Odonatological Abstract Service

published by the INTERNATIONAL DRAGONFLY FUND (IDF)

Editor:
Martin Schorr, Schulstr. 7B, D-54314 Zerf, Germany. Tel. ++49 (0)6587 1025; E-mail: oestlap@online.de
Published in Zerf, Germany
ISSN 1438-0269

1999

21817. Roulon-Doko, P. (1999): Les animaux dans les contes gbaya: République centrafricaine. In: Baroin C. & J. Boutrais (eds.): L'homme et l'animal dans le bassin du lac Tchad. Paris. IRD: 183-192. (in French) [Wikipedia: The Gbaya, also Gbeya or Baya, are a people of western region of Central African Republic, east-central Cameroon, the north of the Republic of Congo, and the northwest of the Democratic Republic of Congo. In the language of this ethnic group, dragonflies are named "rnbéléwél -, les libellules".] Address: https://-horizon.documentation.ird.fr/exl-doc/pleins_textes/pleins_textes_7/divers2/010020141.pdf

2002

21818. Kulkarni, P.P.; Prasad, M.; Talmale, S.S. (2002): New record of damselfly Pseudagrion microcephalum (Rambur) from Maharashtra (Odonata: Coenagrionidae). Bionotes 4(3): 58. (in English) [1 ♂, Melghat Tiger Reserve, 22-VIII-1993, India.] Address: Kulkarni, P.P., Western Regn Stn, Zool. Surv. India, Vidyanagar, Sector 29, Pune-411 044, Maharashtra, India

2003

21819. Kirti, J.S.; Singh, A. (2003): Studies on the male secondary genitalia of two species of genus Sympetrum Newman (Libellulidae: Anisoptera). Fraseria (N.S.) 7(1/2): 9-12. (in English) [The structure of the male secondary apparatus of Sympetrum commixtum (Selys 1884) and Sympetrum haematoneura Fraser 1924 are described and illustrated.] Address: Singh, A., Dept Zoology, Punjabi Univ., Patiala - 147 002 (Punjab), India. Email: archu_speak@yahoo.co.in

2004

21820. Kara, C.; Cömlekcioglu, U. (2004): Investigation of Karacay's (Kahramanmaras) pollution with biological and psycho-chemical parameters. KSU Journal of Science and Engineering 7(1): 1-7. (in Turkish, with English summary) ["In this study, pollution level of Karaçay (Kahramanmaras) has been investigated with biological and psycho-chemical parameters between October 2001 and April 2002. Three stations were determined for sampling in Karaçay. Water samples were collected from these stations monthly during the study. From the samples pH, dissolved oxygen, conductivity, nitrite, nitrate, ammonium, phosphate were analyzed and aquatic macroinvertebrates were determined. It is observed that Karaçay was polluted and macroinvertebrates were affected from this pollution." (Authors) The list of taxa includes Anax sp. and Libellula sp.] Address: Kara, C., Kahramanmaras Sütçü Imam Üniversitesi, Fen-Edebiyat Fakültesi, Biyoloji Bölümü, Kahramanmaras

21821. Wanner, M.; Anders, K.; Bischof, R.; Brozio, F.; Burkart, B.; Prochnow, A.; Riedel, H.; Schneider, D.; Wiesener, C.; Zulka, K.P.; Zumkowski-Xylander, H.; Xylander, W.E.R. (2004): Aktiver Truppenübungsplatz Oberlausitz. In: K. Anders, J. Mrzljak, D. Wallschläger & G. Wiegleb (Hrsg.): Handbuch Offenlandmanagement am Beispiel ehemaliger und in Nutzung befindlicher Truppenübungsplätze. Springer, Heidelberg: 261-278. (in German) [35 odonate species were found to inhabit the military training area in Upper Lusatia (Sachsen, Germany). The brief text on aquatic arthropoda points three species: Brachytron pratense, Lestes barbarus, Coenagrion hastulatum.] Address: Xylander, W., Staatliches Museum für Naturkunde Görlitz, PF 300154, 02806 Görlitz, Germany. E-mail: Willi.Xylander@SMNG.SMWK.Sachsen.de

2005

21822. Jolivet, S. (2005): Espace naturel sensible: Le Marais du Rabuais: Inventaire odonatologique. Syndicat mixte d'aménagement et de gestion du Parc naturel régional du Vexin français, Théméricourt. https://docplayer.fr/storage/63/-49575797/1689496398/BQtvrWitnKgof1mRF9BXvw/49-575797.pdf: 21 pp. (in French) ["The objective of this study was to highlight the presence and development in situ of remarkable Odonata in relation to the natural heritage present on the site called Le Marais du Rabuais (95). The study revealed the presence of 9 species which gives a list of 12 known species on this site. Among these, 3 are determining factors for ZNIEFFs in Île-de-France, one of them also being on the regional protection list. The site is an old marsh, where the colonization of ligneous species is very advanced. Reopening measures were conducted by the manager. The recommendations drawn up with a view to maintaining and promoting local biodiversity are to ensure the site's water supply both in terms of its quality and quantity, to act to preserve open environments and to possibly create puddles in the boggy meadows." (Author/Google translate)] Address: Syndicat mixte d'aménagement et de gestion du Parc naturel régional du Vexin français, Maison du Parc naturel régional du Vexin français, 95 450 Théméricourt, France

2006

21823. Bönsel, A. (2006): First results of mapping and monitoring four dragonfly species of the FFH Directive (Annex II and IV) in Mecklenburg-Vorpommern (Insecta: Odonata). Schriftenreihe des Landesmuseums Natur und Mensch Oldenburg 43: 38-45. (in English, with German summary) ["Leucorrhinia pectoralis, L. albifrons, L. caudalis and Aeshna viridis are present in Mecklenburg-Western Pomerania, Stylurus flavipes is only found on the Elbe. In the period 2001-2003, ten colonies of A. viridis, six of Leucorrhinia albifrons and three of L caudalis became known through evidence of exuviae. L. pectoralis was observed at 51 sites, and exuviae finds at 18 bodies of water proved that it was native. It is assumed that this species has adapted to changing habitat conditions in eutrophic and thus relatively quickly silted up waters through a metapopulation structure. In order to be able to interpret the results of mapping on species distribution and monitoring, such facts and habitat claims must be

clearly clarified in the future. Habitat maintenance measures for such FFH species should also be discussed further, since it has been shown that habitat focuses vary in different geographical landscape units. Protective measures should then not be formulated uniformly in Europe." (Author/Google translate)] Address: Bönsel, A., Vasenbusch 15, 18337 Gresenhorst, Germany. E-mail: andre.boensel@gmx.de

21824. Bogdanovic, T. (2006): Ekološka, morfološka i citogenetièka obilježja roda Lindenia (Insecta, Odonata, Gomphidae) u Hrvatskoj. PhD thesis, Univ. Zagreb; Doktorska disertacija, Prirodoslovno – matematièki fakultet, Sveuèilište u Zagrebu: VIII + 192 pp. (in Croatian) ["Ecology, morphology and cytogenetics of genus Lindenia (Insecta, Odonata, Gomphidae) in Croatia. - Based on the investigated ecological and morphological differences, two different populations of dragonflies of the genus Lindenia were established in Croatia. One is a species of Lindenia tetraphylla, while the other has different characteristics. In order to determine whether they are two different species or the same, a series of experiments were carried out in different areas. Ecological, morphological and cytogenetic characteristics of these populations were investigated. The results of research into the qualitative and quantitative composition of dragonfly fauna in coastal Croatia revealed a total of 52 species. Maps of the distribution of individual species in the researched area were created using the latest methods using GIS technology. Results of application of S&oslash ; Rensen's methods in researching populations in this paper showed that in the researched area there are three types of population communities that are related to specific ecological conditions in the habitats. Seasonal and daily dynamics were investigated and it was determined that dragonflies are most active during the day in the late morning hours, and during the season from the end of June to the beginning of August. Some forms of behavior in dragonflies were investigated and it was determined that they can be classified into two groups. The first, behavior during the preservation of territories and the second, behavior during mating. Differences between the studied populations in the way of eating, choice of prey and manipulation of prey during feeding were also determined. The most important morphological features by which we can distinguish them have been investigated. They refer to the following external morphological characteristics: total body length, wingspan, body color, basic tan markings on the face, shape and structure of the male and female reproductive and receptive organs, and the shape, structure and size of additional sexual organs in males. The results of the research using statistical tests showed that there are significant morphological differences between the investigated populations and that based on morphological characteristics they can be considered different species. Cytogenetic studies of kinship at the chromosome level were made by comparing the number of chromosomes and their basic characteristics. For both populations, the X0/XX type of sex determination was determined, where the male is the heterogametic sex. In the samples of male species Lindenia tetraphylla as well as Lindenia sp. processed in this work in spermatogonial metaphases, the diploid number of chromosomes 2n = 23 and the corresponding chromosomal formula 2n = 22a+X was determined." (Author//Google translate)] Address: not stated

21825. Kordges, T. (2006): Reproduktionsnachweise der Frühen Heidelibelle Sympetrum fonscolombii (SELYS) aus Abgrabungsflächen des Niederbergischen Landes, Nordrhein-Westfalen (Odonata: Libellulidae). Jahresberichte des naturwissenschaftlichen Vereins in Wuppertal 59: 145-157. (in German, with English summary) ["Breeding records of S. fonscolombii from quarry areas of the Niederbergisches Land, Northrhine-Westphalia (Anisoptera: Libellulidae) - Between 1999 and 2005 several breeding records of S. fonscolombii originating from quarry areas of the Niederbergisches Land (Northrhine-Westphalia) confirm the continuous presence of this thermophilous species, which are discussed in context with the invasion of the species in Central Europe in 1996. In Northrhine-Westphalia species status actually seems to be changing from a rare guest to – at least regional – a native species with according consequences concerning its conservation status. Furthermore data are discussed concerning the breeding habitats and the complex phenology of the bivoltine species." (Author)] Address: Kordges, T., Ökoplan - Bredemann, Fehrmann, Kordges und Partner, Savignystr. 59, 45147 Essen, E-Mail: thomas.kordges@oekoplan-essen.de

21826. Kulkarni, P.P.; Talmale, S.S.; Prasad, M. (2006): [Fauna of Sanjay Gandhi National Park (Borivali, Mumbai)]: Insecta: Odonata. Zool. Surv. India Conserv. Area Ser. 26: 19-40. (in English) ["During the faunistic surveys of Sanjay Gandhi National Park, Borivali, Mumbai conducted by Western Regional Station of Zoological Survey of India, approximately 147 specimens of Odonata were collected and identified. Those comprise 27 species distributed in 7 families and two suborders. Two species viz. Vestalis gracilis gracilis (Rambur) and Vestalis apicalis apicalis Selys are recorded for the first time from Maharashtra State." (Author)] Address: Kulkarni, P.P., Zool. Surv. India, W. Reg. Stn, Rawet Rd, Pune-411044, India

21827. Kulkarni, P.P.; Prasad, M.; Talmale, S.S. (2006): [Fauna of Todoba-Andhari Tiger Reserve (Maharashtra)]: Insecta: Odonata. Zool. Surv. India Conserv. Area Sci: 25: 197-226. (in English) ["During the faunistic surveys conducted by Western Regional Station of Zoological Survey of India, approximately 700 specimens of Odonata were collected from Tadoba Andhari Tiger Reserve, Dist. Chandrapur. Altogether 41 species were identified." (Authors)] Address: Kulkarni, P.P., Zool. Surv. India, W. Reg. Stn, Rawet Rd, Pune-411044, India

21828. Ocharan, F.J.; Torralba Burrial, A.; Outomuro, O. (2006): Confirmación de la presencia de Anaciaeschna isosceles (Müller, 1767) en Asturias y primera cita para Cantabria (N España) (Odonata: Aeshnidae). Boletín de la Sociedad Entomológica Aragonesa 39: 396. (in Spanish) ["Two other specimens are found in the Arthropod Collection of the Dept of Organism and Systems Biology of the Univ. of Oviedo. The first is a female with the tag Versalles (Avilés, Asturias) 27-V-1986 (J. M. Bruno leg.) that can be assigned to coordinates 30TTP62, at an altitude of less than 40 m a.s.l. The second is another female with the tag Muriedas (Cantabria) 28-VII-1992 (J. L. Herrero Cotero leg.) (assigned to 30TVP30, at an altitude of less than 25 m a.s.l.). This specimen would represent the first record of the species for Cantabria, having already been cited in the Cantabrian coast of the Basque Country and Asturias (Saloña & Ocharan, 1984; Ocharan Larrondo, 1987). Preprint version of: Ocharan, F. J., Torralba Burrial, A ., & Outomuro, D. (2006). Confirmation of the presence of Anaciaeschna isosceles (Müller, 1767) in Asturias and first record for Cantabria (N Spain) (Odonata: Aeshnidae). Bulletin of the Aragonese Entomological Society, 39, 396-396. On June 8, 2006 we found a population of this species in Llanera, (30TTP723130, Asturias) at 162 m a.s.l. It is a set of shallow ponds with abundant emergent vegetation (Typha sp.), modification of the original

marsh ecosystem due to earth movements. Several males patrolling or perched and one female ovipositing alone were observed. One of the specimens was collected and is deposited in the Arthropod Collection of this Dept. Identified accompanying odonatofauna include Ischnura graellsii, Anax imperator, Orthetrum coerulescens, and O. brunneum. On equivalent dates of 2005 these companion species were flying, in addition to Libellula quadrimaculata, Crocothemis erythraea and immature Sympetrum striolatum.“ (Authors/ Google translate)] Address: Outomuro, D., Depo Biología de Organismos y Sistemas, Universidad de Oviedo. 33071 Oviedo, Spain. E-mail: outomuro.david@gmail.com

21829. Outomuro, D.; Ocharan, F.J. (2006): De Monstruos & Prodigios: Despigmentación alar en Calopteryx xanthostoma (Charpentier, 1825) (Odonata: Calopterygidae). Boletín de la S.E.A. 39: 360. (in Spanish) ["Description of the teratological specimen: Mature male captured in the Narcea river as it passes through the town of Cornellana, (Asturias, N Spain; UTM 29TQJ306104), on 07.VI.2006. At this point the species coexists with C. virgo meridionalis. Despite having a completely normal morphology, the right forewing is virtually colorless, although a slight shade of pigmentation can be perceived. In addition, there are other quite marked depigmentation spots on the rest of the wings (moreover, they are frequent in Calopteryx populations). In this family, the definitive wing coloration is acquired during a period of maturation after the emergence of the adult individual. A greater proportion of the wing spot reveals a greater ability of the male to defend the territory, obtain more copulations and have fewer intestinal parasites, which feed on the food ingested by the host (Córdoba-Aguilar, 2002). These depigmentations would therefore be indicators of low biological efficacy for the individuals that present them, and could be the object of sexual selection (Siva-Jothy, 1999; Córdoba-Aguilar, 2002). The specimens are deposited in the Dept Biol. of Organisms and Systems of the Univ. of Oviedo." (Authors/ Google translate)] Address: Outomuro, D., Depto de Biología de Organismos y Sistemas, Univ. de Oviedo. 33071 Oviedo, Spain. E-mail: outomuro.david@gmail.com

21830. Perez-Bote, J.L.; Torrejon, J.M.; Ferri, F.; Garcia, J.M.; Romero, A.J.; Gil, A. (2006): De Monstruos & Prodigios: Malformación abdominal en Coenagrion mercuriale (Charpentier, 1825) (Odonata, Coenagrionidae). Boletín de la S.E.A. 39: 372. (in Spanish) ["Description of the teratological specimen The specimen with abdominal deformation, captured on July 15, 2005 in Valle del Jerte (northeast of Cáceres), is a mature male that presented a downward turn of practically ninety degrees in the fifth segment (Fig. 2) not noting any other particularity in the individual in question, unlike in other described cases of deformities for the same species (Torralba Burrial and Ocharan, 2005). This deformation is due, presumably, to a problem that occurred during the emergence of the imago, when leaving the exuvia or later, before the hardening of the cuticle (Torralba Burrial and Ocharan, 2005)." (Authors)] Address: Pérez-Bote, J.L., Área de Zoología, Facultad de Ciencias, Univ. de Extremadura, 06071 Badajoz, Spain. Email: jlperez@unex.es

21831. Reels, G. (2006): Hainan, China, August 2005. Echo January 2006: 12-13. (in English) [Report on a trip to Hainan between 24 and 31-VIII-2005 resulting in 41 odonate species and including Planaeschna celia Wilson & Reels, 2001.] Address: Reels, G., 31 St Anne's Close, Winchester SO22 4LQ, UK. E-mail: gtreels@gmail.com

21832. Wilson, K. (2006): Commercial odonate fishery at Cao Hai, Guizhou Province, southwest China. Echo January 2006: 11-12. (in English) ["In August 2005 I travelled from Guangzhou to Weining in west Guizhou, Province, southwest China and visited a large montane lake known as Cao Hai. To my surprise I found the local Hui and Yee people actively engaged in commercial fishing for odonate larvae destined for human consumption" (2,215 m.a.s.l, 26º 51.442.N, 104º 167.194.E). "I examined the catch of one fyke net, which contained many bitterlings, small crucian carp and rice eels in addition to Anax parthenope larvae. Given the extremely high density of fyke nets the high numbers of small fishes and absence of large fishes was not unexpected. The commercial odonate fishery is based entirely on the capture of Anax parthenope larvae. The larvae are dried and sold at retail prices by merchants for ca 100 yuan per kg (US$ 13/kg). Each kg contains several thousand Anax larvae. In Weining we encountered several dried food merchants supplying odonates with each trader holding stock of millions of dried larvae. The commercial fishery appeared to have no significant impact on the local population of Anax parthenope. During my short visit from 15th August 2005 to 19th August 2005 I observed many thousands of Anax partheope exuviae, which had successfully avoided entrapment in fyke nets and used clumps of emergent vegetation or the outside of fyke nets for support during emergence. In a local restaurant in Weining my group ordered a dish of odonates and were promptly served with a dish of freshly fried and seasoned larvae. Surprisingly they were quite tasty; a bit like oily crisps with no strong or unpleasant flavours." (Author)] Address: Wilson, K.D.P., 18 Chatsworth Rd, Brighton, E Sussex, BN1 5DB, UK. E-mail: wilsonkd@ntlworld.com

2007

21833. Cremona, F. (2007): Transfert de méthylmercure et structure des réseaux trophiques chez les macroinvertébrés littoraux. Dissertation, Sciences de l'environment, Universitè du Québec, Montreal: XIV, 159 pp. (in French and English) ["Within the framework of the case study of the St Lawrence River of the COMERN network, the general objective of the thesis was to determine the role of coastal macroinvertebrates in the transfer of methylmercury (MeHg) in the ecosystem of Lake St Pierre. The first chapter was devoted to the quantitative contribution of non-edible invertebrates (“trophic dead ends”) to the transfer of MeHg to fish. For this, the concentrations of total mercury (THg) and MeHg in four functional groups of coastal macroinvertebrates (grazers, detritivores, edible predators, non-edible predators) were measured. The results showed that non-edible predators had the highest concentrations of THg, MeHg and the highest proportion of MeHg/THg of all functional groups. The MeHg load (concentration*biomass) of non-edible predators accounted for 10–36% of the MeHg pool of phytophilic invertebrates. This high proportion of MeHg sequestered in trophic impasses could help explain the low Hg concentrations measured in fish from Lake St Pierre. Our results show that non-consumable organisms must be taken into account in predictive models of Hg contamination of ecosystems in order to avoid overestimating the quantities of MeHg bioavailable to fish. In the second chapter, the objective was to determine the links between the source of organic matter (OM) and MeHg contamination in primary consuming littoral macroinvertebrates. An isotopic approach was applied to meet this objective. Autochthonous sources (epiphytes and macrophyles) predominated in the OM assimilated by primary consumers, with a lower proportion of allochthonous OM (particularly suspended particulate matter). MeHg/THg in macroinvertebrates was positively correlated with epiphyte

proportions, whereas the latter were negatively correlated with inorganic Hg fraction. This finding suggests that the main entry route for MeHg into littoral food webs is in the epiphytes. Primary consumers could then modulate the transfer of MeHg to higher trophic levels depending on whether they feed on OM sources with high or low MeHg concentration. The third chapter dealt with the influence of the functional group (grazer, collector, fragmenter, omnivore, predator, predator-hematophagous, biting-sucker) and spatiotemporal variables (year, month, sampling station) on the signature of $\delta^{15}N$ of coastal macro invertebrates of Lake St Pierre. Station was the most important factor in explaining variations in $\delta^{15}N$, followed by sampling month and functional group. higher than those of the north shore which receives contributions from the Canadian Shield. The Ô.5N signature of the organisms increased by about 3%o during the sampling period, from May to September, equivalent to one trophic level. The enrichment of ÔISN from herbivores to predators averaged 1.6%o, which is lower than the 3.4%o generally considered in organisms in the pelagic zone. Since isotopic fractionation is not homogeneous throughout the food web, we recommend using fractionation values specific to the considered trophic levels, in order to better reconstruct littoral food webs. In the last chapter, the roles of macrophyte habitat and architecture on the biomass and abundance of phytophilic invertebrates were investigated. We also calculated a lake-wide estimate of macroinvertebrate biomass associated with different macrophytic habitat types to estimate the quantitative effects of vegetation change on macroinvertebrate communities. Invertebrate community biomass, abundance, and richness were higher in submerged macrophyte habitats than in floating and emergent macrophyte habitats. Macrophytes with complex architecture did not host significantly more macroinvertebrate biomass than those with simpler architecture. In the case of a drop in the water level of Lake St Pierre, we predicted that the total biomass of phytophilic invertebrates would decrease by 16% at the lake level. In littoral food webs, it appears that energy and MeHg fluxes are not perfectly superimposed. First, the low trophic levels constituted by primary consuming macroinvertebrates are able to modulate MeHg fluxes depending on the nature of their OM sources. Secondly, among secondary consumers a significant proportion of the MeHg pool will be little or not available for transfer to fish. The small difference of $\delta^{15}N$ between primary and secondary consumers allows us to express doubts about the usefulness of this tool as a tracer of the trophic level of an organism in the littoral zone compared to $\delta^{13}C$. " (Author) The list of taxa includes Coenagrion sp., Libellula sp. and Aeshnidae (Tab. 1.1)] Address: not stated

21834. Emiliyamma, K.G.; Radhakrishnan, C. (2007): Fauna of Kudremukh National Park (Karnataka): Insecta: Odonata. Zoological Survey of India. Conservation Area series 32: 27-48. (in English) ["The present study based on a representative faunal collection from KNP comprises of 32 species of Odonata from 21 genera under 7 families, a systematic account of which is presented below. This account forms the first authentic report on the odonate fauna of the Kudrelnukh National park. The specimens studies are deposited in the faunal depository of Western Ghats Field Research Station, Zoological Survey of India, Calicut." (Authors)] Address: Emiliyamma, K.G., Western Ghats Field Research Station, Zoological Survey of India, Calicut 673 002

21835. Harabis, F.; Dolny, A.; Plasek, V. (2007): Could the fen rise in a place of a strip mine lake? In: Kocárek P., Plášek V. & Malachová K. (eds.), Environmental changes and biological assessment III. Scripta Facultatis Rerum Naturalium Universitatis Ostraviensis Nr. 163, Ostrava: 212-214. (in English) ["Since 2001 intensive survey of chosen bioindicative taxa (especially of dragonflies) has been carried out in the localities of anthropogenic origin in Karviná region (NE Silesia, Czech Republic). We have found several fen-living species (including endangered ones) on irrigated mine subsidence. Thanks to this discovery we could presume that irrigated mine subsidence could offer similar conditions such as fens. It is evident that observed species do not require strictly fen biotopes. ... The result of the survey was surprising. We have found 45 species of dragonflies in a relatively small area (see Tab 1 in Appendix). An occurrence of rare and endangered dragonflies in industrially devastated environment is anything unknown. Several rare dragonfly species which occurred in anthropogenic biotopes, with intensive mining activities have been described in the Czech Republic, e.g. Sympecma paedisca (Hájek & Mocek, 2000) or Libellula fulva (Dolný & Matijka, 2006). We have found some typical fen-living dragonfly species there, such as Lestes virens, Somatochlora flavomaculata, Leucorrhinia pectoralis, L.rubicunda. Observed species with similar biotope preference also has been: Lestes sponsa, Aeshna juncea, Somatochlora metallica and Sympetrum danae. Most of them are species with high bioindication value (Czachorowski & Buczyñski, 1999). We supposed, that some species e.g. Nehalennia speciosa, Leucorrhinia albifrons didn't exist in Moravia and Silesia regions. This could be caused by geographical reasons." (Authors)] Address: Dolny, A.., Dept Biol. & Ecology, Fac. of Science, Univ. of Ostrava, Chittussiho 10, CZ-710 00 Ostrava, Czech Republic. Email: ales.dolny@osu.cz

21836. Hübner, G. (2007): Ökologisch-faunistische Fließgewässerbewertung am Beispiel der salzbelasteten unteren Werra und ausgewählter Zuflüsse. Ökologie und Umweltsicherung 27/2007: 322 pp. (in German, with English summary) Hessen, Germany ["Against the background of the European Community Water Framework Directive this paper suggests possible methodology for an assessment of the ecological quality of streams on the basis of the macrozoobenthos aiming at an extensive consideration of the individual stream characteristics, taking the fluvial system of the lower Werra as an example. It examines how the considerable reduction and more regular spreading of the salt pollution of the Werra since the 1990s has impacted the macrozoobenthos and what quality class can be given to the ecological condition of the river and selected main tributaries.“ (Author) References to Calopteryx spendens are made.] Address: not stated

21837. Krech, M.; Schmidt, J. (2007): Erfassung und Bewertung der Libellenfauna (Odonata) in der Conventer Niederung: Ergebnisse eines faunistisch-ökologischen Projektes in den Jahren 2005 und 2006. Archiv der Freunde der Naturgeschichte in Mecklenburg 46: 115-123. (in German) ["The dragonfly fauna was also recorded in 2005 and 2006 as part of a faunistic-ecological project, which included the synoptical recording of site-typical invertebrate animal species groups in the Conventer lowland near Bad Doberan. A total of 29 species of dragonfly could be detected natively, whereby the area of the Rethwisch peat cuttings with 27 species of dragonfly represents the most valuable reproduction habitat. The occurrence of the endangered dragonfly species Coenagrion lunulatum and Sympetrum pedemontanum are of faunistic importance." (Author/Google translate).] Address: Krech, M., Auf der Großen Mühle 7, D-99198 Erfurt-Linderbach, Germany

21838. Schiel, F.-J. (2007): Starker Einflug von Sympetrum fonscolombii im Jahr 2007. Mercuriale 7: 17-28. (in German) ["A strong flight of S. fonscolombii in 2007 is documented based on our own random observations, evaluations of the GdO mailing lists and reports from several SGL employees. As can be concluded from the nationally highly synchronized reports of finds, the flight to Germany took place mainly during the last decade of May and reached its peak until mid-June. The first observations date to 18./19. May. The earliest observation of still uncured 2nd generation animals is from July 15th, the last one from October 15th. Nationwide, there are 91 records from 53 localities, including 64 records of the first generation at 44 sites and 23 records of reproduction of the second generation from 16 bodies of water. There was also evidence of development of the first generation in only two bodies of water. In addition, a further 49 reports of finds from Germany and Switzerland are documented. The frequency of the evidence and the high level of representation in the GdO mailing lists suggest an even larger flight event than in the years 1987 and 1996. An evaluation of the evidence in the SGL database from the last 31 years shows that reports of finds in Baden-Württemberg have increased significantly." (Author)] Address: Schiel, F.-J., Inst. Naturschutz & Landschaftsanalyse, Turenenweg 9, 77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@-INULA.de

21839. Ternois, V.; Lambret, J.-L.; Fradin, E. (2007): La Cordulie à corps fin Oxygastra curtisii (Dale, 1834): état des connaissances pour le Parc naturel régional de la Forêt d'Orient (Odonata, Anisoptera, Corduliidae). Courrier Scientifique du Parc Naturel Regional de la Fôret d'Orient 31: 77-87. (in French) ["Currently, O. curtisii is only known from the Aube and Seine valleys, their tributaries (the Voire) and their outlets (gravel pits, valleys, dead branches). However, considering the biotopes mentioned in the literature, it is not impossible that the species reproduces on certain fish ponds, or even on the lakes of the Orient Forest. For the latter, it is especially on the tails of wooded reservoirs that the species has the best chance of establishing itself. Elsewhere, the dynamics of these large reservoir lakes (increase in water levels until the end of June then a rapid drop in water levels at the beginning of July) does not seem favorable to the reproduction of this odonate. If the observations on the rivers (Aube, Seine and Voire) are not very important, the species is obviously very well established on the gravel pit systems of the Plaine de Brienne and the Seine. O. curtisii is relatively abundant in these areas, in particular on old gravel pits that are around 30 years old, with little or no maintenance. Some gravel pits are not sufficiently advanced today to allow reproduction, but they will be soon. Considering the future evolution of these spaces, there is no doubt that O. curtisii still has a bright future in Champagne-Ardenne, even if the transformation of many gravel pits into leisure areas may harm its establishment. Moreover, the reproduction now proven within alluvial gravel pits must be a major element to be taken into account in the rehabilitation and ecological enhancement of these artificial environments after the cessation of industrial activity. This favorable situation should not hide the fragility of the species in its original habitats. On watercourses, the conservation of riparian forests and hydraulic annexes remains essential to ensure the maintenance of populations." (Author/Google translate)] Address: Ternois, V., CPIE du Pays de Soulaines, Domaine de Saint-Victor, 10200 Soulaines-Dhuys, France. E-mail: cpie.pays.soulaines@wanadoo.fr

21840. Varanguin, N.; Sirugue, D. (2007): Inventaires des odonates patrimoniaux en Bourgogne. Rev. sci. Bourgogne-Nature 5-2007: 66-88. (in French) ["The Burgundy Heritage Wildlife Observatory was set up by the Natural History Society of Autun and the Morvan Regional Nature Park in 2001. Its aims are to improve knowledge and its dissemination of threatened and indicator animal species, and to take them into account in the protection of nature in Burgundy. A specific program on heritage odonates began in 2003 and aims to identify sensitive species and their habitats at regional level, with a view to their integration into coherent conservation approaches. Systematic inventories of these species are thus carried out." (Authors/Google translate) The focus of the study was set on Cordulegaster bidentata. The following species are also treated with some details: Ophiogomphus cecilia, Somatochlora arctica, Oxygastra curtisii, Coenagrion mercuriale, Epitheca bimaculata, and Ceriagrion tenellum.] Address: Varanguin, N., Société d'histoire naturelle d'Autun - Maison du Parc - 58230 Saint-Brisson, France. E-mail: shna.nicolas@orange.fr

21841. Zessin, W. (2007): Variabilität und Formenkonstanz – Schlüssel für die Beurteilung fossiler Insekten. Virgo - Mitteilungsblatt des Entomologischen Vereins Mecklenburg 10(1): 45-56. (in German) ["Geologists and zoologists approach the description of fossil insects differently. Species definitions for extant and fossil species are (necessarily) different. Studies of variability in fossil insect material have (and could) only be carried out on a few taxa. A lack of features in the wing veins usually leads to a higher form constancy, vice versa, a wealth of features leads to higher variability. Where a sufficiently large number of fossil specimens are missing, one should consult recent comparative material with regard to form constancy and variability. Front (mesothoracic) and hind wings (metathoracic wings), left and right wings can usually be identified if there is sufficient material. Using examples of Mesozoic Elcanidae (Orthoptera), Paleozoic Phyloblattidae (Blattodea), Mesozoic Hymenoptera and Protomyrmeleontidae (Odonata), some results of comparative studies are presented. A new genus and species is established for the find of Obotritagrion tenuiformum Zessin, 1991, published by Ansorge (1996) from the lias of Grimmen, Western Pomerania, Germany: Grimmenagrion ansorgei nov. gen. et sp. and two new subfamilies of the Odonata: Protomyrmeleontidae are established: Obotritagrioninae nov. subfam. and Zirzipanagrioninae nov. subfam." (Author/Google translate)] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

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21842. Belancic, A.; Bogdanovic, T.; Frankovic, M.; Ljuština, M.; Mihokovic, N.; Vitas, B. (2008): Red Data Book of dragonflies of Croatia. Ministry of Culture, State Institute for Nature Protection, Zagreb: 132 pp. (in Croatian, with English summary) ["The Red List of Dragonflies of Croatia includes 18 regionally extinct (RE), critically endangered (CR), endangered (EN) and vulnerable (VU) taxa. The additional 18 taxa have the status of near-threatened (NT) and data deficient (DD). 34 taxa are frequent and not endangered in the Republic of Croatia, and five out of a total of 75 taxa of Croatia's dragonfly fauna recorded so far have been deleted from that list." (Authors)] Address: https://www.haop.-hr/sites/default/files/uploads/dokumenti/03_prirodne/crvene_knjige_popisi/Crvena_knjiga_vreten aca_web.pdf

21843. Conze, K.-J.; Menke, N. (2008): Libellen in Nordrhein-Westfalen. Bearbeitungsstand, Inventar und aktuelle Entwicklungen. Natur in NRW 4/08: 2-6. (in German) ["The dragonfly fauna of North Rhine-Westphalia has been well

studied through the work of the AK Dragonflies NRW. Landscape and climate change have led to major upheavals in the past 200 years, and highly dynamic change in species can also be expected for the future. Ongoing surveys and targeted, species-specific protective measures are urgently required, also in order to be able to meet the increasing requirements in international cooperation for nature conservation." (Authors/Google translate)] Address: Conze, K.J., Listerstr. 13, 45147 Essen, Germany. E-Mail: kjc@loekplan.de

21844. Dyatlova, E.S.; Martynov, A.V. (2008): Interesting records of Odonata in the South-Western Ukraine. Vestnik zoologii 42(1): 76. (in English) [Verbatim: Erythromma lindenii is a rare species in Ukraine included into the Red Book (1994) with the I category of conservation status. It was recorded from new site: Odessa Region, Tatarbunarsky District, Dzhantishejskoe lake (SE of the Predanube lake Sasyk, 5 km NW of Liman village), N45°38'58.4" E029°50'17.4" (29.07.2007). More than 20 individuals were observed in the sagebrush vegetation near salt lake (obs. Dyatlova, Martynov). Anax ephippiger was registered for the new sites: Nikolaev province, Ochakov district, Kinburn peninsular, vicinity of Pokrovka village, lake Chimino, N46°28'20.5" E031°39'28.3". {male, female} and 4 flying specimens were recorded while «hunting» at the evening time (6.08.2007); ♀ was recorded on Carex sp. at night time (7.08.2007) (obs. Dyatlova, Martynov). 3 dead teneral specimens of A. ephippiger were recorded in the water of artificial pond in Odessa (Park “Pobedy”) and 2 specimens were flying around (11.08. 2007), N46°26'31.7" E030°45'17.4" (obs. Martynov). Sympetrum pedemontanum is a rare species in Ukraine, especially in the south-western part of the country. One female was recorded in Nikolaev city (3.07.2007), from a permanent well-vegetated reservoir with stagnant shallow water near Ingul River mouth, N46°58'57.2" E031°59'27.3" (obs. Dyatlova).] Address: Dyatlova, Elena, Inst. Zoology, Faculty Biol., I.I. Mechnikov Univ. of Odessa, Odessa, Ukraine. E-mail: lena.dyatlova@gmail.com

21845. Escolà, J. (2008): Nova cita de Platycnemis pennipes (Pallas,1771) a Catalunya (Odonata: Platycnemididae). Boletín de la S.E.A. 42(1): 442. (in Catalan, with Spanish summary and English title) ["On July 3, 2007, a male specimen was captured adult (leg. et col. J. Escolà), from Platycnemis pennipes (in the Vall d'Aran region (Lleida). He was located at 17:00 h (time official) next to the Garonne River lock of the Center of Benós (31TDCH13, alt. 822 m) in some hedges right between the track forest (section of GR211-1) and the dam, a sunny space for the absence of trees, cut down to protect the electric wire." (Author/Google translate)] Address: Escolà i Garriga, J., Avda. Barcelona nº48 1er-1a 08700 Igualada, Spain

21846. Jakob, C. (2008): Résultats du suivi odonates pour la période de mai à octobre 2008 dans le cadre du suivi écologique en parallèle à des opérations de démoustication au Bti sur le périmètre du Parc Naturel Régional de Camargue. Parc Naturel Régional de Camargue, Station Biol. Tour de Valat, Le Sambuc, Aries, France: 18 pp. (in French) ["Evaluation of Methods: The results of the monitoring of odonate adults in 2008 showed the effectiveness of the simplified method with regard to the census of frequent to dominant species. On the other hand, the rarest species in the Camargue, due to their erratic behavior (Oxygastra curtisii), or having a biological cycle with a very synchronized emergence (L. macrostigma), are generally not represented. The relative abundances obtained therefore fairly well reflect the structure of a population, made up of species hunting their prey in the marshes and species that reproduce there. a The adult monitoring method, decided in 2007, is therefore appropriate, however it would be wise to add one or two samplings at favorable times for certain rare species (eg May-June for L. macrostigma, Oxygastra curtisii). Especially since the latter is the only species present in the Camargue listed in Appendix II and IV of the "Habitat Directive" (Directive 92/43/EEC). Sampling of larvae and exuviae are generally means of proving the reproduction of the species on the site, of knowing the success of hatching and of calculating the abundance of the breeding species. However, with regard to the sampling of larvae in 2008, extended to the spring and using the surber technique, the results here are limited to providing proof of reproduction for 2 species in the habitat sampled. Identifying whether the very low number of specimens sampled is due to a technical or sampling frequency problem or to a very low number of clutches in these temporary habitats in 2008 is not clearly feasible. But the comparison with the core sampling the previous year shows a strong difference, which would rather indicate an effect of the year (hydrology, temperatures in spring). The same questions arise for the collection of exuviae, but it should also be noted that grazing on the sampled sites can greatly reduce the number of exuviae attached to the vegetation following the passage of cattle. The larval development of certain species takes place rather in the irrigation canals near the monitored temporary marshes which are very attractive for the imagos which come to feed or shelter there. Followed This second year of study was able to provide the first quantitative results essential for the monitoring of Odonates. These results on specific richness by site and season show a non-significant difference between the control sites and the Bellugue site. This trend of a lower number of species at this station remains to be confirmed over an additional year. A conclusion on a possible effect of BTI treatment on species richness is currently impossible. The relative abundance of adult odonates observed, all seasons combined, highlights the dominance of four species (73%) on all sites, first Ischnura elegans and I. pumilio, then Crocothemis erythraea and Orthetrum cancellatum. A low number of species with high numbers corresponds to frequent functioning in rather extreme habitats (salinity, temporality) and not very heterogeneous (Begon et al., 1996), such as the Camargue. On the other hand, the difference between control sites and site treated with BTI remains to be further investigated. The relative abundance of adults by season and site show results related to their annual development cycle in temporary habitat. Thus, small species with a shorter larval development cycle appear earlier in the season, most Anisoptera species are observed later. The numbers observed at La Fangouse and Rousty tend to be larger but this needs to be confirmed by an additional monitoring season. The large variation in abundance between sites may be due to mass or “synchronized” hatching, which may have taken place on the day of the observation (“spring species”, Corbet). This is frequently observed in odonates, which reproduce in temporary environments with strong temperature variations (Corbet, 1957; Suhling, 1994). Among the Libellulidae, mass spawning in temporary Camargue habitats is known and their interspecific larval behavior adapted to competition (Suhling, Lepkojus, 2001). Nevertheless, neither at La Bellugue nor at La Boutardière this phenomenon of mass hatching could be observed at this time. But these marshes dried up more quickly than the first two and the adults observed could come from neighboring permanent habitats. The variation in relative abundances between seasons for a given species seems to correspond to the known phenology for the species mentioned and does not show any particularities between sites. Shannon's diversity

index, commonly used for comparisons between sites (Pinkney et al, 2000), does not show any significant difference in central Camargue (including Bellugue). On the other hand, the index of the Boutardière station (MDV) is higher. This could be linked to the supply of fresh water and the proximity of running water sites which have an influence on the range of species. The Odonata group represents an important link in the Camargue ecosystems. With a complex life cycle, both aquatic and aerial predators, they are therefore twice exposed to possible changes in the abundance of prey and consequently their predators as well. Hafner (1971) was able to show that odonates made up about 12% of the prey species (by dry weight) of four species of herons. For this first year of extended study, the quantitative results on the populations of Odonates detect certain trends between control sites and sites treated with BTI. However, only longer-term monitoring can confirm these trends." (Author/Google translate)] Address: Jakob, Christiane, Tour du Valat, Le Sambuc, 13200 Arles, France. Email: christianeiakob@oranae.fr

21847. Karle-Fendt, A. (2008): Bestandserfassung der Libellen des Strausbergmooses mit besonderer Berücksichtigung der Alpenmosaikjungfer (Aeshna caerulea). Mitteilungen des Naturwissenschaftlichen Arbeitskreises Kempten 43: 3-8. (in German) ["In the 2006 season, the Strausbergmoos (1180 m above sea level, district of Oberallgäu, Bavaria, Germany; top map 8528/1) was systematically examined for dragonflies. The aim was to use quantitative exuvia collections at one of the two lowest localities in Bavaria to find out whether the population of A. caerulea is collapsing or even disappearing due to climate change. 61 exuviae were found in 19 inspections. This leads to the conclusion that the Strausbergmoos is still home to one of the largest occurrences of A. caerulea in Germany. In addition, the entire dragonfly fauna of the moor was examined except for Cordulegaster boltonii and C. bidentata that are bound to running water." (Author/Google translate)] Address: Karle-Fendt, A., Hofenerstr. 49, 87527 Sonthofen, Germany. Email: karle-fendt@t-online.de

21848. Kistermann, K.; Brux, H. (2008): Pflege- und Entwicklungskonzept für das FFH-Teilgebiet Heumoor (Lkr. Oldenburg) unter besonderer Berücksichtigung von Libellen (Odonata) und Bodenverhältnissen. Natur- und Umweltschutz (Zeitschrift Mellumrat) 7(1): 21-28. (in German, with English summary) [Niedersachsen, Germany; "The investigation area Heumoor, a former raised bog, has an expansion of about 90 ha. It is part of a larger nature reserve of high diversity (including heathland, two lakes and a part of the river Lethe). The existing habitats are the results of dewatering and soil degradation leading to a vegetation which mainly consists of purple moor-grass, wetland, shrubs and trees. Soil, habitat types and dragonflies were investigated and other available information was evaluated. 17 dragonfly species (including 6 endangered) were recorded. Even though the critically endangered Ceriagrion tenellum was found to be indigenous for 10 years, emphasis is laid on certain species protection measures. The main objective is to obtain the good state of preservation for all habitat types according to the FFH-Directive as well as the protection of endangered species. The recommended main tool is raising the groundwater level in order to restore wetland habitat conditions. A set of accompanying measures incuding cutting of shrubs and trees in the bog and mowing of wet greenland is part of the management program." (Authors)] Address: Brux, H., IBL UmweltPlanung GmbH Bahnhofstr. 14a 26122 Oldenburg, Germany

21849. Krech, M.; Wanke, H. (2008): Zur Bedeutung von Abgrabungsgewässern als Reproduktionshabitat für Libellen (Odonata): Ergebnisse odonatologischer Untersuchungen an den Saaler Tongruben (Landkreis Nordvorpommern). Archiv der Freunde der Naturgeschichte in Mecklenburg 47: 37-50. (in German) ["Studies on the tourism significance of excavation waters and their potential as a breeding habitat for dragonflies are hardly available for Mecklenburg-Western Pomerania. In the years 2005 to 2008, odonatological investigations were carried out on ten bodies of water in an abandoned clay mining area in the district of Nordvorpommern. A total of 32 dragonfly species were found natively. The existence of 13 Red List M-V species and one FFH species demonstrate the odonatological importance of this type of water body as a reproduction habitat for dragonflies. The occurrences of Lestes barbaras, Ischnura pumilio, Aeshna isosceles, Anax parthenope Epitheca bimaculata and Leucorrhinia pectoralis are of faunistic importance. The exuvia finds of Epitheca bimaculata \/o!l represent the first evidence of the species at an excavation site in Mecklenburg-Western Pomerania waters to be considered." (Authors/Google translate)] Address: Krech, M., Auf der Großen Mühle 7, D-99198 Erfurt-Linderbach, Germany

21850. Kulkarni, P.P.; Talmale, S.S. (2008): An account of Odonata: Insecta from five conservation areas and two wetlands of Maharashtra, India. Fraseria (N.S.) 7: 51-54. (in English) ["Information on Odonate diversity based on actual collection of the specimens from five Conservation areas and two wetlands is presented here. Identification and distribution of 53 species representing 32 genera and 8 families in the five conservation areas- Melghat Tiger Reserve, Dist. Amravati, Pench Natioonal Park, Dist Naqpur, Tadoba Andhari Tiger Reserve, Dist. Chandrapur, Sanjay Gandhi National park, Borivali, Mumbai and Bhimashankar Wtldlife Sanctuary, Dist. Pune and two wetlands include. Ujani Wetland Dists. Pune and Solapur and Nathsagar Wetland, Jaikwadi, Dists. Aurangabad. and Ahmednagar. Present survey made addition of 18 species to the previously known 46 species from the National Zoological Collection housed in the Western Regional Station of the Zooiogical Survey of India at Pune." (Authors)] Address: Talmale, S.S., Zoological Survey of India, Central Zone Regional Centre, Jabalpur, Madhya Pradesh 482002, India. E-mail: s_talmale@yahoo.co.in

21851. Ngai, J. (2008): Trophic effects on nutrient dycling. PhD thesis, Fac. Grad. Studies (Zoology), Univ. of Britisch Columbia, Vancouver: 83 pp. (in English) [Field work was conducted in the Area de Conservacion Guanacaste, in northwestern Costa Rica (10°59' N, 85°26' W). The dominant predator in this system is a damselfly larva {Mecistogaster modesta Selys, Pseudostigmatidae, Odonata), which is most common in bromeliads greater than 100 ml in capacity. "The top-down effects of consumers and bottom-up effects of resource availability are important in determining community structure and ecological processes. I experimentally examined the roles of consumers — both detritivores and predators — and habitat context in affecting nutrient cycling using the detritus-based insect community in bromeliad leaf wells. I also investigated the role of multiple resources in limiting plant productivity using metaanalyses. The insect community in bromeliads only increased nitrogen release from leaf detritus in the presence of a predator trophic level. When only detritivores were present, the flow of stable isotope-labeled nitrogen from detritus to bromeliads was statistically indistinguishable from that in bromeliads lacking insects. I suggest that emergence of adult detritivores constitutes a loss of nitrogen from bromeliad ecosystems, and

that predation reduces the rate of this nutrient loss. Hence, insects facilitate nutrient uptake by the plant, but only if both predators and detritivores are present. Moreover, predators can affect nutrient cycling by influencing the spatial scale of prey turnover. This mechanism results in a pattern opposite to that predicted by classic trophic cascade theory. Increasing habitat complexity can have implications for nutrient cycling by decreasing the foraging efficiency of both predators and their prey, and by affecting the vulnerability of predators to intraguild predation. Along a natural gradient in bromeliad size, I found that, depending on the relationship between community composition and habitat size, habitat complexity interacts with the changing biotic community to either complement or counteract the impact of predators on nutrient uptake by bromeliads. In contrast to the existing emphasis on single-resource limitation of primary productivity, meta-analyses of a database of 653 studies revealed widespread limitation by multiple resources, and frequent interaction between these resources in restricting plant growth. A framework for analyzing fertilization studies is outlined, with explicit consideration of the possible role of multiple resources. I also review a range of mechanisms responsible for the various forms of resource limitation that are observed in fertilization experiments. These studies emphasize that a wider range of predator and nutrient impacts should be considered, beyond the paradigm of single resource limitation or classic trophic cascades." (Author)] Address: Ngai, Jacqueline, Email: ngai@zoology.ubc.ca

21852. Schmidl, J. (2008): Libellen- und Wasserkäferfauna schwäbischer Niedermoor-Gewässerneuanlagen. Evaluierung artenschutzfachlicher Relevanz und Besiedlungs-Sukzession der Libellen und Wasserkäfer in Niedermoor-Gewässerneuanlagen unterschiedlichen Alters und Ausprägung. Ökologisches Fachgutachten. bufos büro für faunistisch-ökologische studien, Nürnberg., im Auftrag des Bund Naturschutz Bayern e.V.: 117 pp. (in German) ["A total of 30 ponds from 12 fen areas were examined as part of a study on the colonization and biomass of new small water bodies in Swabian fens. The animal groups water beetles … and dragonflies (larvae) were recorded semi-quantitatively and their relative biomass was determined. The water properties are determined and documented in the form of 19 physical-chemical parameters and other physiographic data. 62 species of water beetles and 22 species of dragonflies were detected and documented faunistically, including 15 species from the Red List of Bavaria (2003), 12 species of water beetles (1x RL1, 4 x RL 2, 7 x RL 3) and 3 species of dragonflies (2 x RL 2, 1x RL 3). Remarkably, more than half of the endangered species can be found in the higher endangerment categories "Critically Endangered" or "Critically Endangered", a clear indication of the species protection importance of the examined water bodies. The percentage of RL species in the total spectrum of species (84 species) is 17%, a high value. … The occurrence of Brachytron pratense is remarkable. (RL 2, in the NSG Gundelfinger Moos and NSG Leipheimer Moos), Somatochlora flavomaculata (RL 3, in the NSG Mertinger Hölle) and Sympetrum flaveolum (RL 2, in the Oberen Ried Oberndorf a. Lech). An evaluation of the examined waters and fen areas under faunistic-ecological aspects is carried out; For this purpose, a spectrum of fen character species is defined for the water beetle. In an in-depth analysis, the present work evaluates the species communities of water beetles and dragonfly larvae using multivariate methods and correlates them with the recorded environmental parameters. The data are analyzed using canonical correspondence analysis and other statistical applications. Detailed relationships between the recorded environmental parameters and the species spectra of dragonflies and beetles in the individual bodies of water are shown, and mechanisms of action between individual nutrient components and the relative biomass supply in fen ponds are presented. Based on the results of the multivariate analyses, information on the creation and maintenance of new small water bodies is derived. It is shown that the construction of the ponds has a significant influence on the development of species communities typical of fens (with high proportions of stenök species, character species and Red List species). New plants showing the mineral soil cut below the peat cover and thus begin their succession on mineral substrate, build up higher biomass of insects due to the better supply of nutrients, however, the faunistic development begins with pioneer and communal pond settlers and only leads to the species communities typical of fens with increasing substrate coverage by detritus and peat. In contrast, new plants that remain in the peat body begin their biocenotic development with species communities typical of fens and higher species protection values. This control option is also pointed out in connection with the creation of feeding waters for ornithological objectives. In this study, the quantitative differences in the biomass of water beetles and dragonfly larvae in syntopically populated waters are described for the first time. Apparently, biological-bionomic, possibly also antagonistic properties of these two dominant predator groups among the insects of the fenland water community lead to the two groups having their maxima in terms of occurrence (number of species) and abundance (biomass) in different types of water bodies and in different trophic and structural configurations." (Author/Google translate)] Address: Schmidl, J., Am Kressenstein 48, 90427 Nürnberg, Germany, E-mail: jschmidl@bioform.de

