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18229. Batista, J.D. (2010): Sazonalidade, impacto ambiental e o padrao de deiversidade beta de Odonata em riachos tropicais no Brasil Central. Vicosa, Minas Gerais, Brazil. Federal University of Viçosa.: X, 98 pp. (in Portuguese, with English summary) ["Seasonality, environmental impact and pattern of beta diversity of Odonata in tropical streams of Central Brazil: In this study, I investigated how seasonality and environmental impacts affect the composition and structure of Odonata communities, testing the following hypotheses: 1) the potential species distribution modeling can be useful as a tool to predict environmental changes; 2) changes in the landscape deriving from anthropization affect the distribution and pattern of beta diversity of Odonata; 3) seasonality causes effect in the distribution and richness pattern of Odonata. The study was carried out in streams of river Pindaíba basin, Mato Grosso, with samplings in the dry and rainy seasons, between 2005 and 2009. Sampling of Odonata was done by fixed-areas scan method. Results showed that 1) the distribution model predicted a greater quantity of families and species at all sites in relation to validation data. This result was attributed to habit and species activity hour constraints and sampling effort. However, the use of models can be an important strategy for biodiversity analyses in systems with few historic information about biogeographic distribution; 2) the turnover pattern was dominant for Anisoptera and for Zygoptera, even in areas with smaller integrity. Increase of nestedness in Anisoptera, and the inverse pattern in Zygoptera, can be the result of different levels of specialisation of these groups, producing an unbalanced pattern of unique species in the two systems; 3) the greater richness of Odonata was found in the rainy season, which is an inverse pattern in relation to previous studies in Atlantic Forest, suggesting that Odonata in Cerrado rivers were less controlled by temperature constraints. Finally, it was showed that variation in water temperature acts as a stressing factor in community dynamics, decreasing the number of species that are not adapted to severe environmental conditions, favouring the synchrony of the remaining species due to ecological similarity." (Author)] Address: not stated

18230. Fulan, J.A.; Raimundo, R.; Figueiredo, D.; Correia, M. (2010): Abundance and diversity of dragonflies four years after the construction of a reservoir. Limnetica 29(2): 279-286. (English, with Portuguese summary) ["Few studies have investigated the impacts of river impoundments on reservoir constructions. Reservoir construction deeply changes dragonflies' habitat structures, especially in relation to shoreline vegetation. This study investigated the effects of the impoundment of the Guadiana River and its tributaries on dragonflies four years after the construction of a reservoir. A total of 17 dragonfly species (11 Zygoptera and ten Anisoptera), representing six families, were recorded in 21 sites in the years 1999 and 2003. Aeshna mixta, Coenagrion caerulescens, C. scitulum, Sympetrum fonscolombii, S. meridionale and S. striolatum were sampled just before the impoundment took place, and Anax parthenope, Onychogomphus forcipatus, Orthetrum coerulescens, Trithemis annulata, Platycnemis acutipennis and P. latipes were recorded only after the construction of the reservoir. We concluded that the construction of the Alqueva Reservoir four years earlier did not change the dragonfly species richness, possibly because of species overlap, but that the species composition was modified. Changes in marginal vegetation may have been important to new species compositions." (Authors)] Address: Fulan, J.A., Federal University of Amazonas, Brazil, Campus of Humaitá, Brazil. E-mail: joaofulan@uevora.pt

18231. Grand, D. (2010): Deux siècles d'étude des libellules en Rhône-Alpes (Insecta, Odonata). Bulletin mensuel de la Société linnéenne de Lyon hors-série n°2 2010: 23-29. (French, with English summary) ["Two centuries of regional odonatology: A general presentation of the order Odonata (systematics, biology) is proposed first of all, followed by information on these insects in Rhone-Alpes, a region situated at the crossroads of Alpine, Atlantic and Mediterranean climates. Then, a synthesis summarizes more than two centuries of regional odonatology, where the local status of 7 species is discussed and specified. Finally, the study leads to the report of an improvement of the biodiversity of the regional dragonflies, especially owed these last 50 years to a much better knowledge of their current distribution

and, additionally, to the effects of the global warming." (Author)] Address: deceased

18232. Kovacs, T.; Ambrus, A. (2010): Faunistical Studies on the Odonata of the Szigetköz, NW Hungary. In: Gubányi, A. & Mészáros, F. (eds.): A Szigetköz állatttani értékei. Magyar Természettudományi Múzeum, Budapest: 39-48. (Hungarian, with English summary) ["Odonata populations have been studied for the longest period of time in the Szigetköz area of Hungary. A total of 51 species were found in the Szigetköz (3196 data) at six permanent sampling sites and some 70 sampling sites examined at varying intervals. With the 52 species found in the imago form the presence of a total of 53 Odonata species were proven in this area. The diversion of the course of the river Danube has lead to the disappearance of 2 species- Coenagrion ornatum and Aeshna viridis— from Szigetköz. The diversion of the river did not cause detectable changes in the faunas of the following habitat types: flood plain and the shallow and deep gravel pit lakes beyond the embankments, the eastern moor of the riverside forest Parti-erdo and the Mosoni Danube. But the water replenishment of the area has significantly changed the character of some of the typical, stagnant, slowly flowing water bodies, which harboured rich vegetation. The number of valuable elements of the rich fauna, which is a characteristic feature of stagnant waters, has decreased. The number of riverine species, as well as those tolerant of a wide range of conditions, along with the population size of such species, has increased. In some cases this process has lead to the decrease of the total number of species. This trend is a result of decreasing habitat diversity." (Authors)] Address: Kovacs, T., Mátra Museum., Kossuth Lajos u. 40, HU-3200 Gyöngyös, Hungary. E-mail: koati@matavnet.hu

18233. Mitra, T.R.; Babu, R. (2010): Revision of Indian species of the families Platycnemididae and Coenagrionidae (Insecta: Odonata: Zygoptera). Taxonomy and zoogeography. Records of the Zoological Survey of India (Occasional Paper No. 315): 104 pp. (in English) ["The book deals with detailed geographical distribution in the World of each species with records of authorities. It also discusses the relationship between Ischnura and Rhodischnura; Agriocnemis and Mortonagrion. It comments on taxonomic status and distribution of species of Paracercion, Enallagma and Pyrrhosoma; Agriocnemis corbeti Kumar & Prasad, Agriocnemis keralensis Peter, Calicnemia mahesi Sahni, Coenagrion kashmirensis Das, Archibasis sushmaea Baijal, Onychargia indica Sahni, Enallagma insulae Fraser, Calicnemia miniata doonensis Sangal & Tyagi; comments on the new combination of Mortonagrion aborense (Laidlaw); finally comments on the taxonomic status of several taxa appeared in the recent literature." (Authors)] (Address: Mitra, T.R., Zoological Survey of India, M-Block, New Alipore, Calcutta-700 053, India

18234. Mogren, C.L.; Trumble, J.T. (2010): The impacts of metals and metalloids on insect behavior. Entomologia Experimentalis et Applicata 135(1): 1-17. (in English) ["In toxicology studies, the use of death as an endpoint often fails to capture the effects a pollutant has on disruptions of ecosystem services by changing an animal's behavior. Many toxicants can cause population extinctions of insect species at concentrations well below the EC25, EC50, or EC90 concentrations traditionally reported from short-term bioassays. A surprising number of species cannot detect metal and metalloid contamination, and do not always avoid food with significant metal concentrations. This frequently leads to modified ingestion, locomotor, and reproductive behaviors. For example, some species show a tendency to increase locomotor behaviors to escape from locations with elevated metal pollution, whereas other insects greatly decrease all movements unrelated to feeding. Still others exhibit behaviors resulting in increased susceptibility to predation, including a positive phototaxis causing immatures to move to exposed positions. For purposes of reproduction, the inability to avoid even moderately polluted sites when ovipositing can lead to egg loss and reduced fitness of offspring. Ultimately, impaired behaviors result in a general reduction in population sizes and species diversity at contaminated sites, the exceptions being those species tolerating contamination that become dominant. Regardless, ecosystem services, such as herbivory, detritus reduction, or food production for higher trophic levels, are disrupted. This review evaluates the effects ofmetal and metalloid pollution on insect behaviors in both terrestrial and aquatic systems reported in a diverse literature scattered across many scientific disciplines. Behaviors are grouped by ingestion, taxis, and oviposition. We conclude that understanding how insect behavior is modified is necessary to assess the full scope and importance of metal and metalloid contamination." (Authors) The paper includes a reference to Sympetrum corruptum.] Address: Mogren, Christina, Dept Entom., Univ. California, 900 University Avenue, Riverside, CA 92521, USA. E-mail: cmogr001@student.ucr.edu

18235. Norma-Rashid, Y. (2010): Odonata of Fraser's hill, montane ecozones with conservation implications. Proceedings of National Biodiversity Seminar 2008, ISBN 978-967-5557-05-7: 49-59. (in English, with Malaysian summary) ["In this study, the fauna, habitat preference and ecological features of the dragonflies occurring in the montane forests of Fraser's Hill were investigated with vernacular names also mentioned. To date, 26 species from eight family groups have been documented from current and previous works. The available habitats in the ecozone are listed together with the distinctive associated species. Species diversity in higher latitudes is known to be not as diverse but what has been highlighted in the paper is the degree of endemism reaching 23%. Evident from the findings are existence of taxonomically isolated species such as Devadatta argyoides (Selys, 1859), Onychothemis coccinea (Lieftinck, 1953) and O. testacea (Laidlaw, 1902). The Action Plan proposed by Moore (1997), regarded these dragonflies as priority species from the Oriental region apt for further study and conservation action. Implications for potentially endangered, threatened or vulnerable species status within the study area are also evaluated. The paper concluded that among other suggestions there should be an initiative to create odonate refuges

as these creatures resembled natural flagships for raising public awareness of the importance of conserving forests, aquatic habitats and biodiversity." (Author)] Address: Norma-Rashid, Y., Institute of Biological Sciences, Faculty of Science, University of Malaya, 50603 Kuala Lumpur. E-mail: ynorma@um.edu.my

18236. Prasad, M.; Mondal, S.D. (2010): Odonata: Zygoptera. Zool. Surv. India, Fauna of Uttarakhand, State Fauna Series, 18 (Part-2): 17-28. (in English) ["Suborder Zygoptera (Odonata) fauna of Uttarakhand State has been studied and a total of 47 species/subspecies belonging to 24 genera and 9 families are recorded from the State. Of these, Lestes umbrinus Selys is recorded for the first time from Uttarakhand State. Two species/ subspecies viz., Agriocnemis corbeti Kumar & Prasad and Calicnemia carminea pyrrhosoma Lieftinck are endemic to the State. Rhinocypha biforata biforata Selys is so far known only from the Uttarakhand." (Authors)] Address: Prasad, M., Zoological Survey of India, M-Block. New Alipore. Kolkata-700 053, India

18237. Prasad, M.; Mondal, S.D. (2010): Odonata: Anisoptera. Zool. Surv. India, Fauna of Uttarakhand, State Fauna Series, 18 (Part-2): 29-52. (in English) ["Anisoptera fauna of present day Uttarakhand has been studied comprehensively. A total of 75 species an subspecies belonging to 40 genera under 5 families and two suborders are recorded from the State. Out of these 4 species are recorded for the first time from the Uttarakhand. Keys, collection da~ distributional range in India and out side India have been provided in the text." (Authors)] Address: Prasad, M., Zoological Survey of India, M-Block. New Alipore. Kolkata-700 053, India

18238. Simon, A. (2010): Synthèse des connaissances préalable à la déclinaison régionale du Plan National d'Action Odonates en Haute-Normandie. Première partie: Etat des lieux des connaissances. Direction Régionale de l'Environnement, de l'Aménagement et du Logement: 78 pp. (in French) ["As part of its strategy to combat the erosion of biodiversity, the Ministry of Ecology, Energy, Sustainable Development and the Sea (MEEDDM) has developed National Action Plans (NAP). One of these plans concerns Odonata. In order to better take into account the specific characteristics of the different territories, this NAP must be adapted to the regions. In order to anticipate this regional adaptation, the DREAL of Haute-Normandie commissioned the Conservatoire des Sites Naturels de Haute-Normandie to produce a preliminary summary, gathering the available information on the subject. This preliminary summary presents: - The state of knowledge available on the Odonata of Upper Normandy. - The results of additional field surveys carried out for the preparation of this synthesis. - The inventory of regional actors likely to be concerned by the implementation of the Odonata Action Plan. On the basis of available knowledge and the recently drawn up Red List of Odonates in Haute-Normandie, a list of 17 species of odonates threatened in Haute-Normandie was validated by the CSRPN to be included in the regional version of the action plan. This document also presents the updated lists of ZNIEFF determining species and regional rarity indices." (DeepL)] Address: Conservatoire des Sites Naturels de Haute-Normandie, Rue Pierre de Coubertin, B.P. 424, 76 805 Saint-Etienne-du-Rouvray, France. http ://www.cren-haute-normandie.com

18239. Tanczuk, A. (2010): Interesting observations of dragonflies from Odra II quarry in Opole (Poland, Opole Region). Odonatrix 16_17 (2020): 6 pp. (Polish, with English summary) ["The observations were conducted in the area of Odra II Quarry in Opole in 2018-2019. In total, 18 dragonfly species were recorded. Among them, 4 southern species Orthetrum brunneum, O. coerulescens, Sympetrum fonscolombii and Crocothemis erythraea were observed. Further, some phenological data concerning the occurrence of early appearance of imagines in April and May and late observations of some species in late September and October were presented." (Authors)] Address: Tanczuk, Agnieszka, ul. Przłœniczki 2/40, 20-838 Lublin, Poland. E-mail: atanczuk-@gmail.com

18240. Walia, G.K.; Kaur, H.; Kaur, J. (2010): Cytogenetical studies on five species of the family Libellulidae (Anisoptera:Odonata). Hislopia 3(2): 111-119. (in English) ["Cytogenetical analyses have been carried on five species of the family Libellulidae viz., Brachythemis contarninata, Crocothemis servilia, Orthetrum pruinosum neglectum, O. sabina and Trithemis aurora. Different cytological parameters like conventional staining, C-banding and silver- nitrate staining have been performed. All the species possess 2n= 25m as the diploid chromosome number, which is the type number of the family. Distribution and localization of heterochromatin have been compared in all the species on basis of banding studies. Silver nitrate staining has been done for the first time on the four species of the family Libellulidae." (Authors)] Address: Walia, G.K., Dept of Zoology, Punjabi University, Patiala - 147002, India

2012

18241. Abd, I.F.; Al-Asady, H.S. (2012): External morphological study of Diplacodes triviales Rambur (Odonata: Libellulidae): New record to Iraq. Ibn Al-Haitham Journal for Pure and Applied Science: 70-82. (in Arabian, with English summary) [A specimen from Maisan Governorate caught in 2010 is studied and fugured.] Address: I. F. Abd, I.F., Dept of Biology, College of Education (Ibn AL-Haitham) University of Baghdad, Iraq

18242. Afrane, Y.A.; Lawson, B.W.; Brenya, R.; Kruppa, T.; Yan, G. (2012): The ecology of mosquitoes in an irrigated vegetable farm in Kumasi, Ghana: abundance, productivity and survivorship. Parasites & Vectors 2012, 5:233: 7 pp. (in English) ["Background: Irrigated vegetable farms within the city of Kumasi, Ghana, create hotspots for the breeding of malaria vectors, which could lead to high transmission of malaria. This study investigated the abundance and productivity of mosquitoes in an irrigated vegetable farm in Kumasi, Ghana. Methods: Adult mosquito productivity was estimated five days in a week in different irrigated scheme types

(dug-out wells, furrows and footprints) for 12 weeks using emergence traps. Larval sampling was done five days a week to estimate the abundance of larvae from the different irrigated schemes types. Results: Mosquito breeding in the irrigated vegetable field was confined to dug-out wells, furrows and human footprints. Mosquito productivity (m²/week) was highest in the dugout wells followed by the human footprints and the least was in the furrows (11.23, 5.07 and 4.34 An. gambiae/m²/week). Larval abundance for the late instars (3rd, 4th and pupae) also followed the same trend, with the dug-out wells having the highest larval abundance followed by the human footprints and then the furrows (13.24, 6.81, 5.87 larvae/week). Mosquito productivity and abundance was negatively correlated with rainfall (R^2=0.209; P< 0.01). Conclusion: This study showed that adult and larval mosquito abundance and larval survival were high in the irrigated fields in the irrigated vegetable farm. This therefore, contributed significantly to adult mosquito populations and hence malaria transmission in the city." (Authors) The paper includes a passing reference to Odonata.] Address: Yaw A Afrane, Y.A., School Health Sci., Bondo Univ. College, Bondo, Kenya. E-mail: yaw_afrane@yahoo.com

18243. Baeta, R.; Sansault, E.; Pincebourde, S. (2012): Déclinaison régionale du Plan National d'Actions en faveur des Odonates en région Centre 2013-2017. Association Naturaliste d'Étude et de Protection des Écosystèmes « Caudalis » / Institut de Recherche sur la Biologie de l'Insecte / Direction Régionale de l'Environnement, de l'Aménagement et du Logement Centre: 112 pp. (in French, with English summary) ["Conservation of Odonata species contributes to the maintenance of biodiversity and to the functioning of natural ecosystems. They are particularly sensitive to environmental changes as they are potentially exposed to threats in both aquatic and terrestrial medium. A national plan for the conservation of Odonata species was launch in 2010 in France, with the aim to assess the population level of 18 species that were declared under threat. This national plan is downscaled here at the level of the region Centre. This regional plan reviews our knowledge on population level of several Odonata species, and suggests action plans for the period 2013-2017 in terms of increasing knowledge, conservation management and communication at several levels. This approach aims at stabilizing these threaten species in the region Centre by networking all actors in the conservation of Odonata species. The review shows that the sampling effort has increased substantially since 2000s, although it remains heterogeneous over the region Centre territory. The region Centre hosts 8 species targeted by the national plan (priority 1). In addition, the regional plan targets 13 species of priority level 2 and 9 of priority level 3. The regional plan proposes 9 actions to increase our knowledge. As specified in the national plan, the species Leucorrhinia caudalis is among the main targets of this plan. The Loire Valley is also of concern as 2 species of priority level 1, Gomphus flavipes and Ophiogomphus cecilia, are associated to this particular freshwater system. Finally, 5 actions for conservation management / administration, and 3 actions for communication and training are proposed with the aim to protect these Odonata species and their habitats." (Authors)] Address: Sansault, E., Association Naturaliste d'Étude et de Protection des Écosystèmes (ANEPE) « Caudalis », 118 rue de l'Ermitage, F-37100 Tours, France. E-mail: anepe.caudalis@gmail.com

18244. Bhat, S.U.; Dar, G.A.; Sofi, A.H.; Dar, N.A.; Pandit, A.K. (2012): Macroinvertebrate community assossiciations on three different macrophytic species in Manasbal Lake. Research Journal of environmental Sciences 6(2): 62-76. (in English) ["Three macrophytic species namely Ceratophyllum demersum, Hydrilla verticillata and Potamogeton lucens were investigated for the macroinvertebrate association [including "Odonata"] in Manasbal Lake. A total of 15 macroinvertebrate taxa were reported from these macrophytic species belonging to three phyla including Annelida, Mollusca and Arthropoda. Arthropoda was the dominant phyla comprising of class Insecta, Crustacea and Arachinida. Annelida was the second dominant phyla represented by two classes Hirudinea and Oligochaeta. Mollusca were only represented by families, Lymnaeidae and Planorbidae. All the three phyla showed dominance pattern with respect to macrophytic species in the order of Ceratophyllum demersum followed by H. verticillata and then P. lucens. The results of study also showed that, the C. demersum comparatively harboured large density of macroinvertebrates than the other two macrophytic species, despite the fact that the total number of macroinvertebrate taxa remained the same on all the three macrophytic species thereby reflecting homogeneity of habitats. Among the insects, Chironomidae was dominant taxa on C. demersum followed by H. verticillata and then P. lucens." (Authors)] Address: Ullah Bhat, S., P.G. Dept of Environmental Science, Centre of Research for Development, University of Kashmir, Srinagar

18245. Billqvist, M.; Elleström, O. (2012): Världsrekord i tundratrollslända? fauna&flora 107(3): 40-44. (in Swedish) [World record in Somatochlora sahlbergi? In the summer of 2012, it was probably more individuals of Somatochlora sahlbergi on wings in Tavvavuoma than it had ever been reported anywhere in the world. After several years of negative reports, unlucky with the weather and poorly documented, and few individuals that appeared species completely explode on the very mosquito-rich late July / August.] Address: Billqvist, M.: E-mail: magnus.billqvist@gmail.com

18246. Brandon, A. (2012): Odonata news and events from across the vice counties of Anglesey, Merionethshire, Caernarvonshire, Denbighshire and Flintshire. Y Fursen - North Wales Dragonfly Newsletter No 68: 6 pp. (in English) [Records of Cordulegaster boltonii, Lestes sponsa, Aeshna mixta, Sympetrum danae, Calopteryx virgo, Ischnura elegans are documented.] Address: Brandon, A., North Wales Dragonfly Recorder, Bryn Heilyn, Rowen, Conwy LL32 8YT. UK. E-mail: allanrowenconwy@ antispam sky.com

18247. Campos, F.; Velasco, T.; Santos, E.; Sanz, G. (2012): Nueva cita de Macromia splendens (Pictet, 1843) (Odonata, Corduliidae) en el oeste de España. Boletín de

la Asociación Española de Entomología 36(1-2): 233-235. (in Spanish, with English title) [22-IX-2011, Robleda (UTM 29T 7064474), 755 m a.s.l.] Address: Campos, F., Univ. Europea Miguel de Cervantes, Calle Padre Julio Chevalier 2, 47012 Valladolid, Spain. E-mail: fcampos@uemc.es

18248. Carrère, V.; Blanchon, Y. (2012): Découverte de Gomphus flavipes (Charpentier, 1825) en Languedoc-Roussillon (Odonata, Anisoptera: Gomphidae). Martinia 28(1): 55- (in French) [Verbatim: "On 20 July 2010, an imago of G. flavipes was observed on the Gard bank of the Rhône, in the commune of Codolet (Y. Blanchon, pers. obs.). This is the first record of this species in the Languedoc-Roussillon region. This observation is to be put in relation with the rediscovery of this gomphid in the Rhône-Alpes region in the Rhône valley (GRAND et al., 2011. Gomphus flavipes (Charpentier, 1825) rediscovered in the Rhône river basin (Anisoptera: Gomphidae). Martinia, 27 (1): 9-26), then in Provence-Alpes-Côte d'Azur (BLANCHON et al., 2011. Rediscovery of Gomphus flavipes (Charpentier, 1825) in Provence-Alpes-Côte d'Azur (Odonata, Anisoptera: Gomphidae). Martinia, 27 (2): 121-122). Almost a year later, on 19 May 2011, and about 150 km from the nearest known breeding areas (on the Rhône at Arles), an exuvia of G. flavipes was found on the Aude, in the commune of Cuxac-d'Aude. On 10 June 2011, a second exuvia was found in the same sector (L. Spanneut, pers. comm.), then a third on 20 June 2011. This series of observations constitutes the first evidence of reproduction of this gomphid in Languedoc-Roussillon. On each occasion, a single exuviae of G. flavipes was recorded, while no imago was observed. The species was found in the company of exuviae of Gomphus simillimus Selys, 1840, G. pulchellus Selys, 1840, G. vulgatissimus (Linnaeus, 1758), Onychogomphus forcipatus unguiculatus (Vander Linden, 1823) and Oxygastra curtisii (Dale, 1834). The dominant species was G. simillimus on 19 May and G. vulgatissimus on 20 June. On 10 June, G. flavipes was the only exuviae recorded. In this sector, the Aude has a minor bed about 30 metres wide. Its banks are sandy and occupied by riparian vegetation. Numerous roots are visible on the banks above and in the water; branches of dead wood also emerge from the river. One exuvia was found on roots at the level of the banks, another on the trunk of a shrub, a few tens of centimetres above the water. It should be noted that at the beginning of 2011, the Aude was subjected to a major flood, which was likely to modify the habitats and populations of dragonflies present. As a result, exuviae were rare and localised on the river banks during the 2011 surveys. These findings suggest that the species could very probably reproduce in other localities in Languedoc-Roussillon, in particular on the banks of the Rhône in Gard." Translated with www.DeepL.com/Translator (free version)] Address: Carrère, V., 19 avenue Georges Clemenceau, F-13360 Roquevaire, France. E-mail: carrerevincent@free.fr

18249. Cheetham, S.; Loznik, B.; Stephenson, T.; Mahmoud, N.; Fanning, E. (2012): Frontier- Costa Rica Forest Phase 122. Frontier- Costa Rica Forest Phase 122 Science Report Phase Dates: 2nd April – 11th June 2012: 41 pp. (in English) ["3.4.3 Preliminary results: We captured a total of 314 individuals (3436 when U. imbuta and U. fastigiata are included) representing 53 species, belonging to 29 genera and 9 families (7 Anisoptera, 2 Zygoptera, see Appendix 1). Two species could not be identified to genus level and are classified as Unknown species A and B. A total of 39 species were recorded during the surveys and an additional 14 were found on other occasions. Two families stand out for having both the most genera and species: Libellulidae and Coenagrionidae. The two families combined comprise ~ 73% of the species found in the area. 8.0 Appendix 1. Preliminary species checklist of Odonata on the land of Osa Conservation (current as of June 2012)" (Authors)] Address: not stated

18250. Chen, K.; Xiao, N.; Wang, B.; Li, J. (2012): The effects of petroleum exploitation on water quality bio-assessment and benthic macro-invertebrate communities in the Yellow River Delta wetland, Dongying. Acta Ecologica Sinica 32(6): 1970-1978. (in Chinese, with English summary) ["The major environmental risks associated with petroleum extraction (e. g. oil spills and leaks) are well known. There is a lot of information on the impacts of petroleum exploration on benthic communities in foreign studies. In this study, we probed the effects of petroleum exploration on macro-invertebrate assemblages, which are important components of benthic communities in this wetland ecosystem. The object of the investigation was to provide scientific data to guide the management, ecological restoration, conservation of biodiversity, and sustainable development of aquatic ecosystems. Physicochemical variables were measured at 34 sites in the Yellow River Delta wetland, Dongying, China, in October 2009, and benthic macro-invertebrate assemblages were collected using a D-frame net and a Peterson grab. The water body in the study area was oligohaline, its salinity ranging between 0.05 and 5 ppt. A total of 84 macro-invertebrate taxa, belonging to 70 genera, 41 families, 12 orders, 6 classes, and 3 phyla, were collected. Insecta comprised 52.4% of all benthic invertebrate taxa, of which Odonata and Diptera accounted for 23% and 24%, respectively. The structure and diversity of macro-invertebrate assemblages were expressed using the Shannon-Wiener index, the Margalef index and the dominance index. Water quality was assessed by the Shannon-Wiener index and the biotic index. The dominant species at most of the sites were either Chironomus spp. or Glyptotendipes spp. with overall dominance indices of 0.0315 and 0.0522, respectively. Pearson correlation analysis showed that the Shannon-Wiener index was negatively correlated with total nitrogen (TN) ($r = -0.446$, $P = 0.02$) but was not correlated with any of the other physicochemical variables measured. The biotic index was not correlated with any of the physicochemical variables. The numbers of molluscan taxa were negatively correlated with salinity ($r = -0.422$, $P = 0.028$) and positively correlated with pH ($r = 0.435$, $P = 0.023$). Likewise, the percentages of individual Mollusca at the sites were negatively correlated with salinity ($r = -0.395$, $P = 0.041$) and positively correlated with pH ($r = 0.565$, $P = 0.002$). The numbers of oligochaete taxa were significantly positively correlated with TN ($r =$

0.524, P = 0.005). The petroleum content of the water was not correlated with any of the biological indices and was not considered to be a major stressor. Canonical correspondence ordination analysis (CCA) showed that TN, pH, and salinity were the major contributors to the macro-invertebrate community structure, with 12.18% of species variation explained by these three variables. The substrate and hydrophytes also had effects on the structure of the macroinvertebrate communities. Cluster analysis and MDS ordination of sampling sites showed that all sites could be divided into 11 separate groups at the similarity level of 30%. Oligochaeta and Mollusca were the two main taxa responsive to environmental variables. The bio-assessment indicated that the Shannon-Wiener diversity index was a better indicator of water quality than the biotic index. Bio-assessment using the Shannon-Wiener index showed that the water quality of the Yihong River tributary, the Guangli River upstream, the Tiao River upstream, and the Dongzhang reservoir were clean, that nine sites were slightly polluted, and that the remaining sites were moderately to heavily polluted. We proposed that a comprehensive evaluation of water quality should ideally combine the Shannon-Wiener index, the biotic index, and physicochemical measurements. Additionally, other evaluation methods could be developed based on the biological indices for this region, taking into account the special characteristics of this native ecological environment." (Authors)] Address: Cheng, K., Lab. of Aquatic Insects and Stream Ecology Department of Entomology Nanjing Agricultural University Nanjing 210095 China

18251. Delpon, G. (2012): Contribution à l'inventaire des Odonates du Tarn Maitre de stage caerulescens, l'agrion bleuissant, coeur copulatoire. Rapport de Stage, Août 2012. OPIE-MP: 43 pp. (in French) ["The Tarn is home to a large number of Odonata species, due to the variety of climates and environments found there. Despite this richness, the department has long remained little surveyed and has hardly been taken into account in defining the French distribution of many species. Furthermore, despite the adoption in 2011 of a National Action Plan for Odonates, no such plan has been put in place by the Midi-Pyrénées region, even though several of the species present there are highly threatened. Based on these observations, a dynamic collection of naturalist data has emerged over the last few years in the department. The OPIE-MP is thus involved in a project to inventory the Odonata of the Tarn, alongside the "albistylum" group of the LPO Tarn. This report presents the results of the surveys carried out during June and July 2012 with the aim of making a significant contribution to this project. Particular interest was taken in five species targeted by the PNA Odonates, for which the Midi-Pyrénées region has a significant conservation responsibility, in order to update their distribution: Macromia splendens, Oxygastra curtisii, Gomphus graslinii, Coenagrion mercuriale and C. caerulescens." (DeepL)] Address: Delpon, Gaël, 17 route de Foix 09400 Amplaing, France. E-mail: gael.delpon@yahoo.fr

18252. Devai, G.; Miskolczi, M.; Devai, E. (2012): Adatok a Bükk-vidék szitakötõ-faunájához (Odonata) az imágók felmérése alapján [Data on the dragonfly (Odonata) fauna of the geographical region Bükk-vidék (N-Hungary) based on a survey of adults]. Studia odonatol. hung. 14: 49-64. (in Hungarian, with English summary) ["The authors present faunistical data based on collections of adults in odonatological studies carried out in the mountain area of the geographical region Bükk-vidék (N-Hungary). .... Collections were made between 1989 and 1992, with the participation of 3 specialists on 36 days and 58 localities altogether, in 14 cells (DT 69, DU 51–53, DU 60–63, DU 70–73, DU 81–82) of the 10×10 km UTM grid map. In the report information on 1723 adults (1202 males and 521 females) are given in detail, representing 773 faunistical data. In this study 42 species (19 Zygoptera and 23 Anisoptera) were found to occur in the area, out of which 1 belongs to the very frequent, 18 to the frequent, 14 to the less frequent, 3 to the rare and 6 to the sporadic class of country-wide occurrence frequency." (Authors)] Address: Devai, G., Dept of Ecology, Kossuth L. Univ., 4010 Debrecen, P.O. Box 71, Hungary

18253. Devai, G.; Miskolczi, M.; Jakab, T. (2012): Adatok a Nagy-morotva (Rakamaz és Tiszanagyfalu) szitakötõ-faunájához (Odonata) [Data on the dragonfly (Odonata) fauna of the backwater Nagy-morotva (Rakamaz and Tiszanagyfalu, NE-Hungary)]. Studia odonatol. hung. 14: 37-48. (in Hungarian, with English summary) ["The authors present faunistical data on dragonflies collected (larvae, exuviae and adults) and observed (adults) from the backwater Nagy-morotva in the geographical microregion Borsodi-Tisza-hullámtér (an active floodplain area of River Tisza in NE-Hungary), over the administrative area of the settlements Rakamaz and Tiszanagyfalu. ... Collections were made in 2009, with the participation of 4 specialists on 5 days and 8 localities, in 1 cell (EU 32) of the 10×10 km UTM grid map. In the report information on 392 specimens (215 males, 166 females, 11 specimens with undecided sex) are given in detail [138 larvae (64 males, 64 females, 10 with undecided sex), 140 exuviae (66 males, 73 females, 1 with undecided sex), 114 adults (85 males, 29 females)], with the observed adults representing altogether 176 faunistical data (70 larvae, 43 exuviae, 63 collected and 59 observed adults). In this study 23 species (9 Zygoptera and 14 Anisoptera) were recorded in the area, out of which 1 belongs to the very frequent, 9 to the frequent, 9 to the less frequent, 1 to the rare and 3 to the sporadic class of country-wide occurrence frequency." (Authors)] Address: Devai, G., Dept of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary

18254. Devai, G. (2012): A Magyar Természettudományi Múzeum munkatársai által a Bükki Nemzeti Park kutatási programja keretében gyûjtött szitakötõk (Odonata) faunisztikai adatai [Data on the dragonfly (Odonata) fauna collected in course of the Bükk National Park research programme by the specialists of the Hungarian Natural History Museum]. Studia odonatol. hung. 14: 65-71. (in Hungarian, with English summary) ["The author presents faunistical data from 13 localities in the Bükk National Park and its surroundings in 7 cells (DU 52, 53, 60, 61, 62, 63, 70) of the 10×10 km UTM grid map. The total investigated area belongs to the

geographical mesoregion Bükk-vidék of the mountain area Északi-középhegység (NE-Hungary). Collections were made between 1957–1982, with the participation of 5 specialists and one unidentified person on 5 years and 12 days. In the report information on 71 adults (40 males and 31 females) is given in detail, representing 22 faunistical data. In this study 16 species (8 Zygoptera and 8 Anisoptera) were found to occur in the area, out of which 1 belongs to the very frequent, 12 to the frequent, 2 to the less frequent and 1 to the rare class of country-wide occurrence frequency." (Author)] Address: Devai, G., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary

18255. Dobias, J. (2012): Factors affecting dragonfly species composition in newly created pools and assessment of invertebrate predation on pools zooplankton. Diplomová práce, Katedra ekologie, Pøírodovìdecká fakulta, Univerzita Karlova v Praze: 97 pp. (in Czech, with English summary) ["To identify and quantify the influence of physico-chemical, biotic and geographic factors on the population of Odonata is an essential tool for research of their ecology. The aim of this study was to 1) assess how these factors influence species richness, diversity and spatial distribution of dragonflies in 42 newly constructed or renewed pools located in the Kokoøínsko Protected Landscape Area, which is characterized by two valleys of Libìchovka and Pšovka creeks, low human impact, and a great diversity of small water bodies and 2) use laboratory experiments in order to estimate the relationship between large predatory invertebrates of these pools (Aeshna cyanea, Coenagrion puella, Chaoborus crystallinus and Notonecta glauca) and their common prey (Daphnia curvirostris) in an artificial environment with or without aquatic macrophytes. The pools were monitored and sampled between years 2005 and 2006. In total, 23 dragonflies species were found inhabiting these lentic habitats, comprising 11 species belonging to the suborder Zygoptera and 12 species belonging to the suborder Anisoptera, including a rare species Sympetrum depressiusculum (larvae). Most variability in the dragonfly species richness was explained by the size of the water surface area, followed by the location of the pools (inside or outside the floodplain) and after all, by the number of available pools in the neighbourhood. Much of the residual variability was explained by the species composition of zooplankton, which is a common food source for dragonfly larvae. Based upon the geographical location of pools, I have found out that the species richness of dragonflies is positively autocorrelated only over short distances (up to 1 km distance from other pools), this autocorrelation is very similar between the two suborders (Zygoptera and Anisoptera). The species composition of dragonflies in the pools was monitored for two years. No high differences occurred over the two years, however, the studied pools differed from each other. The variability in dragonfly species composition was largely explained by the size of the water surface area, followed by the age of the pools, the history of the habitat and lastly, by the connection to a spring or a ditch. Whilst most variance in the species composition variability of the Zygoptera suborder was explained by the size of the water surface area, in the Anisoptera suborder most variation in diversity was explained by the position of the pool (in a floodplain or a ravine), followed by the number of available pools in the neighbourhood. Dependence of the diversity on the distance to neighbouring pools has not been significant, except for the long-distant pools on the peripheral areas of the region. Laboratory experiments were conducted to assess predation pressure of either individual predator species or their combinations, under presence/absence of submersed macrovegetation. In combined treatments, an interference between predators has been detected in one out of three experiments. The effect of aquatic macrophytes on prey consumption has been significant, however, its influence differed remarkably between assessed species: presence of vegetation had a negative effect to Coenagrion puella and a positive one on Aeshna cyanea." (Author)] Address: not stated

18256. Drinan, T.J. (2012): The impact of conifer plantation forestry on the ecology of peatland lakes. PhD Thesis, School of Biological, Earth and Environmental Sciences, College of Science, Engineering and Food Science, University College Cork: VIII + 286 pp. (in English) ["Blanket bog lakes are a characteristic feature of blanket bog habitats and harbour many rare and threatened invertebrate species. Despite their potential conservation value, however, very little is known about their physico-chemical or biological characteristics in western Europe, and their reference conditions are still unknown in Ireland. Furthermore, they are under considerable threat in Ireland from a number of sources, particularly afforestation of their catchments by exotic conifers. Plantation forestry can potentially lead to the increased input of substances including hydrogen ions (H+), plants nutrients, dissolved organic carbon (DOC), heavy metals and sediment. The aims of this study were to investigate the effect of conifer plantation forestry on the hydrochemistry and ecology of blanket bog lakes in western Ireland. Lake hydrochemistry, littoral Chydoridae (Cladocera) and littoral macroinvertebrate communities were compared among replicate lakes selected from three distinct catchment land use categories: i) unplanted blanket bog only present in the catchment, ii) mature (closed-canopy) conifer plantation forests only present in the catchment and iii) catchments containing mature conifer plantation forests with recently clearfelled areas. All three catchment land uses were replicated across two geologies: sandstone and granite. Lakes with afforested catchments across both geologies had elevated concentrations of phosphorus (P), nitrogen (N), total dissolved organic carbon (TDOC), aluminium (Al) and iron (Fe), with the highest concentrations of each parameter recorded from lakes with catchment clearfelling. Dissolved oxygen concentrations were also significantly reduced in the afforested lakes, particularly the clearfell lakes. This change in lake hydrochemistry was associated with profound changes in lake invertebrate communities. Within the chydorid communities, the dominance of Alonopsis elongata in the unplanted blanket bog lakes shifted to dominance by the smaller bodied Chydorus sphaericus, along with Alonella nana, Alonella excisa and Alonella exigua, in the plantation forestry-affected lakes, consistent with a shift in lake

trophy. Similarly, there was marked changes in the macroinvertebrate communities, especially for the Coleoptera and Heteroptera assemblages which revealed increased taxon richness and abundance in the nutrient-enriched lakes. In terms of conservation status, despite having the greatest species-quality scores (SQS) and species richness, three of the four International Union for the Conservation of Nature (IUCN) red-listed species of Coleoptera and Odonata recorded during the study were absent from lakes subject to catchment clearfelling. The relative strengths of bottom-up (forestry-mediated nutrient enrichment) and top-down (fish) forces in structuring littoral macroinvertebrate communities was investigated in a separate study. Nutrient enrichment was shown to be the dominant force acting on communities, with fish having a lesser influence. These results confirmed that plantation forestry poses the single greatest threat to the conservation status of blanket bog lakes in western Ireland. The findings of this study have major implications for the management of afforested peatlands. Further research is required on blanket bog lakes to prevent any further plantation forestry-mediated habitat deterioration of this rare and protected habitat." (Author)] Address: Drinan, T.J., School of Biological, Earth & Environmental Sciences, University College Cork, Distillery Fields, North Mall, Cork, Ireland. E-mail: tomdrinan@gmail.com

18257. Emmanuel, J.; Joshua, G.; Shams, S.B. (2012): Comparative study of ecological conditions of four wetlands of Punjab using macroinvertebrates as bioindicators. The Journal of Animal & Plant Sciences 22(4): 908-914. (in English) ["A baseline study was conducted from November 2006 to October 2007 to investigate the status of aquatic macroinvertebrates [including Odonata, not further detailed] as bioindicators and their ecological linkages to physico-chemical characteristics of four wetland areas of Punjab namely, Balloki Headworks, Qadirabad Headworks, Rasul Headworks and Kalar Kahar Lake, India. The sampling points were marked on a map using GPS... The hydrological parameters such as temperature, pH, LDO, salinity and TDS were recorded to get knowledge of the effect of season on the pond ecosystem. Macroinvertebrate sampling from the pelagic water was done using a dip net of mesh size approximately 0.6 mm, dragged in the water for 15 minutes. These were then preserved and identified up to the order level. The results revealed that Balloki area being under the effect of dry season and agricultural stress had more tolerant species. The presence of pollution sensitive Ephemeroptera was justified by low TDS and high LDO at Rasul Headworks. The hydrology and fauna of Kalar Kahar Lake was exclusively different from the other sites. In this case pH, TDS, salinity were highest whereas LDO was the lowest. The relative abundance of sensitive to tolerant species was in accordance with the hydrological data." (Authors)] Address: Emmanuel, J., Kinnaird College for Women, Lahore, India. E-mail: burningchokes@gmail.com

