results indicate the presence of the orders Coleoptera, Dermaptera, Hemiptera, Hymenoptera, Lepidoptera, Neuroptera, Odonata, Orthoptera, Thysanoptera and Diptera. Where the numbers of morphotypes for the chakra with high diversity were 15, 11 and 9 for Diptera, Hemiptera and Lepidoptera, with the presence of 78 plant species, the chakra with medium diversity presented 12, 11 and 10 for Diptera, Hemiptera and Lepidoptera, with 69 plant species, while the chakra with medium diversity was 11, 7 and 5 for Diptera, Lepidoptera and Hemiptera, with 67 plant species. The predominant pest was thrips in the chakra that presented medium diversity with 230 individuals, the control strategies used by the farmers were: application of agrochemicals, rotation and crop association. It was determined that chakra one presented greater diversity in the presence of insects and plant species." (Author) Taxa are treated at order level, no taxonomic details are given.] Address: <http://repositorio-utn.edu.ec/bitstream/123456789/15426/2/03%20AGP%20396%20TRABAJO%20GRADO.pdf>

22878. Tiwari, S.; Madan, S.; Chandel, S. (2024): Numerical investigation on the effect of stroke plane inclination on the aerodynamic performance of dragonfly take-off flight. *MA-TEC Web Conf.* 393: 8 pp. (in English) ["A numerical investigation is carried out to study the role of inclined stroke plane on the aerodynamic performance of a dragonfly during a take-off flight. A two-dimensional numerical simulation of tandem foils oscillating in-phase along an inclined stroke plane at $Re = 160$ is performed using ANSYS Fluent. The stroke plane angle is varied from $10^\circ = \beta = 80^\circ$ to determine its effect on aerodynamic force coefficients of forefoil and

hindfoil. The result shows that the presence of forefoil reduces the hindfoil C_v for low stroke plane angle cases. The cycle-average vertical force coefficient C_v of both foils increases with β up to 50° and then decreases. A vortex pair is present in the wake of the foils during each cycle, which induces a downward dipole jet. The dipole jet characteristics such as jet width, location and maximum velocity components are measured for each stroke plane angle. It is observed that the cause of variation in C_v and CH with stroke plane angle can be explained with the help of dipole jet characteristics." (Author)] Address: Tiwari, S., Dept of Mechanical Engineering, Defence Institute of Advanced Technology (DU), Pune – 411025, India. Email: shubh6tiwari@gmail.com

22879. Wickramasingha, P.D.; Morrissey, C.A.; Phillips, I.D.; Crane, A.L.; Ferrari, M.C.O.; Chivers, D.P. (2024): Exposure to the insecticide, imidacloprid, impairs predator-recognition learning in damselfly larvae? *Environmental Pollution* 342, 123085: 7 pp. (in English) ["Many aquatic organisms use chemosensory information to learn about local predation threats, but contaminants in their environment may impair such cognitive processes. Neonicotinoids are a class of water-soluble systemic insecticides that have become a major concern in aquatic systems. In this study, we explored how a 10-day exposure to various concentrations (0, 0.1, 1.0, or $10.0\mu\text{g/L}$) of the neonicotinoid imidacloprid affects the learned recognition of predator odour by non-target damselfly larvae (*Lestes* spp). Unexposed larvae and those exposed to the low concentration ($0.1\mu\text{g/L}$) demonstrated an appropriate learned response to a novel predator odour following a conditioning with the odour paired with chemical alarm cues. However, such learning failed to occur for larvae that were exposed to imidacloprid concentrations of 1.0 and $10.0\mu\text{g/L}$. Thus, either the cognitive processing of the chemical information was impaired or the chemistry of one or both of the conditioning cues was altered, making them ineffective for learning. In a second experiment, we found evidence for this latter hypothesis. In the absence of background imidacloprid exposure, larvae did not show significant learned responses to the predator odour when the conditioning cues were mixed with imidacloprid (initial pulse solution of $3.0\mu\text{g/L}$) at the start of conditioning (reaching a final concentration of $0.01\mu\text{g/L}$). These findings indicate that even low levels of imidacloprid can have important implications for chemosensory cognition of non-target species in aquatic environments." (Authors)] Address: Chivers, D.P., Dept Biol., Univ. Saskatchewan, 112 Science Pl., Saskatoon, SK, S7N 5E2, Canada