21853. Zessin, W. (2008): Überblick über die paläozoischen Libellen (Insecta, Odonatoptera). Virgo - Mitteilungsblatt des Entomologischen Vereins Mecklenburg 11(1): 5-32. (in German) ["Paper presented at the 5th WDA Congress of Odonatology in Swakopmund, Namibia on April 16, 2007 and at the 4th Bonn Paleoentomology Meeting on October 20, 2007: All Palaeozoic dragonfly genera (Odonatoptera) that were described up to the beginning of 2007 are listed with their localities, the wingspan of their individuals and their absolute age, as far as is known today, and most of the most important species are shown. Comments on the morphological details are given comparatively according to their importance. From the Obora Permian in the Czech Republic, the new genus and species Oboraneura kukalovae n. gen. n. sp. a new family Oboraneuridae n. fam. erected." (Author/Google translate)] Address: Zessin, W., Lange Str. 9, 19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

2009

21854. Bayer, N. (2009): Biodiversität von Libellen an künstlichen Stillgewässern unter Einbeziehung ökomorphologischer Gewässerbewertungen. Staatsexamensarbeit Technische Universität Kaiserslautern, Fachbereich Biologie: 106 pp. (in German) ["The aim of the present work was to record and evaluate the dragonfly fauna in a representative selection of still water bodies in the Palatinate Forest. For this purpose, in the period from mid-July to the end of September 2008, 17 wooges were examined for their dragonfly occurrences. The registration of the dragonflies focused primarily on the visual observation of reproductively active adults. In addition, freshly hatched animals and exuviae were searched for as evidence of the indigenous nature of a species. In addition, important structural and physical-chemical parameters of the water bodies were recorded. A total of 22

dragonfly species were identified, 18 of which were considered likely to be native, although it should be noted that only still waters were examined. Overall, the dragonfly fauna was dominated by euryemic species such as A. cyanea, C. puella, I. elegans, P. nymphula and P. pennipes, while specialized species were almost completely absent from the ponds studied. The typical running water species C. boltonii, C. splendens and C. virgo are only to be regarded as guests at the still waters. The latter in particular occurred with striking frequency but mostly in low abundance in the study waters. Particularly noteworthy are the finds of C. hastulatum and L. dryas, which are classified nationwide as highly endangered, each on one of the bodies of water. Furthermore, dragonfly species such as L. sponsa and S. sanguineum that prefer reed and reed areas could be detected, whereas dragonfly species that prefer floating leaf zones such as A. imperator and E. najas were rather rare and species such as O. cancellatum and L. depressa, which prefer to colonize water bodies free of vegetation, were almost completely absent. The detected species were described in terms of their habitat requirements and possible reasons for their distribution in the study waters were discussed. In addition, the results obtained during the inventory were statistically evaluated in order to be able to make statements about the connection between the number of species or the occurrence of endangered species on the one hand and certain biotope parameters such as Woog size, degree of shading and silting up on the other. The bodies of water differ considerably in terms of the number of species occurring there. It was shown that both the size of the water body and the degree of shading play an important role in biodiversity. Diversity is greatest in larger bodies of water with little shading. The degree of silting up, on the other hand, did not prove to be decisive for colonization of a water body by dragonflies. This is probably rather favored by the presence of certain vegetation structures. It was also determined that the occurrence of bog species is limited to dystrophic water bodies with intermediate bog silting up areas, since their occurrence depends, among other things, on the presence of peat moss (Sphagnum spec.). In order to be able to make concrete statements, however, a larger number of water bodies would have to be examined over a longer period of time." (Author)] Address: not stated; Bayer, Nadine

21855. Burk, G.; Ott, J.; Schröder, K. (2009): Entwicklung der Libellen im Eglinger Filz (Teil des FFH-Gebietes Nr. 8135-371) 2004 – 2008. Landesbund für Vogelschutz (LBV) Kreisgruppe Bad Tölz-Wolfratshausen (Hrsg.): 81 pp. (in German) ["Despite the well-known typical population fluctuations in dragonflies, the 5-year monitoring in the Eglinger Filz (Bavaria, Germany) resulted in very meaningful data. Odonata colonized the new moor water areas immediately after the rewetting – further good evidence that the renaturation made sense. Immediately after it began in 2004, the total number of individuals sighted per year doubled to over 1,000 specimens. The number of dragonfly species sighted increased by 71% to 48. The endangered species in particular benefited from the LBV measure. Their number even doubled. In 2008 alone, 5 new species were found, Aeshna affinis, A. subarctica, Anax parthenope, Cordulegaster bidentata, and Sympetrum meridionale. The rare new discoveries also include the eastern mermaid (2004) and the northern mermaid (2007 and 2008). A special thank you for financial support goes to Mr. Johannes Voith from the State Office for the Environment in Augsburg. The dragonfly investigations in the Eglinger Filz are to be continued.] Address: https://bad-toelz.lbv.de/app/download/15313372124/Libellenbericht_-2004-2008.pdf?t=1674814562

21856. Dommanget, J.-L.; Prioul, B.; Gajdos, A.; Boudot, J.-P. (2009): Document préparatoire à une Liste Rouge des Odonates de France métropolitaine complétée par la liste des espèces à suivi prioritaire. Décembre 2007 – réactualisation: décembre/février 2009. Société française d'odonatologie (Sfonat). Rapport non publié: 47 pp. (in French) ["A preparatory document for a new Red List of Odonates in metropolitan France is presented. The methodology used is inspired by the national application methods of the IUCN protocol. The approach adopted is the evaluation of the status of each of the species of the fauna of France to obtain a classification according to the categories proposed by the IUCN. The assessment was carried out on the basis of the eligibility conditions (reference period, native status, etc.), then using the "species" and "habitats" criteria (table III page 123). The "species" criteria include 1) the analysis of data from the Invod program, 2) a synthesis of the literature from which ten regional Red Lists were taken into account (table IV), 3) other criteria such as the fragmentation of populations, endemism, the different national and Western European protection statuses, etc. The "habitats" criteria have been added and take into account euryoeces species, which use varied environments, globally little or not threatened, and the stenoecious species, which develop in a smaller range of habitats, more threatened. The difficulties encountered show that the sole use of an inventory database is not sufficient for such an evaluation and that it is important to complete the analysis by using criteria based on expert opinion. The preparatory Red List brings together 27.5% of the fauna species of France, of which two are considered extinct, two others are in critical danger of extinction, eleven are in danger and ten are vulnerable. Species on the Red List and those classified in the "Near Threatened" category are included in the Sfonat priority species monitoring programme." (Authors/Google translate)] Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

21857. Guezoul, O.; Benai, A.; Bouzid, A.; Sekour, M.; Souttou, K.; Doumandji, S. (2009): Place des insectes dans le menu trophiques des jeunes du moineau hybride Passer domesticus X P. hispaniolensis) dans la Palmeraie d'Assala à Assi Lekhfif (Ouargla, Sahara al Gerien). Actes du Séminaire International sur la Biodiversité Faunistique en Zones Arides et Semi-arides. Du 22 au 24 novembre 2009. Université Kasdi Merbah, Ouargla: 98-105. (in French, with English summary) ["The study of the trophic menu of the young people To pass domesticus X P. hispaniolensis is carried out for the first time in a palm plantation with 80 of Ouargla (34° 54 ' NR., 5° 20 ' E.). The analysis of the stomachic contents made it possible to identify 347 preys consisted a large fraction of insects in the young sparrows belonging to four categories of ages (100% for let us oisillons sparrow old from 1 to 3 days, 93.9% for the old individuals from 4 to 6 days, 99.0% for let us oisillons from 7 to 9 days and 97.7% for those from 10 to 12 days). The species about Lepidoptera are most intensely consumed by the four categories of age is the young people from 1 to 3 days (59.6%), from 4 to 6 days (78.8%), from 7 to 9 days (83.3%) and from 10 to 12 days (63.6%). Let us young from 1 to 3 days devour apart from Lepidoptera, of Heteroptera with a rate of 34.6%. In the same way the young people of the second category ingurgitent in addition to Lepidoptera, Heteroptera (7.6%) and Oligocheta (6.1%). The old chicks between 7 and 9 days introduce in addition to Lepidoptera, Heteroptera and Coleoptera each one with a rate of 6.3%. The last category of the young people consume in addition to the Lepidoptera, of the Coleoptera (18.2%)." (Authors) Libellulidae spec. indet. accounted very low to the diet of the junvenile birds." (Authors)] Address:

Guezoul, O., Département des sciences agronomiques, Univ. Ouargla, Algeria. E-mail: oguezoul@yahoo.fr

21858. Herrera T.; Blanco, F. (2009): Biodiversidad de los ecosystemas fluviales de la provincia de Málaga. Jabega 101: 55-65. (in Spanish) [27 odonate species are reported. "The rivers of the province of Malaga respond to the behavior of the Mediterranean region and is a clear ecological gradient from the west of the province, where the rivers are more plentiful and permanent, to the east, where the are more ephemeral stream channels, functioning as wadis. This coupled with the geographical situation of our province, halfway between Europe and Africa, has enabled the development of some interesting biological communities that inhabit our rivers." (Authors)] Address: Blanco, F., MEDIODES, Consultaría Ambiental y Paisajismo S. L. U Bulevar Louis Pa$|teur n.° 1, bloq. 2 1.° 1.29010 Málaga, Spain. Email: paco.blanco@mediodes com.

21859. Kulkarni, P.P.; Talmale, S.S. (2009): Insecta: Odonata. Zool. Surv. India. Fauna of Bhimashankar Wildlife Sanctuary, Conservation Area Series 42: 231-250. (in English) [Bhimashankar Wildlife Sanctuary, Dist. Pune, India. Records of 24 odonate species are documented.] Address: Kulkarni, P.P., Zoological Survey of India, Western Regional Centre, Vidyanagar, Rawet Road, Sector 29, PCNTDA Post, Pune-411 044, India

21860. Montpeyó i Garcia-Moreno, D. (2009): Els Odonats d'Osona. Col·legi Sant Miquel dels Sants: 74 pp. (in Catalan, with English summary) ["The work "Odonats d'Osona 1988-2008" consists of a study of odonates in the region of Osona. Just over 20 years ago, the Meganeura group for the study of odonates began work with similar characteristics. "The Odonats of Osona 1988-2008", apart from studying the current situation of the odonates of Osona, it also aims to make a comparative study of both works, studying how the population has evolved in these 20 years and what they could have been the factors that have participated in this change. One of these factors, water quality, has been studied in detail using water quality analytics in 6 aquatic habitats in the county, to compare whether the quality has changed since the work of Meganeura, who also studied these same habitats. Finally, the aim is to determine which species in the region are threatened and which are protected by current legislation and which would serve to be used as bioindicators of water quality. It has been tried that the methodology of the work strictly follows the scientific method. We can divide the practical part of the work into two: Field work: it consists of trips of approximately two hours in 18 different habitats throughout the region with the aim of identifying the different species of odonates found there, in addition to noting the environmental conditions in which the departure was made. The aim is to obtain updated information on odonate populations. Based on the data obtained, a table has been drawn up, organized by registered appointments and by trips made, to work more comfortably and not make mistakes. Lab. work: with the water samples collected in the 6 habitats where Meganeura did its analyzes and at the same time of the year, analyzes were carried out to check how the quality of the water has varied and how this has affected the odonate population. The analyzes could be done by direct measurement (with probes), with chemical tests on site or in a Lab., depending on each parameter. The results that have been obtained point to an increase in the diversity of odonate species in the various habitats studied in the Osona region based on the results obtained by the Meganeura group in their work. From the parallel studies to determine the water quality of the 6 habitats studied, it has been possible to verify that the waters of the region have, in general, experienced a remarkable improvement. With all the data and results obtained, the conclusion has been reached that the diversity of the odonate populations in the region has increased considerably over the last 20 years and this is most likely due to the improvement in the quality of the water experienced by Osona's watercourses and ponds, due to a tightening of regulations and the installation of treatment plants. It is necessary, however, to continue to ensure that its quality does not deteriorate again by combating the activities that still today continue to pollute the oceanic aquatic environment. ver, is to release information about dragonflies, which are unknown and not studied in detail." (Author)] Address: https://recercat.cat/bitstream/handle/2072/43672/PJ_20090012601.pdf?sequence=1

21861. Muscatello, J.R. (2009): Selenium accumulation and effects in aquatic organisms downstream of uranium mining and milling operations in northern Saskatchewan. PhD thesis, Toxicology Graduate Program, Univ. of Saskatchewan, Saskatoon: xxi, 232 pp. (in English) ["The overall objective of this thesis was to determine selenium (Se) levels in the major compartments of aquatic ecosystems and correlate these data with potential Se effects on early life stages of two native fish species. This work was conducted at two uranium (U) mines located in northern Saskatchewan, Key Lake mine and McClean Lake mine. In addition, a site fidelity study was conducted at Key Lake mine to evaluate movement patterns of northern pike inhabiting lakes receiving effluent discharges. At Key Lake mine, Se was accumulated and biomagnified several orders of magnitude higher than its concentration in water (0.7-2.7 µg/L) in lakes receiving discharges, with Se in prey organisms reaching levels above the proposed 3-11 µg/g dry weight (DW) dietary toxicity threshold for fish. Increased concentrations of Se in aquatic biota led to an increase in the Se concentrations in eggs and tissues of northern pike that rely on these organisms as food sources. Furthermore, increases in the incidence of Se-induced deformities above 30% were recorded in fry originating from adults exposed to high levels of dietary Se (> 3µg/g, DW). The increased frequency of deformities found in northern pike fry was associated with a significant increase in the level of Se in northern pike eggs from exposure sites (31.28 - 48.23 µg/g DW) compared to reference (3.19 ± 0.29 µg/g DW). At McClean Lake mine, Se was accumulated and biomagnified through the aquatic food chain with concentrations in some biota groups (e.g., forage fish) exceeding the lower limit (> 3µg/g DW) of the 3-11µg/g (DW) threshold for dietary Se toxicity in fish. Although both northern pike and white sucker females collected from the exposure site showed greater levels of Se in egg and tissues compared to fish collected from a reference site (likely caused by exposure to elevated levels of Se in prey organisms), no increases in Se-induced deformities were found in the developing fish larvae. The lack of a toxic response in fish larvae is in agreement with Se thresholds for early life stage deformities, with egg Se concentrations in northern pike and white sucker collected at the exposure site below the proposed 10 µg/g (DW) threshold associated with the presence of developmental abnormalities. The applicability of the proposed 7.91 µg/g (whole body, DW) Se toxicity threshold to cold water fish is controversial given that most of the research has focused on warm water fish. Therefore, there is an urgent need to conduct studies that allow us to better understand the environmental fate and effects of Se in north temperate (cold water) aquatic systems. The results of my research will contribute valuable information for the establishment of

a realistic and environmentally relevant Se threshold for the protection of fish populations in Canadian waters. During the site fidelity study, fish locations were seasonally and daily recorded using a Lotek SRX_400 receiver with handheld Yagi antenna. The results suggest that tagged pike did not migrate out of the study area throughout the study period, with the mean distance traveled ranging from 50 to 400 m. Differences in movement (distance traveled) and home range were found between reference and exposure sites. Overall data suggest that radio-telemetry is a useful tool in environmental studies. This information on northern pike behavior will be valuable towards developing non-lethal sampling methods that could be applied for assessing the effects of industrial discharges in north temperate aquatic ecosystems." (Author) The study includes many references to "Odonata".] Address: Email: jrm202@mail.usask.ca; https://harvest.usask.ca/handle/10388/etd-02122009-130012

21862. Sherwin, S. (2009): Welchen Einfluss haben Sukzession und Klimawandel auf die Libellenzönosen von Stillgewässern? / Die Libellenzönosen von Stillgewässern in Münster (Westfalen). Diplomarbeit. Westfälische Wilhelms-Universität Münster: 33 pp. (in German, with English summary) ["The Odonata communities of 31 waterbodies were examined in 2008 and were compared with older surveys from 1997 and 2001. The waterbodies could be divided into an early or late succession stage by means of structural and hydrological parameters. Thirteen waterbodies could directly be compared with each other. To examine how the population of the species developed, all of the waterbodies from the current survey and the data from 1997 and 2001 were included in the analysis. The comparison of the thirteen waterbodies showed no differences with regard to species richness (26 vs. 24 species) or endangered species (each with 5 species). But the comparison of all waterbodies indicated that the southern species increased. For the first time the Mediterranean species Crocothemis erythraea was detected in Muenster at three young waterbodies with successful reproduction. The results show that the richness in species and the endangered species are higher in the early succession stage of the waterbodies than in later stages of succession. Except for Erythromma viridulum the southern species also prefer the early succession stage. The Odonata communities of 31 pools and ponds in Muenster were investigated in 2008. The waterbodies could be divided into seven different structural types by means of environmental parameters such as water-level fluctuations, submerged vegetation and marsh plants. The structural types were characterized by specific dragonfly communities. Character and differential species were described at the habitat and structural level. As regional character species for pools and ponds Aeshna affinis, Ischnura pumilio, Lestes barbarus, L dryas, L. sponsa, Libellula depressa and Sympetrum vulgatum were specified. Aeshna cyanea, A. mixta, Anax imperator, Erythromma najas, E. viridulum, Lestes viridis, Libellula quadrimaculata, Platycnemis pennipes and Sympetrum sanguineum act as differential species for particular structural types in this habitat. Waterbodies in an early or middle succession stage have a higher species richness and more endangered species. On the basis of the required results the consequences for conservation are pointed out." (Author)] Address: not stated

21863. Tessier, M.; Sfreddo, G.; Ouin, A. (2009): Étude des peuplements d'odonates dans une plaine agricole du sud de la France. Revue d'ecologie - Terre et vie 64(1): 41-50. (in French, with English summary) ["Odonata communities in an agricultural lowland in the South of France. — Odonata communities were studied in an agricultural landscape where semi-natural habitat patches (pastures and woods, with a dense network of deep ditches) are embedded in a crop mosaic (cereals, irrigated maize). We compared species richness and diversity of aquatic plants and Odonata in ditches surrounded by pastures or by crops. Ours results showed that this surrounding (pastures vs crops) has no effect on aquatic plant and Odonata species richness and diversity. However, in cultivated areas water supply through irrigation and deep ditches with plant-covered borders could promote Odonata species. High level of vegetation cover (particularly with Typha sp.) limited Odonata richness and diversity. A rare species in Europe, protected and sensible to pollution, Coenagrion mercuriale, occurred in many ditches including those surrounded by crops, particularly those with an intermediate semi-aquatic vegetation cover. The regular maintenance of ditches, by limiting shrubs and trees height, keep them open and facilitate the dispersal of this little mobile species. Although irrigated crops seem to support a high level of Odonata diversity, a new intensification of agricultural practices in this area by increasing the pollutant input and/or by converting pastures to crops could be detrimental to Odonata communities and particularly to some species like C. mercuriale." (Authors)] Address: Tessier, M., Université de Toulouse, INP-ENSAT, UMR DYNAFOR, Avenue de l'Agrobiopole, BP 32 607, 31320 Castanet-Tolosan, France

21864. Torralba-Burrial, A. (2009): Estado ecológico, comunidades de macroinvertebrados y de odonatos de la red fluvial de Aragón. Zaragoza: Consejo Económico y Social de Aragón, ISBN: 978-84-692-1628-6: 224 pp. (in Spanish) [https://www.researchgate.net/publication/236671179_Estado_ecologico_comunidades_de_macroinvertebrados_y_de_odonatos_de_la_red_fluvial_de_Aragon] Address: Torralba Burrial, A., Depto de Biología de Organismos y Sistemas, Universidad de Oviedo, 33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

21865. Vermeersch, G.; Beckers, K.; Maes, D.; Adriaens, T.; De Beer, D.; De Knijf, G.; Hendrickx, F.; Jooris, R.; Maelfait, J.P.; Van Den Berghe, K.; Van Keer, K.; Van Landuyt, W.; Van Thuyne, G.; Verbeylen, G. (2009): Een gericht natuurbeleid voor de prioritaire soorten in de provincie Antwerpen. Antenne 3(3): 14-20. (in Dutch) ["A targeted nature policy for the priority species in the province of Antwerp: In 2001, following the preparation of the Provincial Nature Development Plan (PNOP), the Institute for Nature and Forest Research (INBO) made an initial study to introduce the concept of 'typical', 'priority' and provincial 'attention' species on this basis (Bauwens D. et al, 2001) (figure 1). At the end of 2008, the Institute for Nature and Forest Research (INBO) and the province of Antwerp joined forces and INBO was asked to update that study. Based on the most up-to-date possible distribution data of various groups of species (higher plants, locusts, dragonflies, butterflies, spiders, fish, mammals, amphibians, reptiles and breeding birds), the province wants to scientific criteria lead to priority species for the provincial nature policy. This was done in collaboration with Natuurpunt Studie, Arabel, Saltabel and the Flemish dragonfly working group. The same methodology was followed for all taxonomic groups (Bauwens et. al, 2001). The group of mushrooms was examined by Natuurpunt Studie itself and a separate criterion was used for this on the basis of data from the database 'FUNBEL' (see the following article, page 21). Analyzes were carried out by the various database managers in order to draw up a list of priority species per species group. If at least 33% of the current, known distribution area of a species in Flanders is located within the province of Antwerp

and if this percentage is also significant or if the species concerned appears on a Flemish Red List, it is initially included in the analysis. The province wanted to further refine the group of species into species of interest. An expert assessment was therefore formulated by all species specialists, on the basis of which the lists were further narrowed down and it could be clearly stated per species why it should be able to count on the necessary attention within Antwerp's nature and environmental policy. Species that only occur in European protected areas or areas where they can already benefit from efficient protection in another way, were therefore still excluded. In the end, 148 species were retained. A very high number of priority species are tied to stream and river valleys. This will give an extra boost to the efforts that the province is already making there." (Authors/Google translate) The list includes 13 odonate species: Aeshna isoceles, A. juncea, Brachytron pratense, Calopteryx virgo, Coenagrion lunulatum, C. pulchellum, Gomphus vulgatissimus, Leucorrhinia pectoralis, L. rubicunda, Libellula fulva, Orthetrum coerulescens, Sympetrum depressiusculum, and Lestes dryas.] Address: Knijf, G. de, Research Institute for Nature and Forest (INBO), Havenlaan 88 bus 73, 1000 Brussels, Belgium. E-mail: geert.deknijf@inbo.be

2010

21866. Ewald, N.; Nicolet, P.; Oertli, B.; Della Bella, V.; Rhazi, L.; Reymond, A.-S.; Minssieux, E.; Saber, E.; Rhazi, M.; Biggs, J.; Bressi, N.; Cereghino, R.; Grillas, P.; Kalettka, T.; Hull, A.; Scher, O.; Serrano, L. (2010): A preliminary assessment of Important Areas for Ponds (IAPs) in the Mediterranean and Alpine Arc. European Pond Conservation Network (EPCN), c/o Hepia, Univ. of Applied Sciences Western Switzerland, 1254 Jussy/Geneva, Switzerland: V + 41 pp. (in English) ["The Important Areas for Ponds (IAPs) concept was developed to raise awareness of geographic regions that support ponds of national or international biodiversity importance, and help focus strategies for pond monitoring, protection and appropriate management and creation. Ponds are vitally important for freshwater biodiversity and particularly recognised as stepping stone habitats. They also provide a range of ecosystem services and have been used for centuries by local communities. Ponds and pond networks are abundant across Europe and Northern Africa, in spite of significant losses, but are not adequately protected by current legislation even within the European legislative framework for nature conservation and water management. The information gathered during the identification of IAPS will be used to encourage better protection measures for ponds at the regional, national and international level, and their inclusion in biodiversity and water protection strategies (e.g. Water Framework Directive, River Basin Management Plans). In order to achieve greater protection for ponds in Europe there needs to be coordination between countries. The European Pond Conservation Network (EPCN), as part of the ProPond Project (Promoting Pond Conservation in Europe and the Mediterranean Region, a project supported by the MAVA foundation), has begun this work by concentrating on two biogeographical regions – the Mediterranean Basin and the Alpine Arc. Selection of IAPs was based on a set of criteria including the presence of species or habitats of conservation importance, pond density, and their socio-economic importance (providing this did not undermine their biodiversity value) and other factors such as important assemblages of species e.g. dragonflies and macrocrustaceans. IAPs were identified using both GIS techniques and expert knowledge from a wide range of pond workers including both researchers and practitioners. For this first analysis, 140 proposed IAPs (pIAPs) have been identified in the Alpine Arc (30 pIAPs) and in the Mediterranean region (110 pIAPs), the latter including sites both from Northern Africa and the Middle East (28 pIAPs) and from Europe (82 pIAPs). A profile of each IAP has been produced with information on its (i) location, (ii) biodiversity, historical and social value, and (iii) threats. In the Mediterranean basin, pIAPs have been identified in 17 countries in Southern Europe, North Africa and the Eastern Mediterranean. The selected pIAPs reflect the heterogeneity of pond sites, and range from individual ponds in Spain supporting 18 species of European conservation importance to pond networks in Italy known to contain over 60 species of European conservation importance. Many areas qualified as IAPs because of high pond density (e.g. over 15 ponds per km^2 in Greece) whereas others qualified because they contained many ponds scattered over large areas (e.g. 1613 ponds over 200000 ha in Morocco), representing a dispersed but highly significant freshwater biodiversity resource in the region. The socio-economic value of ponds was also recognised in their identification as pIAPs: some such as in Israel show evidence of continuous use since the Roman occupation. Many IAPs, particularly in Northern Africa and the Eastern Mediterranean have no current protection, in spite of the habitats and species of conservation concern they support, and all are under significant threat from the increasing pressures of agriculture and development. Raising the profile of these sites through designation as IAPs will help to secure their protection and future sustainable management In the Alpine Arc, a total of 30 pIAPs were proposed in the four main countries which made up the region. Some had exceptionally high pond densities (e.g. pIAPs with over 30 ponds per km^2 in the French Alps), whereas others in the same region comprise a single pond with important assemblages of species. Pond networks were also identified: some extended over large areas, exceeding 2000 ha in Italy, whilst others (e.g. in Austria) were concentrated within an area of less than 20ha. The majority of pIAPs in the Alpine Arc contained species of European conservation importance but also high altitude stenothermal species. However, these alpine ponds are not well represented in the list of pond types given under the Habitats Directive leading to a lack of designation within the European legislative framework of protected sites. The identification of networks of ponds in the Alpine region as IAPs will provide greater recognition of their importance to biodiversity at an international level. This is particularly relevant to high altitude sites, as they are under significant threat from climate change, an issue which requires cooperation and implementation of conservation initiatives at an international level. IAPs in the Alpine Arc also demonstrate the cultural importance of ponds. Many have a long history of use particularly within the traditional pastoral economy of the region. More recently pond networks are providing a valuable research and educational tool for both the scientific community and the wider public. This report is a preliminary assessment of IAPs in the Mediterranean and Alpine Arc region. Proposed IAPs (pIAPs) will be reviewed through a public consultation process and either accepted as a full IAP, modified or declined. The pIAPs identified as part of the ProPond Project will be published on the EPCN website. This should ensure that the information is rapidly disseminated to pond conservation practitioners and turned into positive action to protect and enhance the pond biodiversity resource. The pIAPs presented in this report incorporate the high quality ponds so far known: we anticipate that, as the profile and knowledge of ponds grows, aided by the IAP process itself, considerably more high quality pond will be found in these regions than have currently identified. The EPCN will now continue to coordinate and facilitate this work, building on the momentum of

the ProPond project. A key role of the network and its members is now to disseminate the information presented here as widely as possible as part of a consultation process, but also to inform international and national policymakers." (Authors) A copy of the study can be downloaded her: https://-www.researchgate.net/publication/266557938_A_preliminary_assessment_of_Important_Areas_for_Pond_s_IAPs-_in_the_Mediterranean_Basin_and_Alpine_Arc] Address: Ewald, Naomi, Pond Conservation: The Water Habitats Trust, c/o Oxford Brookes Univ., Gipsy Lane, Oxford OX3 0BP, UK

21867. Ferreira, R.G.N. (2010): Seleção sexual e sua relação com o dimorfismo sexual em três espécies de Zygoptera (Odonata) no Sudeste do Brasil. Ms. thesis. Faculty of Philosophy, Dep. Biol., Entomology, Univ. Sao Paulo: X + 60 pp. (in Portuguese, with English summary) ["Sexual size dimorphism (SSD) can in some species result from the selection acting through different mating systems. Behavioural studies of neotropical species are rare, and few is known about the Brasilian species. In this study, we described the behaviour of three neotropical species that occur in the Brasilian neotropical savannah: Acanthagrion truncatum, Argia reclusa and Hetaerina rosea. We demonstrate the SSD in these species and investigates through behavioural observations, how SSD develops in species with different mating tactics. With our results, we can see that in territorial species the males are larger than females, while in non-territorial species the females are larger than males. We suggest that, unlike other studies, in Zygoptera the kind of mating system adopted by males may determinate the SSD in a species." (Author) https://teses.usp.br/teses/disponiveis/59/59131/-tde-23042010-161204/publico/tese.pdf]

21868. Jakob, C. (2010): Résultats du suivi écologique en parallèle à des opérations de démoustication au BTI sur le périmètre du Parc Naturel Régional de Camargue - Partie ODONATES. Rapport final 2010. Parc naturel regional de Camargue. Rapport Odonates-BTI 2010: 14 pp. (in French) ["Conclusion and outlook for 2011: The results of the 2010 study on the sites in the Camargue confirm the significant difference observed in 2009 with a lower species richness observed on the sites treated with BTI compared to the untreated sites. The relative abundances vary between treated and untreated sites, distributed over a smaller number of species on the untreated sites, generally more common species. This result is similar to that of 2009. The integration of environmental variables important for the life cycle of Odonates via a statistical analysis made it possible to test their respective impact on Odonates compared with the BTI treatment. Thus, the hierarchical ANOVA analysis made it possible to identify the significant impact of BTI on species richness compared to two other factors (site and year), in which other factors are interwoven (conductivity, hydroperiod). This result is all the more important since currently, few studies are available on the long-term monitoring of the effects of BTI on non-target organisms in their natural habitat (e.g. Boisvert et al, 2004; Niemi et al, 1998, and recently Poulin et al, 2010). For 2011, the continuation of monitoring identical to that carried out in 2010, is proposed on the 7 sampling sites in 6 zones and during the 3 seasons of Odonate activity. The sampling campaign in 2011 will make it possible to use the same hierarchical analysis approaches for abundance and to extend the model to other factors such as conductivity." (Author/Google translate)] Address: Jakob, Christiane, Tour du Valat, Le Sambuc, 13200 Arles, France. Email: christianeiakob@oranae.fr

21869. Loong, F.C.; Hung, B.T.; Ngiam, W.J.R. (2010): Ode to Odonata. Nature Watch 18: 8-16. (in English) [The paper provides "an introduction to help beginners find their way amongst a conspicuous and fascinating group of animals." (Authors)] Address: https://www.nss.org.sg/articles/79631-c96-2V18N1.6-10.pdf

21870. Schnauder, I.; Rudnick, S.; Garcia, X.-F.; Aberle, J. (2010): Incipient motion and drift of benthic invertebrates in boundary shear layers. River Flow 2010 - Dittrich, Koll, Aberle & Geisenhainer (eds) - © 2010 Bundesanstalt für Wasserbau ISBN 978-3-939230-00-7: 1453-1461. (in English) ["The present study aimed to identify threshold shear stresses to cause benthic invertebrates to drift in boundary shear layers. Lab. experiments were carried out in a small tilting flume, 10 cm wide and 3 m long with a closed recirculation system and a fixed sand bottom of uniform grain size. Benthic invertebrates from different orders (Achaeta, Gastropoda, Crustacea, Ephemeroptera, Odonata, Megaloptera, Trichoptera) were collected from a lowland river (Spree, Germany) and kept in aquariums to adapt to the Lab. conditions. Individuals were placed in the flume at low flow conditions, before gradually increasing the discharge until drift occurred. Photos were taken from the side through the flume walls to capture the behaviour and strategies of the organisms to cope with the flow. Photos against millimeter grid graph paper in the background were taken for each individual in order to quantify the body height and length exposed to flow. Subsequently, velocity and shear stress profiles were measured above the drift location with an Acoustic Doppler Velocimeter (ADV, Nortek Vectrino). Bed shear stresses were determined by extrapolation of the Reynolds shear stress profiles in subcritical flow conditions. For supercritical flow conditions, a simple particle tracking velocimetry was applied to determine velocity profiles. Bed shear stress was then estimated from fitting of a log-law. Results are presented in tabular form, containing the average drift shear stress and drift velocity for 15 taxa commonly found in lowland rivers. Drift shear stresses, which can be interpreted as abiotic 'absence' criteria of the species, were in most cases exceeding the conditions of preferential habitats and incipient motion threshold of the sediments. However, it was observed that sudden changes in the angle of flow attack (e.g. by burst events or surface waves) or direct interaction with sediment motion (animals hit by moving grains or erosion of the grains serving as anchorage) were key factors triggering invertebrate drift. ... ‚5.2.3 Calopteryx splendens, Coenagrionida sp. (damselflies)': These damselfly species abundant in River Spree, are typically found in macrophyte stands where they are well camouflaged due to their slender morphology (Figure 4). We collected larvae shortly before emergence, thus having a body length of about 30 mm. Both taxa resisted the highest stresses and velocities reached, and in 85% of all tests they were not drifted at all. In the few drift incidents, the individual was moving towards the flume corners or lifted off the bed by a strong ejection event C. splendens applied rheotaxis by keeping the head low, while the abdomen was detached from the bed and legs absorbed near-bed turbulent fluctuations. Swimming movements by sweeping the tail back and forth were only observed for low velocities but not during drift. ‚5.2.4 Gomphus vulgatissimus, Cordulia aenea (dragonflies)': These dragonfly taxa (Figure 5) live in loose fine sediments close to the banks and are active predators during night. They are not very agile and the physiognomy is adapted to dig into the substrate, where they hide during resting periods. Their claws were not suited well to attach to the grains and drift occurred quickly for all tests in subcritical conditions, often while moving towards the flume corners. For G. vulgatissimus, the drift stress is approximately in the range of the incipient motion of the sand used in the tests (*u*

* = 1.76 cm/s) and indicates the adaptation to life in lentic environment. When drifted, G. vulgatissimus propelled itself forward by sucking water into the body and expelling it through its anal pore. C. aenea has longer legs and a shorter body which allow it to sustain higher stresses than the shortlegged G. vulgatissimus." (Authors)] Address: Schnauder, I., Leibniz-Inst. Freshwater Ecology and Inland Fisheries (IGB), Berlin, Germany

21871. Tomasi, M. (2010): Die Biodiversität am Schlern. Naturparks Südtirol. Unter der Lupe. Autonome Provinz Bozen-Südtirol. Provincia Autonoma di Bolzano - Alto Adige: 32 pp. (in German) [On page 11, Odonata are treated. Verbatim: Summary of results Author: Reinhold Haller, Working group "Libella", Terlan - Taxa found in the study area: 19 - new taxa for South Tyrol: none - new taxa for the Schlern: 9 - new taxa for Italy: none - new taxa for science: none - particularly species-rich areas: Völser Weiher and a pond used as a watering place for livestock an extensively used pasture (St. Konstantin) Most of the species found are very common and widespread in the very common and widespread in the study area. However, no rare species was observed in the vicinity of rare species was observed. At the higher altitudes, on the summit plateau of the Schlern, only one single species was found: Aeshna juncea. Only Cordulegaster bidentatus, a wood dragonfly living along small along small watercourses, is an interesting find: Aeshna juncea. interesting find: It is considered rare in South Tyrol South Tyrol and has been included in the Red List. list.] Address: Abteilung Natur und Landschaft, Amt für Naturparke, Rittner Straße 4, 39100 Bozen, Italy

21872. Winter, P. (2010): Views and reviews: Britain's Dragonflles (second edition) by Dave Smallshire & Andy Swash. WILDGuides, 2010. 208pp., 428 photos, 290 illustrations and 66 maps. Sbk with plastic sleeve. ISBN 978-1-903657-29-4. £17.95. Atropos 41: 46-47. (in English) ["Most people with an interest in British dragonflies will be familiar with the original 2004 edition of this book, which received favourable reviews. Personally I felt that certain sections were crammed and, as skilfully created as the some species to be too small and sometimes difficult to distinguish from the background. Would the second edition improve these and other areas? On opening the book the answer was a definite 'yes'. There are 40 additional pages which have been used to expand several sections, a different font has been used, the layout of the text has been improved making it more readable, and the images have greater clarity. The Biology section, in addition to containing larger images to support the revised text, now has a page showing the stages of aging in a dragonfly, which I hope that newcomers to the subject Will read before diving straight into the species pages. The Habitats section also benefits from a modified layout making it easier to see the species found in different types of habitat. There is also a new page detailing some locations for rare, scarce and localised dragonflies. The summary identification charts, possibly the best innovation in the first edition with the key separating features in red text, are now spaced out over 12 pages rather than the original eight. Southern Emerald Damselfly Lestes barbarus and Willow Emerald Damselfly L. viridis have been added to the charts, the font is larger and more readable, there are fewer families per page, and the darters page now includes excellent drawings of the heads. There is also a two-page spread on identifying male emeralds, hawkers and emperors in flight. I was pleased to read that for Common Hawker Aeshna juncea the yellow costa 'may' be visible as it usually fails to be visible to me unless seen at very close range! The species accounts benefit from a revised layout. As in the first edition the text and distribution map are on the left hand page with the photographs opposite. Set in a pale blue background and with the relief layer removed, each map is clearer in addition to being brought up-to-date. The paragraphs on Adult Identification, Eggs and Larva, Behaviour, and Breeding Habitat are, not surprisingly, largely unchanged. Confusion species now have their own paragraph captioned 'Look-Alikes' with references to the appropriate species pages. The Population and Conservation entries are revised to include recent changes. The main improvement in the species accounts is in the photographic plates. The images for damselflies are all now twice life-size, hawkers remain at life-size, and all other dragonflies are at xl.5. Many of the images are new and they stand out much better from the background than in the first edition. There are now 44 breeding species with the addition of the two emeralds and the removal of Highland Darter, which is now considered to be a form of Common Darter Sympetrum striolatum. These are followed by 19 former breeding, vagrant and potential vagrant species, each with the same two-page layout as the breeding species, making information fuller and easier to find. Sympecma fusca has moved from potential to actual vagrant, Aeshna viridis and Epitheca bimaculata are no longer thought potential visitors but Lestes virens now is. Although the book concentrates on adult identification the section on larvae and exuviae has doubled, now covering 20 pages. There are now 10 pages of larval identification charts in tabular format with the key identification features highlighted in red text. This section is now extremely clear and easy to use. I tried hard to find faults with the book. I would have preferred the use throughout of pterostigma rather than 'wing-spot' and some images are a little tight to the inner margin of the page, but these are just minor quibbles. At less than £18 you have an excellent, well laid out, well illustrated, bang up-to-date field guide that I would gladly recommend as the one dragonfly guide to take out into the field." (Author)] Address: not stated

2011

21873. Bjelke, U. (2011): Insektssafari i Kameruns regnskogar. fauna & flora 106(2): 32-37. (in Swedish) ["Insect safari in Cameroon's rainforests. "Tropical West/Central Africa has significantly fewer nature-interested visitors than the rainforests of Asia, Central and South America. It's a shame, because the area is spectacular and, for example, Cameroon is easier to visit than many people think. In order for the existing natural areas to be preserved, a greater influx of travellers is required." (Author/Google translate) The travelling report includes two odonate pictures identified as Prodasineura (= Elattoneura) vittata and Chlorocypha cancellata.] Address: Ulf Bjelke. Email: Ulf.Bjelke@slu.se

21874. Blanco, T.; Gavira, O.; Herrera, F. (2011): Estudios sobre el estado ecológico del río Genal (Málaga): Compatibilizando los trabajos científicos con la información directa a la población. VII Congreso Ibérico sobre Gestión y Planificación del Agua "Ríos Ibéricos +10. Mirando al futuro tras 10 años de DMA" 16/19 de febrero de 2011, Talavera de la Reina: 1-8. (in Spanish) ["The results of a project carried out by the Fundación Nueva Cultura del Agua on the characterization of the ecological state of the Genal River (Málaga) are presented. Said project constitutes a pilot and original experience because it is based on two differentiated but, at the same time, interrelated phases. On the one hand, a technical-scientific study of the ecological state of the river (water quality, aquatic macroinvertebrates, fish and riverbank

vegetation) was carried out. On the other hand, an intense effort was made to inform the population, especially the local one, about the results of the study. This experience, which has made scientific work compatible with direct and continuous information to the population, has proven to be a useful tool for the conservation of the river. In this sense, the local population itself, now informed and sensitized, is the one that is demanding the protection of this fluvial jewel in the south of the Iberian Peninsula. ... The community of aquatic macroinvertebrates in the Genal basin is extraordinarily diverse. In total, 91 different taxa belonging to 16 orders were identified. Of all of them, the Diptera and Trichoptera stand out with 18 and 13 families respectively. Other diverse orders are the Odonata (9 families), … Among the macroinvertebrates, it is worth highlighting the order of the odonata (dragonflies and damselflies), which was made up of at least 18 species. Oxygastra curtisii and Macromia splendens were two of the most outstanding species of this faunal group. Both are considered "Endangered" and appear in the Andalusian Catalog of Threatened Species." (Authors/Google translate)] Address: Blanco, F., MEDIODES, Consultoría Ambiental y Paisajismo S. L. Bulevar Louis Pasteur nº1 blq 2-1º-1 29010 Málaga, Spain. Email: paco.blanco@mediodes.com

21875. David, S. (2011): The importance of anthropogenic water biotopes on the example of dragonflies (Odonata) of Slovakia. Životné prostredie 45(4): 217-221. (in Slovakian, with English summary) ["We have assessed ecological significance of 5 anthropogenic water biotopes (Košské mokrade – wetlands) after the brown coal mining, water reservoirs, gravel pits, sand pits and lowland channels. We have used the data from 252 localities in which we found 22 270 specimens. The highest species richness has the gravel pits – 50 species, lowland channels – 48 species and water reservoirs – 45 species respectively. The first of them has the highest Shannon diversity (H´= 2.83) as well. Ischnura elegans, Platycnemis pennipes, Enallagma cyathigerum, Coenagrion puella as well as eurytopic and stagnicolous spp. are the dominant ones. We confirmed 25 endangered and protected species for example Coenagrion ornatum, Cordulegaster heros, Epitheca bimaculata, Libellula fulva, Orthetrum coerulescens. The biotopes differ one from another and each of them also vary on the microhabitat level. Basically the evaluated biotopes are the dynamic ecosystems vulnerable to disturbance, the change of water conditions, the increasing eutrophication and the spread of both alien and invasive plants. Thus usages of older data have the limited period of validity." (Author)] Address: David, D., Katedra ekológie a environmentalistiky Fakulty prírodných vied Univerzity Konštantína Filozofa v Nitre – spoloèné pracovisko Ústavu krajinnej ekológie SAV Bratislava, poboèka Nitra s FPV UKF v Nitre, Tr. A. Hlinku 1, 949 74 Nitra, Slovakia. E-mail: stanislav.david@savba.sk

21876. David, S. (2011): Nový nález šidélka ozdobného Coenagrion ornatum (Selys. 1850) na Slovensku. Bryja, J., Eh´´ak, Z. & Zukal, J. (Eds.): Zoologické dny Brno 2011. Sborník abstrakt z konference 17.-18. února 2011: 50. (in Czech) [Verbatim(Google translate): A new discovery of Coenagrion ornatum (Sélys. 1850) in Slovakia. In 2010, we carried out field research with the aim of supplementing the data on the European-important species - the ornamental stilt Coenagrion ornatum. At 18 localities in Hronská pahorkatin, Ipe ské pahorkatin and Ipe ské kotlin, we obtained 494 specimens, from which we identified 23 species of dragonflies. The research was carried out in localities with the potential occurrence of C. ornatum. 8 larvae of C. ornatum were detected at the locality Balog nad Ipom, code DFS 7980B2, 129 m a.s.l. The habitat of the species is a channel overgrown with vegetation with gap-like stands of willows, beech and inundated areas 50-60 m wide is mowed. In addition, the species Calopteryx splendens, Ischnura elegans and Platycnemis pennipes were found at the site. The location represents a typical habitat of the ornamental needlehorn. If the high water levels, typical of 2010, are not repeated, the confirmation of other locations of C. ornatum is highly likely.] Address: David, S., Dept of Ecology & Environmental Sciences, Faculty of Natural Sciences, Constantine the Philosopher Univ. in Nitra, Slovakia

21877. David, S. (2011): Bionomie vážky ervené Crocothemis erythraea (Brullé, 1832) (Odonata: Libellulidae) na Slovensku. Bryja, J., Eh´´ak, Z. & Zukal, J. (Eds.): Zoologické dny Brno 2011. Sborník abstrakt z konference 17.-18. února 2011: 50-51. (in Czech) [Verbatim (Google translate): Bionomics of Crocothemis erythraea (Brullé, 1832) (Odonata: Libellulidae) in Slovakia. Of the 10 species of the genus Crocothemis Brauer, 1868, C. erythraea occurs in Central Europe. The species is classified as an Ethiopian (Afrotropical) faunistic element with a tendency to spread from the Mediterranean in a northerly direction, occurrence is recorded from northern Poland. Currently (31.12.2010) I have 109 records of the species (n= 324, of which 7 exuvium and 34 larvae) from 76 localities in Slovakia. The locations are located in 47 squares of network mapping (out of 432 that extend into the territory of Slovakia). The most common type of habitat where larvae are found and found are dead river branches (21 records), ponds (15 records), small water reservoirs (10 records) and gravel pits (15 records). Hypsometrically, C. erythraea belongs to lowland species. The average altitude of occurrence is 195 m with a minimum occurrence at 98 m a.s.l.. and a maximum at 683 m a.s.l. (1 entry). The highest frequency of occurrence is found at an altitude of 100 to 150 m above sea level (60 records = 55%), 19 records (17%) are from the height interval 150-200 m above sea level. C. erythraea is found in the most species-rich odonate coenoses of stagnant, eutrophic and vegetated waters. Ischnura elegant, Coenagrion puella, Platycnemis pennipes and Enallagma cyathigerum are eudominant in odonatocenoses with the occurrence of C. erythraea. C. erythraea currently shows no signs of invasive spread.] Address: David, S., Dept of Ecology & Environmental Sciences, Fac. of Natural Sciences, Constantine the Philosopher Univ. in Nitra, Slovakia

21878. Escola, J. (2011): Odonatofauna de la Conca d'Òdena (31TCG80). In: Miscellanea Aqualatensia 14 Edition: 2011 Chapter: 1: 13-39. (in Catalan) [In the Òdena basin (Spain) a total of 26 odonate species (including "Onychogomphus sp.") have been recorded. The species of the basin represent 37.68% of the species cited in Catalonia. The study includes a figure with phenology of the species and distributions maps. The records are documented in detail.] Address: Escolà i Garriga, J., Avda. Barcelona nº48 1er-1a 08700 Igualada (Barcelona), Spain

21879. Farkas, A.; Jakab, T. (2011): Data on the dragonfly (Odonata) fauna of the landscape Felsý-Tisza-vidék (NE-Hungary). Studia odonatol. hung. 12: 65-75. (in Hungarian, with English summary) ["The paper presents faunistical data on odonate larvae, exuviae and adults collected along the Hungarian reaches of the rivers Tisza and Szamos in the area of the landscapes Beregi-Tisza-hullámtér and Kraszna–Szamos-közi-sík (two geographical microregions within the mesoregion Felsý-Tisza-vidék, NEHungary). Firstly the authors present the methods employed in the collection of

the specimens and in data processing, and introduce the literature considered in the identification of species and in reporting faunistical data. Thereafter they provide a detailed survey of the faunistical results from the sampling sites and finally summarize and evaluate the data on the dragonfly fauna. Collections were made in one year (2008), with the participation of 1 specialist on 73 days and 18 localities altogether, in 5 cells (EU 92, EU 93, FU 02, FU 03, FU 12) of the 10×10 km UTM grid map. In the report information on 1390 specimens (204 ♂♂, 158 ♀♀ and 1028 specimens with undecided sex) is given in detail [218 larvae (123 males, 95 females), 1028 exuviae (with undecided sex), 144 adults (81 ♂♂, 63 ♀♀)], representing altogether 580 faunistical data (23 larvae, 478 exuviae, 79 adults). In this study 5 species (1 Zygoptera and 4 Anisoptera) were recorded in the area, out of which 1 belongs to the frequent, 1 to the less frequent, 2 to the rare and 1 to the sporadic class of country-wide occurrence frequency." (Authors) Calopteryx splendens, Stylurus flavipes, Ophiogomphus cecilia, Onychogomphus forcipatus, Gomphus vulgatissimus] Address: Farkas, Anna, Debreceni Egyetem, Természettudományi és Technológiai Kar, Hidrobiológiai Tanszék, 4032 Debrecen, Egyetem tér 1, Hungary