18258. Förschler, M.; Bense, U.; Berthold, P.; Dietz, C.; Doczkal, D.; Dorka, U.; Ebel, C.; Hessner, W.; Höfer, H.; Hölzer, A.; Köppel, C.; Kolb, A.; Laufer, H.; Lieser, M.; Marx, J.; Meineke, J.-U.; Münch, W.; Murmann-Kristen, L.; Rennwald, E.; Römpp, I.; Roth, K.; Schanowski, A.; Schelkle, E.; Schiel, F.-J.; Schlund, W.; Schroth, K.-E.; Späth, V.; Stader, P.; Steiner, A.; Stübner, S.; Turni, H.; Waldenspuhl, T.; Wolf, T.; Ziegler, J.; Zimmermann, P. (2012): Ökologisches Potenzial eines möglichen Nationalparks im Nordschwarzwald. Chancen in Prozessschutz-, Entwicklungs- und Managementzonen aus naturschutzfachlicher Sicht. Naturschutz und Landschaftsplanung 44(9): 273-281. (in German, with English summary) ["Ecological Potential of a National Park in the Northern Black Forest – Opportunities in zones for process protection, development and management from a nature conservation point of view The discussion about a possible national park on the Northern Black Forest is currently in full swing. The National Park initiative aims to make available an area of at least 10,000 ha in the medium to long term for the cycle of natural processes in the forest. In an initial phase of 30 years it will be possible to instigate certain forest developments in partial areas, e.g. the promotion of firs, beeches or pines in favour of the upcoming generation. The central question from a nature conservation perspective is which are the positive effects of such a large protection area for the preservation of rare species and the re-establishment of the local species diversity. Summing up, it is expected that the protection of the natural processes in an area of this size will promote many typical species and ecological interactions. These processes and developments should be accompanied by a specialist monitoring (including research) of nature conservation, regional experts of species protection and scientists." (Authors) References to Cordulegaster bidentata and Aeshna subarctica are made.] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenenweg 9, 77880 Sasbach, Germany. E-mail: Franz-Josef.-Schiel@INULA.de

18259. Gallo, S. (2012): Trophic transfer of contaminants in tree swallows (Tachycineta bicolor) nesting near Lake Calumet, Illinois. M.Sc thesis, University of Illinois at Urbana-Champaign: 125 pp. (in English) [Tree swallow nestlings, eggs, and diet and sediment grab samples were used to quantify risks of exposure to15 trace elements, 31 polychlorinated biphenyl (PCB) congeners, 15 polybrominated diphenyl ether (PBDE) congeners and 13 organochlorine pesticides in the Calumet area of northeastern Illinois, USA. Nesting success and clutch size were measured in tree swallows to determine whether local contaminants reduced tree swallow fitness. Overall nesting success was not reduced when compared among sites and to range averages; 71-90% of clutches started had at least one nestling fledge. Likewise there were no differences among sites in the proportion of eggs that hatched and nestlings that fledged. Generally, contaminant concentrations in the media were considered low or not elevated, although sediment concentrations of cadmium, chromium, and nickel at some sites were higher than the “probable effects concentration” or the “probable effects level” for sediment dwelling organisms, and lead, manganese, and zinc were above the “severe effects levels” at some sites. Calumet nestlings in 2005 were fed between 51 and 64% aquatic insects by mass. Terrestrial insects

in the nestling tree swallow diet contained significantly greater concentrations of lead than aquatic insects consumed by the nestling tree swallows. Mean mercury concentrations in nestlings ranged from 0.10 to 0.18 mg/kg dry weight (dw) and egg concentrations ranged from 0.11 to 0.23 mg/kg dw and approximately 5% of the total mercury mass in nestlings came from the eggs. Egg mercury concentrations, which are acquired directly from the mother, were positively correlated with the timing of nesting, and negatively correlated with brood size. Nestlings at Indian Ridge in 2004 and Powderhorn in 2005 accumulated the greatest mass of mercury. Mean sum PCB concentrations in tree swallow eggs ranged from 463 to 830 ng/g wet weight (ww) and from 105 to 208 ng/g ww in nestlings. Egg concentrations contributed approximately 48% of the total PCB mass in nestlings. Nestlings at Big Marsh in both years, and Indian Ridge in 2004 accumulated the greatest mass of PCBs. Nestlings from both Big Marsh and Indian Ridge in 2005 accumulated the most PBDEs, with approximately 21% of the total mass in nestlings coming from the eggs. Mean sum PBDE concentrations in eggs ranged from 47 to 78 ng/g ww and from 20 to 62 ng/g ww in nestlings, and these results appear to be among the first reported PBDE concentrations in tree swallows. Powderhorn had no record of sediment contamination that was found, however low levels of contaminants were in the sediment and biota there. Tree swallow nestlings accumulated a variety of contaminants from the Calumet sites though their diet, though eggs contributed significant amounts for some compounds like PCBs. Understanding contaminant presence and uptake in wetlands of the Calumet area is particularly useful due to the loss of wetland habitat in this region.] Address: not stated

18260. Gamboa, M.; Kimbirauskas, R.K.; Merritt, R.W.; Monaghan, M.T. (2012): A molecular approach to identifying the natural prey of the African creeping water bug Naucoris, a potential reservoir of Mycobacterium ulcerans. Journal of Insect Science 12:2: 10 pp. (in English) ["The extra-oral digestion of creeping water bugs (Naucoridae: Hemiptera) hinders the study of their diet using the standard method of identifying prey body parts in the gut. Genetic methods are available, but rely on PCR tests or similar diagnostics to confirm suspected prey. Where the potential prey is unknown and a broad search for all possible prey is desirable, methods that can potentially capture any prey item are required. Naucoris sp. is known to harbor Mycobacterium ulcerans (Actinomycetales: Mycobacteriaceae), the causative bacterium of Buruli ulcer. Outbreaks of Buruli ulcer have been associated with disturbed freshwater habitats, but the mode of transmission to humans remains unclear. Here we examine the diet of Naucoris sp., a dominant aquatic predator in water bodies in Ghana where the prevalence of Buruli ulcer is high. We cloned and sequenced 576 PCR products (mtDNA rrnL, cox1) isolated from the gut of 60 Naucoris sp. individuals to determining diet composition as broadly as possible. Using phylogenetic analysis of newly sequenced clones and 6 potential prey taxa collected from the site, sequences isolated from Naucoris sp. guts matched locally collected Coleoptera (Hydrophilidae). Blastn queries to GenBank of other clone sequences produced matches to (Anura) (n = 1), Rotifera (n = 5), and fungi (n = 4) as additional components of the diet. Our results suggest that sp. in this Buruli ulcer-endemic area feeds on a wide range of prey and body sizes, and that the approach could be successfully applied to studies of aquatic food webs where morphological identification of prey is impossible and where little or no a priori knowledge is available. ... Genomic DNA was extracted from ... Odonata (Zygoptera) (n = 8) ..." (Authors)] Address: Gamboa, Maribet, Leibniz - Institute of Freshwater Ecology and Inland Fisheries (IGB), Müggelseedamm 301, 12587 Berlin, Germany. E-mail: gamboa@igb-berlin.de

18261. Gandhi, N. (2012): Study of terrestrial birds with special reference to insects as their food base around three reservoirs in Central Gujarat. PhD. thesis, Department of Zoology, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara -390002 India: 370 pp. (in English) [Odonata: pp 129-175] Address: not stated

18262. Geguzis, R. (2012): Benthic macroinvertebrate communities in natural and channelized sites of the merkys river basin streams. Žemes Ukio Mokslai 19(4): 273-287. (in Lituanian, with Englis summary) ["The present study contains the results of an investigation of the abundance and taxonomic composition of benthic macrofauna, collected in natural and straightened sites of 3 streams of the basin of the Merkys River. The current The current velocity, velocity, velocity, water discharge, riverbed overgrowth with plants and direct sun pass were highest in the natural sites of the investigated streams and lowest in the straightened sites of the investigated streams. A total of 72 macroinvertebrate taxa belonging to 48 families were identified in the investigated sites of the streams. 18 macroinvertebrate taxa were found only in the natural sites in the forest of the investigated streams and 7 were found in the straightened sites of the investigated rivers. The data obtained showed that the total taxon number and EPT taxon number of macroinvertebrates in the same stream natural sites in the forest were higher than those in the straightened stream sites. Caddisflies Brachycentrus maculatus dominated in the natural sites of the streams Spengla and Amarnia, chironomids Cricotopus algarum dominated in the straightened sites of all investigated streams. It has shown that the total abundance of macroinvertebrates in the natural sites in the forest of the investigated streams in the forest of the investigated streams as significantly higher in comparison with the straightened sites in the field. The highest total abundance of macroinvertebrates was determined in the natural site in the forest of the stream Spengla (4180±45ind.m^{-2}) and the lowest abundance was found in the straightened site in the field of the stream Gruda (640±17ind.m^{-2}). The data of this investigation showed that the abundance of mayflies (Ephemeroptera), caddisflies (Trichoptera), EPT was significantly higher in the natural sites in the forest of the investigated streams, while the percentage of pollution-tolerant Chironomidae was higher in the straight straightened sites in the field of the streams Spengla and Amarnia." (Author) Calopteryx splendens, Gomphus vulgatissimus] Address: Ramunas

Gegužis, R., Aleksandro Stulginskio universitetas, Studentu g. 11, LT-53361 Akademija, Kauno r, Lituania. E-mail: ramunas.geguzis@gmail.com

18263. Hassall, C.; Hollinshead, J.; Hull, A (2012): Temporal dynamics of aquatic communities and implications for pond conservation. Biodiversity and conservation 21: 829-852. (in English) ["Conservation through the protection of particular habitats is predicated on the assumption that the conservation value of those habitats is stable. We test this assumption for ponds by investigating temporal variation in macroinvertebrate and macrophyte communities over a 10-year period in northwest England. We surveyed 51 ponds in northern England in 1995/6 and again in 2006, identifying all macrophytes (167 species) and all macroinvertebrates (221 species, excluding Diptera) to species. The alpha-diversity, beta-diversity and conservation value of these ponds were compared between surveys. We find that invertebrate species richness increased from an average of 29.5 species to 39.8 species between surveys. Invertebrate gamma-diversity also increased between the two surveys from 181 species to 201 species. However, this increase in diversity was accompanied by a decrease in beta-diversity. Plant alpha-, beta- and gamma-diversity remained approximately constant between the two periods. However, increased proportions of grass species and a complete loss of charophytes suggests that the communities are undergoing succession. Conservation value was not correlated between sampling periods in either plants or invertebrates. This was confirmed by comparing ponds that had been disturbed with those that had no history of disturbance to demonstrate that levels of correlation between surveys were approximately equal in each group of ponds. This study has three important conservation implications: (i) a pond with high diversity or high conservation value may not remain that way and so it is unwise to base pond conservation measures upon protecting currently-speciose habitats; (ii) maximising pond gamma-diversity requires a combination of late and early succession ponds, especially for invertebrates; and (iii) invertebrate and plant communities in ponds may require different management strategies if succession occurs at varying rates in the two groups." (Authors)] Address: Hassall, C., Dept of Biology, Carleton University, Ottawa, ON K1S 5B6, Canada. E-mail: chassall@connect.carleton.ca

18264. Horvath, G.; Marton, J. (2012): Adatok a Tiszamente Csongrád és Röszke közötti szakaszának szitakötõfaunájához (Odonata) [Faunistical data on dragonflies (Odonata) from the inundation area of River Tisza between Csongrád and Röszke]. Studia odonatol. hung. 14: 27-36. (in Hungarian, with English summary) ["The paper presents faunistical data on dragonflies collected (larvae, exuviae and adults) and observed (adults) in the inundation (active and ancient floodplain) area of River Tisza along both sides between settlements Csongrád and Röszke. The fieldwork was carried out in water bodies and their margins. Collections and observations were made in three years (2009–2011), with the participations of 2 specialists on 24 days and 13 localities altogether, in 7 cells (DS 21, DS 33, DS 34, DS 35, DS 36, DS 37, DS 44) of the 10×10 km UTM grid map. In the report information on 311 larvae (114 males, 129 females and 68 young specimens of unidentifiable sex on the basis of morphological features), 41 exuviae (22 males and 19 females) and 204 adults (162 males and 42 females), altogether 556 specimens (298 males, 190 females and 68 young specimens of unidentifiable sex on the basis of morphological features) is given in detail, representing 109 faunistical data (58 larvae, 15 exuviae and 36 adults). The number of observational data without the number of individuals is 66, thus the total number of data is 175. In this study 20 species (8 Zygoptera and 12 Anisoptera) were found to occur in the area, out of which 10 belong to the frequent, 7 to the less frequent, 2 to the rare and 1 to the sporadic class of country-wide occurrence frequency." (Authors)] Address: Horvath, G., Dept of Ecology, Fac. Natural Sciences & Informatics, Univ. of Szeged, Közép fasor 52., 6726 Szeged, Hungary

18265. Jessat, M.; Kipping, J.; Klaus, D.; Kahnt, A. & Baumkötter, G. (2012): Das ENL-Projekt „Pleißeaue Altenburger Land – Maßnahmen zur Entwicklung der Natura 2000-Gebiete im Altenburger Land, Thüringen“ – Eine Projektbeschreibung. Mauritiana (Altenburg) 23: 4-53. (in German, with english summary) ["Formerly the Pleiße f lood plain in Altenburger Land was species-rich and characterized by humid grassland with shallow depressions and ponds. With the ending 20th century many kinds of animals and plants of this habitat disappeared or are now on the verge of extinction. Intensively farmed and drained land is characterizing the scene/ landscape. In the year 2008 the NABU-Stiftung Nationales Naturerbe and the Mauritianum Altenburg started the project for the development of nature and landscape “Pleiße flood plain in Altenburger Land – activities for the development of nature 2000-areas in Altenburger Land, Thuringia”. With financial support of the European Union and Thuringia a lot of things happened along the river line in two areas of “Council Directive on the conservation of natural habitats and of wild fauna and flora” many small ponds were created, 2.000 metres of a moat were uncovered, grassland became humid again and extensive farming was starting. Humid grassland, floodplain typical trees and shrubs and floodplain habitats close to nature are able to develop again. The conservation of large meager lowland hay meadows with stocks of Sanguisorba officinalis and occurrence of Maculinea nausithous and Maculinea teleius had been the target of protection as well as optimization of the conditions for Triturus cristatus and Lutra lutra in eutrophic closed waters. Running waters with underwater vegetation and the only Thuringian Population of Bufo viridis in primary habitats were the focus as well. A promising project approach, in which nature protection, landscaping, agriculture and recreation are connected." (Authors) The paper includes a few references to Odonata.] Address: Kipping, J., BioCart Ökologische Gutachten, Albrecht-Dürer-Weg 8, 04425 Taucha, Germany. E-mail: biocartkipping@email.de

18266. Kelly, P.T. (2012): Insect emergence from a large river system in the presense and absence of bighead (Hypophthalmichthys nobilis) and silver (H. molitrix) carp. M.Sc.

thesis, College of Science and Allied Health, Biology – Aquatic Science, University of Wisconsin-La Crosse: IX, 58 pp. (in English) ["Aquatic insect emergence is an important resource for terrestrial insectivores that rely on aquatic insects while raising young, or when terrestrial production is low. Emerging insects also transfer valuable high-energy lipids from phytoplankton to terrestrial consumers. The objectives of this project were to: (1) quantify insect emergence in two large-river systems that differed in primary productivity, and (2) determine the impacts of bighead and silver carp on the emergent insect community. Floating traps (surface area = 0.25 m^2) were used to sample emerging adult insects, and were placed in study sites with and without Asian carp. Insects were sorted, identified to family, and individually weighed to determine emergent biomass rates. Sites with carp displayed the greatest insect flux; however, insect diversity was greatest at sites without carp, and lowest at the sites with carp. Emergent insect diversity was correlated with the presence of aquatic vegetation. Insect abundance was also linearly related to algal standing stock (measured as chlorophyll a). This suggests that primary productivity in large river systems have a positive impact on the magnitude of insect emergence, and that the diversity of insects increases with aquatic vegetation. Bighead and silver carp may positively impact insect emergence by removing zooplankton competitors, but may decrease insect diversity by a reduction in large-sized phytoplankton food resources." (Author) Taxa - including Odonata - are treated at family level: Coenagrionidae, Corduliidae, Macromiidae] Address: not stated

18267. Lambert, J.-L. (2012): Potentialités de présence de Boyeria irene (Fonscolombe, 1838) et Ophigomphus cecilia (Fourcroy, 1785) en Champagne-Ardenne. Naturale 4: 8-16. (in French) ["Within the framework of the regional version of the National Action Plan for Odonates, we need to improve our knowledge of the priority species in Champagne-Ardenne, including B. irene and O. cecilia. The still fragmentary knowledge on the distribution and habitat of B. irene in the region must be improved. The confirmation or denial of the presence of O. cecilia in the Champagne-Ardenne also needs to be clarified (Ternois, 2011). These two taxa appear in particular on the benthic macrofauna listings established according to the samples taken at several IBGN stations (DREAL Champagne!Ardenne studies since 1988). However, experience shows that confusion can easily arise at the generic level when using the dichotomous key used by the determiners responsible for drawing up the taxonomic lists. The 5th annual day devoted to odonates at the Metz Interregional Delegation of the Office National de l'Eau et des Milieux Aquatiques is an opportunity to carry out targeted investigations on two stations where IBGN (Indice Biologique Global Normalisé) surveys are carried out in the river Aube where the genera Boyeria McLachlan, 1896 and Ophiogompus Selys, 1854 appear in the listings." Translated with www.DeepL.com/Translator (free version) (Authors)] Address: Lambert, J.-L., ONEMA, Service Départemental de la Marne, France. E-mail: jean-luc.lambert18-@wanadoo.fr

18268. Liberski, J. (2012): Breath of levante – odonatological impressions from the Strait of Gibraltar. Odonatrix 8(2): 43-51. (in Polish, with English summary) ["The paper presents data from southern Andalusia (Spain), from the period between 16.08 to 2.09.2011. It was at 8 sites during on ornithological studies. Those were: 1. Bolonia (36°6'3,92" N, 5°43'58,12" W, UTM TE59); 2. Cabrito (36°3'19,05" N, 5°33'12,97" W, TE69); 3. La Peña (Valle de Santuario) (36°3'52,77" N, 5°38'52,35" W, TE69); 4. La Janda (36°13'-10,84" N, 5°46'59,01" W, TF41); 5. El Algarrobo (36°5'-25,21" N, 5°29'2,28" W, TE79); 6. Palmones (36°10'9,59" N, 5°26'35,91" W, TF80); 7. Los Barrios (36°13'44,69" N, 5°29'6,96" W, TF71), 8. Algeciras (36°6'24,63" N, 5°26'-28,45" W, TE89). At site no. 3 there was a small stream, at site no. 4 rice field with irrigating canals, at site no. 6 – the estuary of the River Rio Palmones and its pools, at site no. 7 – strongly polluted small water bodies within the area of rubbish dump. The rest of the bird-watching sites was situated far from the potential breeding sites of dragonflies. 11 dragonfly species were noted: Calopteryx haemorrhoidalis, Ischnura pumilio, I. graellsii, Anax ephippiger, A. parthenope, Orthetrum chrysostigma, Brachythemis impartita, Crocothemis erythraea, Sympetrum fonscolombii, Trithemis annulata and T. kirbyi. The most distributed was S. fonscolombii, observed at every sites, and O. chrysostigma. The most numerous were S. fonscolombii and C. erythraea. The richest in dragonflies were rice fields in La Janda. The observed species are common in southern Spain. An exception and, at the same time, the most interesting one among others was T. kirbyi. This is African species, in continental Europe known until recently from the study area, otherwise noted in Sardinia. Nowadays, it has been in territorial expansion; it has inhabited the neighbouring province Malaga and was noted in central-western Andalusia (Seville)." (Author)] Address: Liberski, J., skrytka poczt. 4, 41-407 Imielin, Poland. E-mail: jakub_liberski@gazeta.pl

18269. Lillo, E.P.; Arlandis, J.S. (2012): Un caso de teratología abdominal en Anax parthenope (Selys, 1839) (Odonata: Aeshnidae). Boletín de la SEA 50: 539-540. (in Spanish, with English summary) [A teratology involving the abdomen in a specimen of A. parthenope, with reproductive implications, is described." (Authors).] Address: Prieto-Lillo, E.P., Universidad de Valencia, Facultad de Ciencias Biológicas, Departamento de Zoología, Laboratorio de Entomología. Dr. Moliner 50, 46100 Burjasot (Valencia), Spain. E-mail: ezequiel.prieto@uv.es

18270. Lillo, E.P.; Fontana-Bria, L.; Arlandis, J.S. (2012): Villafranca del Cid (Castellón, España), enclave de relevante contribución a la odonatofauna valenciana (Insecta: Odonata). Boletín de la SEA 50: 521-526. (in Spanish, with English summary) ["The new odonatological records of Sympetrum sanguineum (Müller, 1764), S. vulgatum ibericum (Ocharan, 1985), S. flaveolum (Linnaeus, 1758) and Lestes sponsa (Hansemann, 1823) constitute a remarkable rise in the number of species included in the Comunitat Valenciana´s odonatological catalogue, now at 65 species, highlighting the relevance of "La Rambla de las Truchas" (north-

western Castellón province), a river ecosystem of great significance for the preservation of several dragonfly populations in the east of the Iberian Peninsula." (Authors)] Address: Prieto-Lillo, E.P., Universidad de Valencia, Facultad de Ciencias Biológicas, Departamento de Zoología, Laboratorio de Entomología. Dr. Moliner 50, 46100 Burjasot (Valencia), Spain. E-mail: ezequiel.prieto@uv.es

18271. Lillo, E.P.; Arlandis, J.S. (2012): Ejemplar teratológico de Gomphus simillimus (Selys, 1840) (Odonata: Gomphidae). Boletín de la SEA 50: 543-544. (in Spanish, with English summary) ["A teratological specimen of G. simillimus, with a malformation in the apical area of the right hindwing and a significant reduction in the left mesothoracic leg, is described." (Authors)] Address: Prieto-Lillo, E.P., Univ. de Valencia, Facultad de Ciencias Biológicas, Depto de Zoología, Laboratorio de Entomología. Dr. Moliner 50, 46100 Burjasot (Valencia), Spain. E-mail: ezequiel.prieto@uv.es

18272. Lis, L. (2012): Leucorrhinia albifrons (Burmeister, 1839) (Odonata: Libellulidae) in an anthropogenic habitat in the former sulfur mine “Jeziórko” (Sandomierz Basin). Odonatrix 8(2): 55-58. (in Polish, with English summary) ["In the year 2012 a small autochthonic population of L. albifrons was discovered in the area of the former underground mine of sulphur Jeziórkoh (south-eastern Poland, 50°33'34"N, 21°48'00"E, UTM EB50). It inhabited one of the artificial water bodies created in the frames of reclamation of this area, situated in the depression, gathering flowing or discharging waters from the surrounding areas. In May and June a few individuals of L. albifrons was observed, with juvenile specimens of both sexes in it. The habitat of L. albifrons was characterized by abundant swamp vegetation (Phragmites australis mainly) and moderately abundant floating and submerged vegetation (Potamogeton natans, Ceratophyllum demersum, Utricularia vulgaris). Water was transparent, moderately alkaline (pH: 7.71), quite strongly mineralized (electrolytic conductivity: 2325 µS.cm^{-1}, dissolved solids: 1163 mg dm^{-1}, salinity: 1.2 PSU). Compact range of L. albifrons in Poland is limited to lakelands in the north of the country. Farther towards the south there is a zone of the insular occurrence, on single sites or their groups. This zone reaches south-eastern Poland through which the range boundary is running from Slovakia only one single sites is known, historical and doubtful one. The site in Jeziórkois situated near the southern range boundary of L. albifrons which is marked nowadays by three sites in the Przemysl Foothills. Its discovery is a valuable supplement to the knowledge about the distribution of the species on the edge of its range. This shows that this species can occur at more sites and in more regions than previously thought. The new site confirms also the previous data that the occurrence of the species in the marginal zone of the range is in large part connected with secondary habitats which can locally contribute to the increase in species distribution in comparison to historical period." (Author)] Address: Lis, L., Zakład Zoologii, Uniwersytet Marii Curie-Skłodowskiej, ul. Akademicka 19, 20-033 Lublin, Poland. E-mail: lisulis@o2.pl

18273. Lorthiois, M., Cheyrezy, T.; Gaudet, S.; Lecomte, T.; Simon, A. (2012): Leucorrhine à gros thorax en Haute Normandie - Leucorrhinia pectoralis (Charpentier, 1825) (Odonata, Libellulidae). L'Entomologiste Haut-Normand 2: 2-10. (in French) ["Conclusion The odonatological fauna of Haute Normandy, France has thus included a 50th species since spring 2012: the L. pectoralis. Observed at 5 stations in the region, 3 in Seine-Maritime and 2 in Eure, this species has reached us thanks to an exceptional invasion phenomenon. This has affected the whole of north-eastern France and the region constitutes its known western limit. Many potentially favourable environments were surveyed despite the difficult weather conditions during the presence of the species in the region. However, many peat ponds were not visited and the species may have swarmed on some of them. Even if evidence of reproduction was only formally observed on one of the five sites where the species was found, we cannot exclude the temporary establishment of other populations elsewhere in Haute-Normandie. Consequently, we will have to be particularly vigilant in the spring of 2014 and 2015, and even as early as 2013, to detect any new populations of this protected species." (Authors) Translated with www.DeepL.-com/Translator (free version)] Address: Lorthiois, M., 13, rue de Fort Dauphin - 76350 Oissel, France. E-mail: matthieu_-lorthiois@yahoo.fr

18274. Mahmoud, M.F. (2012): Insects associated with sesame (Sesamun [i.e. Sesamum] indicum L.) and the impact of insect pollinators on crop production. Pesticides and Phytomedicine 27(2): 117-129. (in English) ["A survey of insects associated with sesame, Sesamum indicum L. (Pedaliaceae) was conducted at the Agriculture Research Farm of The Faculty of Agriculture, University of Suez Canal during the growing seasons 2010 and 2011. All different insect species found on the experimental site were collected for identification. Sampling was done once a week and three times a day. Three methods were used to collect insects from the sesame plants (a sweep net, pitfall traps, digital camera and eye observation). A total of 31 insect species were collected and properly identified during the survey. Insects recorded on the plants were divided into four groups, true pollinators (Hymenoptera), other pollinators (Diptera, Coleoptera and Lepidoptera), pests (Orthoptera, Odonata [Ischnura senegalensis, Crocothemis erythraea], Hemiptera and Homoptera) and natural enemies (Coleoptera, Hymenoptera, Neuroptera and Dictyoptera). For studying the impact of insect pollination on sesame production, the experiment was divided in two: opened and non-opened pollination of sesame. 50 plants from nonopened pollination were covered with a perforated paper bag to allow the air to pass through and to prevent insects from approaching the plants. Quantitative and qualitative parameters were measured as follows: pod weight, number of seeds in each pod, weight of 1000 seeds, germination (%), seedlings vigour and oil content (%). Results clearly demonstrate that the opened pollination improved the crop production." (Authors)] Address: Mahmoud, M.F., Suez Canal University, Ismailia (Egypt). Faculty of Agriculture, Plant Protection Department

18275. Milton Montaño, C.; Meza, A.M.; Dias, L.G. (2012): La colección entomológica cebuc y su potencial como colección de referencia de insectos acuáticos. Bol. cient. mus. hist. nat. 16(2): 173-184. (in Spanish, with English summary) [Entomology collections constitute a country or region's natural history archive, where specimen preservation and its associated information are the basis for taxonomic, ecological, phylogenetic, and biogeographic studies. The Entomology Collection of the Biology Program of the Universidad de Caldas (CEBUC) has had an entry and deposit of reference specimens since 1993. Despite the time passed since its creation, it did not count on an appropriately organized collection. With the objective of optimizing the collection and organizing the information associated with the conserved species, its curation process was carried out. In parallel, an analysis of the taxonomic determination of the exemplars was done, finding that a total of 34184 exemplars were identified to the family level, of which 29542 (86.42%) are identified to the genus level. A total of 28542 liquid-stored aquatic insects are recorded, distributed in 28 orders, 90 families, and 215 genera and/or morphotypes, collected from different rivers and streams of the Caldas department. By analyzing the source data of the aquatic insect exemplars of the CEBUC, it was possible to determine that the greatest richness and abundance of aquatic insects is associated to leaf litter substrate. The generalist collectors' trophic guild is the dominant group among the aquatic insects deposited in the collection. In regards to the dry-preserved collection, it currently contains 5642 individuals, grouped in 14 orders belonging to 111 families. In this manner, CEBUC becomes an important reference tool for future investigations, in addition to manifesting the diversity of Colombia's central coffee region." (Authors) The collection includes 101 specimens with five families] Address: Milton Montaño, C., Programa de Biol., Fac. de Ciencias exactas y naturales, univ. de Caldas. milt-m@-hotmail.com

18276. Murria, E.; Jarne, M. (2012): Nuevo registro de Cordulegaster bidentata Sélys, 1843 en el Parque Nacional de Ordesa y Monte Perdido (Huesca) (Odonata: Cordulegastridae). Boletín de la SEA 50: 262. (in Spanish, with English summary) ["A new record is provided of C. bidentata from the Ordesa y Monte Perdido National Park (Huesca, Spain), 62 years after its first and last record in this area of the Pyrenees." (Authors)] Address: Murria, E., C/ Felix Rodriguez de la Fuente, 1 22623 Aineto (Huesca), Spain. E-mail: entomomurria@hotmail.com

18277. Ndenga, B.A.; Simbauni, J.A.; Mbugi, J.P.; Githeko, A.K. (2012): Physical, chemical and biological characteristics in habitats of high and low presence of anopheline larvae in western Kenya highlands. PLoS ONE 7(10): e47975: 7 pp. (in English) ["Background: Characteristics of aquatic habitats determine whether mosquitoes will oviposit, hatch, develop, pupate and successfully emerge into adults or not, thus influencing which mosquito species will occupy a habitat. This study determined whether physiochemical and biological characteristics differ between habitats with high and low presence of anopheline larvae. Methods: Physical, chemical and biological characteristics were evaluated in selected habitats twice per month within three highland valleys in western Kenya. Aquatic macro-organisms were sampled using a sweep-net. Colorimetric methods were used to determine levels of iron, phosphate, nitrate, ammonium and nitrite in water samples. Generalized Estimating Equations (GEE) was used to compare parameters between the two categories of anopheline presence. Results: Habitats with high anopheline presence had greater abundance of mosquito aquatic stages and tadpoles and two times more levels of nitrate in water, whereas habitats with low anopheline presence had wider biofilm cover and higher levels of iron in water. Conclusion: Habitats of high and low presence of anopheline larvae, which differed in a number of physical, chemical and biological characteristics, were identified in valleys within western Kenya highlands. Differences in habitat characteristics are critical in determining the number of anopheline larvae that will fully develop and emerge into adults." (Authors)] Address: Ndenga, B.A., Dept of Zoological Sciences, Kenyatta University, Nairobi, Kenya. E-mail: bndenga@yahoo.com

18278. Nelson, S. (2012): Sampling guide for the collection of dragonfly larvae and water samples from National Parks for mercury analysis. University of Maine (UMaine)/George J. Mitchell Center, Acadia Learning/Schoodic Education Research Center (SERC) Institute, National Park Service (NPS) – Air Resources Division (ARD): 12 pp. (in English) [http://-participatoryscience.org/sites/default/files/DragonflyHg_SamplingGuide_NationalParks_March2012.pdf] Address: Nelson, Sarah: Email: sarah_nelson@umit.maine.edu

18279. Olivier, X. (2012): Primeres dades sobre les comunitats d'odonats (Insecta: Odonata) de la Garrotxa. Annals de la delegado de la Garrotxa de la Inst. Cat. Hist. Nat. 5: 67-78. (in Spanish, with English summary) ["This article represents a first attempt to characterize the odonate communities found in a large number of different types of habitat in La Garrotxa. Data was gathered during monitoring carried out between 2005-2011 at a total of 42 stations. Species richness, densities and the phenology of the odonate communities, as well as the characteristic species of each habitat, were analyzed on a basis of indicators of presence and density." (Author)] Address: Oliver, X., Delegació de la Garrotxa de la Institució Catalana d' Historia Natural, C/ Fontanella, 3, E-17800 Olot, Spain. E-mail: xevioliver@gmail. com

18280. Pinto, A.P.; Carvalho, A.L. (2012): Taxonomic and distributional notes on Telebasis Selys, 1865, with a redescription of T. pallida Machado, 2010, and an evaluation of the T. racenisi Bick & Bick, 1995 "complex" of species (Odonata, Coenagrionidae). Deutsche Entomologische Zeitschrift 59(2): 189-200. (in English) ["A full checklist of the species of Telebasis Selys, 1865, housed in the Brazilian collections Cole o Entomol gica "Prof. Jos Alfredo Pinheiro Dutra", Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio do Janeiro (DZRJ), and Museu

de Zoologia, Universidade de S o Paulo (MZSP) is presented. A total of 325 specimens representing 19 species were studied. Ten new records for Brazilian States were found for T. carmesina Calvert, 1909 (Rio de Janeiro and Rio Grande do Sul), T. corallina (Selys, 1876) (Pernambuco), T. demarara (Williamson, 1917) (Maranhao), T. filiola (Perty, 1834) (Para ba and Santa Catarina), T. gigantea Daigle, 2002 (Sao Paulo), T. inalata (Calvert, 1961) (Mato Grosso do Sul), T. pallida Machado, 2010 (Goias) and T. obsoleta (Selys, 1876) (Mato Grosso do Sul), as well as a new record of T. carminita Calvert, 1909 for Suriname. Telebasis pallida Machado, 2010 is redescribed and diagnosed based on 14 males collected near the type locality, and its genital ligula is described and illustrated for the first time. Furthermore, the status of the three species of the Telebasis racenisi Bick & Bick, 1995 “complex” is evaluated. Of these, Telebasis pareci Machado, 2010 syn. n. is proposed as junior subjective synonym of Telebasis lenkoi Machado, 2010, and a possible synonymy among the three species is discussed under T. racenisi." (Authors)] Address: Pinto, A.P., Laboratory of Systematics on Aquatic Insects (LABSIA), Departamento de Zoologia, Universidade Federal do Paraná, P. O. Box 19020, 81531-980, Curitiba, PR, Brazil

18281. Popova, O.N.; Haritonov, A.Yu. (2012): On the change of the ranges of certain dragonfly (Odonata) species of the Russian fauna. Proceedings of the Russian Entomological Society. St. Petersburg 83(1): 73-82. (in Russian, with English summary) ["Many examples of changing the dragonfly ranges and dragonflies' invading new habitats are described. The range is suggested to be treated as a dynamic lace with widely varying «density» and location of separate populations. The active dragonfly settling in recent years is explained by the increasing destabilization of atmospheric processes involving also the Earth's biosphere." (Authors) Among others, the paper discuss the following species: Coenagrion ecornutum, C. glaciale, C. hylas, C. johanssoni, Nehalennia speciosa, Aeshna subarctica, Anax parthenope, Gomphus epophtalmus, Nihonogomphus ruptus, Macromia amphigena] Address: Popova, Olga, Institut Sistematiki i Zkologii Zhivotnykh, 630091 Novosibirsk, Ul. Frunse 11, Russia. E-mail: popova.olga.nik@gmail.com

18282. Poulin, B. (2012): Indirect effects of bioinsecticides on the nontarget fauna: The Camargue experiment calls for future research. Acta Oecologica 44: 28-32. (in English) ["Following its high selectivity and low toxicity to nontarget organisms, Bacillus thuringiensis var. israelensis (Bti) has become the most commonly used microbial agent to control mosquitoes worldwide. Considered non-toxic to mammals, birds, fish, plants and most aquatic organisms, Bti direct effects on the nontarget fauna are largely limited to non-biting midges (Chironomidae). Studies addressing the indirect effects of Bti through food web perturbations are scanty and showed no significant results. Mosquito-control in southern France was implemented in 1965 using various insecticides over 400 km of coast. In spite of a high mosquito nuisance, the Camargue wetlands were excluded from this control programme to preserve biodiversity. The expanding use of Bti has prompted the implementation of an experimental mosquito control in 2006 involving 2500 of the 25,000 ha of larval biotopes of the Camargue, accompanied by impact studies on the nontarget fauna. Using birds from natural and human-inhabited areas as model species, we assessed trophic perturbations caused by three years of Bti applications. The preliminary results of this 5-yr programme revealed significant effects of Bti spraying on abundance of reed-dwelling invertebrates serving as food to passerines [including Odonata], as well as on the diet and breeding success of house martins nesting in rural estates and small towns. Very few studies (if any) have provided such compelling evidence of an insecticide affecting vertebrate populations, putting into question the environmental-friendly character of Bti, at least in some areas. The significance of these results are discussed within a wider context and completed with an analysis of the current Bti bibliography to highlight and orient priorities for future research on this topic." (Author)] Address: Poulin, Brigitte, Tour du Valat Research Center, Le Sambuc, 13200 Arles, France. E-Mail: poulin@tourduvalat.org.

18283. Sannier, D. (2012): Inventaire des Odonates (Odonata) et synthèse des connaissances dans les réserves naturelles catalanes. Master 2ème Année Pro, Biodiversité – Écologie - Environnement, Université Joseph Fourier Grenoble 1: 152 pp. (in French, with English summary) ["Odonata are insects highly dependent on wetlands, making it a taxonomic group endangered. Thus, respectively 30 % and 15 % of world's and European species are considered as “threatened” and over a quarter of French species are on a Red List in preparation. The Catalan federation of nature reserves initiated a campaign of inventories to better know these insects and apprehend local conservation issues. It's in this context that this study is included: it main objective is to make an Odonata inventory of the Madres-Coronat south side. So, 26 taxa were inventoried, which 21 of them are formally indigenous. Among this species, six are news for the nature reserve of Nohèdes and three for the Catalan nature reserves. Spatial distribution and time division of every taxa as well as the four main odonatological corteges of Madres-Coronat are characterized. The conservation issues are significant, in particular for 6 highly interesting species: Somatochlora arctica, Cordulegaster bidentata, Coenagrion hastulatum, Sympetrum flaveolum, S. danae, Aeshna juncea. Many efforts are still needed to complete knowledge about Odonata in the Catalan nature reserves, except perhaps Madres-Coronat's ones. The implementation of population monitoring at the Estany del Clot should also allow to measure their evolution in the Nohèdes's nature reserve." (Author)] Address: Sannier, D., Univ. Joseph Fourier – Grenoble 1 - UFR de Biologie, 2231 rue de la Piscine, Bâtiment C de Biologie, B.P. 53, 38041 Grenoble Cedex 9, France

18284. Sharma, G. (2012): Studies on the reproductive behaviour of Pseudagrion rubriceps Selys (Odonata: Arthropoda) at Gyan Sarovar, Mount Abu, Rajasthan, India. Raghunathan, E., Sivaperuman, C. and Venkataraman, K. 2012. Recent Advances in Biodiversity of India: 1-529 (Published by the Director, Zool. Surv. India, Kolkata): 251-255.