22880. Yang, G.-H.; Orr, A.G. (2024): The final-instar larva of *Bayadera strigata* Davies & Yang, 1996 from Yunnan, China (Odonata: Zygoptera: Euphaeidae). *International Journal of Odonatology* 27: 11-18. (in English) ["The final instar of *B. strigata*, from Yunnan Province, China, is described and illustrated for the first time. This study confirms several characters as being typical of, or unique to, the genus *Bayadera* and discusses them in comparison to other genera. The larva of *B. strigata* is distinguished from its congeners by the presence of numerous distinct short spines on the genae, but no long spines. The gonapophyses are unusually long in both sexes. Notes on this species' habitat and behaviour are provided. The material examined will be stored at the Bioscience Museum of Dali University, Dali, Yunnan, China." (Authors)] Address: Yang, G.-H., College of Agriculture & Life Sciences, Dali Univ., Yunnan 671003, China. Email: yanggh727@sina.com

22881. Yildirim, Y.; Kristensson, D.; Outomuro, D.; Mikolajewski, D.; Rödin Mörch, P.; Sniegula, S.; Johansson, F. (2024): Phylogeography and phenotypic wing shape variation

in a damselfly across populations in Europe. *BMC Ecology and Evolution* 24(19): 16 pp. (in English) ["Background: Describing geographical variation in morphology of organisms in combination with data on genetic differentiation and biogeography can provide important information on how natural selection shapes such variation. Here we study genetic structure using ddRAD seq and wing shape variation using geometric morphometrics in 14 populations of *Lestes sponsa* along its latitudinal range in Europe. Results: The genetic analysis showed a significant, yet relatively weak population structure with high genetic heterozygosity and low inbreeding coefficients, indicating that neutral processes contributed very little to the observed wing shape differences. The genetic analysis also showed that some regions of the genome (about 10%) are putatively shaped by selection. The phylogenetic analysis showed that the Spanish and French populations were the ancestral ones with northern Swedish and Finnish populations being the most derived ones. We found that wing shape differed significantly among populations and showed a significant quadratic (but weak) relationship with latitude. This latitudinal relationship was largely attributed to allometric effects of wing size, but non-allometric variation also explained a portion of this relationship. However, wing shape showed no phylogenetic signal suggesting that lineage-specific variation did not contribute to the variation along the latitudinal gradient. In contrast, wing size, which is correlated with body size in *L. sponsa*, had a strong negative correlation with latitude. Conclusion: Our results suggest a relatively weak population structure among the sampled populations across Europe, but a clear differentiation between south and north populations. The observed geographic phenotypic variation in wing shape may have been affected by different local selection pressures or environmental effects." (Authors)] Address: Johansson, F., Dept of Ecology & Genetics, Animal Ecology, Evolutionary Biology Centre, Uppsala University, Uppsala, Sweden. Email: frank.johansson@ebc.uu.se

22882. Zhang, K.; Su, X.; Zhao, Y. (2024): A novel dragonfly dual-wing hovering flight model. *Physics of Fluids* 36, 011913 (2024): 16 pp. (in English) ["During the hovering flight of dragonflies, the coupling interaction between the forewings and hindwings leads to a reduction in the lift of each wing. Numerous scholars have reached a unanimous conclusion that under the coupling effect, the lift of the hindwings is significantly decreased. Meanwhile, the coupling of the forewings and hindwings enhances the controllability of dragonfly flight. In this article, a novel hovering flight model termed the partial advanced dual-wing model (PADM) is proposed. This model is capable of increasing the lift of both the forewings and hindwings. The maximum average lift of the forewings is increased by 18.09%, and the maximum average lift of the hindwings is increased by 41.58%. In addition to the shared advantage of enhanced positive pressure on the rear half of the wing surface due to the advanced rotation, the superior performance of the hindwings compared to the forewings is attributed to the hindwings cutting off the trailing-edge vortex ring formed by the coupling of the fore and hind wings during the downstroke phase. The vertical force and energy consumption exhibit a linear relationship with the partially advanced time, independent of the coupled aerodynamic effects. The PADM model not only sustains the weight of the dragonfly but also plays a controlling role in transitioning from a hovering flight model to a vertical leap flight model. Furthermore, it enables dragonflies and micro air vehicles to maintain hovering flight while carrying additional loads." (Authors)] Address: Zhang, K., School of Hydraulic Engineering, Dalian Univ. Tech., Dalian 116024, China. Email: zkxinvestigation@163.com