21880. Hager, I. (2011): Faunistische Untersuchung von Quellbiotopen der Hangleitenwälder der Alz, Lkr Altötting – Ergebnisbericht 2010. Auftraggeber: Landschaftspflegeverband Altötting, Bahnhofstr. 38, 84503 Altötting: 10 pp. (in German) [Bavaria, Germany. The study includes records of Cordulegaster bidentata.] Address: Hager, Ines, Pranckhstr. 13, 84503 Altötting, Germany

21881. Hutchinson, R.; Ménard, B (2011): Stylurus notatus Rambur (Odonata: Gomphidae): mise à jour de nos récoltes dans l'Outaouais, répartition géographique et quelques notes biologiques. Nouv'Ailes 21(2): 9-10. (in French) [Verbatim/Google translate: Until the mid-1990s, we did not suspect the existence of a large population of S. notatus on the banks of the Outaouais, in the locality of Luskville (N45°29.519' W76°0.438, alt. 32 m) (Menard 1996). Hence the absence of mention of this magnificent odonate for this locality in the work of Pilon and Lagacé (1998). We have since recovered, since visiting a first site a few times, from 1996 to 2011, on the banks of the Outaouais, allowed us to collect many exuviae. These were often found on stone walls, sometimes on blades of grass, aquatic plants, rarely on sand, mud or piles of dead vegetation (Hutchinson 2001). In 2011, we discovered a second environment, along the Outaouais, located about one hundred meters from the first. The rocky, muddy shoreline was littered with exuviae of S. notatus. Finally, our participation in the annual meeting of the Society of Odonatology of the Americas, which took place in Arnprior, Ontario, enabled us to collect other exuviae from this magnificent Stylurus for the Outaouais (Catling et al. 2005). First, we present the summary of our collections of S. notatus, to date, as well as some data gleaned from the literature concerning this gomphid. It is important to remember that our excursions generally lasted one or two hours at most. We left the place even if there were probably other exuviae not picked, lying on the ground or clinging to the stones. Summary of our collections of Stylurus notatus Luskville (Qc), first site 1996-2001, June 30 to August 5, 130 exuviae, plus 15 exuviae (Hutchinson 2001). June 11, 2005, no exuviae found, water too high. June 13, 2009, no exuviae found, however harvest of exuviae of a dozen other species of odonates. June 26, 2011, collection of about thirty exuviae and seven larvae which came out of the water and were preparing to emerge (see drawing of a larva and an exuviae). Luskville (Qc), second site August 13, 2011, collection of 51 exuviae, often lying on the ground, sometimes buried in mud or among plant debris, for example in the leashes formed by the accumulation of the waves: three exuviae were suspended from spider threads. Westmeath (On), third site July 10-11, 2005, about twenty exuviae collected by the authors, plus those of other participants in the odonatological meeting (Catling et al. 2005). As Perron & Ruel (2002) demonstrated by collecting, for three years, on a daily basis, 2342 exuviae of S. notatus in the intertidal zone of the St. Lawrence River, at Saint-Augustin-de-Desmaures, near de Québec, the species still seems to be well established in the river and its tributaries. Our collection of exuviae along the Ottawa River is proof of this. Our brief harvests represent evidence that the species is surviving the harmful effects of pollution, including discharges, effluents from nearby towns and villages, not to mention changes and diversions of currents due to the erection of dams. It is interesting to read from the pens of Daigle & Vogt (1988) that Stylurus notatus has been rarely observed in the United States since the early 1940s. Hutchinson & Ménard (1999) presented known data on the species at that time. Needham et al. (2000) specify that this clubtail is known from three Canadian provinces, namely Quebec, Ontario and Manitoba, and from 21 American states. Still according to them, its flight period extends from May 30 to October 4 for the entire territory identified. Pilon & Lagacé (1998) mention sixteen localities for southwestern Quebec, all in the cold temperate zone of the province. Mead (2003) writes that detectable exuviae are very numerous, but adults are rarely observed, which Walker (1958) had already mentioned. As far as we are concerned, we only have adults obtained by exuviation, therefore teneral individuals, after having collected larvae whose emergence was imminent. We hope, despite everything, to have the chance to capture adult, mature and reproductive individuals one day. The two aforementioned authors specify that the adults perform their long spectacular flight in a dive, in open water, in the middle of large expanses of water, to then take refuge in the crown of riparian trees, which is confirmed by Dunkle (2000). According to the latter, the male patrol is between noon and 3 p.m. Perspectives: Among the initiatives to be set in motion to better understand this elusive species, the following should be mentioned: 1) observing the flight of adults from a boat in the middle of large rivers on the banks of which are strewn the exuviae often in large number; 2) find ways to capture them in this wide open habitat; 3) establish patrol times for males; 4) look for larvae in the sandy bed of large rivers (Needham & Heywood 1929).] Address: Menard, B., 16, rue Smith, Gatineau (Québec) J8T 3A1. Email: ménardben@vidéotron.ca

21882. Koch, K. (2011): Die Libellenfauna der Stillgewässer des FFH-Gebietes Kottenforst bei Bonn (Insecta: Odonata). Diplomarbeit. Rheinische Friedrich-Wilhelms-Universität Bonn: IV + 142 pp. (in German) ["In the present work, investigations were carried out on the dragonfly fauna of the still waters of the fauna-flora-habitat area Kottenforst near Bonn (North Rhine-Westphalia). For this purpose, from April to October 2010, 30 bodies of water of different sizes and locations were examined, which were distributed over the approximately 40 km2 area. The adults were recorded by visual observation and catching nets, the exuviae and larvae by random searches. One focus was on the comparison of bodies of water that had existed for a long time with those that were created by the Bonn Biological Station in the years 2006-2008 as part of species protection projects. The investigation of the still waters of the Kottenforst, consisting of five inspections per water body, yielded 2482 observations of imagines, 847 exuvia and 975 larvae. The total

spectrum of species consisted of 23 species, one of which is a running water species. The main species found in the Kottenforst were Coenagrion puella, Pyrrhosoma nymphula, Aeshna cyanea, Sympetrum sanguineum and S. striolatum, as well as Lestes viridis. The remaining 18 species appeared as companion species with less abundance and less continuity. 15 native species, one potential native species and seven guests were recorded. Taking into account the current Red List and thus the latest knowledge at state level, the species spectrum consists of 18 endangered species, two species on the early warning list, two endangered species (Aeshna juncea, Ischnura pumilio) and one highly endangered species (Lestes dryas). The historical comparison of the data showed that many earlier species could no longer be confirmed for the Kottenforst, probably because their habitats were destroyed. In addition, there was a low number of climate change beneficiaries compared to other areas, since the area has a (still) cool climate due to its abundance of trees and the elevated position. There was no significant difference in the number of imagines or species between the biostation and the backwaters. A clear concentration of endangered species of the current Red List of North Rhine-Westphalia on the biostation waters was recognizable. Eight parameters were examined to examine possible influencing factors for the detection probability of dragonflies. It could be determined that the factors time of day, wind, cloud cover, predators and disturbing factors have no significant influence on the presence of dragonflies. On the other hand, the time of inspection, the air temperature and the current level of sunshine in a body of water at the time of mapping proved to be significant. To determine habitat preferences, seven different parameters were examined. Of these, the factors of water temperature, electrical conductivity and pH had no significant impact on the number of imagines found or the number of species. An influence on the number of species could be determined in relation to the size of the water body (area/circumference) and the type of soil substrate. The design of the banks turned out to be a significant factor with regard to the number of imagines. The investigations into the species spectrum of the vegetation yielded relatively homogeneous results for the 30 investigation water bodies. The degree of coverage of different vegetation categories turned out to be the decisive parameter. The investigation of the populations in the Kottenforst revealed a balanced sex ratio in the exuviae and a clear excess of males in the imagines. In summary, it can be said that the Kottenforst is interesting for dragonflies due to its mosaic of water bodies of different stages of succession and has an average dragonfly fauna for a deciduous forest area. The maintenance of the existing habitats and the creation of new habitats should take place in order to maintain the current status or to improve it." (Author/Google translate)] Address: Koch, Katharina, c/o Biostation Bonn-Rheinerft, Auf dem Dransdorfer Berg 76, 53121 Bonn, Germany

21883. Leandri, F. (2011): Le libellule in provincia di Cremona. Centro di documentazione ambientale Quaderni 15: 96 pp. (in Italian) [Italy; 41 odonate species are treated.] Address: https://bibliotecadigitale.provincia.cremona.it/quadernicda/-download/la%20libellula%20in%20provincia%20di%20cremona_dimesioni_ridotte.pdf

21884. Moser, I. (2011): Biomonitoring gefährdeter Tierarten in den Naturschutzgebieten Bannriet und Spitzmäder (Gemeinden Altstätten und Oberriet SG). Bericht 2008–2011. Verein Pro Riet Rheintal Schwalbenweg 16 9450 Altstätten: 38 pp. (in German) [Switzerland; Lestes virens and Sympetrum depressiusculum are mapped, and conservation measures are discussed. For more details see: https://pro-riet.ch/wp-content/uploads/2020/08/2011-Bericht-Biomonitoring.pdf] Address: Verein Pro Riet Rheintal, Schwalbenweg 16, 9450 Altstätten, Switzerland

21885. Steinke, T. (2011): Fühlinger See und Escher See – Zwei Sport- und Naherholungsgebiete im Spannungsfeld zwischen naturverträglicher Gestaltung und intensiver Nutzung – Untersucht am Beispiel von Libellen als Modellorganismen. Hausarbeit zur Ersten Staatsprüfung. Universität zu Köln: 53 pp. (in German) ["The aim of this thesis was to investigate a possible conflict of interest between nature-friendly design and intensive use of the sports and recreation areas of Lake Fühlingen and Lake Escher using dragonflies as a model organism. For this purpose, the dragonfly species spectra of the two water bodies were first recorded. Due to the scarcity of species found, it seemed more meaningful to take the absence rather than the presence of the species as the starting point of the analysis. With the help of a reference study (Olthoff, Menke, Rodenkirchen 2011), a dragonfly species spectrum was then compiled that would have been characteristic for secondary biotopes - such as the two water bodies studied. Due to the absence of many species that were actually to be expected, assumptions could now be made regarding the reasons for this. One result is that the preservation of the Fühlinger and Escher lakes as local recreation areas on the one hand, and the protection of dragonflies at these water bodies on the other hand, are closely connected. For this reason, the two complexes should not be considered separately, but together. This applies in particular to possible design measures at the lakes: these can contribute both to improving the habitats for dragonflies, but at the same time also to safeguarding the water quality and thus the continued usability of the local recreation areas. These include preventive measures such as the reduction of direct (bathing, litter, fish feeding) or indirect (increasing waterfowl populations through feeding) nutrient inputs into the water bodies. Increased education and more strictly controlled bans can contribute significantly to this. Rotational models for watercourse and shoreline management are one way of conserving waterbodies in a way that does not restrict lake visitors, yet is likely to have positive effects on dragonfly and other fauna in the lakes and their surroundings. Also helpful for the protection of both dragonflies and the waters themselves would be the reduction of fish stocking and the occurrence of Myocastor coypus (nutria) and Ondatra zibethicus (muskrat), as well as the promotion of structural diversity in general. In addition, this work has also discussed those measures for more nature-oriented design that provide for restrictions in watercourse use in certain areas. However, in addition to dragonfly protection, these also have the long-term usability of the water bodies as sports and recreation areas in mind. Examples of such design interventions would be making further lake areas inaccessible and creating new shallow water zones. In conclusion, it can be said that the preservation of the two study waters as local recreation areas and the protection of dragonflies are not fundamentally mutually exclusive. In this respect, it is to be hoped that the future development and maintenance of the Fühlinger See and the Escher See will also take dragonfly protection measures into account, representing sustainable and nature-compatible landscape development for the protection of flora and fauna." (Author(DeepL)] Address: no stated

21886. Thorp, J.H.; Rogers, D.C. (2011): Chapter 21 – Dragonflies and Damselflies: Insect Order Odonata. Field Guide to Freshwater Invertebrates of North America. Elsevier: 191-197. (in English) ["Another ancient insect order is Odonata, which

consists of about 318 species of Anisoptera and 132 species of Zygoptera in North America. This aquatic group has a close evolutionary link to the order Ephemeroptera but differs greatly from mayflies in body form, life history, and ecology. These predaceous insects are relatively long-lived in both the nymphal (or larval) and adult stages, but especially in the former. Odonates are relatively well known to the average person because the adults are colorful, relatively large, and easily visible as they flit about all freshwater ecosystems and nearby lands in pursuit of insect prey, including pesky mosquitoes, blackflies, and deer flies. However, they are harmless to humans—except for an occasional finger nipping if you hold them carelessly! Their bright colors and distinctive patterns are not only useful in some species identifications but also make odonates attractive to nature lovers and many artists. In fact “dragonfly watching” has become very popular, and many guides are available for identifying adults. The nymphal stages also consume many invertebrates, and even small fish in rare cases. These larvae are much more diverse in body form than the adults, especially among the dragonflies.] Address: not stated

21887. Toth, S. (2011): Data on the dragonfly (Odonata) fauna of Hungary according to my scatter-collections by December 31, 1987. Studia odonatol. hung. 12: 33-46. (in Hungarian, with English summary) ["This is the 16th paper of a series directed at communicating faunistical data of Hungary which had been unpublished until December 31, 1987 (cf. Dévai, G. et al. 1993). The author presents 578 faunistical data, results of a survey based on his own scatter-collections and other specimens captured by Malaise-traps and collected by 22 colleagues. The adult dragonfly series is from 125 localities throughout the country, but mostly from the sampling sites of Transdanubia. The localities are situated in 66 cells according to the 10×10 km UTM grid map. Collections were made on 201 days in 24 years between 1959 and 1988. In all cases it was possible to provide the number of individuals as well, thus the paper is based on the study of 2449 presented specimens (1150 male, 961 female and 338 specimens with undecided sex). In conclusion, 49 species (20 Zygoptera and 29 Anisoptera) were recorded throughout the country, out of which 1 belongs to the very frequent, 19 to the frequent, 14 to the less frequent, 6 to the rare and 9 to the sporadic class of country-wide occurrence frequency." (Author)] Address: Tóth, S., 8420 Zirc, Széchenyi u. 2, Hungary

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21888. Eriksson, L. (2012): Habitat impact on Odonata species occurrence and detectability. MSc. thesis, Biology and environmental science, Dept of Ecology, Swedish Univ. of Agricultural Sciences, Uppsala: (in Swedish) ["This study aims to investigate how the habitat affects the dragonfly species' occurrence patterns and the detectability of larvae of different species, as well as the effectiveness of the inventory method. Detectability means the probability that the species has been detected given that it is present on the premises. Both larvae and adult dragonflies were inventoried in 14 ponds in Frihult, Sjöbo municipality in Skåne during June-August 2009. The larvae were surveyed by moulting and for each moult the dominant vegetation was noted. Occurrence data for dragonfly larvae and pond characteristics were analysed species by species using the software Presence4.2. I tested whether the ponds' pH, surface area, depth and degree of shading affected the probability of a species occurring, and whether vegetation and the time of the inventory affected the probability of discovering a certain species. For each pond, observations of larvae were compared with observations of adults of the same species. 28 species were found during the inventory, a total of 22 species of larvae and 25 species of fully formed dragonflies. The 13 most common species were analyzed. Shading was the characteristic that affected the most species. Most of these species preferred more sun-exposed ponds. The three species affected by the pond surface all tolerated larger ponds. According to the statistical analyzes t, on average, a species was found in 16% more ponds than it was discovered in. Thus, one can expect to miss relatively many occurrences of larvae even during an intensive inventory like this. If the purpose of an inventory is to find many species within a larger area, an inventory of adults is most effective, but if you want to investigate which habitats are important for reproduction, the larvae must be inventoried. When raking larvae, it is important to be outside both at the beginning and end of summer as there is no time when larvae of all species are present in the pond. If there are several types of vegetation, you should rake in all of these as the probability of discovering a certain species varies depending on the type of vegetation." (Author/google translator) Calopteryx virgo, Lestes virens, L. sponsa, L. dryas, Erythromma najas, Coenagrion hastulatum, C. puella, C. pulchellum, Enallagma cyathigerum, Ischnura elegans, Aeshna grandis, A. viridis, A. cyanea, A. mixta, Anax imperator, Brachytron pratense, Cordulia aenea, Somatochlora metallica, Leucorrhinia rubicunda, L. pectoralis, Libellula quadrimaculata, L. depressa, Orthetrum cancellatum, Sympetrum flaveolum, S. danae, S. vulgatum, S. striolatum, S. sanguineum] Address: https://stud.epsilon.slu.se/4757/1/eriksson_l_120903.pdf

21889. Klink, A. (2012): Paleo-ecologisch onderzoek van de Overijsselse Vecht. Onderbouwing van maatregelen ten behoeve van ecologisch herstel. Hydrobiologisch Adviesburo Klink Rapporten en Mededelingen nr. 121 Project 341, Juni 2012. In opdracht van Waterschap Velt en Vecht: 62 pp. (in Dutch) [In the Overijsselse Vecht, a paleo-ecological study was carried out to learn more about the biotic community in the past. To this end, boreholes have been drilled in abandoned residual channels at a number of locations between the German border and Ommen. Based on old (reliable) maps, these deposits have been dated to the period 1670 – 1950. A number of deposits in existing waters (old meanders) do not appear to contain stream-loving fauna, but most deposits drilled from surface level contain usable material. Based on the traits database of the Ecological Water Management Working Group, environmental variables were determined on the basis of the macrofauna encountered. Most of the calculated changes are marginal, do not look realistic and the limitations of this method are great because: • Environmental factors are determined on the basis of all waters in which a species is found. The Vecht is certainly not an “average” water • Validation of the database for the Vecht is missing The most striking change has taken place in the current, which was much higher in 1670 to 1850 than in the subsequent period. Furthermore, the reduced trophy and saprobia appear to have changed little over the past 340 years. Additional analysis of higher plants and diatoms from relevant deposits may nuance this picture. In order to contribute more to the character of the Vecht, a proprietary traits database was subsequently drawn up based on the macrofauna data collected in the Vecht in 2005 – 2010 (Klink, 2011a). This lacks chemical data, but the allocation of the individual species to habitat looks more realistic. The calculations indicate that the Vecht was a river in previous centuries, where the sandy bottom was by far the most important habitat. Wood and riparian vegetation played a minor role and submerged vegetation in 70 2010 flow varied widely

between the deposits, but also within the individual sites. As a result, the share of this habitat seems to say something about the geomorphological processes in the Vecht. A number of species have been found, particularly in the stretch upstream of Hardenberg, which indicate a much more natural character of the Vecht than was known until now. The stonefly Isoperla grammar, the beetles Macronychus quadrimaculatus and Stenelmis canaliculatus and the caddis fly Itthytrichia lamellaris no longer occur in the Netherlands and have never been collected in the Vecht in the past. These species are still common in the undammed lowland rivers of northern France with good water quality and great biotope diversity. Despite the (scarce) occurrence of these special species, the density and diversity of critical macrofauna, even in the oldest deposits, is deplorable. A comparison with the Aisne, a corresponding river in northern France, shows that mayflies, caddis flies and beetles (Elmidae) are strongly underrepresented in the deposits and Chironomidae and Simuliidae together dominate the fauna with a share of 97%. This observation is a clear signal that the macrofauna community was also under great stress in the past. Two possible causes come to mind: • Physical limitations for the macrofauna exist in the form of a treeless drifting landscape, which was aptly mapped in 1722 by Peter de la Rive (in Neefjes et al., 2011). The macrofauna present in the deposits indicates a dominant role for sand and a varying proportion of aquatic and riparian plants. The small proportion of the fauna that can be attributed to wood dwellers indicates that wood was hardly present in the Vecht. In comparable rivers with forest on the banks, wood dwellers are the dominant group ((Behning, 1932; Benke et al., 1985; Klink, 1992 and 2011b). The barren landscape and the busy Vecht (Emst & Scharlo, 2006) are in accordance with this • Chemical limitations are seen in the calculated oxygen content that amounts to a maximum of 6 mg/l over the period under investigation This finding will have no consequences for the current ecological recovery of the Vecht This may be different for the dissolved levels of heavy metals (period 2004-2010) According to the literature, the strongly increased content of iron and aluminum in particular, probably the result of natural leaching of iron ore, appears to pose a serious threat to the occurrence of mayflies, stoneflies and caddis flies (Beasley & Kneale, 2003; Clements et al., 2000; Deutsch, 1981; Hickey & Clements, 1998; Malmquist and Hoffsten 1998; Winner et al., 1975; Winner et al., 1980) These groups are the prime target species for the WFD yardstick for the Vecht. For a better understanding of the ecological functioning of the Vecht in the past, it is of great importance to also determine the remains of the higher plants and the diatoms and to integrate the results in the current understanding. This research makes an essential contribution to estimating the potential of paleo-ecological research in running water. An earlier publication already provided insights into the enormous ecological significance of trees in rivers (Klink, 1992). In this study, the macrofauna community of the Vecht has been dug up since 1650. The fact that the natural conditions, including the occurrence of iron ur in the Vechtdal, may limit the ecological objectives is an aspect that had not previously come to light." (Author/Google translate) The following odonate taxa are listed: Brachytron pratense, Calopteryx splendens, Coenagrion pulchellum, Erythromma najas, Ischnura elegans, Libellulidae, Orthetrum cancellatum, and Platycnemis pennipes.] Address: Klink, A., Boterstraat 28, 6701 CW Wageningen, The Netherlands. E-mail: agklink@klinkhydrobiology.com. www.klinkhydrobiologie.nl

21890. Marchi, M.; Jørgensen, S.E.; Bécares, E.; Fernández-Aláez, C.; Rodríguez, C.; Fernández-Aláez, M.; Pulselli, F.M.; Marchettini, N.; Bastianoni, S. (2012): Effects of eutrophication and exotic crayfish on health status of two Spanish lakes: a joint application of ecological indicators. Ecological Indicators 20: 92-100. (in English) ["Lake Sentiz and Lake Chozas are two small water bodies in the Province of León (NW Spain). The former is mesotrophic and the latter went from oligotrophic to turbid in 1997, due to introduction of an invasive allochthonous crayfish Procambarus clarkii ([0275], [0280], [0210] and [0215]). We set out to study health status of the two ecosystems by the joint use of different but correlated ecological indicators, supplementing the values obtained by monitoring campaigns. We examine three scenarios: (1) Lake Sentiz, (2) Lake Chozas before and (3) Lake Chozas after the biological invasion. We evaluate eco-exergy, emergy and eco-exergy–empower ratio, three holistic ecological indicators based on the thermodynamics of far-from-equilibrium systems. When structural changes take place in ecosystems it is recommended to apply holistic thermodynamic indicators as presented in [0190] and [0195]. We propose their joint application for a complete overview of the monetary value of natural capital, because they provide information added to statistical analysis and direct measurement. The aim is to determine which of these indicators best represents the effects of eutrophication and perturbations caused by alien species in the two freshwater systems. The eco-exergy–empower ratio gives the best results, since it clearly indicates lake efficiency in transforming direct and indirect solar energy inputs into organization. The eco-exergy (work capacity) results are used to estimate ecosystem services and quantify the economic value of lake natural capital. Calculation of ecosystem services on an eco-exergy basis provides good indications of monetary gains or losses possible in perturbed systems, including eutrophic or invaded ecosystems. This is not surprising, because work capacities include all possible services offered by ecosystems, not only the services actually used by humans. Eco-exergy and the eco-exergy–empower ratio can be guidelines for the calculation of ecosystem services, although they give only a partial indication of the environmental costs and benefits of a given level of information. The present results suggest political and economic considerations and solutions, and are a useful example for organisations involved in environmental management of pollution and biological invasions by exotic species. Highlights: * We set out to study health status of lakes Sentiz and Chazas (León, NW Spain). * Eco-exergy, emergy and eco-exergy–empower ratio quantify ecosystem health status. * Eco-exergy–empower ratio reflects the perturbations better than the other indicators. * We determine ecosystem services and sustainability from eco-exergy or work capacity. * It is useful to apply thermodynamic holistic indicators for bio-invasion management." (Authors)] Address: Marchia, Michela, Dept of Chemistry, Univ. of Siena, Via della Diana 2a and Via Aldo Moro 2, 53100 Siena, Italy. Email: marchi27@unisi.it

21891. Radulovic, S.; Boon, P.J.; Laketic, Dušanka, Simonovic P., Puzovic S., Živkovic Milica, Jurca Tamara, Ovuka M., Malaguti S., Teodorovic Ivana (2012): Preliminary checklists for applying SERCON (System for Evaluating Rivers for Conservation) to rivers in Serbia. Archives of Biological Sciences 64(3): 1037-1056. (in English) ["This paper describes the first steps in gathering biological data to assess the conservation value of rivers in Serbia, using SERCON (System for Evaluating Rivers for Conservation). SERCON was developed in the UK to improve consistency in assessments of river 'quality' by using a scoring system to evaluate habitat features and species groups, catchment

characteristics, and the potential impacts to which river systems may be subjected. This paper provides checklists for aquatic, semiaquatic and marginal plants, macroinvertebrates, fish and birds associated with rivers in Serbia, collated from a wide range of published and unpublished sources. These lists should be regarded as provisional because few wide-ranging biological surveys have been carried out specifically on Serbian rivers; further revisions are likely as more information becomes available in future. Ultimately, the work will benefit regulators and decision-makers with responsibility for river management under the new Water Law, and contribute to river protection and conservation in Serbia." (Authors) Odonata are treated at family level.] Address: Radulovic, Snezana, Univ. of Novi Sad, Faculty of Sciences, Dept Biol. and Ecology, 21000 Novi Sad, Serbia

21892. Salewski, V (2012): Eine Neuansiedlung der Feuerlibelle Crocothemis erythraea (Brulle, 1832) in Regensburg. Acta Albertina Ratisbonensia 59: 52-53. (in German) [Verbatim/Google translate: In the summer of 2013, C. erythraea was found in the area of the abandoned clearing ponds of the former sugar factory near Irl in the south-east of Regensburg. From the end of July the area was regularly visited by the author about once a week. The first fire dragonfly, which was a fully colored male, was observed on July 27 (Fig. 1). It was identified by the bright red body and eyes, the dorso-ventrally flattened abdomen (Fig. 2), its size, and the orange spot at the base of the hind wings (Dijkstra & Lewington 2006). These characteristics distinguished it from males of various darter species Sympetrum sp., which are also found in the area. Up to the end of August, up to six fire dragonflies could be observed regularly, most of which were males. There were no indications that they were native. The fire dragonfly originally had an African-Mediterranean distribution, but has been steadily expanding northwards for several decades as a “winner” of global warming. After it was first recorded in Germany in 1918, it now occurs in almost all federal states, and the number and size of the populations continue to increase, especially in southern Germany (Ott 2007). In Bavaria, the fire dragonfly is regarded as a breeding guest, with the number of records and individual indications of indigenousness also steadily increasing since 1993 (Kuhn & Burbach 1998). According to Kuhn & Burbach (1998), the fire dragonfly was not yet known from the Regensburg area; the closest evidence is from Bogen and the Naab valley near Schwarzenfeld. A fire dragonfly was never observed on regular visits to the area during the summer of 2012, nor on more infrequent visits in previous years. It can therefore be assumed that 2013 was at least a temporary resettlement that fits into the usual pattern of the spread of the species. Further observations over the next few years will have to show whether the species can establish itself permanently.] Address: Salewski, V., Prinz-Rupprecht-Str. 24, 93053 Regensburg, Germany

21893. Smolis, A.; Kadej, M.; Bena, W.; Malkiewicz, A.; Zajac, K.; Mañkowska-Jurek, D.; Rapala, R. (2012): Nowe dane o rozsiedleniu wa¿ek (Insecta: Odonata) na Œl¹sku. Przyroda Sudetów 15: 57-66. (in Polish, with German and Czech summaries) [New data on distribution of dragonflies (Insecta: Odonata) in Silesia: "The paper lists several dozen new locations of five rare dragonfly species (Odonata). Of these, three species - Sympecma paedisca, Gomphus flavipes and Cordulegaster boltonii - are among the protected species of fauna and so far have been known from Silesia from few and often scattered localities. The rest two species - Cordulegaster bidentata and Crocothemis erythraea - have been very rarely reported from the study area and are known from the literature only from a few sites. From a faunistic point of view, the most interesting records are the first documented records of C. bidentata from Kladsko, C. boltonii from the Western Sudetenland and the Barycz river valley and then the discovery of C. erythraea in the Lower Silesian Boreas. Particularly interesting case in terms of species ecology is undoubtedly the joint occurrence of both representatives of the genus Cordulegaster in the Sudetenland." (Author/DeepL)] Address: Bena, W., ul. Olszewskiego 7, 59-900 Zgorzelec, Poland. Email: waldemarbena@gmail.com

21894. Wiemers, M.; Denner, M.; Schweiger, O.; Winter, M. (2012): Biodiversitätsindikatoren für Klimaveränderungen am Beispiel der Tagfalter und Libellen Sachsens. In: Horst Korn, Ute Feit und Rainer Schliep (Red.): Biodiversität und Klima – Vernetzung der Akteure in Deutschland VIII – Ergebnisse und Dokumentation des 8. Workshops. BfN – Skripten 307: 54-57. (in German) ["Biodiversity indicators for climate change using the example of butterflies and dragonflies in Saxony: The Community Temperature Indices (CTI) according to DEVICTOR et al. (2008) calculated. The basis for this are Species Temperature Indices (STI), which represent the mean annual temperatures in the entire European range of a species. STI values were first reported for birds of France and by VAN SWAAY et al. (2008) also calculated for European butterflies. In both works, individual numbers from monitoring programs were used for the weighting. In the analyzes the CTI showed a clearly positive trend analogous to the general temperature development in almost all cases, which means that populations of warmth-loving species are increasing in relation to cold-loving species; however, the correlation between the annual values of the CTI and the mean area temperature was not examined in the work mentioned. Our analyzes with the Saxon data also revealed a positive trend for butterflies and dragonflies, which, however, as in the aforementioned studies, is lower than the temperature increase observed in the area over the same period. According to DEVICTOR et al. (2008) conclude that the temperature increase exceeds the adaptability of the species community. The shape of the curve was only slightly affected by a change in species selection, which indicates the robustness of this index. However, strong immigration events of non-established species can lead to biases. Instead of individual numbers, dataset numbers per species can also be used for weighting, but this reduces the sensitivity of the indicator. While the CTI values for butterflies (Figure 1) correlate strongly with the annual mean temperatures, there was no correlation for dragonflies. This can probably be explained by the different generation length of up to five years in dragonflies compared to a maximum of one year in butterflies. Accordingly, the highest correlations of the CTI values were found with the 2-year moving mean temperature of the current and previous year (for butterflies) or the 5-year moving mean temperature of previous years (for dragonflies). These highly significant correlations with short-term climate variability support the reliability of the measured long-term trends. The CTI therefore appears to be a particularly well-suited biodiversity indicator for climate change, especially for monitoring data such as that obtained in Citizen Science projects such as Germany's butterfly monitoring (TMD; http://www.tagfalter-monitoring.de/). Climate changes can not only lead to shifts in abundance within species communities, but also to shifts in range, as is well known. However, the detection of area changes is more complicated than is often assumed. This is due to the fact that the population densities along the area boundaries are often very low. On small-scale scales such

as individual federal states, there are hardly any zonal distribution limits and the accuracy of most of the data is insufficient for recording the vertical distribution. Saxony also has a topography that is unfavorable for zonal distribution limits (mountains on the southern border). Therefore, the Area Index (AI) was developed to record range shifts, which reflects the ratio of the areas of warmth-loving to cold-loving species. An objective assignment to one of the two groups can be guaranteed by an STI-based weighting. The difference between the STI value of the individual species and the CTI (as a total mean of all species of the respective taxon) is used for weighting. The analysis of the Saxon data shows a positive trend and a high correlation with the CTI for both the butterflies (Figure 2) and the dragonflies, especially when using the STI-based weighting. The lower slope of the Area Index shows that it reacts less sensitively to climate changes than the CTI. Nevertheless, the area index seems particularly suitable for faunistic data sets with good spatial coverage for recording the climate reaction, and can also be used for species groups for which no STI values can be calculated due to the lack of total distribution maps." (Authors/Google translate)] Address: Denner, M., Referat 61 – Landschaftsökologie, Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie, Halsbrücker Str. 31a, 09599 Freiberg, Germany. Email: maik.denner@smul.sachsen.de

2013

21895. Bouton, F.M. (2013): Recherche de Sympetrum danae (Sulzer, 1776), et identification du cortège odonatologique de zones humides du boisement de Marchevert (Conflans-sur-Anille, 72). Ligue pour la Protection des Oiseaux de la Sarthe, Maison de l'Eau - 43 rue de l 'Estérel - 72 100 Le Mans: 58 pp. (in French) ["Within the framework of the National Action Plan in favor of Odonata, a list of species considered as priorities has been defined for the Pays de la Loire, broken down regionally. These species were chosen based on their degree of threat and rarity. Among these is the Black Sympetrum (Sympetrum danae). As this species has never been the subject of specific research on a regional scale, no recent data on an attested breeding site exists (for the Dept of Sarthe, the most recent dating from 2004). Its current autochthony therefore remains to be proven, especially since it is a species with a high potential for erraticism (Dijkstra K.-D.B. & Lewington R., 2007; Grand D. & Boudot J.-P. 2006). This report gives an account of the study carried out by the LPO Sarthe, with the support of the Loire Bretagne Water Agency, the Regional Group for the Study of Armorican Invertebrates (GRETIA), the association leading the regional implementation of the Action Plan and the Regional Center for Forest Property (CRPF) of the Pays de la Loire, which aims to rule on the presence and, where appropriate, on the reproductive status of the species on the Bois de Marchevert site (part of the Vibraye forest massif) in the communes of Conflans-sur-Anillé, Montaillé and Semur-en-Vallon in the Sarthe Dept. In addition, a second objective of this study was to identify the odonatological procession existing on the site (classified as ZNIEFF type 1) as well as on the neighboring wetlands (namely the Anille river and the Fief pond within the Marchevert forest), all located within the watershed of the valley of the Braye." (Author(Google translate) https://side.developpement-durable.gouv.fr/cent/digitalCollection/DigitalCollectionAttachmentDownloadHandler.as hx?parentDocumentId=335495&documentId=632382&skipWatermark=true&skipCopyright=true] Address: Bouton, F.M., 18, rue Saint Pavin de la Cité, 72000 Le Mans, France. E-mail: fmb72@yahoo.fr

21896. Faton, J.-M. (2013): Le Sympetrum danae (Sulzer, 1776) reproducteur dans les habitats fluviaux duranciens. Sympetrum 17: 5-7. (in French) ["Like most sympetrums, S. danae is a pioneer and opportunistic species. The discovery of a large population of this species in the Hautes-Alpes, breeding in the river annexes of the Durance, is however a surprise. Here, Sympetrum danae is an abundant and very adaptable species, as can be Sympetrum striolatum in many regions." (Author/Google translate)] Address: Faton, J.-M., Gare des Ramières, Route de Grane - 26400 Allex, France

21897. Harms, T.M.; Rasmussen, R.D.; Kinkead, K.E.; Frese, P.W.; Dinsmore, S.J. (2013): Springtime Darner (Basiaeschna janata) new to Iowa. Argia 25(3): 25. (in English) ["An individual B. janata was first observed by Ryan Rasmussen on 5 May 2012 at Lacey-Keosauqua State Park in Van Buren County. No other individuals were observed in 2012. Rasmussen returned to the area on 13 May 2013 and observed a small group of six individuals near Lake Lacey, which is located within the park (OdonataCentral record #400091)." (Author)] Address: Harms, T.M., Center for Survey Statistics and Methodology, Iowa State Univ., 208 Office and Lab. Building, Ames, IA 50011, USA. E-mail: harmsy@iastate.edu

21898. Hatfield, J.K. (2013): A possible hybridized Plathemis lydia (Common Whitetail) x Plathemis subornata (Desert Whitetail) specimen? Argia 25(4): 16. (in English) [7-IX-2013, Bottomless Lakes State Park, Roswell, New Mexico, USA] Address: Jerry K. Hatfield: Email: jerry.hatfield@umchealthsystem.com

21899. King, S. (2013): A mass movement of Autumn Meadowhawks (Sympetrum vicinum). Argia 25(4): 17. (in English) ["On 8-X-2013, a swarm of S. vicinum coalesced in our backyard in North-field, Minnesota, USA. This concentration of dragonflies stayed put throughout the afternoon, busily feeding, and was gone the next day. Dozens of mature meadowhawks, both male and female, perched on garden fences, tree trunks, and grapevines, until all the good spots were taken. Dan Tallman, another Northfield resident, reported seeing them at his home on the opposite side of town on this day as well, so the swarm stretched at least several miles. Whether it was a county-wide cloud or a thin red line fallen by chance across the town like a dropped ribbon, there's really no way to know." (Author)] Address: Scott King. Email: ldng@meadowhawks.info

21900. Lyons, R. (2013): An observation of Octogomphus specularis (Grappletail) oviposition. Argia 25(3): 27. (in English) [27-VI-2013, Golden and Silver Falls State Natural Area in Coos County, Oregon (north-east of Coos Bay), USA] Address: Ron Lyons, Bandon, Oregon. Email: pondhawk@uci.net

21901. McHugh, M.; Hummel, S. (2013): First record of Epitheca semiaquea (Mantled Baskettail) for Missouri. Argia 25(3): 24. (in English) [The record had been vetted on 24 April 2011 as Epitheca cynosura. A subsequent re-evaluation, showed this record to actually be E. semiaquea.] Address: McHugh, M., Kansas City, USA. E-mail: Emchugh2@kc.rr.com

21902. Mguni, S. (2013): Enigmatic rock paintings of insectifroms in the Cederberg, western cape, South Africa. South African Archaeological Bulletin 68(198): 160-172. (in English) ["In this paper I describe an unusual triad of images from

the northern Cederberg, Western Cape. The probable origin of their subject matter is implied by the depicted morphological features. While their heads are distinctly anthropomorphic, nothing else invokes the humanoid form. Their identification is sought elsewhere, outside the mammalian kingdom. Even though a few traits suggest insectiforms, these are too few to be useful in identifying exact species. Nevertheless, the most likely generic candidate [Odonata] is identified, which offers the potential for interpreting these images by assembling multifarious and nuanced readings of possible San ethnographic correlations." (Author)] Address: Mguni, S., Rock Art Research Institute, Private Bag 3, WITS, 2050 South Africa. E-mail: Siyakha@rockart.wits.ac.za

21903. Moser, I. (2013): Monitoring gefährdeter Tierarten im Raum Bannriet-Spitzmäder Bericht 2012 – 2013. Verein Pro Riet Rheintal, Schwalbenweg 16, 9450 Altstätten, Switzerland: 41 pp. (in German) [Results of the monitoring of Lestes virens are documented. Conservation measures are outlined. Records of Aeshna isoceles, Crocothemis erythraea, Aeshna affinis, Lestes barbarus and Sympetrum meridionale are briefly documented. For more details see: https://pro-riet.ch/wp-content/uploads/2020/08/Bericht_Monitoring_2013.pdf] Address: Verein Pro Riet Rheintal, Schwalbenweg 16, 9450 Altstätten, Switzerland

21904. Nirschl, R. (2013): First record for Libellula auripennis (Golden-winged Skimmer) in Michigan. Argia 25(3): 18. (in English) [On 14-VI-2013, Nan Weston Preserve in Washtenaw County, Michigan, USA.] Address: Rick Nirschl: Email: ricknir@hotmail.com

21905. Patten, M.A.; Smith-Patten, B. (2013): First record of the Marsh Bluet (Enallagma ebrium) for Colorado. Argia 25(3): 26. (in English) [6-VII-2013, Alamosa National Wildlife Refuge, San Luis Valley, Alamosa County, Colorado, USA.] Address: Patten, M.A., Oklahoma Biological Survey, Univ. of Oklahoma, Norman, OK 73019, USA. E-mail: mpatten@ou.edu

21906. Paulson, D. (2013): An apparently introduced population of California Spreadwings (Archilestes californicus). Argia 25(3): 14. (in English) [The author describes a "range extension" of A. californicus to Magnuson Park, Seattle, King County, Washington, USA, probably caused by landscaping with native vegetation, including many willows.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dennispaulson@comcast.net

21907. Roble, S.M.; Chazal, A.C.; Pendleton, W.T. (2013): Enallagma carunculatum (Tule Bluet), an addition to the Virginia damselfly fauna. Argia 25(4): 14. (in English) ["This species has not been previously recorded from Virginia, but it was listed as a potential member of the state's fauna by Roble (1994). During a visit to the Carnegie Museum of Natural History (Pittsburgh, Pennsylvania) in February 2013, Roble and Chazal learned that their holdings included a small collection of pinned Odonata (n=37) from Virginia, most of which were collected by H. C. Will at Dayton, Rockingham County during 1930-1931. Wills name only appears on the 1931 collection labels (and on several without dates), but the 1930 labels are similar except for the lack of a collector's name. All but a few of these specimens were previously unidentified, including all of the damselflies. Closer examination revealed that two males collected on 14 June 1930 are referable to E. carunculatum, the first known specimens from Virginia, thus becoming the 19th Enallagma and 56th damselfly species recorded from the state, and extending the species' range in the East slightly to the south." (Authors)] Address: Chazal, Anne, Virginia Dept of Conservation and Recreation, Division of Natural Heritage, 600 E. Main Street, 24th Floor, Richmond, Virginia 23219, USA

21908. Ruffoni, A. (2013): La cordulie à corps fin (Oxygastra curtisii) en Bourgogne: espèce discrète de plus en plus observée. La feuille de Neomys. La lettre de l'Observatoire de la FAune de Bourgogne 9: 6. (in French) [Verbatim (Google translate): This large green and yellow anisopter is one of the 6 species of Corduliidae present in Burgundy. It is protected in France and listed in appendix 2 and 4 of the Habitat Directive. Knowledge of the distribution of the species is very incomplete in Burgundy. Before the launch of the Atlas inventory, 23 stations were known, since, thanks to targeted searches, at the beginning of 2013, 25 more stations have been discovered. In the south-east of the Yonne Dept, the species was quite easily detected during "atlas" surveys on various rivers: the Serein, the Armançon, the Cure, the Yonne and marginally on the Cousin. On the Serein, the species is at least regularly present on 25 kilometers of river. It was also discovered on many gravel pits in Auxerrois, environments that seem to be good substitute biotopes for the development of larvae. Most of the time the species was detected thanks to the collection of exuviae, out of a total of 101 data of the species present in the BBF, 36 data correspond to exuviae (36%). A survey carried out at the right time and targeted on the larval remains is therefore imperative if we want to advance knowledge of the distribution of the species in Burgundy. It is sought on various rivers: the Nièvre, the Aron, the Saône, the Yonne, the Seille, the Arroux, the Grosne, the Alène, the Seine (downstream part), the Tille, the Loire, the Allier,… as well as on gravel and sand pits. Reminders on the species Preferred habitats: calm areas of rivers and streams, to be sought upstream of the reaches (e.g. upstream of the mill), ponds, gravel pits and sand pits. Note: gravel pits/sand pits seem to be good substitute sites. Supposed distribution: scattered presence on the territory, to be sought on the main rivers. Detection: exuviae to look for on the trunks of trees (alder, willow and ash) whose roots plunge into the water of sectors with a calm current and fairly deep, imagos. Flight period: from mid-May to mid-August with a greater presence from June to mid-July.] Address: Ruffoni, A., Société d'histoire naturelle d'Autun/Groupe Odonates Bourgogne et Société française d'Odonatologie - shna.ruffoni@orange.fr

2014

21909. Adu, B.W.; Ogbogu, S.S.; Ogunjobi, J.A. (2014): Odonata biodiversity: An indicator of anthropogenic activity in Aponmu forest, Akure, southwestern Nigeria. FUTA Journal of Research in Sciences 10(1): 35-42. (in English) ["Diversity assessment of Odonata in Aponmu forest was carried out to determine its composition, abundance, and distribution. Biodiversity of the taxon was also used as a measure of human activities in the forest. Three study sites were identified at the forest which were: "Ago-Store"Pond (AGO), "Alatori"stream (ALA) and River "Aponmu" (APO). Both adults and larvae specimens of Odonata were collected. Only advanced penultimate and ultimate larvae were collected and were reared to adults. Some physico-chemical parameters that influenced the existence of Odonata within the forest were also investigated. Diversity indices and inferential statistic were applied to the data collected at the

forest. Water samples collected were analyzed so as to determine quality of water which houses the immature stages of the fauna. 1385 individuals were collected from the forest. Most of the species collected were ubiquitous. “Alatori” stream was the richest study site, while river “Aponmu” was the least. Generally, the study indicates that the dominance of ubiquitous species of Odonata with broad niches in the forest may be a result of anthropogenic activity going on in the forest." (Authors)] Address: Adu, B.W., Biological Science Dept, Ondo State Univ. of Science and Technology, Okitipupa, Nigeria. E-mail: williamsadubabs@yahoo.com

21910. Almeida, D.; Grossman, G.D. (2014): Regulated small rivers as ‘nursery’ areas for invasive largemouth bass Micropterus salmoides in Iberian waters. Aquatic Conservation: Marine and Freshwater Ecosystems 24(6): 805-817. (in English) ["Few studies have assessed the ecological role of regulated small rivers in the environmental biology of invasive largemouth bass Micropterus salmoides in Iberian waters. Size structure, diet, physical condition, and developmental stress of largemouth bass populations were compared between two contrasting habitats in the Iberian Peninsula, the Encinarejo Reservoir and the small River Jándula below the dam (Guadalquivir River Basin, southern Spain). Size structure differed between river and reservoir populations of small (<180 mm FL) largemouth bass, with a higher proportion of individuals between 30 and 60 mm in the river and a higher proportion of 20–40 mm individuals in the reservoir. In the river, the most important prey for small largemouth bass were Ephemeroptera, Plecoptera and Odonata nymphs. In the reservoir, Gerridae insects and pumpkinseed Lepomis gibbosus were the most important prey in terms of ingested biomass for small largemouth bass, whereas large individuals consumed high percentages of common carp Cyprinus carpio and pumpkinseed. Prey richness, trophic niche breadth, and trophic diversity were significantly higher in small largemouth bass from the river, as well as eviscerated mass and glucose level. Fluctuating asymmetry was lower in the river for branched rays of pectoral fins, eye diameter, and length of pectoral fins. Overall results indicate that largemouth bass are taking advantage of both habitat differentiation and flow regulation in Mediterranean streams. Therefore, regulated small rivers may play an ecological role as ‘nursery’ areas, where developmental stress is low and thus, juvenile fish can display better body condition and nutritional status than their reservoir counterparts. The present study provides information relevant to the management of largemouth bass and subsequent conservation of the valuable and endemic Iberian fish fauna. For example, size-specific culls in the reservoirs and below the dams are suggested strategies to control the reinforcement of downstream populations." (Authors)] Address: Almeida, D., Dept of Zoology and Physical Anthropology, Complutense Univ. of Madrid, E-28040 Madrid, Spain. E-mail: dalmeidareal@yahoo.es

21911. Ananian, V. (2014): On the need of protection of goldenring Cordulegaster vanbrinckae in Armenia. Biological journal of Armenia 66(4): 27-30. (in Russian, with Armenian and English summaries) ["C. vanbrinkae is a rare relict species in Armenia, which requires study of its biology and implementation of urgent complex conservation measures. Establishment of microreserves in its habitats would prevent their destruction and would contribute to preservation of the species in the country." (Author)] Address: Ananian, V., 179 Bashinjaghyan St., apt. 23, 0078, Yerevan, Armenia. E-mail: gomphus@gmx.com

21912. Buczyniski, P.; Szlauer-Lukaszewska, A. (2014): A disjunctive site of Sympecma paedisca (Brauer. 1877) (Odonata: Lestidae) in Lubuskie Province (western Poland). Wiad Entomol. 33(4): 279-280. (in Polish, with English title) ["The occurrence of Sympecma paedisca was found in the middle Oder valley: - 3.4 km NE from the village of Bobrowniki (51°53'N / 15°45'E, UTM: WT54), the "Ochlica" reservoir connected to the Oder - the oxbow lake of the Oder, into which the Ochla River also flows. The reservoir with an area of approx. 14.5 ha, located in an elm and willow forest. In the further surroundings, vast meadows with a network of drainage ditches dominate. A relatively young oxbow lake (formed in the 1970s), with sandy shores, with a bottom with a not too thick layer of organic sediments and with well-developed underwater meadows. Material: August 2, 2009, 1 larva about 1.2 cm long. found in a hydro-biological test taken with a drag on a shaft from an area of approx. 0.7 no." (Authors/Google translate)] Address: Buczynski, P., Dept of Zool., Maria Curie-Sklodowska Univ., Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

21913. Chakraborty, A. ; Kumar, K.; Rajadurai, G. (2014): Biodiversity of insect fauna in Okra (Abelmoschus esculentus (L.) Moench) ecosystem. Indian Journal of Animal Nutrition 7(16): 2206-2211. (in English) [East farm of Pandit Jawaharlal, Nehru College of Agriculture and Research Institute (PAJANCOA and RI), Karaikal, India. The following odonate taxa are listed: Ischnura aurora, Agriocnemis sp., Brachythemis contaminata, Crocothemis servilia, Diplocodes trivialis, Neurothemis fulvia, Orthetrum sabina, Pantala flavescens, Rhyothemis variegata, and Tholymis tillarga.] Address: Chakraborty Ardhendu, Dept of Agricultural Entomology, PGP College of Agricultural Sciences, Tamil Nadu Agricultural Univ., Namakkal-637 207, Tamil Nadu, India. E-mail: entomonardha@yahoo.com