(in English) ["The reproductive behaviour of Pseudagrion rubriceps has been studied three times at study site on dated 19.09.08, 20.09.08 and 21.09.08. The conspicuous sexual dimorphism with a bright orange face of male, while much paler in females made easy to keep a close watch on a species. The observations on different activities, their duration and variabilities in the reproductive behaviour of P. rubriceps were recorded as below." Information are given to: "(a) Territoriality, (b) Before wheel tandem, (c) Copulatory wheel position, (d) After wheel tandem, and (e) oviposition".] Address: Sharma, G., Desert Regional Centre, Zoological Survey of India, Jhalamand, Pali Road, Jodhpur-342 005, Rajasthan, India, E-mail: drgaurav.zsi.india@gmail.com

18285. Vizslán, T. (2012): Adatok Sajóbábony környékének szitakötõ-faunájához (Odonata) [Data on the dragonfly (Odonata) fauna from the surroundings of the settlement Sajóbábony (N-Hungary)]. Studia odonatol. hung. 14: 73-79. (in Hungarian, with English summary) ["The author presents faunistical data based on collections of dragonfly adults in the surroundings of the settlement Sajóbábony. The sampling sites are situated in one 10×10 km UTM grid map cell (DU 73) of a geographical microregion (Tardonai-dombság) in the mountain area Bükk-vidék (N-Hungary). ... Collections were made in 1989 and 1990, with the participation of 2 specialists on 22 days and 3 localities altogether. In the report information on 278 adults (185 males and 93 females) are given in detail, representing 93 faunistical data. In this study 24 species (11 Zygoptera and 13 Anisoptera) were found to occur in the area, out of which 1 belongs to the very frequent, 13 to the frequent, 5 to the less frequent, 2 to the rare and 3 to the sporadic class of country-wide occurrence frequency." (Authors)] Address: Vizslán, T., 9027 Gyr, Nagysándor József u. 36., IV/17

18286. Vliegenthart, A. (2012): Kwaliteit van tijdelijke natuur in de Haven van Amsterdam. Rapport VS2012.022, De Vlinderstichting, Wageningen: 22 pp. (in Dutch, with English summary) ["The goal of the 'Green Deal Temporary Nature' is to stimulate temporary nature development and to study the problems faced. One of the main targets is research on development of this new nature areas. Amsterdam Harbour has initiated as the first Dutch company a pilot 'Temporary Nature' on their site. Simple provisions were made to improve biodiversity like constructing artificial relief and creating ponds on the pilot site. In addition of the monitoring of Natterjack Toad and Orchids, research on quality of the temporary nature areas is started using an inventory of butterflies, dragonflies and grasshoppers. In this research three areas (in total 21 ha) in Westpoort where potentially nature could develop were studied. The pilot area, which was the focus of this research, is the biggest and it was created by Amsterdam Harbour in 2007. For the purpose inventory of butterflies, dragonflies and grasshoppers was done for their good qualities as indicators of nature development. In total 30 species of butterflies, dragonflies [10 species recorded] and grasshoppers in the three temporary nature areas of Westpoort were found and their relation with the habitat were assessed. These species are associated to the nature development and quality. Many indicative species of pioneer vegetation and (flowery) grasslands were found. These species were found here because of the early stage of development of the area. The discovery of at least two individuals of Bluewinged grasshoppers was promising surprise of the study. They most probably have colonised the area from the dunes nearby. This indicative species of open sandy areas and pioneer habitat proves the available ecological balance in the pilot area. The dragonfly diversity seemed to be increasing and quality of good fresh water improving. The quality of the flowery grasslands is high and provide good quality of habitat that not only for butterflies, but also for rare plant species like Orchids, Grass of Parnassus and Yellow-wort . The conclusion is was that this 'temporary nature' develops fast and in the right direction. There are already flowery meadows with high grassland butterfly diversity, which is positive since they are under high pressure. The investigated area of 'temporary nature' functions as important stepping stone in the region for this group and other species associated with open sand and pioneer habitat. These are usually dynamic systems from where species can disperse. Due to the natural succession, the species typical of pioneer habitat will disappear and the terrain transform potentially to a more developed habitat and host other species.The data from the National Databank Flora & Fauna shows that the species diversity is available in the direct vicinity. The pilot project of Amsterdam Harbour creating the artificial relief and ponds in the temporary nature area, achieved a very good positive development for the biodiversity in the area. At this moment the area is a very important habitat and stepping stone for species of pioneer habitat and grasslands, which are currently threatened in the Netherlands."] Address: De Vlinderstichting, Mennonietenweg 10, Postbus 506, 6700 AM Wageningen, The Netherlands. E-mail: info@vlinderstichting.nl

18287. Walia, G.K. (2012): Chromosomal studies on two species of family Platycnemididae (Odonata: Zygoptera). Hislopia journal 5(1): 55-58. (in English) ["Karyological Investigations have been carried out on the male individuals of Copera annulata and Copera vittata. These species were collected from Jammu & Kashmir, while former species was also collected from Assam. Both the species possess the type number of the family, that is, 25m as the diploid chromosome number with XO sex determining mechanism. Copera vittata has been studied cytologically for the first time from India and chromosome complement (2n=25m) of Copera annulata is different from earlier report (2ns27m)." (Author)] Address: Walia, G.K., Dept of Zoology & Environmental Sciences, Punjabi University, Patiala- 147002, India.

18288. Ajuria Ibarra, H.; Reader, T. (2013): Reasons to be different: do conspicuous polymorphisms in invertebrates persist because rare forms are fitter? Journal of Zoology 290(2): 81-95. (in English) ["Many invertebrate species show conspicuous colour polymorphisms, the study of which has provided us with important insights in evolutionary biology. The potential importance of frequency-dependent selection

in the maintenance of polymorphisms was identified by theoretical studies more than 50 years ago, and since then, the topic has received considerable attention from those seeking to explain observed diversity in natural populations. Here, we consider the different ecological interactions that have been shown to lead to negative frequency-dependent selection in invertebrate populations in the wild, and assess the likely relative importance of this mechanism in comparison with alternatives that may promote genetic and phenotypic diversity. The literature shows that frequency dependence can result from a wide array of ecological interactions, in particular, those involving mate choice, sexual conflict and predation. However, even though negative frequency-dependent selection is the most common explanation for the occurrence of conspicuous polymorphisms in invertebrates, conclusive evidence of its importance in natural populations is largely absent. A particular problem is that in most studies, it is the only explanation considered. In the most comprehensively studied systems, it has been shown that multiple mechanisms (both selective and neutral) operate to maintain observed phenotypic variation, and that negative frequency-dependent selection is not the most important of these. Thus, as yet at least, we do not have strong grounds for believing that negative frequency-dependent selection is a major diversifying force in invertebrate morphology. However, without more comprehensive studies in a wider range of ecological contexts, we are equally unable to dismiss it as weak and/or irrelevant." (Authors) The paper includes references to Odonata.] Address: Ajuria Ibarra, Helena, School of Biology, University Park, Univ. Nottingham, Nottingham, NG7 2RD, UK. Email: ajuria_i@yahoo.com

18289. Alcorlo, P.; Baltaná, A. (2013): The trophic ecology of the red swamp crayfish (Procambarus clarkii) in Mediterranean aquatic ecosystems: a stable isotope study. Limnetica 32(1): 121-138. (in English) ["The red swamp crayfish (Procambarus clarkii) is an invasive species in most of its current distribution range. As an omnivorous species that feeds on items of many trophic levels [including Odonata] and is eaten by many others, it occupies a key trophic position within the invaded food webs. This trophic position, in combination with its active physiology, makes P. clarkii a suitable organism for ecotoxicological studies and, more specifically, a bioindicator of heavy metal pollution. These characteristics also make P. clarkii a likely vector of contaminants toward higher trophic levels. In this study, we (i) describe aquatic food webs in three contrasting Mediterranean wetlands in the lower Guadalquivir River Basin, southwestern Spain, each populated by invasive P. clarkii but having a different heavy metal concentration, (ii) assess the trophic role of crayfish and temporal trends in its diet using stable isotope analysis ($\delta^{13}C$ and $\delta^{15}N$), and (iii) assess the relationship of crayfish isotopic signatures to the content of heavy metals (Cu, Zn, Pb, Cd, As) bioaccumulated in crayfish body tissues. We detected significant between-site differences in carbon and nitrogen isotopic signatures but found significant between-date differences only for nitrogen signatures. Between site changes in carbon and nitrogen isotopes were due primarily to variations in the relative contribution of autochthonous vs. allochthonous primary producers and shifts in crayfish abundance through time, respectively. Isotopic food web models were used to distinguish between systems driven by a detritus-based energy pathway and systems supported by detritus and primary producers. The trophic positions estimated for crayfish and other invertebrates at each site were low, suggesting the prevalence of omnivory and the occurrence of a trophic continuum rather than discrete levels. Isotopically, crayfish occupy a predator position in the observed food webs, which is consistent with the predominance of animal food sources in the species' diet. No significant changes were found between crayfish ontogenetic stages using isotopic ratios. The site with the highest concentration of heavy metals showed the highest $\delta^{13}C$ and $\delta^{15}N$ values, and a significant correlation was found between five heavy metal elements (As, Cd, Zn. Cu, Pb) measured in crayfish and their nitrogen isotope signatures ($r = 0.72$, $p < 0.0001$), thus reinforcing its contamination biomarker role." (Authors)] Address: Alcorlo, Paloma, Department of Ecology, Universidad Autonoma de Madrid, E-28049 Madrid, Spain. E-mail: paloma.alcorlo@uam.es

18290. Amann, P. (2013): Die Libellenfauna der Jagdberggemeinden. Naturmonographie Jagdberggemeinden. Dornbirn (inatura Erlebnis Naturschau Dornbirn).: 207-228. (in German, with English summary) ["Within the framework of inatura's investigation into the flora and fauna of the Jagdberg communities, I was given the task of examining and documenting the dragonfly populations in the region. Collections were taken on dragonfly habitats over a period of two years (2010-2012). These recent collections were supplemented with unpublished data from Georg Amann from 2003-2004. This work should interest experts as well as laymen who are interested in nature. The dragonfly species which inhabit the investigated region were described, their typical behaviours were documented, and hints were given on how and where to observe them. The results: Of the 55 dragonfly species registered in Vorarlberg, 27 were detected in the Jagdberg communities. Six of the observed species are considered highly endangered according to Hostettler (2001). (Calopteryx virgo, Cordulegaster bidentata, C. boltonii, Ischnura pumilio, Sympecma paedisca, Sympetrum pedemontanum) Especially the C. virgo and both the Cordulegaster species could be observed over a number of years. These insects have found their final retreat and reproduction space in the small, flat moorlands in the Jagdberg communities in Vorarlberg. In conclusion, three examples of development possibilities are presented which the Jagdberg communities could implement to create living and protection space for dragonflies. A concrete catalogue of measures and positive examples of successful intervention by the communities completes the work." (Author)] Address: Amann, P., Wiesenbachweg 8, A-6824 Schlins, Austria. E-mail: p.amann@aon.at

18291. Assmann, B.R.; Silva, J.E.A.; Marinho, J.R. (2013): Análise da dieta alimentar de tartarugas-de-água-doce da da família Chelidae em lagos rasos costeiros em Rio Grande, RS. Vivências 9(16): 36-52. (in Portuguese, with

English summary) ["Feeding analysis of freshwater turtles in coastal shallow lakes in Rio Grande, RS: Turtles are vertebrates most easily recognizable due to their morphological specializations associated with different habitats they occupy basically aquatic or semi-aquatic, exist species that are carnivorous, herbivores and omnivores. There is a significant lack of research lines on turtles in academic institutions outside the region southeast, mainly of Chelidae Family. The increase in the concentration of nutrients through the artificial enrichment of aquatic ecosystems can influence the availability of certain food items in the diet of turtles Chelidae Family. Obtaining data on the diet of these turtles allows to know the variations and food preferences when they are exposed to different conditions of human disturbance in their aquatic environment. The objective of this study was to determine the feeding diet composition of freshwater turtles of genres Acanthochelys and Phrynops, Chelidae Family. Catches and recaptures of specimens family Chelidae occurred during two weeks in August, October, November, December 2011 and January 2012, a period corresponding between 8 hours and 18 hours in three shallow lakes in Campus Carreiros of FURGS in Rio Grande, RS. Catches were performed manually with dip nets and traps water cylindrical of type covo average size. After immobilization of the animal, the analyzes of diet occurred through the technique by of gastric lavage in specimen captured, and subsequent analysis of the stomach contents of each individual. We collected a total of 19 individuals in the three lakes, 14 of espécie Acanthochelys spixii and five species of Phrynops hilarii. The diet was primarily composed of aquatic invertebrates and individuals of the order Diptera that were the most representative. The availabilityof food for Acanthochelys spixii and Phrynops hilarii and is directly related to the limnological conditions of the lakes where these species live." (Authors) Odonata contributed < 10% to diet of different Chelidae species.] Address: not stated

18292. Badawy, R.M.; El Hoseny, I.; Talal, M. (2013): Biodiversity and seasonal fluctuation of aquatic and semiaquatic insects in Rashid stream, kafr El Zayat (Gharbyia governorate). Egypt. Acad. J. Biolog. Sci. 6(1): 47-66. (in English) ["Rashid branch of Nile River is a principle stream in Kafr El Zayat (Gharbyia governorate) for drinking and irrigation to different essential crops. Five stations were selected for seasonal collection, resulted in 539 specimens, belonging to 7 orders and 22 families and 31 species. The total population density was higher during Spring (41.9%), then in Summer (25.1). Order Diptera was the most abundant (33.8%), … then order Odonata (16.7%) (Libellulidae & Coenagrionidae), the highest representation was during Spring; ..." (Authors)] Address: Badawy, R.; Entomology Department, Faculty of Science, Ain Shams University, Cairo, Egypt

18293. Bouteloup, R. (2013): Etude des cortèges odonatologiques des lentilles calcaires angevines Expertise approfondie sur les populations de Cordulies à corps fin (Oxygastra curtisii Dale, 1834). Rapport de stage de Master 2, Expertise Faune Flore, Inventaires et indicateurs de biodiversité, Année 2012-2013: CPIE Loire et Mauges, Maison de Pays, BP 50048, 49602 Beaupreau Cedex, France. 49 pp. (in French, with English summary) [In 2012, the reproduction of O. curtisii, was observed on a former quarry in St-Aubin-de-Luigné, located in the west of Maine-et-Loire. The study carried out by the CPIE Loire et Mauges is part of the National Action Plan for Odonates and aims to fill in the gaps in the presence of the species in stagnant environments. Odonatological inventories on other calcareous duckweeds have been carried out by collecting exuviae and observing imagos. They will also make it possible to identify the odonatological communities present. The study highlights the odonatological richness of the limestone water bodies through the presence of species with different ecological requirements and sometimes good populations of Oxygastra curtisii. The dispersal of individuals could not be demonstrated despite the Capture-Mark-Recapture protocol implemented on this occasion. Finally, the study highlights the preferred habitat structures for the emergence of the species." (Author, DeepL)] Address: CPIE Loire et Mauges, Maison de Pays, BP 50048, 49602 Beapreau, Cedex, France

18294. Bulankova, E.; Beracko, P.; Derka, T. (2013): Occurrence of protected species (Gomphus flavipes, Odonata and Palingenia longicauda, Ephemeroptera) in the Danube River and its deltas (Romania, Slovakia). Scientific Annals of the Danube Delta Institute Tulcea, Romania 19: 21-24. (in English) ["Large population of Gomphus flavipes was found in the Malý Dunaj (Small Danube), in the area called Danube's "Inland Delta", in 2000–2001. Watching of dragonflies in the Danube Delta (Romania) demonstrated another large population in 2007–2008. In contrast with these observations are our results, from long–term monitoring of dragonflies in the Danube, in the area influenced by the Gabèíkovo power plant (operational since 1992). Changes in hydromorphology in this section started in 19th century and at present dam represents a significant impact on the functioning of the Danube ecosystem. During 20 years monitoring we found only one larva of Gomphus flavipes in the Danube at the site downstream of the dam. Another critically endangered species, mayfly Palingenia longicauda was found in the Danube Delta in 2009. We observed emergence of giant mayfly in the Danube´s arm in Romania. Palingenia longicauda disappeared totally in the 1930s from many European rivers. At present it occurs in Tisza and Rába rivers (Hungary) and has been reintroduced in Lippe and Odra rivers (Germany). New findings of large populations of Palingenia longicauda in the Romanian Delta has been unknown till now. Findings of large population of Gomphus flavipes in deltas confirm that river deltas are of high importance for aquatic biodiversity conservation." (Authors)] Address: Beracko, P., Faculty of Natural Sciences of Comenius University: Mlynská dolina, 842 15 Bratislava 4, Slovakia. E-mail: beracko@fns.uniba.sk

18295. Caut, S.; Angulo, E.; Díaz-Paniagua, C., Gomez-Mestre, I, (2013): Plastic changes in tadpole trophic ecology revealed by stable isotope analysis. Oecologia 173(1): 95-105. (in English) ["Amphibian larvae constitute a large fraction of the biomass of wetlands and play important roles in

their energy flux and nutrient cycling. Interactions with predators and competitors affect their abundance but also their foraging behaviour, potentially leading to non-consumptive cascading effects on the whole trophic web. We experimentally tested for plastic changes in larval trophic ecology of two anuran species in response to competitors and the non-lethal presence of native and non-native predators, using stable isotope analysis. We hypothesized that tadpoles would alter their diet in the presence of competitors and native predators, and to a lesser extent or not at all in the presence of non-native predators. First, we conducted a controlled diet experiment to estimate tadpole turnover rates and discrimination factors using Pelobates cultripes and Bufo calamita. Turnover rates yielded a half-life of 15–20 days (attaining a quasi-isotopic equilibrium after 2 months), whereas discrimination factors for natural controlled diets resulted in different isotopic values essential for calibration. Second, we did an experiment with P. cultripes and Rana perezi (=Pelophylax perezi) where we manipulated the presence/absence of predators (Anax imperator, Procambarus clarkii) and heterospecific tadpoles using microcosms in the laboratory. We detected a significant shift in trophic status of both amphibian species in the presence of non-native crayfish: the d15N values and macrophyte consumption of tadpoles increased, whereas their detritus consumption decreased. This suggests that tadpoles could have perceived crayfish as a predatory risk or that crayfish acted as competitors for algae and zooplankton. No dietary changes were observed in the presence of native dragonflies or when both tadpole species co-occurred. Stable isotopic analysis is an efficient way to assess variation in tadpoles' tropic status and hence understand their role in freshwater ecosystems. Here we provide baseline isotopic information for future trophic studies and show evidence for plastic changes in tadpoles' use of food resources under different ecological scenarios." (Authors)] Address: Caut,S., Estación Biológica de Donana, CSIC, Avda. Americo Vespucio, s/n, 41092 Sevilla, Spain. E-mail: stephanecaut@gmail.com

18296. Cavalieri, C.; Dionisi, V.; Petrucci, M.; Poggiani, L. (2013): Libellule del Metauro. Fondazione Cassa di Risparmio di Fano (ed.): 144 pp. (in Italian) [Regional odonate fauna of the Umbria region of central Italy. ISBN 978-88-98714-01-8]

18297. Charrier, M. (2013): Les libellules de Maine-et-Loire. Inventaire et cartographie. Les Naturalistes Angevins 4: 91 pp. (in French) [nv; "This atlas of odonates, the result of field surveys, is as accurate an inventory as possible of the odonatological fauna in Maine-et-Loire. Each monograph presents the current distribution of each species contacted at least once in the department and provides details on the environments frequented and the periods of flight recorded (distribution map, phenological diagram, status as well as photographs). In addition to the involvement of local naturalists, under the aegis of the Angevin Naturalists Association, the production of this atlas was facilitated by the involvement of other departmental associations with data - Mauges Nature, the CPIE Loire et Mauges, the LPO Anjou and the PNR Loire-Anjou-Touraine." (Publisher, DeepL)

18298. Chung, A.Y.C.; Chew, S.K.F.; Majapun, R.; Nilus, R. (2013): Insect diversity of Bukit Hampuan Forest Reserve, Sabah, Malaysia. Journal of Threatened Taxa 5(10): 4461-4473. (in English, with Bahasa Malaysia summary) [" An insect diversity survey was carried out at Bukit Hampuan Forest Reserve, adjacent to Kinabalu Park in Sabah, Malaysia. … Diurnal insects were sampled using sweep nets and fine forceps. A total of 19 Bornean endemic insect species were recorded, comprising 15 moth and four beetle species. … Some dragonfly species were sampled along the streams in the forest adjacent to Kg. Lohan Bongkud, e.g. Macromia westwoodii at about 700m while others were collected at the Bukit Hampuan FR open area at 1,370m, e.g. Pantala flavescens. Macromia westwoodii is a large dragonfly, with its hindwing measuring up to 50mm. It is fairly common on clear fast forest streams from the lowlands to 900m but is extremely inconspicuous and wary. Pantala flavescens is the most wide ranging odonate species in the world, being found throughout the tropics and subtropics, from dense primary forest up to at least 3000m (Orr 2003)." (Authors)] Address: Chung, A.Y.C., Forest Research Centre, Sabah Forestry Dept, P.O. Box 1407, 90715 Sandakan, Sabah, Malaysia. E-mail: arthur.chung@sabah.gov.my

18299. Colborne, S.F.; Peres-Neto, P.R.; Longstaffe, F.J.; Neff, B.D. (2013): Effects of foraging and sexual selection on ecomorphology of a fish with alternative reproductive tactics. Behavioral Ecology 24(6): 1339-1347. (in English) ["The foraging ecology of fish is often considered to be the primary determinant of body shape due to tight links between morphology, swimming performance, and foraging efficiency. Fish foraging on littoral benthic macroinvertebrates typically have a deeper body shape than those foraging on pelagic zooplankton in the water column. However, morphological traits often have multiple ecological functions, which could result in performance trade-offs between functions. Here, we provide the first examination of body shape and diet in a species with alternative reproductive tactics, in this case, bluegill sunfish (Lepomis macrochirus Rafinesque, 1819). Bluegill males mature into either "parental" or "cuckolder" reproductive tactics. Parentals build nests and provide sole parental care and defense of the young. Cuckolders instead act as "sneakers" darting into the nests of parental males while mating is occurring and then later in life become "satellites," mimicking female appearance and behavior. Using stable carbon and nitrogen isotopic analysis of diet, we found that parentals and females consumed primarily pelagic zooplankton yet were the deepest in body shape. Sneakers consumed more littoral resources but were the most streamlined. Satellite males also consumed predominately littoral resources but had a deeper body form that was more similar to females than to size-matched juveniles. Our results differ from past studies of foraging ecomorphology and suggest that other selection pressures, such as sexual selection in species with alternative reproductive tactics, may also be an important factor influencing shape. ... we collected the 5 most common littoral prey groups in Lake Opinicon (snails, amphipoda, isopoda, larval ephemeroptera, and larval Odonata)." (Authors)] Address: Neff, B.D., Dept Biology, Univ.

Western Ontario, Biological & Geological Sciences Building, London, Ontario N6A 5B7, Canada. E-mail: bneff@uwo.ca

18300. de Camargo, N.F.; Ribeiro, J.F.; de Camargo, A.J.A.; Vieira, E.M. (2013): Diet of the gracile mouse opossum Gracilinanus agilis (Didelphimorphia: Didelphidae) in a neotropical savanna: intraspecific variation and resource selection. Acta Theriologica 59(1): 183-191. (in English) ["Investigation of the effect of endogenous and exogenous factors on the diet of animals is necessary for a better understanding of their feeding habits. This approach can provide relevant information on the autoecology of a species and its ecological interactions. We investigated the composition and intraspecific variation in the diet of the marsupial Gracilinanus agilis in areas of dry woodland forests (i.e., cerradão) in the Cerrado of Central Brazil, taking into consideration the availability of prey (arthropods) in the environment. We found insects, spiders, birds, and fruits in the scats of G. agilis. Insects (orders Hymenoptera, Isoptera, Hemiptera, and Coleoptera) and fruits were the most frequently consumed resources. Males fed more heavily on insects than females did, whereas during the warm–wet season (October to April), the reproductive females fed on insects more than the nonreproductive females did. On the other hand, the consumption of fruits and vertebrates did not vary between seasons, sexes, or according to female reproductive condition. Moreover, reproductive females fed more frequently on ants and beetles than nonreproductive females did. We also detected both positive (for Isoptera and Hemiptera) and negative (for Hymenoptera) selection of insects during the cool–dry season, whereas in the warm–wet season, these resources were consumed according to their availability in the environment. Our study revealed that G. agilis is an insectivore–omnivore species, but fruits also are a relevant part of its diet. This marsupial seemed to select their prey qualitatively according to its energy demands and nutritional requirements." (Authors) Odonata: Percentage of the total number of samples (0,92%) and absolute frequency (N=4) of food items detected in 422 scat samples of Gracilinanus agilis in four areas of cerradão (closed woodland forest) located in central Brazil (Brasília, DF).] Address: Vieira, E.M., Laboratório de Ecologia de Vertebrados, Departamento de Ecologia, Instituto de Ciências Biológicas, CP 04457, Universidade de Brasília (UnB), Brasília, DF, 70919-970, Brazil. E-mail: emvieira@unb.br

18301. de Klerk, A.R.; Wepener, V. (2013): Macroinvertebrate assemblage changes as an indicator of water quality of perennial endorheic reed pans on the Mpumalanga Highveld, South Africa. Journal of Environmental Protection 4: 10-21. (in English) ["Reed pans are a very uncommon type of endorheic wetland, and as such the amount of information available is very limited. Thus, they are being impacted on by various agricultural, livestock and other anthropogenic activities. The objectives of this study were to determine the spatial and temporal variations of macroinvertebrate community structures in reed pans and the environmental factors (i.e., water quality) responsible for the maintenance of these structures. Reed pans were studied over four different seasons, during which time subsurface water, sediment and macroinvertebrate samples were collected and analyzed. The reed pans studied showed that the macroinvertebrates were able to reflect various changes in reed pans with regard to seasonal variability and anthropogenic impacts on water quality. These anthropogenic impacts caused the disappearance of sensitive macroinvertebrate taxa and the increase of tolerant macroinvertebrate taxa." (Authors) Anax imperator, Aeshna minuscula, Ceriagrion glabrum, Tetrathemis polleni] Address: de Klerk, A.R, Dept Zool., Univ. of Johannesburg, Johannesburg, South Africa. E-mail: adklerk@csir.co.za

18302. Delpon, G. (2013): Étude de l'écologie et gestion conservatoire de Leucorrhinia pectoralis sur le territoire du Parc Naturel Régional des Volcans d'Auvergne. PNR des Volcans d'Auvergne: 111 pp. (in French) ["L. pectoralis, is a scarce and threatened dragonfly species. It is listed in Annexes II and IV of the UE Habitats Directive (92/43/EEC) and it is a protected species in France. In Auvergne (France), the Jolan peatbog is the only site where its reproduction has been proven. This peatbog is located in the Parc naturel régional des Volcans d'Auvergne and is integrated in a Natura 2000 site. The species is known to grow in former peatdiggings. Nowadays, this population is highly threatened because of its isolation and the small number of individuals. In order to apply conservation measures adapted to the local context, a characterization of larval habitats and a survey across the site were carried. The results of this study allowed to localize seven pitdigginigs which are potentially favorable to L. pectoralis. They are isolated on a fen dominated by sedges (Carex rostrata). They are characterized by a depth approaching 3 meters, by the presence of water plants (Utricularia minor, Sparganium minimum, Potamogeton natans, …) and by a high density of Salix sp groves around them. A reduced number of adults have been observed during a period of only 18 days. A single male territory has been inventoried on the only pitdiggings which has a free water area higher than 30%. Rapid evolution of other pits to advanced successional stages over the last years has been highlighted. This dynamic implies a decrease of the availability of suitable habitat for the species. Based on these findings, measures were built to restore breeding habitats of L. pectoralis in the Jolan peatbog in order to maintain the local population. Linked to these actions, a standardized survey protocol has been proposed. Beyond these emergency measures, management recommendations on a larger scale were given to ensure the sustainability of the population over the long term. In the future, it will be essential to gradually broaden the discussion to a larger scale in order to restore a network of favorable and interconnected sites." (Author)] Address: Delpon, Gaël, 17 route de Foix 09400 Amplaing, France. E-mail: gael.delpon@yahoo.fr

18303. Dhal, S.; Mitchell, C.P.J. (2013): Saltwater flotation for more efficient matrix separation of wetland macroinvertebrates does not affect total mercury or methylmercury concentrations. Environmental Toxicology and Chemistry 32(6):

1233-1236. (in English) ["We compared benthic wetland invertebrate matrix separation techniques (handpicking vs. saltwater flotation) to test for effects on invertebrate mercury concentrations. Neither total mercury nor methylmercury concentrations differed significantly between techniques across eight taxa. Matrix separation by the flotation technique took significantly less time and resulted in significantly greater abundance recovery in some taxa. We conclude that the saltwater-based flotation technique does not lead to mercury contamination or analytical interference issues." (Authors) ... three significantly different ranges, in groups (see Table 1: Corixidae and Caenidae range 180 - 400 ng g-1, Notonectidae, Dytiscidae, and the Odonata other than Aeshna spp. range 180 - 650 ng g^{-1}, and Aeshna spp. range 590– 780 ng g^{-1}."] Address: Mitchell, C.P.J., Univ. of Toronto – Scarborough, Dept of Physical & Environmental Sciences, Toronto, ON, Canada. E-mail: carl.mitchell@utoronto.ca

18304. Florencio, M.; Diaz-Paniagua, C.; Gomez-Rodriguez, C.; Serrano, L. (2013): Biodiversity patterns in a macroinvertebrate community of a temporary pond network. Insect Conservation and Diversity 7(1): 2-21. (in English) [Donana National Park (SW Spain) "(1.) Macroinvertebrate assemblages of temporary ponds are ideal model systems to explore biodiversity patterns and metacommunity ecology. In addition, the study of the environmental variables driving such biodiversity patterns is essential in establishing proper guidelines for the conservation of the singular fauna of temporary ponds, especially since such ponds are vulnerable systems. (2.) We analysed the macroinvertebrate assemblages and environmental characteristics of 80 ponds spread across the Donana National Park, SW Spain to (i) analyse macroinvertebrate b-diversity and metacommunity structure; and (ii) discern the main environmental and spatial drivers of these patterns. (3.) The pond network was highly heterogeneous as temporary ponds were highly variable. Macroinvertebrate b-diversity partitioning showed that species replacement made the greatest contribution to total b-diversity while the contribution of nestedness was small. The macroinvertebrate community structure and b-diversity were similarly driven by: electrical conductivity (and co-variables alkalinity, pH, and ion concentrations), plant richness (and the co-variable pond surface area), maximum depth, marsh, and coastal proximity as well as two spatial descriptors extracted from Moran's eigenvector maps. The spatial descriptors indicated that large interpond distances were involved, suggesting that species dispersal limitations only take place over long distances in the area. (4.) Those taxa that departed from the general nested pattern, termed idiosyncratic, significantly contributed to the maintenance of high pond network diversity through the species replacement and occurred within particular environmental conditions in the pond network. (5.) These results reveal that environmental heterogeneity and connectivity are key factors in the preservation of high macroinvertebrate diversity in nested pond networks with high numbers of idiosyncratic species. ...Odonatans preferred northern temporary ponds with the lowest conductivity values; for example S. fonscolombii was observed almost exclusively in these ponds." (Authors) Aeshna affinis, A. mixta, Coenagrion scitulum, Ischnura elegans, I. pumilio, Lestes barbarus, L. dryas, L. macrostigma, L. virens, Crocothemis erythraea, Sympetrum fonscolombii, S. meridionale, S. sanguineum, S. striolatum, Orthetrum brunneum, O. cancellatum, O. nitidinerve] Address: Florencio, Margarita, Donana Biological Station-CSIC, Am erico Vespucio s/n, 41092 Seville, Spain. E-mail: margarita@ebd.csic.es

18305. Fontanarrosa, M.S.; Chaparro, G.N.; O'Farrell, I. (2013): Temporal and spatial patterns of macroinvertebrates associated with small and medium-sized free-floating plants. Wetlands 33(1): 47-63. (in English) ["Macrophytes play an important role in structuring communities in aquatic ecosystems due to their influence on ecological processes and attributes of biological aquatic assemblages. Freshwater macroinvertebrates comprise a functionally and taxonomically diverse group in shallow lakes, which serve as food for fish, amphibians, and water birds, and are involved in the breakdown of organic matter and nutrients. Here, we investigated macroinvertebrate assemblages associated with small and medium-sized free-floating plants (FFP) by describing their structure, analyzing functional aspects (considering functional feeding groups and habits), and determining how much of the variation in fauna composition is explained by environmental factors, mainly FFP. Differences in structure, functional feeding groups and habits of macroinvertebrate assemblages were associated with different compositions and percentages of cover of FFP. Gradients of richness and diversity of macroinvertebrates were positively related to the complexity of FFP mats, which was associated with the structure of roots and leaves." (Authors) "Aeshna sp., Sympetrum sp., Coenagrionidae"] Address: Fontanarrosa, Maria, Lab. de Limnología, Instituto de Ecología, Genética y Evolución de Buenos Aires (CONICET-UBA), Fac. Cs. Exactas y Naturales, Universidad de Buenos Aires, Int. Güiraldes 2160, Pab. II, 4°Piso. Lab.95, 44. CP C1428EHA, Buenos Aires, Argentina. E-mail: fontanarrosa@ege.fcen.uba.ar

18306. Gering, E.J. (2013): Causes and consequences of color polymorphism in Rambur's forktail (Ischnura ramburii). PhD thesis, Faculty of the Graduate School of The University of Texas at Austin, University of Texas at Austin: XVI + 121 pp. (in English) ["Variation in male and female forms occurs in countless animal taxa, and has fascinated evolutionary biologists since Darwin and Wallace. The underpinnings of male variation have been elucidated in diverse groups; less is known about the selective forces that diversify female forms in nature. Female-polymorphic damselflies provide ideal systems in which to study how female variation evolves. Colour polymorphic damselflies typically contain one female morph that resembles the male ("andromorph") and one or more alternative morphs with distinctive coloration ("gynomorphs" or "heteromorphs"). My thesis draws upon the unique context of a biological invasion to elucidate factors that promote and maintain this variation in female colour. Empirical work in my dissertation is focused upon Rambur's Forktail (Ischnura ramburii), a species native to the Americas that invaded Hawaii in the 1970s. I first examine whether female colour morphs diverge in mating rates

or other reproductive traits within the native and invasive range, to see whether such traits might affect morph frequency dynamics in the invasion context (Chapter 2). Next, I test whether variation in selective regimes, both across female development and among populations, predicts variation in andromorph coloration (Chapter 3). Upon finding andromorphs to follow predictions of mimicry theory, I ask whether andromorph presence might result in increased male-male interaction rates, due to sex recognition errors (Chapter 4). Finally, I document recent, rapid evolution of andromorphy within Hawaii populations, and conduct mesocosm experiments to test the potential for density- and frequency-dependent selection to promote and maintain colour polymorphism. Results indicate 1) andromorphs may benefit from reduced mating, but male-like morphology may also incur reproductive constraints; 2) andromorph colour variation accords with mimicry theory: andromorphs resemble syntopic males, and resemblance is maximized after reproductive onset; 3) male-male interactions increase in the presence of andromorphs, to male detriment; 4) gynomorphs are subject to negative-frequencydependence in high-density populations, which may have driven the rapid evolution of andromorphy in Hawaii following introduction to the islands. These findings offer new insights into multiple mechanisms by which colour polymorphism can arise and be maintained within native and invasive contexts.] Address: Gering, E.J., Integrative Biology, University of Texas at Austin, 1 University Station C0930, Austin, TX 78712, USA

18307. Graf, W.; Chovanec, A.; Hohensinner, S.; Leitner, P.; Schmidt-Kloiber, A.; Waringer, J.; Ofenböck, G. (2013): Das Makrozoobenthos als Indikatorgruppe zur Bewertung großer Flüsse unter Einbeziehung auenökologischer Aspekte. Österreichische Wasser- und Abfallwirtschaft 65(12): 386-399. (in German, with English summary) ["With the guideline 2000/60/EG, which called for the creation of a framework on water policy, the environmental policy of the European Community took on a new dimension. The goal of the guideline is (among others) the creation of a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater in order to avoid their deterioration; and to protect and improve the status of aquatic ecosystems, their associated land ecosystems directly dependent on them, and wetlands in terms of their water budget. Thanks to various forms of use, e.g. hydropower production, flood protection and ship traffic, especially major European rivers like the Danube, Rhine and Elbe have changed massively from their original typological characteristics. Reference conditions are hardly anywhere to be found, many native species are now extinct, and river biotopes are often dominated by invasive species. The size and depth of these rivers also pose challenges in terms of taking samples, and it has also become apparent that all methods currently used to assess rivers' ecological status focus solely on the main channels; the various habitats to be found in large rivers' riparian systems aren't taken into account. However, there is international consensus that these systems are key elements in rivers' processes and biodiversity, and as such are significant for the continuing functionality of major rivers. In the context of an Austrian Ministry of Life-funded research project, the Institute of Hydrobiology and Aquatic Ecosystem Management's Working Group on Benthic Ecology and Ecological Status Assessment, together with the University of Vienna and the Environment Agency Austria, is currently working to develop a practice-oriented riparian zone index based on macrozoobenthos as an indicator of quality. To date, Europe has no Water Framework Directive-compliant assessment systems for riparian zones. Given the fact that established methods are limited to river's main channels, precluding a holistic view of and approach to river ecosystems, this project represents a pioneering work in the field of European water resource management.] Address: Chovanec, A., Umweltbundesamt, Spittelauer Lände 5, 1090, Wien, Austria. E-mail: andreas.chovanec@umweltbundesamt.at

18308. Grether, G.F.; Anderson, C.N.; Drury, J.P.; Kirschel, A.N.G.; Losin, N.; Okamoto, K.; Peiman, K.S. (2013): The evolutionary consequences of interspecific aggression. Annals of the New York Academy of Sciences 1289(1): 48-68. (in English) ["Competition has always been a cornerstone of evolutionary biology, and aggression is the predominant form of direct competition in animals, but the evolutionary effects of aggression between species are curiously understudied. Only in the past few years, existing theoretical frameworks have been extended to include interspecific aggression, and significant empirical advances have been made. After arguing that agonistic character displacement (ACD) theory provides the most suitable theoretical framework, we review new empirical evidence for ACD and the results of mathematical models of the process. We consider how ACD can be distinguished empirically from ecological and reproductive character displacement and the additional challenges posed by developmental plasticity. We also provide the first taxonomically broad review of theoretical and empirical work on the effects of interspecific aggression on species coexistence and range limits. We conclude by highlighting promising directions for future research on the evolutionary effects of interspecific aggression." Hetaerina (Authors)] Address: Grether, G.F., Dept Ecology & Evolutionary Biology, 621 Charles E. Young Drive South, Univ. of California, Los Angeles, CA 90095-1606. ggrether@ucla.edu

18309. Guillermo-Ferreira, R.N. (2013): Morfologia funcional da coloração das asas em Odonata. Dissertation, Tese apresentada à Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto da Universidade de São Paulo: IX + 150 pp. (in Portuguese, with English and Spanish summaries) ["In Nature, animals carry particularities such as courtship and territorial behaviors which show their conspicuous coloration and call the attention of scientists since the primordial ages of biological sciences. Several animal groups exhibit coloration patterns which are used as intraspecific signals for communication. These signals can be derived from pigments, structural colors, fluorescence and bioluminescence. Although such signals have been studied for more than a century, the functional morphology of colorful characters in animals have been underexplored. Therefore, this thesis had the goal of studying the morphology and optical properties of

sexual ornaments in insects of the order Odonata, regarding their function in reproductive and territorial behavior. Three Neotropical species of Odonata were used as models in this study: Chalcopteryx scintillans (Polythoridae), Zenithoptera lanei (Libellulidae) and Mnesarete pudica (Calopterygidae). The results obtained show the relationship between coloration and behavior in these species, suggesting that wing structures and pigmentation are signals used by these animals during sexual recognition, territorial contests and courtship behavior, with the potential role of individual quality indicators." (Author)] Address: Guillermo-Ferreira, R., Depto de Biol., Fac. de Filosofia, Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto, SP, Brazil. E-mail: rhainerguillermo@yahoo.com.br

18310. Ha, N.S.; Truong, Q.T.; Goo, N.S.; Park, H.C. (2013): Relationship between wingbeat frequency and resonant frequency of the wing in insects. Bioinspiration & Biomimetics 8(4):046008. 12 pp. (in English) ["In this study, we experimentally studied the relationship between wingbeat frequency and resonant frequency of 30 individuals of eight insect species from five orders: Odonata (Sympetrum flaveolum), Lepidoptera (Pieris rapae, Plusia gamma and Ochlodes), Hymenoptera (Xylocopa pubescens and Bombus rupestric), Hemiptera (Tibicen linnei) and Coleoptera (Allomyrina dichotoma). The wingbeat frequency of free-flying insects was measured using a high-speed camera while the natural frequency was determined using a laser displacement sensor along with a Bruel and Kjaer fast Fourier transform analyzer based on the base excitation method. The results showed that the wingbeat frequency was related to body mass (m) and forewing area (A_f), following the proportionality $f \sim m^{1/2}/A_f$, while the natural frequency was significantly correlated with area density ($f_0 \sim m_w/A_f$, m_w is the wing mass). In addition, from the comparison of wingbeat frequency to natural frequency, the ratio between wingbeat frequency and natural frequency was found to be, in general, between 0.13 and 0.67 for the insects flapping at a lower wingbeat frequency (less than 100 Hz) and higher than 1.22 for the insects flapping at a higher wingbeat frequency (higher than 100 Hz). These results suggest that wingbeat frequency does not have a strong relation with resonance frequency: in other words, insects have not been evolved sufficiently to flap at their wings' structural resonant frequency. This contradicts the general conclusion of other reports—that insects flap at their wings' resonant frequency to take advantage of passive deformation to save energy." (Authors)] Address: Ha, N.-S.,Biomimetics & Intelligent Microsystem Lab., Dept Advanced Technology Fusion, Division of Interdisciplinary Studies, Konkuk University, Seoul 143-701, Korea

18311. Hutter, G.; Graf, W.; Weichselbaumer, P. (2013): Gewässerzustand und tierische Besiedelung der Fließgewässer der Vorarlberger Jagdberggemeinden. Naturmonografie Jagdberggemeinden, Dornbirn: 193-206. (in German, with English summary) ["Due to topography the aquatic ecosystem at the Jagdberggemeinden is heterogeneous and water courses range from higher regions(1985 m above sea level) to the lowland (480 m); its total length covers 34 kilometers. About 40 % of streams and rivers are morphologically unaffected. The remaining sections are heavily impaired by various constructions. Nevertheless rivers and brooks are densely populated with aquatic invertebrates. Within the most sensitive insect orders EPT (Ephemeroptera, Plecoptera and Trichoptera) 94 different species are currently known from the area." (Authors) In addition, Cordulegaster boltonii is listed for the Kirchenbach.] Address: Hutter, G., Institut für Umwelt & Lebensmittelsicherheit des Landes Vorarlberg, Montfortstr. 4, 6901 Bregenz, Austria