21914. Furness, A.N. (2014): Why shouldn't the dragonfly cross the road? The influence of roadway construction and vehicle speed on the behavior, mortality, and conservation of adult dragonflies (Odonata: Anisoptera). M.Sc. thesis, Univ. of South Dakota: 94 pp. (in English) ["Roads are a ubiquitous part of landscapes across the globe. Unfortunately their ecological effects are numerous and widespread as well. Impacts include disturbance of the physical environment, modification of the chemical environment, shifts in human use of land and water, spread of exotic species, alterations of animal behaviour, and wildlife mortality due to road construction and collisions with vehicles. A growing body of literature has focused on the effects of roads on wildlife, especially vertebrates; however, only select studies have examined the impacts of roads on invertebrates, with very few looking at insects in particular. This thesis attempts to understand how roads, including a bridge, affect dragonflies, especially the federally endangered Hine's emerald dragonfly (Somatochlora hineana). It also investigates potential ways to lessen their effects. To determine whether the I-355 bridge interrupts movement of adult dragonflies, flight behaviour was recorded in the I-355 corridor prior to, during, and after construction. I compared the proportion of individuals initiating crossing behaviour between the pre-bridge, bridge, and open bridge stages as well as the proportions attempting to cross above and below the bridge deck after completion. In order to better understand which factors make dragonflies vulnerable to collisions with vehicles, I recorded the result of dragonfly-vehicle encounters at select speeds. By analyzing flight heights and flight types in combination with vehicle speeds, I was able to esti-

mate the probabilities of being hit for different kinds of dragonflies at varying speeds. Measures to moderate and/or reduce vehicle speed in high- risk areas during peak flight times could decrease dragonfly roadkill rates. The use of diversion structures was also assessed by conducting observations of S. hineana flights at a simulated roadway location with and without nets up. Diversion netting has the potential to deter S. hineana from crossing roadways as well as cause them to fly over roadways at heights above that of most vehicles, depending on the spacing of nets." (Authors)] Address: Furness, Amber Nichole

21915. Groupe Odonates Bourgogne ; Ruffoni, A. (coord.) (2014): Atlas préliminaire des odonates de Bourgogne (Odonata), version 2014. Société d'histoire naturelle d'Autun, Société française d'Odonatologie: 43 pp. + annexes. (in French) [https://www.researchgate.net/publication/336956799_Atlas_preliminaire_des_odonates_de_Bourgogne_Odonata _version_2014] Address: Ruffoni, A., Maison du Parc, F-58230 Saint-Brisson, France. E-mail: shna.ruffoni@orange.fr

21916. Houard, X.; Merlet, F.; (coord.) (2014): Liste rouge régionale des libellules d'Île-de-France. Natureparif – Office pour les insectes et leur environnement – Société française d'Odonatologie. Paris: 80 pp. (in French) ["A quarter of the dragonflies in Île-de-France threatened or disappeared. By examining the dragonflies listed in the region, this is the first time that the process of drawing up the Ile-de-France Red Lists has focused on the vast world of insects and particularly those that thrive in aquatic environments. This synthesis work was carried out by applying the official methodology established by the IUCN and constitutes a new standardized reference recognized internationally. This Red List was jointly piloted by the Office for Insects and their Environment and the French Society of Odonatology as part of the regional implementation of the National Action Plan for Odonata. A group of a dozen regional experts volunteered for this evaluation exercise. Thus, more than 28,800 observation data from the naturalist testimonies of 303 contributors, compiled since the beginning of the 1980s in a computerized database, were analyzed. In total, of the 59 species observed in Île-de-France over the period 1992-2012, one is already considered "Regionally extinct" (2%), thirteen are considered threatened (19%) and eight have been assessed as "Near Threatened" (14%). The destruction and degradation of wetlands induced by urbanization and the intensification of agricultural practices are the main causes of the disappearance of dragonflies. The disappearance and rarefaction of dragonflies in the Ile-de-France region is characteristic of the damage caused to the region's aquatic ecosystems. Despite these ever-increasing pressures, Île-de-France has significant assets in terms of wetland conservation and must therefore be able to mobilize to preserve its threatened dragonfly populations. Thus, by way of examples, thanks to this Red List, Leucorrhinia caudalis is classified as "Vulnerable" and Coenagrion pulchellum is classified as "Endangered" can now be considered as ambassadors of wetlands that should be pampered and protected. taken into account in the implementation of sustainable regional development policies." (Authors/Google translate)] Address: Merlet, Florence, 78 rue de Cornouailles, F-78180 Montigny-le-Bretonneux, France. Email: florence.merlet@gmail.com

21917. Hutchison, L. (2014): Male aggression in the banded demoiselle damselfly Calopteryx splendens. MSc. thesis, Dept Biol., Lund Univ.. http://lup.lub.lu.se/student-papers/record/4360319: (in English) [Calopteryx splendens is a sexually dimorphic insect that is currently moving north, into new geographic areas of Fennoscandia. In doing so, this damselfly species is coming into contact with naïve populations of a closely related conspecific: the beautiful demoiselle damselfly, Calopteryx virgo. This study revealed that male C. splendens' aggression appears to be influenced by both age and experience; however, there was no evidence of learned species recognition in outdoor cage experiments. Teneral (immature) and mature males responded at significantly different strengths to intruding males, indicating that the age at which they were caught affected the development of territorial responses. Whether C. splendens came from allopatric or sympatric populations did not statistically significantly influence their response to intruding males. Average male aggression levels were positively correlated with male survival rate, although the causal factor behind this correlation is unknown. Moreover, C. splendens survived longer in the cages than C. virgo revealing interspecific differences in longevity, and C. splendens individuals from an allopatric population survived significantly longer compared to C. splendens individuals from a sympatric population. This result might indicate that C. splendens suffer from shorter life span in the presence of the heterospecific competitor C. virgo. Male C. splendens responded differently to female con- and heterospecific individuals depending on the male's origin, suggesting that field experience with the opposite sex and species was important in determining male mate preferences towards females. Finally, cage density had no significant impact on male C. splendens' aggression towards conspecifics. Popular science summary: As the climate warms and species move northwards, some species encounter populations of a similar species. In this case, the banded demoiselle damselfly Calopteryx splendens is moving north, further into Fennoscandia than it has been known to go before, and is meeting populations of the beautiful demoiselle damselfly Calopteryx virgo. Males of both species set up and defend territories along the banks of freshwater streams. If these two species are to co-exist, one or both should theoretically be able to discriminate between individuals of their own and of the other species to avoid hybridising. This project aimed to understand whether learning or genetics determine how a male C. splendens responds to intruding males of his own species and of the other species, C. virgo. The response to females of both species was also tested. The work was carried out in 27m³ mesh cages at Stensoffa field station, in southern Sweden and 2 nearby sites were used to capture the insects. At one site, only C. splendens was present, at the other both C. splendens and C. virgo were present. One male and one female of each species were tethered to a stick of roughly 1.5 m in length and were then presented to free-flying, but caged, males. A four-point scale was used to record the reaction from the free-flying male. A threat response is illustrated in the figure opposite. The effect of cage density on aggression in C. splendens was tested by keeping males and females in cages with a ratio of 2 males to 1 female. Low density cages had a maximum of six individuals; high density cages had a maximum of twelve. In this study, mature individuals of neither species were more or less aggressive towards males of their own of the other species. This finding contrasts with previous field studies which found that C. virgo males show stronger species recognition than C. splendens males (Svensson, et al. 2007). C. splendens males caught as sexually mature individuals responded more aggressively towards intruders than did those caught as sexually immature. This is not sur-

prising as sexually immature individuals are not yet competing for territories. Interestingly, this species appears to go against the classic trade-off hypothesis of "live fast, die young" as the longer an individual lived, the more aggressive it appeared to become. Sexually immature male C. splendens responded less aggressively towards females of either species than did sexually mature male C. splendens. Males from populations where both species are present responded more strongly to females of their own species than to females of the other species. This supports the hypothesis that age or experience is important in determining the response to intruders. Cage density did not affect the average aggression levels displayed by male C. splendens. Origin also had no significant impact on the aggression level therefore hinting at a possible genetic component in the response to intruders. Individuals showed repeatability in their response to different intruders indicating a possible genetic component, but further study would be needed to confirm this. In conclusion, it is likely that both genetics and experience play a role in determining the reaction of male C. splendens' to intruders and that experience is necessary in fixing the genetic response." (Author)] Address: not stated

21918. Izzat-Husna, M.; Ahmad, A.B. (2014): Odonata (Class: Insecta) of Sungkai Wildlife Reserve, Perak, Malaysia. Journal of Wildlife and Parks 29: 23-30. (in English) ["Protected areas need to be continuously monitored for their flora and fauna for the ecosystem management and conservation purposes. Odonata is a good bio-indicator for habitat monitoring; they are ecologically conspicuous and sensitive to environmental changes. A two-day survey was done at Sungkai Wildlife Reserve (SWR), Perak in June 2014 to record the odonate diversity of the areas. Twenty-one species from seven families were collected, namely Libellulidae with seven species, Protoneuridae and Chlorocyphidae (four species each), Calopterygidae and Euphaeidae (two species each), and Platycnemididae and Coenagrionidae with a single species respectively. Despite the short collection period, this area showed a rich odonate fauna but further survey is needed to obtain a complete picture. The results formed the first checklist of odonate fauna here and may serve as baseline information for future research towards habitat monitoring, conservation and management of SWR." (Authors)] Address: Izzat-Husna, M., School of Marine and Environmental Sciences, Universiti Malaysia Terengganu, 21030 Kuala, Terengganu, Terengganu, Malaysia. E-mail: amirrudin@umt.edu.my; izzat_1166@yahoo.com

21919. Jurkiewicz-Karnkowska, E.; Zontek, M.A. (2014): Ocurrence and domination relations of benthos organisms accompanying mollusc species in the Nature Reserve Stawy Siedleckie. In: Sposób cytowania: Górski P. 2014. Kleszcze rezerwatu Stawy Siedleckie. [W:]+ M. Falkowski, K. Nowicka-Falkowska, M. Omelaniuk (red.). Bogactwo przyrodnicze rezerwatu Stawy Siedleckie. Monografia Przyrodnicza. s. 57, Siedlce: 145-150. (in Polish, with English summary) ["In the collected samples, representatives of 12 higher taxonomical units of invertebrates were noted. Hey were: Annelida, Hirudinea, Oligochaeta, Arachnida, Odonata, Coleptera, Crustacea, Diptera, Ephemeroptera, Hemiptera. Lepidoptera, Megaloptera and Nematoda. In the scale of the whole nature reserve the dominant group of macrofauna accompanying mollusk species were representatives of the order Hemiptera. The highest benthos biodiversity was observed in fishponds "Stary" and the lowest – in fishpond "Wyrostkowy". Fishpond "Stary" was distinguishable by the largest vegetation cover (61%), that was the result of its ageing due to fish farming cessation, whereas fishpond "Wyrostowy" was intensively used (intensive fish farming, periodic rising and lowering of water level)." (Authors)] Address: Jurkiewicz-Karnkowska, Ewa, Zak³ad Turystyki i Rekreacji, Instytut Nauk o Zdrowiu, Uniwersytet Przyrodniczo-Humanistyczny, ul. B. Prusa 12, 08-110 Siedlce, Poland. Email: karnkowska@uph.edu.pl

21920. Kiszewski, A.E.; Teffera, Z.; Wondafrash, M.; Ravesi, M.; Pollack, R.J. (2014): Ecological succession and its impact on malaria vectors and their predators in borrow pits in western Ethiopia. Journal of Vector Ecology 39(2): 414-423. (in English) ["Soil pits excavated for home construction are important larval habitats for malaria vectors in certain parts of Africa. Borrow pits in diverse stages of ecological succession in a maize-farming region of Western Ethiopia were surveyed to assess the relationships between stage of succession and the structure and composition of invertebrate and plant communities, with particular attention to Anopheles gambiae s.l. and An. coustani, the primary local malaria vectors. An array of 82 borrow pits was identified in a multi-lobed drainage basin in the community of Woktola. Each pit was evaluated on its physical features and by faunal and floral surveys during August, 2011, at the height of the longer rainy season (kiremt). Anopheles gambiae s.l. and An. coustani were the sole immature anophelines collected, often coexisting with Culex spp. Sedges were the most common plants within these pits, and included Cyperus elegantulus, C. flavescens, C. erectus and C. assimilis. The legume Smithia abyssinica, Nile grass (Acroceras macrum), cutgrass (Leersia hexandra), clover (Trifolium spp.), and the edible herb Centella asiatica, were also common in these habitats. No plant species in particular was strongly and consistently predictive of the presence or absence of mosquito immatures, particularly with regard to An. coustani. The presence of An. gambiae s.l. immatures in borrow pit habitats was negatively correlated with the presence of backswimmers (Notonectidae) ($Z = -2.34$, $P = 0.019$). Young (freshly excavated) borrow pits more likely contained immature An. gambiae s.l. ($Z = -2.86$, $P=0.004$). Ecological succession was apparent in older pits, and as they aged, they became less likely to serve as habitats for An. gambiae s.l. ($Z=0.26$, $P=0.796$), and more likely to support An. coustani ($Z=0.728$, $P=0.007$). As borrow pits age they become less suitable for An. gambiae s.l. breeding and more likely to harbor An. coustani. The abundance of notonectids in habitats was a negative indicator for An. gambiae s.l. abundance. Plant species are not reliable indicators for the presence or absence of malaria vectors in borrow pits. ... Odonata were also highly represented with dragonflies from the family Lestidae in over 51% of sites, and 33% of sites bearing specimens from the family Aeshnidae … Backswimmers (Notonectidae) and dragonfly naiads (odonates) were found to be the most efficient arthropod predators of immature An. ... While dragonfly nymphs have previously been found to be effective predators of anopheline immatures ...] (Authors) Address: Kiszewski, A.E., Dept of Natural and Applied Sciences, Bentley Univ., Waltham, MA 02452, USA. E-mail: akiszewski@bentley.edu

21921. Klecka, J.; Boukal, D.S. (2014): The effect of habitat structure on prey mortality depends on predator and prey microhabitat use. Oecologia 176(1): 183-191. (in English) ["Structurally complex habitats provide cover and may hinder the movement of animals. In predator–prey relationships, habitat structure can decrease predation risk when it provides refuges for prey or hinders foraging activity of predators. However, it may also provide shelter, supporting

structures and perches for sit-and-wait predators and hence increase their predation rates. We tested the effect of habitat structure on prey mortality in aquatic invertebrates in short-term Lab. predation trials that differed in the presence or absence of artificial vegetation. The effect of habitat structure on prey mortality was context dependent as it changed with predator and prey microhabitat use. Specifically, we observed an 'anti-refuge' effect of added vegetation: phytophilous predators that perched on the plants imposed higher predation pressure on planktonic prey, while mortality of benthic prey decreased. Predation by benthic [Libellula depressa, Platycnemis pennipes, Sympetrum sanguineum, Coenagrion sp.] and planktonic predators on either type of prey remained unaffected by the presence of vegetation. Our results show that the effects of habitat structure on predator–prey interactions are more complex than simply providing prey refuges or cover for predators. Such context-specific effects of habitat complexity may alter the coupling of different parts of the ecosystem, such as pelagic and benthic habitats, and ultimately affect food web stability through cascading effects on individual life histories and trophic link strengths." (Authors)] Address: Klecka, J., Dept of Ecosystems Biology, Faculty of Science, Univ. of South Bohemia, Branišovská 31, Èeské Budìjovice, 37005, Czech Republic. E-mail: jan.klecka@eawag.ch

21922. Orwa, P.O.; Omondi, R.; Okuku, E.; Ojwang, W.; Njuguna, S.M. (2014): Composition, abundance and feeding guilds of macroinvertebrates in lake Kenyatta, Kenya. International Journal of Environmental Monitoring and Analysis 2(5): 239-243. (in English) ["In an attempt to describe the benthic macroinvertebrate assemblage of Lake Kenyatta and recommend possible interventions for sustainable management, sampling was done at different stations using an Eckman grab and a scoop net. At each station, six samples were taken (three grabs and three scoops). The samples were washed using a 300ìm sieve, sorted live and identified to genus level and where possible to species level using appropriate keys. The specimens were further categorized into functional feeding guilds. The data were then analysed for diversity, evenness, abundance and dominance. Forty two species in 25 families and 13 orders were recorded [including 13 odonate taxa]. The organisms were further grouped into 4 functional feeding groups. The order Pulmonata dominated the macroinvertebrates sampled with 34.3% relative abundance while the lowest were Rhynchobdellida and Lepidoptera with 0.3% each. The high abundance of mollusks in the lake is probably an indication of absence of a predator. It is thus recommended that a fish species be introduced to convert these mollusks into fish biomass. This will enhance the economic gains and reduce the risk of bilhazia infestation since the host snail exists within the lake." (Authors) Anax imperator, Aeshna ellioti, Ictinogomphus ferox, Brachythemis leucosticta, Chalcostephia flavifrons, Sympetrum fonscolombii, Trithemis aurora, T. aconita, T. annulata, T. bifida, T. dorsalis, Urothemis assignata, Platycnemis sp] Address: Orwa, P.O., Kenya Marine and Fisheries Research Institute, Kisumu, Kenya

21923. Perveen, F.; Khan, A.; Rauf, S.A. (2014): Key for first recorded dragonfly (Odonata: Anisoptera) fauna of District Lower Dir, Khyber Pakhtunkhwa, Pakistan. Insects Review 1(2): 26-35. (in English) [" The present research was the first record of 318 specimens of dragonflies from district Lower Dir (LD), Khyber Pakhtunkhwa, Pakistan collected during May-July 2011. Among the specimens collected there were 11 species, 7 genera and 3 families. The number of specimens collected in each family were 17 Cordulegasteridae (5.3%), 18 Gomphidae (5.7%), and 283 Libellulidae (89.0%). All cordulegastrids were the golden ringed, Cordulegaster brevistigmata brevistigmata Selys. All gomphids were Clubtails, Onychogomphus bistrigatus Selys. Libellulids species were: blue or black percher, Diplacodes lefebvrei (Rambur); ground skimmer, D. trivialis Rambur; black tailed skimmer, Orthetrum cancellatum (L); common red skimmer, O. pruinosum neglectum (Rambur); slender skimmer, O. sabina (Drury); triangle skimmer, O. triangulare triangulare (Selys); wandering glider or global skimmer, Pantala flavescens (Fabricius); spine legged redbolt, Rhodothemis rufa (Rambur) and common skimmer, Sympetrum decoloratum Selys. A dichotomous key based on external morphology, coloration and wing venation was prepared to facilitate the identification of the dragonfly fauna of the LD and aid conservation efforts of dragonflies in Pakistan." (Authors)] Address: Perveen, Farzana, Depts of Zoology, Shaheed Benazir Bhutto Univ. (SBBU), Main Campus, Sheringal, Khyber Pakhtunkhwa, Pakistan

21924. Setiawan, D.D.; Prihaatin, J.; Suratno. (2014): Diversity of dragonfly (Orddo Odonata) at area PTP Nusantara X area Ajung District Jember regency. Artikel Ilmiah Hasil Penelitian Mahasiswa Tahun 2014 - Scientific Articles of Student Research Results in 2014: 3 pp. (in Indonesian, with English summary) ["Conceptually, basic skill Biol. education is student's effort to embrace the biology learning concept through real object observation process, between variables, collect and proceed the data, analize the research result and do the experiment. One of the important things that must do by the teacher for increasing learning teaching process quality is by using the environment as a learning source. Dragonfly diversity (Odonata Order) in the area of PTP Nusantara X Kecamatan Ajung Kabupaten Jember could be one of alternative learning source. The objective of this research is to discover the diversity of dragonflies in area of PTP Nusantara X Kecamatan Ajung Kabupaten Jember and it's usage as dragonfly field guide book. Dragonfly samples was taken by using the random cluster sampling method and the diversity is analyzed using Shannon-Wiener diversity index. The diversity was analized using Shannon-Wiener Diversity Index. The Dragonfly that had been found is consist of 14 species that is included in 5 families. The result of this study is developed for insect field guide book that can be used by the teacher as a supporting references book in the learning process. This field guide book was contained pictures of species, descriptions, and glossary that can help readers understand Latin terms. Score of validation test of product is equal to 88,75. Based on the result of validation test products, the field guide book is recommended as one of alternative learning source in school." (Authors)] Address: Setiawan, D.D., Jurusan Pendidikan MIPA, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Jember, Jln. Kalimantan 37, Jember 68121, Indonesia. Email: jekti_pr@yahoo.com

21925. Theischinger, G.; Kalkman, V.J. (2014): The genus Teinobasis on the Bird's Head Peninsula and the Raja Ampat Islands, Indonesia (Odonata: Coenagrionidae). Odonatologica 43(3/4): 143-168. (in English) ["An overview of the genus Teinobasis on the Bird's Head Peninsula and the Raja Ampat Islands in Indonesia is given. Four new species, T. aquila, T. lieftincki, T. michalskii, and T. splendens, are described from the area and one probably new species is described but left unnamed. New material of six other species, T. buwaldai, T. pretiosa, T. pulverulenta, T. rufithorax, T. cf. superba, and T. wallacei, is brought on record. A key

to the males of the twelve species known from the region is included and colour illustrations of males of eight species and females of five species are given." (Authors)] Address: Theischinger, G., Water Science, Office of Environment and Heritage, NSW Dept of Planning and Environment, PO Box 29, Lidcombe, NSW 1825, Australia. E-mail: gunther.theischinger@environment.nsw.gov.au

21926. Walsh, C.J.; Bloink, C.; Hehir, G. (2014): Preliminary report on macroinvertebrate assemblages of Pyrites and Goodmans Creek in relation to the management of Merrimu Reservoir: patterns in 2013 in early stages of flow manipulation. Melbourne Waterway Research-Practice Partnership Technical Report 14.8. Waterway Ecosystem Research Group, The Univ. of Melbourne: 17 pp. (in English) ["Environmental flow management requires understanding of the degree to which the natural flow regime must be replicated to protect ecological structure and function of streams. A basic requirement, particularly in the application of environmental flow management to intermittent streams, is a robust understanding of ecological responses to different aspects of the flow regime. This report presents an analysis of macroinvertebrate assemblage composition in two intermittent streams, Pyrites and Goodmans creeks, in the early stages of an environmental flow program in the lower reaches of Pyrites Creek. Both creeks have segments with augmented flows that are used as water supply conduits, and Pyrites Creek has a large water supply reservoir, which greatly reduces the variability and volume of flow downstream, while producing a small permanent flow through leakage for several kilometres downstream. We assess the nature of variation in assemblage composition, between the two creeks, along each creek, and among the segments with differing flow regimes. Specifically, we aimed to assess the likely effects on assemblage composition of a) the use of the streams as water supply conduits and b) Merrimu reservoir (Pyrites Creek only) in its pre-2014 flow management. Finally, we considered appropriate analytical approaches for assessing changes resulting from environmental flow releases from Merrimu reservoir now and in the future. Pyrites Creek macroinvertebrate assemblage composition downstream of the reservoir was distinct from all other sites. The permanently flowing sites downstream of the reservoir were in substantially worse condition than most other sites, with a much greater dominance of scrapers (algal grazers) than other sites. This suggests a shift in trophic functioning of the stream from a riparian-organic-matter-dominated foodweb to an algal-dominated one. The higher abundance of scrapers (primarily several snail families and notonemourid stoneflies) and other disturbance-tolerant families was accompanied by an absence or low abundance of a range of sensitive families. In the Pyrites Creek segment further downstream, in which the small permanent flow transitioned into intermittency with reduced flows, the macroinvertebrate assemblage showed greater similarity to upstream, intermittent sites. Intermittent sites with augmented flows differed in assemblage condition from other intermittent sites and had higher family richness. The most upstream intermittent sites were more similar to the Pyrites Creek sites downstream of the reservoir, than to other upstream sites, which we hypothesize is a result of those sites having shorter and less reliable wet periods or being at a later stage of the annual drying cycle than others. The dominance of scrapers downstream of the reservoir suggests that a strong, detectable change in assemblage composition to an assemblage more dominated by riparian inputs of organic matter is possible, if environmental flow releases adequately mimic the magnitude and frequency of high-flow events capable of scouring biofilms. However, transfer rates limit capacity to use flows to scour the stream bed and remove the stands of Typha that have colonized the channel downstream of the reservoir. Thus changes to assemblage composition are likely to be limited. The large seasonal variability in intermittent streams such as these, present challenges for robust monitoring of changes resulting from management actions. As much temporal replication of sampling as possible is recommended. Spatial autocorrelation among sites points to the need to use Bayesian statistical methods for future analyses, comparing 2013 assemblage patterns with those in future years following longer periods of ongoing environmental flow management." (Authors) The paper includes two references to aeshnids.] Address: cwalsh@unimelb.edu.au

2015

21927. Lucic, A.; Paunovic, M.; Tomovic, J.; Kovacevic, S.; Zoric, K.; Simic, V.; Atanackovic, A.; Markovic, V.; Kracun-Kolarevic, M.; Hudina, S.; Lajtner, J.; Gottstein, S.; Miloševic, D.; Andus, S.; Žganec, K.; Jaklic, M.; Simcic, T.; Vilenica, M. (2015): Aquatic macroinvertebrates of the Sava River. The Sava River. The Handbook of Environmental Chemistry 31: 335-359. (in English) ["The objective of this chapter is to present the data on aquatic macroinvertebrate communities along the Sava River, based on investigation performed during 2011 and 2012 at 12 sampling sites within the sector between Vrhovo (Slovenia) and Belgrade (confluence to the Danube). During our study 227 macroinvertebrate taxa were recorded in the Sava River. Having in mind that upper stretch of the Sava River was not covered by this work (alpine and subalpine stretch), as well as based on the review of previous works on the macroinvertebrate fauna of the Sava River, more than 300 species will be confirmed for the Sava River. The data on the distribution of aquatic macroinvertebrates revealed five different stretches — alpine, subalpine, Upper Sava plain, Middle Sava and Lower Sava. Physical habitat degradation, pollution and pressure caused by biological invasions were found to be the main factors of endangerment of aquatic macroinvertebrate fauna diversity. There is an obvious need for further investigation of the Sava River in order to complete the data on aquatic macroinvertebrates and to provide the basis for accurate assessment of environmental status of the river." (Authors) The occurrence of Coenagrion mercuriale is questionable.] Address: Paunovic, M., Institute for Biological Research “Sinisa Stankovic”, Univ. of Belgrade, 142 Bulevar Despota Stefana, Belgrade, Serbia. E-mail: mpaunovi@ibiss.bg.ac.rs

21928. Remm, L.; Lõhmus. A.; Maran, T. (2015): A paradox of restoration: prey habitat engineering for an introduced, threatened carnivore can support native biodiversity. Oryx 49(3): 559-562. (in English) ["Conservation of charismatic vertebrates in modern landscapes often includes habitat engineering, which is well supported by the public but lacks a consideration of wider conservation consequences. We analysed a pond management project for an introduced island population of captive-bred, Critically Endangered European mink Mustela lutreola. Ponds were excavated near watercourses in hydrologically impoverished forests to support the main prey of the mink (brown frogs Rana temporaria and Rana arvalis). A comparison of these ponds with other, natural, water bodies revealed that the (re)constructed ponds could reduce food shortages for the mink. Moreover, the ponds provided habitat for macroinvertebrates that were uncommon in the managed forests in the study area,

including some species of conservation concern. The cost-effectiveness of the management of charismatic species can be increased by explicitly including wider conservation targets at both the planning and assessment stages. ... Dragonflies and damselflies were found only in the (re)constructed ponds, including two species of European conservation concern: Aeshna viridis and Nehalennia speciosa." (Authors)] Address: Remm, Liina Remm, Dept Zoology, Inst. Ecology and Earth Sciences, Univ. of Tartu, Vanemuise Street 46, EE-51014 Tartu, Estonia. E-mail liina.remm@ut.ee

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21929. Buchsbaum, R.; Leahy, C.W.; Allison, T. (2016): Distribution and abundance of Odonata species across Massachusetts: Results of a long-term monitoring program. Northeastern Naturalist 23(4): 501-524. (in English) ["Surveys of Odonata were carried out at Mass Audubon wildlife sanctuaries in all regions of the state and in multiple habitats. Our goals were to provide a comprehensive look at patterns of species distribution and relative species richness across Massachusetts and compare surveys where effort was and was not controlled. Observers encountered a total of 146 species, 11 of which were very widespread, having been recorded at more than 40 of the 54 properties examined. Thirty-five species were relatively rare, occurring at only 1 or 2 sanctuaries. A few sanctuaries were particularly notable for supporting somewhat uncommon species. These sites were not located in any particular ecoregion, but reflected local conditions. In surveys where effort was not controlled, a regression analysis indicated that about two thirds of the variation in species richness among sanctuaries could be explained by the amount of observer effort, the size of the sanctuary, and the extent of wetland habitat. Quantitative surveys that used transects or point counts to control for sampling effort resulted in observation of fewer species, including state-listed taxa, compared to the non-quantitative surveys. Despite producing fewer species, data from these quantitative surveys can be used to make statistical comparisons with data from future studies and detect changes over time in species richness, abundance, and frequency of occurrence." (Authors)] Address: Buchsbaum, R., Mass Audubon, 346 Grapevine Road, Wenham, MA, USA

21930. Docile, T.N.; Figueiró, R.; Portela, C.; Nessimian, J.L. (2016): Macroinvertebrate diversity loss in urban streams from tropical forests. Environmental Monitoring and Assessment 188(4):237: (in English) ["The increase of human activities in recent years has significantly interfered and affected aquatic ecosystems. In this present study, we investigate the effects of urbanization in the community structure of aquatic macroinvertebrates from Atlantic Forest streams. The sampling was conducted in the mountainous region of the State of Rio de Janeiro, Brazil in 10 urban and 10 preserved streams during the dry season (August–September) of 2012. The streams were characterized for its environmental integrity conditions and physico-chemical properties of water. The macroinvertebrates were sampled on rocky substrates with a kicknet. A total of 5370 individuals were collected from all streams and were distributed among Ephemeroptera, Odonata, Plecoptera, Hemiptera, Megaloptera, Coleoptera, Trichoptera, Lepidoptera, and Diptera. In urban sites, all those orders were found, except Megaloptera, while only Mollusca was not found in preserved streams. We performed a non-metric multidimensional scaling (NMDS) analysis that separated two groups distributed among sites in urban communities and another group outside this area. The dominance was significantly higher at urban sites, while the a diversity and equitability were greater in preserved sites. A canonical correspondence analysis (CCA) was also performed, indicating that most taxa associated with high values of the Habitat Integrity Index (HII) and a few genus of the order Diptera with the high values of ammonia, total nitrogen, associated to streams in urban sites. Urban and preserved streams differ by physical-chemical variables and aquatic macroinvertebrates. In urban streams, there is most dominance, while a diversity and equitability are higher in preserved streams." (Authors)] Address: Docile, Tatiana, Lab. Entomologia, Depto de Zoologia, Inst. de Biologia, Universidade Federal do Rio de Janeiro (UFRJ), CCS, Bloco A, sala A1-107, Av. Carlos Chagas Filho, 373, Rio de Janeiro, Rio de Janeiro, Brazil. E-mail: tatidocile@gmail.com

21931. Onishko, V. (2016): [Spring dragonfly fauna (Odonata) in the northern surroundings of the Utrish Nature Reserve and some information on ecology of species]. Educational and research practices in European Russia. Collection of research papers of students of the Young Naturalists' Club of the Zoological Research Museum of Moscow State Univ. named after MV Lomonosov and methodological materials for them (edited by M. V. Kalyakin and E. A. Dunaev), 2016: 175-179. (in Russian) ["Conclusions 1. At least 27 odonate species live in the vicinity of the Utrish Reserve, Russia (for a more complete picture, it is necessary to explore the region in the middle and end of summer). 2. The background and most abundant species of the region are Platycnemis pennipes, Orthetrum albistylum, Anax parthenope and Anaciaeschna isosceles. 3. The richest biotope in terms of species composition is the lake in the village. Sukko (85.2% of all identified species). 4. For the first time in the region, Pyrrhosoma nymphula, Caliaeschna microstigma and Brachytron pratense were recorded. 5. For such rare species as Anax ephippiger, more accurate dates of seasonal migrations and distribution on the Black Sea coast of Russia have been made. Findings of Caliaeschna microstigma and Pyrrhosoma nymphula significantly expand the ranges of these species." (Author/Google translate)] Address: Onishko, V., Moscow Zoo, 1 Bolshaya Gruzinskaya Str., 123242, Moscow, Russia. E-mail: wervolf999@yandex.ru

21932. Seehausen, M.; Dow, R.A. (2016): Morphological studies and taxonomic considerations on the 'reddish-brown-winged' group of Neurothemis Brauer, 1867 with the description of N. taiwanensis sp. nov. (Odonata: Libellulidae). International Dragonfly Fund - Report 93: 1-101. (in English) ["Specimens of Neurothemis disparilis Kirby, 1889, N. fluctuans (Fabricius, 1793), N. fulvia (Drury, 1773), N. ramburii (Brauer, 1866), N. stigmatizans (Fabricius, 1775) and N. terminata Ris, 1911, including their subspecies, were studied with the main focus on the morphology of the vesica spermalis, wing maculation, wing venation, abdominal markings and vulvar scales. The results were compared with species descriptions and directly with type specimens where possible. The vesica spermalis, especially the medial process, is useful at least in separating species groups and supports the traditional differentiation methods using wing maculation and venation. The use of other characters in accessing specific status, coupled with known distribution patterns, is discussed. The following taxonomic changes are proposed: Neurothemis manadensis (Boisduval, 1835) stat. nov., Neurothemis papuensis (Lieftinck, 1942) stat. nov. and Neurothemis taiwanensis sp. nov. is described (27.5.1998, Kenting, Pingtung County/Taiwan, L. M. Juang leg.; holotype is deposited at Taiwan Forestry Research Institute, Taipeh, Taiwan). The type of Polyneura palliata Rambur, 1842 was re-discovered at MNHN and designated as lectotype; a lectotype

for Neurothemis nicobarica Brauer, 1867 housed at NHMW is designated. The holotype of Neurothemis incerta Brauer, 1867 was re-discovered and synonymized with N. ramburii." (Authors)] Address: Seehausen, Waldhöhe 9a, D-24306 Plön, Germany. Email: m.seehausen@gmx.de

21933. Underhill, L.G.; Navarro, R.; Manson, A.D.; Labuschagne, J.P.; Tarboton, W.R. (2016): 2016. OdonataMAP: progress report on the atlas of the dragonflies and damselflies of Africa, 2010–2016. Biodiversity Observations 7.47: 1-10. (in English) ["In the six years since the OdonataMAP section of the ADU Virtual Museum started in 2010, a total of 22,809 submissions have been made. 8,438 (37%) records were submitted in the sixth year of the project, highlighting the dramatic growth of OdonataMAP. Records had been submitted for 31 countries in Africa 20,339 (89%) were from South Africa. Seven countries all in the southern third of Africa had more than 100 records: Botswana (213), Malawi (441), Mozambique (157), Namibia (145), Swaziland (556), Zambia (259) and Zimbabwe (144). Of the records for South Africa, 7,597 (37%) had been submitted from KwaZulu-Natal. Two other provinces had more than 2,000 records: Limpopo with 2,845 and the Western Cape with 2,275." (Authors)] Address: Underhill, L.G., Animal Demography Unit, Dept of Biological Sciences, Univ. of Cape Town, Rondebosch, 7701 South Africa

2017

21934. Finotello, S.; Feckler, A.; Bundschuh, M.; Johansson, F. (2017): Repeated pulse exposures to lambda-cyhalothrin affect the behavior, physiology, and survival of the damselfly larvae Ischnura graellsii (Insecta; Odonata). Ecotoxicology and Environmental Safety 144: 107-114. (in English) ["Highlights: •Pyrethroids can have negative impact on behaviour, physiology, and survival on non-target organisms. •We simulated natural frequent runoff events of the pyrethroid lambda-cyhalothrin in a Lab. study on damselfly larvae. •Prey capture success on prey decreased significantly following lambda-cyhalothrin exposures compared to the control. •We found a lower growth rate (up to ~20%) and lipid content (up to ~30%) of damselflies at 50 and 250 ng lambda-cyhalothrin L^{-1}. •Long-term exposure towards lambda-cyhalothrin pulses at concentration found in nature can affect damselfly behaviour, physiology and survival. Abstract: Damselflies form an essential part of the aquatic and terrestrial food web. Pesticides may, however, negatively affect their behaviour, physiology, and survival. To assess this, a 42-day-lasting bioassay was conducted, during which damselfly larvae (Ischnura graellsii; n = 20) were repeatedly exposed to lambda-cyhalothrin (3 days at; 0, 10, 50, 250, 1250, and 6250 ng LCH L^{-1}), followed by recovery phases (4 days) in pesticide-free medium for six weeks. This exposure design was used to simulate frequent runoff events in the field. Variables related to the behaviour (strikes against prey and capture success), growth, physiology (lipid content and fatty acid composition), as well as mortality were assessed throughout the experiment. The two highest LCH concentrations induced 100% mortality within the first 48 h, whereas 85% of the test organisms survived 28 days under control conditions. The number of strikes against prey was not affected by LCH. In contrast, prey capture success decreased significantly (up to ~50% at 250 ng LCH L^{-1}, for instance, after the third pulse exposure) following LCH-exposures compared to the control. This difference was not observed after recovery phases, however, which did not counteract the enhanced energy demand for detoxification and defense mechanisms indicated by a lower growth rate (up to ~20%) and lipid content (up to ~30%) of damselflies at 50 and 250 ng LCH L^{-1}. In addition, two essential fatty acids (eicosapentaenoic acid and arachidonic acid) and two precursors (linolenic acid and a-linolenic acid) decreased in their concentrations upon exposure towards 250 ng LCH L^{-1}. Thus the results of this study indicate that long-term exposure towards LCH pulses can affect damselfly behaviour, physiology and survival. Given the essential role of damselflies in food web dynamics, these effects may potentially translate into local population impairments with subsequent bottom-up directed effects within and across ecosystem boundaries." (Authors)] Address: Johansson, F., Animal Ecology, Dept of Ecology & Genetics, Uppsala Univ., Uppsala, Sweden. Email: frank.johansson@ebc.uu.se

21935. Gassmann, D. (2017): Unerschöpfliche Vielfalt: neue Libellenarten (Odonata) aus Papua-Neuguinea. Jahresbericht 2015/16, Zoologisches Forschungsmuseum Alexander Koenig: 10-12. (in German) [Verbatim: "The insect and arthropod fauna of the Papuan biogeographical region, which stretches south of the equator from the Moluccas in the west to the vast island of New Guinea and the Solomon Islands in the east, remains largely unexplored. In principle, this could also apply to the Papuan dragonflies, especially since only a handful of systematists (including the author) are working on this group today. However, it is mainly thanks to the Dutch entomologist Maurits A. Lieftinck (1904-1985), who described more than half of the species known today, that we know the dragonfly fauna of New Guinea and the surrounding islands comparatively better than other insect groups in the region. According to current knowledge, the Papuan dragonflies with about 600 species make up about 12% of the global odonate fauna. Dragonflies are semi-aquatic insects whose larvae (or better: nymphs) live predatory in the water before they leave it to hatch and conquer the airspace as adults. As a guest researcher in the Arachnida Dept, which curates the ZFMK dragonfly collection, I have been able to contribute to research on the biodiversity of this group for more than two years, building on my previous work at the Naturalis Biodiversity Center in Leiden/Netherlands. The publication of a complete annotated and illustrated list of species from one of my previous trips to northern New Guinea and the Bismarck Archipelago fell during this period. In addition to the new species already described in previous years, the final evaluation of this expedition yielded some remarkable new distribution data and first records for islands in the Bismarck Archipelago. Subsequently, a number of new species from Papua New Guinea were described in collaboration with Australian and American colleagues. This work was based in large part on the recent collections of Dr. Stephen J. Richards associated with the South Australian Museum in Adelaide as a herpetologist and odontologist. Reference specimens in the form of paratypes of two of these species could be retained for the ZFMK collection. Surely the most spectacular first description that comes from this cooperation is that of Macrocnemis gracilis, for which a new genus had to be set up, since the examination of the morphological characteristics initially did not allow a clear family relationship. In addition, M. gracilis, with a wing length of around three centimeters and an abdomen length of almost five centimetres, is the largest feathered dragonfly from the subfamily Idiocnemidinae and thus one of the largest dragonfly damselflies in the Papuan region. The species and genus is only known from the montane rainforest of the Hindenburg Mountains, a remote region in western Papua New Guinea. An interesting redescription in 2016 was that of Pseudagrion woodlarkensis from Woodlark Island, far east of New Guinea. The genus Pseudagrion (Elf Maidens),

restricted to the Old World, represents the largest genus of slender dragonflies (Coenagrionidae) and also occurs in the Papuan region with around a dozen species. The new species is characterized by the very complex abdominal appendages of the males. Similar structures are only found in two other Pseudagrion species from mainland New Guinea. The pretty, bright yellow forehead dragonfly can be considered endemic to Woodlark, possibly including some outlying islands, and has been found on medium-sized streams with rich riparian vegetation, even in moderately disturbed habitats. In addition to P. woodlarkensis, only one other potentially endemic woodlark dragonfly species is known. However, expeditions to the archipelagos off New Guinea repeatedly lead to the discovery of new dragonfly species. Only in 2011 did I describe another new Pseudagrion species from the largest Bismarck Island, New Britain. Like Woodlark's Pseudagrion, it was by no means rare on the island; only there are comparatively few entomologists who venture into this remote part of the world and recognize new species as such. The series of new Papuan dragonfly species was supplemented in 2016 by the first description of Idiocnemis schorri. From the species-rich genus Idiocnemis, which I had already subjected to a taxonomic revision several years ago, potentially new species from southern Papua New Guinea have repeatedly appeared in recent years. Of the new, handsomely marked species, specimens were available from the foothills of the Müller Mountains, the aforementioned Hindenburg Mountains, and the Kikori Basin, all regions of southern Papua New Guinea. Once again the new species showed the strong radiation of endemic genera in the New Guinea region and at the same time demonstrated how incomplete our knowledge of the dragonfly diversity of southern New Guinea is, from where I am currently working on one or two other new Idiocnemis species. Obtaining such data on biodiversity is of crucial importance for the protection of nature and species in the region. Many of the new species have been and are being discovered as part of Rapid Biodiversity Assessments organized by NGOs (Non-Governmental Organizations) such as Conservation International and the Wildlife Conservation Society. The rapid inventory of the species spectrum and the analysis of endemism patterns in the often completely unexplored rainforest areas is the basis for initiating protective measures and provides the biological facts to give them more weight. In the Koenigiana and in two public evening lectures at the ZFMK and the Natural History Museum in Braunschweig, I reported on my work to a wider audience. The ongoing processing of New Guinean and especially Philippine dragonfly collections in the ZFMK collection will be reported elsewhere. My taxonomic work was financially supported by the International Dragonfly Fund (IDF) in 2016." (Author/Google translate)] Address: Gassmann, D., Arachnida Section, Zoological Research Museum Alexander Koenig, Bonn, Germany. Email: d.gassmann@leibniz-zfmk.de

21936. Rapantová, L. (2017): Vážky (Odonata) Kokotských rybníkù na Rokycansku - Dragonflies of the Kokot ponds near Rokycany. Diplomová práce, Západoèeská Univerzita v Plzni, Fakulta Pedagogická, Centrum Biologie, Geovìd a envigigiky: 45 pp, appendix (in Czech, with English summary) ["The aim of this thesis was to contribute to the research on the distribution of dragonfly in the Czech Republic. The essence of the research was to compile a list of the Odonata species that have been discovered at Kokot Ponds during the research for the thesis and consequently to perform the qualitative and quantitative analysis for the purpose of mapping the fauna quadrate 6247. Another part of the research was to record the frequency of the individual types of weeds in the monitored area. This was the first time there has been a research conducted on this topic." (Author) https://dspace5.zcu.cz/handle/11025/28289 Calopteryx splendens, C. virgo, Chalcolestes viridis, Coenagrion hastulatum, C. puella, Enallagma cyathigerum, Erythromma najas, Ischnura elegans, Lestes sponsa, Sympecma fusca, Aeshna cyanea, A. grandis, A. mixta, Anaciaeschna isoceles, Anax imperator, Cordulia aenea, Gomphus vulgatissimus, Leucorrhinia pectoralis, Libellula quadrimaculata, Orthetrum cancellatum, Somatochlora metallica, Sympetrum danae, S. sanguineum, S. vulgatum] Address: not stated

2018

21937. Adande, R.; Liady, M.N.L.; Bokossa, H.K.J.; Djidohokpin, G.; Zouhir, F.; Mensah, G.A.; Fiogbe, E.D. (2018): Utilisation rationnelle de fertilisants organiques pour la production de macroinvertébrés benthiques d'eau douce en pisciculture. Biotechnol. Agron. Soc. Environ. 2018 22(4): 12 pp. (in French, with English summary) [Benin; "Rational utilization of organic fertilizers for freshwater benthic macroinvertebrate production in fish farming. Description of the subject: This study aims to determine optimal conditions of rabbit manure utilization in freshwater benthic macroinvertebrate production in order to produce fish at low cost. Objectives: To determine the optimal dose of rabbit manure to be used for freshwater macroinvertebrate production. Method: Six treatments, including one control, received respectively 0%, 10%, 25%, 50%, 75% and 100% of rabbit manure compared to the substrate total volume. Cultures were carried out in buckets, which received 10 dm^3 of substrate, 16 dm^3 of groundwater and 4 dm^3 of fishpond water. The initial seeding density was 6 ind·dm^{-2} of odonates, 6 ind·dm^{-2} of annelids or (3 ind·dm^{-3}, for 0.5 m depth), 8 ind·dm^{-2} of chironomids or (4 ind·dm^{-3}) and 10 ind·dm^{-2} of mollusks or (5 ind·dm^{-3}). Physicochemical and biological parameters were measured during the 63 days of the experiment. Results: The highest densities of benthic macroinvertebrates were obtained within treatment T2, with 192 ± 1.20 ind·dm^{-2} of chironomids, 52 ± 0.8 ind·dm^{-2} of mollusks, 6 ± 0.33 ind·dm^{-2} of odonates and 6± 0.33 ind·dm^{-2} of annelids. Considering the depth of our experimental buckets (0.5 m), these highest densities also corresponded to respectively: 96 ± 1.20 ind·dm^{-3} of chironomids, 26 ± 0.8 ind·dm^{-3} of mollusks, 3 ± 0.33 ind·dm^{-3} of odonates [Libellulidae] and 2 ± 0.33 ind·dm^{-3} of annelids). The highest biomass of chironomids and mollusks was obtained within treatment T2, with respectively 728.1 ± 2.23 mg dry matter·dm^{-2} and 699.98 ± 22.49 mg dry matter·dm^{-2} (i.e. respectively 364.05 ± 2.23 mg dry matter·dm^{-3} and 349.99 ± 22.49 mg dry matter·dm^{-3}). Conclusions: Considering these results, treatment T2 with 140 g dry matter of rabbit manure·dm^{-2} of substrate (i.e. 75 g dry matter of rabbit manure·dm^{-3} of substrate) could constitute the optimal dose that could be recommended for the optimal production of freshwater benthic macroinvertebrates." (Authors)] Address: Adande, R., Université d'Abomey-Calavi (UAC). Faculté des Sciences et Techniques. Dépt de Zoologie. Lab. de Recherche sur les Zones Humides (LRZH). BP 526. Cotonou, Bénin. E-mail: richard_adande@yahoo.fr

21938. Ametov, Y.I.; Jumanov, M.A. (2018): Material on the ecology of shikra Accipiter badius in the lower stretches of the Amudarya. European Science Review DOI: 10.29013/ESR-18-9.10.1-9-12: 9-12. (in English) [Uzbekistan "The article provides material on shikra's ecology collected in the Lower Amudarya area in 2004, 2005, 2015 and 2016. It also describes the results of research into shikra's distribution, number, breeding biology and diet. The work gives recommendations for

the conservation of this bird." (Authors) Table 2 shows that invertebrates comprise 42.8% of the diet the shikra; 3,3% are dragonflies (n=3 specimens).] Address: Jumanov, M.A., Berdakh Karakalpak State Univ., Uzbekistan. Email: m.jumanov@karsu.uz

21939. del Val, L.; Murga, A.A. (2018): Primeras citas de Aeshna affinis (Vander Linden, 1820), Anax parthenope (Selys, 1839) y Anax ephippiger (Burmeister, 1839) (Odonata: Aeshnidae) en Cantabria (norte de la Península Ibérica). Boletín de la S.E.A. 62: 319-320. (in Spanish, with English summary) ["First records of A. affinis, A. parthenope and A. ephippiger in Cantabria province are provided. ... During the month of September 2017, the three species were located in the town of Noja, on the Cantabrian coast, the individuals being photographed and released without damage. A. affinis was observed on September 8, 2017 at 2:30 p.m., in a small freshwater lagoon (UTM 30T, 460356, 4812975, ETRS89; 0 m a.s.l.) located between the dune cord of the beach Trengandín and the north face of Mount Mijedo, which due to its limestone nature favors the presence of various freshwater outcrops and the formation of small lagoons in a predominantly saline environment. The presence of at least 2 ♂♂ in flight in a territorial attitude was verified, since there was a confrontation between them every time they met in the air. Anax ephippiger was observed in the same place, on September 27, 2017, between 1:45 p.m. and 2:45 p.m. They were located around 12-15 specimens in different attitudes. Some of the individuals flew over the sheet of water at the same time that mating and mating in tandem were observed. A. parthenope was located on September 28, 2017 at 1:00 p.m. It was a fairly old ♀, judging by its dark coloration, which was perched on a reed stem (P. australis) on the shores of the Victoria Marsh (UTM 30T, 458387, 4813151, ETRS89; 0 m a.s.l.)." (Authors)] Address: del Val, L., Técnico de medio ambiente en el P.N. Marismas de Santoña, Victoria y Joyel. (Ayuntamiento de Noja y Sociedad Española de Ornitología SEO/BirdLife). Carretera de Soano, nº 3, 39180 Noja, Cantabria, Spain. E-mail: ludovicodevega@hotmail.com

21940. Diaz-Martinez, C.; Evagelio Pinach, J.M. (2018): Primera cita de Selysiothemis nigra (Vander Linden, 1825) (Odonata, Libellulidae) en la provincia de Cuenca (centro-este de España) - First records of S. nigra in Cuenca province (east-center Spain). Boln. Asoc. esp. Ent. 42(3-4): 461-465. (in Spanish, with English title) ["The purpose of this note is to communicate the first records of S. nigra in the province of Cuenca, observed during the summer of 2018 in two locations: 1. Gravels of Casalonga. Municipality of Villar de Cañas, 806 m a.s.l. These are abandoned quarry holes currently clogged with water, forming a rosary of permanent lagoons surrounded by areas of seasonal flooding. The records presented correspond to the lagoons located at the UTM coordinates ETRS89 30S 536044/4408812 (lagoon 1) and 536062/4408559 (lagoon 2), with a surface area of 0.5 and 1 ha, respectively. 08/01/2018, 11:30 a.m.: 2 ♂♂, 1 ♀. The ♀ (was captured while perched on herbaceous vegetation 30 m from Lagoon 2. The two ♂♂ flew over the surface of the water in Lagoon 1, chasing each other and other odonates flying in the area away. 08/05/2018, 12:00 pm: 3 ♂♂ and a mating tandem, all of them perched on different tamarisk (Tamarix L.) feet. The ♂♂ were in lagoon 2 and the tandem, one meter from lagoon 1. 08/23/2018, 1:30 p.m.: 1 ♂, which was photographed in the vicinity of lagoon 2. 2. Irrigation pond. Place of La Trapera, municipal term of La Almarcha, UTM ETRS89 30S 557501/4394166, 840 m altitude. It is an artificial pond for irrigation of 2.90 ha and deep water (Fig. 1d). It is waterproofed with clay, which allows the development of aquatic vegetation and an incipient colonization of the shores by marshy (reed) and woody (tarayes and some poplar) vegetation. 08/11/2018, 5:10 p.m.: 1 ♂ perched on a tamarisk, which was captured and photographed." (Authors/Google translate)] Address: Diaz-Martinez, Cecilia, Dirección Provincial de la Consejería de Agricultura, Medio Ambiente y Desarrollo Rural en Cuenca. Junta de Comunidades de Castilla-La Mancha, Spain. E-mail: ceciliad@jccm.es

21941. Ruffoni, A.; Barbotte, Q.; Boeglin, Y.; Soissons, A.; Brunet, S. (2018): État des lieux sur la répartition actuelle de Coenagrion ornatum en France. Revue scientifi que Bourgogne-Franche-Comté Nature 27: 310-313. (in French) ["An (almost) Burgundian specialty, C. ornatum (Selys, 1850) is present in Europe mainly in the south-east and becomes rarer going west. Its situation is worrying, the number of stations in the heart of its major area of occupation tends to decrease, in addition to its regression at the margins (Boudot & Kalkman, 2015). The westernmost sector of presence is currently located in France, straddling 3 regions (the Alsatian populations have disappeared); Centre-Val-de-Loire, Bourgogne-Franche-Comté and Auvergne-Rhône-Alpes, the largest populations being located in the Depts of Nièvre and Saône-et-Loire. Provisional assessments of the state of knowledge were carried out for the Center of France in 2002 (Grand, 2002) and for Burgundy in 2011 (Ruffoni et al., 2013). C. ornatum lives in small, slow-flowing streams and seeping springs in grazed meadows in a bocage context. Its situation remains fragile (NT) in France and Burgundy (IUCN France et al., 2016; Ruffoni, 2014). Currently, the French core seems increasingly isolated. The nearest population is now more than 300 kilometers away." (Authors/Google translate)] Address: Ruffoni, A., Société d'histoire naturelle d'Autun - Maison du Parc - 58230 Saint-Brisson, France

21942. Sathasivam, K. (2018): Dragonflies in Madras. Blackbuck 35(3/4): VI + 102 pp. (in English) [https://www.researchgate.net/publication/344151825_Dragonflies_in_Madras] Address: Sathasivam, K., A-2, Casa Grande, 13-14, Elliamman Koil Street, Chennai 600020, India. E-mail: kumaran.sathasivam@gmail.com

2019

21943. Escola, J. (2019): Primera cita de Trithemis kirbyi Selys, 1891 (Odonata: Libellulidae) de la provincia de Lérida (Cataluña, Península Ibérica). Boletín de la Sociedad Entomológica Aragonesa 65: 218. (in Spanish, with English summary) ["The 'Alta Ribagorça' is a region of the Lérida Pyrenees, located to the south of the 'Vall d'Aran', to the west of 'Pallars Sobirà' and to the north of 'Pallars Jussà'. To the west it limits with the homonymous region of the autonomous community of Aragon. Pont de Suert is the capital of the 'Alta Ribagorça' and the 'Centre de Fauna' is located in this municipality at the crossroads of the N-230 and N260 roads. On August 9, 2019 at 12:10 p.m., a single male specimen of T. kirbyi. The photograph that supports the quote has been deposited in the citizen platform Biodiversidad Virtual (http://-www.biodiversidadvirtual.com, registry -img1171673 of the gallery of invertebrates). No other specimen of odonate is observed, so it could be a dispersing specimen, looking for new habitats. The place is located within the grid of 1 km on a side UTM 31TCG 1496, at 829 m a.s.l." (Author/Google translate)] Address: Escolà, J., ICHN (Institució Catalana d'Història Natural) Carrer del Carme, 47; 08001 Barcelona, Spain Email: jescola2@xtec.cat

21944. Kietzka, G.J.; Pryke, J.S.; Gaigher, R.; Samways,

M.J. (2019): Applying the umbrella index across aquatic insect taxon sets for freshwater assessment. Ecological Indicators 107, December 2019, 105655: (in English) ["Highlights: • The umbrella index successfully identified sensitive freshwater taxa as indicators. • It performed well in a biodiverse region with many rivers and varying disturbances. • Eight Ephemeroptera/Plecoptera/Trichoptera and seven Odonata were selected. • Both groups co-occurred with high percentages of own taxa and for the other group. • These groups have great potential and interchangeable for biodiversity conservation. Abstract: Biological surrogates in conservation biology are valuable for rapid biodiversity and environmental surveys, and as an early warning of potential threats. However, these surrogates need to be simple and inexpensive to apply. The umbrella index was applied here to quantify the selection of surrogate species for biodiversity assessments, but requires interrogation for application in areas rich in threatened endemic species. Aquatic larvae of Ephemeroptera, Plecoptera and Trichoptera (EPT), as well as the adult Odonata, are all highly responsive to changes in freshwater condition. Using the umbrella index, we evaluated the performance of the surrogate species approach for aquatic insect conservation in a region (Greater Cape Floristic Region) with an exceptional level of rare and endemic species, across multiple rivers with different disturbance levels. Due to a lack of species level information, EPT taxa were calculated using morphospecies within families, and Odonata were identified to species level. The umbrella index identified eight EPT species and seven Odonata species as potential surrogates. Both these groups co-occurred with high percentages of their own overall groups (EPT surrogates for overall EPT, and Odonata surrogates for overall Odonata), as well as for the other group (EPT surrogates for overall Odonata, and Odonata surrogates for overall EPT). The index was surprisingly flexible, and performed well in an area with so many species of conservation concern, as well as across spatial scales greater than a single river, with varying degrees of disturbance. Both EPT and Odonata showed promise as potential biodiversity surrogates, and for future conservation planning. Ideally, conservationists should aim to use taxa that are easy to identify to species level, with known sensitivities to human disturbance. However, when this is not a possibility, the umbrella index is still applicable and accurate for morphospecies (family level sensitivities)." (Authors)] Address: Kietzka, Gabriela, Dept of Conservation Ecology & Entomology, Stellenbosch Univ., Matieland, South Africa. E-mail: gkietzka@sun.ac.za

21945. Marinov, M.; Rashni, B. (2019): Stories from the Stone Bowl Nadarivatu, Viti Levu Island, Fiji. Agrion 23(1): 30-33. (in English) [Indolestes vitiensis (Tillyard 1924) Nesobasis angulicollis. (B) N. comosa. (C) N. erythrops. (D) N. telegastrum N. leveri. (B) N. caerulecaudata. (C) Procordulia irregularis.] Address: Milen Marinov [milen.marinov@mpi.govt.nz] & Bindiya Rashni [diyarash@gmail.com

21946. Masius, P. (2019): Die Gestreifte Quelljungfer (Cordulegaster bidentata Selys, 1843) im nördlichen Hunsrück: Erste Ergebnisse unter besonderer Berücksichtigung der Erfassungsmethodik (Odonata: Cordulegastridae). Decheniana 172: 142-157. (in German, with English summary) ["A survey of C. bidentata was conducted in the Northern Hunsrück in 2016, 2017 and 2018. At ten of the twelve studied sources the species was recorded. Before this study, only one old record of C. bidentata has existed from the study area. The results of this survey substantiate the thesis, that in the Northern Hunsrück (Germany) a main distribution area of C. bidentata in Rhineland-Palatinate lies. By diversifying the search methods (records of larvae, exuviae and imagos), the problems with recording this species were taken into account. The results of the different methods are presented and discussed. In sum, they imply that a combination of all three methods is superior to the conventional larvae-method." (Author)] Address: Masius, P., Burbacherstr. 150, 53129 Bonn, Germany. EMail: patrick_masius@gmx.de

21947. Tran, T.T.; Janssens, L.; Dinh, K.V.; Stoks, R. (2019): An adaptive transgenerational effect of warming but not of pesticide exposure determines how a pesticide and warming interact for antipredator behaviour. Environmental Pollution 245: 307-315. (in English) ["Highlights: •We studied transgenerational effects of pesticide and warming on mosquito behaviour. •Exposure to chlorpyrifos (CPF) and warming reduced antipredator behaviour. •The effect of CPF on antipredator behaviour was smaller under warming. •Parental exposure to warming shaped combined effect of CPF and warming in offspring. Abstract: The impact of pesticides on organisms may strongly depend on temperature. While many species will be exposed to pesticides and warming both in the parental and offspring generations, transgenerational effects of pesticides under warming are still poorly studied, particularly for behaviour. We therefore studied the single and combined effects of exposure to the pesticide chlorpyrifos (CPF) and warming both within and across generations on antipredator behaviour of larvae of the vector mosquito Culex pipiens. Within each generation pesticide exposure and warming reduced the escape diving time, making the larvae more susceptible to predation. Pesticide exposure of the parents did not affect offspring antipredator behaviour. Yet, parental exposure to warming determined how warming and the pesticide interacted in the offspring generation. When parents were reared at 24°C, warming no longer reduced offspring diving times in the solvent control, suggesting an adaptive transgenerational effect to prepare the offspring to better deal with a higher predation risk under warming. Related to this, the CPF-induced reduction in diving time was stronger at 20°C than at 24°C, except in the offspring whose parents had been exposed to 24°C. This dependency of the widespread interaction between warming and pesticide exposure on an adaptive transgenerational effect of warming is an important finding at the interface of global change ecology and ecotoxicology." (Authors)] Address: Stoks, R., Lab. voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

21948. Verspui, K.; Wasscher, M.T. (2019): Puzzling watercolours of Odonata from the collection of Edmond de Selys Longchamps. Odonatologica 48(1/2): 1-25. (in English) ["19 watercolours of Odonata which until now have remained unidentified were studied in order to establish their identity. They form part of the 1 256 watercolours of the collection of Edmond de Selys Longchamps housed in the Royal Belgian Institute for Natural Sciences (RBINS). Selys wrote on each watercolour either no, partial or full species names that were never published. We examined previously published literature, specimens in the RBINS and consulted with various experts in hopes of associating these watercolours with current species names. We were able to associate ten watercolours with current species names and four only with genera, while four watercolours remain unidentified. In one watercolour the male is identified on the species level and the female on the generic level. We have thus far been able to associate 96 % of the entire odonate watercolour collection with current species names." (Authors) Lestes albilabris, Lestes concinnus, Indolestes peregrinus, Hetaerina sp., H.

vulnerata, Heliocypha biseriata, Rhinocypha sp., Amorphostigma armstrongi, Argiocnemis rubescens intermedia, Megalagrion sp., "Pseudagrion spurium", Teinobasis alluaudi, Teinobasis sp. 1, Teinobasis sp. 2, "Agrion pyrrhomelas", Heliogomphus drescheri, "Gomphus", Microgomphus camerunensis, "Onychogomphus", Neuraeschna dentigera, Oplonaeschna magna] Address: Verspui, Karin, Lingedijk 104, 4196HC Tricht, The Netherlands. E-mail: karin.verspui@gmail.nl

21949. Vos, W.; Komdeur, J.; Hammers, M. (2019): Frequency-dependent resemblance of male-colored females to males in a damselfly. Insect Science 26(5): 958-962. (in English) [https://onlinelibrary.wiley.com/doi/epdf/10.1111/1744-7917.12584] Address: Vos, W., Behavioural and Physiological Ecology, Groningen Inst. for Evolutionary Life Sciences, Univ. of Groningen, Groningen, The Netherlands

2020

21950. Garcia-Pozuelo-Ramos, C. (2020): Primera observación de Erythromma viridulum (Charpentier, 1840), (Odonata, Coenagrionidae), en la provincia de Toledo (España central). - First observation of Erythromma viridulum (Charpentier, 1840), (Odonata, Coenagrionidae), in the Toledo province (central Spain). Boln. Asoc. esp. Ent. 44(1-2): 197-201. (in Spanish) [Erythromma viridulum has been observed in Illescas (Toledo), in the La Canta quarry pond (UTM datum ETRS89 30S 426165/4440914, 590 m). Specimens observed: 6/30/2019 - approximately twenty specimens; 7/VII/2019 - approximately twenty specimens, copulations and clutches; 7/14/2019 - approximately a dozen individuals, including an immature male.] Address: Garcia-Pozuelo-Ramos, C., Sociedad Entomológica y Ambiental de Castilla-La Mancha (SEACAM). Email: pkymp@yahoo.es

21951. Tysoe, M.; Rebassa, M. (2020): Descobrint els odonats de les Illes Balears. Es Busqueret 50: 41-47. (in Calatan) [Discovering the odonates of the Balearic Islands. Available at: https://ibdigital.uib.es/greenstone/sites/localsite/collect/busqueret/index/assoc/EsBusque/ret_2020/n050p040.di r/EsBusqueret_2020n050p040.pdf] Address: Rebassa, M., Societat d'Història Natural de les Balears, carrer Margalida Xirgu, 16, baixos, 07011, Palma, Spain. Email: escarabatdaurat@gmail.com

2021

21952. Ertas, A.; Boz, T.; Kizilkaya, I.T. (2021): Comparative analysis of benthic macroinvertebrate-based biotic and diversity indices used to evaluate the water quality of Kozluoluk Stream (West Anatolia of Turkey). Community Ecology 22: 381-390. (in English) ["Freshwater ecosystems are vitally important which supports biological diversity. With this aim, a total of eight biotic and three species diversity indices were used to determine water quality of Kozluoluk Stream in West Anatolia of Turkey. The biotic indices were: Saprobi (SI), Biological Monitoring Working Party (BMWP-O, BMWP-S and BMWP-G), Average Score per Taxon (ASPT), Family Biotic Index (FBI), Belgian Biotic Index (BBI), EPT-Taxa [%], and species diversity indices consisted of: Shannon–Weaver (SWDI), Simpsons (SDI) and Margalef (MDI). Principal component analysis (PCA) was applied to the physicochemical and biotic dataset. Similarities between the sampling stations were clustered by using cluster analysis (CLUS). Pearson-based correlations were used to determine which index is more suitable in determining water quality of the stream. The nine taxonomic groups were found in Kozluoluk Stream consisting of Amphipoda, Oligochaeta, Gastropoda, Ephemeroptera, Plecoptera, Trichoptera, Odonata, Coleoptera and Diptera. The 1st and 2nd stations (90%) were the most similar stations in terms of benthic macroinvertebrate species distribution. The results indicate that the ASPT, BBI, BMWP-O, BMWP-S, BMWP-G and EPT-Taxa [%] are more proper than FBI and SI indices to determine the water quality of Kozluoluk Stream. The water quality along the stream varied from good class in upstream stations, to moderate in downstream stations. This study clearly showed that the specific biotic index according to the ecological characteristics of Turkey should be developed." (Authors)] Address: Ertas, A., Dept Biol., Faculty of Science, Ege Univ., 35100, Izmir, Bornova, Turkey

21953. Kalniņš, M. (2021): Contribution to the knowledge of dragonflies (Odonata) from the Raja Ampat (Indonesia), with notes on their ecology. In: Telnov D., Barclay M. V. L. & Pauwels O. S. G. (eds) Biodiversity, biogeography and nature conservation in Wallacea and New Guinea. Volume IV. The Entomological Society of Latvia, Riga, 443 pp: 221-238. (in English) ["This article contains information on 103 Odonata species from Raja Ampat – Waigeo, Misool, Salawati, and Batanta Islands. No information was found on the species composition of Kofiau dragonflies. Eleven Odonata species are new to the fauna of Misool Island, collected or observed by the author and five Odonata species found by other researchers. Three Odonata species are new records for the fauna of Waigeo Island. Additional information on ecology and behaviour of several species is also given." (Author)] Address: Kalniņš, M., Nature Protection Board, Eksporta iela 5, Riga, 1010, Latvia. Email: martins.kalnins@dap.gov.lv

21954. Martín, B.D.; Gil, A.C. (2021): Escaralimanía: preparando entomoaficionados para favorecer la conservación de odonatos y otros artrópodos. Boletín de la Sociedad Entomológica Aragonesa 69: 206-211. (in Spanish, with English summary) ["Based on the premise that in order to appreciate you have to know, the ESCARALIMANIA project (beetles, spiders, dragonflies and butterflies) seeks to promote the knowledge and participation of citizens in the importance and conservation of arthropods within an interactive and collaborative learning process that consists of four phases: LEARN, through courses given by specialists; OBSERVE, through outdoor activities; PARTICIPATE as a volunteer by recording data; and ACT by caring for and recovering their habitat. In the case of odonates, different activities are being carried out through these four lines of action, in order to achieve a continuous training process with the aim of consolidating a quality monitoring network to evaluate the distribution of the species and their conservation status." (Authors) The paper includes drawings of exuviae of Trithemis kirbyi.] Address: Díaz Martín, Beatriz, Depto de Entomología, Sociedad de Ciencias Aranzadi. Zorroagagaina 11, 20014 Donostia – San Sebastián (Gipuzkoa, Spain). Email: entomologia@aranzadi.eus

21955. Monnerat, C. (2021): Les gomphides du Valais: Synthèse des données et évolution de leur distribution (Odonata: Gomphidae). Bull. Murithienne 139: 39-51. (in French, with German summary) ["The first evidence for the development of Gomphus vulgatissimus and Onychogomphus f. forcipatus is provided for the central Valais (western inner Alps). The discovery of an exuvia of G. vulgatissimus in 2009 in a stream in the alluvial zone of the Bois de Finges documents its reproduction, which has not been followed up. Observed in the central Valais since 2011, O. f. forcipatus has colonised the water bodies of former gravel pits in the Rhône

plain between Martigny and Sierre in less than a decade. Evidence of the development of O. f. forcipatus, documented in Lake Geneva (Haut Lac) since 2000 and in the Chablais vaudois since 2004, was provided in several sites in the central Valais from 2016. The historical and current data of the three gomphid species known from the canton of Valais, G. pulchellus, G. vulgatissimus and O. forcipatus, are presented and discussed. While O. f. forcipatus has recently expanded its range in Valais through secondary habitats, G. pulchellus and G. vulgatissimus no longer find suitable habitats for maintaining permanent populations in the canton of Valais." (Author/DeepL] Address: Monnerat, C., Info fauna, Bellevaux 51, 2000 Neuchâtel, Switzerland. E-mail: christian.monnerat@unine.ch

2022

21956. Assandri, G.; Bazzi, G.; Festi, A.; Leandri, F. (2022): Distribution, ecology and conservation of Aeshna caerulea (Ström, 1793) and Aeshna subarctica elisabethae Djakonov, 1922 (Insecta: Odonata) at the southernmost limits of their range. Aquatic Insects 44(2): 136-150. (in English) ["We provide an overview of the distribution, habitat preference, phenology, and conservation of A. caerulea and A. subarctica elisabethae in Italy. Both species are found exclusively in the Central Eastern Alps. By 2021, A. caerulea has been reported for 31 sites, whereas A. s. elisabethae for 15. The new southernmost global range limit for A. caerulea was found in the Adamello massif and the new southernmost Western Palearctic limit for A. s. elisabethae in the Tesino plateau (Trentino-Alto Adige). A. caerulea reproduces at high-altitude ponds or small lakes, inundated fens or fen meadows, and occasionally in the depressions within raised bogs. A. s. elisabethae is found at lower altitudes, only at raised bogs and, to a lesser extent, in acidic transitional mires rich in Sphagnum mosses. 46% of the reproduction sites of A. caerulea and 93% of those of A. s. elisabethae are included within a national/local protected area or the Natura 2000 network." (Authors)] Address: Assandri, G., Area Per L'Avifauna Migratrice, Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA), Ozzano dell'Emilia, Italy. Email: giacomo.assandri@gmail.com

21957. Burch, S.F. (2022): The Dragonflies and Damselflies of Oxfordshire. Fritillary 10: 9-108. (in English) ["This paper provides a timely update of current knowledge of the dragonflies of Oxfordshire. All 37 species that have been recorded are described and distribution maps for all species, derived from all records within the National Biodiversity Network (NBN) Atlas database are given. An analysis to show how the relative recording frequencies of individual species have changed over time has been carried out and highlights increases and decreases relative to the numbers of records received for all dragonflies. This includes species recently arrived in Oxfordshire having expanded their range from continental Europe to England. For three highly localised species, the results from the recording frequency analysis are supplemented by summary plots of quantitative data from BBOWT transect surveys that have taken place over almost the last twenty years at two reserves at Cothill. In addition, phenology data were obtained from the NBN Atlas for first and last sighting dates and are compared with the corresponding information from 1996." (Author)] Address: Stephen Burch: Email: stephen_burchemail@yahoo.co.uk

21958. Bylak, A.; Kukula, K. (2022): Impact of fine-grained sediment on mountain stream macroinvertebrate communities: Forestry activities and beaver-induced sediment management. Science of the Total Environment 832 155079: 16 pp. (in English) ["Highlights: • In mountain areas, fine sediment influx is mostly generated by forestry activities. • Fine sediments disturb benthic habitats and lead to decreased invertebrate density. • Fine sediments clogging spaces between stones limit the presence of rheophilic taxa. • Fewer scrapers and shredders may affect the food-web structure in stream ecosystems. • Fine sediments trapped in beaver ponds may accelerate recovery of stream sections. Abstract: Fine-grained sediments are a natural component of river systems. Human activities generate additional sources of fine sediment. In mountainous areas, the anthropogenic inputs of fine sediments are associated with forestry. The aim of this study was to analyse the differences in the macroinvertebrate communities between the reference and caused by forest harvesting activities increased influx of fine-sediment to mountain streams. The tested hypothesis was that the macroinvertebrate communities will differ depending on the intensity of forest harvesting practices in the stream catchment that causes excessive influx of fine sediment into the stream. The reintroduction of beavers in the study area, and the formation of in-stream beaver dams, contribute the accumulation of sediments in stream sections with slower water. Thus, it was also assumed that by capturing and storing fine sediments, may contribute to the restoration of the natural structure of the benthic communities downstream of the ponds. The study was carried out in a mountain stream catchment area (Carpathians, Poland), in which inflow of fine sediments in the stream sections varied in intensity. The study was conducted over three years (2018–2020). The extensive use of forest roads, timber skidding trails, and timber storage areas produced fine sediments that clogged the interstitial spaces between the stones in the riffles, limiting the presence of rheophilic taxa associated with coarse-grained substrates. The reduction of the number of scrapers and shredders (i.e. primary consumers) associated with the influx of fine sediments may significantly affect the entire food-web structure in stream ecosystems. The capture and deposition of fine sediments in beaver ponds may accelerate the revitalisation of the flowing sections of the stream. Be aver-induced sediment management is strongly recommended as a beneficial practice that could contribute to ecological preservation and the potential of streams, particularly in mountain areas." (Authors)] Address: Kukula, K., Dept Ecology & Environmental Protection, Univ. of Rzeszów, Poland. Email: kkukula@ur.edu.pl

21959. Costa, R.M.G.; Ferro, J.L.S.; Farjalla, V.F. (2022): Disentangling the mechanisms related to the reduction of aquatic habitat size on predator–prey interactions. Hydrobiologia 849: 1207-1219. (in English) ["Reductions in aquatic habitat size facilitate encounters between predators and prey by reducing the height of the water column and the water volume. Here, we proposed to disentangle the effects of these mechanisms on predation rates and parameters of functional response curves of predators. We paired active-search predators (Buenoa, Hemiptera) or ambush predators (Pantala, Lestes) with prey of different mobility types (Argyrodiaptomus, Copepoda; Culex, Diptera). Three treatments were established: high water column height and high water volume (H + V +), low water column height and high water volume (H - V +), and low water column height and low water volume (H - V-). We used contrast analysis to separate the effects of water column height (H +, H-) and water volume (V +, V-). Predation rates were higher in V- than in V + for Pantala and Buenoa consuming Argyrodiaptomus. In addition, we observed an increase in attack rates and a decrease in handling time in V- in relation to V + for Pantala and Lestes consuming Argyrodiaptomus. We concluded that reduction in the water volume was main responsible factor for

the changes in predator–prey interactions. These changes depended on the prey behavior and predator foraging modes: ambush predators were the most benefited, and highly mobile prey were the most consumed." (Authors)] Address: Farjalla, V.F., Lab. Limnology, Ecology Dept, Biology Institute, CCS, Federal Univ. of Rio de Janeiro (UFRJ), Ilha do Fundão, Rio de Janeiro, Brazil

21960. Ertas, A.; Yorulmaz, B. (2022): Comparative performance of the indices used for bioassessment of water quality of Sangi stream (West Anatolia, Turkey). Russian Journal of Ecology 53: 318-327. (in English) ["This study has been carried out to determine water quality of Sangi Stream (West Anatolia, Turkey) and to compare the performance of indices used. Five biotic and three diversity indices have been used for determination of water quality of Sangi Stream. The assessment of water quality has been done based on benthic macroinvertebrate and physicochemical parameters. The following biotic indices have been used: Saprobi Index (SI), Biological Monitoring Working Party (BMWP), Average Score per Taxon (ASPT), Family Biotic Index (FBI), Belgian Biotic Index (BBI), as well as the following diversity indices: Shannon–Weaver index (SWDI), Simpsons index (SDI), Margalef index (MDI) and Evenness (E1). Principal component analysis (PCA) has been applied to the physicochemical variables. The similarities between the sampling stations have been clustered by using Cluster analysis (CLUS). Our results have shown the presence of 9 taxonomic groups in Sangi Stream: Crustacea, Oligochaeta, Gastropoda, Ephemeroptera, Plecoptera, Trichoptera, Odonata, Coleoptera, and Diptera. The water quality along the Sangi Stream has varied from high class quality in station 1, 2, 3 and 4, to good and moderate quality in station 5 and 6. The results indicate that the SI, BMWP, FBI and ASPT were sufficient in the estimation of water quality in the examined watercourse. This study has clearly shown that a specific biotic index according to the ecological characteristics of Turkey should be developed." (Authors)] Address: Ertas, A., Ege Univ., Faculty of Science, Dept Biol., Bornova, Izmir, 35100, Turkey

21961. Feng, Z.; Wan, S.; Sui, Q.; Labandeira, C.; Guo, Y.; Chen, J. (2022): A Triassic tritrophic triad documents an early food-web cascade. Current Biology 32(5): 5165-5171. (in English) ["Highlights: • Body-fossil evidence is described from egg chorions for insect-endophytic oviposition. • Late Triassic evidence of egg predation is documented based on insect-feeding damage. • An ecological cascade of a plant host-ovipositing insect-egg predator link is shown. Summary: Endophytic oviposition behavior, the insertion of eggs into plant tissues, represents a sophisticated reproductive strategy of insects. This process is accomplished by employing a specialized egg-laying device, the ovipositor, that effectively protects eggs through plant tissue concealment. Endophytic oviposition behavior is currently common in many lineages of several major, extant insect orders, principally Odonata, Orthoptera (katydids and grasshoppers), Hemiptera (cicadas, aphids, scale insects, whiteflies, leafhoppers, and bugs), Coleoptera, Lepidoptera (moths), and Hymenoptera (sawflies). Based on the occurrences of egg insertion damage and associated scar tissue expressed in fossil plant stems and leaves, endophytic ovipositional behavior is presumed to have emerged as early as the Early Pennsylvanian Period. However, for impression fossils, egg morphology and surrounding scar tissue can be difficult to discern on plants, often resulting in ovipositional damage that may be assigned to exophytic (eggs laid on plant surfaces) or to endophytic behavior. This ambiguity is due to the spatial relationships and histological mingling of ovipositional damage and enveloping scars with adjoining plant-host tissues. Here, we describe body fossils of insect eggs within ginkgophyte leaves from the Upper Triassic of China. Feeding damage from an egg-predatory insect commonly occurs on these eggs, as some eggs bear up to several feeding punctures. We provide exceptional body-fossil evidence for resource use of a host plant by an ovipositing insect and unravel the earliest-known tritrophic cascade of a host plant, an ovipositing insect, and an egg-predatory insect." (Authors)] Address: Feng, Z., Inst. Palaeontology, Yunnan Key Lab. of Earth System Science, Yunnan Key Lab. for Palaeobiology, MEC International Joint Lab. Palaeobiology & Palaeoenvironment, Yunnan Univ., Kunming 650500, China. Email: zhuofeng@ynu.edu.cn

21962. Fiebrich, M.; Medinger, V. (2022): Reproduktionsnachweise der Schabracken-Königslibelle (Anax ephippiger) im NSG Wollmatinger Ried 2021 (Odonata: Aeshnidae). Mercuriale 22: 53-69. (in German, with English summary) ["Successful reproduction of vagrant emperor (Anax ephippiger) in the Wollmatinger Ried nature reserve, SW-Germany (Odonata: Aeshnidae) - In the year 2021, A. ephippiger was recorded in the Wollmatinger Ried nature reserve (Western Lake Constance). In addition to patrolling males, evidence for reproduction (oviposition) as well as proof of reproduction (freshly hatched individuals, exuviae) were documented. In August and September, mass emergence occurred. A total of 1,175 exuviae were collected. These are the only reproductive records of this species in Germany this year. Further observations of A. ephippiger in Germany and neighbouring countries are listed." (Authors)] Address: Medinger, Verena, Forsteistraße 4, 78315 Radolfzell, Germany. Email: VerenaMedinger@gmx.net

21963. Fukaya, W.; Futahashi, R. (2022): Distribution survey of Mnais damselflies (Zygoptera: Calopterygidae) in Saitama Prefecture, central Honshu, Japan. Tombo 65: 58-62. (in Japanese, with English summary) ["We surveyed the distribution of the genus Mnais in Saitama Prefecture, central Honshu, Japan. Based on nuclear ITSi sequences, three groups, Mnais costalis Selys, 1869, M. pruinosa Selys, 1853, and "Izu population" or M pruinosa Selys, 1853 were found in Saitama Prefecture. M pruinosa is widely distributed mainly in the western part of the prefecture, while M costalis is distributed only in limited areas in the eastern and southern parts of the prefecture. "Izu population" was discovered in the upstream of the Arakawa River in Chichibu City, which is the first record from Saitama Prefecture." (Authors)] Address: Fukaya, W.: Email: aeshna2074@gmail.com

21964. Fukuda, A. (2022): The first record of Ictinogomphus pertinax (Hagen in Selys, 1854) from Ibaraki Prefecture, Japan). Tombo 65: 56-57. (in Japanese, with English summary) ["A male of I. pertinax was photographed in Jojamachi, Joso-shi, Ibaraki Prefecture, Japan, on 6 August 2022. This is the first record of this species from Ibaraki Prefecture and the northernmost record for Japan." (Author)] Address: Email: gea01624@nifty.com

21965. Futahashi, R.; Koshikawa, S.; Okude, G.; Osanai-Futahashi, M. (2022): Diversity of melanin synthesis genes in insects. Advances in Insect Physiology 62: 339-376. (in Emglish) ["Melanins are tyrosine-derived pigments that are ubiquitous in animals, plants, and fungi. Melanins are often associated with black and brown pigmentation, which provide a variety of biological functions, such as mimicry, camouflage, thermoregulation, and UV protection. The synthetic pathway of melanin pigments has been extensively studied in vertebrates, but interestingly, it has become clear

that the kinds of melanin pigments and genes involved in melanin biosynthesis differ significantly between insects and vertebrates. Dopamine melanin is the major melanin pigment in various insects. In insects, most of the melanin synthesis genes are highly conserved, but the yellow family genes and aaNAT family genes exhibit diversity in gene repertoire among diverse insect taxa. In this review, we introduce eight melanin synthesis genes involved in insect epidermal pigmentation: tyrosine hydroxylase (TH), dopa decarboxylase (DDC), aspartate 1-decarboxylase (ADC, black), N-ß-alanyldopamine synthase (NBADS, ebony), N-ß-alanyldopamine hydrolase (NBADH, tan), arylalkylamine N-acetyltransferase (aaNAT), multicopper oxidase 2 (MCO2, laccase2), and yellow. For each gene, we show the molecular phylogenetic tree based on the amino acid sequences of six representative insects, the fruit fly Drosophila melanogaster (Diptera), the silkworm Bombyx mori (Lepidoptera), the swallowtail butterfly Papilio xuthus (Lepidoptera), the red flour beetle Tribolium castaneum (Coleoptera), the honeybee Apis mellifera (Hymenoptera), and Ischnura senegalensis, which highlights the diversity of melanin synthesis genes among insects. We also introduce the current knowledge of the melanin synthesis gene that contribute to colour pattern formation in various insects." (Authors)] Address: Futahashi, R., Nat. Inst. Advanced Indust. Science &Tech. (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

21966. Futahashi, R.; Kiyoshi, T. (2022): The past record of Ischnura rubilio Selys, 1876 from Ishigaki Island. Tombo 65: 40-43. (in Japanese, with English summary) ["Ischnura aurora (Brauer, 1865), previously thought to be widespread from Asia to Oceania, has recently been divided into two species, with the Asian species identified as Ischnura rubilio Selys,1870. In Japan, the species Distributed on Iwojima island was recognized to be genuine I. aurora. Here we examine an individual collected in the past from Ishigaki Island, Japan, and confirm that it is I. rubilio, the same species as found in Taiwan morphologically. As a result, the number of Odonata species in Japan increases to 206." (Authors)] Address: Futahashi, R., National Inst. Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

21967. Hisamatsu, S. (2022): Life history of Sympetrum uniforme (Selys, 1883) and future actions to preserve its habitat. Tombo 65: 1-7. (in Japanese, with English summary) ["S. uniforme is ranked as “endangered” by the Ministry of the imvironment, Japan; its current habitats have been identified in only seven prefectures. In this paper, I report on the current condition of the existing habitats and about the seasonal prevalence of this species, which were investigated by the author in Ehime Prefecture in 2016-2019. From the results of the investigation, it is inferred that water-edge vegetation, such as Phragmites australis and Paspalum distichum, is needed for the emergence of the species; traditional management methods of the ponds in the study area, such as mowing the grass in fixed months and water management, are associated with the life history of the species. There are some ponds in which no adults emerge if the mature adults have territorial and oviposition behavior in the ponds. Additionally, the results also revealed that immature adults spend time in high-altitude areas and mature adults spend time in vegetation and/or fruit gardens near the habitat ponds at night. The results of the investigation suggest that preserving a wide range of areas is needed, not only for preserving the particular habitat ponds but also pond groups and areas at the foot of mountains." (Author)] Address: Email: s-hisamatsu@uhe.ac.jp

21968. Iida, M.; Tamada, A. (2022): First record of Macromia daimoji Okumura, 1949 from Miyagi Prefecture, Japan. Tombo 65: 54-55. (in Japanese, with English summary) ["On 2 July 2022, an adult male of M. daimoji was incidentally recorded from Miyagi Prefecture for the first time. But, no additional individuals were found at the region by the research on November 2022. We will confirm its settlement by further research." (Authors)] Address: Iida, M.: Email: odonata_62-@yahoo.co.jp

21969. Joshi, S.; Gassahd, R.; Ismaveld, V.A. (2022): Dragonflies and damselflies (Insecta: Odonata) of Karimganj District, Assam, India with four additions to the Indian checklist. Oriental Insects 56(3): 299-327. (in English) ["Situated at the intersection of the Himalayan and Indo-Chinese biodiversity hotspots, Northeast India is one of the most biodiversity rich areas of South Asia. Despite this, insects such as dragonflies and damselflies (Order: Odonata) of this region remain poorly studied causing an impediment to their conservation assessments. We conducted long-term surveys to study odonate diversity of the Karimganj District, Assam, India bordering the states of Tripura and Mizoram, and the country of Bangladesh. Here, we publish reports of eight species: four new to India Ceriagrion calamineum, Nannophyopsis clara, Phyllothemis eltoni, and Zyxomma breviventre, and four noteworthy species newly recorded from the state: Megalogomphus smithii, Orientogomphus indicus, Pseudothemis zonata, and Sarasaeschna khasiana. We recorded total 97 odonate species during our surveys. We provide the checklist of Odonata of Assam based on our surveys and literature." (Authors)] Address: Joshi, S., Biodiversity Lab, National Centre for Biological Sciences, Bangalore 560065, India. E-mail: Shantanu@ifoundbutterflies.org

21970. Kita, H. (2022): Overwintering process of Aciagrion migratum (Selys, 1876) in a Cypress forest in Tokyo. Tombo 65: 8-20. (in Japanese, with English summary) ["The overwintering conditions or adult A. migratum were observed through winter from December, 2021 to February, 2022 in a Cypress forest in western Tokyo. The longest observed continuation or overwintering conditions was 57 days among the 4 male and 5 female individuals continually observed (it was 61 days in Chigasaki City, Kanagawa Prefecture). ‘Overwintering conditions’ are defined as the state in which an individual stays in the same place all day without flying during the winter. On December 21st, the flight of an individual was observed, while no flight for three resting individuals was confirmed on January 13th. The beginning of overwintering conditions was therefore estimated to be early January. The height of resting position utilized by the overwintering individuals was in the range of 1.2 m to 3.5 m above the ground. Even individuals in overwintering conditions can perform slight locomotion by walking, self-cleaning and hiding behaviors. The final confirmation date (the date just before the end of the overwintering conditions) of 1 ♂ and 2 ♀♀, whose overwintering conditions were continuously monitored, was March 13th. From this, it was estimated that the overwintering conditions ended around mid-March at this location. Since the temperature in the forest during mid-March exceeded 15°C, the repetition of similar warm weather within several days was considered to be one of the factors that terminated the overwintering conditions. In addition, the end of the overwintering conditions was earlier in the sunny coniferous and broad-leaved mixed forest facing east in Chigasaki City than in the shaded forest. From the above results, it is pointed out that the start and end of overwintering conditions for this species were considerably affected by not

only temperature, but also sunlight." (Author)] Address: kita-1114-age@u01.gate01.com

21971. Magliochetti, C. (2022): High trophic niche overlap within the aquatic carnivore guild in vernal ponds. MSc. thesis, Rutgers, The State Univ. of New Jersey: 39 pp. (in English) ["he underlying mechanisms shaping niche size and overlap within and between species are crucial for understanding species coexistence and community assembly. The hunting strategy of and the competition between predators shape their diets, but many species can adjust their niches via trophic or microhabitat differentiation to minimize foraging competition with co-occurring species. Niches can also change in response to environmental factors such as nutrient enrichment, which can affect the diversity and abundance of prey resources to consumers. Here we tested for trophic niche partitioning and niche specialization within an invertebrate carnivore guild. To do this, we sampled populations of arachnids and odonates, dominant riparian carnivores, in vernal ponds across a nutrient gradient in the New Jersey Pine Barrens. We used stable isotope analysis of carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) to obtain time- and space-integrated information on trophic niches of these populations. Our results showed variation in the trophic niche size of arachnids and odonates, however, our findings revealed a lack of niche differentiation between populations of arachnids and odonates within and across ponds. Additionally, neither nutrient enrichment, nor prey abundance or diversity were good predictors of niche width of these predators. Our results suggest that these co-occurring predators can coexist with minimal trophic niche overlap. As changes in climate shift species distributions and alter community assemblages, it is important to be able to predict how species will respond to overlaps in their distributions." (Author) Availabe at: https://rucore.libraries.rutgers.edu/rutgers-lib/68185/] Address: not stated

21972. Mavromati, E.; Kemitzoglou, D.; Tsiaoussi, V.; Lazaridou, M. (2022): A new WFD—compliant littoral macroinvertebrate index for monitoring and assessment of Mediterranean lakes (HeLLBI). Environmental Monitoring and Assessment volume 193, Article number: 745: 16 pp. (in English) ["A new multimetric index (HeLLBI) based on littoral benthic macroinvertebrates is presented in this paper for classification of Greek natural lakes, in compliance with the requirements of Water Framework Directive (WFD). The method was developed based on the collection of littoral benthic invertebrate fauna and environmental data from 109 sampling sites in 21 natural lakes of the Greek National Water Monitoring Network. We focused the analysis on the effects of shore morphological alterations and eutrophication to the littoral invertebrate fauna, identified to family level, except oligochaetes, which were identified as a class, and more particularly to taxonomic composition and abundance, to taxa sensitivity, and to richness/diversity. Three metrics were included in the multimeric index: the relative abundance of Odonata classes, the Average Score per Taxon, and the Simpson's diversity index. The metrics were converted to ecological quality ratios and ecological class boundaries were defined. The final multimetric index HeLLBI is expressed as an arithmetic average of normalized ecological quality ratios of the above metrics and a final score was assigned to each lake. Pressure-response relationships of HeLLBI scores were statistically tested for morphological alterations, expressed as percentage of artificial shoreline, and eutrophication, expressed as total phosphorus. The HeLLBI scores correspond to ecological classes, according to WFD, and sampling sites with different ecological status contained distinct biological communities; those at high status where more diverse and with sensitive taxa and as the water quality deteriorated, macroinvertebrate assemblages consisted of fewer and more tolerant to degradation taxa. The HeLLBI method gave a reliable assessment of littoral benthic invertebrate fauna of Greek natural lakes and could be a useful tool for the classification of ecological status of other Mediterranean lakes.] Address: Mavromati, Efpraxia, The Goulandris Natural History Museum, Greek Biotope/Wetland Centre, 14th km Thessaloniki. Mihaniona, 57001 Thermi, Greece. E-mail: emavromati@ekby.gr

21973. Morita, R.; Watanabe, T.; Futahashi, R. (2022): The second record from Japan of an interspecific hybrid between Paracercion sieboldii and P. melanotum from Ishioka Citv, Ibaraki Prefecture, Honshu, Japan). Tombo 65: 44-46. (in Japanese, with English summary) ["We report a male interspecific hybrid between Paracercion sieboldii (Selys, 1876) and P. melanotum (Selys, 1876) collected in Ishioka Citv, Ibaraki Prefecture. This is the second record of the hybrid or this combination in Japan. The markings on the antefrons and postocular spots, and the shape of the appendages are intermediate between the two species. Nuclear DNA analysis indicated an interspecific hybrid between P. sieboldii and P. melanotum, and mitochondrial DNA analysis confirmed that the mother species is P. sieboldii." (Authors)] Address: Futahashi, R., National Inst. Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

21974. Nakada, T.; Futahashi, R.; Hori, S. (2022): A record or the pale-winged male of Sympetrum croceolum (Selys, 1883) from Hokkaido, Japan. Tombo 65: 47-48. (in Japanese, with English summary) ["An abnormal pale-winged male of S. croceolum was collected in Eoetsu-shi, Hokkaido, Japan. Nuclear DNA analysis confirmed that this individual is a pure S. croceolum, not a hybrid with other species." (Authors)] Address: Futahashi, R., National Inst. Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

21975. Nicolai, B.; Grimm, H. (2022): Zur Nahrung des Turmfalken Falco tinnunculus dacotiae Hartert, 1913 (Aves: Falconidae) auf Fuerteventura (Kanarische Inseln, Spanien). Vernate 41: 81-90. (in German, with English summary) ["From 2019 to 2021, the diet of kestrels on Fuerteventura (Canary Islands, Spain) was studied. For this purpose, pellets were collected at resting/sleeping sites of adult birds. In total 5756 prey items were identified, mainly invertebrates (insects and spiders). In terms of biomass, lizards make up the largest proportion of the diet. Although other vertebrates (small mammals, birds) also provide a share of the biomass, these prey items are not regularly consumed or sufficiently accessible for the kestrels. The calculation of prey value (BW) results in only the following significant food items: Lizards (Squamata) (BW 54-78 %), Grasshoppers (Orthoptera) (BW 8-21 %), Spiders (Arachnida) (6-9 %) and Beetles (Coleoptera) (5-9 %). The results confirm the previously known composition of the diet of kestrels on the Canary Islands. In addition, there are indications, especially due to the drought of recent years, that under the (increasingly?) arid conditions of the island - besides a general reduction in the supply of potentially suitable prey - the proportion and thus the importance of lizards in particular, and also of invertebrates, in the diet are increasing." (Authors) The diet includes "Odonata".] Address: Bernd Nicolai, B., Herbingstr. 20, 38820 Halberstadt, Germany. Email: nicolai-bea@gmx.de

21976. Ocampo, M.; Chuirazzi, C.; Takahashi, M.K. (2022): The effects of road salt (NaCl), predation, and competition on the growth and community interactions of Spotted Salamanders (Ambystoma maculatum) and Wood Frogs (Lithobates sylvaticus). Environmental Pollution 315, 120349: (in English) ["Road deicing salts are frequently used in northern regions of the world during the winter and early spring months. As a result, a significant portion of road runoff into surrounding aquatic habitats contains road deicing salts. Previous studies found road salt contaminations in vernal pools that pond-breeding amphibians commonly use, including A. maculatum) and L. sylvaticus). Studies have examined the impact of road salt on both amphibian species, but to our knowledge no previous studies have examined how road salt impacts the interspecific competition between both amphibians. We hypothesized that road salt would negatively impact growth and survivorship of both amphibian species. During the spring and summer of 2017, we conducted an outdoor mesocosm experiment in which we created eight experimental conditions with three main factors: presence/absence of NaCl (1000 mg/L Cl^-), presence/absence of interspecific competition between the two amphibian species (A. maculatum and L. sylvaticus), and presence/absence of predatory dragonfly larvae (Libellulidae). Our experiment revealed that salt delayed hatching and increased deformity in spotted salamander hatchlings. Additionally, salt significantly decreased both salamander and frog survivorship. Wood frog tadpoles and road salt interacted to further diminish salamander survivorship, likely through an increase in interspecific competition. Road salt increased the larval period of salamanders and decreased the proportion metamorphosed by the end of the experiment. Dragonfly larvae caused a reduction in survivorship of salamander larvae, whereas they increased wood frog tadpole development rates. Dragonfly larvae and salt interacted to alter tadpole denticle size, with salt negating the impact of dragonfly larvae. This may signify that salt interferes with aquatic predatory chemical cues. Overall, our data suggest that the application of road de-icing salt has many far-reaching impacts on amphibians and their aquatic communities." (Authors)] Address: Ocampo, Melissa, 904C Southwood Drive, Murray KY 42071, USA. Email: mocampo@murraystate.edu

21977. Ott, J. (2022): Interessante Arten an den LIBELLULA-Teichen bei Trippstadt – mit einem aktuellen Brutnachweis der Krickente (Anas crecca). Fauna Flora Rheinland-Pfalz 14(4): 1459-1470. (in German, with English summary) ["The author reports on the faunistic species found between 2013 and 2022 at the ponds of the LIBELLULA environmental education center in the Karlstal near Trippstadt. A particularly outstanding feature this year was the successful breeding of an Eurasian teal (Anas crecca) with nine chicks. Overall, a large number of protected and endangered animal species from a wide variety of taxonomic groups was found in the approximately one-hectare wetland area – a former fish pond system now left to free succession –, which underlines the high nature conservation value of the area." (Author) The author compiles records of 27 species.] Address: Ott, J., Friedhofstr. 28, 67705 Trippstadt, Germany. E-mail: ott@lupogmbh.de

21978. Péricat, A.; Maury, L.; Theaud, R.; Chalais, B. (2022): Étude hydrologique du lac Achard et des zones humides connexes: diagnostic et définition de scénarios de restauration pour une gestion environnementale du lac – phase 1: Diagnostic. Commune de Chamrousse, S.T.E. Sciences et Techniques de l'Environnement - Rapport 21-8570: 120 pp. (in French) [Isère, France; "This study aims to establish a synthesis of the quality of Lake Achard and its related environments, through the analysis of previous data, supplemented by field investigations carried out in 2021-2022 to determine the hydromorphological parameters of the lake and its quality. physico-chemical and hydrobiological. Flora and fauna inventories were carried out in parallel to define the heritage issues of the site, in particular on the related wetlands, and their alterations. This diagnosis made it possible to characterize the body of water and to understand the origin of the turbidity of the water: it is about algal developments (phytoplankton). Nutrient inputs to the lake are low, but the water body has high primary production. This natural phenomenon does not indicate any deterioration in the quality of the environment apart from a visual impact. At the heritage level, the flora and fauna inventories (amphibians and odonates) have highlighted a certain diversity of wetland habitats (low marshes) with heritage stations of Laiche des Bourbiers. Lac Achard displays a lack of aquatic grass beds and shows a degradation of riparian habitats. This "diagnosis" report constitutes the 1st volume of this study. The second volume aims to define restoration scenarios for the environmental management of the lake. It is therefore a question of defining the issues and the proposals for action with the ultimate objective of achieving the good status of this body of water and the good quality of the expected uses." (Authors/Google translate) The following taxa are treated: Aeshna sp.; Aeshna cyanea, A. juncea, Coenagrion hastulatum, C. puella, Lestes dryas, Lestes sp, L. sponsa, Leucorrhinia dubia, Libellula depressa, L. quadrimaculata, Pyrrhosoma nymphula, Somatochlora alpestris, S. metallica, Sympetrum flaveolum.] Address: Sciences et Techniques de l'Environnement – B.P. 90374, 17, Allée du Lac d'Aiguebelette - Savoie Technolac, 73372 Le Bourget du Lac cedex, France; http://www.mairiechamrousse.com/images/pdf/zones_naturelles/Etude_hydro_Lac_Achard_phase1diagnostic_E NS_2022_compressed.pdf