18312. Iqbal, M.A.; Rizvi, S.A.; Akhter, M.A. (2013): The Dragonflies (Odonata. Anisoptera) of Sindh, Pakistan. LAP Lambert Academic Publishing: 100 pp. (in English) ["Dragonflies are predators, they themselves are subject to predation by frogs, spiders, fish, water bugs, birds, lizards, and even other large dragonflies. Dragonflies have great agricultural importance because they are voracious predators of those insects which are pest of many field crops. In the present studies about 600 specimens of the order Odonata were collected from the various localities, include sixteen species belonging to eleven genera, representing three families, two subfamilies of the suborder Anisoptera, and were described in detail with special reference to their male and female genitalia from Sindh, Pakistan. The research techniques and information are helpful for graduate and research students of Zoology, Entomology & Agricultural Sciences." (Publisher)

18313. Janssens, L.; Stoks, R. (2013): Predation risk causes oxidative damage in prey. Ecology letters 9(4): 20130350: 4 pp. (in English) ["While there is increasing interest in non-consumptive effects of predators on prey, physiological effects are understudied. While physiological stress responses play a crucial role in preparing escape responses, the increased metabolic rates and shunting of energy away from other body functions, including antioxidant defence, may generate costs in terms of increased oxidative stress. Here, we test whether predation risk increases oxidative damage in Enallagma cyathigerum damselfly larvae. Under predation risk, larvae showed higher lipid peroxidation, which was associated with lower levels of superoxide dismutase, a major antioxidant enzyme in insects, and higher superoxide anion concentrations, a potent reactive oxygen species. The mechanisms underlying oxidative damage are likely to be due to the shunting of energy away from antioxidant defence and to an increased metabolic rate, suggesting that the observed increased oxidative damage under predation risk may be widespread. Given the potentially severe fitness consequences of oxidative damage, this largely overlooked non-consumptive effect of predators may be contributing significantly to prey population dynamics." (Authors)] Address: Janssens, Lizanne, Laboratory of Aquatic Ecol., Evol. & Conserv., Univ. Leuven, Deberiotstr. 32, 3000 Leuven, Belgium. E-mail: lizanne.janssens@bio.kuleuven.be

18314. Johansson, H (2013): Fish stocking and its effect on biodiversity in Hökensås area: A comparison of invertebrate fauna between lakes. BcS. Student thesis: 22 pp. (in Swedish, with English summary) ["Pisciculture has been

shown to affect biodiversity negatively, e.g. owing to increased nutrient loading and modified genetic set by breeding at other qualities then what is advantageous in in the wild. The purpose of this study was to investigate which impact stocked fish has on the invertebrate fauna and thereby biodiversity. The study is performed at Hökensås area in Västra Götalands län, where there are about 20 lakes included in a sport fishing business. There are seven lakes included in the study; four which yearly became stocked with fish and three non-stocked. By bottom fauna samples invertebrate fauna has been collected, identified, counted and measured [including "Odonata"]. No significant differences have been detected between the lake groups considering diversity index, number of taxa or size of taxa. Nor has significant correlation between amount stocked fish/year- and (a) diversity index, (b) number of taxa been shown. A possible factor that may have affected the result is, from a statistical point of view, the low number of lakes, the varying qualities of the lakes and that the collecting of invertebrate fauna was performed too early in the year than optimal. Strong correlation between number of taxa and grade of acidification was detected." (Author)] Address: Johansson, Hanna, University of Skövde, School of Life Sciences

18315. Jones, T.A.; Chumchal, M.M.; Drenner, R.W.; Timmins, G.N.; Nowlin, W.H. (2013): Bottom-up nutrient and top-down fish impacts on insect-mediated mercury flux from aquatic ecosystems. Environmental Toxicology and Chemistry 32(3): 612-618. (in English) ["Methyl mercury (MeHg) is one of the most hazardous contaminants in the environment; it adversely affects the health of both wildlife and humans. Recent studies have demonstrated that aquatic insects biotransport MeHg and other contaminants to terrestrial consumers, but the factors that regulate the flux of MeHg out of aquatic ecosystems via emergent insects have not been studied. We used experimental mesocosms to test the hypothesis that insect emergence [Libellulidae] and the associated flux of MeHg from aquatic to terrestrial ecosystems is affected by both bottom-up nutrient effects and top-down fish consumer effects. In the present study, nutrient addition led to an increase in MeHg flux primarily by enhancing the biomass of emerging insects whose tissues were contaminated with MeHg, whereas fish decreased MeHg flux primarily by reducing the biomass of emerging insects. Furthermore, we found that these factors are interdependent such that the effects of nutrients are more pronounced when fish are absent, and the effects of fish are more pronounced when nutrient concentrations are high. The present study is the first to demonstrate that the flux of MeHg from aquatic to terrestrial ecosystems is strongly enhanced by bottom-up nutrient effects and diminished by top-down consumer effects." (Authors)] Address: Chumchal, M.M., Biology Dept, Texas Christian University, Fort Worth, Texas, USA. E-mail: m.m.chumchal@tcu.edu

18316. Karjalainen, S. (2013): Sudenkorentojen kolmois-tandemit: havaintoja Suomesta [Dragonflies in triple tandem: records from Finland]. Crenata 6: 17-19. (in Finnish, with English summary) ["This paper lists all known Finnish records of dragonflies in triple tandem. A total of nine records are known. They concern the following species: Calopteryx splendens, C. virgo, Lestes sponsa, Sympetrum danae, Leucorrhinia dubia and L. rubicunda. In two of the cases the triple connection was heterospecific." (Authors)] Address: Karjalainen, S., Neidonpuistontie 6 D 8, FI–02400 Kirkkonummi, Finland. Email: sk@korento.net

18317. Kitagawa, K.; Katatani, N. (2013): Notes on the odonate fauna of Southeast Asia Part 3. Amphipterygidae 1 (Genus Devadatta). Aeschna 49: 47-56. (in Japanese, with English summary) ["This is the third report of Southeast Asian Odonata of the genus Devadatta of the family Amphipterygidae. Six species and 2 subspecies are known; D. argyoides argyoides, D. argyoides tiomanensis, D. cyanocephala, D. ducarix, D. glaucinotata, D. multinervosa, D. podolestoides podolestoides and D. podolestoides basilanesis. D. multinervosa found in Laos and the female of D. podolestoides basilanensis distributed in the Philippines are not observed. The feature of the color pattern of the body, the caudal appendages of male and the distal abdominal segments of female are shown by photographs. The observations on these species and their distribution are also shown." (Authors)] Address: Kitagawa, K., Imaiti 1-11-6, Asahi-ku, Osaka C., Osaka, 535-0011, Japan

18318. Kolaríková, K.; von Tümpling, W.; Bartels, P. (2013): Bioaccumulation of HCH isomers in selected macroinvertebrates from the Elbe River: sources and environmental implications. Environmental Monitoring and Assessment 185(5): 4333-4346. (in English) ["Sediments of the Elbe River have been extremely polluted by contaminants originating from previous large-scale hexachlorocyclohexane (HCH) production and the application of γ-HCH (lindane) in its catchment in the second half of the twentieth century. In order to gain knowledge on bioaccumulation processes at lower trophic levels, field investigations of HCHs in macroinvertebrates were carried out along the longitudinal profile of the Elbe and tributary. Among the sites studied, concentrations in macroinvertebrates ranged within five orders of magnitude (0.01–100 µg/kg). In general, lower values of HCH isomers were observed at all Czech sites (mostly <1 µg/kg) compared with those in Germany. At the most contaminated site, Spittelwasser brook (a tributary of the Mulde), extremely high concentrations were measured (up to 234 µg/kg a-HCH and 587 µg/kg ß-HCH in Hydropsychidae). In contrast, the Obríství site, though also influenced by HCH production facilities, showed only negligibly elevated values (mostly <1 µg/kg). Results showed that fairly high levels of a-HCH and ß-HCH compared to ?-HCH can still be detected in aquatic environments of the Elbe catchment, and these concentrations are decreasing over time to a lesser extent than γ-HCH. Higher HCH concentrations in sediments in the springtime are considered to be the result of erosion and transport processes during and after spring floods, and lower concentrations at sites downstream are thought to be caused by the time lapse involved in the transportation of contaminated particles from upstream. In addition, comparison with fish (bream) data from the literature

revealed no increase in tissue concentrations between invertebrates and fish." (Authors)] Address: Kolaríková, Katerina, Institute for Environmental Studies, Charles University, Benátská 2, 128 01, Praha 2, Czech Republic. E-mail: katerina.kolarikova@natur.cuni.cz

18319. Kremer, P. (2013): Entwicklung, Interpretation und Vergleich von ökologischen Nischenmodellen ausgewählter Segellibellen (Odonata: Libellulidae) in Deutschland. Wissenschaftliche Prüfungsarbeit gemäß §12 der Landesverordnung über die Erste Staatsprüfung für das Lehramt an Gymnasien vom 07. Mai 1982, in der derzeit gültigen Fassung der Johannes Gutenberg-Universität in Mainz, Fach: Biologie: 90 pp. (in German) ["The ecological niche is defined as an n-dimensional hyperspace composed of the sum of all abiotic and biotic environmental factors in which a species can survive and reproduce. Each living being has its specific ecological niche, limited by the total amount of tolerance areas, which can be modelled by known information about a species. Dragonflies are considered bioindicators that indicate the condition of water bodies and make the influence of climate change clear through migration. On the one hand, they are of great ecological importance, and on the other hand, there is a very high level of knowledge about these relatively large insects. Therefore, they are very suitable objects for niche modelling. Libellulidae are the most species-rich family within the Anisoptera. In this work, I created ecological niche models for nine of the 22 species of damselfly found in Germany. I was interested in whether it is generally possible to create niche models for dragonflies. I also checked how well the models can predict the actual distribution and how differences in the quality of the models come about. I then investigated whether the models could be transferred to other geographical areas. The study area comprised the eight southern German states of Baden-Württemberg, Bavaria, Rhineland-Palatinate, Saarland, Hesse, Thuringia, Saxony and North Rhine-Westphalia. Abiotic environmental parameters and distribution data of the species at mixed table leaf level were used as prediction parameters. The study period covers the years 1991 to 2006. 127 initial parameters were used, which were tested for correlation in pairs. There remained 61 and 62 independent parameters, respectively, which were used in the calculation of the models. The model calculation was carried out with the Maximum Entropy Method (MaxEnt). In order to incorporate the strongly correlated climate parameters into the models, four basic models were first created for each species. The climate parameters used were adapted to the life cycle of the dragonflies and were tested individually in the basic models. The basic models were gradually reduced to a few parameters and a final model was created for each of the nine species. The results were validated both in the study area (internally) and in the five northern federal states of Saxony-Anhalt, Brandenburg, Lower Saxony, Schleswig-Holstein and Mecklenburg-Western Pomerania (externally). For validation, the average AUC value, kappa, sensitivity and specificity were determined. The results varied greatly in terms of quality (AUC values between 0.518 and 0.968). Two models had very low quality. For seven species, I was able to model the ecological niche and it was possible to create raster maps with distribution predictions of good to very good quality for the study area. The model parameters could be explained with the help of the habitat requirements of the respective species. A correlation was found between the AUC values and the number of occupied survey table sheets of the respective species. The more frequently the species occurred in the study area, the lower the AUC values achieved. This could explain the differences in model quality. For the external validation area, only very low values for sensitivity and kappa were achieved. It was not possible to transfer the model to the validation area and produce raster maps with distribution predictions. For dragonflies in general, several relevant parameters could be identified. Temperature plays the decisive role. Especially for the endangered and threatened species, models of high quality could be created, which makes it possible to identify habitats worth protecting and to stop their destruction or to renature them." (Author, DeepL)] Address: not stated

18320. Labroche, A. (2013): La diversité odonatologique des étangs Cagneaux. Bulletin de la Société d'Histoire Naturelle des Ardennes 102(2012): 86-99. (in French) [Les étangs Cagneaux, Saint-Marcel, NW of Charleville-, France. Between 2003-2012, a total of 32 species was recorded, including Epitheca bimaculata and Leucorrhinia caudalis (11-VI-2003), is discussed in details with focus on its habitat requirements, and the red-listed Aeshna grandis, A. isoceles, Gomphus vulgatissimus, Cordulegaster boltonii boltonii, Somatochlora metallica metallica and Epitheca bimaculata are outlined from a regional point of view.] Address: Labroche, A., 8a rue de Guépin, 08460 Saint-Marcel, France. E-mail: aurelienlabroche@gmail.com

18321. Laltanpuii; Mathai, M.T.; Gurusubramanian, G.; Lalremsanga, H.T.; Kumar, N.S. (2013): Diversity of Libellulidae (Insecta: Odonata) in Mizoram, northeast India. In: K. Khelchandra Singh, Kulendra C. Das & H. Lalruatsanga (eds.): Bioresources and Traditional Knowledge of Northeast India: 236-239. (in English) ["In the present study, 28 species of libellulidea belonging to genus Acisoma, Aethriamanta, Bradinopyga, Brachydiplax, Brachythemis, Cratillia, Crocothemis, Diplacodes, Neurothemis, Orthetrum, Pantala, Potamarcha, Rhyothemis, Tetrathemis, Tramea, Trithemis and Tholymis were collected and their distribution along the altitudinal range has been recorded for the first time in Mizoram. Among the species recorded during the present study, 10 species belonging to 8 genera were recorded for the first time in Mizoram. Crocothemis servilia, Trithemis festiva, T. aurora, Orthetrum glaucum, O. pruinosum and Pantala flavescens were the dominant species in all the surveyed sites. Five species, namely - Acisoma paranorpoids, Tramea basilaris, Diplacodes nebulosa, Brachydiplax sorbina and B. chalybea were found only in the lower altitudes less than 100 m above sea level. Trithemis pallidinervis was found only in high altitude more than 1000 m above sea level.] Address: Laltanpuii, Dept of Zoology, Madras Christian College, Tambaram, Chennai - 600 059, India. E-mail: laltetei@yahoo.co.in

18322. MacColl, A.D.C.; El Nagar, A.; de Roij, J. (2013): The evolutionary ecology of dwarfism in three-spined sticklebacks. Journal of Animal Ecology 82(3): 642-652. (in English) ["Body size is a defining phenotypic trait, but the ecological causes of its evolution are poorly understood. Most studies have considered only a single putative causal agent and have failed to recognise that different environmental agents are often correlated. Darwin suggested that although trait variation across populations is often associated with abiotic variation, evolution is more likely to be driven by biotic factors correlated with the abiotic variation. This hypothesis has received little explicit attention. We use structural equation modelling to quantify the relative importance of abiotic (pH, metal concentrations) and biotic (competition, predation) factors in the evolution of body size in three-spined sticklebacks Gasterosteus aculeatus on the island of North Uist, Scotland. We combine phenotypic data from multiple isolated populations, detailed characterisation of their environment and a common garden experiment that establishes the genetic basis of size differences. Three-spined sticklebacks on North Uist show almost unprecedented intraspecific evolution of body size that has taken place rapidly (<16 000 years). The smallest fish mature at only 7% of the mass of ancestral, anadromous fish. Dwarfism is associated with reduced abundance of a smaller competitor species, the nine-spined stickleback Pungitius pungitius, and with low pH indicative of poor resource conditions. Dwarfism also tends to occur where an important predator, the brown trout Salmo trutta, is also small. The abundance of P. pungitius and the size of S. trutta are themselves related to underlying abiotic environmental variation. Despite the close association between abiotic and biotic factors across populations, our results support Darwin's hypothesis that biotic factors, associated with variation in the abiotic environment, are more important in explaining evolution than is abiotic variation per se. This study demonstrates the importance of considering the relationships between environmental variables before conclusions can be drawn about the causes of (body size) evolution on islands." (Authors) Aeshna juncea and Sympetrum spp. larvae are present at low density where there is emergent vegetation, which is rare in the North Uist lochs.] Address: MacColl, A., School of Biology, Univ. Nottingham, University Park, Nottingham, UK. E-mail: andrew.maccoll@nottingham.ac.uk

18323. Macedo, M.N.; Coe, M.T.; DeFries, R.; Uriarte, M.; Brando, P.M.; Neill, C.; Walker, W.S. (2013): Land-use-driven stream warming in southeastern Amazonia. Philos. Trans. R. Soc. London B Biol. Sci. 368(1619): 9 pp. (in English) ["Large-scale cattle and crop production are the primary drivers of deforestation in the Amazon today. Such land-use changes can degrade stream ecosystems by reducing connectivity, changing light and nutrient inputs, and altering the quantity and quality of streamwater. This study integrates field data from 12 catchments with satellite-derived information for the 176 000 km² upper Xingu watershed (Mato Grosso, Brazil). We quantify recent land-use transitions and evaluate the influence of land management on streamwater temperature, an important determinant of habitat quality in small streams. By 2010, over 40 per cent of catchments outside protected areas were dominated (greater than 60% of area) by agriculture, with an estimated 10 000 impoundments in the upper Xingu. Streams in pasture and soya bean watersheds were significantly warmer than those in forested watersheds, with average daily maxima over 4°C higher in pasture and 3°C higher in soya bean. The upstream density of impoundments and riparian forest cover accounted for 43 per cent of the variation in temperature. Scaling up, our model suggests that management practices associated with recent agricultural expansion may have already increased headwater stream temperatures across the Xingu. Although increased temperatures could negatively impact stream biota, conserving or restoring riparian buffers could reduce predicted warming by as much as fivefold." The paper includes a passing reference to Odonata: Batista (2010); https://www.locus.ufv.br/handle/123456789/7837 (Authors)] Address: Macedo, Marcia, Woods Hole Research Center, Falmouth, MA 02540, USA. Email: mmacedo@whrc.org

18324. Mauersberger, R.; Brauner, O.; Petzold, F.; Kruse, M. (2013): Die Libellenfauna des Landes Brandenburg. Naturschutz und Landschaftspflege in Brandenburg 22(3/4): 168 pp. (in German) [Federals state Brandenburg, Germany: checklist of species, phenology, habitats and regional distribution (maps) are outlined in detail.] Address: Mauersberger, R., Bahnhofstr. 24, D-17268 Templin, Germany. E-mail: Foerderverein_Ueckermark.Seen@t-online.de

18325. McGoff, E.; Aroviita, J.; Pilotto, F.; Miler, O.; Solimini, A.G.; Porst, G.; Jurca, T.; Donohue, L.; Sandin, L. (2013): Assessing the relationship between the Lake Habitat Survey and littoral macroinvertebrate communities in European lakes. Ecological Indicators 25: 205-214. (in English) ["Implementation of the EU Water Framework Directive (WFD) has drawn much attention to hydromorphological alterations of surface waters. The Lake Habitat Survey (LHS) protocol provides a method for characterising and assessing the physical habitats of lakes and reservoirs. Two metrics were developed based on this method: the Lake Habitat Modification Score (LHMS) and the Lake Habitat Quality Assessment (LHQA), as measures of lake modification and habitat value, respectively. However, the use of these metrics to predict measures of ecological quality remains largely untested. Thus, we assessed the relationships between LHS metrics and the littoral macroinvertebrate community in 42 lakes across Europe. A significant relationship was found between littoral macrophyte descriptors and riparian natural land cover variables of the LHQA score and macroinvertebrate community composition in 2 out of 4 European regions. No relationship was found between macroinvertebrate community composition and the LHMS. Some significant correlations were found between selected macroinvertebrate metrics and the LHS scores, but this pattern was not consistent across regions, and no relationship was found with the overall LHMS or LHQA scores. This demonstrates that the LHS metrics do not consistently predict the quality

of littoral macroinvertebrate communities across Europe, and a region specific approach may be necessary. However, we could demonstrate a relationship between the site specific LHS variables and the macroinvertebrate community at the site level, and in some cases at the regional level. Therefore, although the LHS metrics do not appear to be a useful for relating habitat quality and pressure to littoral macroinvertebrate communities, selected LHS variables may exhibit stronger relationships with the biota." (Authors) Indices include "Odonata".] Address: McGoff, Elaine, Department of Aquatic Sciences & Assessment, Swedish University of Agricultural Sciences (SLU), P.O. Box 7050, SE 750 07 Uppsala, Sweden. E-mail: elaine.mcgoff@slu.se

18326. Meng, X.G.; Sun, M. (2013): Aerodynamic effects of wing corrugation at gliding flight at low Reynolds numbers. Phys. Fluids 25, 071905 (2013); doi: 10.1063/1.4813804: 15 pp. (in English) ["Corrugation gives an insect-wing the advantages of low mass, high stiffness, and low membrane stress. Researchers are interested to know if it is also advantageous aerodynamically. Previous works reported that corrugation enhanced the aerodynamic performance of wings at gliding flight. However, Reynolds numbers considered in these studies were higher than that of gliding insects. The present study showed that in the Reynolds number range of gliding insects, corrugation had negative aerodynamic effects. We studied aerodynamic effects of corrugation at gliding motion using the method of computational fluid dynamics, in the Reynolds number range of Re = 200–2400. Different corrugation patterns were considered. The effect of corrugation on aerodynamic performance was identified by comparing the aerodynamic forces between the corrugated and ?at-plate wings, and the underlying flow mechanisms of the corrugation effects were revealed by analyzing the flow fields and surface pressure distributions. The findings are as follows: (1) the effect of corrugation is to decrease the lift, and change the drag only slightly at 15°–25° angles of attack, lift is decreased by about 16%; at smaller angles of attack, the percentage of lift reduction is even larger because the lift is small). (2) Two mechanisms are responsible for the lift reduction. One is that the pleats at the lower surface of the corrugated wing produce relatively strong vortices, resulting in local low-pressure regions on the lower surface of the wing. The other is that corrugation near the leading edge pushes the leading-edge-separation layer slightly upwards and increases the size of the separation bubble above the upper surface, reducing the “suction pressure,” or increasing the pressure, on the upper surface." (Authors)] Address: Sun, M., Ministry-of-Education Key Laboratory of Fluid Mechanics, Beijing University of Aeronautics and Astronautics, Beijing 100191, China

18327. Mikolajczuk, P. (2013): New sites of Pygmy Damselfly Nehalennia speciosa (Charpentier, 1840) (Odonata: Coenagrionidae) in the southern part of Podlasie with notes on ecology and species mobility. Odonatrix 9(1): 1-12. (in Polish, with English summary) ["The Author discusses 7 new sites of N. speciosa in the southern Podlasie (central-eastern Poland). Two of them (no. 4 and 5) are situated within agricultural landscape and have no forest buffering zone. It shows that the environment without forest surrounding but with suitable spatial structure of vegetation – a key factor for N. speciosa – can be inhabited by this species. Microhabitat preferences of Pygmy Damselfly found during studies were interesting. Except for sedge species given in the literature as most preferable plant species by N. speciosa, at sites discussed in this paper the leading plant components for this species were Equisetum fluviatile (sites 4 and 5) and Eriophorum vaginatum (site 2). These are, respectively, only the fourth and second confirmed records of this kind in Poland. At two sites within the study area imagines as well as larval development in larger patches of Carex vesicaria (site 6 in this paper) were also found. Moreover, at one of them, many larvae were collected in the aggregation of Eriophorum angustifolium. At both known sites with E. vaginatum imagines were present in its clumps while larvae – at their bases and probably in spaces between, with flooded Sphagnum. These are the examples of inconsiderable spatial separation of larval and imaginal habitats although they were close. The similar situation was found in south-eastern Poland, where Molinia caerulea grew on land in the direct neighbourhood to a flooded peat bog excavation. Carex elata as the leading plant component was found at one of the sites from eastern Mazowsze. The clumps of C. elata were not massive and did not display typical hummock-hollow structure. Loose clump formations of Carex sp. (C. elata probably) are also known at one site in south-eastern Poland. All of these observations confirm that ecological plasticity and habitat spectrum of N. speciosa are bigger than previously thought. Presented data shows the ability of N. speciosa for the colonization of new sites. Site 3 was not the place of development: the observed individuals are the example of dispersion. However, site 2 had originally the character of a bog forest with large trees. Suitable conditions appeared there until 2011 due to a record increase in groundwater level and the death of almost all the trees – the site was colonized in this year. Distance from the nearest active site is ca. 400 and 700 m. Therefore N. speciosa is fully mobile, at least for close distances (ca. 1 km) and certainly these are not exceptional cases. Many sites of N. speciosa in southern Podlasie dry up party or entirely during dry summers. At some of them the periods without water could be longer than hydration periods. It is not clear whether the presence of the species in many of these sites is the result of surviving by the larvae unfavourable hydrological conditions, or rather the result of colonization. Clarification of this issue should provide further observations of dried sites in the year 2012." (Author)] Address: Mikolajczuk, P., ul. Partyzantów 59c/26, 21-560 Miêdzyrzec Podlaski, Poland. E-mail: gugapm@wp.pl

18328. Miler, O.; Porst, G.; McGoff, E.; Pilotto, F.; Donohue, L.; Jurca, T.; Solimini, A.; Sandin, L.; Irvine, K.; Aroviita, J.; Clarke, R.; Pusch, M.T. (2013): Morphological alterations of lake shores in Europe: A multimetric ecological assessment approach using benthic macroinvertebrates. Ecological Indicators 34: 398-410. (in English) ["Besides pollution, lakes are affected by human alterations of lake-shore morphology.

However, ecological effects of such alterations have rarely been studied systematically. Hence, we developed tools to assess the ecological effects of anthropogenic morphological alterations on European lake-shores based on pressure-specific response patterns of littoral macroinvertebrate community composition. Littoral invertebrates were sampled from 51 lakes in seven European countries. Sampling covered a range of natural to heavily morphologically degraded sites including natural shorelines, recreational beaches, ripraps and retaining walls. Biological data were supplemented by standardized morphological data that were collected via a Lake Habitat Survey (LHS) protocol and subsequently used to develop a morphological stressor index.Two biotic multimetric indices were developed based on habitat-specific samples (Littoral Invertebrate Multimetric based on Habitat samples, LIMHA) and composite samples (Littoral Invertebrate Multimetric based on Composite samples, LIMCO) through correlations with the morphological stressor index. Similarity analyses showed strong spatial differences in macroinvertebrate community composition between four main geographical regions, i.e. Western, Northern, Central and Southern Europe. The morphological stressor index as well as LIMCO and LIMHA have been developed for each geographical region specifically,thereby optimizing correlations of LIMCO and LIMHA with the respective morphological stressor index.The metric composition of LIMCO and LIMHA and their correlation coefficients with the morphological stressor index are comparable to existing national and regional methods that assess morphological lakeshore degradation via macroinvertebrate communities. Hence, LIMCO and LIMHA indices constitute a new stressor-specific assessment tool that enables comparable lake morphology assessment across Europe, as it has been developed involving a uniform methodology followed by regionalized optimization. These tools fulfil the standards of the EU Water Framework Directive and thus may complement existing assessment approaches used in lake monitoring focusing solely on lake eutrophication so far." (Authors) The index includes "Odonata".] Address: Miler, O., Leibniz Institute of Freshwater Ecol. & Inland Fisheries (IGB), Müggelseedamm 301, 12587 Berlin, Germany. E-mail: oliver.miler@web.de

18329. Mohammed, I.F.A.; Al-Asady, H.S. (2013): External morphological study of Sympetrum decoloratum Selys (Odonata: Libellulidae). Ibn Al-Haitham Journal for Pure and Applied Science 26(1): 34-45. (in Arabian, with English summary) [The morphology of S. decoloratum is outlined and figured in detail.] Address: Al-Asady, H.S., Dept. of Biology/College of Education for Pure Science(Ibn-Al Haitham)/ University of Baghdad, Iraq

18330. Monvoisin, C. (2013): Etude des cortèges d'Anisoptères des cours d'eau et de l'implication des microhabitats ligneux dans leur répartition. Rapport de stage Master 1 Patrimoine Naturel et Biodiversité, UFR SVE: 23 pp. (in French) ["The study was carried out on sections of four rivers in the Pays de la Loire region: the Sèvre nantaise (between the Grossière bridge and Terbin, in Boussay), the upstream part of the Erdre (between Nort sur Erdre and Joué sur Erdre), the Huisne (between Saint Mars La Brière and Monfort le Gesnois and between Brêteau and Vouvray sur Huisne), and the upstream part of the Mayenne (between Gué de Loré and la Frételière). Conclusion: Anisopteran species and their environment are linked by complex relationships that are difficult to define. Multiple factors are involved throughout their life cycle. The effects of certain variables such as the nature of the sediments, the nature and presence of hydrophytes, helophytes, herbaceous plants as well as the physico-chemical quality of the water have yet to be studied on these rivers. Furthermore, the sampling carried out could not be standardised in terms of the total length of bank surveyed per river, so comparisons between sites seem less relevant. Research must be continued over several years and several rivers to try to define the factors involved in the presence of particular species of Anisoptera." (Author, DeepL) Boyeria irene, Oxygastra curtisii, Gomphus pulchellus, G. vulgatissimus, Onychogomphus forcipatus] Address: not stated

18331. Morgenstern, R. (2013): Vergleich von Nischenmodellen bei Libelluliden (Odonata). Diplomarbeit Johannes-Gutenberg Universität Mainz Fachbereich Biologie. Institut für Zoologie, Abteilung Ökologie, Johann-Joachim-Becherweg 13, 55128 Mainz: 58 pp, appendix- (in German) ["The concept of the ecological niche, established by Hutchinson in 1958, is still relevant today. The underlying principle, namely that a species has a certain fitness along the gradients of certain environmental parameters, is used in current studies to predict, for example, the distribution or the change in distribution of a species under certain conditions. In this work, I investigated the similarities and differences of niche models within two genera of the damselfly family. I also tested whether species with more occurrences or rarer species could be modelled better. For this purpose, I first collected data on topography, land use, landforms and climate for all federal states in Germany, in addition to occurrence data for the 13 species of the two genera Orthetrum and Sympetrum. From these raw data, I created 127 prognostic variables, which were then tested for correlation with each other in order to use only parameters in the models that do not correlate with each other. This allowed me to calculate five seasonally different niche models for each species using MaxEnt software and validate the best ones internally and externally. For this purpose, I chose central and southern Germany as the internal model creation space and northern Germany as the external validation space. The specificity, sensitivity and kappa value were used for validation. It turned out that all models produced an AUC value (goodness of fit measure from 0 to 1) above 0.5, which made them better than a model based on random predictions. However, only for the less widespread species were very good niche models found with AUC values above 0.7. These good models used temperature parameters most often, indicating the thermophily of damselflies, because as temperatures increased, so did the probabilities of occurrence. In addition, it became apparent that soil pH values seem to play a greater role than previously assumed, as these also very often played an important role in the niche models. However, the models created for Central and

Southern Germany did not transfer so well to the external validation area of Northern Germany, which could probably be due to the very different characteristics of the two areas as well as the fact that a complete fitness curve, i.e. niche mapping, was not achieved for all parameters. As a conclusion, it can be said that the niche modelling of the damselflies was quite successful and that the results of this work were also found in the other genera of the family. For more comprehensive models that can be better transferred to unknown territory, a finer observation level, a larger study area, more specific parameters or a combination of these three is probably necessary. After all, Germany only represents a section of the total distribution of the species studied, and the chosen level of observation and the characteristics studied do not seem to lead to the desired results for all species." (Authors, DeepL)] Address: E-mail: robertmo@students.uni-mainz.de

18332. Noel, N. (2013): La Grande Aeshne en Normandie; Aeshna grandis (Linnaeus, 1758) (Odonata, Aeshnidae). L'Entomologiste Haut-Normand 3: 9-13. (in French) [A. grandis is a rare species in Normandy. Two main population nuclei are known in Normandy: one formed by populations located in the south of the Eure (Avre valley, Iton valley) and the Perche ornais and a second in the north of the Seine-Maritime (Bresle valley, in continuity with the populations present in Picardy). In 2013, in Normandy, sightings of the species relatively far from the sites where it was previously known are at the origin of this article. In Haute-Normandie, the species has been observed in new localities: - Commune of Canehan (76), in the Yères valley by Nicolas MOULIN (1 ♂, 23-VIII-2013). Observation located more than 25 km from the nearest site where the species is known (Bresle valley). - Commune of Heudreville-sur-Eure (27), in the Eure valley, by Adrien SIMON (1 ♂, on 30-VIII-2013 and 05-IX-2013). Observation located more than 35 km from the nearest known breeding site. - Commune de la Vieille-Lyre (27), in the Risle valley, by Nicolas NOEL (1 ♂, on 23-IX-2013 and 25-IX-2013). Observation located more than 12 km from the nearest known breeding site. - Commune of Guichainville, in the Iton valley (27), by Emmanuel MACE. Observation (05-VIII-2013) located more than 15 km from the nearest known breeding site.] Address: Noel, N. 2 rue des Andelys, 27380 Douville-sur-Andelle, France. E-mail: nicolas.noel27@orange.fr

18333. OPIE Franche-Compté (2013): Listes rouges régionales d'insectes de Franche-Comté: Libellules (Odonates), Criquets, Sauterelles et Grillons (Orthoptères), Papillons de jour (Rhopalocères & Zygènes) et Mantes (Mantidés). maison de l'environnement de Franche-Comté 7 rue Voirin - 25000 BESANCON: 16 pp. (in French) [Red list of Odonata from the Départements Doubs, Jura, Haute-Saône and Territoire de Belfort, the region in France bordering to the western border of Switzerland.] Address: OPIE Franche-Compté, maison de l'environnement de Franche-Comté, 7 rue Voirin - 25000 Besancon, France. E-mail: cbnfc@cbnfc.org; www.cbnfc.org

18334. Siepielski, A.M.; Wang, J.; Prince, G. (2013): Non-consumptive predator driven mortality causes natural selection on prey. Evolution 68(3): 696-704. (in English) ["Predators frequently exert natural selection through differential consumption of their prey. However, predators may also cause prey mortality through non-consumptive effects, which could cause selection if different prey phenotypes are differentially susceptible to this non-consumptive mortality. Here we present an experimental test of this hypothesis, which reveals that non-consumptive mortality imposed by predatory dragonflies causes selection on their damselfly prey favouring increased activity levels. These results are consistent with other studies of predator driven selection, however, they reveal that consumption alone is not the only mechanism by which predators can exert selection on prey. Uncovering this mechanism also suggests that prey defensive traits may represent adaptations to not only avoid being consumed, but also for dealing with other sources of mortality caused by predators. Demonstrating selection through both consumptive and non-consumptive predator mortality provides us with insight into the diverse effects of predators as an evolutionary force." (Authors)] Address: Siepielski, A.M., Dept Biol., Univ. San Diego, 5998 Alcala Park, San Diego, California 92110, USA. E-mail: adamsiepielski@sandiego.edu

18335. Simon, A. (2013): Précisions sur la répartition de la naïade aux yeux rouges: Erythromma najas (Hansemann, 1823), (Coenagrionidae, Odonata) en Haute-Normandie. L'Entomologiste Haut-Normand 3: 52-55. (in French) [E. najas is considered "exceptional" in Haute-Normandie and classified as "critically endangered" on the regional red list established in 2010 according to the methodology recommended by the IUCN. In the years following this assessment, targeted research on this species was undertaken and it was found that it was in fact somewhat more widespread than previously assumed. This article presents the new evidence gathered in recent years.] Address: Simon, A., 3, rue de la Bouillotte – 27350 Hauville, France. E-mail: simon.adrien1@voila.fr

18336. Soucek, D.J.; Levengood, J.M.; Gallo, S.; Hill, W.R.; Bordson, G.O.; Talbott, J.L. (2013): Risks to birds in the Lake Calumet region from contaminated emergent aquatic insects. RR Series (Illinois Sustainable Technology Center); RR-122: 76 pp. (in English) ["The highly industrialized Grand Calumet River basin includes an extensive wetlands complex that has been severely degraded through heavy industrial activity, sewage and industrial discharges, landfills, and hazardous waste storage/disposal. Sediments and other environmental media in this area are contaminated with heavy metals and organic compounds. Our objective was to empirically quantify risks to insectivorous birds in the Lake Calumet wetlands region from contaminated sediments via ingestion of aquatic insects using tree swallows (Tachycineta bicolor) as a model organism. To accomplish this objective, we completed the following tasks: (1) assessed organic contaminant transfer (polychlorinated biphenyls [PCBs], organochlorine pesticides, polybrominated diphenylethers [PBDEs]) from an aquatic ecosystem (sediment

and benthic macroinvertebrates) to a terrestrial food chain (tree swallows feeding on emergent aquatic insects), (2) quantified elemental contaminants in these locales and biota, (3) evaluated ecological effects these contaminants may have on tree swallows, comparing mercury loads and nesting ecology data at different sites as a case study, and (4) assessed the value of stable isotope data in determining how food chain length and food source (aquatic versus terrestrial, location of origin) affects contaminant loads in tree swallows nesting at Lake Calumet wetlands. With the exception of timing of nest initiation and other variables that are dependent on nest initiation timing (e.g., clutch size, and nestling mass), we observed no differences among sites in tree swallow nesting ecology endpoints. A variety of inorganic and organic contaminants were accumulated by nestlings via their insect diets, but concentrations of nearly all the contaminants were at the lower end of ranges in the literature. The exception to this trend was dichlorodiphenyldichloroethylene (DDE) concentrations in eggs and nestlings at Big Marsh which were among the higher reported values. To our knowledge, this paper is the first report of PBDEs concentrations in tree swallow nestlings. Our stable isotope analysis suggested a terrestrial origin for many of the contaminants as has been suggested by others." (Authors)] Address: not stated

18337. Susmita, G.; Sushmita, D.; Pinki, P. (2013): Use of aquatic insects in Water quality assessment of ponds around two cement factories of Assam, India. International Research Journal of Environment Sciences 2(7): 15-19. (in English) ["Present study was carried out using aquatic insects as bio monitors in a few ponds located near Badarpur and Bokajan cement factories, Assam, North East India. Study revealed presence of aquatic insect order Hemiptera, two families (Gerridae and Notonectidae) and three species (Anisops sp., Gerris sp. and Buenoa sp.) from the ponds located around Cement factory, Badarpur. Anisops sp. was found eudominant in all the ponds except pond 1 where Gerris sp. was eudominant. Ponds (pond 5 and 6) located around Bokajan Cement Factory revealed presence of two aquatic insect orders (Hemiptera and Odonata), five families (Notonectidae, Gerridae, Nepidae, Coenagrionidae and Libellulidae) and eight species (Gerris sp., Anisops sp., Limnometra sp., Ranatra sp., Pseudogrion sp., Ischnura sp., Libellula sp., Sympetrum sp.). In Pond 5, Gerris sp. was found eudominant . In Pond 6, Anisops sp. was found eudominant. In each of the five ponds diversity index (Shannon H' Log Base 10) values were found less than 1 where as signal values were found less than 5.5. Study reported low diversity and occurrence of only tolerant group of aquatic insects in the aquatic systems around the cement factories confirming the fact that aquatic insects are good indicator of water quality." (Authors)] Address: Susmita, G., Dept of Ecology & Environment Science, Assam Univ., Silchar-788004, India

18338. Tennessen, K. (2013): Gomphus lynnae (Columbia Clubtail) in New Mexico. Argia 25(3): 15. (in English) [Gila River, Grant County, New Mexico, 19-V-2013. Photo by Ken Tennessen. Owyhee River, Malheur County, Oregon, 10-VI-2013. Photo by Jim Johnson.] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

18339. Terzani, F.; Mazza, G.; (2013): 559 - Cordulegaster bidentata bidentata Selys, 1843 (Odonata Cordulegastridae). Boll. Soc. Entomol. Ital. 145 (1): I- (in Italian) ["Lazio: Prov. Viterbo, Acquapendente, loe. Il Sasseto, Torre Alfina, m 550, 5.VI.2010, Mazza G. legit, 1 female (Coll. Mus. St. Nat. Univ., Firenze)." (Authors)] Address: Terzani, F., Museo di Storia Naturale dell'Universita di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: libellula.ter@gmail.com