21979. Phan, Q.T.; Karube, H. (2022): Description of two new species of the genus Chlorogomphus Selys, 1854 (Odonata: Chlorogomphidae) and a new record of Chlorogomphus gracilis Wilson & Reels, 2001 from the Central Highlands of Vietnam. European Journal of Taxonomy 794: 91-110. (in English) ["Two new species of the genus Chlorogomphus are described based on both sexes collected from the Central Highlands of Vietnam. These species are C. hoaian sp. nov. (holotype male from Kon Ka Kinh National Park, 14.3672° N, 108.5368° E, alt. 1000 m) and C. vani sp. nov. (holotype male from Chu Yang Sin National Park, 12.4780° N, 108.4617° E, alt. 749 m). Furthermore, C. gracilis Wilson & Reels, 2001 is recorded from Vietnam for the first time, with notes on its morphology and detailed illustrations of male and female structures." (Authors)]

21980. Pinilla-Rosa, M.; García-Saúco, G.; Santiago, A.; Ferrandis, P.; Méndez, M. (2022): Can botanic gardens serve as refuges for taxonomic and functional diversity of Odonata? The case of the botanic garden of Castilla-La Mancha (Spain). Limnology 24(1): 37-50. (in English) ["In a scenario with declining biodiversity and habitat loss, botanic gardens could serve as refuges for invertebrates, but the opportunities they offer for animal conservation are still poorly understood. Odonata is a good model group for conservation studies, because it includes threatened species and responses to habitat disturbance are well documented. In this study, we assessed the role of the botanic garden of Castilla-La Mancha in Spain as a refuge for members of Odonata by analysing their taxonomic and functional diversity. We explored if the small size of the botanic garden might constrain

the taxonomic diversity of Odonata and if low habitat diversity might limit their functional diversity. We sampled adult Odonata from five water bodies along a gradient of human impact and characterized the Odonata communities based on 12 functional traits in Odonata. We used a species-area relationship to control for differences in the size of water bodies. Compared with natural lakes, the Odonata communities contained less species and their functional diversity was lower in the botanic garden ponds, where generalist species were basically hosted. Despite these limitations, the botanic garden ponds hosted the number of species expected for natural water bodies with the moderate surface area and functional diversity, thereby demonstrating that they are a valuable habitat for Odonata in an urban environment. Appropriate management involving the removal of exotic fish and habitat diversification, including creating lotic environments, would increase the taxonomic and functional diversity of Odonata in this urban system." (Authors)] Address: Pinilla-Rosa, M., Univ. Rey Juan Carlos, C/ Tulipán s/n, 28933 Móstoles, Madrid, Spain. Email: man.pinilla96@gmail.com

21981. Post, M. (2022): Verbreitung der Libellen in Nordbaden (Odonata). Mercuriale 22: 1-69. (in German, with English summary) ["Dragonflies in North Baden (Federal State of Baden-Württemberg) - Based on the data recorded in the database of the Schutzgemeinschaft Libellen in Baden-Württemberg e.V. (SGL), an Overview of the dragonfly fauna in North Baden is given. The study area, the data basis and the localities are presented and discussed. The occurrence of all 61 dragonfly species reliably recorded so far are presented, including historical data. Some previously unrecorded or uncertain species are discussed. Historical changes in the landscape are presented, with discussion of their effects on the hydrologic regime and dragonfly fauna." (Author)] Address: Post, M., Baden-Badener Str. 5, 69126 Heidelberg, Germany. Email: mjphd@posteo.de

21982. Price, B.W.; Winter, M.; Brooks, S.J. (2022): The genome sequence of the blue-tailed damselfly, Ischnura elegans (Vander Linden, 1820) [version 1; peer review: awaiting peer review]. Wellcome Open Research 2022, 7:66 Last updated: 22 FEB 2022: 9 pp. (in English) ["We present a genome assembly from an individual female Ischnura elegans (Arthropoda; Insecta; Odonata; Coenagrionidae). The genome sequence is 1,723 megabases in span. The majority of the assembly (99.55%) is scaffolded into 14 chromosomal pseudomolecules, with the X sex chromosome assembled." (Authors)] Address: Price, B.W., Dept of Life Sciences, Natural History Museum, London, UK

21983. Sáenz Oviedo, M.A.; Kuhn, W.R.; Sepulveda, M.A.R.; Abbott, J.; Ware, J.L.; Sanchez-Herrera, M. (2022): Are wing contours good classifiers for automatic identification in Odonata? A view from the Targeted Odonata Wing Digitization (TOWD) project. International Journal of Odonatology 25: 96-106. (in English) ["In recent decades, a lack of available knowledge about the magnitude, identity and distribution of biodiversity has given way to a taxonomic impediment where species are not being described as fast as the rate of extinction. Using Machine Learning methods based on seven different algorithms (LR, CART, KNN, GNB, LDA, SVM and RFC) we have created an automatic identification approach for odonate genera, through images of wing contours. The training population is composed of the collected specimens that have been digitized in the framework of the NSF funded Odomatic and TOWD projects. Each contour was pre-processed, and 80 coefficients were extracted for each specimen. These form a database with 4656 rows and 80 columns, which was divided into 70% for training and 30% for testing the classifiers. The classifier with the best performance was a Linear Discriminant Analysis (LDA), which discriminated the highest number of classes (100) with an accuracy value of 0.7337, precision of 0.75, recall of 0.73 and a F1 score of 0.73. Additionally, two main confusion groups are reported, among genera within the suborders of Anisoptera and Zygoptera. These confusion groups suggest a need to include other morphological characters that complement the wing information used for the classification of these groups thereby improving accuracy of classification. Likewise, the findings of this work open the door to the application of machine learning methods for the identification of species in Odonata and in insects more broadly which would potentially reduce the impact of the taxonomic impediment." (Authors)] Address: Sáenz Oviedo, Mayra, Dept Epidemiology & Biostatistics. Pontificia Univ. Javeriana, Ak. 7 # 40-62, 10231, Bogotá, Colombia

21984. Sasamoto, A.; Cho, S.; Futahashi, R. (2022): Genetic similarity between Paracercion sieboldii and P. v-nigrum, with special reference to the population of Tsushima Island (Zygoptera: Coenagrionidae). Tombo 65: 21-27. (in English, with Japanese summary) ["The phylogenetic relationship between Paracercion sieboldii (Selys, 1876), endemic in Japan, and Paracercion v-nigrum (Needham, 1930), widely distributed in east of continental Asia, is discussed. They are morphologically, especially in the male anal appendages, differentiated, but genetically, not separated in nuclear, or showed little difference in mitochondrial analysis. Interestingly, Tsushima, which is located nearly in the border of their distribution, individuals of P. sieboldii cannot be distinguished from P. v-nigrum even by mitochondria DNA. It is highly probable that they are most closely related species and that Tsushima population of P. sieboldii experienced hybridization in the past after the allopatric speciation." (Authors)] Address: Sasamoto, A., 190-4 Yakuoji Tawaramoto, Shiki-gun, Nara prefecture, 636-0341, Japan. E-mail: aks-smt@sea.plala.or.jp

21985. Saxton, N.A.; Marinov, M.G.; Bybee, S.M. (2022): Revision of Vanuatubasis Ober & Staniczek, 2009 (Odonata, Coenagrionidae), with description of seven new species. ZooKeys 1128: 129-169. (in English) ["Vanuatubasis Ober & Staniczek, 2009 is an endemic genus of damselfly found on the island archipelago of Vanuatu. Previously only three species were assigned to the genus. Here, all known species of Vanuatubasis are formally described and treated, including the association of females for known species. The following new congeners are also described: V. discontinua sp. nov., V. evelynae sp. nov., V. insularivorum sp. nov., V. kapularum sp. nov., V. nunggoli sp. nov., V. rhomboides sp. nov., and V. xanthochroa sp. nov. from material collected across six different islands. An illustrated key to both males and females of all species within Vanuatubasis is provided as well as distributions for all known species." (Authors)] Address: Saxton, Natalie, Research & Collections Division, The Cleveland Museum of Natural History, Cleveland, OH, 44106, USA Email: nsaxton@cmnh.org

21986. Scheibler, E.E.; Montemayor, S.I.; Melo, M.C. (2022): Macroinvertebrate communities in high mountain desert wetlands: Building biological indexes to address the vulnerability of species and communities. Insect Conservation and Diversity 15(6): 714-724. (in English) ["1. Andean wetlands in arid climates are isolated ecosystems surrounded by steep terrain and have crucial relevance as a water resource. The species inhabiting them are adapted to these

habitats and vulnerable to environmental changes. 2. The aim of this study is to evaluate the vulnerability of invertebrate aquatic species to climate change and organic pollution through an index adapted from the species distributional models (SDM) score [vulnerability of aquatic invertebrate species index (Vais)], and the vulnerability of the invertebrate communities through an index developed herein [wetland community vulnerability index (Wcv)]. 3. The Vais index ranges from 1 (highly vulnerable) to 0 (non-vulnerable species). It was calculated for 22 species of the orders Coleoptera, Ephemeroptera, Hemiptera, and Odonata. According to our results, the most vulnerable species belong to the orders Ephemeroptera (2) and Odonata (8) (scores 0.63–0.76); species with medium vulnerability belong to the orders Coleoptera (1) Ephemeroptera (1), Hemiptera (4) and Odonata (1) (scores 0.43–0.54); and the most tolerant species belong to the orders Coleoptera (2) and Hemiptera (3) (0.31–0.29). 4. The Wcv index was calculated for 31 communities in Andean wetlands. Lower Wcv values correspond to less vulnerable communities and higher values to more vulnerable communities. According to our results, communities can be divided into three groups: the most vulnerable (scores 0.61–0.71), the ones with medium vulnerability (scores 0.49–0.59), and the least vulnerable (scores 0.33–0.48). 5. The Vais and Wcv indexes are useful tools for evaluating the vulnerability of aquatic species and wetland communities, providing valuable information for defining conservation strategies." (Authors) The following species are used of assessment: Ischnura fluviatis, Erythrodiplax corallina, Progomphus joergenseni, Cyanallagma interruptum, Erythrodiplax connata, Rhionaeschna absoluta, Ischnura ultima, and Andinagrion peterseni.] Address: Montemayor, Sara Itzel, División Entomología, Facultad de Ciencias Naturales y Museo, Univ. Nacional de La Plata, Paseo del Bosque s/n, B1900FWA, La Plata, Argentina. Email: smontemay@fcnym.unlp.edu.ar

21987. Seok, Y.; Kim, D.G.; Son, J.; Park, J.; Lee, J. (2022): The importance of the Mujechineup wetland for biodiversity: an evaluation of habitat quality and ecosystem service value. Landscape and Ecological Engineering 18(4): 477-491. (in English) ["Wetlands are important multifunctional systems that provide various ecological services for animal populations, particularly with regard to regulation and support. The biodiversity of wetlands is threatened by human activities that cause habitat fragmentation and destruction. The international community needs to make efforts to measure habitat quality and recognize the value of biodiversity. This study aimed to evaluate the value of Nannophya koreana habitat restoration in the Mujechineup wetland. First, through a literature review, this study estimated the expected ecosystem service value of the Mujechineup wetland compared to existing wetlands. The Mujechineup wetland's ecosystem service value ranged from a minimum of $109,296.00 (SD $32,752.00) to a maximum of $679,457.14 (SD $4,611,730.90). Second, we quantified the habitat quality of the Mujechineup wetland in Ulsan for biodiversity measurements using the integrated valuation of ecosystem services and tradeoffs (InVEST). The analysis showed that there was a difference in the quality of the habitat depending on the spatial unit. Samdong-myeon was processed for 2 min with a mean value of 0.094. Ulju-gun was processed for 1 h 14 min with a mean value of 0.146. In addition, as a result of the field survey, the ratio of Hemiptera, Odonata and Coleoptera (HOC) groups in the Mujechineup wetland where Nannophya koreana lives was more than 50%, but the ratio of predators was approximately 10% on average. Third, this study investigated the willingness to pay to restore the habitat of Nannophya koreana, which lives in the Mujechineup wetland. The average amount that people would be willing to pay annually for the restoration of the Mujechineup wetland was $33,652. The study found that awareness of the importance of Nannophya koreana and the need for restoration of its habitat environment was high. These findings can be used to recognize the value of the Mujechineup wetland as a habitat for Nannophya koreana and to communicate its importance." (Authors)] Address: Lee, J., Division of Environmental Science & Ecological Engineering, College of Life Sciences & Biotechnology, Korea Univ., Seoul, 02841, Republic of Korea. Email: archjung@korea.ac.kr

21988. Shavkatovna, A.M. (2022): Systematic analysis of the dragonfly fauna (Insecta: Odonata) in the Khorezm region. (Uzbekistan). Proceedings of International Scientific Conference on Multidisciplinary Studies, Conferencea, 7–11. Retrieved from https://conferencea.org/index.php/conferences/article/view/1618: 116-120. (in Russian, with English summary) ["This article provides brief information about the current state of the dragonfly fauna of the Khorezm region. According to the results of studies conducted in the Khorezm region in 2020-2022, 6 families, 11 genera and 23 species belonging to 2 suborders (Zygoptera and Anisoptera) were identified. According to the zoogeographical status of the dragonfly fauna, 11 Palearctic species (47.8%), 7 cosmopolitan species (30.4%), 2 Holarctic, trans-Palaearctic species (8.7%), 1 Australasian species (4.3%) were identified." (Google translate)] Address: Shavkatovna, Akhmedova Mokhira, Khorezm Mamun Academy (PhD) student, Uzbekistan. Email: mohiraahmedova21@gmail.com

21989. Shavkatovna, A.M.; Saparboyevich, D.J. (2022): Phenological groups of dragonflies (Insecta: Odonata) in Khorezm oasis. International Journal of Genetic Engineering 10(2): 17-20. (in English) ["This article presents the species composition and phenology of dragonflies distributed in the Khorezm oasis [Uzbekistan]. When analyzing the results of the observations made in 2020-2021, four phenological groups were noted: spring-summer species, summer species, summer and autumn species, all-season-specific species (spring, summer, autumn). Accordingly, all-season-specific species (10 species) were numerically superior to others." (Authors)] Address: Shavkatovna, Akhmedova Mokhira, Khorezm Mamun Academy, Khiva, Uzbekistan. Email: mokhira1011@gmail.com

21990. Silas Veras, D.; Silva Pinto, N.; Calvão, L.; Santana Lustosa, G.; Silva de Azevêdo, C.A.; Juen, L. (2022): Environmental thresholds of dragonflies and damselflies from a Cerrado-Caatinga ecotone. Environmental Monitoring and Assessment volume 194(9), Article number: 614: (in English) ["Aquatic ecosystems are affected by different land uses that modify gradients of environmental conditions. These impacts act directly on the community structure, especially the most sensitive ones, such as aquatic insects. Thus, dragonflies have been used as good models to assess these changes, since their suborders Anisoptera and Zygoptera have different ecophysiological and behavioral requirements. This study aimed to evaluate the following hypotheses: (1) dragonfly species composition differs along the environmental gradients of streams; therefore, we expect a higher proportion of species of the suborder Anisoptera in environments with a higher degree of disturbance, since these environmental conditions select heliothermic species with exophytic oviposition; (2) the reduction of habitat integrity and canopy cover will lead to a lower richness of the Zygoptera, due to the restrictions of its thermoregulation and oviposition behavior in relation to Anisoptera, since the higher light input

would favor heliothermic and exophytic species; (3) alterations in habitat integrity create ecological thresholds and points of change in the abundance and frequency of Odonata species, generating gradients in the environmental integrity conditions. Specimens were collected from 24 streams (first to third order), in a gradient of land uses. Canopy cover and stream width were predictors of taxonomic richness and abundance of the suborders Anisoptera and Zygoptera, with greater coverage and smaller width, positively affecting Zygoptera and negatively Anisoptera. The turning points were determined by a habitat integrity index, where below 0.38 there is an increase in generalist taxa and a decline in sensitive taxa. On the other hand, above 0.79, there was a sensitive taxa increase in detriment of generalists. Four individual taxa indicators were selected, two of which associated with a negative response (Perithemis tenera and Acanthagrion aepiolum) and two with positive responses (Epipleoneura metallica and Zenithoptera lanei) for habitat integrity. Our results are important to guide management strategies, recovery, and protection policies for areas of permanent protection, aiming to conserving biodiversity and natural resources essential to life quality maintenance." (Authors)] Address: Silas Veras, D., Lab. de Ecologia E Conservação, Programa de Pós-Graduação Em Ecologia-PPGECO, Universidade Federal Do Pará, Belém, Brazil

21991. Sommerhäuser, M.; Deuster, M.; Korte, T.; Hurck, R.; Wilbertz, M. (2022): Entwicklung der Wasserinsekten in der Lippe. Natur in NRW 2/2022: 35-40. (in German) ["While the biomass of terrestrial insects has declined considerably, the efforts of Efforts to protect water bodies since the 1970s and the renaturation movement since the 1980s have evidently led to an improvement in the situation of water-borne insect species. The Lippe - 50 years ago still a largely developed lowland river widely used for water abstraction and the absorption of wastewater and mine water - is now once again home to 150 aquatic insect species. Compared to the beginning of standardised quality surveys around 1970, when only 13 insect species were recorded, this corresponds to an eleven-fold increase. The article discusses this trend and the underlying causes, such as the considerable improvement in water quality due to the expansion of sewage treatment plants and the measures for ecological improvement. However, the limits of this process and the necessary measures for a further improvement of the situation of the aquatic insect fauna in flowing waters are also discussed." (Authors/DeepL)] Address: Sommerhäuser, M., Lippeverband Essen, Germany. Email: sommerhaeuser.mario@eglv.de

21992. Suhling, F.; Goertzen, D. (2022): 17. Libellen (Odonata). In book: Natur in Hondelage: Lebensräume - Pflanzen - Tiere. Publisher: FUN Hondelage: 194-209. (in German) [Hondelage, near Braunschweig, Niedersachsen, Germany. General introduction into dragonflies and brief discussion of (most of) the 50 regionally reported species. Focus is set on conservation measures.] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, 38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

21993. Umeda, T. (2022): Morphological difference in a lobe between the cerci of anal appendages between final instar larvae of Calopteryx japonica Selys,1869 and Atrocalopteryx atrata (Selys,1853). Tombo 65: 38-39. (in Japanese, with English summary) ["The shape of a lobe between the cerci at the anal appendages of final instar larvae between Calopteryx japonica and Atrocalopteryx atrata is compared. It is revealed to be clearly different, i.e. the apex of the lobe in C. japonica protrudes in a mountain shape, whereas that of A. atrata is rounded." (Author)] Address: Email: takashi.-umeda@jcom.home.ne.jp

21994. Van Eupen, C.; Maes, D.; Herremans, M.; Swinnen, K.R.R.; Somers, B.; Luca, S. (2022): Species profiles support recommendations for quality filtering of opportunistic citizen science data. Ecological Modelling 467, May 2022, 109910: (in English) ["Highlights: • Taxonomy and relative species traits support data quality filtering recommendations. • Species profiles reveal relative importance of species traits. • Clearest recommendations for filters based on observer activity/validation status. • Improving species knowledge and record validation protocols increase data quality. • Filtering is not recommended when sample size decreases over 75 percent. Abstract: Opportunistic citizen science data are commonly filtered in an attempt to improve their applicability for relating species occurrences with environmental variables. Recommendations on when and how to filter, however, have remained relatively general and associations between species traits and filtering recommendations are sparse. We collected six traits (body size, detectability, classification error rate, familiarity, reporting probability and range size) of 52 birds, 25 butterflies and 14 dragonflies. Both absolute (values not rescaled) and relative traits (values rescaled per taxonomic group) were linked to filter effects, i.e. the impact on three different measures of species distribution model performance caused by applying three different quality filters, for different degrees of sample size reduction. First, we applied multiple regressions that predicted the filter effects by either absolute (including taxonomic group) or relative traits. Second, a principal component and clustering analysis were performed to define five species profiles based on species traits that were retained after a multiple regression model selection. The analysis of the profiles indicated the relative importance of species traits and revealed new insights into the association of species traits with changes in model performance after data quality filtering. Both taxonomic group (more than absolute traits) and relative species traits (mainly classification error rate, range size and familiarity) defined the impact of data quality filtering on model performance and we discourage the selection of a quality filtering strategy based on one single species trait. Results further confirmed the importance of considering the goal of the study (i.e. increasing model discrimination capacity, sensitivity or specificity) as well as the change in sample size caused by stringent filtering. The general species knowledge amongst citizen scientists (importance of observer experience), together with the mechanism of record verification in an opportunistic data platform (importance of verifiable metadata) have the largest potential for enhancing the quality of opportunistic records." (Authors)] Address: Van Eupen, Camile, Ghent Univ., Dept of Data Analysis & Mathematical Modelling, Coupure Links 653, B-9000 Ghent, Belgium

21995. Wang, Y.-J.; Tüzün, N.; Sentis, A.; Stoks, R. (2022): Thermal plasticity and evolution shape predator-prey interactions differently in clear and turbid water. Journal of Animal Ecology 9184): 883-894. (in English) ["1. Warming and eutrophication negatively affect freshwater ecosystems by modifying trophic interactions and increasing water turbidity. We need to consider their joint effects on predator-prey interactions, and how these depend on the thermal evolution of both predator and prey. 2. We quantified how 4°C warming and algae-induced turbidity (that integrates turbidity per se and increased food for zooplankton prey) affect functional response parameters and prey population parameters in a common-garden experiment. We did so for all combinations of high- and low-latitude predator (damselfly larvae)

and prey (water fleas) populations to assess the potential impact of thermal evolution of predators and/or prey at a high latitude under warming using a space-for-time substitution. We then modelled effects on the system stability (i.e. tendency to oscillate) under different warming, turbidity and evolutionary scenarios. 3. Warming and turbidity had little effect on the functional response parameters of high-latitude predators. In contrast, warming and turbidity reduced the handling times of low-latitude predators. Moreover, warming increased the search rates of low-latitude predators in clear water but instead decreased these in turbid water. 4. Warming increased stability (i.e. prevented oscillations) in turbid water (except for the “high-latitude predator & high-latitude prey” system), mainly by decreasing the prey’s carrying capacity and partly also by decreasing search rates, while it did not affect stability in clear water. Algae-induced turbidity generally decreased stability, mainly by increasing the prey’s carrying capacity and partly also by increasing search rates. This resembles findings that nutrient enrichment can reduce the stability of trophic systems. The expected stability of the high-latitude trophic system under warming was dependent on the turbidity level: our results suggest that thermal plasticity tends to destabilize the high-latitude trophic system under warming in clear water but not in turbid water, and that thermal evolution of the predator will stabilize the high-latitude system under warming in turbid water but less so in clear water. 5. The extent to which thermal plasticity and evolution shape trophic system stability under warming may strongly differ between clear and turbid water bodies, with their contributions having a more stabilizing role in turbid water." (Authors)] Address: Wang, Y.-J., Evolutionary Stress Ecology & Ecotoxicology, Univ. Leuven, Leuven, Belgium. Email: Email: lanexran@gmail.com

21996. Wolz, M.; Schrader, A.; Whitelaw, E.; Müller, C. (2022): Gregarines modulate insect responses to sublethal insecticide residues. Oecologia 198: 255-265. (in English) ["Throughout their lifetime, insects face multiple environmental challenges that influence their performance. Gregarines are prevalent endoparasites in most invertebrates that affect the fitness of their hosts, but are often overlooked in ecological studies. Next to such biotic factors, a current common challenge is anthropogenic pollution with pesticides, which causes a major threat to non-target organisms that are readily exposed to lethal or sublethal concentrations. In a Laboratory study, we investigated whether the presence of gregarines modulates the food consumption and life history traits of a (non-target) leaf beetle species, Phaedon cochleariae, in response to sublethal insecticide exposure. We show that the larval food consumption of the herbivore was neither affected by gregarine infection nor sublethal insecticide exposure. Nevertheless, infection with gregarines led to a delayed development, while insecticide exposure resulted in a lower body mass of adult males and a reduced reproduction of females. Individuals exposed to both challenges suffered most, as they had the lowest survival probability. This indicates detrimental effects on the population dynamics of non-target insects infected with naturally occurring gregarines that face additional stress from agrochemical pollution. Moreover, we found that the infection load with gregarines was higher in individuals exposed to sublethal insecticide concentrations compared to unexposed individuals. To counteract the global decline of insects, the potential of natural parasite infections in modulating insect responses to anthropogenic and non-anthropogenic environmental factors should be considered in ecological risk assessment." (Authors) The paper includes references to Odonata.] Address: Müller, Caroline, Dept Chemical Ecology, Bielefeld Univ., Universitätsstr. 24, 33615 Bielefeld, Germany. Email: caroline.mueller@uni-bielefeld.de

21997. Wu, X.; Zheng, X.; Yu, L.; Lu, R.; Zhang, Q.; Luo, X.-J.; Mai, B.-X. (2022): Biomagnification of persistent organic pollutants from terrestrial and aquatic Invertebrates to songbirds: Associations with physiochemical and ecological indicators. Environmental Science & Technology 56: 12200-12209. (in English) ["Biomagnification of persistent organic pollutants (POPs) is affected by physiochemical properties of POPs and ecological factors of wildlife. In this study, influences on speciesspecific biomagnification of POPs from aquatic and terrestrial invertebrates to eight songbird species were investigated. The median concentrations of polychlorinated biphenyls (PCBs) and polybrominated diphenyl ethers (PBDEs) in birds were 175 to 13 200 ng/g lipid weight (lw) and 62.7 to 3710 ng/g lw, respectively. Diet compositions of different invertebrate taxa for songbird species were quantified by quantitative fatty acid signature analysis. Aquatic insects had more contributions of more hydrophobic POPs, while terrestrial invertebrates had more contributions of less hydrophobic PCBs in songbirds. Biomagnification factors (BMFs) and trophic magnification factors had parabolic relationships with log KOW and log KOA. The partition ratios of POPs between bird muscle and air were significantly and positively correlated with log KOA of POPs, indicating respiratory elimination as an important determinant in biomagnification of POPs in songbirds. In this study, the species-specific biomagnification of POPs in songbird species cannot be explained by stable isotopes of carbon and nitrogen and body parameters of bird species. BMFs of most studied POPs were significantly correlated with proportions of polyunsaturated fatty acids in different species of songbirds." (Authors)] Address: Yu, L., School Biol. & Food Engineering, Guangdong Univ. of Education, Guangzhou 510303, China

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21998. Adelmann, J.; Frank, M. (2023): Die Sympetrum-Arten in Hessen - Aktueller Stand und Entwicklung ihrer Verbreitung (Odonata: Libellulidae). Libellen in Hessen 16: 79-102. (in German) ["All nine Sympetrum species found in Germany were also found in Hesse. In the current draft of the Red List of Dragonflies in Hesse, three species are now considered extinct or lost (S. depressiusculum, S. flaveolum, S. pedemontanum), and two others, S. danae and S. vulgatum, show a strongly negative trend. In contrast, the S. meridionale has established itself since the first proof of reproduction in Hesse in 2007 and has been found in 57 MTB quadrants since 2015 alone. The current status of the individual species is presented in numbers and distribution maps using the grid analysis based on the occupied quadrants and MTB-64. The decline of the common darter is discussed against the background of recent findings on reproduction and the competitive situation compared to the greater darter." (Authors/Google translate)] Address: Adelmann, J., Potsdamer Str. 70, 64372 Ober-Ramstadt, Germany. Email: jadelmann-@web.de

21999. Adelmann, J.; Feisel, L.; Frank, M.; Roland, H.-J.; Stübing, S. (2023): Im Fokus: Gabel-Azurjungfer (Coenagrion scitulum) - Stand der Verbreitung in Hessen (Odonata: Coenagrionidae). Libellen in Hessen 16: 49-69. (in German) [C. scitulum, "first detected in Hesse (Germany) in 2008, has firmly established itself in the federal state and has now been found in 84 MTB quadrants. The evidence is concentrated on the plains and river valleys in the south of the state, but

there are also individual reports from northern Hesse and the low mountain ranges up to medium altitudes. While the evidence often only relates to individual individuals, larger numbers of individuals up to several hundred are observed at some localities. Six of these deposits, which may serve as a source population for further colonization of the country, are presented with regard to their structural features and their dragonfly fauna. In accordance with other publications, these are exclusively shallow, sun-exposed and permanent bodies of water with predominantly rich aquatic vegetation." (Authors/ Google translate)] Address: Adelmann, J., Potsdamer Str. 70, 64372 Ober-Ramstadt, Germany. Email: jadelmann@-web.de

22000. Adelmann, J. (2023): Die Libellenfauna im südlichen Vogelsberg. Libellen in Hessen 16: 103-118. (in German) ["For a long time, the Vogelsberg was one of the areas in Hesse that had received little attention from odontologists. Apart from older investigations in the Hohen Vogelsberg and more recent observations from two NSGs set up primarily for bird protection, only a few observations are available. Therefore, in the last four years, a sub-area in the southern Vogelsberg was examined more systematically with regard to the choice of water bodies and mapping dates. Including the results recently obtained from another mapping project at the Ober-Mooser Teich, a total of seven areas were mapped and evaluated. These areas are presented briefly and the proven species are considered with regard to their continuity and frequency. A total of 38 species were detected, with 8 species only being observed in one body of water and only in one year. Enallagma cyathigerum was detected most frequently, for which a significant decline can be reported in Hesse overall. Sympetrum vulgatum was also detected much more frequently and with greater consistency than corresponds to its strongly negative trend in Hesse." (Authors/Google translate)] Address: Adelmann, J., Potsdamer Str. 70, 64372 Ober-Ramstadt, Germany. Email: jadelmann@web.de

22001. Aghade, J.B.; Saraf, S.A.; Dongre, S.B.; Shinde, A.M. (2023): Studies on the species diversity of damselflies and dragonflies (Odonata: Insecta) around the Harsul and Salim Ali Lake, Aurangabad, Maharashtra, India. Eur. Chem. Bull. 12 (Special issue 8): 5494-5496. (in English) ["Around the Harsul Lake and Salim Ali Lake in Aurangabad, Maharashtra, India, a thorough study on the species diversity of odonates was carried out in 2021–2022, recording about 12 species belonging to 03 families within 2 suborders of the order Odonata. The order Odonata's most prevalent family, the Libellulidae, had eight species, followed by the Coenagrionidae, which had three, and the Gomphidae, which had one. The months of July through September saw the mass emergence of Brachythemis contaminata and the migratory species Trithemis pallidinervis." (Authors) The paper includes the Westpalaearctic/European species Coenagrion mercuriale, Pyrrhosoma nymphula, and Ceriagrion tenellum.] Address: Aghade, J.B., Dept of Zoology, Government College of Arts and Science, Dr. B.A.M. Univ., Chhatrapati Sambhaji Nagar, Aurangabad, Maharashtra, India

22002. Asrori, S.L.; Putri, K.A.; Diniarsih, S.; Lupiyaningdyah, P.; Sari, H.P.E. (2023): Diversity of Odonata in Langsa urban forest, Langsa, Aceh, Indonesia. Treubia 50(1): 1-10. (in English) ["Odonata is important as environmental bioindicator as well as pest control. Langsa Urban Forest (LUF) is a 10-ha green open space in Langsa City, Aceh Province which serves the purpose of tourism and support biodiversity conservation, in which Odonata is included. There is a lack of Odonata research in Langsa, especially at the LUF area, therefore this study offers a baseline information for wildlife management. Field observations had been conducted between February to March 2022 using line-transect method. As a result, this study recorded 19 Odonata species from four families, of which Orthetrum sabina became the most prominent species observed. Odonata diversity in LUF was medium (H' = 1.863-2.252) with population of each species presumed to be nearly even (J = 0.71-0.79). Odonata diversity in LUF serves as additional information on Odonata species found in Indonesia, especially Aceh Province. Also, the medium category of Odonata diversity index in LUF can be used as a reference for LUF management to support more ecosystems as Odonata habitat." (Authors)] Address: Sari, H.P.E., Dept Biol., Faculty of Enginering, Universitas Samudra, Langsa, Aceh, 24416, Indonesia. Email: herlinaputriendahsari@unsam.ac.id

22003. Azar, D.; Nel, A. (2023): Libanogomphidae, a new extraordinary dragonfly family from the Upper Cretaceous of Lebanon (Odonata, Anisoptera). Cretaceous Research 148, August 2023, 105501: (in English) ["Libanogomphus lionelcavini gen. et sp. nov., the third dragonfly fossilized in compression from the Lebanese Cretaceous, is described and illustrated. It is attributed to the new gomphid family Libanogomphidae on the basis of a series of extraordinary structures in the hind wing venation, never observed elsewhere among Odonata. More or less similar structures can be found in the Palaeozoic odonatopteran Meganeuridae or Protanisoptera. This new fossil confirms the originality of the odonatan fauna of the Lebanese Cretaceous. It also further suggests that our current knowledge on the Mesozoic odonatan diversity is quite under-evaluated." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@mnhn.fr

22004. Borkenstein, A.; Jödicke, R. (2023): Langjährige Entwicklung der Libellenfauna zweier Moore in Nordwestdeutschland und Einfluss der Dürreperiode 2018–2020 (Odonata). Libellula 41(3/4): 115-153. (in German, with English summary) ["Long-term development of the dragonfly fauna of two bogs in north-west Germany and influence of the drought period 2018–2020 (Odonata) – The population development of dragonflies in two lowland bogs in Lower Saxony was surveyed for 18 and 12 years, respectively. In all, 41 species were identified. The most significant changes in the dragonfly fauna happened when both study areas dried up in 2018–2020 due to summer rain deficits and hot spells. In the years before this drought, there were fairly stable populations of regularly reproducing species, but also those with occasional reproductive success as well as visitors. During the study period, there were no colonisations by southern species expanding their range to Lower Saxony as a result of global warming. However, even before the dry years, some species, such as Lestes sponsa, Aeshna juncea or Sympetrum flaveolum, showed significant to extreme population declines. This negative development was in line with the regional trend. In the dried-up bogs during the drought summers only a few individuals of a few species could be observed. According to our observations, no larva survives dry and hot peat soil. As an exception, a few teneral individuals of Libellula quadrimaculata and Leucorrhinia rubicunda had apparently been able to survive as larva in the few still humid dips. Some univoltine species, such as L. sponsa, Coenagrion puella or S. danae, survived the drought as imago, and their offspring emerged before the bogs dried out again in the following season. Lestes dryas, which colonised the areas during the drought period, proved to be the beneficiary of

the drought. Also, L. virens only reproduced in the dry years and became the most abundant damselfly species. During the comparatively wet following year of 2021 we observed a resettlement by most species. Apparently, the arrival of dispersing mature individuals from surrounding waters without desiccation problems played a decisive role. The population of C. lunulatum did not recover until the end of our study. In addition to the disappearance of this species, which has become rare in Germany, the rapid expansion of the common rush in the dry phases poses a significant problem, because the shallow waters and bights overgrown by it irreversibly lost their bog character. As climate change continues, the drought years described here will recur and eventually become the norm. Losses among the odonate species, especially those of the bog dwellers, will steadily increase. The protection program of bogs in Lower Saxony is in danger of failing due to the lack of summer rain in connection with extreme heat waves." (Authors)] Address: Jödicke, R., Am Liebfrauenbusch 3, 26655 Westerstede, Germany. Email: reinhard.joedicke@magenta.de

22005. Bota-Sierra, C.; Sánchez Herrera, M. (2023): A new species of bannerwing damselfly, Polythore albistriata sp. nov. (Odonata: Polythoridae). International Journal of Odonatology 26: 82-92. (in English, with Spanish summary) ["The traditional method of classifying the 21 species within the South American genus Polythore has been relying on wing color patterns and male genital ligula shape. However, recent molecular research has shown that wing color patterns can vary significantly within some species, making it an insufficient means of species diagnosis by itself in some cases. In this study, we employ a combined approach of morphological and molecular data to describe a new Polythore species found in the southeastern Colombian Andes. Our analysis includes detailed illustrations and pictures of diagnostic features, haplotype networks for two barcode genes, COX1 and NADH I, a distribution map, and a brief discussion of the conservation status of the species. We found wing color pattern, male genital ligula morphology, and NADH I barcode sequences to be sufficiently diagnostic to identify the species as new. Our results highlight the importance of integrating multiple data sources for accurate species identifications and descriptions in this genus." (Authors)] Address: Sánchez Herrera, Melissa, Lab. de Zoología y Ecología Acuática (LAZOEA), Biological Sciences Dept, Univ. de los Andes, Bogotá, Colombia. Email: melsanc@gmail.com

22006. Boudet, L.; Nel, A.; Huang, D. (2023): A new basal hawker dragonfly from the earliest Late Jurassic of Daohugou, northeastern China (Odonata: Anisoptera: Mesuropetalidae). Historical Biology 35(8): 1267-1273. (in English) ["Sinomesuropetala daohugensis gen. nov. et sp. nov., first accurate Chinese representative of the Mesozoic family Mesuropetalidae, is described from the Haifanggou Formation near the Daohugou village in northeastern China. The exceptional preservation of the fossil allows the description of reproductive structures seldom observed in compression fossils. It confirms the high diversity of the 'basal' Aeshnoptera during the Middle-Late Jurassic, especially in China. This new finding confirms the widespread distribution of the Mesuropetalidae during the Jurassic." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@mnhn.fr

22007. Bybee, S.M.; Futahashi, R.; Renoult, J.P.; Sharkey, C.; Simon, S.; Suvorov, A.; Wellenreuther, M. (2023): Transcriptomic insights into Odonata ecology and evolution. In: Dragonflies and Damselflies. Second Edition. Edited by Alex Córdoba-Aguilar, Christopher D. Beatty & Jason T. Bried, Oxford Univ. Press. Oxford Univ. Press (2023). DOI: 10.1093/-oso/9780192898623.003.0003: 21-35. (in English) ["Chapter 3 attempts to define transcriptomics, a powerful tool for scientific research that has advanced our knowledge of Odonata evolution in many meaningful ways. It then goes on to outline its strengths and weakness for ecological and evolutionary research. The chapter frames the current state of transcriptomics research in Odonata. It focuses specifically on color, color vision, embryogenesis, and phylo-transcriptomics, as these are currently the deepest areas for transcriptomics among Odonata to date. The chapter also describes the authors' advocacy for future research using transcriptomics and it presents clearly and concisely their arguments to convince the reader that there are exceptional opportunities among Odonata. This is particularly so when transcriptomics is combined with genomics." (Authors)] Address: Futahashi, R., National Inst. Advanced Industrial Science & Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

22008. Cano-Cobos, Y.; Montes-Fontalvo, J.; Bota-Sierra, C. (2023): Philogenia realpei sp. nov. (Zygoptera: Philogeniidae), a new damselfly species from Colombia. International Journal of Odonatology 26: 74-81. (in English, with Spanish summary) ["Philogenia realpei sp. nov., is described here from 5 ♂♂, 2 ♀♀ collected at Cauca and Putumayo Depts in southern Colombia. This species is included in the P. helena group and can be differentiated from other species by the unique morphology of its paraprocts. We also provide a distribution map and a taxonomic key for the males of this group." (Authors)] Address: Cano-Cobos, Yiselle, Laboratorio de Biodiversidad y Genética Ambiental (BioGeA), Univ. Nacional de Avellaneda, Piñeyro 1870, Avellaneda, Buenos Aires, Argentina. Email: yisellecanoc@gmail.com

22009. Chang, S.-C.; Li, Y.; Zheng, D. (2023): Dating amber: Review and perspective. Minerals 2023, 13, 948. https://-doi.org/10.3390/min13070948: 15 pp. (in English) ["Amber is a fossilized tree resin that ranges in age from the Carboniferous to the Cenozoic. It occurs globally from the Arctic to Antarctica. As the resin petrifies and turns into amber, it can enclose and preserve other materials. Amber with inclusions can help reconstruct past biodiversity and ecosystems. Some amber contains fossils representing the oldest and most detailed records of critical evolutionary traits or markers. Inclusions can even capture behavioral indicators previously only observed in extant organisms. Evidence of insect pollination of flowering plants and dragonfly mating behavior appears in amber, as does the morphological specialization of insects, indicating sociality and social parasitism. Dating amber deposits can help calibrate evolutionary events and inform reconstructions of past ecosystems. While the direct dating of amber remains impossible, age constraints on most amber deposits are based on correlations or relative dating, methods that come with significant uncertainties. This study discusses two cases using $^{40}Ar/^{39}Ar$ and U–Pb geochronologic methods to constrain the ages of amber deposits in China and the paleo-ecosystems they record. This paper also summarizes how radio-isotopic dating and other techniques combined with the analysis of inclusions in amber can help elucidate biogeography and the dynamic relationship between life and the physical environment." (Authors)] Address: Chang, S.-C., Dept Earth Sciences, Univ. Hong Kong, Hong Kong, China. Email: suchin@hku.hk

22010. Cranston, J.; Isaac, N.J.B.; Early, R. (2023): Associ-

ations between a range-shifting damselfly (Erythromma viridulum) and the UK's resident Odonata suggests habitat sharing is more important than antagonism. Conservation and Diversity 16(3): 416-426. (in English) ["1. Species shifting their ranges under climate change are a conservation dilemma. Range-shifters may be threatened by climate change in their historic range. However range-shifters are likely to be generalist opportunists, which could mean they could harm aspects of biodiversity in their new ecosystems. Therefore, we need approaches to rapidly assess how range-shifters may integrate into the community of historically resident species. 2. E. viridulum has shifted into the UK since 1999, and may affect resident Odonata via intraguild predation. We asked whether the damselfly's arrival is associated with a decline in resident Odonata. 3. We harnessed the British Dragonfly Society's dataset, using records from 49,788 site visits between 2000-2015 to construct dynamic species occupancy models for 17 resident UK Odonata. We estimated the potential effect of E. viridulum presence on the probability that each species would persist at a given site, while controlling for potential effects of climate and recording effort. 4. On average, Anisoptera persisted more frequently at sites where E. viridulum had established, whilst Zygoptera showed no change in persistence. Nevertheless, two resident damselflies, including E. viridulum's congener, disappeared more frequently when the range-shifter established. 5. We suggest E. viridulum poses minimal risk to most UK resident Odonata. Rather, E. viridulum may be differentially establishing in areas with good habitat quality, where many species of historically resident Odonata are also found. Therefore, high quality, biodiverse sites may become home to increasing numbers of range-shifters in future. Our approach permits rapid-detection of how range-shifters are integrating into resident biota." (Authors)] Address: Early, R., Centre for Ecology & Conservation, Univ. Exeter, Penryn Campus, Penryn, TR10 9FE, UK. Email: r.early@exeter.ac.uk

22011. Dias, S.J.; Borker, A.S. (2023): An assessment of the diet of Brown Fish-Owl Ketupa zeylonensis (J.F. Gmelin, 1788) (Aves: Strigiformes: Strigidae) from two localities in the foothills of the Western Ghats of Goa, India. Journal of Threatened Taxa 15(7): 23514-23520.["The Brown Fish-Owl is a large nocturnal bird of prey that has a vast distribution range. However, there is a significant literature gap on the ecology of this species in the Western Ghats ecoregion, particularly in regard to its food spectrum. In the present study, we assessed the diet composition of this species in the foothills of the Western Ghats of Goa, India. The diet was evaluated by analysing the undigested prey remains in regurgitated pellets obtained from the banks of forest streams and roosting sites. A total of 104 pellets were collected from two localities that exhibited similar landscape characteristics. Our analysis indicated that crabs contributed to a significant proportion of the diet of the species (75.47%), followed by amphibians (frogs, 8.02%), fishes (7.08%), reptiles (snakes, 2.83%), birds (2.36%), scorpions (1.89%), and insects (Odonata, 0.47%). Additionally, 1.89% (n = 4) of the prey items could not be identified due to their disintegrated nature. Furthermore, an assessment of Food Niche Breadth (FNB) indicated that K. zeylonensis exhibited a high degree of specialization in terms of its diet in the study areas." (Authors)] Address: Dias, S.J., Planet Life Foundation, C8/G4, Maple Grove Apartments, Belloy, Nuvem, Salcete, Goa 403601, India.