18340. Varshney, P.K.; Agrahari, R.K.; Singh, S.K.; Yadav, A.K.; Pandey, A.K. (2013): Biological diversity of live food spectrum at Maa Chandrika Devisite in upstream of river Gomti in Lucknow (India). Journal of Ecophysiology & Occupational Health 12(3/4) (2012): 113-127. (in English) ["An upstream location along the course of river Gomti in Lucknow, Maa Chandrika Devi, was identified for the present study. The water quality of the river at the site was moderate with mean DO 6.15 mgl^{-1} whereas nitrate (22.70 mgl^{-1}), phosphate (2.40 mgl^{-1}) and COD (48.72 mgl^{-1}) were high. The high concentration of nutrients as well as COD during pre-monsoon may be due to low precipitation and influx of effluents during summer. Phytoplanktons were represented by Chlorophyceae, Bacillariophyceae and Xanthophyceae. Phytoplankton mainly contributed by Gonatozygon (10.89%), Closteridium (30%), Cladophora (34.94%) and Cosmerium (14.49%). Protozoa, Ostracoda, Rotifera, Cladocera, Copepoda, Diptera and Oligochaeta were the zooplankton phyla. The dominant zooplankton genera were Brachionus (13.38%), Daphnia (5.55%), Moinodaphnia (6.94%0), Cyclops (22.22%), Mesocyclops (11.11%) and Diaptomus (8.33%) apart from worms (8.33%). Benthic fauna was represented by Oligochaeta, Chironomus, Crustacea, Diptera, Odonata, Nematoda, Pelecypoda, Gastropoda and leech. Chironomus with contribution of 54.09% dominated the fauna. Other predominant groups were Oligochaeta (20.16%), Pelecypoda (16.57%) and Diptera (4.99%). In general, high population density of phytoplankton, zooplankton and benthos were encountered during premonsoon season. Low population of zooplankton compared to phytoplankton and increasing number of rotifers next to copepods and cladocerans as well as presence of protozoans indicated substantial load of organic matter. The organic pollution indicator benthic species like Branchiura, Tubifex, Chironomus, Cullicoid larvae (Diptera), Lamellidans, Corbicula, Lymnaea and leech also supported the polluted environment. Shannan-Wiener index of less than 1 for Diptera, Gastropoda and Pelecypoda indicated the stressed environment. Low abundance of plankton population in spite of high nutrient budget of the ecosystem was the function of great infestation of water quality which indicated extreme state of pollution." (Authors)] Address: Varshney P.K., National Bureau of Fish Genetic Resources, (ICAR), Lucknow, Uttar Pradesh, India. E-mail: pkvarshney1@gmail.com

18341. Wiener, J.G.; Haro, R.J.; Rolfhus, K.R.; Sandheinrich, M.B.; Bailey, S.W.; Northwick, R.M.; Gostomski, T.J.

(2013): Bioaccumulation of contaminants in fish and larval dragonflies in six National Park units of the western Great Lakes region, 2008-2009. Natural Resource Data Series NPS/GLKN/NRDS—2013/427. National Park Service, Fort Collins, Colorado: 108 pp. (in English) ["The authors report results of an initial assessment completed during 2008 and 2009 of selected bioaccumulative contaminants in aquatic organisms in six national park units within the Great Lakes Inventory and Monitoring Network. The park units included in the study were Grand Portage National Monument, Indiana Dunes National Lakeshore, Isle Royale National Park, Pictured Rocks National Lakeshore, Sleeping Bear Dunes National Lakeshore, and Voyageurs National Park. The principal objectives of this project were (1) to assess spatial patterns in contamination of aquatic biota in the six park units, (2) to identify park units and surface waters where concentrations of bioaccumulative contaminants may pose a risk to organisms atop aquatic food webs, and (3) to evaluate temporal trends in contamination of aquatic food webs in parks of the Great Lakes Network." (Authors) lead; mercury; DDT; PCB; PFC; PBDE] Address: Wiener, R.J., University of Wisconsin-La Crosse, River Studies Center, 1725 State Street, La Crosse, Wisconsin 54601, USA

18342. Zurawlew, P. (2013): Dragonflies (Odonata) of the borderland between the Kalisz High Plain and Rychwalska Plain (Great Poland). Odonatrix 9(2): 33-54. (in Polish, with English summary) ["Paper summarizes six-year long (2007–2012) studies on dragonflies (Odonata) in the county of Pleszew (Western Poland) as well as the eight border sites located in the area of adjacent counties (Fig. 1). The whole area is in the macroregion of the Południowowielkopolska Lowland, in the borderland of two mesoregions: the Kalisz High Plain and Rychwalska Plain. The research was aimed at understanding the species composition of dragonflies and discovering as many sites of rare species as possible. 58 sites lying on the Kalisz High Plain and 85 sites located in the Rychwalska Plain were controlled. Noteworthy is the presence of tens Sphagnum peat bogs in the studied part of the Rychwalska Plain. … Most of the sites were controlled irregularly (mainly between June and August), often only once. The records of particular species were differentiated into three categories: 1) development confirmed (larvae, exuviae, teneral imagines, intensive reproductive behavior – copulations, tandems, laying eggs), 2) development likely (single reproductive behavior, territorial imagines, a large population in the environment suitable for development), 3) development possible (single imagines observed only). In the years 2007–2012 in the discussed area 55 species of dragonflies were recorded (data in this paper), as well as Aeshna juncea given earlier (Bernard, Toñczyk 2011). Total number of 56 species comprise 77% of the species reported in Poland so far (Bernard et al. 2009). For many species important information clearly enriching the knowledge of their distribution in this part of Poland was collected. This particularly refers to the species associated with Sphagnum bogs (Aeshna subarctica, Leucorrhinia albifrons, L. dubia and L. rubicunda), thermophilous species (Aeshna affinis, Orthetrum albistylum, O. brunneum, O. coerulescens, Crocothemis erythraea, Sympetrum fonscolombii and S. meridionale) as well as rare and very rare in south-western Poland (Lestes barbarus, Sympecma paedisca, Coenagrion lunulatum, Epitheca bimaculata and Leucorrhinia caudalis). Protection of the studied Sphagnum peat bogs, where many rare and protected species of vascular plants (Zurawlew & Zurawlew 2010) and the dragonflies (this study) are present, should be one of the priorities of the Forestry Grodziec managing this area. The four tables given in this paper show: studied habitats with the number of species (Tab. 1), a list of the sites of all species and the observed flight period (Tab. 2), the sites with the highest number of species (Tab. 3) and the listing of the occurrence of dragonflies for 15 UTM squares covering the studied area (Tab. 4)." (Author)] Address: Zurawlew, P., Kwilen 67a, 63-313 Chocz, Poland. E-mail: grusleon@gmail.com

2014

18343. Hancíková, B. (2014): Local dispersal of golden-ringed dragonfly Cordulegaster boltonii - Lokální disperse páskovce Cordulegaster boltonii. MSc. thesis, Faculty of Science, Department of Ecology, Univerzita Karlova, Praha: 47 pp. (in Czech, with English summary) ["We carried out a pilot study of local dispersion and patterns of movement of C. boltonii. Cordulegasteridae is a family with many primitive traits present and rather restricted geographical distribution ranges (at least among European species). Their migration seems to be limited despite the body size that predetermines them to high mobility over large spatial scale. Linear habitat (upper parts of narrow forest streams) specialisation along with behavioural ecology (peculiar premating habit of scanning streams for females) is a unique life history, which bring lot of questions. We collected mark-release-recapture data during two adult flight seasons in year 2010 and 2011. We were simultaneously capturing patrolling males along three separate streams (Dracice, Koštenický and Struha) in total length of 9.9 km in, located in the Natural park Ceská Kanada, in the Southern Czech Republic. We captured and marked 440 individuals and recorded 113 recapture events (26 % recapture rate) in year 2010 and 355 individuals were marked, 171 recapture events made (48 % recapture rate) in 2011. Our data suggested high level of stream fidelity (only 10 inter stream dispersal events, 2.8 % dispersal rate). What was as well reflected in a closeness of population estimated by Craig analyse. Patrolling males had home range about 250 m, home ranges had large overlaps that resulted in a high-density male cooccurrence not territoriality. Despite general expectation males rather stayed within favoured and crowded patch than moved into a bit more unfavourable low density patches, which were readily being abandoned. There was not observed a correlation between female (even though very rare) visits and patches favoured by males. We have not found any preference for patrol flight direction (upstream vs. downstream). During sampling we observed interesting behavioural interaction when we found that time schedule of patrolling males on streams in not random and a large proportion of males were patrolling subsequently within one minute interval." (Author)] Address: not stated

18344. Lan, H.-b.; Ran, J.-c. (2014): Odonata in stream of Maolan karst forest. Hubei Agricultural Sciences 53(7): 1528-1534. (in Chinese, with English summary) ["Based on investigations and identifications, 63 species of 11 families were found in Odonata of stream in Maolan karst forest, among which there were 25 Libellulidae, 4 Gomphidae, 7 Coenagriidae, 6 Aeshnidae Rambur, 5 Platyenemididae, 2 Macromidae, 3 Agriidae, 4 Epallagidae, 2 Amphipterygidae, 4 Libellaginidae, 1 Megapodagriidae. There were new records of Guizhou in Gynacantha saltatrix, Orthetrum glaucum, Rhyothemis fuliginosa, Mnais earnshawi, Philoganga vetusta, Libellago lineata,Agriocnemis lacteola." (Authors)] Address: Lan, H.-b., Management Department of Maolan Nature Reserve in Guizhou, Libo 558400,Guizhou, China. E-mail: lanhongbo0913@163.com

18345. Morikawa, M.; Akihito, A.; Kobayashi, T. (2014): The litter supply regulates the structure of the dragonfly larva community. Journal of the Japanese Society of Revegetation Technology 39(1): 15-20. (Japanese, with English summary) ["The species diversity and population of dragonfly larvae are spatially different. In this study, we did mesocosm experiments to examine the effect of litter supply on the dragonfly larvae community. Size and species composition of dragonfly larvae and presence / absence of chironomid, a food resource for dragonfly larvae, were also controlled in the experiment. The results indicated that the litter provide the hiding places for small larvae, and consequently extend the survival time of them. Therefore, the litter supply regulates the structure of the dragonfly larva community." (Authors)] Address: E-mail : masatonium@yahoo.co.jp

18346. Ojha, N. (2014): A new tool for predicting distribution patterns of African dragonflies in space and time: sensitivity analyses of model parameters and environmental variables. PhD. thesis, Faculty of Environment and Natural Resources, Albert-Ludwigs-Universität, Freiburg im Breisgau, Germany. xvi, 154 pp. (in English) [Pseudagrion kersteni "In the last few decades, Africa has been a dynamic continent regarding the changes in landscape, population and climate. To identify effects of the changes in environmental conditions on biodiversity, species distribution modelling (SDM) can be of use and SDM has been used in wide array of ecological applications such as determining hotspots, planning of reserves, designing survey for biodiversity inventory, or assessing the impacts of environmental change on biodiversity. Odonata which require both terrestrial and aquatic ecosystem for a lifecycle, is suitable species to consider as flagship species for many ecological studies. Here, a logistic regression based new SDM tool, the 'SpeeDi Tool' is presented focusing on modelling the distribution of African Odonata species using the Odonata Database of Africa. The use of geographic information system (GIS) in pre- and postprocessing is integral part of the SDM workflow and GIS and statistical modelling is integrated in the SpeeDi Tool. The user centred approach for the development of the SpeeDi Tool offers usability and achievement of the goal (i.e. predicting the distribution range) with ease. Pseudagrion kersteni, a widely spread dragonfly species in sub-Saharan Africa, is taken as species of interest to demonstrate the use and ability of the SpeeDi Tool. An expert-drawn watershed based range map from IUCN serves the purpose for visually comparing the modelled spatial distribution and, thus, enables to evaluate the predicted range. The SpeeDi Tool has several modelling parameters, some of which have been new in SDM field, namely, elastic-net factor which has not been applied to SDM using background samples until now, soft buffer threshold (SBT) which is a new concept introduced here, and weights for samples. In addition to the use of background samples, it introduces the modelling by using presence samples with absence and / or background samples; the combination of presence, absence and background samples is a new option not found in existing SDM tools yet. In order to gain confidence in using the SpeeDi Tool, several sensitivity analyses are performed using P. kersteni samples for different modelling approaches for applying different modelling parameters and for using different environmental geodatasets. These sensitivity analyses are thought for determining the optimum values of different regression parameters to maximise the model's performance, and for finding the important environmental variables and their effects on the prediction of distribution ranges. The concept similar to that of a virtual species is used to evaluate general applicability of the SpeeDi Tool. The sensitivity analyses of modelling parameters showed a) the elastic-net regularisation is superior to L1 or L2 regularisation, b) the uncertainty in population prevalence in background samples can be reduced by applying SBT, c) weights can be effective in reducing effects of sampling bias, d) the number of background samples is sensitive for fitting the model, and e) product interaction of variables are necessary for better prediction of distribution range. The sensitivity of environmental datasets showed a) monthly climate datasets should be preferred over synthesised bioclimatic datasets, b) predicted distributions using land-cover datasets with different classification schemes are not much different but the contribution of land cover classes in different datasets indicated that false interpretation regarding ecological significance of these classes can be possible. Further, the results for the modelling of A. minuscula showed that there is not much difference in distribution range when modelled at spatial resolutions of 1 km and 8 km. The results also indicated that modelling extent should not extend too far beyond the species' native region." (Author)] Address: not stated

18347. Verny, A.; Simon, A. (2014): Découverte de Lestes dryas (Kirby, 1890) dans le massif forestier de la Madeleine à Evreux (Odonata, Lestidae). L'entomologiste Haut-Normand 4: 7-8. (in French) ["The existence of perennial populations of Lestes dryas (Odonata: Lestidae) in Haute-Normandie has never been reported before. The only observation of the species in the region concerned a single, erratic male in 2012. This note relates the discovery of a possible population in Haute-Normandie. Details on the context of observation and the conditions of development of the species are also provided. (DeepL)] Address: Simon, A., CenHN – Rue Pierre de Coubertin BP 424 – 76805 Saint-

Etienne-du-Rouvray Cedex, France. E-mail: a.simon@-cren-haute-normandie.com

18348. Villeda-Callejas, M.; Barrera-Escorcia, H.; Rojas-Frias, V.L.; Lara-Vazquez, J.A.; Flores-Maya, S.; Guedea-Fernandez, D. (2014): Histologic description of the compounds eyes of Pseudoleon superbus (Libellulidae) and Enallagma novaehispaniae (Coenagrionidae). Entomologia Mexicana 1: 1133-1138. (in Spanish, with English summary) ["The histological sections showed that the compound eyes of P. superbus and E. novaehispaniae and have the same cellular components with variations as are the dimensions of the omatides, 756.9 m and 365.5 m respectively; corneogen and well-defined cells in both species were located , crystalline cones have a homogeneous arrangement in both species, but more elongated in P. superbus . Pigment distributed cells were observed throughout the omatide in damselfly more intense pigmentation regarding dragonflies. The rabdom is thin and separated by the cytoplasm of the cells of the retina with number six with slight variations in appearance." (Authors)] Address: Villeda-Callejas, Maria del Pilar, Laboratorio de Zoologia1, Laboratorio de Microscopia2, FES Iztacala, UNAM. Av. de los Barrios # 1, Los Reyes Iztacala, Tlalnepantla, Edo. de Mexico. Mexico C. P. 54090. E-mail: mapili_villeda@yahoo.com.mx,

18349. Zajac, A. (2014): Effects of herbicides on the Hine's Emerald Dragonfly. M.Sc. thesis, University of South Dakota. 75 pp. (in English) ["We are currently experiencing a global decline in biodiversity that is resulting in endangered species becoming increasingly prevalent. This decline has many causes, but threats from habitat contamination and invasive species have become especially concerning for the federally endangered Hine's emerald dragonfly (Somatochlora hineana) whose already limited habitat is being invaded by reed canarygrass (Phalaris arundinacea). There is concern that this invasive grass could have negative effects on S. hineana populations. An herbicide, Fusilade DX (fluazifop-p-butyl) can be effective in reducing this invasive grass. However, herbicide application could result in habitat contamination and could have significant negative effects on aquatic fauna. To safely apply this herbicide, we need to know how S. hineana and plant and animal community members will react to the presence of Fusilade DX and if it will reduce reed canarygrass in the area. However, an endangered organism can be difficult to experiment with and mortality from experiments could be harmful to the continuation of the species. We therefore set out to find a surrogate for S. hineana to use in toxicological experiments. We did this by capturing Aeshna umbrosa, Boyeria vinosa, Epitheca princeps, and Somatochlora williamsoni dragonfly larvae and comparing their response to one and two year old S. hineana larvae in toxicological testing. Glyphosate was used for this testing as Fusilade DX had been shown to have very little effect in pre-experiment work and there was also interest in using a more powerful herbicide if Fusilade DX proved to be ineffective. We exposed dragonfly larvae to glyphosate at concentrations of 0mg/L, 100mg/L, 1,000mg/L, 10,000mg/L and 50,000mg/L for 96 hours. We found significant differences between the two age classes of S. hineana with two year old larvae experiencing no mortality, but found S. hineana to be the least sensitive of all species tested. We also found S. williamsoni to react most similarly to S. hineana and would recommend its use in further surrogate studies. We also set out to determine the effects of Fusilade on plant and animal communities. We did this by applying Fusilade DX to S. hineana habitat and comparing control and treatment plots. We found Fusilade to decrease growth of reed canarygrass by 32.5%, but not overall coverage. It also had no significant effect on native plant coverage or any direct or indirect effect on S. hineana populations." (Author)] Address: not stated

18350. Zandigiacomo, P.; Chiandetti, I.; Fiorenza, T.; Nadalon, G.; Uboni, C. (2014): Odonata of Friuli Venezia Giulia: Second update of checklist and further remarks. Gortania 36: 33-44. (in English, with Italian summary) ["Within the Project “Atlas of the Odonatofauna of the Friuli Venezia Giulia region”, additional remarks of the Odonata of the region (North-eastern Italy) was carried out in the years 2010-2014. The new data have allowed us to enrich the regional Checklist of Odonata with five species: Chalcolestes parvidens and Lindenia tetraphylla that have not been observed previously in the region and Anax ephippiger, Gomphus vulgatissimus, and Sympetrum flaveolum that have been detected in previous years. In addition, knowledge of the distribution of twelve species that are rare or of natural interest has been improved. At the present time the Checklist of Odonata of Friuli Venezia Giulia includes 62 species representing 66% of the Italian fauna. Two species, L. tetraphylla and Cordulegaster heros Theischinger, 1979, are listed in the Annexes of the Habitats Directive. The list includes some species that have migratory tendencies and probably do not breed regularly in the region, such as L. tetraphylla and A. ephippiger. It is possible that in the near future other species might be found, some of which have already been reported for the region. Despite the considerable richness of species, we highlight a critical status for some species that are typical of mountain or alpine habitats, such as Coenagrion hastulatum, C. heros, Somatochlora alpestris, S. arctica, Sympetrum danae and Leucorrhinia. In addition, Nehalennia speciosa is near extinction at the regional and national level due to the presence of just one breeding site located in a peat bog in the morainic hilly area." (Authors)] Address: Zandigiacomo, P., Dipartimento di Scienze agrarie e ambientali (DISA) – Entomologia, Università degli Studi di Udine, Via delle Scienze 208, I-33100 Udine, Italy. E-mail: pietro.zandigiacomo@uniud.it

2015

18351. Amoroso, N.; Chalcraft, D.R. (2015): Duration of colonization and interactions between early and late colonists determine the effects of patch colonization history on patch biodiversity. Oikos 124(10): 1317-1326. (in English) ["Patches can vary in their colonization history as the result of many factors, including differences in patch size and isolation, which alter the timing and duration in which one or

more species colonize a patch. Prior work has found that the particular time that a species colonizes a patch can affect the performance of co-occurring species, but it is less clear whether it affects the biodiversity of the patch. Our objective was to evaluate how two components of colonization history affect biodiversity – the total duration of the colonization window in which a predator is able to colonize the patch and the particular time in the patch's colonization history (i.e. early versus late in community development) that colonization by a predator occurs. We conducted an experiment to examine how the duration and timing in which predatory dragonflies colonize recently filled ephemeral ponds affects insect biodiversity. Dragonfly colonization history had an important effect on insect biodiversity. Ponds with a longer colonization history by dragonflies had fewer insect morphotypes than ponds with a shorter colonization history. The timing of dragonfly colonization (i.e. early versus late in community development) had no effect on the number of insect morphotypes present despite altering both the rate of dragonfly metamorph production and the abundance of larval dragonflies present at the end of the study. The effect of duration of long-term dragonfly colonization on biodiversity stemmed from early colonists weakening the influence of later colonists on insect biodiversity. Though colonization by dragonflies reduced adult insect abundance, differences in the time in which dragonflies colonized ponds had no effect on total insect abundance. Moreover, differences in patch biodiversity appears to be affected more by variation in the duration a patch was colonized by a predator than variation in the time in which a patch was colonized by a predator." (Authors)] Address: Chalcraft, D.R., Dept of Biology & Center for Biodiversity, East Carolina Univ., Greenville, USA. E-mail: chalcraftd@ecu.edu

18352. Angot, D. (2015): Présentation et répartition communale des Libellules de Chalonnes sur Loire, Atlas de la Biodiversité Chalonnaise. Ville de Chalonnes sur Loire: 64 pp. (in French) ["Conclusion: The inventories have made it possible to significantly improve our knowledge of the dragonflies of the Chalonnais. 45 species are now known in the area, which represents almost three quarters of the species in the department and a little less than half of the species in France. The data collected over the last 10 years, and particularly in 2015, has made it possible to collect more than 1100 data on the group. This work would not have been possible without the work of naturalists and local associations such as the CPIE Loire Anjou and the LPO Anjou. The synthesis of these data made it possible to publish distribution maps, to specify the status and the autochthony of each species in order to present the results in the communal monographs presenting the ecology and the local distribution. Following the synthesis and study of the group in the commune, it appears that the great wealth of environments allows a large number of species to carry out their life cycle. The Chalonnais region is home to special habitats that allow certain remarkable species to develop and maintain their populations. On the Louet and the Loire, Gomphus flavipes and Ophiogomphus cecilia seem to be well established. On the old quarries, Oxgastra curtisii breeds (three quarries in Chalonnes). On two small streams, Coenargion mercuriale is present and breeds. These four species are protected at French and European level, but other species also have a special status. There are, for example, 18 species that are determinants for the establishment of Natural Zones of Faunistic and Floristic Interest (ZNIEFF). All these data give Chalonnes a particular responsibility in terms of the preservation of aquatic ecosystems (ponds, watercourses, ponds), but also for terrestrial environments and in particular natural meadows which host a significant number of individuals during the maturation period. The complementarity and relative proximity of these environments enables the needs of a large number of species to be met. These species can then carry out their life cycle from the aquatic to the aerial phase in good conditions. It should be emphasised that the publication of this document does not mean that data collection has stopped. Specific data and certain studies on the commune will enable the improvement of knowledge to be continued (monitoring of pools, collection of exuviae, monitoring of the mouth of the Layon). The distribution maps, even if they largely specify the distribution of the species, are far from exhaustive and only reflect the state of knowledge at a given moment. The wealth of odonatological species in the Chalonnais is a perfect illustration of the diversity and quality of the Chalonnais landscapes, which express this beautiful and fragile biodiversity, a real heritage that should be preserved and made known." (Author) Translated with www._DeepL.com/Translator (free version) Département Maine-et-Loire] Address: not stated

18353. Bai, Y.; Dai, D.-F.; Bao, K.-O.; Quin, A.-N.; Ling, R.-J.; Wang, H.-R. (2015): Using geometric morphometrics to quantify the sexual dimorphism of Pantala flavescens. Chinese Journal of Applied Entomology 52(2): 363-369. (in Chinese, with English summary) ["We obtained wing shape information by digitizing the fore and hindwings of P. flavescens. Sexual dimorphism in wing shape and vein structure was then analyzed by principal component analysis (PCA) and the thin-plate spline (TPS) graphical technique. The PCA results indicate significant sexual dimorphism in the fore and hindwing. TPS indicates that forewing differences are mainly in the nodus and triangle, whereas hindwing differences were mainly in the nodus and in the area of the cubital and anal veins. Centriod size (CS) indicates that females have a bigger fore and hindwing than males. Sexual dimorphism in wing shape in P. flavescens probably reflects selection for different wing shape and vein structure in each sex." (Authors)] Address: Bay, Y., Institute of Zoology, Shaanxi Normal University, Xian 710062, China

18354. Ball-Damerow, J.E.; Oboyski, P.T.; Resh, V.H. (2015): California dragonfly and damselfly (Odonata) database: temporal and spatial distribution of species records collected over the past century. ZooKeys 482: 67-89. (in English) ["The recently completed Odonata database for California consists of specimen records from the major entomology collections of the state, large Odonata collections outside of the state, previous literature, historical and recent field surveys, and from enthusiast group observations. The

database includes 32,025 total records and 19,000 unique records for 106 species of dragonflies and damselflies, with records spanning 1879–2013. Records have been geographically referenced using the point-radius method to assign coordinates and an uncertainty radius to specimen locations. In addition to describing techniques used in data acquisition, georeferencing, and quality control, we present assessments of the temporal, spatial, and taxonomic distribution of records. We use this information to identify biases in the data, and to determine changes in species prevalence, latitudinal ranges, and elevation ranges when comparing records before 1976 and after 1979. The average latitude of where records occurred increased by 78 km over these time periods. While average elevation did not change significantly, the average minimum elevation across species declined by 108 m. Odonata distribution may be generally shifting northwards as temperature warms and to lower minimum elevations in response to increased summer water availability in low-elevation agricultural regions. The unexpected decline in elevation may also be partially the result of bias in recent collections towards centers of human population, which tend to occur at lower elevations. This study emphasizes the need to address temporal, spatial, and taxonomic biases in museum and observational records in order to produce reliable conclusions from such data." (Authors)] Address: Oboyski, P.T., Collections Manager & Curatorial Supervisor, Essig Museum of Entomology, 1170 Valley Life Science Building, University of California, Berkeley, 1101 VLSB, #4780, Berkeley, CA 94720, USA

18355. Brabender, M. (2015): The impact of shore types on benthic macroinvertebrate community structure and functioning in a large lowland river. Dissertation, Fakultät Umweltwissenschaften, Technische Universität Dresden: 129 pp. (in English, with German summary) ["Shore zones of large rivers are hot spots of biodiversity and contribute significantly to riverine ecosystem functioning. Today, shore degradation and other structural impairments like river straightening and channelization are strong impact factors on river ecosystem health. However, we still lack a thorough understanding of how structural shore zone degradation affects benthic community composition and their inherent ecosystem functions. In this thesis I tested the influence of training structure induced environmental factors on benthic macroinvertebrate community composition and the share of nonnative species. Moreover, I assessed the community-associated ecosystem functions in terms of secondary production and resource utilization. In the main channel, communities were composed of only a few specialized taxa with low abundances, which contributed little to riverine secondary production. This is probably due to the harsh conditions produced by constantly high flow velocities and relocation of the fine sandy sediment. Main channel habitats were hardly affected by the adjacent training structure. Hence, species compositions and productivities were similar at all investigated main channel sites. By contrast, each of the shore communities was diverse, highly abundant and productive in comparison to the main channel. However, variations between shore structure communities and their ecosystem functions were prominent. One particular training structure, i.e. the off-bankline revetment, bore the most diverse and by far most productive benthic community, which utilized vast total amounts of basal resources (1,323 g DM m^{-2} y^{-1}). Varying sediment compositions, availability of macrophytes and diverse flow velocities, including lentic conditions, were revealed as key factors for increasing biodiversity, secondary production and resource utilization. Allochthonous boulder habitats were generally highly prone to non-native species invasion. Neozoa proved less productive than many native community members and consumed minor relative and total amounts of the prevailing resource pelagic algae. The present quantitative comparison of shore type specific effects on biodiversity, biomass and productivity provides managers with a tool to improve the ecological attributes of large river ecosystems with an unchangeable, impaired macrostructure. In its entirety, this thesis constitutes a sound basis to increase the mechanistic understanding of the way in which shore zone manipulation can affect riverine benthic communities and their associated ecosystem functions." (Author) The paper includes data on Gomphidae (Stylurus flavipes, Gomphus vulgatissimus)] Address: not stated

18356. Combes, S.A. (2015): Neuroscience: Dragonflies predict and plan their hunts. Nature 517: 279-280. (in English) ["An analysis reveals that the dragonfly's impressive ability to catch its prey arises from internal calculations about its own movements and those of its target — the first example of such predictions in invertebrates." (Author)] Address: Combes, Stacey, Department of Organismic and Evolutionary Biology, Concord Field Station, Harvard University, Bedford, Massachusetts 01730, USA.

18357. Guliyeva, S.A.; Aliyev, R.A. (2015): Species composition and quantitative distribution of larvae of dragonflies (Odonata) in the new ecological conditions of the lake Aggol. Journal of Zaporizhzhya National University 2(2015): 93-98. (in Russian, with English summary) ["The paper presents new data on species composition, number and distribution of the larvae of Odonata in new environmental conditions of the different habitats of in the lake Aggol. Field works conducted in 2011-2012 in the lake Aggol resulted in the rearings of 28 species and forms of dragonfly larvae. Six of these Coenagrion concinnum, C. armatum, Aeshna viridis, Sympetrum striolatum, S. sanguineum, S. meridionale are new to the lake. Species Coenagrion concinnum and C. armatum were found in winter, spring and autumn of 2011 and winter and autumn of 2012; Aeshna viridis in winter and autumn of 2011; Sympetrum striolatum - winter, spring and autumn of 2011; S. sanguineum in winter and autumn of 2011-2012; S. meridionale in winter and spring of 2011-2012. The widest distributed species belong to the genera Coenagrion, Aeshna and Sympetrum. The maximum development of larvae of dragonflies was registered in winter (106 ind./m², 1,10 g/m²) and minimum in summer (12 ind./m²; 0,14 g/m²). Ecology of the fauna is studied in detail.In the study period (2011-2012) the number of species of dragonfly larvae reaches a minimum in summer (6 species), and the maximum (27 species) in winter. Species

Coenagrion scitulum, C. lunulatum, C. puella, C. mercuriale [sic!], Anax imperator, Sympetrum flaveolum are observed in the lake in all seasons and are dominated by widespread. It should be noted that the decrease in the number of larvae of dragonflies in the summer, especially at depths of up to 0.5 m is due to their intensive consumption by fish and water birds and emergence of adult dragonflies which leave the lake. On the other hand, in summer period, the volume of oxygen in shallow water of the lake Aggol is greatly reduced, and as a result of evaporation of water, the amount of salts in water is increased. In such circumstances, the probability of occurrence of freshwater organisms in the benthos is naturally decreased.Average annual number of dragonfly larvae per square meter of the lake Aggol in 2011 was 88 ind./m2, and biomass - 0.31 g/m². During this period, the maximum development of the larvae of dragonflies observed in winter (141 ind./m², 0.50 g/m²), and the minimum - in the summer (25 ind./m2; 0.10 g/m²). In contrast to 2011, in 2012 the average annual number of dragonfly larvae per square meter lake was 66 ind./m2, and biomass -0.24 g/m². It is shown that the maximum development of dragonfly larvae was observed in winter (126 ind./m²; 0.47 g/m²) and the minimum (11 ind./m², 0.03 g/m²) - during the summer season.The study of the distribution of larvae of dragonflies on specific habitats of the lake revealed their maximum development on plant and silty habitats, and the minimum - on black silty sand.Changes in biomass of benthic organisms as well as larvae of dragonflies, which developed very poor is analyzed. The index of the average biomass of dragonfly larvae per square meter of lake in the 60s was 0.27 g/m² in 70s - 0, 20 g/m², in 80s - 0.13 g/m², and in 2011-2012 - 0.28 g/m². Poor development of dragonfly larvae in the lake Aggol is characterized, on the one hand with their intensive consumption by fish and water birds and on the other hand - the steady worsening of the environmental conditions of the lake." (Authors) Imishli Rayon (district)] Address: Guliyeva, S.A., Inst. of Zoology Azerbaijan Nat.l Acad. of Sciences, 1073, Azerbaijan, Baku, passage 1128, block 504.

18358. Hämäläinen, M. (2015): Nomenclatorial fossicking - unearthing forgotten Selysian species names of Belgian Odonata. Notulae odonatologicae 8(6): 197-201. (in English) ["Five forgotten available species group names in Odonata, introduced by Edmond de Selys Longchamps in 1831, are listed and their taxonomic status is discussed. The following synonymies are presented: Agrio[n] cyaneus Selys, 1831 and Agrio[n] oeneus Selys, 1831 are junior subjective synonyms of Calopteryx virgo (Linnaeus, 1758); Agrio[n] cellaris Selys, 1831 and Agrio[n] virescens Selys, 1831 are junior subjective synonyms of Calopteryx splendens (Harris, 1780). Agrio[n] coralinus Selys, 1831, an obvious coenagrionid species, is ranked as a nomen dubium."] Address: Hämäläinen, M., Naturalis, P.O. Box 9517, 2300 RA, Leiden, The Netherlands. E-mail: libellago@gmail.com

18359. He, H.C.; Fan, Q.-x.; Chu, W.-h.; Wang, F.; Wu, Q.-w.; Zaho, Z.-b.; Zhang, C.-m.; Zhang, Y.-l. (2015): The predation intensity of Pantala flavescens nymph on Paramisgurnus dabryanus larvae and juveniles and its prey selection. Freshwater Fisheries 45(6): 108-112. (in Chinese, with English summary) ["This study was conducted to determine the predation intensity of Pantala flavescens nymph on Paramisgurnus dabryanus (5, 15, 25, 35 days after hatching, DAH) and the prey selection of the Pantala nymph on loach larvae, chironomus larvae, and tubificidae. The results showed that both the instar of Pantala nymph and the size of loach were related to the predation intensity of the Pantala nymph on Chinese loach. The predation intensity of 9 ~ 12 instar Pantala larvae on P. dabryanus was significantly stronger than that of 5~8 instar larvae. P. dabryanus at 25 DAH couldn't be captured and eaten by Pantala larvae less than 5-8 instar, and P. dabryanus at 35 DAH couldn't be captured and eaten by Pantala larvae less than 9-12 instar. The feeding rates of 5 -8 instar Pantala larvae on 5 and 15 DAH loach showed no significant difference, and the feed rates of 9 - 12 instar Pantala larvae on 5, 15, and 25 DAH loach showed no significant difference. P. flavescens nymph could prey on P. dabryanus, chironomus larvae, and tubificidae, with the preference in the order of chironomus larvae > tubificidae > P. dabryanus." (Authors)] Address: He, H.C., College of Fishery, Huazhong Agricultural Univ., Wuhan 430070, China

18360. Hothem, R.L.; May, J.T.; Gibson, J.K.; Brussee, B.E. (2015): Concentrations of Metals and Trace Elements in Aquatic Biota Associated with Abandoned Mine Lands in the Whiskeytown National Recreation Area and Nearby Clear Creek Watershed, Shasta County, Northwestern California, 2002–2003. Prepared in cooperation with the National Park Service. Open-File Report 2015–1077. U.S. Department of the Interior, U.S. Geological Survey: 64 pp. (in English) ["Park management of the Whiskeytown National Recreation Area, in northwestern California, identified a critical need to determine if mercury (Hg) or other elements originating from abandoned mines within the Upper Clear Creek watershed were present at concentrations that might adversely affect aquatic biota living within the park. During 2002–03, the U.S. Geological Survey, in cooperation with the National Park Service, collected aquatic invertebrates, amphibians, and fish, and analyzed them for Hg, cadmium, zinc, copper, and other metals and trace elements. The data from the biota, in conjunction with data from concurrent community bioassessments, habitat analyses, water quality, and concentrations of metals and trace elements in water and sediment, were used to identify contamination “hot spots.” In 2002, we selected collection sites within the study area based on the presence of historical mines and results from sampling of bed sediment in 2001. In 2003, collection sites were selected based on sediment data as well as data on water and biota from this study in 2002. Eleven sites were sampled in both 2002 and 2003, 11 sites were sampled only in 2002, and 14 sites were sampled only in 2003. Comparisons of sites within the Upper Clear Creek watershed indicated that most of the more contaminated sites were outside of the park boundaries, especially at sites within the French Gulch, Cline Gulch, and Whiskey Creek watersheds. The site with the highest overall contamination within the park, based on both fish and invertebrate data, was WLCC, a site on Willow Creek impacted by acid mine

drainage and listed as impaired under Section 303(d) of the Clean Water Act. Compared with other recently evaluated mine-impacted watersheds in northern California, invertebrates, amphibians, and fish from sites within the Upper Clear Creek watershed tended to have significantly lower concentrations of Hg than at most other sites. For other metals and trace elements, Upper Clear Creek sites were only compared with the Deer Creek watershed, Nevada County, California. Copper from both Willow Creek sites (WLCC and WLTH) in the Clear Creek watershed was the only metal with concentrations in biota that were significantly higher than biota from Deer Creek. ... The target aquatic macroinvertebrates for elemental analysis in this study were predatory insects, depending on their abundance and availability at each sample site. Taxa collected were larval dragonflies (Gomphidae, Libellulidae, Aeshnidae, and Cordulegastridae), adult water striders (Hemiptera: Gerridae), larval stoneflies (Plecoptera: Perlidae), larval dobsonflies (Megaloptera: Corydalidae), and adult predaceous diving beetles (Coleoptera: Dytiscidae). Banana slugs (Gastropoda: Arionidae) also were collected at a limited number of sites. ... The highest mean concentration of HgT in dragonflies (Gomphidae) was from MDOX in 2003 (0.115 µg/g), with the second highest from CLN2 (0.110 µg/g). All the most elevated HgT concentrations were from sites outside the park boundaries." (Authors)] Address: Director, Western Ecological Research Center, U.S. Geological Survey, 3020 State University Drive East, Sacramento, California 95819, USA. http://werc.usgs.gov/

18361. Jäckel, K.; Koch, K. (2015): Anisoptera-Exuvien (Odonata): nur leere Hüllen? Libellula 34(3/4): 143-159. (in German, with English summary) ["Anisoptera exuviae: Only empty husks? – Many organisms leave moulting skins that can be utilised by secondary users. Exuviae of Anisoptera are relatively robust and remain relatively long on the substrate. Therefore, we asked ourselves the following questions: To what extent and for what purpose can secondary users be found in exuviae? Which taxa can be found as secondary users? Do secondary users prefer exuviae of certain dragonfly species? For our study, we systematically collected exuviae of Anisoptera in the nature reserve area Eich-Gimbsheimer Altrhein (Germany, Rheinland-Palatinate) in 2013 and 2014. In 2013 secondary users were found in 30 % and 2014 in 67 % of the exuviae. The differences in the occupation rate with secondary users likely roots in the modified method. The exuviae were screened in the field with flashlights and only taken inside the lab when we found a secondary user in 2013. We certainly missed some secondary users or their traces, like faeces or spider webs. In 2014, all exuviae found were collected. Overall, we found arthropods from 18 genera and 18 families. The secondary users distributed to the orders Arachnida, Diplopoda (Millipedes), Collembola (Springtails), and Insecta (Insects). The family of spiders (Araneae) was most common (2013: 71 %, 2014: 78 %). Within the spiders, the genus Clubiona of the family of Clubionidae (sack spiders) was most abundant. Clubiona sp. was found at all ages. With a few exceptions, only one secondary user per exuviae was found. The taxa compositions of secondary users at the family level were significantly different in the two years. In 2013, large-volume exuviae were occupied primarily; in 2014, this pattern was not confirmed. In general, exuviae of Anisoptera can be used by different arthropods as a temporarily microhabitat." (Authors)] Address: Koch, Kamilla, Institut für Zoologie, Abteilung Evolutionäre Ökologie, Johannes Gutenberg-Universität Mainz, Becherweg 13, 55128 Mainz, Germany. E-mail: kochka@uni-mainz.de

18362. Jisha Krishnan, E. K.; Sebastian, C. D. (2015): Assessment of the phylogenetic relationship among Coenagrionidae family (Odonata: Zygoptera) using Coi gene marker. Proceedings 25th SWADESHI SCIENCE CONGRESS, a national seminar, 16-18 December 2015, Sree Sankaracharya University of Sanskrit, Kalady, Ernakulam, Kerala: 337-339. (in English) ["Zygoptera represents the most ancient damselflies with their ancestors known to exist 250 million years ago. They are geographically distributed in all continents except Antartica and ecologically important as bioindicators and biocontrol agents. Coenagrionidae is the most abundant damselfly family among the Zygopterans. In the present study, we assessed the phylogentic relationships of 3 Coenagrionidae members (Ischnura aurora, Ceriagrion coromandelianum and Copera marginipes) using mitochondrial cytochrome oxidase subunit I (COI) gene marker. The partially amplified PCR product of this gene yielded 606 bp, 573 bp and 616 bp long DNAs respectively. The nucleotide BLAST analysis confirmed the taxonotomic identity of all these species. We had taken two species from Coenagrionidae and Calopterygidae families from NCBI GenBank for comparative study. Phylogenetic tree constructed by Neighbour joining method showed that Coenagrionidae members represent monophyletic ancestry due to its consistent divergence from a common ancestor. Among these members, Ischnura aurora are having a sister clade relationship with Copera marginipes which remained in the same clade and Ceriagrion coromandelianum with C. cerinorubellum in another clade. The average A+T content of all these species are 62.03% while G+C content is 37.97% showing a strong A+T bias. The nucleotide substitution analysis states that Copera marginipes is having highest value than other members due to the transition of Cytosine and Thymine. Thus the present study concluded that cytochrome oxidase I is an effective tool for the species identification and phylogenetic relationships of closely related species." (Authors)] Address: Sebastian, C. D., Molecular Biology Laboratory, Department of Zoology, University of Calicut, Kerala, India. E-mail: drcdsebastian@gmail.com

18363. Kastner F.; Buchwald, R.; Willen, M. (2015): Artenhilfsprogramme für die FFH Libellenarten Aeshna viridis, Coenagrion mercuriale und Coenagrion ornatum in NW-Deutschland. Abschlussbericht zum gleichnamigen DBU-Projekt, Oldenburg: 59 pp, Anh. (in German) ["The development of watercourses and the intensification of land use have led to a loss of many typical floodplain habitats and small water bodies. This loss of primary habitats can be compensated for a number of species by colonising anthropogenic ditch systems as secondary habitats. The odonates A.

viridis, C. mercuriale and C. ornatum, which were selected as target species in this project, are classified as "Critically Endangered" (RL 2), "Critically Endangered" (RL 1) or "Extinct" (RL 0) on the German Red List as well as for Lower Saxony and North Rhine-Westphalia and are listed in the Annexes of the Habitats Directive. The aim of the project was to determine the current distribution and population structure of the three dragonfly species in the study areas and to describe the colonised habitats in more detail. Based on this, initial measures for habitat optimisation and habitat connectivity were carried out as the basis for a species protection concept. A. viridis, which is bound to Stratiotes aloides plants, was detected in the Hunte-Weser lowlands in the sub-areas NSG Bornhorster Huntewiesen, Iprump/Oberhausen, Huntorf and Warfleth as well as in the areas of Delmenhorst, NSG Werderland and NSG Hollerland. However, the recorded exuviae numbers per sub-area differ significantly from each other. The importance of large and dense emersed S. aloides stands for the occurrence of A. viridis can be confirmed and a lower threshold value of 20 % cover or 12 m^2 growth area of a S. aloides stand can be determined. In terms of water chemistry, the colonised ditches are classified as meso- to eutrophic and moderately to significantly anthropogenically polluted. The results of the reintroduction of S. aloides into suitable water bodies show that this is a suitable method for planning and implementing species protection measures precisely targeted at target species. For the long-term protection and conservation of A. viridis and S. aloides populations, ecological ditch maintenance following the example of Bremen plays an essential role. The conservation, optimisation and networking of habitats (with S. aloides populations) is the basis for the protection of A. viridis. The populations of C. mercuriale in the areas of Espelkamp and Ilwede with Barlage and Großer Dieckfluss in the district of Minden-Lübbecke are among the largest of the species in North Rhine-Westphalia. The population of C. ornatum near Espelkamp represents the main population of the species in North Rhine-Westphalia. The colonised water bodies in Minden-Lübbecke are characterised as follows: narrow incised water bodies with wide banks, mostly strongly sunlit, low to moderate flow velocity, shallow water depth, cover of emersed vegetation between 20 % and almost 100 %, well-developed submerged vegetation, Characteristic plant species are Berula erecta, Phalaris arundinacea and Sparganium spp. In terms of water chemistry, the waters can be classified as eutrophic and moderately to significantly anthropogenically polluted. The dispersal tendency of C. mercuriale is very low overall, but few individuals travel long distances. For the long-term conservation of both species, the continuation of adapted watercourse maintenance and a further reduction of emerging woody plants along the Kleine Aue near Espelkamp play a decisive role. Furthermore, the drying up of water bodies and their eutrophication pose a challenge for the future conservation of both species." (Authors, DeepL)] Address: Kastner, Friedericke, AG Vegetationskunde und Naturschutz, IBU, Carl von Ossietzky Universität Oldenburg, 26111 Oldenburg, Germany. E-Mail: Friederike.Kastner@uni-oldenburg.de

18364. Krams, A.; Krama, T.; Trakimas, G.; Kaasik, A.; Rantala, M.J.; Škute, A. (2015): Reproduction is costly in an infected aquatic insect. Ethology Ecology & Evolution 29(1): 74-84. (in English) ["Internal energy reserves of animals are limited, and the current investment in reproduction often decreases survival or future reproductive success. Some studies showed that copulatory activities impair the strength of immune function in insects, while the recent evidence is contradictory. In this study we tested whether copulatory activity affects the rate of encapsulation response in males of Calopteryx splendens damselfly in allopatric populations, and in sympatric populations where C. splendens stay together with their superior competitor C. virgo. We also counted the number of eugregarines, which are common parasites of damselflies. Copulation activity did not affect the immunity of C. splendens males in allopatric populations. In sympatric populations C. splendens males had more gut parasites, and we found a significant interaction between parasite number and copulatory activity on the rate of encapsulation. Our results suggest that the costs of reproduction are higher in infected males, which may affect reproductive investment and sexual selection." (Authors)] Address: Krams, A., Institute of Ecology and Earth Sciences, Univ. of Tartu, Tartu, Estonia. E.mail: indrikis.krams@ut.ee

18365. Kreder, M.; Colleu, M.-A., Pont, L. (2015): Amélioration des connaissances de l'Agrion à lunules Coenagrion lunulatum sur le territoire du Parc naturel régional des Volcans d'Auvergne. Syndicat Mixte du Parc naturel régional des Volcans d'Auvergne: 49 pp + 16 p d'annexes.- (in French) ["C. lunulatum is a rare and discreet species found only in the French Massif Central. Its habitat is mainly comprised in the region of Auvergne, more specifically in the territory of the Volcans d'Auvergne Natural Regional Park, which is the entity responsible for the protection and preservation of this species. The study of 2014 aims at improving the knowledge of the habitat and distribution of this species. Surveys have identified 39 stations, whose 9 were not yet known.The analysis of the species' distribution shows a fragmented population, however without landscape discontinuity. Thus, according to the displacement abilities of the species, exchanges between different populations are hypothetically possible. The results of habitat characterization show the importance of the presence of emergent plants, but also highlights the importance of sunny banks, low intensity of pasture as well as the absence of fishes. A strategy of effective preservation of C. lunulatum will consist, on one hand, in the implementation of concrete and direct population management measures at the site scale and, on the other hand, by protecting a continuum of potentially favourable sites to different populations and thus allowing for the establishment of a sustainable population." (Authors)] Address: not stated

18366. Kulijer, D.; Miljevic, I. (2015): First record of Leucorrhinia caudalis for Bosnia and Herzegovina (Odonata: Libellulidae). Notulae odonatologicae 8(6): 176-183. (in English) ["On 30-vi-2013, a single young male of L. caudalis was col-

lected at a gravel pond near Banja Luka, Bosnia and Herzegovina. This is the first record of the species for the country and its southernmost occurrence in southeastern Europe, where it is an extremely rare species, restricted to the floodplains of the Sava and Danube Rivers. Recent surveys suggest further decline of the species in the region. Habitat characteristics at the capture site correspond with the previously described preferred habitats of the species. Floating and submerged vegetation was well developed and dominated by Potamogeton spp. and Myriophyllum spp., while sedges and reeds grew along the margins. The distribution, habitats and status of the species in the Balkans and central Europe are outlined and discussed (western Balkans, Hungary and Slovakia). Data on the species' distribution in western Europe are also provided." (Authors)] Address: Kulijer, D., National Museum of Bosnia and Herzegovina, Zmaja od Bosne 3, 71000 Sarajevo, Bosnia and Herzegovina. E-mail: dejan.kulijer@gmail.com

18367. Lancaster, L.T.; Dudaniec, R.Y.; Hansson, B.; Svensson, E.I. (2015): Latitudinal shift in thermal niche breadth results from thermal release during a climate-mediated range expansion. Journal of Biogeography 42(10): 1953-1963. (in English) ["Aim: Climate change is currently altering the geographical distribution of species, but how this process contributes to biogeographical variation in ecological traits is unknown. Range-shifting species are predicted to encounter and respond to new selective regimes during their expansion phase, but also carry historical adaptations to their ancestral range. We sought to identify how historical and novel components of the environment interact to shape latitudinal trends in thermal tolerance, thermal tolerance breadth and phenotypic plasticity of a range-shifting species. Location: Southern and central Sweden. Methods: To evaluate phenotypic responses to changes in the thermal selective environment, we experimentally determined the upper and lower thermal tolerances of > 2000 wild-caught damselflies (Ischnura elegans) from populations distributed across core and expanding range-edge regions. We then identified changing correlations between thermal tolerance, climate and recent weather events across the range expansion. Niche modelling was employed to evaluate the relative contributions of varying climatic selective regimes to overall habitat suitability for the species in core versus range-edge regions. Results: Upper thermal tolerance exhibited local adaptation to climate in the core region, but showed evidence of having been released from thermal selection during the current range expansion. In contrast, chill coma recovery exhibited local adaptation across the core region and range expansion, corresponding to increased climatic variability at higher latitudes. Adaptive plasticity of lower thermal tolerances (acclimation ability) increased towards the northern, expanding range edge. Main conclusions: Our results suggest micro-evolutionary mechanisms for several large-scale and general biogeographical patterns, including spatially and latitudinally invariant heat tolerances (Brett's rule) and increased thermal acclimation rates and niche breadths at higher latitudes. Population-level processes unique to climate-mediated range expansions may commonly underpin many broader, macro-physiological trends." (Authors)] Address: Lancaster, Lesley, Univ. of Aberdeen, School of Biological Sciences, Zoology Building, Tillydrone Avenue, Aberdeen AB24 2TZ, UK. E-mail: lesleylancaster@abdn.ac.uk

18368. Lauth, E. (2015): Sukzessionsstudie der Uferzonen des Wallersees und des Wenger Moores am Beispiel der Odonatenfauna. Reihe Gewässerschutz 17: 129-150.["At 13 different types of the shores of the Wallersee and in the Wenger Moor the adult dragonflies and exuviae were recorded before (1998) and after (2008) the increase of the water surface. The odonates regain areas with low water level and well developed vegetational structures. The comparative study clearly is referring to a trend of repopulation of these areas. In fact, the species richness and abundance of the odonates, which prefer dense reeds and extended plants with floating leaves, increased noticeable."] Address: Lauth, Elke, Hinterbuch 26, 5163 Perwang, Austria

18369. Lauth, E.; Waringer, J. (2015): Libellen als Bioindikatoren für den ökologischen Zustand der Seeufer der Trumer Seen. Reihe Gewässerschutz 17: 95-128. (in German, with English summary) ["For the first time dragonflies are used as bioindicators for the assessment of the ecological state of lakesides. In the study area the human influence is high. Drainage and fertilization cause a change in the vegetation of the lakesides. The dragonfly communities can clearly show these impacts." (Authors)] Address: Lauth, Elke, Hinterbuch 26, 5163 Perwang, AUstria

18370. Marino, N.A.C.; Srivastava, D.S.; Farjalla, V.F. (2015): Predator kairomones change food web structure and function, regardless of cues from consumed prey. Oikos 125(7) : 1017-1026. (in English) ["Predation risk in aquatic systems is often assessed by prey through chemical cues, either those released by prey or by the predator itself. Many studies on predation risk focus on simple pairwise interactions, with only a few studies examining community-level and ecosystem responses to predation risk in species-rich food webs. Further, of these few community-level studies, most assume that prey primarily assess predation risk through chemical cues from consumed prey, even heterospecific prey, rather than just those released by the predator. Here, we compared the effects of different predation cues (predator presence with or without consumed prey) on the structure and functioning of a speciose aquatic food web housed in tropical bromeliads. We found that the mere presence of the top predator (a damselfly) had a strong cascading effect on the food web, propagating down to nutrient cycling. This predation risk cue had no effect on the identity of colonizing species, but strongly reduced the abundance and biomass of the macroinvertebrate colonists. As a result, bacterial biomass and nitrogen cycling doubled, with a concomitant decrease in bacterial production, but CO2 flux was unaffected. These community and ecosystem effects of predator presence cues were not amplified by the addition of chemical cues from consumed prey. Our results show that some of the consequences of predation risk observed in controlled experiments with simplified food webs

may be observed in a natural, species-rich food web." (Authors)] Address: Marino, N.A.C., Lab. de Limnologia, Depto de Ecologia, Inst. de Biologia, Centro de Ciências da Saúde, Univ. Federal do Rio de Janeiro, PO Box 68020, Rio de Janeiro, RJ, Brazil. E-mail: nac.marino@gmail.com

18371. Mikó, Z.; Ujszegi, J.; Gál, Z.; Imrei, Z.; Hettyey, A. (2015): Choice of experimental venue matters in ecotoxicology studies: Comparison of a laboratory-based and an outdoor mesocosmexperiment. Aquatic Toxicology 167: 20-30. (in English) ["The heavy application of pesticides and its potential effects on natural communities has attracted increasing attention to inadvertent impacts of these chemicals. Toxicologists conventionally use laboratory-based tests to assess lethal concentrations of pesticides. However, these tests often do not take into account indirect, interactive and long-term effects, and tend to ignore different rates of disintegration in the laboratory and under natural conditions. Our aim was to investigate the importance of the experimental venue for ecotoxicology tests. We reared tadpoles of the agile frog (Rana dalmatina) in the laboratory and in outdoor mesocosms and exposed them to three initial concentrations of a glyphosate-based herbicide (0, 2 and 6.5 mg a.e./l glyphosate), and to the presence or absence of caged predators (dragonfly larvae [Aeshna cyanea]). The type of experimental venue had a large effect on the outcome: The herbicide was less lethal to tadpoles reared in outdoor mesocosms than in the laboratory. Further, while the herbicide had a negative effect on development time and on body mass in the laboratory, tadpoles exposed to the herbicide in mesocosms were larger at metamorphosis and developed faster in comparison to those reared in the absence of the herbicide. The effect of the herbicide on morphological traits of tadpoles also differed between the two venues. Finally, in the presence of the herbicide, tadpoles tended to be more active and to stay closer to the bottom of laboratory containers, while tadpole behaviour shifted in the opposite direction in outdoor mesocosms. Our results demonstrate major discrepancies between results of a classic laboratory-based ecotoxicity test and outcomes of an experiment performed in out-door mesocosms. Consequently, the use of standard laboratory tests may have to be reconsidered and their benefits carefully weighed against the difficulties of performing experiments under more natural conditions. Tests validating experimentally estimated impacts of herbicides under natural conditions and studies identifying key factors determining the applicability of experimental results are urgently needed." (Authors)] Address: Mikó, Z., Evolutionary Ecology Research Group, Plant Protection Institute, Centre for Agricultural Research, Hungarian Academy of Sciences, Herman Ottout 15, Budapest 1022, Hungary. E-mail: miko.zsanett@agrar.mta.hu

18372. Ngo, C.D.; Ngo, B.V.; Hoang, T.T.; Nguyen, T.T.T.; Dang, H.P. (2015): Feeding ecology of the common sun skink, Eutropis multifasciata (Reptilia: Squamata: Scincidae), in the plains of central Vietnam. Journal of Natural History 49(39-40): 2417-2436. (in English) ["We studied the feeding ecology of Eutropis multifasciata in the tropical plains of central Vietnam to understand better the foraging mode, spatiotemporal and sexual variation in dietary composition, and rarefaction curves of prey-taxon richness for males and females. Stomach contents (n = 161) were collected from October 2013 to May 2014 using a nonlethal stomach-flushing technique. A total of 680 food items (624 animal items and 56 plant items, [and including Odonata]) was found in 161 stomachs of skinks, representing 19 unique animal categories. We found that the diet of E. multifasciata is composed mainly of small, sedentary and clumped prey and that this skink specialises on spiders, insect larvae, snails, grasshoppers and crickets (with a combined importance index of 60%). Dietary composition, prey size and total prey volume in E. multifasciata changed between dry and rainy seasons and among regions. The total volume of food items consumed by males was larger than that of females, and the diversity and evenness index of prey categories were larger in males than in females. However, using rarefaction curves revealed that females have the higher prey-taxon richness after points between 130 and 140 prey items for frequency, and between 160 and 170 prey items for number of items, and the differences were not statistically significant. The foraging behaviour of E. multifasciata best fits a 'widely foraging' model." (Authors)] Address: Ngo, C.D., Faculty of Biology, College of Education, Hue University, Hue, Vietnam. E-mail: ndc6868@gmail.com

18373. Orlofske, S.A.; Jadin, R.C.; Johnson, P.T.J. (2015): It's a predator–eat–parasite world: how characteristics of predator, parasite and environment affect consumption. Oecologia 178(2): 537-547. (in English) ["Understanding the effects of predation on disease dynamics is increasingly important in light of the role ecological communities can play in host–parasite interactions. Surprisingly, however, few studies have characterized direct predation of parasites. Here we used an experimental approach to show that consumption of free-living parasite stages is highly context dependent, with significant influences of parasite size, predator size and foraging mode, as well as environmental condition. Among the four species of larval trematodes and two types of predators (fish and larval damselflies[Enallagma sp.]) studied here, parasites with larger infective stages (size >1,000 μm) were most vulnerable to predation by fish, while small-bodied fish and damselflies (size <10 mm) consumed the most infectious stages. Small parasite species (size approx. 500 μm) were less frequently consumed by both fish and larval damselflies. However, these results depended strongly on light availability; trials conducted in the dark led to significantly fewer parasites consumed overall, especially those with a size of <1,000 μm, emphasizing the importance of circadian shedding times of parasite free-living stages for predation risk. Intriguingly, active predation functioned to help limit fishes' infection by directly penetrating parasite species. Our results are consistent with established theory developed for predation on zooplankton that emphasizes the roles of body size, visibility and predation modes and further suggest that consumer–resource theory may provide a predictive framework for when predators should significantly influence parasite transmission. These results

contribute to our understanding of transmission in natural systems, the role of predator–parasite links in food webs and the evolution of parasite morphology and behavior." (Authors)] Address: Orlofske, Sarah, Dept of Ecology and Evolutionary Biology, University of Colorado, Boulder, CO, 80309, USA. E-mail: s.a.orlofske@gmail.com

18374. Pamungkas, D.W.; Ruspendi, E.C.A.; Ani, N.L. (2015): Diversity and distribution of dragonflies (Odonata) in Bromo Forest Area (BKPH Lawu Utara : KPH Surakarta) Central Java. Proceedings of International Conference on Life Sciences and Biotechnology(ICOLIB). Exploration and Conservation of Biodiversity, Jember. ISBN : 978-602-9030-98-3: 123-127. (in English) ["Odonates diversity in Bromo forest area (KPH Surakarta) was observed, where we recorded 21 species. Libellulidae was the richest family with 12 species and Orthretum was the most common genera. Zygoptera were represented by 7 species and 14 species represent Anisoptera. River stream along the forest area with multiple vegetation structure may provides good habitat to Odonata lives. Mostly odonates were aggregated due to habitat specific nature, the presence of family Gomphidae, P. reinwardtii in this study showed there is a good condition of water. A detailed list of odonates recorded from Bromo forest area is presented." (Authors)] Address: Pamungkas, D.W., Biodiversitas Study Club, Department Biology, Faculty of Mathematics and Science, Sebelas Maret University. Jl. Ir. Sutami 36A Surakarta 57126, Central Java, Indonesia. E-mail: diagal.wisnu@gmail.com

18375. Ramlee, S.N.S. (2015): Studies of breeding habitats and seasonal occurrence of mosquitoes in Putrajaya and Kuala Selangor, with laboratory experiments of guppies and dragonfly nymphs as potential biocontrol predators against mosquito larvae. PhD thesis, University of Malaya: xxviii, 305 pp. (in English) ["Mosquito control is essential for the control of vector borne diseases. Many synthetic insecticides are widely used for controlling adult and larval mosquito populations. However, there are multirole effects: e.g. the harmful effects of chemicals on non-target organisms, the development of resistance to these chemicals in mosquitoes and the recent resurgence of different mosquito-borne diseases. The objectives of this study are to determine the potential breeding habitats of the mosquitoes, mosquito indices, mosquito species, density of mosquito larvae, perceptions of respondents on bio control and to conduct captivity studies on predator–prey relationships. Entomological surveillance was carried out in six localities in the urban and suburban areas from January until December 2010 to identify potential breeding sites for mosquitoes and mosquito species populations. A total of 442 representative households in six localities were selected. Breeding habitats were sampled outdoors in the surroundings of the housing areas. There was a significant difference in the number of mosquito larvae collected, where the urban areas had a higher density in contrast to suburban areas. The study indicated that the most predominant species found in both areas was Aedes albopictus with gardening utensils as a preferred breeding habitat for urban area and artificial containers for suburban area. Entomological indices were calculated to predict future outbreaks in the localities. Ovitrap surveillance was carried out in one year to study the relationship between ovitrap surveillance and environmental parameters, which revealed no significant difference in the population numbers for both areas and no correlation to the environmental factors. Questionnaires on the perceptions of chemical in mosquito control and the potential use of bio control were distributed to staffs in health office and also public in both study areas. In general the public had high uncertainties (scoring on 'not sure' for all the 4 questions given ranging from 47.9% to 27%. This is due to the public being unfamiliar to bio control as indicated in question 1 (56%) in contrast to staff very aware on bio control (75%). Fatigue was the most frequently reported symptom by staff and breathing difficulty reported by public. Natural bio control agent surveillance was conducted in both study areas. Poecilicia reticulata and Odonata nymph species was the most natural predator collected at study areas. Three species of Odonata nymphs consumed more Aedes species than Culex species but there was no significant difference in the predator feeding efficiency. In terms of prey preferences of guppy, both male and female consumed more Aedes species than Culex species. The behaviour of mosquito larvae species and predator (guppy and Odonata nymph) species showed direct influence on the predatory activities. All predators exhibited diurnal activities; they were day-time stalkers and actively consumed more mosquito larvae during the day time. The efficiency of predatory activities depends on several factors such as water volume, number of predator, and number of prey density. These results concluded that both common biocontrol agent (guppies) and potential biocontrol agent (Odonata nymphs) are efficient predators in laboratory experiment and thus likely candidates to be utilized as an environmental friendly mosquito management strategy." (Author)] Address: not stated

18376. Salcher, M.; Schiel, F.-J. (2015): Neunachweise der Helm-Azurjungfer (Coenagrion mercuriale) bei Tübingen (Odonata: Coenagrionidae). Mercuriale 15: 5-12. (in German, with English summary) ["We report about new records of C. mercuriale west of the city of Tübingen in the federal state of Baden-Württemberg (southwestern Germany). The species was found there by the first author in the years 2013 to 2015 at eight sites in the valleys of the rivers Ammer and Neckar. The reproduction sites are small rivulets and ditches with dense aquatic and riparian vegetation, which are typical habitats for the species. The populations are separated both from those at the Prealpine Area and the Upper Rhine valley by distances from at least 70 km of mountainous and forested landscape. Therefore we suppose the populations to be overlooked. Furthermore there seems to be a high extinction risk because of the high isolation of the habitats." (Authors)] Address: Salcher, M., Poltringer Hauptstr. 97, 72119 Ammerbuch, Germany. E-mail: martin_salcher@web.de

18377. Samin, N.; Sakenin, H.; Thipaksorn, A. (2015): The species of Odonata (Insecta) from the Arasbaran Biosphere

Reserve and vicinity, northwestern Iran. Wuyi Science Journal 31(1): 85-92. (in English) [Arasbaran (East Azarbaijan province, northwestern Iran), Aeshna mixta, Anax ephippiger, Anax imperator, Anax parthenope, Calopteryx intermedia, Ischnura elegans ebneri, Ischnura evansi, Ischnura pumilio, Coenagrion vanbrinkae, Sonjagaster nobilis, Epallage fatime, Onychogomphus assimilis, Crocothemis erythraea, Libellula depressa, Orthetrum anceps, O. brunneum, O. ransonneti, O. sabina, Pantala flavescens, Trithemis annulata, T. arteriosa, T. festiva, T. kirbyi, Zygonyx torrida, Platycnemis dealbata] Address: Samin, N., Young Researchers & Elite Club, Science & Research Branch, Islamic Azad Univ., Tehran, Iran. E-mail: n_samin63@yahoo.com

18378. Sanchez-Guillen, R.A.; Cordoba-Aquilar, A.; Hansson, B.; Ott, J.; Wellenreuther, M. (2015): Evolutionary consequences of climate-induced range shifts in insects. Biological Reviews 9184): 1050-1064. (in English) ["Range shifts can rapidly create new areas of geographic overlap between formerly allopatric taxa and evidence is accumulating that this can affect species persistence. We review the emerging literature on the short- and long-term consequences of these geographic range shifts. Specifically, we focus on the evolutionary consequences of novel species interactions in newly created sympatric areas by describing the potential (i) short-term processes acting on reproductive barriers between species and (ii) long-term consequences of range shifts on the stability of hybrid zones, introgression and ultimately speciation and extinction rates. Subsequently, we (iii) review the empirical literature on insects to evaluate which processes have been studied, and (iv) outline some areas that deserve increased attention in the future, namely the genomics of hybridisation and introgression, our ability to forecast range shifts and the impending threat from insect vectors and pests on biodiversity, human health and crop production. Our review shows that species interactions in de novo sympatric areas can be manifold, sometimes increasing and sometimes decreasing species diversity. A key issue that emerges is that climate-induced hybridisations in insects are much more widespread than anticipated and that rising temperatures and increased anthropogenic disturbances are accelerating the process of species mixing. The existing evidence only shows the tip of the iceberg and we are likely to see many more cases of species mixing following range shifts in the near future." (Authors) Crocothemis erythraea] Address: Sanchez-Guillen, Rosa, Department of Biology, Lund University, Lund 223 62, Sweden. E-mail: rosa.sanchez_guillen@biol.lu.se

18379. Sivtseva, L.V. (2015): On the seasonal activity of Odonata in Central Yakutia. Sciene and Education 2015(4): 137-142. (in Russian, with English summary) ["The phenology of 25 species of damselflies and dragonflies in the cryosemiarid conditions of Central Yakutia is studied. Total flight activity of the imago is continued during 5 months from May to September. Six seasonal groups are revealed: hibernating – the first 10 days of May – the last 10 days of August (Sympecma paedisca), late spring-summer – the last 10 days of May – the last 10 days of July (3 species), late spring-late summer – the last 10 days of May – the last 10 days of August (1), summer – 10 days in the middle of June – the last 10 days of July (9), summer-late summer – 10 days in the middle of June – the first 10 days of September (9), and the summer-autumn – 10 days in the middle of July – the last 10 days of September (2 species). Emergence of damselflies and dragonflies from reservoirs occur within seventy days from the last 10 days of May to the last 10 days of July and their greatest diversity (25 species) is observed in the period from the 11th to the end of July. The period of seasonal flight activity of adults Odonata in the investigated area essentially does not differ from the period of flight in the North-East of the European part of Russia. The terms of flight of damselflies and dragonflies in the Central Yakutia, in comparison with phenological data of the north of the Far East appear longer for a month, and is shorter for a month than in the south of Siberia and the Far East." (Author)] Address: Sivtseva, L.V., Institute for Biological Problems of Cryolithozone SB RAS, Yakutsk, Russia

18380. Westermann, K.; Westermann, E. (2015): Exuvienfunde der Großen Moosjungfer (Leucorrhinia pectoralis) auf 940 m NN im Oberen Hotzenwald – erster Bodenständigkeitsnachweis im Schwarzwald. Naturschutz südl. Oberrhein 8: 118- (in German) [L. pectoralis: The first proof of successful reproduction by records of exuviae (20/25-V-2014) of at 940 m a.s.l. in the upper Hotzenwald, Baden-Württemberg, Germany is documented.] Address: Westermann, K., Buchenweg 2, 79365 Rheinhausen., Germany

18381. Winkler, C. (2015): Die Libellenfauna der Moor- und Heidegewässer im Raum Sorgwohld. Faun.-Ökol. Mitt. Suppl. 39: 53-64. (in German, with English summary) ["The dragonflies were mapped from April 7th to October 10th 2010 in the region around Sorgwohld (Schleswig-Holstein, northern Germany) at 24 standing waters of four bog and heathland areas. In total 32 species were recorded. The three most frequent species were Enallagma cyathigerum, Libellula quadrimaculata and Leucorrhinia rubicunda. For the threatened or near threatened species Coenagrion hastulatum, C. lunulatum, Lestes dryas, Aeshna juncea, A. subarctica elisabethae, Leucorrhinia dubia, L. pectoralis, L. rubicunda and Sympetrum flaveolum population size, habitats and effects of habitat management are presented and discussed. Most of these species prefer mesotrophic or oligotrophic bog or heathland waters. L. pectoralis, L. dryas, and S. flaveolum were found in recently established shallow waters only, which let presume that they benefit from the habitat management. All other threatened species benefit from management too, especially from cutting trees and scrubs at the edge of peat cuttings and restoration of wetlands." (Author)] Address: Christian Winkler Bahnhofstr. 25 24582 Bordesholm Email: chr.winkler@email.de

18382. Zamorova, M.A. (2015): The feeding of bream Abramis brama in the Danube lake Kotlabuh. Science. zap. Ternopil. nat. ped. un-tu. Ser. Biol., 2015, No 3-4 (64): 242-245. (in Ukrainian, with English summary) ["It was found out that in the Kotlabuh Lake the feeding range of bream A.

brama is quite wide and composed of organisms from 37 taxa. Regardless of the season, Dreissena polymorpha was the most important in the diet of bream (by weight). Besides, in the autumn there also were Lymnaeidae, larvae of Trichoptera, Hirudinea, larvae of Odonata, Ephemeroptera; in the spring - larvae of Ephemeroptera, Coleoptera, molluscs Unionidae, Viviparidae, larvae of Trichoptera and Hirudinea. According to the values of the index of relative importance for the whole period of studies Dreissena polymorpha, Oligochaeta, Amphipoda, Hirudinea and larvae of Trichoptera, Chironomidae dominated in bream's feeding. In spring and autumn gastropods can be considered as the favorite food of fish." (Author)] Address: Zamorova, M.A., I. I. Mechnykov Odesa National University, Ukraine

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18383. Jung, S.-W.; Min, H.-K.; Hwang, H.-S.; Seo, Y.-J.; Bae, Y.-J.; Paek, W.-K. (2016): Diversity of aquatic insects of Taean area in South Korea, with notes on species-specific distribution. Korean Journal of Environment and Ecology 30(1): 58- 70. (in Korean, with English summary) ["An investigation was carried out to study the diversity of aquatic insects, functional feeding groups (FFGs), habitat oriented groups (HOGs), and species-specific distribution in the Taean area in Korea from June to August, 2015. As a result, a total of 72 species belonging to 30 families and six orders were identified in all the investigated regions. Odonata (22 spp.: 30.56%) was the largest group in species richness followed by Coleoptera (21 spp.: 29.16%), Hemiptera (17 spp.: 23.61%) and Diptera (8 spp.: 11.11%) while for Ephemeroptera and Trichoptera, only two species (2.78%) were found. In addition, Plecoptera and Megaloptera inhabiting clean and flowing waters were not found. In the FFGs, predators (48 spp.: 66.67%) were relatively larger as represented by Odonata, Coleoptera, and Hemiptera, whereas shredders and scrapers were lower in proportion. The dominant groups of HOGs were swimmers (24 spp.: 33.33%), climbers (18 spp.: 25.0%), and sprawlers (12 spp.: 16.67%), which were characterized as aquatic insects community of island. Four species: Cybister lewisianus Sharp, Helophorus auriculatus Sharp, Agrypnia pagetana Curtis, Diplonychus esakii Miyamoto & Lee that are designated as Endangered, Near Threatened, and Vulnerable (Korean Red List) have been found to inhabitthe Taean area. Also, two species belonging to the exportable species group (Ceriagrion auranticum Fraser, Paracercion melanotum (Selys)) and one species belonging to the climate-sensitive biological indicator group (Ischnura elegans (Van der Linden)) were identified. In this study, four significant species including the Endangered are presented on the Korean distribution map based on the information in the national ecosystem survey accumulated for 7 years (2006-2012) by the Ministry of Environment." (Authors)] Address: Jung, S.-W., Research and Promotion Division, National Science Museum, Daejeon 34143, Korea

18384. Minot, M. (2016): Suivi des populations de Leucorrhinia pectoralis (Insecta: Odonata) et étude des habitats favorables à l'implantation de l'espèce dans le Canton de Neuchâtel. Master's Thesis, Université de Rouen: 48 pp, app. (in French, with English summary) ["After the restoration of peatlands which were previously exploited in two valleys, the dragonfly Leucorrhinia pectoralis settled down in the swiss Jura. This species listed at the second annexe of the Bern Convention is critically endangered in Switzerland. **18385.** As part of a 5 years populations study, this work enabled to estimate the size of the biggest populations based on the mark-recapture of 529 individuals. The numbers of mature males are estimated at 296 and 80 on both main peatlands. This is respectively as many and two times less than than in 2015. This decline for one of the populations is probably due to the unfavourable climatic conditions in 2016. Only three inter-peatland movements were observed. Two of them were done by immatures, among the 134 individuals that we marked. Contrary to the value found in the bibliography, the sex-ratio at the emergence seems to be much more favourable to the females with only 38 % of males. Beside the mark-recapture study, the vegetation was mapped and abiotic factors were recorded on 111 water ponds. A statistical study enabled then to highlight the environmental factors that attract L. pectoralis on the sites and are favourable to its reproduction. Habitats seems to be more attractive when the pH is high, with few sphagnum and the presence of Potentilla palustre and Typha latifolia. L. pectoralis prefers the water ponds with several different units of vegetation: a patchwork of structures. Conservation measures can be applied to maintain transition environments, which structure is similar to the old natural low-marshes. An example of management on 7 water ponds in the « Marais de Brot » based on dredging at regular time intervals was then presented." (Author)] Address: Minot, M., Normandie Univ, UNIROUEN, IRSTEA, ECODIV, 76000 Rouen, France. E-mail: m.minot@hotmail.fr

18386. Renner, S.; Sahlén, G.; Périco, E. (2016): Testing dragonflies as species richness indicators in a fragmented subtropical Atlantic forest environment. Neotropical Entomology 45(3): 231- 239. (in English) ["We surveyed 15 bodies of water among remnants of the Atlantic Forest biome in southern Brazil for adult dragonflies and damselflies to test whether an empirical selection method for diversity indicators could be applied in a subtropical ecosystem, where limited ecological knowledge on species level is available. We found a regional species pool of 34 species distributed in a nested subset pattern with a mean of 11.2 species per locality. There was a pronounced difference in species composition between spring, summer, and autumn, but no differences in species numbers between seasons. Two species, Homeoura chelifera and Ischnura capreolus, were the strongest candidates for regional diversity indicators, being found only at species-rich localities in our surveyed area and likewise in an undisturbed national forest reserve, serving as a reference site for the Atlantic Forest. Using our selection method, we found it possible to obtain a tentative list of diversity indicators without having detailed ecological information of each species, providing a reference site is available for comparison. The method thus allows for indicator species to be selected in blanco from taxonomic groups that are

little known. We hence argue that Odonata can already be incorporated in ongoing assessment programs in the Neotropics, which would also increase the ecological knowledge of the group and allow extrapolation to other taxa." (Authors)] Address: Renner, S., Lab de Evolução e Ecologia, Centro Universitário Univates, Rua Avelino Talini, 171, Bairro Universitário, 95900-000 Lajeado, RS, Brasil; samuelrenner@hotmail.com

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18387. Kipping, J.; Clausnitzer, V.; Fernandes Elizalde, S.R. F.; Dijkstra, K.-D.B. (2017): The dragonflies and damselflies (Odonata) of Angola . African Invertebrates 58(1): 65-91. (in English) ["Prior to 2012, only 158 species of Odonata were known from Angola. Surveys in 2012 and 2013 added 76 species and two further additions in 2016 brought the national total to 236 species. We provide a revised checklist with taxonomic notes and discuss the history of research, the biogeography of the fauna, and the potential for further discoveries. The national total is likely to be above 300 species. This would make Angola one of the richest countries for Odonata in Africa. The endemic species formerly classified in Chlorocypha are transferred to Platycypha." (Authors)] Address: Kipping, J., BioCart Ökologische Gutachten, Albrecht-Dürer-Weg 8, 04425 Taucha/Leipzig, Germany

18388. Wang, X.; Zhang, Z.; Ren, H.; Chen, Y.; Wu, B. (2017): Role of soft matter in the sandwich vein of dragonfly wing in its configuration and aerodynamic behaviors. Journal of Bionic Engineering 14(3): 557-566. (in English) ["The microstructure of the main longitudinal veins of the dragonfly wing and the aerodynamic behaviours of the wing were investigated in this paper. The microstructure of longitudinal vein presents two circumferential chitin layers and a protein-fiber soft layer. The dragonfly wing is corrugated due to the spatial arrangement of longitudinal veins. It was found that the corrugation angle could significantly influence the lift/drag ratio across a range of attack angles by the wind tunnel experiments. The results of the finite element analysis indicate that the protein soft layer of vein facilitates the change of the corrugation angle by allowing substantial relative twisting deformation between two neighbouring veins, which is not possible in veins without a soft sandwich layer." (Authors)] Address: Wang, X., Dept of Engineering Mechanics, Appl. Mechanics Lab., Tsinghua Univ., Beijing 100084, China

18389. Ware, J.L.; Pilgrim, E., May, M.L.; Donnelly, T.W.; Tennessen, K. (2017): Phylogenetic relationships of North American Gomphidae and their close relatives. Systematic Entomology 42(2): 347-358. (in English) ["Intrafamilial relationships among clubtail dragonflies (Gomphidae) have been the subject of many morphological studies, but have not yet been systematically evaluated using molecular data. Here we present the first molecular phylogeny of Gomphidae. We include six of the eight subfamilies previously suggested to be valid, and evaluate generic relationships within them. We have included examples of all genera reported from the Nearctic except Phyllocycla. This sample includes all North American species of Ophiogomphus, which has allowed us to explore intrageneric relationships in that genus. Our particular focus is on the closest relatives of the genus Gomphus, especially those North American species groups that have been commonly treated as subgenera of Gomphus. The Gomphus complex is split into additional genera, supported by molecular and morphological evidence: Phanogomphus, Stenogomphurus, Gomphurus and Hylogomphus are here considered to be valid genera. The genus Gomphus, in our restricted sense, does not occur in the western hemisphere; in addition, G. flavipes is transferred to Stylurus." (Authors)] Address: Ware, Jessica L., Dept of Biology, Rutgers University, Newark, NJ, USA. E-mail: jware42@andromeda.rutgers.edu

18390. Wellenreuther, M. (2017): Balancing selection maintains cryptic colour morphs. Molecular Ecology 26: 6185-6188. (in English) ["Animals display incredibly diverse colour patterns, a testament to evolution's endless innovation in shaping life. In many species, the interplay between males and females in the pursuit of mates has driven the evolution of a myriad of colour forms, from the flashy peacock tail feathers to the tiniest colour markings in damselflies. In others, colour provides crypsis by allowing to blend into the background and to escape the eyes of predators. While the obvious benefits of this dazzling diversity for reproduction and survival seem straightforward, its maintenance is not. Theory predicts that genetic drift and various forms of selection reduce variation over time, making the persistence of colour variants over generations a puzzle. In this issue of Molecular Ecology, Lindtke et al. (2017) study the cryptic colour morphs of Timema cristinae walking sticks to shed light on the genetic architecture and mechanisms that allow colour polymorphism maintenance over long timescales. By combining genome-wide data with phenotyping information from natural populations, they were able to map the green and melanistic colour to one genomic region with highly reduced effective recombination rate between two main chromosomal variants, consistent with an inversion polymorphism. These two main chromosomal variants showed geographically widespread heterozygote excess, and genomic signatures consistent with long-term balancing selection. A younger chromosomal variant was detected for the third morph, the green-striped colour morphs, in the same genomic regions as the melanistic and the green-unstriped morphs. Together, these results suggest that the genetic architecture of cryptic T. cristinae morphs is caused by nonrecombining genomic blocks that have been maintained over extended time periods by balancing selection making this study one of the few available empirical examples documenting that balancing selection of various forms may play an important role in maintaining adaptive genetic variation in nature." The paper includes references to Ischnura elegans. (Authors)] Address: Wellenreuther, Maren, Seafood Res. Unit, Plant & Food Research Limited, Nelson, New Zealand. Email: maren.wellenreuther@plantandfood.co.nz

18391. Westenbrink, F.; Ketelaar, R. (2017): Veranderingen in de libellenfauna van de Gorsselse Heide: 1949-

2016. Brachytron 19(1): 22-34. (in Dutch, with English summary) ["The Gorsselse Heide is a heathland remnant with some bogs and ponds in an area called De Achterhoek in the eastern part of the Netherlands. Since 1949 was this nature area regularly visited by odonatologists who observed a total of 43 species of dragonflies. Acidification and desiccation resulted in a decrease and the disappearance of typical species like Sympecma paedisca, Leucorrhinia rubicunda and Aeshna juncea. Eutrophication in the second part of the former century caused an increase of Pyrrhosoma nymphula, Sympetrum sanguineum and Brachytron pratense. Since the beginning of this century species from the southern part of Europe were added to the species list. Due to climate changes Crocothemis erythraea, Aeshna affinis, Erythromma lindenii and Sympetrum fonscolombii colonized the Gorsselse Heide. A special observation was the settlement and rapid increase of Lestes virens and the simultaneous disappearance of L. sponsa. The last three years the area was intensively managed to restore the quality of the degenerated heath and ponds. As a consequence a rapid increase of former scarce species like Orthetrum cancellatum and Libellula depressa occurred. As the landscape of the Gorsselse Heide basically did not change, the observed variations in the dragonfly population seem to be a derivative of the extreme nationwide fluctuations seen the last decades in the Netherlands and Flanders." (Authors)] Address: Westenbrink, F. E-mail: f.westenbrink@kpnmail.nl