22012. Doriath-Döhler, A.; Hervet, S.; Bétoux, O. (2023): Palaeophylolestes distinctus n. gen., n. sp., a new malachite damselfly (Odonata: Zygoptera: Synlestidae) from the Paleocene Menat locality (France). Geodoversitas 45(14): 401-407. (in English, with French summary) ["Palaeophylolestes distinctus n. gen., n. sp., is described from the Paleocene Menat locality. It can be distinguished from other Synlestidae owing to the very long wing veins MA, MP and CuA, and a unique combination of other wing venation features. The occurrence of a Synlestidae in the western Palaearctic area (while extant species occur in Australia, the Oriental region, South-East Asia, South Africa and Hispaniola) is not unexpected given the known fossil record of these insects and climatic conditions prevailing at Menat during the Paleocene." (Authors)] Address: Doriath-Döhler, Aimie, 20 Avenue de la Marne, F-92160 Antony, France. Email: aimie.doriathdohler@gmail.com

22013. Đurdevic, A.P.; Popovic, M.A.; Medenica, I.J.; Nikolic, M.L.J. (2023): New findings of Cordulegaster insignis Schneider, 1845 (Odonata: Cordulegastridae) in Serbia. Kragujevac Journal of Science 45: 335-339. (in English) ["During a field survey in 2021 in Southern Serbia, near the village of Strezovac, two specimens of C. insignis were found. This species is extremely rare in Serbia. The findings are located on the western border of its areal." (Authors)] Address: Institute for Nature Conservation of Serbia, Office in Niš, Vožda Karadorda 14/II, 18000 Niš, Serbia. E-mail: djukiamphibia@gmail.com

22014. Fang, R.; Zheng, D. (2023): A new tarsophlebiid dragonfly from the Lower Cretaceous of western Liaoning, NE China (Insecta: Odonatoptera, Panodonata). Cretaceous Research 143, March 2023, 105424: (in English) ["A well-preserved dragonfly Turanophlebia liaoningensis sp. nov., belonging to the family Tarsophlebiidae, is described from the Lower Cretaceous Yixian Formation in the Huangbanjigou Village, western Liaoning, China. This is the second species of Turanophlebia recovered in China, although it was widely distributed in Eurasia during the Late Jurassic and Early Cretaceous. Turanophlebia liaoningensis sp. nov. differs from all other species of Turanophlebia in the hindwing pterostigma covering 6-8 cells and cubito-anal area with five rows of cells between CuA and the posterior wing margin. The discovery provides new insight into the biodiversity and evolution of Tarsophlebiidae." (Authors)] Address: Zheng, D., State Key Lab. Palaeobiol. & Stratigraphy, Nanjing Inst. Geology & Palaeontology & Center for Excellence in Life & Paleoenvironment, Chinese Acad. Sciences, 39 East Beijing Rd, Nanjing 210008, China. Email: drzheng@nigpas.ac.cn

22015. Fedorova, A.; Pustovalova, E.; Drohvalenko, M. (2023): High frequency of hindlimb malformation in froglets Pelophylax sp. in Ukraine. The Herpetological Bulletin 164: 24-25. (in English) [Revealing the primary reason of each malformation would be a complex task because malformations could result from either natural or anthropogenic factors, including parasitic infections, exposure to UV radiation and chemical pollutants, physical traumas, and genetic defects (Johnson et al., 1999; Ouellet, 2000; Henle et al., 2017). Furthermore, Ballengee & Sessions (2009) showed that the most likely reason for missing limbs and missing limb segments is predation by dragonfly nymphs who can injury or even amputate the limbs of tadpoles." (Authors)] Address: Fedorova, Anna, Dept of Zoology & Animal Ecology, V.N. Karazin Kharkiv National Univ., Kharkiv, 61022, Ukraine. Email: anna.fedorova@karazin.ua

22016. Ferzoco, I.M.C.; McCauley, S.J. (2023): Breaking down the components of the competition-colonization trade-off: New insights into its role in diverse systems. Journal of Animal Ecology 92(2): 352-366. (in English) ["(1) Performance trade-offs between competition and colonization

can be an important mechanism facilitating regional coexistence of competitors. However, empirical evidence for this trade-off is mixed, raising questions about the extent to which it shapes diverse ecological communities. Here, we outline a framework that can be used to improve empirical tests of the competition-colonization trade-off. (2) We argue that tests of the competition-colonization trade-off have been diverted into unproductive paths when dispersal mode and/or competition type have been inadequately defined. To generate comparative predictions of associations between dispersal and competitive performance, we develop a conceptual trait-based framework that clarifies how dispersal mode and type of competitor shape this trade-off at the stage of dispersal and establishment in a variety of systems. Our framework suggests that competition-colonization trade-offs may be less common for passively dispersing organisms when competitive dominants are those best able to withstand resource depletion (competitive response), and for active dispersers when traits for dispersal performance are positively associated with resource pre-emption (competitive effect). (3) The framework presented here is designed to provide common ground for researchers working in different systems in order to prompt more effective assessment of this performance trade-off and its role in shaping community structure. By delineating key system properties that mediate the trade-off between competitive and colonization performance and their relationship to individual-level traits, researchers in disparate systems can structure their predictions about this trade-off more effectively and compare across systems more clearly." (Authors)] Address: Ferzoco, Ilia Maria, Dept of Ecology & Evolutionary Biology, Univ. of Toronto, Toronto, Ontario, Canada. Email: ilia.ferzoco@mail.utoronto.ca

22017. Fischer, I.; Chovanec, A.; Kargl, V.; Sittenthaler, M.; Sattmann, H.; Haring, E. (2023): The dragonfly fauna of the Vienna Lobau – a survey from 2017–2020. Acta ZooBot Austria 159: 119-136. (in German, with English summary) ["In this study, the ecological status of the water bodies in the Viennese part of the Danube Floodplain National Park, the Viennese Lobau, was assessed from a dragon fly ecology perspective. The surveys for this were conducted in 2017, 2018 and 2020. The assessment was based on the comparison of the status quo with the water body type-specific reference coenosis, based on a classification of the Lobau waters using the Lorenzo map (surveyed 1816–1817). The reference coenosis was dominated by rheophilous species and dragonfly species that depend on dynamic waters with fluctuating water levels. Due to the low abundance of stillwater habitats, limnophilic species played only a minor role in the reference situation. The dragonfly fauna recorded during the study – 43 dragonfly species, with 39 of them autochthonous – consists for the most part (74%) of species with a distribution focus in the limnophilic range. Rheophilic species and species adapted to strongly fluctuating water levels made up only a small part of the species spectrum and also occurred (especially in the Upper Lobau) only to a very limited extent. Due to this, the dragonfly ecological status of the waters in the Lobau was assessed as “poor”." (Authors)] Address: Fischer, Iris, Central Research Laboratories, Natural History Museum Vienna, Burgring 7, 1010 Vienna, Austria. Email: iris.fischer@nhm-wien.ac.at

22018. Fortunato, M.H.T.; Mendes, H.F.; Hayashi, C.; Faria, L.R. de; Melo, C.L. de; & Ananias, I. de M.C. (2023): Predation rate of dragonfly (Odonata: Libellulidae) on tilapia (Oreochromis niloticus Linnaeus 1758) and the availability of alternative preys (Insecta: Diptera: Chironomidae) to increase fish survival. Acta Scientiarum. Biological Sciences 45(1), e65291: 12 pp. (in English) ["The objective of this work was to evaluate the predation rates of two genera of Odonata Miathyria Kirby, 1889 and Erythemis Hagen, 1861 in post-larviculture of tilapia (Cichlidae) with and without availability of Chironomidae. For that, 3 experiments were carried out, the first to analyze which size scale of these two genera would be more efficient in the predation of tilapia and the other 2 experiments with the selected size scales, to analyze the predation rates on tilapia with different Odonata densities, with and without availability of the aquatic insect Chironomidae. For statistical analysis of the data, an analysis of variance (ANOVA) was applied with the Duncan test searching for the means in all experiments. In experiments 2 and 3 a linear regression model was also applied. In experiment 1, there were significant differences between treatments, and in the phase with Miathyria the predation of tilapia post-larvae was higher among odonates that corresponded to the size scale from 7.1 to 9.9 mm and therefore the scale was also selected for the next experiments. For Erythemis, the consumption of tilapia was higher in the size scale between 12.1 to 14,2 mm. In the following experiments, there were significant differences between treatments. With the increase in Odonata densities the predation of the fish was greater. With the availability of Chironomidae, the consumption of tilapia post-larvae decreased. The consumption of Chironomidae was higher than the consumption of fish in experiment 3. Miathyria proved to be more efficient than Erythemis in predation and the use of Chironomidae can be a sustainable alternative for post-larvae predation control on fish farms." (Authors)] Address: Fortunato, M.H.T., Programa de Pós Graduação & Agricultura Sustentável, Univ. Professor Edson Antônio Velano, Rodovia MG-179, km 0, 37132-440, Alfenas, Minas Gerais, Brazil. E-mail: mtank@-live.com

22019. Frank, M.; Adelmann, J.; Blanckenhagen, B. v.; Houzmann, J.; Roland, H.-J.; Stübing, S.; Tamm, J. (2023): Jahresbericht Hessen 2022. Libellen in Hessen 16: 3-47. (in German) [Records of 59 species from Hessen, Germany are documented and discussed.] Address: Frank, M., Zur Traubenmühle 5A, 55268 Nieder-Olm, Germany

22020. Fukaya, W. (2023): Distribution of Macromia daimoji Okumura, 1949 in Tochigi Prefecture, Honshu, Japan based on field studies from 2019 to 2022. Tombo 66: 63-66. (in Japanese, with English summary) [" This paper reports on the distribution status of M. daimoji in Tochigi Prefecture, central Honshu, Japan. It was recorded from three rivers in the Nakagawa River svstems. Multiple individuals were collected in two of these rivers, indicating that a stable population exists in Tochigi Prefecture." (Author)] Address: Fukaya, W.: Email: aeshna2074@gmail.com

22021. Fukaya, W., Kaneuchi, Y., Kotabe, A. & Seki, N. (2023): Records of Macromia daimoji Okumura, 1949 from Saitama Preiecture: rediscovery after 31 years. Tombo 65: 63-64. (in Japanese, with English summary) ["We record M. daimoji from Tokigawa River and Irumagawa River, Saitama Pretecture, Honshu, Japan. This is 31 years since last record or this species in Saitama Prefecture. The environment of the habitats was considered to be favorable for this species." (Authors)] Address: Fukaya, W.: Email: aeshna2074-@gmail.com

22022. Futahashi, R.; Fukaya, W. (2023): Distribution survey or Mnais damselflies (Zygoptera: Calopterygidae) in Tochigi Prefecture, central Honshu, Japan. Tombo 66: 41-47. (in Japanese, with English summary) ["We surveyed the

distribution of the genus Mnais in Tochigi Prefecture, central Honshu, Japan. Based on nuclear ITS1 sequences, two species, M. pruinosa and M. costalis were found in Tochigi Prefecture. M. costalis was recorded widely from lower to higher elevations, whereas M. pruinosa was recorded only in the lower mountains of the western part of the prefecture and could not be found at higher elevations above 1,000 m. We also examined environmental factors associated with the distribution of both species, and found that the angle of slope around the habitat was significantly larger for M. pruinosa than for M. costalis. Moreover, the minimum temperature may be one of the limiting factors in the distribution of M. pruinosa around the northern Kanto district." (Authors)] Address: Futahashi, R., National Inst. Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

22023. Futahashi, R. & Kiyoshi, T. (2023): A brief report on Sympetrum kunckeli collected in Taiwan. Tombo 65: 81-82. (in Japanese, with English summary) ["In Taiwan, only one individual of S. kunckeli has been recorded previously, in 1968, and recently it has been regarded as a doubtful species. We confirmed that this specimen exists in the Asahina collection preserved in the National Museum of Nature and Science, and report the photos. S. kunckeli has decreased dramatically in Japan in recent years, and it is considered to have been distributed in Taiwan in the past." (Authors)] Address: Futahashi, R., National Inst. Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

22024. Futahashi, R., Kagimoto, B. & Sakamoto, M. (2023): Genetic diversity of Orthetrum poecilops among populations in Miyajima Island, Japan. Tombo 66: 56-59. (in Japanese, with English summary) ["We conducted genetic analyses of Japanese O. poecilops using a next-generation sequencer on a total of 10 individuals derived from three populations in Miyajima Island, Hiroshima, Japan. Almost no individual differences were detected in the nuclear ribosomal DNA region and mitochondrial DNA sequences. In addition, the dendrogram based on the 8,275 nuclear DNA loci did not detect genetic differentiation among the populations, suggesting genetic interaction among the Miyajima populations." (Authors)] Address: Futahashi, R., National Inst. Advanced Industrial Science & Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

22025. Garrison, M.; Tennessen, K.J. (2023): Nymph Cove: Identification to genus: Aeshnidae (Part II). Argia 35(2): 38-41. (in English) [The following North American aeshnid genera are diagnosed: Anax, Gynacantha, Triacanthagyna, Oplonaeschna, Remartinia, Aeshna, and Rhionaeschna.] Address: Garrison, Marla, Biology Faculty McHenry County College Crystal Lake, IL, USA. E-mail: mgarriso@mchenry.edu

22026. Ge, Y. García-Girón, J,; Heino, J.; Liu, Z.; Zhang, C.; Yan, Y.; Xie, Z.; Li, Z. (2023): Dispersal syndromes mediate phylogenetic distance decay relationships in a dendritic stream network. Journal of Biogeography 50(3): 897-908. (in English) ["Aim: Understanding the mechanisms underlying the structure and connectivity of ecological communities is a central issue in biogeography. Dispersal syndromes are tightly woven into organisms' life history seen across populations and communities, but measuring dispersal is still complicated in practice. We investigated the role of dispersal syndromes (here, associated with body size, adult flying ability and voltinism) to predict phylogenetic distance decay relationships (DDRs) of aquatic insect assemblages in dendritic stream networks. Location: Du River Basin, China. Taxon: Aquatic insects (Coleoptera, Diptera, Ephemeroptera, Hemiptera, Lepidoptera, Megaloptera, Odonata, Plecoptera and Trichoptera). Methods: We applied multiple methods (i.e. deconstruction approach, null models, Mantel tests and partial Mantel tests) to enhance our basic understanding of phylogenetic distance decay patterns. To provide additional insights into correlates of phylogenetic dissimilarity between stream sites, we modelled potential dispersal routes based on overland, watercourse and cost distances. Results: Overland distances were among the main correlates of phylogenetic distance decay in the stream networks studied, suggesting that aquatic insects disperse overland seeking for habitats suitable for survival and reproduction. However, local environmental filtering was generally more important for phylogenetic DDRs than geographical distances alone. The interaction between environmental vs. dispersal processes in driving spatial patterns of phylogenetic dissimilarity was contingent on different dispersal syndromes. More specifically, significant phylogenetic DDRs were detected only for subsets of large-bodied, univoltine taxa with strong adult flying abilities, such as dragonflies. Main Conclusions: Overall, historical constraints affect the phylogenetic DDRs in aquatic insects. Dispersal syndromes associated with body size, adult flying ability and voltinism are key features underlying distance decay in phylogenetic assemblage similarity and the evolutionary legacies of aquatic insects in dendritic stream networks." (Authors)] Address: García-Girón, J., Dept Biodiversity & Environmental Management, Univ. of León, León, Spain. Email: Jorge.Garcia-Giron@oulu.fi

22027. Gómez-Llano, M.; McPeek, M.A.; Siepielski, A.M. (2023): Environmental variation shapes and links parasitism to sexual selection. Evolutionary Ecology 37: 585-600. (in English) ["Parasite-driven population divergence in hosts can be exacerbated by environmental factors affecting host parasitism, as well as by increasing sexual selection against parasitized hosts. Environmental factors can influence parasitism directly by affecting parasite survival, and indirectly by affecting host condition, which can in turn shape host sexual selection. To disentangle these potential alternative paths, we used a damselfly (host) - water mite (parasite) system to examine how environmental factors directly and indirectly drive heterogeneity in parasitism across populations and influence the strength of sexual selection acting against parasitized males. We found substantial heterogeneity in parasitism across populations, driven mainly by lake pH, and damselfly density. Although this heterogeneity in parasitism did not translate directly into variation in sexual selection, the density of predatory fish increased sexual selection strength, likely through the effects on damselfly condition. These results imply that parasitism alone may not cause differences in sexual selection across populations, but when linked with underlying environmental conditions, parasitism can increase the strength of selection. More broadly, these results suggest that elucidating how parasitism may drive sexual selection requires consideration of the intwined effects of ecological processes. ... Damselflies were collected from 10 populations of E. ebrium and eight population of E. geminatum in Vermont and New Hampshire, USA." (Authors)] Address: Gómez-Llano, M., Dept of Environmental & Life Sciences, Karlstad Univ., Karlstad, 65188 Sweden. Email: miguel.gomez@kau.se

22028. Greenhalgh, J.A.; Genner, M.J.; Jones, G. (2023): Diel variation in insect-dominated temperate pond soundscapes and guidelines for survey design. Freshwater Biology

68(7): 1148-1160. (in English) ["1. Passive acoustic monitoring has been used for decades as a non-invasive tool for quantifying biodiversity in terrestrial and marine ecosystems. Recently, there has been increased interest in the potential for the method to survey freshwater biodiversity. Fundamental aspects of freshwater soundscape phenology, however, often remain poorly understood, despite their importance for suitable survey design. 2. To gain a greater understanding of daily acoustic variation in aquatic insect- dominated temperate pond soundscapes, 840 hr of underwater sound recordings were collected from five ponds in the southwest of the U.K. We calculated six commonly used acoustic indices to investigate diel trends and evaluated the suitability of each acoustic index to identify biologically complex pond soundscapes. In addition, macroinvertebrates were collected from each pond to investigate potential drivers of diel soundscape variation. 3. The ponds studied possessed clear patterns of daily acoustic variation, with acoustic activity typically peaking between 02:00 and 04:00 and around the solar noon. Acoustic Entropy showed the greatest variation between day and night soundscapes and was best suited for detecting overall daily acoustic variation in the study ponds. However, the Normalised Difference Soundscape Index and the Bioacoustic Index captured strong diel variation in aquatic insect-dominated soundscapes. Furthermore, we calculated that a minimum hydrophone deployment time of 24 hr is required to ensure that soundscape variation is adequately captured. 4. This study provides an increased understanding of daily acoustic variation in insect- dominated temperate pond soundscapes, enabling us to provide guide-lines for the design and implementation of future passive acoustic monitoring surveys. We suggest that a minimum of 24 hr is required to adequately capture pond soundscape variation. This will increase the chance of detecting key soniferous species in the soundscape and enable more accurate assessments of temper-ate pond soundscapes." (Authors) Figure 1 includes "Coenagrionidae"; no further discussion of Odonata is made.] Address: Greenhalgh, J.A., School of Biological Sciences, Univ. of Bristol, Life Sciences Building, 24 Tyndall Avenue, Bristol, BS8 1TQ, U.K. Email: jackhalgh95@gmail.com

22029. Grigoropoulou, A.; Ab Hamid, S.; Acosta, R.; Akindele, E.O.; Al-Shami, S.A.; Altermatt, F.; Amatulli, G.; Angeler, D.G.; Arimoro, F.O.; Aroviita, J.; Astorga-Roine, A.; Costa Bastos, R.; Bonada, N.; Boukas, N.; Brand, C.; Bremerich, V.; Bush, A.; Cai, Q.; Callisto, M.; Chen, K.; Vilela Cruz, P.; Dangles, O.; Death, R.; Deng, X.; Domínguez, E.; Dudgeon, D.; Eriksen, T.E.; Faria, A.P.J.; João Feio, M.; Fernández-Aláez, C.; Floury, M.; García-Criado, F.; García-Girón, J.; Graf, W.; Grönroos, M.; Haase, P.; Hamada, N.; He, F.; Heino, J.; Holzenthal, R.; Huttunen, K.-L.; Jacobsen, D.; Jähnig, S.C.; Jetz, W.; Johnson, R.K.; Juen, L.; Kalkman, V.; Kati, V.; Keke, U.N.; Koroiva, R.; Kuemmerlen, M.; Langhans, S.D.; Ligeiro, R.; Van Looy, L.; Maasri, A.; Marchant, R.; Garcia Marquez, J.R.; Martins, R.T.; Melo, A.S.; Metzeling, L.; Miserendino, M.L.; Jannicke Moe, S.; Molineri, C.; Muotka, T.; Mustonen, K.-R.; Mykrä, H.; Cavalcante do Nascimento, J.M.; Valente-Neto, F.; Neu, P.J.; Nieto, C.; Pauls, S.U.; Paulson, D.R.; Rios-Touma, B.; Rodrigues, M.E.; Roque, F.; Salazar Salina, J.C.; Schmera, D.; Schmidt-Kloiber, A.; Shah, D.N.; Simaika, J.P.; Siqueira, T.; Tachamo-Shah, R.D.; Theischinger, G.; Thompson, R.; Tonkin, J.D.; Torres-Cambas, Y.; Townsend, C.; Turak, E.; Twardochleb, L.; Wang, B.; Yanygina, L.; Zamora-Muñoz, C.; Domisch, S. (2023): The global EPTO database: Worldwide occurrences of aquatic insects. Global Ecology and Biogeography 32(5): 642-655. (in English) ["Motivation: Aquatic insects comprise 64% of freshwater animal diversity and are widely used as bioindicators to assess water quality impairment and freshwater ecosystem health, as well as to test ecological hypotheses. Despite their importance, a comprehensive, global database of aquatic insect occurrences for mapping freshwater biodiversity in macroecological studies and applied freshwater research is missing. We aim to fill this gap and present the Global EPTO Database, which includes worldwide geo-referenced aquatic insect occurrence records for four major taxa groups: Ephemeroptera, Plecoptera, Trichoptera and Odonata (EPTO). Main type of variables contained: A total of 8,368,467 occurrence records globally, of which 8,319,689 (99%) are publicly available. The records are attributed to the corresponding drainage basin and sub-catchment based on the Hydrography90m dataset and are accompanied by the elevation value, the freshwater ecoregion and the protection status of their location. Spatial location and grain: The database covers the global extent, with 86% of the observation records having coordinates with at least four decimal digits (11.1 m precision at the equator) in the World Geodetic System 1984 (WGS84) coordinate reference system. Time period and grain: Sampling years span from 1951 to 2021. Ninety-nine percent of the records have information on the year of the observation, 95% on the year and month, while 94% have a complete date. In the case of seven sub-datasets, exact dates can be retrieved upon communication with the data contributors. Major taxa and level of measurement: Ephemeroptera, Plecoptera, Trichoptera and Odonata, standardized at the genus taxonomic level. We provide species names for 7,727,980 (93%) records without further taxonomic verification. Software format: The entire tab-separated value (.csv) database can be downloaded and visualized at https://glowabio.org/project/-epto_database/. Fifty individual datasets are also available at https://fred.igb-berlin.de, while six datasets have restricted access. For the latter, we share metadata and the contact details of the authors.] Address: Grigoropoulou, A., Dept of Community & Ecosystem Ecology, Leibniz Inst. Freshwater Ecology & Inland Fisheries, Müggelseedamm 310, Berlin 12587, Germany. Email: afroditi.grigoropoulou@igb-berlin.de

22030. Hering, J.; Geiter, O.; Fünfstück, H.-J.; Küttner, R. (2023): Hitze, Schweiss und Überraschungen im Juni: expedition auf dem Nassersee. Der Falke 70(7): 14-21. (in German) [Lake Nasser is a vast reservoir in southern Egypt and northern Sudan. The avifauna of the Egyptian part was studied in June 2022. 13 odonate species were found, but only Brachythemis impartita and Paragomphus pumilio are listed.] Address: not stated

22031. Higashikawa, W.; Sueyoshi, M.; Mori, T.; Yonekura, R.; Nakamura, K. (2023): The Satogawa Index: A landscape-based indicator for freshwater biodiversity in Japan. Ecological Indicators Volume 152, August 2023, 110350: 8 pp. (in English) ["Highlights: • The 'Satogawa' Index (SGI) is based on the heterogeneity of freshwater landscape. • Diversity and shape complexity of freshwater land covers were considered in the SGI. • The SGI correlated well with species richness of Odonata and freshwater fish. • The SGI may assess the effects of the changes in land use on freshwater biodiversity. Abstract: Nationwide biodiversity indicators based on landscape heterogeneity have been developed primarily for terrestrial ecosystems, but not well for freshwater ecosystems worldwide. A plausible reason for this limitation is the difficulty in the fine discrimination of freshwater environments by remote sensing. However, in recent years, Geographic Information System (GIS) vector data of freshwater land cover are classified in detail (i.e. rice paddy

fields, other marshy wetlands, rivers, ponds and lakes) in Japan. Using these GIS data, we developed an index for freshwater landscape heterogeneity with 1 km square as the spatial unit, which was named the 'Satogawa' Index (SGI). The SGI formula consisted of two-component terms, one reflecting the diversity of freshwater land covers, and the other representing their spatial shapes. We calculated the SGI at a central region in Japan and found significant relationships with the species richness of Odonata (dragonflies and damselflies) and freshwater fish. The amounts and spatial patterns of freshwater landscape elements by which the SGI was estimated were different among regions in Japan; however, the SGI may be adapted to other regions as a surrogate of aquatic species richness, a typical measure of freshwater biodiversity. Although several modifications are underway that may have negative consequences for freshwater biodiversity, land use has been changed to prevent flood damage and improve the freshwater environment. The SGI may reveal the influences of the changes in land use on freshwater biodiversity and may identify the type and amount of lotic and lentic environment that should be supplemented to improve freshwater biodiversity at a certain location." (Authors)] Address: Higashikawa, W., Kyushu research center, Forestry and Forest Products Research Institute, Kumamoto 860-0862, Japan. Email: higashi_n34@yahoo.co.jp

22032. Huamán-Tucumango, J.K.D.; Vela-Ahumada, A.; Vergara-Copacondori, J.A. (2023): Estudio del orden Odonata en el caserío Nuevo Perú del Centro Poblado Huambocancha Baja - Cajamarca - Peru. Revista Peruana de Entomología 56(1): 1-15. (in Spanish, with English summary) ["Study of the Odonata order in the Nuevo Perú hamlet of the Huambocancha Baja Population Center - Cajamarca. Rev. peru. entomol. 56 (1): 1-15. In the Nuevo Perú hamlet, Centro Poblado Huambocancha Baja, district, province and Dept of Cajamarca - Peru, the investigation was carried out with the objectives of determining the diversity of the order Odonata and taxonomically identifying the specimens collected at the genus level. During eight months and on a weekly basis, the collection of immature and adult stages was carried out during the time of day in which they showed their greatest activity (between 10:00 a.m. and 2:00 p.m.). To collect adults, the aerial entomological net was used and in the case of immature stages (eggs and naiads), the aquatic net was used. Each insect collected was assigned a field code and the corresponding observations (code, date, altitude (masi), latitude, longitude, and collector) were noted on a form. Three water sources were evaluated and the Margalef, Simpson and Shannon indices were determined to assess diversity. The eggs, naiads and adults collected were placed in 70% alcohol and in entomological envelopes to be later transferred to the Entomology Lab. of the Faculty of Agrarian Sciences of the National Univ. of Cajamarca. For the identification of the collected species, the taxonomic keys of Borror (1942), Von Ellenrieder (2003), Trapero & Naranjo (2004), Bermúdez (2005), Heckman (2006), Trapero & Naranjo (2009) and Ramírez were used. (2010). Likewise, they were identified by Dr. Cornelio Bota Sierra and Dr. Natalia Von Ellenrieder. The best conformed and in good condition insects were mounted dry and wet, and labeled with the basic field data, to be considered within the collection of Odonata of the Entomological Museum of the Faculty of Agrarian Sciences of the National Univ. of Cajamarca. In conclusion, the order Odonata is represented by at least four species in Caserío Nuevo Perú, Huambocancha Baja, Cajamarca." (Authors) Morphology of the following species is treated in great detail: Rhionaeschna marchali (Rambur, 1842), Sympetrum gilvum (Selys, 1884), Erythrodiplax fusca (Rambur 1842), and Oxyallagma dissidens (Selys 1876).] Address: Huamán-Tucumango, J.K.D., Tesista de la Universidad Nacional de Cajamarca, Peru. Email: jhuamant13@unc.edu.pe

22033. Huang, D.; Lian, X.; Fu, Y.; Nel, A. (2023): The first Chinese representative of the Cenozoic hawker dragonfly Oligaeschna (Odonata: Aeshnidae) from the Eocene of North Tibet. Historical Biology 35(6): 997-1001. (in English) ["Oligaeschna sinica sp. nov., the oldest recorded and first Chinese representative of the Cenozoic aeshnid genus Oligaeschna, is described from the Bartonian of Tibet. This fossil is also among the oldest known representatives of the family Aeshnidae sensu stricto. Its presence in the Niubao Formation supports a temperate, cool to warm climate for the area during this period." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@mnhn.fr

22034. Iezekiel, S.; Dimitriou, K.; Bakaloudis, D.E.; Kotsonas, E.G.; Aristophanous, M.; Yosef, R. (2023): First confirmed breeding records of Grey Wagtail Motacilla cinerea Tunstall, 1771 (Passeriformes: Motacillidae) in Cyprus. Ornithological Science 22(2): 151-159. (in English) ["In this paper we describe first breeding of M. cinerea in Cyprus. 23 nests were found during the 2020 and 2021 breeding seasons in riparian habitats adjacent to major river systems in the Paphos State Forest. Most nests were located on roadside banks at a height of 2.38 m above the ground and at a distance of about 0–10 m from the river. Nests consisted of grassy cups with a mean diameter of 13.39 cm, while the nest cup itself had a mean diameter of 7.07 cm and a depth of 3.41 cm. 20 nesting attempts were monitored with females laying eggs between early April and early July. A total of 54 eggs were laid and 44 nestlings were successfully raised from the 12 nests. The mean clutch size was 4.5 eggs per nest, the mean number of hatched eggs was 3.92 and the mean number of fledglings was 3.67. Parents fed their young mostly on invertebrates and in particular on insects. Diptera and Odonata were the most common insect Orders comprising the majority of prey items. Average insect prey size was 10.79 mm (range 2–60 mm), with little difference in prey size between that delivered by males and females. This study confirms the first breeding of the species in Cyprus, where it follows a breeding pattern similar to that in other parts of Western Palearctic range. The affinity of the Grey Wagtail to human structures and the low predation rate highlight the successful breeding potential and the future range expansion of the species across the island of Cyprus." (Authors)] Address: Bakaloudis, D.E., School of Forestry & Natural Environment, Aristotle Univ. of Thessaloniki, P.O. Box 241, 541 24 Thessaloniki, Greece. Email: debakaloudis@for.auth.gr

22035. Indriani, G.R.; Singkam, A.R. (2023): Population dynamics of dragonflies at the paddy field ecosystem, Sidorejo, Central Bengkulu. Jurnal Ilmiah Biologi Eksperimen Dan Keanekaragaman Hayati (J-BEKH) 10(1): 69-74. (in English) ["The rice fields of Sidorejo Village have the potential for dragonfly diversity. This study aims to analyze fluctuations in the diversity and abundance of dragonflies in three ecosystem conditions of rice fields in Sidorejo Village, Bengkulu Tengah. Sampling using purposive sampling with the cruising method. Data analysis was carried out descriptively through the identification of characteristics to obtain the name of the species. After the species name was obtained, the relative abundance, Shannon Wienner diversity index, and species evenness index were calculated. The results of the study found that the harvest ecosystem had the highest diversity and abundance of dragonflies (13 species and 45

individuals). The species that were consistently found in three types of ecosystems were Orthetrum sabina, O. testaceum, and Pantala flavescens. The species with the highest relative abundance was O. sabina with 32%. The diversity index ranged from 1.32 (post-harvest) to 2.25 (harvest). The highest evenness index was in the post-harvest ecosystem at 0.95, and the lowest was in the harvest ecosystem at 0.87. The results of this study are expected to show that the diversity and abundance of dragonflies fluctuate depending on seasonal ecosystem conditions in the rice fields." (Authors)] Address: Indriani, Gisela Ratna, Jurusan Pendidikan Biologi FKIP Universitas Bengkulu, Indonesia. Email: giseltuuh@gmail.com

22036. Inoue, K. (2023): Obituary: Professor Dr. B. Kiauta. Tombo 65: 83-85. (in Japanese, with English title) ["In this column, we would like to express our heartfelt condolences to Mr. Bastiaan Kiauta (1937-2022) (joined in 1963) who passed away on March 26, 2022. I sincerely pray that he may rest in peace." (Author/Google translate)] Address: deceased

22037. Jonderko, T.; Beczała, T.; Wiśniewski, M.; Pietraszko-Wachałowska, M. (2023): Observations of Green Snaketail Ophiogomphus cecilia FOURCROY 1785 in the Silesian Beskid Mountains in 2016-2019. Odonatrix 192 (2023): 3 pp. (in Polish, with English summary) ["In 2016-2019, occasional observations of the dragonfly Ophiogomphus cecilia were made in some forests and flushes in Silesian Beskid Mountains (southern Poland). O. cecilia was found at 3 localities on the Kotarz mountain in Brenna, in the Wapienica Valley in Bielsko-Biala, and in the Bucznik mountain in Jaworze. This species has never yet been recorded at such high altitudes in Poland." (Authors)] Address: Jonderko, T., Stowarzyszenie Górecki Klub Przyrodniczy, ul. Zalesie 12, 43-436 Górki Wielkie, Poland. Email: acer70@wp.pl

22038. Juen, L.; Koroiva, R.; Geraldo de Carvalho, F.; Mendoza-Penagos, C.C.; Brito, J.d.S.; Calvão, L.B.; Ferreira, V.R.S.; Ribeiro dos Santos, Â.; Silva, C.S.; Guerreiro, S.; Cavalcante, G.C.; Magalhães, L.; de Souza, J.E.S.; Gomes, D.H.F.; Montag, L.F.; Michelan, T.S.; Ligeiro, R. (2023): The first mitochondrial genome of an Odonata endemic to South America, Chalcopteryx rutilans (Rambur, 1842) (Odonata: Polythoridae), and its implications for the phylogeny of the Zygoptera. Diversity 15(8):908: 11 pp. (in English) ["C. rutilans is a species widely distributed in central Amazonia. Due to its sensitivity to environmental changes, it is a bioindicator species used to evaluate the environmental conditions of streams in federally protected areas. By sequencing C. rutilans mitogenome, we report the first whole mitogenome from the Polythoridae family and the first from an Odonata species endemic to South America. The entire mitogenome has 15,653 bp and contains 13 protein-coding, 22 tRNA, and two rRNA genes. The nucleotide composition of the mitogenome is 42.7%, T: 25.5%, C: 19.4%, and G: 12.4%. The AT and GC skews of the mitogenome sequence were 0.249 and -0.220, respectively. C. rutilans was recovered as a sister to Pseudolestes mirabilis Kirby, 1900 (Pseudolestidae), demonstrating the absence of mitogenomes of species from multiple families in the current literature. Mitogenome data from this study will provide useful information for further studies on the phylogeny and conservation of Polythoridae." (Authors)] Address: Juen, L., Laboratório de Ecologia e Conservação, Univ. Federal do Pará (UFPA), Belém 66075-110, PA, Brazil. Email: leandrojuen@gmail.com

22039. Karube, H.; Shiraishi, R. (2023): Record of a gynandromorphic individual or Trithemis aurora (Burmeister, 1839) (Anisoptera: Libellulidae). Tombo 66: 67-69. (in Japanese, with English summary) ["A gynandromorphic individual or T. aurora was photographed at pond of Kokura Castle park, Fukuoka Pref., SW Japan, which is the third records of the gynandromorphic individual for this species. This individual roughly bears male characteristics on the right side and female characteristics on the left side by the view of color maculation." (Authors)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

22040. Karube, H., Kameda, Y., Kaga, R., & Fujita, E. (2023): Contamination status or neonicotinoid insecticides for the habitat of endangered Odonata in Japan. Tombo 66: 13-24. (in Japanese, with English summary) ["We studied the contamination status of neonicotinoid insecticides in the habitats or endangered Odonata from Hokkaido (northern Japan) to the Ryukyu Archipelago (southern Japan), as well as the population status. This survey shows that neonicotinoid insecticides were detected in almost all of the studied areas, although contamination concentration was not so high as that of preceding studies on the habitats of Sympetrum maculatum and Libellula angelina. The result also found that multiple pollutions by neonicotinoid insecticides were often detectable and that the pollution extends to good habitat and to areas not adjacent to agricultural land. The detection of these insecticides in habitats where surface soil inflow and underground water contamination are improbable suggests these pollutions occurred via evapotranspiration and snowfall from the foothills. These findings represent only a part of the pollution. Considering the risk of exposure to lethal contamination concentrations even once during the larval period, it is strongly desired from the perspective of conservation, that plural surveys in each season, research on the effects or insecticides and herbicides other than neonicotinoid, and the effects of these pesticides on larvae of the endangered species, be undertaken." (Authors)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

22041. Kašák, J.; Holuša, O.; Mazalová, M. (2023): Artificial habitat – a chance for survival of a rare montane dragonfly (Odonata): case study on an alpine emerald (Somatochlora alpestris). Journal of Insect Conservation 27: 315-321. (in English) ["The mountain ecosystems of Central Europe are an important natural phenomenon. The character of small isolated islands also predetermines their vulnerability. Typical inhabitant of subalpine and alpine peat bogs, tiny montane habitats, is the endangered dragonfly S. alpestris a glacial relict surviving in restricted area of several mountain ranges within Central Europe. Species is threatened mainly by habitat loss and its transformation due to climate change, the expansion of tourist activities and plant succession. In our study from three mountain ranges in the Czech Republic, we bring the first ever evidence of successful development of S. alpestris in artificial habitats. Successful development of the species was recorded in peat pools created by the movement of heavy machinery on now almost abandoned forest roads. Some of the pools have been colonized in great numbers - up to tens of larvae of different instars, exuviae and imagoes have been found. Successful colonisation of the species was mainly due to: (i) proximity to source sites, (ii) suitable environmental parameters of the secondary habitat and (iii) the gradual abandonment of the paths´ use, leading to a reduction in the frequency of disturbance." (Authors)] Address: Kašák, J., Dept of Forest Protection & Wildlife Management, Mendel Univ. in Brno, Brno, Czech Republic. Email: abovic@seznam.cz

22042. Kirkpatrick Baird, F.; Spray, D.; Hall, J.; Stubbs Partridge, J. (2023): Projected increases in extreme drought frequency and duration by 2040 affect specialist habitats and species in Scotland. Ecological Solutions and Evidence 4(3) e12256: 12 pp. (in English) ["Climate-driven increases in drought occurrence are an overlooked risk in temperate climates, which may be less resilient to water scarcity than arid habitats. Scotland provides an example of a temperate oceanic climate in which drought risk is understudied, but could have substantial ecological impacts, particularly in combination with additional stressors. We modelled changes to risk of extreme drought occurrence in Scotland, and considered potential impacts of these changes on two key habitats, ombrotrophic (precipitation fed) wetlands and temperate rainforest. Using temperature and precipitation data from the UK Climate Projections 2018 and the drought index Standardized Precipitation-Evapotranspiration Index, we calculated and mapped likely changes in extreme drought for the near future (2021–2040) in comparison to a baseline (1981–2001). We found likelihood of extreme drought events increased from an average of one event every 20 years in the baseline period, to one event every 3 years by 2040. Typical events were projected to be up to 2–3 months longer, with an average of 11 extra drought months per decade. Increases were projected throughout the country, but the effect was most severe in the east, and during autumn. Ombrotrophic wetlands have some level of adaptive resilience to drought, but are considered at high risk as several key sites are in drought hotspot areas. In contrast, Scotland's temperate rainforest is located in lower risk areas, but is typically less drought resilient. Potential impacts on these habitats include reductions in ecosystem services including carbon capture, reduced breeding success for multiple taxa and increased competition among plant communities, which threatens drought-sensitive species. These projections suggest that climate-driven drought risk is a significant and imminent threat, even in wet climates. In Scotland, the results can direct mitigation and management actions to areas likely to be at greatest risk, as well as informing conservation interventions that can cope with drought. Additionally, other areas with a temperate oceanic climate may be at risk of extreme drought and could experience similar consequences. Therefore, these results have implications both for facilitating improved resilience to extreme drought in Scotland and for potentially overlooked impacts of drought in oceanic climates elsewhere." (Authors) "These impacts affect wetland-adapted animal species, for which substantial or prolonged changes in water availability could have serious implications for long-term population health. For example, the breeding success of waders … can be reduced when surface water pools where chicks forage dry up (Burston, 2006), and frequent drought periods have been linked to population declines or losses in great crested newts Triturus cristatus (Miró et al., 2017). Similarly, nationally scarce invertebrates, including Odonata such as Aeshna caerulea and Leucorrhinia dubia, rely on waterbodies for all life stages. Scottish Odonata larvae spend two or more years in water, so could suffer population crashes if pools dry for even one season (Hogreve & Suhling, 2022). Less-mobile and short-lived species especially can recover or recolonize from short-term losses, but may decline under frequent and severe drought episodes."] Address: Fairlie Kirkpatrick Baird: Email: fairlie.kirkpatrickbaird@gmail.com

22043. Kobyłecki, P. (2023): New observations of dragonflies (Odonata) of Rembertów. Odonatrix 191: 12 pp. (in Polish, with English summary) ["The observations were conducted in the peatbogs, natural and anthropogenic small water bodies, fish ponds, rivers and channel east of Warsaw in 2021 and 2022. In total, 50 odonate species were recorded." (Author)] Address: Kobyłecki, P., ul. Liryczna 8, 04-410 Warszawa e-mail: fario@poczta.fm

22044. Kutsuma, T.; Ozono, A.; Futahashi, R. (2023): The first records of Ictinogomphus pertinax (Hagen in Selys, 1854) from Yamanashi Prefecture, Honshu, Japan. Tombo 65: 73-74. (in Japanese, with English summary) [Records of I. pertinax in Kai, Koru and Nirasaki cities in Yamanashi Prefecture, Japan are presented.] Address: Futahashi, R., National Inst. Advanced Industrial Science & Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

22045. Lambret, P.; Jeanmougin, M.; Stoks, R. (2023): Factors driving larval abundance and adult size of the threatened Lestes macrostigma (Odonata): keys for water management and habitat restoration. Journal of Insect Conservation 27: 389-402. (in English) ["L. macrostigma is a damselfly of temporary brackish ponds, and is threatened in Europe. Better understanding its larval ecological requirements is imperative to inform conservation management measures and habitat restoration programs. We studied in a set of 33 temporary ponds the effect of 14 biotic and abiotic variables (including hydroperiod, pond surface area, water salinity, oviposition plant availability and predator relative abundance) on L. macrostigma larval abundance and adult size at emergence. Contrarily to our expectations, salinity level and oviposition plant availability did not drive the species larval abundance. Instead, the later the flooding date of the pond in autumn/winter the higher the larval abundance in the next spring. This effect seemed mediated by the aeshnid dragonfly larvae, as the size and relative abundance of these predators were lower in later flooded ponds. Larval abundance of L. macrostigma also increased with decreasing pond surface area. Lestes macrostigma adults tended to be bigger when they emerged from ponds with higher water levels, likely because deeper waters have lower water temperatures; this larger size may positively affect adult lifespan and fecundity. Our results contribute to explaining the species strong inter-annual variation in population abundance and further illustrate the threat of artificial early flooding of ponds for Mediterranean species. Implications for insect conservation: To improve L. macrostigma conservation actions, our results advocate to avoid temporary pond flooding before late autumn and to maintain high water levels until adults emerge in the next spring. Further, to increase habitat availability, our data indicate the importance of creating a network of small and deep temporary ponds." (Authors)] Address: Lambret, P., Tour du Valat, Research Institute for the Conservation of Mediterranean Wetlands, Le Sambuc, 13200, Arles, France

22046. Lee, S.H.; Park, J.S.; Pyo, J.-Y.; Kim, S.-S.; Kim, I. (2023): The complete mitochondrial genome of the blue-tailed damselfly Ischnura elegans (Odonata: Coenagrionidae) — a climate-sensitive indicator species in South Korea. International Journal of Industrial Entomology 46(2): 41-54.["I. elegans is a climate-sensitive indicator species in South Korea. In this study, we sequenced the complete mitochondrial genome (mitogenome) of I. elegans collected from South Korea for subsequent population genetic analysis, particularly to trace population movements in response to climate change. The 15,963 base pair (bp)-long complete mitogenome of I. elegans has typical sets of genes including a major non-coding region (the A+T-rich region), and an arrangement identical to that observed in ancestral insect species.

The ATP6, ND3 and ND1 genes have the TTG start codon, which, although rare, is the canonical start codon for animal mitochondrial tRNA. The A/T content was 71.4% in protein-coding genes, 72.1% in tRNAs, 72.9% in the whole genome, 74.7% in srRNA, 75.3% in lrRNA, and 83.8% in the A+T-rich region. The A+T-rich region is unusually long (1,196 bp) and contains two subunits (192 bp and 176–165 bp), each of which is tandemly triplicated and surrounded by non-repeat sequences. Comparison of the sequence divergence among available mitogenomes of I. elegans, including the one from the current study, revealed ND2 as the most variable gene, followed by COII and COI, suggesting that ND2 should be targeted first in subsequent population-level studies. Phylogenetic reconstruction based on all available mitogenome sequences of Coenagrionidae showed a strong sister relationship between I. elegans and I. senegalensis.] Address: Kim, I., Dept of Applied Biology, College of Agriculture & Life Sciences, Chonnam National Univ., Gwangju 61186, Republic of Korea. Email: ikkim81@chonnam.ac.kr

22047. Lieckweg, A.; Hesse, V.; Mau-Hansen, C.; Lüers, E. (2023): Recherche der historischen Verbreitung von Coenagrion scitulum in Nordwestdeutschland (Odonata: Coenagrionidae). Libellula 41(3/4): 179-202. (in German, with English summary) ["Research of the historical distribution of Coenagrion scitulum in northwestern Germany (Odonata: Coenagrionidae) – Historical reports of C. scitulum for northwestern Germany have been reviewed several times over the last few decades. Some of these could be discarded due to the respective research or at least assessed as implausible. In some cases, no intensive research had been done or the whereabouts of the collection specimens were unknown, e.g. in the case of a finding of “Agrion scitulum” near Hanover (Schumann Specimen) that was corrected again shortly after its publication, and supposed specimens of “Agrion scitulum” from Lower Saxony (Genz Specimen) and northern North Rhine-Westphalia (Kiebitz Specimen). These collection specimens were searched for in various museums in Lower Saxony, Bremen, Hamburg, and North Rhine-Westphalia. The Schumann Specimen is located in the Zoological Museum Hamburg. It was indeed not a male of C. scitulum, but of Coenagrion hastulatum. The Genz Collection is located in the Übersee-Museum Bremen. Three specimens to be examined were females of C. pulchellum and not of C. scitulum. Regarding the report of the finding for northern North Rhine-Westphalia (Kiebitz Specimen), no specimen could be found despite extensive research. Therefore, a comparative photo analysis was carried out here. This showed that the Kiebitz Specimen was most likely not a male of C. scitulum, but a male of C. pulchellum. No historical finds of the species for northwestern Germany could be confirmed or newly detected. Based on the knowledge gained, a reassessment of the historical area extents of C. scitulum is carried out." (Authors)] Address: Lieckweg, Ariane, Artillerieweg 9, 26129 Oldenburg, Germany. Email: ariane.lieckweg@web.de

22048. Lishawa, S.C.; Schrank, A.J.; Lawrence, B.A.; Monks, A.M.; Albert, D.A. (2023): Aquatic connectivity treatments increase fish and macroinvertebrate use of Typha- invaded Great Lakes coastal wetlands. Freshwater Biology 68(8): 1462-1477. (in English) ["1. Coastal wetlands provide critical habitat for aquatic organisms and important ecosystem services for the terrestrial and aquatic landscapes that they bridge, but increasingly common invasive macrophytes disrupt plant communities, food webs, habitat structure and littoral–pelagic linkages. In Laurentian Great Lakes coastal wetlands, invasive cattails (Typha × glauca and T. angustifolia, hereafter Typha) homogenise ecosystem structure and reduce nearshore dissolved oxygen, and plant, fish and macroinvertebrate diversity. We hypothesised that management treatments which reduce Typha and its abundant litter promote structural heterogeneity and mitigate physicochemical and biodiversity impacts. 2. To test this hypothesis, we implemented a large-scale (2,048 m² treatment units), multi-site (four coastal wetlands) experiment in northern Michigan (USA.) to examine how invasive Typha mechanical harvesting treatments (biomass harvest, aquatic connectivity channels, Typha-dominated control) altered fish, macroinvertebrate, plant, larval amphibian abundance and diversity, and water quality for 2-year post-treatment. 3. Both harvest and channel treatments reduced Typha biomass, cover and dominance; harvest increased multi-taxa species richness, fish diversity and abundance; and channels altered plant, fish, and macroinvertebrate community structures. Dissolved oxygen was greater and litter was reduced by both treatments, indicating likely mechanisms for shifts in fish and macroinvertebrate use. 4. Our results suggest that harvesting invasive macrophytes can ameliorate biodiversity impacts and improve habitat quality, and that adding aquatic connectivity channels can increase community complexity. 5. Typha management that incorporates both harvesting and aquatic connectivity channels appears to provide the greatest benefit to several taxonomic groups, likely by reducing Typha and its litter, increasing dissolved oxygen availability, and increasing the connection between open water and wetland interiors. Increasing habitat complexity and aquatic connectivity of invaded wetlands can promote biodiversity and provides a more realistic management goal than the complete elimination of invasive macrophytes." (Authors) Lestidae were similar in abundance in control and harvest treatments, but never found in channels.] Address: Lishawa, Shane C., School of Environmental Sustainability, Loyola Univ. Chicago, Chicago, IL, USA. Email: slishawa@luc.edu

22049. Lynch, A.J.; Cooke, S.J.; Arthington, A.H.; Baigun, C.; Bossenbroek, L.; Dickens, C.; Harrison, I.; Kimirei, I.; Langhans, S.D.; Murchie, K.J.; Olden, J.D.; Ormerod, S.J.; Owuor, M.; Raghavan, R.; Samways, M.J.; Schinegger, R.; Sharma, S.; Tachamo-Shah, R.-D.; Tickner, D.; Tweddle, D.; Young, N.; Jähnig, S.C (2023): People need freshwater biodiversity. Water. 2023; e1633.: 31 pp. (in English) ["Freshwater biodiversity, from fish to frogs and microbes to macrophytes, pro vides a vast array of services to people. Mounting concerns focus on the accel erating pace of biodiversity loss and declining ecological function within freshwater ecosystems that continue to threaten these natural benefits. Here, we catalog nine fundamental ecosystem services that the biotic components of indigenous freshwater biodiversity provide to people, organized into three cate gories: material (food; health and genetic resources; material goods), non material (culture; education and science; recreation), and regulating (catch ment integrity; climate regulation; water purification and nutrient cycling). If freshwater biodiversity is protected, conserved, and restored in an integrated manner, as well as more broadly appreciated by humanity, it will continue to contribute to human well-being and our sustainable future via this wide range of services and associated nature-based solutions to our sustainable future." (Authors)] Address: Lynch, Abigail, U.S. Geological Survey, National Climate Adaptation Science Center, 12201 Sunrise Valley Drive MS 516, Reston, VA 20192, USA. Email: ajlynch@usgs.gov

22050. Mahato, S.; Mandal, S.; Das, D. (2023): Diversity and seasonal occurrence of odonates in the dry deciduous ecoregion of Purulia, West Bengal, India. Zoology and Ecology 33(1): 5-14. (in English) ["A year-long study was conducted

in the dry deciduous ecoregion of Purulia, West Bengal, India from March 2018 to February 2019 to document the diversity, species composition, and occurrence of odonata species in different seasons. Direct search and opportunistic sighting methods were used in combination at five selected sites, namely, the Sidho-Kanho-Birsha Univ. campus, Saheb Bandh, the Surulia Deer Park (Mini Zoo), Ketika, and the Kansai river-side. A total of 11,471 individuals belonging to 8 families and 40 species were recorded during the study period. Anisoptera were represented by 29 species belonging to 4 families, whereas Zygoptera were also found to be represented by 4 families but only 11 species. Libellulidae were found to be the largest family represented by 24 species, while the ground skimmer Diplacodes trivialis was the most dominant species. Species richness was the highest in the post-monsoon, whereas the Shannon diversity index was found to reach maximum values in winter. Overall, we conclude that the town of Purulia and its adjoining area with its patchy vegetation and extreme weather conditions have moderate odonate diversity." (Authors)] Address: Das, D., Bagnan College, Khalore, Bagnan, Howrah, West Bengal 711303, India. Email: dipanwita.das05@gmail.com

22051. Malovichko, L.V.; Umets, K.E.; Rezanov, A.E.; Pushkin, S.V. (2023): Feeding the green bee-eater Merops persicus in the Stavropol Territory. Russian Journal of Ornithology 32, Express Issue 2306: 2241-2242. (in Russian) [110 pellets collected on May 28, 2017 in the Merops persicus colony in the Neftekumsky district and 40 pellets collected on August 31, 2017 in the Levokumsky district in an apiary under dry tamarix bushes, which served as perches for the bee-eaters. From the pellets, 1271 parts of the outer integument of invertebrates and the skeleton of vertebrates were isolated and analysed. 1243 specimens belonging to 3 types (Arthropoda, Mollusca and Chordata), 4 classes, 10 orders, 35 families, 91 genera were identified. 70 species of Insecta are reliably identified: Hymenoptera – 578 specimens. (46.5%), Odonata –300 (24.1%), Lepidoptera – 175 (14.1%), Orthoptera – 86 (6.9%), Coleoptera – 21 (1.7%), total 1160 specimens. (93.3%). M. persicus diet was dominated by Hymenoptera (honey bees and wasps) and Odonata.] Address: not stated

22052. Márquez-Rodríguez, J.; Samraoui, B.; Ferreras-Romero, M. (2023): Effect of forest fires on a Mediterranean Odonata assemblage. International Journal of Odonatology 26: 27-35. (in English) ["Large-scale forest fires have shaped the Mediterranean landscape for millennia, causing a recurrent disturbance that constitutes a serious environmental issue. Following a devastating forest fire, changes in the Odonata larvae assemblage of a headwater stream were analysed during six consecutive years. Five dragonflies survived the fire as larvae: Boyeria irene, Gomphus pulchellus, Onychogomphus forcipatus, O. uncatus, and Cordulegaster boltonii. Mediterranean semivoltine odonates, in contrast to species with short life cycles, exhibited resilience to forest fires, suggesting that species with long life cycles were adapted to fire disturbances that periodically sweep through their habitats." (Authors)] Address: Márquez-Rodríguez, J., Dept of Physical, Chemical & Natural Systems, Univ. Pablo de Olavide, Seville, Spain. Email: jmarrod1@admon.upo.es