18392. Westermann, K. (2017): Die Libellen des Hirschbädermooses im Feldberggebiet. Naturschutz am südlichen Oberrhein 9: 123-140. (in German, with English summary) ["The Hirschbädermoos is a moor which is mainly supplied by precipitation, and which is located in the Feldberg area (southern Black Forest) at an altitude of roughly 1280 m. In 2016, the moor dragonflies emerged there from 5th of June onwards. until and including the 2nd of September all exuviae were collected 15 times. until the end of the 20th century, this moor was the last remaining habitat in the Black Forest in which Aeshna caerulea bred. Since then, there have been no recordings and it is probably now extinct in the Black Forest. Although 2015 was a very hot and dry year, in 2016 main habitats of the moor dragonflies Aeshna subarctica, Leucorrhinia dubia, Somatochlora arctica und S. alpestris were found here. Therefore, an increase and stabilisation of the former two species must have occurred. In 2011, the upper parts of three old drainage ditches, which had a damaging effect on the moor, were blocked. It is very likely that this was the main cause for the population increase in some species. However, this measurement is not sufficient, because in 70 % of the 77 big pools and other water bodies, no or only very small populations of successfully emerged moor dragonflies were recorded. The water bodies dried up even in the “normal” summer of 2016 and were very likely dried up for a long period in 2015. Suggestions for a continuing reconstitution of the moor were elaborated. Moor dragonflies are perfectly suited as indicators of the condition of the water bodies in which they develop and also indirectly of the moor." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany

18393. Westermann, K. (2017): Zur Drift der Larven der Kleinen Zangenlibelle (Onychogomphus forcipatus) im Fluss-System Elz-Dreisam-Leopoldskanal-Restrhein. Naturschutz am südlichen Oberrhein 9: 141-154. (in German, with English summary) ["The drift of larvae of O. forcipatus in the river system Elz-Dreisam-Leopoldskanal-restrhein. According to investigations along a 34 km channel-like constructed section of the river system of the Elz, Dreisam, Leopoldskanal and restrhein (districts of Emmendingen and Breisgau-Hochschwarzwald, Baden-Württemberg) the hatching abundance of O. forcipatus reached a high number of up to 27 exuviae / meter and year along the river bank at the lower reaches. at the middle reaches, there were significantly fewer. In contrast, the abundance of adult males along the middle reaches was much higher than along the lower reaches. This phenomenon can only be explained by downstream drift of a high portion of larvae over a large distance which is compensated by an upstream flight movement of the imagoes. The downstream drift of the larvae facilitates the buildup of a large population of O. forcipatus with several hundreds of thousands of freshly emerged imagoes. Drifted larvae find a large supply of refuges which are protected from flooding and with lower stream velocity along the Leopoldskanal and lower reaches of Elz and Dreisam. In the significantly warmer eutrophic lower reaches, which are presumably richer in feed, the development is faster, leading to an earlier emergence on average of the imagoes. adult imagoes gather along the middle reaches in the area of quickly flowing and turbulent sections, which seem to be the preferred sites for pairing and oviposition. the eggs and young larvae are deposited on water which is cooler and has higher oxygen levels than in the lower reaches. If this drift is enforced due to severe floods in the form of a „catastrophic drift“ or if the larvae drift more spontaneously as a strategy in view of an advantage of the biology of the population, remains unclear." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany

18394. White III, H.B.; O'Brien, M.F. (2017): Naming an undescribed dragonfly: Williamson's Williamsonia and the travails of R. Heber Howe Jr.. Northeastern Naturalist 24 (Monograph 14): 1-43. ["R. Heber Howe Jr. (1875–1932), a New England preparatory school teacher and natural historian, became interested in dragonflies after one of his students found the rare Williamsonia lintneri (Hagen) school property. Subsequently, Howe quickly became a prominent regional authority on Odonata through his own studies and through his frequent correspondence with E.B. Williamson and other established dragonfly authorities. In 1922, while Howe was drafting an article on the history of W. lintneri, Williamson discovered a second species of Williamsonia, which Howe may have also recognized. Correspondence archived from this period reveals a dispute between Howe and Williamson about naming and describing the new species that peripherally involved Philip P. Calvert and Clarence H. Kennedy, other well-established dragonfly specialists, and Canadian entomologists James H. McDunnough and Edmund M. Walker. Howe's position in the dispute that the new species had previously been named in the literature, though not

formally described, did not prevent Williamson from describing and naming Williamsonia fletcheri. Yet behind the scenes, expressed in letters, the saga reveals tensions that can develop, exposing personality traits, among specialists with competing interests." (Author)] Address: White III, H.B., Dept of Chemistry & Biochemistry, University of Delaware, Newark, DE 19716, USA. E-mail: halwhite@udel.edu

18395. Wiederman, S.D.; Fabian, J.M.; Dunbier, J.R.; O'Carroll, D.C. (2017): A predictive focus of gain modulation encodes target trajectories in insect vision. eLife 2017; 6:e26478: 19 pp. (in English) ["When a human catches a ball, they estimate future target location based on the current trajectory. How animals, small and large, encode such predictive processes at the single neuron level is unknown. Here we describe small target-selective neurons in predatory dragonflies that exhibit localized enhanced sensitivity for targets displaced to new locations just ahead of the prior path, with suppression elsewhere in the surround. This focused region of gain modulation is driven by predictive mechanisms, with the direction tuning shifting selectively to match the target's prior path. It involves a large local increase in contrast gain which spreads forward after a delay (e.g. an occlusion) and can even transfer between brain hemispheres, predicting trajectories moved towards the visual midline from the other eye. The tractable nature of dragonflies for physiological experiments makes this a useful model for studying the neuronal mechanisms underlying the brain's remarkable ability to anticipate moving stimuli." (Authors) Hemicordulia tau] Address: Wiederman, S.D., Adelaide Medical School, University of Adelaide, Adelaide, Australia. E-mail: wiederman@adelaide.edu.au

18396. Wildermuth, H. (2017): Die Libellenfauna (Odonata) zweier neu angelegter Wiesenweiher - Sukzession, Prädation, Manipulation. Libellula 36: 109-134. (in German, with English summary) ["Odonata of two newly created meadow ponds: succession, predation, and manipulation – In the southern Canton of Zürich (Switzerland) the Odonata fauna of two meadow ponds, created in autumn 2010, was recorded on 72 days from 2012 to 2017. In total, ca 1.000 data sets were collected for 37 recorded species, 14 of them with regular reproduction. The results are summarized in tables with regard to the following aspects: (1) yearly presence and evidenced reproduction of all species, (2) maximum yearly number of imagines per recording day, and (3) number of recording days per year with presence of the species. Spectrum of species, origin, and reproduction success of the various species are discussed in respect of the neighbouring potential of species, water regime, water fowl as possible predators, vegetation and its succession, and clearing of prevailing aquatic vegetation. For the promotion of the local odonate fauna at newly created small ponds in rural landscape adequate habitat maintenance is indispensable." (Author)] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

18397. Williams, E.B.; Chumchal, M.M.; Drenner, R.W.; Kennedy, J.H. (2017): Seasonality of odonate-mediated methyl mercury flux from permanent and semi-permanent ponds and potential risk to red-winged blackbirds (Agelaius phoeniceus). Environmental Toxicology and Chemistry 36 (10): 2833-2837. (in English) ["Methyl mercury (MeHg) is an aquatic contaminant that can be transferred to terrestrial predators by emergent aquatic insects such as odonates. We assessed the effects of month and pond permanence on odonate-mediated MeHg flux (calculated as emergent odonate biomass x MeHg concentration) in 10 experimental ponds and the potential risk to nestling red-winged blackbirds (Agelaius phoeniceus) posed by consuming MeHg-contaminated odonates. Emergent odonates were collected weekly from permanent ponds with bluegill (Lepomis macrochirus) (n = 5) and semi-permanent ponds without fish (n = 5) over an 8-month period (January - August, 2015). Methyl mercury flux from damselflies, aeshnid dragonflies and libellulid dragonflies began in March and peaked in April, May and June, respectively, and then declined throughout the rest of the summer. Odonate-mediated MeHg flux from semi-permanent ponds without fish was greater than odonate-mediated MeHg flux from permanent ponds with fish. Nesting of red-winged blackbirds overlapped with peak odonate emergence and odonate-mediated MeHg flux. Because the diet of nestling red-winged blackbirds can be dominated by damselflies and dragonflies, we tested the hypothesis that MeHg-contaminated odonates may pose a health risk to nestling red-winged blackbirds. Methyl mercury concentrations in odonates exceeded wildlife values (the minimum odonate MeHg concentrations causing physiologically significant doses in consumers) for nestlings, suggesting that MeHg-contaminated odonates can pose a health risk to nestling red-winged blackbirds." (Authors)] Address: Williams, E.B., Dept of Biology, Texas Christian University, Fort Worth, Texas, USA.

18398. Willink, B.; Svensson, E.I. (2017): Intra- and intersexual differences in parasite resistance and female fitness tolerance in a polymorphic insect. Proc. R. Soc. B 284 (1847): 8 pp. (in English) ["To understand host–parasite interactions, it is necessary to quantify variation and covariation in defence traits. We quantified parasite resistance and fitness tolerance of a polymorphic damselfly (Ischnura elegans), an insect with three discrete female colour morphs but with monomorphic males. We quantified sex and morph differences in parasite resistance (prevalence and intensity of water mite infections) and morph-specific fitness tolerance in the females in natural populations for over a decade. There was no evidence for higher parasite susceptibility in males as a cost of sexual selection, whereas differences in defence mechanisms between female morphs are consistent with correlational selection operating on combinations of parasite resistance and tolerance. We suggest that tolerance differences between female morphs interact with frequency-dependent sexual conflict, which maintains the polymorphism locally. Host–parasite interactions can therefore shape intra- and intersexual phenotypic divergence and interfere with sexual selection and sexual conflict." (Authors)] Address: Willink, Beatriz: E-mail: beatriz.willink@biol.lu.se

18399. Worthen, W.B. (2017): Perch selection in a guild of tropical dragonflies (Odonata: Libellulidae): relationships with body size and thermal ecology. International Journal of Odonatology 20(2): 63-78. (in English) ["In the temperate zone, male perch height of co-occurring dragonfly species (Odonata: Libellulidae) often correlates with species body size. I tested for this relationship in a guild of tropical dragonflies at a wetland at La Selva Biological Station, Heredia, Costa Rica. Males of 12 species were observed perching in January–February 2016. Mean male perch height was positively correlated with species body size. For six common species, I quantified differences in perch substrate selection, relationships between diurnal activity, temperature and radiation, and aggressive interactions. The largest species, Libellula herculea and Orthemis discolor, exhibited typical heliotherm behavior: they used sunny perches at mid-day, and activity correlated more with radiation than temperature. Orthemis cultriformis, a slightly smaller heliotherm, was active at mid-day but used shadier perches. Micrathyria atra – previously classified as a "behavioral endotherm" – behaved accordingly, avoiding over-heating by flying early and perching in moderate light. The smallest common species, Erythrodiplax fervida, departed from the expected "thermoconformer" behavior by showing no relationship between activity and temperature, perching throughout the day in shaded grasses. The medium-sized Cannaphila insularis was unusual, perching 1 m higher than other species. Like larger heliotherms, activity occurred mid-day and correlated with solar radiation. Larger species exhibited greater degrees of interspecific aggression than smaller species. Cannaphila insularis is a docile species, but juveniles and females resemble the larger, more aggressive O. cultriformis. I hypothesize that C. insularis perches high to escape harassment and "reproductive interference" by O. cultriformis." (Author)] Address: Worthen, W.B., Biology Dept, Furman Univ., Greenville, SC, USA, 29613. E-mail: wade.worthen@furman.edu

18400. Wright, I.A.; Belmer, N.; Davies, P.J. (2017): Coal mine water pollution and ecological impairment of one of Australia's most 'Protected' High Conservation-Value rivers. Water Air and Soil Pollution 228:90: 19 pp. (in English) ["The environmental regulation of a coal mine in the greater Sydney area has failed to recognise the importance of and protect a high conservation-value river located in a World Heritage listed area. This study measured the water quality and ecological health (using macroinvertebrates) of the Wollangambe River and its tributaries near the point of the waste water discharge of a coal mine and assessed the longitudinal impact for 22 km downstream. The investigation revealed two important aspects. The first is the significant impact of the waste water discharge when compared to the otherwise near-pristine condition of the high conservation value river system. The second is the spatial extent of the pollution from the mine that extends at least 22 km downstream from the outflow of coal mine wastes. The resulting water pollution is causing major impairment of the aquatic ecosystem, with reduced abundance, taxonomic richness and loss of pollution-sensitive macroinvertebrate groups. Water pollution from the mine includes thermal pollution, increased salinity and increased concentrations of zinc and nickel. The mine's waste discharge also strongly modified the river's ionic composition. The study also highlights the failure of the regulatory and governance systems that enable the mine to operate in a manner that causes major environmental impacts." Aeshnidae (Authors)] Address: Wright, I.A., School of Science & Health,Western Sydney Univ., Locked Bag 1797, Penrith 2751, Australia. E-mail: i.wright@westernsydney.edu.au

18401. Yano, A.; Urabe, M. (2017): Larval stages of Neoplagioporus elongatus (Goto and Ozaki, 1930) (Opecoelidae: Plagioporinae), with notes on potential second intermediate hosts. Parasitology International 66(2): 181-185. (in English) ["Highlights: •Cercaria of Neoplagioporus elongatus were identified using a molecular technique. •The cercaria was cotylomicrocercous-type developing in Semisulcospira nakasekoae. •Experimental 2nd-intermediate hosts are oligochaetes, leeches and some dragonflies. Abstract: The morphology of sporocysts and cercariae of Neoplagioporus elongatus (Goto and Ozaki, 1930) is described for the first time. A cotylomicrocercous cercaria obtained from the sorbeoconch snail Semisulcospira nakasekoae was confirmed to be the cercaria of N. elongatus, based on the degree of sequence identity of the COI gene to that of adult worms. Freshwater annelids (oligochaetes and leeches) and some aquatic insects (odonates) were demonstrated experimentally to be potential second intermediate hosts." (Authors)] Address: Urabe, M., Dept of Ecosystem Studies, School of Environmental Science, The University of Shiga Prefecture, 2500 Hassaka, Hikone, Shiga 522-8533, Japan. E-mail: urabe@ses.usp.ac.jp

18402. Younes, A.; El-Sherief, H.; Gawish, F.; Mahmoud, M. (2017): Experimental evaluation of Odonata nymph in the biocontrol of schistosomiasis intermediate hosts. Asian Pacific Journal of Tropical Biomedicine 6(12): 995-1000. (in English) ["Highlights: •Bulinus truncatus and Biomphalaria alexandrina snails are obligatory hosts of Schistosoma. •Elimination or reducing these snails will reduce the chances of transmission of Schistosomiasis disease. •The predator Hemianax ephippiger was evaluated against these snails. •H. ephippiger can be used in biological control of the freshwater snails. Abstract: Objective: This study has been carried out to evaluate the predatory potential of the Odonata nymph on freshwater snails that serve as intermediate hosts for Schistosoma species (Bulinus truncatus and Biomphalaria alexandrina). Methods: Observations on the searching, attacking and devouring of the two snail types with series of laboratory-based predation experiments, whose aims were to determine daily predation rate, differential predation, prey preference considering small-, medium- and large-sized snails were conducted. Results: Laboratory evaluation revealed that, the Odonata nymph could kill and consume the two intermediate hosts. The number of snails consumed differed according to the snail type, size and density. The times taken for searching and handling times were dependent on

the snail size, type and satiation of the predator. The predation rate varied also with respect to snail type, size and density. This study also evaluated that Odonata nymphs consumed more B. truncates per unit time than B. alexandrina, and that there may be a preference for smaller than larger snails. Conclusion: According to our observation, the predator, H. ephippiger nymph may be a suitable bio-control agent in connection with Schistosoma intermediate hosts." (Authors)] Address: Younes, A., Dept Entom., Fac. of Science, Cairo Univ., Giza, Egypt. E-mail: alyyounes@hotmail.com

18403. Yu, X. (2017): An overview of taxonomy of the family Calopterygidae and checklist of China. Highlights of Sciencepaper Online, 2017,10(15): 1701-1706. (in Chinese, with English summary) ["Calopterygidae is the most beautiful species of Odonata. China is one of the countries in which calopterygids have the highest diversity. In this paper, the taxonomic history of Calopterygidae insect was reviewed briefly with a checklist of Chinese species, including 12 genera and 38 species. This work added a new record of China, and provided basic information for further related research." (Author)] Address: College of Life Sciences, Nankai University, Tianjin 300071

18404. Zamoroka, A.M.; Bidychak, R.M.; Geriak, Yu.M.; Glotov, S.V.; Kaprus, I.Ya.; Kozoriz, Yu.H.; Martynov, A.V.; Mykhayliuk-Zamoroka, O.V.; Pushkar, T.I.; Rizun, V.B.; Slobodian, O.M.; Smirnov, N.A.; Utevsky, S.Yu.; Shparyk, V.Yu. (2017): Distribution of rare invertebrate animals listed in the Red Data Book of Ukraine in Ivano-Frankivsk Region. Ukrainian Entomological Journal 2(13): 77-94. (in Ukrainian, with Russian and English summaries) ["In the current study we present comprehensive list of 65 rare invertebrate animal species listed in third edition of the Red Data Book of Ukraine and their records in Ivano-Frankivsk Region of Ukraine. Some of the listed species are under protection of International legal acts such as Bern Convention – 15 species, European Red List – 14 species, Red List of IUCN – 21 species and EU Habitats Directive – 11 species. We provide detail data on their records, estimation of populations size and their range in Ivano-Frankivsk Region. We found that two species are, possibly, extinct in the Region. Populations of three species are critically endangered and dramatically decreasing in the size. Fifteen species are characterized by small and stable populations. We revealed that populations of fourteen species are large in size with high density of individuals. Two species rapidly increased their range northward and currently penetrated into Ivano-Frankivsk Region. However, there are no sufficient data on population size for the rest 29 species. We described distribution of the rare species within Ivano-Frankivsk Region. According to our data, 21 species are widely distributed in the Region occupying the Carpathian Mountains, the Precarpathian Lowland and the Podillya Eminence. Seventeen species were registered only in the Carpathian Mountains; all other species distributed mainly within the Precarpathian Lowland and/ or the Podillya Eminence. Present data can be used in preparation the IV edition Red data Book of Ukraine, and also be a base for creation Red book of Ivano-Frankivsk Region." (Authors)] Address: Zamoroka, A.M.. E-mail: andrii.zamoroka@pu.if.ua,

18405. Zeuss, D.; Brunzel, S.; Brandl, R. (2017): Environmental drivers of voltinism and body size in insect assemblages across Europe. Global Ecology and Biogeography 26(2): 154-165. (in English) ["Aim: General geographical patterns of insect body size are still a matter of considerable debate, mainly because the annual number of generations (voltinism) and its relationship with body size have largely been ignored. We present the first analyses of voltinism and body size of insect assemblages at a continental scale using lepidopteran and odonate species. We hypothesize that voltinism is strongly driven by environmental conditions and constrains body size on macroecological scales. Location: Europe. Methods: We compiled the distribution, voltinism and body size of 943 lepidopteran and odonate species within a 50 km × 50 km grid system, thereby presenting a novel method for estimating the body volume of species from digital images. Regressions and structural equation modelling were applied to distinguish the effects of temperature, productivity and season length on mean voltinism and body size within grid cells. We accounted for spatial autocorrelation with autoregressive models and analysed the possible effect of species richness and intraspecific variability. Results: Voltinism consistently decreased with latitude for both lepidopterans ($r^2 = 0.76$) and odonates ($r^2 = 0.86$), with species having on average fewer generations per year in northern Europe and more generations per year in southern Europe. The effects of temperature, productivity and season length on body size contrasted in sign between lepidopterans and odonates, leading to opposing geographical patterns across Europe. Main conclusions: Voltinism in insect assemblages is strongly driven by environmental temperature, and trade-offs between voltinism and body size influence the occurrence of species at macroecological scales. Insects with the ability to extend their generation time over multiple years can overcome this constraint, allowing for a relatively large body size in cold areas. Our results furthermore support the idea that body sizes of terrestrial and aquatic insects form contrasting geographical patterns because they are differently affected by temperature and resource constraints." (Authors)] Address: Zeuss, D., Faculty of Biology, Dept of Ecology – Animal Ecology, Philipps-Univ. Marburg, Karlvon-Frisch-Str. 8, 35043 Marburg, Germany. E-mail: dirk.zeuss@biologie.uni-marburg.de

18406. Zeyghami, S.; Bode-Oke, A.T.; Dong, H. (2017): Quantification of wing and body kinematics in connection to torque generation during damselfly yaw turn. Science China Physics, Mechanics & Astronomy 60(014711): 13 pp. (in English) ["This study provides accurate measurements of the wing and body kinematics of three different species of damselflies in free yaw turn flights. The yaw turn is characterized by a short acceleration phase which is immediately followed by an elongated deceleration phase. Most of the heading change takes place during the latter stage of the flight. Our observations showed that yaw turns are executed via drastic rather than subtle changes in the kinematics of

all four wings. The motion of the inner and outer wings were found to be strongly linked through their orientation as well as their velocities with the inner wings moving faster than the outer wings. By controlling the pitch angle and wing velocity, a damselfly adjusts the angle of attack. The wing angle of attack exerted the strongest influence on the yaw torque, followed by the flapping and deviation velocities of the wings. Moreover, no evidence of active generation of counter torque was found in the flight data implying that deceleration and stopping of the maneuver is dominated by passive damping. The systematic analysis carried out on the free flight data advances our understanding of the mechanisms by which these insects achieve their observed maneuverability. In addition, the inspiration drawn from this study can be employed in the design of low frequency flapping wing micro air vehicles (MAV's)." (Authors)] Address: Zeyghami, S., Department of Mechanical and Aerospace Engineering, University of Virginia, Charlottesville, USA

18407. Zhang, R.; Xie, P.; Zhou, C.; Wang, C. (2017): Three-dimensional numerical study on the interaction of contralateral insect wings in asymmetric stroke. Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering 232(9): 1671-1684. (in English) ["A-symmetric flight of insects and birds is often seen in nature which is a conventional way for them to obtain the flexibility of maneuver in turning, hovering, and gliding. A numerical study on the interaction between contralateral wings of a dragonfly in asymmetric forward flight is carried out using the finite volume method. Various asymmetric flights with different advance ratios are considered where the aerodynamic forces, torques of each wing, pressure distributions, vorticity, and velocity fields are analyzed. A number of symmetric flights corresponding to the asymmetric flights are also studied. The results indicate that the interaction between the contralateral wings of a dragonfly is very small even when the dragonfly is in an asymmetric flight no matter how the advance ratios vary in the range concerned. With a typical example of asymmetric forward flights the difference in the mean value of vertical force coefficient is generally less than 5% compared with that for its corresponding symmetric flight. It is found that a small lateral flow region (LFR) is formed near the body, and there is a small lateral flow across the symmetric plane of the body. But this flow is very weak and resulted interaction between contralateral wings is very small. The result has confirmed in a way that dragonflies take a quite different way from fruit flies to obtain the lift with the contralateral wings. That is, fruit flies employ clap-and-fling mechanism which needs contralateral wings to be close enough to extrude the flow and generate lift, which means the contralateral two wings are so close that strong interaction happens, while dragonflies flap their contralateral wings on two sides of the vertical central plane with a relatively far distance between the wings where the interaction of contralateral wings is negligibly weak." (Authors)] Address: Peng Xie, Harbin Institute of Technology (Shenzhen) D207B HIT Campus in Univ. Town of Shenzhen, Shenzhen 518055, Guangdong, China. Email: xie.peng@hit.edu.cn

18408. Zheng, D.; Chang, S.-C.; Wang, B.; Zhang, H. (2017): New Early Cretaceous dragonfly Sinojagoria magna Li et al., 2012 (Odonata, Gomphaeschnidae) emending the Chinese tribe Sinojagorini. Cretaceous Research 74: 192-197. (in English) ["The monotypic dragonfly tribe Sinojagorini was only recorded from the Lower Cretaceous Yixian Formation of the Huangbanjigou outcrop of western Liaoning, NE China. Its diagnostic characters are incomplete because its subordinates were established based on forewings and fragmentary hindwings or only forewings. A well-preserved dragonfly attributed to Sinojagoria magna Li et al., 2012 is described herein from the same horizon and locality of the type specimen, not only improving the description of this species but also providing additional diagnostic characters for Sinojagorini. The new specimen further supports the sister-group relationship between Sinojagorini and the remaining Gomphaeschnaoidinae." (Authors)] Address: Zheng, D., State Key Lab. of Palaeobiology & Stratigraphy, Nanjing Institute of Geology & Palaeontology, Chinese Academy of Sciences, 39 East Beijing Road, Nanjing 210008, China

18409. Zhu, C.; Wang, P.; Li, Y.; Chen, Z.; Li, H.; Ssebugere, P.; Zhang, Q.; Jiang, G. (2017): Trophic transfer of hexabromocyclododecane in the terrestrial and aquatic food webs from an e-waste dismantling region in East China. Environmental Science: Processes & Impacts 19(2): 154-160. (in English) ["A Trophic transfer of hexabromocyclododecane (HBCD) was investigated in both the terrestrial and aquatic food webs from an e-waste dismantling region in East China. The mean $\sum_3$HBCDs concentrations in the terrestrial species varied from 0.91 (0.16-1.85) ng g^{-1} lipid weight (lw) in Pantala flavescens to 40.3 (22.1-51.1) ng g^{-1} lw in rat (Rattus norvegicus). Isomeric profile indicated that a-HBCD presented a decreasing trend along the trophic level (TL) (from 97.2% to 16.3% of $\sum_3$HBCDs), while ɣ-HBCD showed a reversed trend (from 2.8% to 73.6% of $\sum_3$HBCDs). Trophic magnification factor (TMF) derived from the slope of regression line between TLs and ln-transferred $\sum_3$HBCDs was 0.10, suggesting a trophic dilution of HBCD in the terrestrial food web. By contrast, in the aquatic species, $\sum_3$HBCDs concentrations varied from 5.02 (3.5-6.55) ng g-1 lw in apple snail (Ampullaria gigas spix) to 45.9 (14.9-67.8) ng g-1 lw in grass carp (Ctenopharyngodon idellus). a-HBCD was the dominant isomer, followed by ɣ-HBCD in the majority of species. Positive linear relationship was observed in the plots of ln $\sum_3$HBCDs versus TLs (R2=0.81, p=0.06). TMF for $\sum_3$HBCDs was 6.36, indicating a trophic magnification of HBCD in the aquatic food web. Although these results demonstrated the distinct trophic transfer of $\sum_3$HBCDs in the different ecosystems, further research is needed to eliminate the uncertainty of the tendencies, due to the non-significant relationship and limited species." (Authors)] Address: Wang, P., State Key Lab. of Environmental Chemistry & Ecotoxicology, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing 100085, China. E-mail: qhzhang@rcees.ac.cn.

18410. Šidagyte, E.; Razlutskij, V.; Alekhnovich, A.; Ry-

bakovas, A.; Moroz, M.; Šniaukštaite, V.; Vaitonis, G.; Arbaèiauskas, K. (2017): Predatory diet and potential effects of Orconectes limosus on river macroinvertebrate assemblages of the southeastern Baltic Sea basin: implications for ecological assessment. Aquatic Invasions 12(4): 523-540. (in English) ["Invasive crayfish can affect macroinvertebrate assemblages and thus alter conventional macroinvertebrate-based ecological assessment. We aimed to reveal potential impacts of the North American crayfish Orconectes limosus on river assessment in the Neman River basin (southeastern Baltic Sea). A laboratory experiment using identical macroinvertebrate assemblages was conducted to compare feeding selectivity and effects between O. limosus and the European Astacus leptodactylus. Field experiments were conducted to evaluate potential impacts of O. limosus on disturbed and undisturbed crayfish-free macroinvertebrate assemblages: one dominated by Oligochaeta vs. one co-dominated by Ephemeroptera-Plecoptera-Trichoptera and Mollusca (EPT codominated). In the laboratory experiment, both crayfish species preferred feeding on Diptera (mostly chironomids), but O. limosus also selected Trichoptera and Ephemeroptera. Family richness did not change, but both species inflated the Shannon Diversity index by reducing Diptera domination. Astacus leptodactylus treatments had higher Shannon Diversity and percentage of EPT abundance compared to O. limosus treatments. Field experiments indicated (1) negative, (2) assemblage-specific, or (3) no effects of O. limosus on macroinvertebrate metrics. A negative effect, especially in the undisturbed assemblage, was observed on simple additive metrics based on taxa presence data, such as total or EPT family richness, or BMWP (Biological Monitoring Working Party) score. Assemblage-specific effects were indicated for some metrics based on relative abundances. In the Oligochaeta dominated assemblage, Shannon Diversity was inflated and the percentage of Oligochaeta abundance was reduced. In the EPT codominated assemblage Shannon Diversity was deflated while the relative abundance of Oligochaeta was not affected. No effects were observed when using the ASPT (Average BMWP Score Per Taxon) or percentage of EPT abundance. We conclude that O. limosus may have a more diverse predatory diet than A. leptodactylus, and thus can have a stronger effect on macroinvertebrate taxa sensitive to disturbances. Therefore, the invasion of O. limosus can alter macroinvertebrate assemblages and compromise conventional ecological assessment, even when it displaces resident Astacus species. ... No changes were observed in Odonata (Calopterygidae, Gomphidae) and Coleoptera abundances after terminating the experiment in any aquarium" (Authors)] Address: Šidagyte, E., Nature Research Centre, Akademijos St. 2, 08412 Vilnius, Lithuania. E-mail: e.sidagyte@gmail.com

18411. Anderson, C.B.; Johnson, M.; Lopez, M.E. (2018): Establishing habitat-specific indicator species in Tierra del Fuego with freshwater macroinvertebrates. New Zealand Journal of Marine and Freshwater Research 52(1): 145-154.["As a tool to understand Tierra del Fuego's basic ecology and detect changes due to human pressures, this study develops habitat bioindicators. We compared the freshwater benthic macroinvertebrates at 61 study sites in six habitat types: grassland streams, urbanised streams, forested streams, beaver ponds, lakes and peat bog ponds. Forty-nine taxa were identified; insects were the most diverse group. Beaver pond, lake and grassland stream assemblages were similar, as were those from lakes, grassland streams and peat bog ponds. Fourteen taxa were habitat-specific. In forests, these included mayfly scrapers (Andesiops, Meridialaris) and blackfly filterers (Gigantodax). In lakes, two copepod filterers were indicators, and in urban streams, one shredder (Aphroteniella) and three collector-gatherers (springtail, earthworm, aquatic worm). Predators (Corixa, Aeshna) were characteristic of peat bog ponds. Beaver ponds had no indicator species. Establishing links between species and ecosystems constitutes the beginning of a broader effort to understand anthropogenic impacts to Fuegian watersheds." (Authors)] Address: Anderson, C.B.. Institute of Polar Sciences, Environment & Natural Res., National University of Tierra del Fuego, Ushuaia, Tierra del Fuego, Argentina. E-mail: canderson@alumni.unc.edu

18412. Bried, J.T.; Murray, S.N.; Jog, S.K.; De Marco Jr, P. (2018): Emergence timing and fixation height in Pachydiplax longipennis (Odonata: Libellulidae) at varying substrate density and sunlight exposure. International Journal of Odonatology 21(3-4): 181-187. (in English) ["Emergence substrate and sunlight penetration inherently trade off in patchy vegetation. Given the importance of solar radiation at emergence, we expected greater sunlight availability in sparse vegetation to advance emergence timing and reduce the average height of emergence fixation. We used outdoor mesocosms stocked with varying cattail (Typha) densities and late-stage Pachydiplax longipennis larvae. As predicted, emergence based on exuviae observations began significantly earlier (5 d) at lower cattail density and greater sunlight exposure, with over 60% of the emergence completed midway into the experiment period, compared to about 50% in the medium and higher density cattail. This finding suggests lag effects under relatively limited light availability in a temperate-centered lentic-breeding heliotherm. Contrary to our prediction, we found significantly greater emergence heights at lower cattail density (x=18.0cm) than at medium (x=13.0cm) and higher (x=10.0cm) densities. We recommend further study of emergence heights using larval choice experiments in natural settings. Variation in emergence timing and fixation height under the substrate–sunlight tradeoff may be driven proximally by larval choices/development and ultimately by adult activity." (Authors)] Address: Bried, J.T., Dept Biological Sciences, Univ. of Arkansas, Fayetteville, AR, USA. E-mail: bried@uark.edu

18413. Bried, J.T.; Hinchliffe, R.P. (2018): Improving taxonomic resolution in large-scale freshwater biodiversity monitoring: an example using wetlands and Odonata. Insect Conservation and Diversity 12: 9-17. (in English) ["1. Immature aquatic insects are a major source of taxonomic difficulty in large-scale freshwater biodiversity monitoring. Adult stages could improve taxonomic resolution for assessing

distributions and trends of biodiversity. Odonata have accessible adult stages that should greatly enhance the amount of species-level information. 2. We used Odonata and a wetland monitoring programme in Alberta, Canada to illustrate how much taxonomic information can be lost in larval collections, and an extensive adult records database to estimate what could be gained from adult surveys. 3. Despite processing 22 638 odonate specimens from 975 wetlands throughout Alberta, larval monitoring failed to collect or identify almost 60% of the lentic-breeding Odonata species known from adult records. A total of 25 lentic-breeding dragonfly species and 12 lentic-breeding damselfly species were present in adult records and not the larval data, including species of conservation concern. Due to the abundance of early instars, a substantial 82% of the processed damselfly collection and 62% of the processed dragonfly collection was left at suborder. 4. We recommend supplementing aquatic sampling with adult rearing, collecting, and observing (at least Odonata) to improve the basic inventory and overall status assessment in large-scale freshwater biodiversity monitoring. This is especially true when aquatic sampling is restricted to a suboptimal time of year for species identifications." (Authors)] Address: Bried, J.T., Dept of Biological Sciences, University of Arkansas, Fayetteville, AR, USA. E-mail: bried@uark.edu

18414. Bried, J.T.; Siepielski, A.M. (2018): Opportunistic data reveal widespread species turnover in Enallagma damselflies at biogeographical scales. Ecography 41: 958-970. (in English) ["An information tradeoff exists between systematic presence/absence surveys and purely opportunistic (presence-only) records for investigating the geography of community structure. Opportunistic species occurrence data may be of relatively limited quality, but typically involves numerous observations and species. Given the quality-quantity tradeoff, what can opportunistic data reveal about spatial patterns in community structure? Here we explore opportunistic data in describing geographic patterns of species composition, using over 4,600 occurrence records of Enallagma damselflies in the United States. We tested phylogenetic scale (genus level, Enallagma major clades, Enallagma subclades) and spatial extent (U.S. vs. watershed regions), hypothesizing that nonrandom structure is more likely at larger spatial extents. We also used three sets of systematic presence/absence surveys as a benchmark for validating opportunistic presence-only records. Null model analysis of matrix coherence and species replacements showed many cases of nonrandom structure and widespread species turnover. This outcome was repeated across spatial and environmental gradients and community composition scenarios. Turnover dominated across the U.S. and two watersheds spanning biogeographic boundaries, but random assemblages were prevalent in a third watershed with limited longitudinal extent. Turnover also pervaded each level of phylogeny. Opportunistic presence-only datasets showed identical patterns as systematic presence/absence datasets. These results indicate that extensive opportunistic data can be used to detect species turnover, especially at geographic scales where range margins are crossed." (Authors)] Address: Bried, J.T., Department of Biological Sciences, University of Arkansas, Fayetteville, AR, USA. E-mail: bried@uark.edu

18415. Carey, N.; Strachan, S.R.; Robson, B.J. (2018): Impacts of Indian waterfern (Ceratopteris thalictroides (L.) Brongn.) infestation and removal on macroinvertebrate biodiversity and conservation in spring-fed streams in the Australian arid zone. Aquatic Conservation: Marine and Freshwater Ecosystems 28(2): 466-475. (in English) ["1. Removal of invasive macrophytes is a priority for river managers. However, the ecological effects of macrophyte removal on macroinvertebrate diversity are rarely examined but may be of particular significance in conservation reserves and when threatened species are present. 2. This study investigated the macroinvertebrate fauna inhabiting invasive and native macrophytes in spring-fed channels in the Millstream-Chichester National Park, Australia. The effects of waterfern management (periodic hand-weeding) were examined by comparing assemblages at weeded and unweeded reaches on three occasions. 3. Ceratopteris thalictroides harboured a diverse, insect-dominated macroinvertebrate assemblage, including the endangered damselfly Nosoticta pilbara. Total taxon richness was similar between waterfern and native macrophytes, but macroinvertebrate assemblages differed in the dry season. Damselflies (including N. pilbara) were associated with waterfern-dominated reaches, whereas dragonfly nymphs were more common among native macrophytes. 4. Weeding altered macroinvertebrate assemblage composition. Some weeded reaches developed assemblages indistinguishable from those in native-dominated reaches, but others did not. Weeded reaches often supported taxa that were rare or absent from waterfern-dominated reaches, including suspension feeders, found also in native-dominated reaches. 5. Odonata are particularly diverse at Millstream, with 18 species recorded. Odonate species richness was significantly lower at weeded reaches than unweeded reaches. Nosoticta pilbara and other short-range endemic species were absent from weeded reaches. As most odonates are univoltine, these adverse effects on local population size may affect species persistence. 6. Invasive macrophyte species may support a high diversity of native invertebrates, including endangered and short-range endemic species. Furthermore, although hand-weeding appeared to enable a greater diversity of species to co-exist, the removal of a large biomass of macrophytes appeared to remove whole cohorts of insect populations from stream reaches, including endangered species. Removal of invasive macrophytes should not be implemented without understanding their effects on invertebrate assemblage composition and life-cycles." (Authors)] Address: Robson, Belinda, Environmental and Conservation Sciences, Murdoch University, Murdoch Western Australia 6150. Email: b.robson@murdoch.edu.au

18416. Felker, A.S.; Vasilenko, D.V. (2018): A new genus and species of the damselfly family Hemiphlebiidae from the Lower Cretaceous Chernovskie Kopi locality (Eastern Transbaikalia). Paleontological Journal 52(2): 142-145. (in

English) ["Thairia transbaikalica Felker et Vasilenko, gen. et sp. nov. (Odonata, Hemiphlebiidae) from the Mesozoic Chernovskie Kopi locality is described. A short review of known genera of Hemiphlebiidae is provided. Relative age of enclosing rocks is discussed." (Authors) Original Russian Text © A.S. Felker, D.V. Vasilenko, 2018, published in Paleontologicheskii Zhurnal, 2018, No. 2, pp. 34–37.] Address: Felker, A.S., Paleontological Institute. A.A. Borisyak RAS, Moscow, Russia. E-mail: lab@palaeoentomolog.ru

18417. Henry, E.R.; Rivera, J.A.; Linkem, C.N.; Scales, J.A.; Butler, M.A. (2018): Damselflies that prefer dark habitats illustrate the importance of light as an ecological resource. Biological Journal of the Linnean Society 123(1): 144-154. (in English) ["Habitat associations provide clues to the resources that influence the life of animals. Food distribution, structural microhabitat or degree of insolation can determine species' strategies for energy acquisition, locomotor strategy or thermoregulation. A growing body of research suggests that insolation may be important not for heat, but rather for visual performance in communication, crypsis or prey capture. Odonates are famous for their heliothermic habitat associations. Megalagrion nigrohamatum nigrolineatum is a forest-dwelling damselfly endemic to the island of O'ahu and part of an ecologically diverse adaptive radiation with spectacular body coloration. Although many Megalagrion exploit full sun, nigrolineatum can be curiously found in deep shade raising the possibility that it is shade-seeking. Here, we show that nigrolineatum selects perches based on light, and not perch type or temperature. Surprisingly, they did not select the brightest locations available (as might be expected if they are extending their visual function in a challenging habitat), but chose darker perches in a fairly dark habitat. This strategy opens up niche space that is abundantly available in forests, yet little-occupied by other odonates. We discuss implications of shade-seeking for communication, evolutionary diversification and preserving future evolutionary potential." (Authors)] Address: Hernry, Elizabeth, Department of Biology, University of Hawaii at Manoa, 2538 McCarthy Mall, Edmondson 216, Honolulu, HI 96822, USA. E-mail: erh@hawaii.edu