22053. Mataba, G.R. (2023): Exploring integrated strategies to control oviposition and larval development in mosquitoes in northern Tanzania. PhD thesis, Faculty of: Sciences and Bioengineering, Vrije Universiteit Brussel: VIII + 216 pp. (in English) ["Besides services, ecosystems can also provide disservices. A significant disservice is the emergence of mosquitoes from freshwater habitats. These mosquitoes transmit diseases which claim millions of lives every year worldwide. The problem is exacerbated by the absence of vaccines or effective cures for many mosquito borne diseases, making effective control of mosquito populations the only reliable method to control these diseases. The widespread development of mosquito resistance against widely used insecticides hinders successful control of mosquito borne diseases using chemicals. This resistance in combination with the environmental hazards of pesticides point out the need for alternative, more effective and ecologically friendly means of mosquito control. Biological control of mosquitoes could therefore become an appropriate complementary method. In this thesis, we investigated different strategies of biological control of mosquito populations by means of reducing oviposition and larvae development. Using field surveys, we investigated which factors limit population of mosquito larvae in aquatic habitats including temporary ponds, artificial habitats (e.g., discarded tires, flowerpots) and small ground pools (e.g., hoofprints, puddles, and small pools). In a next step, we used field mesocosms to investigate whether aquatic predators could control mosquito populations by deterring oviposition. Lastly, we investigated whether pesticides (e.g., Bacillus thuringiensis var israelensis - Bti) could control mosquito populations by mechanisms other than lethal effects, such as deterring or attracting oviposition. We found that in our study region (Lake Manyara Basin, Tanzania), populations of larval mosquitoes in aquatic habitats are controlled by different factors. In temporary ponds, populations of mosquito larvae are controlled by aquatic predators, while in small ground habitats their abundance is determined by the level of turbidity and proximity of habitat to houses. In artificial habitats, populations of mosquitoes (i.e., larvae) are mainly determined by covering, emptying, and refilling of water storage vessels by residents. In addition, we found evidence that presence of predators in a breeding habitat deters mosquito oviposition. Lastly, we found that the pesticide Bti was effective in controlling larvae abundance by killing them but not by altering mosquito oviposition and there was no change in the pond invertebrate community structure. We conclude that in our study region, it is important to have an integrated mosquito control approach which prioritizes controlling mosquito larvae of small ground habitats with environmentally friendly larvicides and conservation of mosquito predators in temporary ponds. Also, proper management of water storage containers and discarded artefacts is emphasized in this region. ... The thesis includes the following chapter: Interactive effects of dragonfly larvae and the biocide Bacillus thuringiensis var. israelensis on mosquito oviposition and survival in temporary pond communities: a field test in the Afrotropics. Worldwide, a variety of larvicides are used to control reproduction of mosquitoes in freshwater habitats. However, their broader impact on the ecosystem including non-target species is often unclear. In addition, it is unknown how larvicides may interact with local mosquito predators to shape oviposition site selection of mosquitoes. We used an outdoor mesocosm experiment to investigate the effects of realistic concentrations of the biolarvicide Bacillus thuringiensis var israelensis (Bti) on Culex oviposition, larval density, survivorship and on densities of non-target species. We also manipulated the complexity of the community by manipulating the presence of dragonfly larvae as a predator. Culex oviposition was unaffected by Bti but the larvicide effectively reduced larval density and survivorship in all treatments. Bti did not affect non-target insects but stimulated phytoplankton density. The presence of dragonfly larvae in mesocosms did not reduce Culex oviposition or larval sensitivity to Bti. We conclude that Bti may effectively reduce the density and survivorship of Culex

quinqefasciatus mosquitoes in this part of East Africa, but possibly at the cost of higher phytoplankton densities. Bti treated mesocosms were not more or less attractive for mosquitoes suggesting that its application would not alter their oviposition behaviour in the field." (Authors)] Address: Mataba, G.R., Faculty of Science Dept Biol. Ecology & Biodiversity Section Community Ecology Lab. Pleinlaan 2 - 1050 Brussel

22054. Matsuki, K. (2023): Memorial to Dr. Nissin. Tombo 66: 74-75. (in Japanese) [obituary] Address: Email: matsuki_k-@nifty.com

22055. Mendoza-Penagos, C.C.; Gonçalves, M.; Viela, D.S. (2023): A new species of Dimeragrion Calvert, 1913 (Odonata: Zygoptera: Heteragrionidae) from Northwestern Brazil. Zootaxa 5318(3): 411-420. (in English, with Portuguese summary) ["Dimeragrion Calvert, 1913 is a genus with five species, restricted to the Pantepui region. Here, we describe Dimeragrion baniwa sp. nov. (Holotype. ♂ (LABECO, N° 12276), BRAZIL, Amazonas, São Gabriel da Cachoeira, (0.017, -66.891, 81 m a.s.l.), first-order stream inside Terra Firme Forest, in lateral swamps: 29.xi.2021, C. C. Mendoza-Penagos & M. Gonçalves, leg.), the sixth species of the genus from 13 ♂♂ and 3 ♀♀ collected in the municipality of São Gabriel da Cachoeira in the Brazilian Amazon, located at the southern extreme of the Pantepui region. Additionally, we provide photographs of the diagnostic characters of the male and female, photographs of live specimens as well as information on their biology. Finally, identification keys are provided, as well as a distribution map of the species of the genus [D. baniwa, D. clavijoi, D. mesembrinum, D. percubitale, D. secundum, D. unturanense]." (Authors)] Address: Mendoza-Penagos, C.C., Lab. 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

22056. Miralles Núñez, A.; Zaldívar, C.; Prunier, F.; Cabana, M.; Torralba Burrial, A.; Luque, P.; de Vega, L.; Cordero Rivera, A. (2023): An updated and agreed-upon proposal for the common names of dragonflies and damselflies in Spanish. Asociación española de Entomología, Sociedade Portuguesa de Entomologia, Congreso Ibérico de Entomología (20º. 2023. Alicante): 144. (in English) ["Odonata (dragonflies) is one of the most attractive Order of insects for nature enthusiasts, photographers, and wildlife observers. It is worth noting that unlike all other European countries, there is not yet a widely accepted list of common names in Spanish for dragonfly species present in Spain. Among international organizations, IUCN has asked for such names in Spanish. In recent years, some citizen science publications and web portals have incorporated the use of common names for dragonflies, albeit with a lack of standardization. In 2015, a reasoned proposal was presented at the I Iberian Symposium of Odonatology held in Córdoba, but it did not include species found exclusively in the Canary Islands. Although this first proposal generated an enriching debate, it also had some reservations. In 2021, at the III Iberian Symposium of Odonatology held in Irún, another proposal was presented in order to stimulate the need for agreement on Spanish dragonflies common names. In the following weeks, the Grupo Ibérico de Odonatología called for participation and created a working group with the goal of creating such a consensus list. This working group is currently reviewing the 2015 and 2021 proposals, considering the existing names in Catalan (2016) and Galician (2012). As a result, a consensus list has been elaborated for the 82 Ibero-balear species, plus 4 species exclusive to the Canaries within Spain." (Authors)] Address: Miralles Núñez, Adrià, Grup d'Estudi deis Odonats de Catalunya (Oxygastra-GEOC), Institució Catalana d'História Natural, Barcelona, Spain

22057. Mobasher, A.; Bayrami, A.; Asadi-Sharif, E.; Pouran, S.R. (2023): Ecological indicators for qualitative assessment of Ojarud River: A case study. Ecology and Evolution 13(7), e10310: 13 pp. (in English) ["Today, the application of ecological indicators based on organisms has replaced traditional saprobic approaches for assessment of the quality of rivers impaired due to organic pollution and some other environmental disturbances. This study aimed to weigh the quality of the Ojarud River in Ardabil, Iran, applying biological and physiological indices of macro-invertebrates. A total of 12,524 samplings were fulfilled at four stations (S1, S2, S3, S4) from the headstream to downstream by a Surber sampler (30 × 30 cm^2) from June/2020 to April/2021. All year round, the highest frequent families were Chironomidae (2658), Simuliidae (1025) from Diptera and Caenidae (1855), and Baetidae (724) from Ephemeroptera. The diversity pattern was analyzed by PAST software, and Primer 7 (BIO-ENV analysis) was utilized to understand what factor has the most impact on the distribution of macro-invertebrates. The least similarity of S4 to other stations was recognized by Cluster analysis. As per the ANOSIM (analysis of similarities), a statistically significant difference in the macroinvertebrates' frequency was established between S3 and other stations ($p = .0001$, $r = .63$). Moreover, the relationship between heavy metals and macro-invertebrate showed that the three families of Simuliidae, Gomphidae, and Caenidae had a positive correlation with the concentrations of heavy metals in the sediment. As per the Ephemeroptera, Plecoptera and Trichoptera index, the water quality was placed in the "excellent" class, but the Biological Monitoring Working Party and Hilsenhoff Family Biotic Index indices scored the water quality "good" class at S1 and the "poor" class at S3. Based on the results of this study, the use of physicochemical and hydro-morphological indicators can support the biological indicators but cannot replace them. In addition, careful evaluation of biological indicators is required to develop conservation strategies." (Authors)] Address: Bayrami, A., Dept Biol., Faculty of Science, Univ. of Mohaghegh Ardabili, Ardabil, Iran. Email: abolfazlbayrami@gmail.com

22058. Mulhair, P.O.; Holland, P.W.H. (2023): Evolution of the insect Hox gene cluster: Comparative analysis across 243 species. Seminars in Cell & Developmental Biology: 12 pp. (in English) ["The Hox gene cluster is an iconic example of evolutionary conservation between divergent animal lineages, providing evidence for ancient similarities in the genetic control of embryonic development. However, there are differences between taxa in gene order, gene number and genomic organisation implying conservation is not absolute. There are also examples of radical functional change of Hox genes; for example, the ftz, zen and bcd genes in insects play roles in segmentation, extraembryonic membrane formation and body polarity, rather than specification of anteroposterior position. There have been detailed descriptions of Hox genes and Hox gene clusters in several insect species, including important model systems, but a large-scale overview has been lacking. Here we extend these studies using the publicly-available complete genome sequences of 243 insect species from 13 orders. We show that the insect Hox cluster is characterised by large intergenic distances, consistently extreme in Odonata, Orthoptera, Hemiptera and Trichoptera, and always larger between the 'posterior' Hox genes. We find duplications of ftz and zen in

many species and multiple independent cluster breaks, although certain modules of neighbouring genes are rarely broken apart suggesting some organisational constraints. As more high-quality genomes are obtained, a challenge will be to relate structural genomic changes to phenotypic change across insect phylogeny." (Authors) Ischnura elegans, Platycnemis pennipes, Pantala flavescens] Address: Mulhair, P.O., Dept Biol., Univ. Oxford, 11a Mansfield Road, Oxford OX1 3SZ, UK. Email: peter.mulhair@biology.ox.ac.uk

22059. Nakada, T., Sawaaa, K., Shimbori, O. & Futahashi, R. (2023): The first records or Coenagrion terue (Asahina,1949) from Toyama Prefecture, Honshu, Japan. Tombo 65: 75-77. (in Japanese, with English summary) ["C. terue is recorded for the first time from three locations in Asahi-macni, Toyama Prefecture. Adult emergence and egg-laving behavior were also observed. This is the most western record of this species. Adding this species, the total number of Odonata species recoded in Toyama Prefecture is 90." (Authors)] Address: Futahashi, R., National Inst. Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

22060. Naraoka, H. (2023): Opening angle of the right and left wings while at rest in nine damselfly species (Odonata: Zygoptera. Tombo 66: 34-40. (in Japanese, with English summary) ["The opening angle of the right and left wings at rest for nine Zygopteran species was investigated in Hokkaido and Aomori-pref. in 2019-2022. Four species of the genus Coenagrion rested with almost an open-winged posture (> 4°) i.e., more than 93 % in C. lanceolatum, 83 % in C. terue, 67 % in C. ecornutum, and 87 % in C. hylas. The wing angle of these four species was larger in the morning and evening, and was smaller during the day. A statistically significant negative correlation was recognized between the wing open angle and air temperature in the former three species. On the other hand, Paracercion calamorum, P. plagiosum, Enallagma circulatum and Pseudocopera annulata folded their wings together above the body from 70 to 97 % throughout the day. Conversely, almost 90 % of Lestes sponsa was opening more than 100° throughout the day." (Author)] Address: Naraoka, H., 36-71, Aza-Motoizumi, Fukunoda, Itayanagi-cho, Kita-gun, Aomori Prefecture, 038-3661, Japan. Email: naraoka62@outlook.jp

22061. Nel, A.; Jouault, C.; Ribeiro, G.C. (2023): The third aeschnidiid dragonfly genus and species from the Lower Cretaceous Crato Formation (Odonata, Anisoptera). Historical Biology 35(6): 865-869. (in English) ["Cratoaeschnidium martinsnetoi gen. et sp. nov., third genus and species of the family Aeschnidiidae from the Crato Formation (Brazil), is described and illustrated based on one well-preserved forewing. It can be differentiated from the other genera in the family, inter alia, because its discoidal triangle is very narrow with only one row of cells; three rows of cells between Mspl and MAa, and between Rspl and IR2; one row of cells between CuAa and MP in basal part; three rows of cells between RP3/4 and MAa. This new genus and species confirms that much can be expected in regard to discovering the Odonata in the Crato Formation." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@mnhn.fr

22062. Nel, A.; Garrouste, R.; Prevec, R. (2023): The first Permian Gondwanan damselfly-like Protozygoptera (Insecta, Odonatoptera). Historical Biology 35(6): 870-874. (in English) ["Afrozygopteron inexpectatus gen. et sp. nov., the oldest known representative of the protozygopteran grade from Gondwana, is described from the Guadalupian of Southern Africa. It is attributed to the family Luiseiidae, previously only known by one genus and species, Luiseia breviata described from the Carboniferous/Permian boundary of New Mexico (USA). This new fossil demonstrates that during the Carboniferous/Permian, the Protozygoptera were probably much more widely distributed than previously thought and were not limited to the northern part of Pangea." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@mnhn.fr

22063. Nishimoto, S.; Horita, M., & Futanashi, R. (2023): Records of Trithemis aurora with partially immature-colored wing. Tombo 66: 70-72. (in Japanese, with English summary) ["We recorded T. aurora mature males with a partially immature-colored wing. Close examination or the specimen revealed that the normal coloration was probably inhibited by a wound on the wing." (Authors)] Address: Futahashi, R., National Inst. Advanced Industrial Science & Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

22064. Okude, G.; Futahasm, R. (2023): Morphological changes during the final nymphal instar and the genes essential for metamorphosis in dragonflies and damselflies. Tombo 66: 1-12. (in Japanese, with English summary) ["Odonata insects, which belong to the most-ancestral group of winged insects, are key organisms for understanding the evolution of insect metamorphosis. However, the morphological changes that occur via metamorphosis during the final nymphal instar have not been well described, and the molecular mechanisms underlying nymph-to-adult metamorphosis of Odonata have been totally unknown until recently. In tins review, we summarize the visually recognizable morphogenetic events in the final nymphal instar and the genes essential for metamorphosis in Odonata based on our recent reports." (Authors)] Address: Futahashi, R., National Inst. Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

22065. Okuyama, H.; Kivoshi, T.; Isubaki,Y.; Takahasm, J. (2023): The complete mitochondrial genome and ITS region or nuclear genome sequences of Libellula angelina Selys, 1883 from Kirarahama Prefecturai Nature Observation Park in Yamaguchi Prefecture, Japan. Tombo 66: 48-55. (in Japanese, with English summary) ["L. angelina is classified as Critically Endangered in the Japanese Red List and designated as Endangered Species of Wild Fauna and Flora by Act on Conservation of Endangered Species of Wild Fauna and Flora. In this study, we analyzed the complete mitochondrial genome and ITS regions of the nuclear genome of L. angelina from Kirarahama Prefectural Nature Observation Park in Yamaguchi Prefecture, Japan using next generation sequencing. The mitochondrial genome of L. angelina consists of a circular molecule of 15,232 bp that includes 37 genes. The ITS1 region is 228 bp and ITS2 region is 312 bp. From a comparison between the complete mitochondrial genome sequence of L. angelina from Yamaguchi, Japan and South Korea (MG 189907), 72 gene mutation sites were confirmed. We performed phylogenetic analyses for COI partial gene region, 1-rRNA partial gene region, COI - tRNA-Leu2 - COII region and ITS region. As a result of the phylogenetic analyses, COI partial gene region, 1-rRNA partial gene region and COI - tRNA-Leu2 -COII region of L. angelina were found to have some genetic diversities among individuals, but L. angelina from Japan did not divide regional clades. On the other hand, the ITS region of L. angelina had no genetic mutation among 10 individuals

in 5 regions usea in the analysis. And the genetic diversity of L. angelina in Yamaguchi Prefecture could be at a low level." (Authors)] Address: Okuyama, H., Faculty of Life Sciences, Kyoto Sangyo Univ., Kamigamo, Motoyama, Kita-ku, Kyoto, Japan. E-mail: k5533@cc.kyoto-su.ac.jp

22066. Payra, A.; Tiple, A.D.; Koparde, P. (2023): First descriptions of the females of Cyclogomphus heterostylus Selys, 1854 and Ictinogomphus distinctus Ram, 1985 from India, with comments on the status of Cyclogomphus wilkinsi Fraser, 1926 (Odonata: Gomphidae). Zootaxa 5319(3): 421-428. (in English) ["The present paper deals with the first descriptions of the females of two endemic Gomphid dragonflies of India, namely Cyclogomphus heterostylus Selys, 1854 and Ictinogomphus distinctus Ram, 1985, based on the specimens collected from Maharashtra, India. Additionally present status of Cyclogomphus wilkinsi Fraser, 1926 in India is also discussed." (Authors)] Address: Payra, A., Dept of Environmental Studies; School of Science & Environmental Studies; Dr. Vishwanath Karad MIT World Peace Univ.; Pune 411038; Maharashtra; India

22067. Petrovic, A. (2023): New data on distribution of Caliaeschna microstigma (Schneider, 1845) (Odonata: Aeshnidae) in Serbia. Acta Entomologica Serbica 28(1): 1-10. (in English) ["C. microstigma is a species distributed mainly in the eastern Mediterranean, from Croatia in the west to northern Iran and Caucasus in the east. Until this study, it was reported only from a few localities in Serbia, which are located in far south. Here we have summarized all available data and presented new data on the distribution of C. microstigma in Serbia. The Eastern Spectre was detected at seven new localities (four during field study and three from publicly available databases), extending its current range in Serbia by more than 120 km to the north." (Author)] Address: Petrovic, A., Institute of Zoology, University of Belgrade-Faculty of Biology, 11000 Belgrade, Serbia. Email: andjeljko@bio.bg.ac.rs

22068. Pétremand, G.; Cosandey, V.; Freitag, A.; Reymond, A.; Walter, F.; Breitenmoser, S. (2023): L'entomofaune de la réserve naturelle Pro Natura «Au Chevry» (Trélex, Vaud). Entomo Helvetica 16: 145-172. (in French, with English and German summaries) ["The entomofauna in the nature reserve Pro Natura «Au Chevry». - The Pro Natura nature reserve «Au Chevry» (Trélex, VD) includes a large part of a rich fen of regional importance. In 2022, several days were organised by the «Société vaudoise d'entomologie» to inventory the insect fauna present in this reserve. Most of the surveys were carried out by active search and focused mainly on saproxylic and aquatic beetles, hoverflies, ants, dragonflies, damselflies, crickets and grasshoppers. A total of 318 species belonging to 71 families and 9 orders (insects and spiders) were identified. Many species are endangered or of regional, national or even European interest. Their occurrence testifies to the exceptional natural values of the rich fen and its associated areas (ash woodland, oak woodland, seepages, dry meadows). These surveys lead to a series of recommendations for the future management of the protected area, including a proposal to extend its perimeter." (Authors) "13 species of Odonata have been identified in the reserve or on its border. Among them, only Ceragion tenellum appears on the Swiss red list and is considered endangered there (Monnerat et al. 2021, Tab. 1). This species is very localized in Switzerland and is generally closely associated with low marshes. Only one individual having been observed, it would however be necessary to confirm the presence of a true population of this species on the site. Other species include Orthetrum coerulescens, an uncommon species of regional interest in the canton of Vaud, observed together with Orthetrum brunneum in the reserve. O. coerulescens is particularly fond of seeps in acid low marshes and peat rivulets poor in vegetation. The latter and Cordulegaster boltonii were observed along the seep bordering the northeast area of the reserve, suggesting that these species may be colonizing this flow area. The rest of the faunal procession is made up of ubiquitous species or species with low ecological requirements (stagnant water, ditches, ponds) but fond of sunny sites." (Authors/Google translate)] Address: Pétremand, Gaël, Corcelettes 15, 1422 Grandson, Swiitzerland. Email: gael.petremand@arvensis-naturalistes.ch

22069. Phan, Q.T.; Keetapithchayakul, T.S. (2023): First descriptions of the final stadium larva of Heliogomphus chaoi Karube, 2004 and the adult female of Microgomphus jurzitzai Karube, 2000 from Vietnam (Odonata: Gomphidae). Zootaxa 5318(1): 83-96. (in English) ["The larva of H. chaoi and the adult female of M. jurzitzai are described from Vietnam for the first time. The morphological difference between the larvae of the genera Heliogomphus Laidlaw, 1922 and Microgomphus Selys, 1858 are discussed, which throws doubts about the current taxonomic status of H. retroflexus (Ris, 1912)." (Authors)] Address: Phan, Q.T., The Center for Entomology & Parasitology Res., College of Medicine & Pharmacy; Duy Tan Univ., 120 Hoang Minh Thao, Lien Chieu, Da Nang, Vietnam

22070. Pryswitt, K.-P. (2023): Libellen (Odonata) - Notizen vom 11. Juni bis zum 29. November 2021, Neustadt am Rübenberge. Neustadt am Rübenberge, Selbstverlag: 40 pp. (in German) [Between 2018 and 2021, near Neustadt, Niedersachsen, Germany, a total of 42 species could be found. In 2021, 38 species were found; localities and habitats of the species are discussed in detail.] Address: Pryswitt, K.-P., Lessingstr. 2, 31535 Neustadt am Rübenberge, Germany

22071. Rakotomalala, A.A.N.A. (2023): Review: Klaas-Douwe B. Dijkstra and Callan Cohen: Dragonfies and damselfies of Madagascar and the Western Indian Ocean Islands, Univ. of Chicago Press, Chicago, IL, USA, 2021, 194 pp, US$ 45.00 (Hardcover), ISBN: 9782957099726. Community Ecology 24: 301. (in English) [Verbatim: After almost two decades of research, odonatologist Klaas-Douwe B. Dijkstra and biologist Callan Cohen finally published the first Odonata guidebook of the Malagasy archipelago. This region hosts 227 Odonata species, of which 80% are endemic. Structured in two parts, this book is an excellent primer for this insect group. The first part (circa 41 pp.) covers the biology and ecology of Odonata, provides a guideline for the collection, handling, and preservation of specimens, and introduces their morphology, which is essential for their identification. The second part (137 pp.) consists of an illustrated description of each species, followed by an updated checklist and information about their geographical distribution and conservation status. I particularly liked the identification part; I tried to identify Odonata from photos I took in Madagascar, and I can confirm that it is possible. The species photographs in the book are good enough and clear. However, I noticed that most of them wasted some space on the sides. Filling this space with a distribution map could have been more informative and practical. In addition, color coding according to the family names on the page header would have allowed navigating quickly through the book. Despite these few inconveniences, this book is suitable for amateur entomologists who are patient enough to get familiar with the scientific terms illustrated and well-defined in a glossary. In particular, I would recommend it to anyone who lives in the Malagasy

region or will visit this biodiversity hotspot for entomological research or tourism and to whoever has a particular interest in Odonata.] Address: Rakotomalala, A.A.N.A., Functional Agrobiodiversity, Georg-August-Univ. Göttingen, Grisebachstr. 6, 37077 Göttingen, Germany. Email: andrynyaina001@gmail.com

22072. Rani, A.A.; Mishra, A.; Jayashankar, M. (2023): Documenting Odonata along the Sri Krishna Lake, Bengaluru, Karnataka. Insect Environment 26(2): 142-145. (in English) ["A total of eleven species of Anisoptera belonging to three different families viz., Libellulidae, Aeshnidae and Gomphidae were observed in which 81.81% observed species belonged to Libellulidae, Brachythemis contaminata and Crocothemis servilia were found to be abundant and maximum activities were observed during the midday. Simpson's Index (D) (0.2), Simpson's index of diversity (1-D) (0.7), Shannon-H (1.8) and Evenness Index (0.6) indicated good diversity and necessity to continue seasonal observations." (Authors)] Address: Jayashankar, M., Dept of Zoology, School of Life Sciences, St. Joseph's Univ., Bengaluru-560027, Karnataka, India. Email: jayashankar.m@sju.edu.in

22073. Ranjan, K.S.; Pawar, A.A.; Roy, A.; Saha, S. (2023): Transoceanic migration network of dragonfly Pantala flavescens: origin, dispersal and timing. Frontiers in Ecology and Evolution 11:1152384. doi: 10.3389/fevo.2023.1152384: 12 pp. (in English) ["The awe-inspiring multi-generational, transoceanic migration circuit of P. flavescens stretches from India to Africa. Understanding the collective role of wind, precipitation, fuel, breeding, and life cycle driving the migration remains elusive. We identify the transoceanic migration route from years 2002 to 2007 by imposing an energetics-based time-constraint on a modified Dijkstra's path-planning algorithm incorporating active wind compensation. The prevailing winds play a pivotal role; the Somali Jet enables migration across the Indian Ocean from Africa to India, whereas the return requires stopovers at the disappearing islands of Maldives and Seychelles. The migration timing, identified using monthly-successful trajectories, life cycle, and precipitation data, corroborates sightings. A branched-network hypothesis connects our sighting in Cherrapunji (North-East India), the likely origin, to the known migration circuit." (Authors)] Address: Saha, S., Indian Inst. Technology Kharagpur, Kharagpur, 721302, West Bengal, India

22074. Sadasivan, K.; Nair, V.P.; Samuel, K.A. (2023): A review of Macromia Rambur, 1842 (Odonata, Macromiidae) of Western Ghats, with taxonomic notes on Macromia miniata Fraser, 1924 and M. irata Fraser, 1924. Entomon 48(2): 253-286. (in English) ["A review of the genus Macromia Rambur, 1842 (Odonata, Macromiidae) of Western Ghats of Peninsular India is presented with its updated distribution. An attempt is made to collate the scattered data in peer-reviewed literature published to date and is supplemented with field data gathered by the authors over two decades. Although Macromia is represented by nine species including six endemics in the Western Ghats, not much has been published on them from the region. Macromia irata Fraser, 1924 was described from Coorg but was rarely reported in peer-reviewed literature since its very brief original description by Fraser in 1924. The detailed morphology including that of the genitalia of M. irata is discussed. A revised classification based on the species groups and a key to the species of Macromia of the Western Ghats of Peninsular India is provided. To quantify the ratios of the number of the prenodal and postnodal veins in Odonata, a new nodal range expression called Standardised Species Nodal Range (SSNR) and a new index termed Standardised Species Nodal Index (SSNI) is also proposed." (Authors) The study includes the following species: Macromia annaimallaiensis Fraser, 1931, Macromia bellicosa Fraser, 1924, Macromia cingulata Rambur, 1842, Macromia ellisoni Fraser, 1924, Macromia flavicincta Selys, 1874, Macromia flavocolorata Fraser, 1922, Macromia ida Fraser, 1924, Macromia indica Fraser, 1924, Macromia irata Fraser, 1924] Address: Sadasivan, K., Greeshmam, BN 439, Bapuji Nagar, Thiruvananthapuram 695011, Kerala, India. Email: kaleshs2002in@gmail.com

22075. Sano, S (2023): Odonata recorded from the Izu Islands (Shikine Is., Kouzu Is. and Miyake Is.), Japan. Tombo 65: 65-72. (in Japanese, with English summary) ["In 2021 and 2022, we conducted a survey or Odonata in Shikine Is., Kouzu Is. and Miyake Is. of the Izu Islands, Japan. In results, we recorded two species from Shikine Is., nine species from Kouzu Is., and ten species from Miyake Is. Among them, Sympetrum frequens and Pantala flavescens were for the first time recorded from Shikine Is., Tramea virginia and Crocothemis servilia mariannae were for the first time recorded from Kozu Is., and Anotogaster sieboldii and Pantala flavescens were for the first time recorded from Miyake Is." (Authors)] Address: Email: sano-gengoroh@kannonzaki-nature-museum.org

22076. Sasamoto, A. (2023): [Annual Meeting of the Dragonfly Society of Japan 2022]. Tombo 65: 86. (in Japanese) [The 2022 Annual Meeting of the Dragonfly Society of Japan was held on November 26th and 27th of the same year at the Okazaki Campus of the Univ. of Human Environment in Okazaki City, Aichi Prefecture, under the direction of Executive Committee Chairman Takanobu Matsuzawa. It was held with the efforts of people. It was the first time since 2019 that it was held locally, and I was able to meet the members for the first time in a long time. In addition, for those who are unable to attend onsite, the general meeting, research presentations, and public symposium will be delivered remotely, making it the first hybrid format. Unfortunately, the social gathering was canceled as the new coronavirus was not over yet, but we were able to have a good time interacting with each other as thorough measures were taken at the venue. The program was the same as before, with board meetings and general meetings on the first day, and research presentations (8 oral presentations and 4 poster presentations) on the second day. In the afternoon of the second day, a public symposium titled "Deep digging for dragonflies in Aichi!" Interesting presentations were made on natural history, etc., and in addition, many excellent images of dragonfly filmed mainly in the Tokai region were held in a format that could be listened to by non-members. Finally, a bouquet of flowers was presented to Mr. Yasuro Takasaki in hopes of his many years of achievement and future success. I would like to express my deep gratitude to all the members of the executive committee for their efforts in making this first local event a success. (Google translate)] Address: Sasamoto, A., 190-4 Yakuoji Tawaramoto, Shiki-gun, Nara prefecture, 636-0341, Japan. E-mail: akssmt@sea.plala.or.jp

22077. Sasamoto, A. (2023): Book review: Itsuro Kawashima: Observing Insects, The Work of Itsuro Kawashima, a Specimen Painter of Insects. Tombo 66: 76. (in Japanese) [Review] Address: Sasamoto, A., 190-4 Yakuoji Tawaramoto, Shiki-gun, Nara prefecture, 636-0341, Japan. E-mail: akssmt@sea.plala.or.jp

22078. Seehausen, M.; Turiault, M. (2023): Zur Libellenfauna in Nordvorpommern und Rügen - Daten aus den Jahren

2021-2022 (Odonata). Virgo 26: 16-27. (in German) ["Results from two years of data collection are presented. These are based on 2567 data sets by the authors and 35 data sets by Oliver Brauner, Michael Frank and Marcel Wasscher. A total of 48 species were detected and various detection gaps in the MTB districts, especially in southern Rügen, were closed. One locality is given for each of Coenagrion hastulatum and C. lunulaturn, and three localities are listed for Leucorrhinia albifrons. Aeshna affinis, Anax parthenope, Crocothemis erythraea and Sympetrum striolatum are represented with significantly more localities than was previously known. Orthetrum brunneum and O. coerulescens are the rarest recorded species for Mecklenburg-Western Pomerania from the reporting period." (Authors/Google Translate)] Address: Seehausen, M./Turiault, M., Waldhöhe 9a, 24306 Plön, Germany. Email: m.seehausen@gmx.de

22079. Sharma, N.; Singh, D.; Sharma, S.; Ansari, A. (2023): A preliminary assessment of Odonata (dragonflies & damselflies) across an elevation gradient – insights from Shiwaliks to Alpines, northwestern Himalaya, India. Journal of Threatened Taxa 15(7): 23545-23556. (in English, with Dogri summary) ["Understanding the species distribution and richness along an environmental gradient helps identify hotspots and prioritize conservation efforts at landscape scale. This is more effective for the species that are indicators of environmental change, such as odonates. As the information about the distribution of this group of insects is scarce in Jammu & Kashmir, their documentation assumes a greater significance. Here, we present a checklist of odonate species from 23 sites across diverse landscapes in subtropical, temperate, and alpine ecosystems over an elevational gradient of 3,700 m in Jammu division. We recorded 63 species from 39 genera and 11 families, four Anisoptera and seven Zygoptera. The most represented families were Libellulidae (15 genera & 29 species) and Coenagrionidae (five genera & 10 species). The preliminary surveys resulted in addition of 24 new species to the Odonata fauna of Jammu & Kashmir, including three new to the northwestern Himalaya. The study underlines that even opportunistic records are useful in understanding the distribution range and delineating the potential habitats of odonates. The study calls for intensive odonate surveys to better understand their distribution and ecology in hitherto less explored region in the northwestern Himalaya." (Authors)] Address: Sharma, N., Inst. Mountain Environment, Univ. Jammu, Bhaderwah Campus, Bhaderwah, UT of Jammu & Kashmir 182222, India. Email: nirazsharma@gmail.com

22080. Shin, I.-C.; Lee, S.-H.; Lee, Y.-M.; Yoon, J.-Y.; Hong, S.-J.; Yoon, H.-J.; Park, S.-G.; Han, E.-J. (2023): Distribution characteristics of macroinvertebrates in an agricultural paddy field and irrigation pond ecosystems in a farmer's practice manual on the village of the Agricultural Environment Conservation Program. Korean J. Environ. Biol. 40(2): 148-156. (in Korean, with English summary) ["Ecological occupation in irrigation ponds is a well-acknowledged fact that is essential for biodiversity conservation in agricultural ecosystems. However, there are few studies on the ecological functions and relationship between a paddy field and irrigation using macroinvertebrates in an environmentally friendly paddy field. The objective of this study is to identify the community and distribution characteristics of macroinvertebrates in an agricultural paddy field and irrigation pond ecosystems, and to provide basic data on the ecological function of an environmentally friendly paddy field. Macroinvertebrate sampling was conducted from May to September in an agricultural paddy field and irrigation pond in an environment-friendly paddy field in Boryeong city. We conducted a study to identify the distribution characteristics using macroinvertebrate species analysis, such as Functional Feeding Groups (FFGs), Habitat Oriented Groups (HOGs), rarefaction curve, and a two-way dendrogram. A total of 37 species of macroinvertebrates in 28 families, 13 orders were collected study during the period of the investigation. Dominant taxa of macroinvertebrates included Coleoptera, Hemiptera, and Odonata [Ischnura asiatica, Anax parthenope, Crocothemis servilia, Orthetrum albistylum]. In terms of FFGs, predators and gathering collectors accounted for approximately 70%, in relation to HOGs, and climbers and swimmers occupied more than 50% from both the paddy field and irrigation pond. With respect to the rarefaction curve, the irrigation pond (July) was high as E (S, 141) = 18 species, while the paddy field (May) was comparatively low as E (S, 141) = 9 species. In conclusion, our results revealed that macroinvertebrates, such as Notonecta triguttata, Peltodytes intermedius, Appasus major, Laccotrephes japonensis, Appasus japonicus, Sigara substriata, Enochrus simulans, and Sternolophus rufipes, were used as a habitat and spawning ground in both paddy field and irrigation pond. The irrigation pond appears to be a very important spawning ground for macroinvertebrates." (Authors)] Address: Han, E.-J., National Acad. Agricultural Science, RDA, Wanju 55365, Republic of Korea. Email. hejs2@korea.kr

22081. Shoji, K.; Karube, H. (2023): Predation by terrestrial flatworm Platydemus sp. (Tricladida: Continenticola: Geoplanidae: Rhynchodeminae) on an adult of Rhinocypha ogasawarensis (Odonata: Zygoptera: Chlorocyphidae). Tombo 66: 60-62. (in English, with Japanese summary) ["Koushinzuka, Hahajima Island, Ogasawara Village, Tokyo Metropolis, Japan, 9-XI-2021, 2:08 p.m. to 2:51 p.m. An adult male of R. ogasawarensis, which was was already dead, discovered on a stone, standing upright in an unnatural position and motionless (Fig.1). Close examination revealed a terrestrial flatworm Platydemus sp. coiling from the thorax to the second abdominal segment of R. ogasawarensis. The legs, abdominal tip and hind wing tip of R. ogasawarensis were glued to the stone surface with mucus of Platydemus sp.. During the observation until 2:51 p.m., Platydemus sp. remained coiled onto R. ogasawarensis." (Authors)] Address: Shoji, K., Ogasawara Environmental Planning Lab., Ogasawara, Tokyo, Japan. E-mail: kyohei_shoji@okanken.or.jp

22082. Shrestha, P.; Rai, A.; Wagle, P.C.; Ghimire, S. (2023): Evaluation of disturbance zonation of Bagmati River system using benthic macroinvertebrates in the Kathmandu Valley, Nepal. Journal of Institute of Science and Technology 28(1): 79-89. (in English) ["The existence of Nepal's holy river, Bagmati, which flows through the core of Kathmandu Valley has been menaced by many anthropogenic threats. It is necessary to identify how vulnerable it has been. This research focuses on the evaluation of disturbance zonation to analyze the Bagmati River System's spatial biological health. Benthic macroinvertebrates (BMIs) were used as biological indicators and were sampled from upstream to downstream using a multi-habitat sampling approach during the post-monsoon period in 2021. The Ganga River System Biotic Score/Average Score per Taxa (GRSBIOS/ASPT) was used to assess river water quality. From the sampling of 21 sites, a total of 5839 individual BMIs from 51 Families and 11 Orders were recorded. Upstream accounted for more than 30% of all the families, making upstream rich in taxonomic preferences, which steadily decreased from midstream to downstream. Facultative taxa were widely distributed in both upstream and midstream, but sensitive taxa were limited to upstream only. There are no signs that facultative and sensitive taxa existed downstream and were fully dominated by pollution-tolerant

species. According to classification, the upstream river within Shivapuri Nagarjun National Park of the Bagmati River System was clean and was categorized as Class I, whereas rivers from the boundaries of the protected area to downstream were categorized as Class IV-V with few sites as Class II and Class III, indicating that this stretch of the river was extremely polluted. Water resource managers should utilize the study's findings to assess and restore the water's quality using biological indicators." (Authors) The paper includes references to "Odonata". (Authors)] Address: Shrestha, P., Dept Environmental Science, GoldenGate International College, Kathmandu. 44600, Nepal. Email: pratikshrestha2055@gmail.com

22083. Shiroishi, T. (2022): Reconfirmation of the habitats of Aeschnophlebia anisoptera, after the 2011 off the Pacific coast of Iohoku Earthquake, in Miyagi Prefecture, northeastern Honshu, Japan). Tombo 65: 49-53. (in Japanese, with English summary) ["There were a few habitats of A. anisoptera in Miyagi Prefecture before 2011, but they were threatened with extinction after 2011 big tsunami. The author researched favorable environments in the islands off the coast of the prefecture in 2020 and 2021, and discovered four populations, including exuviae." (Author)] Address: Email: t_shiroishi_aeshna@yahoo.co.jp

22084. Simonsen, T.J.; Djernæs, M.; Nielsen, O.F.; Olsen, K. (2023): COI diversity supports subspecific division in Western European Lestes virens (Charpentier, 1825) (Zygoptera: Lestidae), but hints at further Mediterranean complexity. International Journal of Odonatology 26: 18-26. (in English) ["We analyse COI sequences of 48 specimens of European L. virens to explore patterns in genetic diversity including subspecific boundaries and potential glacial refugia. Our haplotype network and phylogenetic analyses reveal three distinct groups in Western and Northern Europe. One group corresponding to the nominate subspecies L. virens virens is confined to the Iberian Peninsula and southwestern France, and one group corresponding to the subspecies L. virens vestalis is found in the rest of western Europe including southern Scandinavia, mainland Italy and the Mediterranean island Sardinia. Surprisingly three specimens from the Mediterranean island Sicily form a highly distinct group in all our analyses. An analysis of molecular variance (AMOVA) confirms that almost all observed genetic variance is explained by variation between these three groups rather than by variation between sample areas or between individuals. We conclude that the subspecific division into L. virens virens and L. virens vestalis is justified, but further studies are needed to determine the status of the populations in Sicily, southeastern Europe, and North Africa. The genetic pattern we find may reflect different glacial refugia: an Iberian/North African refugium for L. virens virens; a potential Italian refugium for L. virens vestalis; and a Sicilian/North African refugium for the Sicilian populations." (Authors)] Address: Simonsen, T.J., Natural History Museum Aarhus, Wilhelm Meyers Allé 10, 8000 Aarhus, Denmark. E-mail: t.simonsen@nathist.dk

22085. Somal, D.S.; Walia, G.K. (2023): Cytological study of family Aeshnidae (Odonata: Anisoptera) from India: A review. Biosciences Biotechnology Research Asia 19(4): 843-855. (in English) ["Cytological review of 59 aeshnid species and cytogenetic investigations on Anax ephippiger, Anax immaculifrons, Anax indicus, Anax nigrofasciatus nigrolineatus, Anax parthenope, Gynacantha subinterrupta of the family Aeshnidae by carbol fuchsin staining and C - banding have been under taken. All the species posses 2n = 27m with X0 - XX sex determination except Anax ephippiger with 2n = 14 + neo XY, resulted by the 13 simultaneous fusions among the autosomes and between autosome and sex chromosome. The structure and behaviour of chromosomes, variation in size of m chromosomes and X chromosome and distribution of C - heterochromatin have been studied and compared among the species. C - bands are mostly present at the terminal regions of autosomal bivalents, while Anax ephippiger and A. parthenope also possess C - bands at the interstitial and sub-terminal regions of the bivalents. Moreover, sex chromosome and m bivalent show variation in distribution of C-heterochromatin in the species. Out of these, chromosome complement of A. indicus Lieftinck, 1942 and C - banding on A. ephippiger and A. indicus have been investigated for the first time. List of cytologically studied species of family Aeshnidae has been updated to 60 species." (Authors)] Address: Walia, Gurinder Kaur, Dept of Zoology and Environmental Sciences, Punjabi Univ., Patiala - 147002, Punjab, India. E-mail: gurinderkaur_walia@yahoo.co.in

22086. Sroka, S.D.; Howells, T.F.; Nel, A. (2023): A new transitional “libelluloid” family of odonates with Mesozoic affinities in the Eocene Green River Formation of Utah, USA. Acta Palaeontologica Polonica 68(2): 337–342-342. (in English) ["The new “libelluloid” family Cordulibellulidae is described to accommodate a new genus and species Cordulibellula inopinata from the Eocene Green River Formation, Utah, USA. Even if its affinities remain somewhat uncertain because of the lack of information on structures others than those of the hind wing, ts putative closest relatives are known from the Late Jurassic and Early Cretaceous. Therefore, this new fossil is interpreted as a “relict” taxon surviving until the Paleogene. This new addition to the odonatan paleoentomofauna of the Green River Formation confirms the high diversity of this clade during the Paleogene and in this formation." (Authors)] Address: Sroka, S.D., Utah Field House of Natural History State Park Museum, Vernal, UT 84078 Utah, USA. Email: stevesroka@utah.gov

22087. Takasaki, Y. (2023): [Mr. Hisashi Ando passed away]. Tombo 66: 73. (in Japanese) [obituary] Address: not stated

22088. Tarris-Samaniego, S.; Muzón, J.; Iglesias, M.S. (2023): When size and shape matter: morphometric characterization of two sympatric dragonflies of the genus Perithemis Hagen 1861 (Odonata: Libellulidae). Anais da Academia Brasileira de Ciências 95 (suppl 1): 10 pp. (in English) ["Perithemis mooma, Kirby, 1889 and Perithemis icteroptera (Selys in Sagra, 1857) live in sympatry from southern Brazil to central Argentina. The taxonomy of the genus Perithemis Hagen, 1861 has been hampered by the use of characters that are highly variable or show slight differences among species. Our objective was to assess the efficiency of traditional morphometrics (TM) and geometric morphometrics (GM) to discriminate between these species using wing size and shape and vulvar lamina contour, and to analyze the presence of sexual dimorphism in wing size and shape in both species. The TM and landmark-GM methods were applied on the fore and hind wings, while the outline-based GM method was applied on the vulvar lamina. GM allowed species delimitation using shape variables of either wing. The wing and vulvar lamina shapes were confirmed to be good diagnostic characters to separate these species and appear to be promising tools for distinguishing among other species of this genus. Centroid size failed to achieve species separation. Both species exhibited sexual size dimorphism (SSD). In contrast to what would be expected for Perithemis whose males are strongly territorial, P. icteroptera and P. mooma showed female-biased SSD suggesting a common pattern

in Perithemis." (Authors)] Address: Iglesias, Mónica Sandra, Depto de Biodiversidad y Biología Experimental, Fac. de Ciencias Exactas y Naturales, Univ. de Buenos Aires, Intendente Güiraldes 2160 (C1428EHA), 4º piso Pabellón II, Ciudad Universitaria, CABA, Argentina. E-mail: iglesias@bg.fcen.uba.ar

22089. Tavakol, M.R.; Tooski, M.Y.; Jabbari, M.; Javadi, M. (2023): The effect of graphene nanoparticles on the strength of inspired sandwich panel structure under quasi-static loading. Amirkabir Journal of Mechanical Engineering 54(12): 2821-2842. (in Persian, with English summary) ["Dragonfly wings have an interesting biological composite structure and are very specialized flight organs that are well adapted for the flight behavior of each dragonfly. This paper aims to investigate the effect of graphene nanoparticles on the strength of a sandwich structure inspired by the dragonfly wing configuration under quasi-static loading. The streak structures are made of glass/epoxy layers with different percentages of graphene nanoparticles. Also, polyurethane foam was used in the central core of the vein. The crashworthiness characteristics of these structures were discussed. On the other hand, the effect of polyurethane foam on the damage rate of sandwich veins due to quasi-static loading was investigated. In order to investigate the damage in sandwich structures, pictures of the damaged surface and the cut view of the damage were taken, and the results were reported. Finally, FE-SEM analysis was used to evaluate the distribution of graphene nanoparticles in the polymer structure. The results of this study show that the presence of graphene nanoparticles in the sandwich structure resin with foam core will not have much effect on the strength of the structure if it is less than one value. On the other hand, if the amount of graphene nanoparticles in the resin of this type of structure exceeds a certain amount, it shows relatively good resistance." (Authors)] Address: Tavakol, M.R., Dept of Mechanical Engineering, Faculty of Engineering, Islamic Azad Univ. South Tehran Branch, Iran. Email: m_yarmohammad@azad.ac.ir

22090. Tian, F.; Zheng, D.; Nel, A.; Ye, Y.; Mei, T.; Zhang, H. (2023): A new campterophlebiid damsel-dragonfly (Odonata: Isophlebioidea) from the Middle Jurassic Yanan Formation of Yulin City, Shaanxi Province, NW China. Comptes Rendus Palevol 22(23): 491-496. (in English, with French summary) ["The family Campterophlebiidae Handlirsch, 1920 is the dominant Jurassic clade of Odonata Fabricius, 1793, especially hosting a high diversification in northern China. The Chinese campterophlebiid damsel-dragonflies were mainly recovered from the Middle Jurassic of Inner Mongolia, northern China. In the present study, a new campterophlebiid, Parasinitsia qingyunensis n. gen., n. sp., is described from the early Middle Jurassic Yanan Formation of the Ordos Basin, NW China. Parasinitsia n. gen. resembles the genus Sinitsia Pritykina, 2006 recorded from the Upper Jurassic of eastern Transbaikalia, but differs from the latter in having two or three rows of cells between RA and RP1 distal of the pterostigma, IR2 and RP3/4 with at least four rows of cells near the wing margin, and CuAa with about 15 rows of cells between it and the posterior wing margin in the broadest area. The new damsel-dragonfly comes from a new early Middle Jurassic insect site from the Ordos Basin, providing new clues to understand the terrestrial ecosystems during this epoch." (Authors)] Address: Zheng, D., State Key Lab. of Palaeobiology and Stratigraphy, Nanjing Inst. Geology & Palaeontology & Center for Excellence in Life & Paleoenvironment, Chinese Acad. of Sciences, 39 East Beijing Road, Nanjing 210008. China. Email: drzheng@nigpas.ac.cn

22091. Verheyen, J.; Stoks, R. (2023): Thermal performance curves in a polluted World: Too cold and too hot temperatures synergistically increase pesticide toxicity. Environmental Science & Technology 57(8): 3270-3279. (in English) ["Ecotoxicological studies typically cover only a limited part of the natural thermal range of populations and ignore daily temperature fluctuations (DTFs). Therefore, we may miss important stressor interaction patterns and have poor knowledge on how pollutants affect thermal performance curves (TPCs), which is needed to improve insights into the fate of populations to warming in a polluted world. We tested the single and combined effects of pesticide exposure and DTFs on the TPCs of low- and high-latitude populations of Ischnura elegans damselfly larvae. While chlorpyrifos did not have any effect at the intermediate mean temperatures (20–24 °C), it became toxic (reflecting synergisms) at lower (=16 °C, reduced growth) and especially at higher (=28 °C, reduced survival and growth) mean temperatures, resulting in more concave-shaped TPCs. Remarkably, these toxicity patterns were largely consistent at both latitudes and hence across a natural thermal gradient. Moreover, DTFs magnified the pesticide-induced survival reductions at 34 °C. The TPC perspective allowed us to identify different toxicity patterns and interaction types (mainly additive vs synergistic) across the thermal gradient. This highlights the importance of using thermal gradients to make more realistic predictions about the impact of pesticides in a warming world and of warming in a polluted world." (Authors)] Address: Verheyen, Julie, Evolutionary Stress Ecology & Ecotoxicology, Univ. of Leuven, Charles Deberiotstraat 32, 3000 Leuven, Belgium. Email: julie.verheyen@kuleuven.be

22092. Yanagisawa, T.; Sakamoto, M. (2023): Recent records of Trigomphus ogumai Asahina, 1949 from Hiroshima Prefecture, Japan. Tombo 65: 78-80. (in Japanese, with English summary) ["T. ogumai which is considered as a vulnerable species in the prefecture, is recorded in multiple ponds from Fukuyama City, eastern Hiroshima Prefecture." (Authors)] Address: Enail: shozo@yc4.so.net.ne.jp

22093. Yokoi, N. (2023): Territorial behaviors of Tanypteryx pryeri (Selys, 1889) (Odonata: Petaluridae). Tombo 66: 25-33. (in Japanese, with English summary) ["The territorial behavior of Tanypteryx pryeri (Selys, 1889) was observed in a habitat in Fukushima Prefecture during the 2021 and 2022 flight season. The species showed strong intraspecific struggle and occupancy, and the territory was maintained by the priority male. The struggle for territory has always favored priority male over new intruders. However, the occupancy time was short, about 15 minutes or less. Because of this, many new intruders could become territorial occupants. Territories were graded based on the number of ovipositing individuals and the number of successful matings. The strongest male occupied the highest grade territory. Losers, driven out by occupiers, were relegated to lower grade territory. However, the losers were also able to mate there, albeit with a lesser chance. Occupants staved around the territory for several days and repeatedly flew into the territory to become new occupants each day. The territorial behavior of this dragonfly is simply to occupy the best territorial grounds and mate with females. The breeding system of this dragonfly is thought to be that many males can become occupants one after another through the territory and mate with females." (Author)] Address: Yokoi, N., 2-37-11, Kaisei, Koriyama, Fukushima, 963-8851 Japan. Email: yokoi@orange.plala.or.jp