18418. Jesús, F.; Hladki, R.; Gérez, N.; Besil, N.; Niell, S.; Fernández, G.; Heinzen, H.; Cesio, M.V. (2018): Miniaturized QuEChERS based methodology for multiresidue determination of pesticides in odonate nymphs as ecosystem biomonitors. Talanta 178(1): 410-418. (in English) ["Highlights: •A method to determine 73 pesticide residues in 0.2 g odonate nymphs was developed. •The methodology is simple, low cost, miniaturized and environmentally friendly. •LOQs of 1 μg kg^{-1} for many compounds were achieved. •Two positive findings of metsulfuron-methyl were obtained in real samples. •The developed and validated methodology can be used for monitoring programs. Abstract: The impacts of the modern, agrochemicals based agriculture that threatens the overall systems sustainability, need to be monitored and evaluated. Seeking for agroecosystems monitors, the present article focus in the occurrence and abundance of aquatic macroinvertebrates, that have been frequently used as bioindicators of water quality due to their relationship with land use. Some of these organisms are on the top of the food chain, where bioaccumulation and biomagnification processes can be observed, and they can turn into secondary pollution sources of systems and terrestrial organisms as well. Odonate nymphs, which belong to the functional group of predators, were selected for this study. A methodology to determine 73 pesticide residues in odonate nymphs by LC-MS/MS and GC-MS/MS was developed. A QuEChERS sample preparation strategy was adapted. As it is complex to obtain samples especially in disturbed ecosystems, the method was minimized to a sample size of 200 mg of fresh nymphs. The method was validated and good recoveries (71–120%) with RSDs below 20% for the majority of the studied pesticides at least at two of the assayed levels 1, 10 and 50 μg kg^{-1} were obtained. For 32 analytes the limit of quantitation was 1 μg kg^{-1} and 10 μg kg^{-1} for the others. The lineal range was observed between 1–100 μg kg^{-1} in matrix-matched and solvent calibration curves for most of the assessed pesticides. LC-MS/MS matrix effects were evaluated, 40% of the analytes presented low or no signal suppression. Only flufenoxuron presented high matrix effects. The obtained methodology is adequate for pesticide multiresidue analysis in aquatic macroinvertebrates (odonates) aiming to contribute to the ecological state evaluation of freshwater ecosystems." (Authors)] Address: Jesús, Florencina, Polo de Desarrollo Universitario Abordaje holístico, CenUR Litoral Norte Sede Paysandú, Univ. de la República, Ruta 3 km 363, Paysandú CP 60000, Uruguay

18419. Suhonen, J., Ilvonen, S.; Dunn, D.W.; Dunn, J.; Härmä, O.; Ilvonen, J.J.; Kaunisto, K.M.; Krams, I. (2018): Parasitism affects variation in a male damselfly sexual ornament. Ethology Ecology & Evolution 30(3): 256-266. (in English) ["Sexually selected ornaments in animals are costly, with parasitism often affecting the degree to which they are expressed. Male Calopteryx splendens damselflies exhibit melanised 'wing spots'. Those possessing large spots are favoured by females but also have an increased likelihood of being attacked by C. virgo, a common sympatric competitor. Melanin is used to produce the wing spots, but it is also used in immune defence against parasites that commonly infect damselflies. A total of 261 C. splendens males were collected from 26 Finnish and Latvian populations, of which half were found to be sympatric with C. virgo. It was found that males which originated from populations in which eugregarine parasites were present had smaller wing spots than individuals from parasite-free populations. Contrary to previous studies, the wing spots of C. splendens males in populations sympatric with C. virgo were not found to be smaller than those in allopatric populations. Parasite presence in C. splendens was found to be strongly associated with populations sympatric with C. virgo. The results suggest that the presence of C. virgo may increase rates of parasitism in C. splendens, and show that parasitism is an important additional factor to interspecific aggression in determining variation in the sizes of the wing spots of C. splendens males. These findings highlight a lack of understanding on the determinants of the expression of secondary sexual characters

and the processes of how parasitism affects hosts." (Authors)] Address: Suhonen, J., Dept of Biology, University of Turku, FI-20014 Turku, Finland

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18420. Debecker, S.; Stoks, R. (2019): Pace of life syndrome under warming and pollution: integrating life history, behavior and physiology across latitudes. Ecological monographs 89(1): 22 pp. (in English) ["To fully comprehend and predict the impact of drivers of global change such as climate warming and pollution, integrated multi-trait approaches are needed. As organismal traits are often correlated, responses to stressors are expected to induce coordinated changes in many traits. A promising framework to study this is the pace-of-life syndrome (POLS), which predicts the integration of life-history, behavioral and physiological traits along a fast-slow continuum. Using an integrative multi-trait approach we evaluated the presence of a POLS both within and across latitudes and how POLS patterns are affected by warming and metal pollution. We studied this in Ischnura elegans damselfly larvae of replicated low-and high latitude populations that strongly differ in voltinism (3-4 generations per year vs. 1 every two years) reared in a common-garden experiment at two temperatures. Across latitudes, life history, behavior and physiology covaried in accordance with the POLS, with the fast-paced low-latitude damselflies characterized by a fast growth rate, high activity and more explorative and risk taking behavior, fast metabolic rate and low investment in immune function (activity of phenoloxidase). This fast POLS strategy was associated with a higher sensitivity to metal exposure and a higher vulnerability to predation. Warming caused opposite responses between the latitudes consistent with differential thermal adaptation in growth rate, behavior and oxidative stress parameters. Despite this, damselflies of both latitudes showed a consistent pattern in phenotypic correlations among traits that, moreover was not affected by warming and metal exposure. Within latitudes there was no full support for the POLS. More active larvae were more explorative and risk taking, which aligned with the fast-slow life-history axis, but less strong than at the across-latitude level. Physiological traits were also integrated within latitudes, yet there was no unambiguous coupling with the fast-slow life-history continuum. The consistent syndrome structure, if underpinned by genetic correlations, may restrict the independent evolution of individual traits, yet may not necessarily constrain adaptive evolution of integrated trait sets. This is because the covariance pattern was to a large extent similar across latitudes and within latitudes, suggesting adaptive trait integration guiding adaptive evolution of trait sets along the fast-slow continuum." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, 3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

18421. Lavimi, R.; Hojaji, M.; Manshadi, M.D. (2019): Investigation of the aerodynamic performance and flow physics on cross sections of dragonfly wing on flapping and pitching motion in low Reynolds number. Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering 233(2):095441001773732: 589-603. (in English) ["In this research, the flow physics and aerodynamic performance of dragonfly cross sections, used in Micro Aerial Vehicles (MAVs), in low Reynolds are investigated. The main objective of the research is to study the performance of dragonfly wing cross-sections flapping motion in Reynolds 5000 and 10,000. Pitching motion is one of the most important mechanisms in force lifting generation, and the effects of Reynolds number and mean angle of attack on aerodynamic coefficients have been extensively investigated for the pitching motion. In the present study, the geometry of two cross sections of dragonfly was extracted. Incompressible, two-dimensional and unsteady Navier–Stokes equations have been used to simulate the flow. *k*-ε RNG model was used for turbulence modeling. To simulate the wing pitching motion, the dynamic mesh method was used. The results showed that in flapping motion, pitching-up rotation has caused a rapid increase in lift coefficient. Furthermore, it was found that the absence of stall does not increase the lift and drag coefficients, while formation of new strong vorticity layers have caused an increase in lift coefficient. On the other hand, corrugations on the cross sections of the dragonfly in the pitching motion cause the delay of separation and increasing the lift coefficient. In flapping motion and the pitching motion, the lift coefficients of three cross sections were increased due to stronger vorticity layers by reducing the Reynolds number. Due to the existence of corrugations, the first and the second cross sections have good aerodynamic performance, compared to the flat plate. The comparison carried out in the current research showed that the second cross section is a proper replacement for the flat plate in MAVs." (Authors)] Address: Lavimi, R., Dept of Mechanical Engineering, Najafabad Branch, Islamic Azad University, Najafabad, Iran

18422. Malkmus, R. (2019): Zur vertikalen Verbreitung der Libellen in den Tiroler Alpen um Mayrhofen (Odonata). Libellula 38(1/2): 71-92. (in German, with English summary) ["The vertical distribution of dragonflies in the surroundings of Mayrhofen (Tyrol) - During ten field trips to the mountains around Mayrhofen, Austria (Tuxer Alps, Zillertaler Alps, Kitzbüheler Alps) between 2012 and 2018, 14 species of Odonata were recorded at 40 localities (water bodies) between 1,800 and 2,500 m a.s.l.: 5 indigenous species (Coenagrion puella, Aeshna caerulea, A. juncea, Somatochlora alpestris, Leucorrhinia dubia), two species (Enallagma cyathigerum, Libellula quadrimaculata) with supposed reproduction and seven species (Lestes sponsa, Ischnura elegans, Pyrrhosoma nymphula, A. cyanea, Sympetrum danae, S. sanguineum, S. striolatum) as vagrants. The hitherto known maxima of the vertical distribution could be extended for nine species (L. sponsa, C. puella, E. cyathigerum, I. elegans, P. nymphula, A. cyanea, L. quadrimaculata, S. danae, S. sanguineum) with reference to Tyrol and for six species (E. cyathigerum, I. elegans, P. nymphula, A. cyanea, L. quadrimaculata, S. danae) with respect to Austria. At the sites on average three species of dragonflies were recorded, rarely more than five, and eleven at one locality. Aeshna caerulea,

A. juncea and S. alpestris were the only species with occurrence higher than 2,400 m a.s.l. and dominant at 28, 33 or 17 localities, respectively, within the investigated area. C. puella and E. cyathigerum that were recorded at 13 of 40 localities, were revealed as the most common species Many waters, mainly at altitudes between 1,800 and 2,300 m a.s.l., are impaired by tourism and livestock. In order to protect these sites effectively against trampling and pollution by grazing cattle it is recommended to fence the most important water bodies." (Author)] Address: Malkmus, R., Schulstr. 4, 97859 Wiesthal, Germany. E-mail: rudolf.malkmus@senckenberg.de

18423. Zou, P.-Y.; Lai, Y.-H.; Yang, J.-T. (2019): Effects of phase lag on the hovering flight of damselfly and dragonfly. Physical Review E 100(6): 14 pp. (in English) ["In this work we investigated the mechanisms of hovering flight of damselflies (Matrona cyanoptera) and dragonflies (Neurothemis ramburii) with different phase lag between fore- and hindwings. The flight motion of damselflies and dragonflies in hovering were first recorded with two high-speed cameras, and the difference between the hovering motions of both species were analyzed. Because of differences in evolution, damselflies and dragonflies normally fly with forewing or hindwing in the lead, respectively. The fore- and hindwings of dragonflies are different shapes. In contrast, those of damselflies are very similar in size and shape. Therefore, they use different hovering strategies to adapt to differences in body morphology. Comparing the differences of wing phases in hovering, this work shows that the interactions between fore- and hindwings greatly affect their vortex structure and flight performance. The wake of a damselfly sheds smoothly; a vertical force is generated steadily during the stage of wing translation. Damselflies hover with a longer translation phase and a larger flapping amplitude. In contrast, the root vortex of a dragonfly impedes the shedding of wake vortices in the up-stroke, which results in the loss of a vertical force; the dragonfly therefore hovers with a large amplitude of wing rotation.] Address: Yang, J.-T., Dept Engineering Science & Ocean Engineering, National Taiwan Univ., 10617 Taipei, Taiwan. E-mail: jtyang@ntu.edu.tw

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18424. Abdillah, M.M.; Lupiyaningdyah, P. (2020): Distribution, characteristic and behaviour of Rhinocypha anisoptera Selys, 1879 (Odonata: Zygoptera: Chlorocyphidae) in East Java. Zoo Indonesia 29(2): 94-102. (in English, with Indonesian summary) ["Rhinocypha anisoptera is distributed in Sumatra and Java. In Java, this species was previously recorded from Mount Wilis, Mount Arjuno, Mount Welirang, Mount Kawi, Nongkojajar, Mount Tengger, Mount Semeru, Ijen Crater and Baju-kidul, with most recent encounter at Mount Kelud. Despite the vast encounter localities, there was lack of specimens collected to reveal its typical characteristic and behavior. This study confirmed the existence of R. anisoptera at most localities in East Java as reported in 1934 by Lieftinck, with additional new distribution in Mount Anjasmoro. R. anisoptera is typically characterized by dark coloration at the hind wing leaving transparent in the bases with metallic blue-tinged covering 4–5 % area in mid-section of the hindwing. Differ from other Chlorocyphidae, R. anisoptera perch on leaves more frequently compared to perching on twigs and rocks near waterways." (Authors)] Address: Lupiyaningdyah, P., Zoology Division - Museum Zoologicum Bogoriense, Research Center for Biology, Indonesian Institute of Sciences (LIPI), Gedung Widyasatwaloka, Jl. Jakarta Bogor Km. 46, Cibinong, 16911, Jawa Barat, Indonesia. E-mail: pungkilupi@gmail.com

18425. Bos-Groenendijk, G.I. (2020): Opzet monitoring gevlekte witsnuitlibel in Gelderland. N2000-gebieden Veluwe en Korenburgerveen. Rapport VS2020.027, De Vlinderstichting, Wageningen: 20 pp. (in Dutch) ["In Gelderland, Leucorrhinia pectoralis is a designated species in the Natura 2000 areas of Veluwe and Korenburgerveen. As input for the N2000 management plans, insight is required into the occurrence, distribution, numbers and development of the species. To this end, new routes have been established in the areas in 2020, after first exploring whether the species actually had populations here. In the Veluwe N2000 area, L. pectoralis is found in the Mosterdveen and in the Leemputten near Staverden. In both areas, there are now two routes for counting the species. The species is vulnerable here. In such a large area, two small populations, which are also far apart, are very few. The population in the Mosterdveen seems to be doing reasonably well, with reasonable numbers and moreover several suitable pools. Since 2012 (with one observation during an SNL mapping) the species seems to have increased considerably, but what the population trend is at the moment is not known. This will have to be ascertained from the results of the NEM monitoring that will be running from now on. In the Leemputten near Staverden, L. pectoralis, also since 2012, first increased, but recently collapsed due to drying up of the ponds in 2018. Time will tell whether the current population will survive here. In the Natura 2000 area of Korenburgerveen, five routes have been set out at two different locations. The species established itself in Korenburgerveen in 2003 and has since grown into a stable population. The current trend is unknown, as the species has not been counted within the NEM. When the new routes are counted annually, the number developments of L. pectoralis can be followed well. The populations on the Veluwe are small and vulnerable. A small disturbance in the form of dehydration or an incorrect management intervention can lead to the disappearance of the population. It is therefore important to take L. pectoralis into account in the management of the areas. At the moment, all sites are well managed and no interventions are necessary. However, it is important to think about the water management of the areas in the long term, so that the fens also keep enough water in dry periods." (Author, DeepL)] Address: De Vlinderstichting, Mennonietenweg 10, Postbus 506, 6700 AM Wageningen, The Netherlands. E-mail: info@vlinderstichting.nl

18426. Felker, A.S. (2020): New dragonflies of the family Permagrionidae (Odonata: Kennedyina) from Perm, European russia. PALEOSTRAT-2020. Annual meeting (scientific

conference) of the paleontology section of the Moscow Society of Naturalists and the Moscow Branch of the Paleontological Society at the Russian Academy of Sciences. Moscow, January 27-29, 2020 Program & abstracts. Alekseev A.S. and Nazarov V.M. (ed.): Paleontological Institute im. A.A. Borisyaka RAN, 2020. 66 p.: 59. (in Russian) ["Verbatim: Permagrionidae Tillyard is classified as a fairly large extinct stalked dragonflies with markedly frequent transverse wing venation. The family itself is included in the infraorder Protoz ygoptera, which in turn belongs to the suborder Kennedyina (Pritykina, 1989; Nel et al., 2012). Its first representative, Permagrion falklandicum Tillyard, was described from the Wuchapa (Lower Vyatka) deposits of the Bodie Grick Head locality (Falkland Islands) (Tillyard, 1928). Moreover, until the last revision of the protozygopter (Nel et al., 2012), this family was considered monotypic. However, after re-studying the already described and identifying new material, the authors of the revision transferred to the Permagrionidae the taxa that previously belonged to the families Permolestidae Martynov and Solikamptilonidae Zalessky Nel et al., 2012). At the moment, the family includes 6 genera with 9 species, most of which are known from the Middle and Upper Permian deposits of Europe (Martynov, 1932, 1937; Nel et al., 1999, 2012; Fate et al., 2013). Most of the representatives of the family are known from the remnants of wings, therefore the main diagnostic features of permagrionids are: the presence of a "complete" nodule N) with thickened and noticeably inclined nodal (n) and subnodal sn) veins; the presence of a pronounced prenodal vein (Asn), curvature of the main structures of the pedicle: arch (Arc), discoidal q) and subdiscoidal sq) cells, and the absence of a distinct anal vein (A), often accompanied by the formation of numerous additional cells at the posterior edge of the wing (Nel et al., New material is represented by 9 specimens of Permagrionids from the localities: Soyana (Kazan Stage; Arkhangelsk Prov.) 1 specimen, B. Kityak (Kazan I Russian; Kirov Prov.) 2 specimens, Kargala (Severodvinsk Stage; Orenburg Prov.) 1 specimens and Isady (Severodvinsk Stage; Vologda Prov.) 5 specimens Most of them belong to new species of already known genera Epilestes and Sushkinia from B. Kityak, Permolestes (2 new species, 5 specimens) from Isad, Scytolestes from Kargaly and Solikamptilon from Soyana The most interesting is a new species of the genus Solikamptilon from Soyana, which, in the presence of characters characteristic of Permagrionids, and undoubtedly belonging to this genus, has very specific features that make it with with small protozygopters of the family Kennedyidae Tillyard, especially with the Middle Late Triassic species Kennedya carpenter i Pritykina. This allows us to consider at a new level the question of the relationship between the Permagrionids and the Kennedyids. (google translate)] Address: Felker, A.S., Paleontological Institute. A.A. Borisyak RAS, Moscow, Russia. E-mail: lab@palaeoentomolog.ru

18427. Lu, S.; Qiu, R.; Hu, J.; Li, X.; Chen, Y.; Zhang, X.; Cao, C.; Shi, H.; Xie, B.; Wu, W.-M.; He, D. (2020): Prevalence of microplastics in animal-based traditional medicinal materials: Widespread pollution in terrestrial environments. Science of The Total Environment 709, 20 March 2020, 136214: 9 pp. (in English) ["Highlights: • 20 types of animal medicinal materials and 10 types of fresh animals were collected in China. • Microplastics (MPs) were found in all medicinal materials with average incidence rate of 94.67%. • The abundance of MPs was in the range of 1.80 ± 0.38 to 7.80 ± 0.83 items/individual. • Major MPs were microfibers (84.68%), or PET (40.45%), Rayon (30.64%) and PE (10.11%). • MPs show similar characteristics between medicinal materials and fresh animals. Abstract: Microplastics (MPs) pollution is an emerging environmental and health concern. MPs have been extensively observed in the aquatic environment, yet rarely investigated in the terrestrial ecosystem, especially in relation to health risks. To evaluate potential MPs pollution in land-dwelling animal medicine materials, we collected 20 types of small animal-based medicinal materials and 10 types of available fresh terrestrial animals from eight different regions in China. MPs were found in all medicinal materials with an average incidence rate of 94.67%. The abundance of MPs was in the range of 1.80 ± 0.38 to 7.80 ± 0.83 items/individual or 1.59 ± 0.33 to 43.56 ± 9.22 items/g (dry weight), with polymer distribution by polyethylene terephthalate (40.45%), rayon (30.64%), polyethylene (10.11%), nylon (7.35%), polypropylene (5.93%), and polyvinyl chloride (5.52%). The majority of MPs were microfibers (84.68%), with 15.32% of fragments. Moreover, MPs were directly observed in the intestine, detected in all ten types of fresh medicinal animals with the abundance of 0.83 ± 0.35 to 3.42 ± 0.46 items/individual. Furthermore, significant positive correlations (R: 0.32–0.99, $p < 0.05$) of MPs characteristics were found between medicinal materials and fresh animals, including shape, size, color, and polymer distribution of MPs. The results support that MPs in the medicinal materials were likely derived from living animals. This study demonstrates the prevalence of MPs in animal-based, traditional medicinal materials, and also suggests widespread MPs pollution in terrestrial environments and latent health risks." (Authors)] Address: Lu, S., School of Ecological & Environmental Sciences, Shanghai Key Lab. for Urban Ecological Processes & Eco-Restoration, East China Normal University, Shanghai 200241, China

18428. Lupiyaningdyah, P. (2020): The past, present and future of dragonfly research in Indonesia. BIO Web Conf. 19(00024): 4 pp. (in English) ["Up to present, Indonesia has 900 described species of dragonflies with around 70% are endemic; among them, the most diverse is in Papua. This data is collected based on 356 publications from scientific journals, bulletins, magazines, books, theses, and proceedings from 1773 to 2019. There is still a lack of information about what is the most and least popular topics and where is the most explored regions in Indonesia for Odonata research. I categorized the topics into biodiversity, taxonomy and systematics, biogeography, conservation, ecology, education, ethnozoology, history, and molecular. The result shows that the most popular topic is biodiversity by 139 publications and the least are history and molecular by only one publication. Most popular group to be observed is dragonflies in general (both suborders) by 200 publications and the least observed is Anisoptera by only 71 publications. Java is the

most explored island for about 160 publications in 250 years." (Authors)] Address: Lupiyaningdyah, P., Zoology Division - Museum Zoologicum Bogoriense, Research Center for Biology, Indonesian Inst. Sciences (LIPI), Gedung Widyasatwaloka, Jl. Jakarta Bogor Km. 46, Cibinong, 16911, Jawa Barat, Indonesia. E-mail: pungkilupi@gmail.com

18429. Néraudeau, D.; Vullo, R.; Bénéfice, P.; Breton, G.; Dépré, E.; Gaspard, D.; Girard, V.; Le Couls, M.; Moreauf, J.-D.; Nel, A.; Perrichot, V.; Solórzano-Kraemeri, M.M.; Wappler, T. (2020): The paralic Albian–Cenomanian Puy-Puy Lagerstätte (Aquitaine Basin, France): An overview and new data. Cretaceous Research 111, July 2020, 104124: (in English) ["Highlights: • Stratigraphy, palaeontology and palaeoecology of the Puy-Puy Lagerstätte, France. • Mid-Cretaceous Konservat-Lagerstätte formed in a quiet paralic environment. • Rich plant assemblage with diverse insect damages on angiosperm leaves. • Lagerstätte with insects preserved in both amber and lignitic clay. • Co-occurrence of marine, brackish, freshwater and terrestrial organisms. The Puy-Puy quarry at Tonnay-Charente (Charente-Maritime, SW France) is a sand quarry exposing a 9-m-thick series of latest Albian–earliest Cenomanian (mid-Cretaceous) age. The uppermost Albian deposits consist of lignitic clay containing fossiliferous amber. The lowermost Cenomanian sand deposits alternate with clay intercalations containing plant remains. One of these clay levels, named P1, shows an outstanding accumulation of conifer and angiosperm macrofossils including delicate reproductive structures such as flowers. Plant remains are associated with invertebrates such as insects (Odonata, Dictyoptera, Diptera), crustaceans (Mecochirus sp.), putative brachiopods (aff. Lingula sp.), and worms. A few vertebrate remains such as shark egg capsules (Palaeoxyris sp.) and a feather are present in the fossil assemblage, as well as an enigmatic specimen tentatively interpreted as a cephalochordate or a petromyzontiform. Various ichnofossils occur in abundance, such as crustacean coprolites and burrows (Ophiomorpha isp.), insect coprolites (Microcarpolithes hexagonalis), and leaves with grazing structures, galls and mines. The sediments have been deposited in a coastal, calm and brackish area." (Authors)] Address: Néraudeau, D., Univ Rennes, CNRS, Géosciences Rennes, UMR 6118, 263 avenue du Général Leclerc, 35000 Rennes, France

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18430. Felker, A.S. (2021): The first damselflies of the family Kennedyidae (Odonata: Protozygoptera) from the Permian–Triassic boundary deposits of the Kuznetsk Basin, Russia. Paleontological Journal (Russian Academy of Sciences (Moscow)) 2: 52-59. (in Russian, with English summary) ["Two new fossil damselfly species of the family Kennedyidae: Kennedya kedrovkensis sp. nov. and Progoneura kemerovensis sp. nov. are described from presumably lower Triassic beds of the Permian–Triassic boundary sequence of the Babii Kamen' locality. The new species confidently differ from previously known species of Kennedya and Progoneura according to the main characters of wing venation." (Authors)] Address: Felker, A.S., Paleontological Institute. A.A. Borisyak RAS, Moscow, Russia. E-mail: lab@palaeoentomolog.ru

18431. Felker, A.S. (2021): New Damselflies of the Family Kennedyidae (Odonata: Protozygoptera) from the Upper Permian of the Vologda Region. Paleontological Journal 55: 396-404. (in English) ["A new species of damselfly of the family Kennedyidae: Kennedya suchonensis sp. nov. is described from the Upper Permian (Severodvinian) deposits of the Isady locality (Vologda Region, Velikoustyugsky District). Despite the continuity of the main features of wing venation, new species has an unusual structure of the stem's discoidal area. This structure is not typical of known Paleozoic damselflies, which allows us to re-consider the morphogenesis of this structure. The evolutionary relationships between damselflies of Isady and other kennedyids are discussed." (Author)] Address: Felker, A.S., Paleontological Institute. A.A. Borisyak RAS, Moscow, Russia. E-mail: lab@palaeoentomolog.ru

18432. Fortunato, M.H.T.; Mendes, H.F.; Carmino Hayashi, C.; Rodrigues de Faria, L.; Lopes de Melo, C.; Carvalho Ananias, I.M. (2021): Survey of dragonfly immature (Insecta: Odonata) in excavated tanks of pisciculture in the mesoregion of Alfenas-MG. Research, Society and Development 10(11): 13 pp. (in Portuguese, with English and Spanish summaries) ["Dragonfly immatures are found in a vast number of freshwater aquatic environments, including excavated tanks of pisciculture. As they are predators during the aquatic phase, they end up causing great damage in the initial stages of production of freshwater aquaculture. However, studies on which dragonflies are most common in fish ponds are still scarce in Brazil, and this is the first step to think about an effective control. For this reason, we collected immature dragonfly (Odonata) with net "D" and macrophytes between October 218 and March 2019. The physicochemical variables were measured with water quality kits, and they remained within the parameters for fish farming defined by CONAMA, with the exception of temperature. Of the 692 immatures collected, we found 12 genera distributed in the two suborders of Odonata, with Miathyria Kirby, 1889 and Erythemis Hagen, 1861 being the most abundant. After correspondence analysis and principal component analysis, we proved that rarer genera have a lower correlation with abundance, reinforcing the value attributed to the relative abundance of immatures." (Authors)] Address: Fortunato, M. H.T., Universidade José do Rosário Vellano, Brasil. E-mail: mtank@live.com

18433. Kamboj, N.; Kamboj, V. (2021): Sand-gravel mining as a threat to macro-benthic assemblage and habitat parameters: A case study of river Ganga, India. In: Siddiqui N.A., Bahukhandi K.D., Tauseef S.M., Koranga N. (eds) Advances in Environment Engineering and Management. Springer Proceedings in Earth and Environmental Sciences. Springer, Cham. https://doi.org/10.1007/978-3-030-79065-335: 463-476. (in English) ["The present study was conducted for assessing the impact of sand-gravel mining on the habitat parameters, diversity and abundance of macro-benthic species

in the mining impacted area of the Ganga river from April 2017 to March 2018. Samples were collected from four different zones i.e. zone A as reference zone while zones B, C and D are mining impacted area of Ganga river correspondingly. During the study, habitat parameters such as substratum type, pH, dissolved oxygen, biochemical oxygen demand, turbidity and TDS showed a significant difference at selected zones throughout the study. Besides, during the survey, a total of 29 macro-benthic species belonging to ten groups mainly Oligochaeta (2 species), Turbellaria (2 species), Hirudinea (3 Species), Odonata (2 species), Ephemeroptera (4 species), Trichoptera (3 species), Diptera (6 species), Gastropoda (3 species), Decapoda (1 species) and Coleoptera (3 species) were found respectively. The Diptera group was found a maximum of 30.77% throughout the study period at selected zones. Besides this, the other major groups were such as Coleoptera 12.73%, Gastropoda 10.80% and Ephemeroptera 9.65%. The result showed that the zone A contains the higher number 1205 ind./m² while zone B, zone C, and zone D contain 899 ind./m², 714 ind./m² and 497 ind./m² respectively throughout the year. The canonical correspondence analysis (CCA) analysis showed a strong relationship with habitat parameters mainly substratum structure, pH, water temperature, dissolved oxygen with the macro-benthic species. Besides this, the reason for the decline in species number in respected zones (B, C & D) is the removal of the sand and gravel material. The removal of these materials causes habitat destruction in the form of increasing depth, slope, channelization of river and water quality." (Authors)] Address: Kamboj, V., Dept of Zoology & Environmental Sci., Haridwar, India

18434. Khan, M.A.; Padhy, C. (2021): Study on aerodynamic and structural analysis of bio-mimetic corrugated wing. Research Trends and Challenges in Physical Science 1: 90-100. (in English) ["The aerodynamic and static structural analysis of a newly developed bio-mimetic corrugated aerofoil inspired by dragonfly forewing is included in this work. The basal wing part of the dragonfly corrugated aerofoil structure used in this study was placed around the radius of the forewing. These corrugations define the stressed skin structure, which is made up of grider-like veins and a thin cuticle membrane that provides a sophisticated mechanical advantage for longitudinal bending resistance while allowing for wing camber and torsion. Dragonflies are recognised for their amazing flight abilities. They are designed to carry both aerodynamic and inertial loads. At a Reynolds number of 15000, a computational analysis of a newly designed dragonfly corrugated aerofoil is performed, with flow assumed to be laminar, steady, incompressible, and two dimensional. The project includes static structural analysis and aerodynamic flow analysis of a 2-D dragonfly corrugated aerofoil utilising Ansys Fluent and Ansys Mechanical APDL. It has been discovered that the design criteria employed, as well as simulations performed on a corrugated aerofoil, produce significantly better results than earlier studies. The structural analysis also demonstrates that it can withstand maximum pressure loads and provides high rigidity to the wing span. This discovery adds to our knowledge of insect-inspired corrugated wing structure and facilitates the application for improved design of artificial wings for MAVs and UAVs." (Authors)] Address: Khan, M.A., GITAM Deemed to be University, Dept of Aerospace Engineering, Hyderabad, India

18435. Minot, M.; Besnard, A.; Husté, A. (2021): Habitat use and movements of a large dragonfly (Odonata: Anax imperator) in a pond network. Freshwater Biology 66(2): 241-255. (in English) ["1. Local movements of aquatic insects within the surroundings of waterbodies aim essentially to find food, mates, resting sites, or avoid predation. Distances moved are very variable among species and may also differ depending on sex or age at the intraspecific scale. Despite a large panel of studies on odonate activities near waterbodies, little is known about their movements and behaviour in the surrounding landscape matrix. This knowledge is, however, crucial to support management schemes of pond networks and allow improvement of connectivity between them. 2. In this study, 87 individuals of Anax imperator were identified with a unique code on the wings and monitored visually on five ponds during summers 2017 and 2018. Simultaneously, 54 individuals were equipped with radio transmitters and tracked for up to 15 days. 3. We built Cormack Jolly Seber models to test which factors are important for movement and survival of individuals, and calculated home ranges. Additionally, we performed a step selection analysis on the telemetry data to identify the terrestrial habitats selected by A. imperator at the interface between a rural area and a suburban area in north-western France. 4. A reduction of the survival rate was observed on the day immediately following capture regardless of the marking method. Individuals equipped with radio transmitters had a lower estimated daily survival (0.78; 95% confidence interval = 0.70–0.85) compared to wing-marked individuals (0.89; 95% confidence interval = 0.85–0.92). Wing loading and age were the main variables influencing dragonfly survival for both methods. 5. The probability of movement between ponds was similar for both sexes, but radiotracking data showed that females moved significantly further away in the landscape matrix than males, with one female detected up to 1,902 m away from the release pond. Females also had a larger home range (mean 95% kernel: 50 ha) than males (mean 95% kernel: 5 ha). Reproductive behaviour of males and flying behaviour of females were positively related to air temperature. Individuals of both sexes were present on ponds more often than in all other habitats whatever their activity. High trees were the preferred place to rest when air temperatures were low, especially for females. 6. Overall, this study highlights the importance of integrating neighbouring trees in management schemes of ponds. It also confirms that preservation of pond networks must include on several hectares of land around ponds to meet the aquatic and terrestrial needs of amphibious organisms such as odonates. Our radio-tracking data provide a basis for further studies on the persistence of odonate meta-populations in fragmented landscapes." (Authors)] Address: Minot, M., Université de Normandie, UNIROUEN, INRAE, ECODIV, Rouen, France. Email: m.minot@hotmail.fr

18436. Novelo-Gutiérrez, R.; Bota-Sierra, C.A. (2021): Primer registro del género Racenaeschna para Colombia (Anisoptera: Aeshnidae) y otras especies en la Reserva La Forzosa — First record of the genus Racenaeschna for Colombia and other species at Reserva La Forzosa. Hetaerina 3(2): 7-11. (in Spanish, with English summary) ["Cordillera Central. In a recent expedition to the Reserva La Forzosa (Anorí Municipality, Antioquia Department), two last instar female larvae were found inhabiting a small creek inside the primary forest. Besides, another 12 species were registered, among them five are Colombian endemics, highlighting the importance of this reserve for dragonflies and damselflies conservation. Finally, details of larval morphology are provided, as well as high–quality photos, and a map of the current distribution of the genus in South America." (Authors)] Address: Novelo-Gutiérrez, R., Instituto de Ecología, A.C. Red de Biodiversidad y Sistemática. Xalapa, México. Correo electrónico: rodolfo.novelo@inecol.mx

18437. Nugrahaningrum, A.; Soesilohadi, R.C.H. (2021): Variations of movement, dispersal, and morphometrics among subpopulations of Javan endemic damselfly, Drepanosticta spatulifera (Odonata: Platystictidae) in Petungkriyono Forest. Journal of Tropical Biodiversity and Biotechnology 6(3): 14 pp. (in English) ["D. spatulifera is a Javan endemic damselfly. The population is spread unevenly in the Petungkriyono Forest and is threatened due to environmental pressure. The aims of this research are to know the variation of the movement, dispersal, and morphometric among subpopulations of D. spatulifera. Movement and dispersal variation data collection was done using Mark Release Recapture (MRR) for six weeks from early August until mid-September 2020. The collection of morphometric samples was done during the last week of the MRR survey and 46 individuals were measured with 12 continuous characters. During the MRR survey, 596 males of D. spatulifera were marked and 302 were recaptured. D. spatulifera had short movement and dispersal thus no individuals were found across the subpopulations. The distance moved of successive capture and net lifetime movement were dominantly less or equal to five meters. The duration of the MRR survey had a low correlation with the dispersal distance of D. spatulifera. In the morphometric variations, closer subpopulations tended to have a similar cluster of morphometric characters. Variation of distance moved between successive capture and wing size from Mangli Stream was significantly different from other sites. The subpopulation of Mangli, the farthest and higher altitude of the sites, had the highest distance move, more disperse, and the largest wing size. Our study showed that D. spatulifera was extremely sedentary damselfly. It will enhance inbreeding and vulnerability to extinction. Therefore, the interaction between the subpopulations of D. spatulifera in the Petungkriyono Forest needs to be done more." (Authors)] Address: Soesilohadi, R.C.,H., Fac. Biology, Universitas Gadjah Mada, Teknika Selatan Street, Senolowo, Sinduadi, Mlati, Sleman, Yogyakarta 55281, Indonesia. E-mail: hidayat@ugm.ac.id

18438. Pérez, J.H.; Rocha-Gil, Z.E.; Pérez-Rubiano, C.C.; Bernal-Figueroa, A.A. (2021): Biological quality in an aquatic system influenced by mining and agricultural activitiess: River Salitre, Boyacá (Colombia). Tropical and Subtropical Agroecosystems 24: 14 pp. (in Spanish, with English summary) ["Background. The study and monitoring of water quality is commonly carried out through the characterization of physicochemical and bacteriological parameters. However, the presence of point pollutants that are discharged at times when an exact record of their incidence may not be achieved, has led to the exploration of different methodologies in order to determine the quality of a body of water, one of which is the bioindication through the study of aquatic organisms. Objective. Analyze the biological quality of the Salitre river basin, Boyacá in areas of influence of mining and agricultural activity in the rainy season (April-May 2019) and dry season (September-October 2019). Methodology. The study was conducted by determining the diversity of aquatic macroinvertebrates present in three stations distributed in the upper (P1), middle (P2) and lower (P3) part of the river. Results. 3573 individuals distributed in eight orders, 28 families and 39 genera were observed, standing out in wealth and abundance: Diptera (79.54%), Ephemeroptera (9.51%) and Odonata (6.07%). Implications. The main limitation of this work was the transfer of the water samples to the laboratory for the physicochemical analysis, for the maintenance of the cold chain during all the samplings. Conclusions. Changes were registered in physicochemical and biological conditions of the system, mainly for the diversity in the three sampling points, which represents a low capacity of this system to take better and better use of nutrients and energy in areas of anthropogenic intervention, affecting self-purification of the river and the biological activities of the ecosystem." (Authors)] Address: Pérez, J.H., Grupo de Investigación Gestión Ambiental, Fac. Cien. e Ingen., Univ. de Boyacá, Carrera 2ª Este No. 64 – 169, Tunja-Boyacá, Colombia. E-mail: jhperez@uniboyaca.edu.co

18439. Schletterer, M.; Kurz, B.; Schönegger, A.; Egger, G.; Feistmantl, K. (2021): Transplantation of an alpine Carex-fen – a mitigation measure related to the construction of a reservoir in the Austrian Alps. BIO Web of Conferences 31, 00036 (2021): 7pp. (in English) ["Translocations are applied in the context of infrastructure projects to preserve certain vegetation types. Within the EIA of a large hydropower project in the Austrian Alps, manifold mitigation measures were defined. Among those, the transplantation of about 1.4 ha Carex-fen at an altitude of about 2000 m was defined. One year before the start of the construction works in 2021, basic infrastructure (roads) was established and different ecological measures were undertaken, e.g. translocation of amphibians to newly constructed habitats as well as the transplantation of the Carex-fen. The turf was cut from the initial area with an adjusted excavator shovel, delivered to a wheel loader which brought each single turf immediately to the target area, where another excavator mounted the turf in a prearranged area. At the donor site more than ½ of the area was based on wet gley, while especially areas in the vicinity of the river were based on fluvial gravel. With the 30 to 70 cm thick turfs also animals, e.g. Odonata, were transferred.

Before the translocation a monitoring of the donor sites was carried out. The monitoring concept foresees a detailed monitoring of the newly established sites for 10 years. Herein we provide insights in the applied technology and summarize first results of the monitoring. Overall, our project is unique regarding the vegetation type, the technology, the size and the intensity of monitoring... With this measure also larvae of Odonata were transferred with the substratum in their new habitat. Within the assessments for the EIA, three dragonfly species were detected by visual observation and net catches (adults and larvae) in the valley: Enalagma cyathigerum, Aeshna juncea and Somatochlora alpestris). During the pre-monitoring in 2020, also the occurrence of Leucorrhinia dubia was confirmed by visual observations. All detected species are similar in terms of their larval habitat. The translocation of larvae by transplanting turf is the most effective method, which has also the advantage that the entire biotope is relocated. Beside the herein described measures, an additional measure related to the establishment." (Authors)] Address: Schletterer, M., TIWAG-Tiroler Wasserkraft AG, Innsbruck, Austria. E-mail: martin.schletterer@tiwag.at

18440. Singh, S.D.; Kaur, W.G. (2021): Cytological review and first cytogenetic report on three species of family Macromiidae (Odonata: Anisoptera) from India. International Journal of Zoological Investigations 7(2): 447-452. (in English) ["Cytological data of family Macromiidae based on chromosome number and sex determination has been reviewed and cytogenetic investigations on Epophthalmia vittata, Macromia ellisoni and M. flavicincta have been done using conventional staining, C- banding, silver nitrate staining and sequence specific staining. Macromiid species were captured from Maharashtra (Nagpur) and Kerala (Kuttiadi river and Vatakara) states of India. All the species possess 2n (♂) = 25m, which is the type number of family withX0-XX type sex determination. All the autosomal bivalents including large bivalent present in Epophthalmia vittata and Macromia ellisoni show terminal C-bands and NORfs, while X chromosome is C- positive and NOR rich, whereas m bivalent is C-negative and NOR- negative. In the sequence specific staining, all autosomal bivalents including X chromosome possess overlapping DAPI/CMA_3 signals. Cytogenetically, all the three species have been studied for the first time." (Authors)] Address: Singh, S.D., Dept Zoology & Environmental Sciences, Punjabi Univ., Patiala 147002, Punjab, India

18441. Tamilselvan, R.; Kumar, K. (2021): Diversity of Coccinellidae and Odonata in Agri-Horti Ecosystems. Indian Journal of entomology 83(2): 273-275. (in English) ["Surveys were conducted during kharif and rabi season in the 2015–2016 in Pandit Jawaharlal Nehru College of Agriculture and Research Institute, Karaikal (10°55? N and 79°52' E), Union Territory of Puducherry, to assess the species diversity and abundance of coccinellids and odonates in agricultural and horticultural ecosystems viz., rice, cotton, sugarcane, lablab, cassava, sweet potato, guava, mango, sapota, and curry leaf. Insect specimens were collected by sweeping and hand picking. Totally 19 species of Coleoptera and Odonata under four families (Coccinellidae, Libellulidae, Coenagrionidae, and Lestidae) were observed. Coccinella transversalis F. (25.56%) was the most abundant followed by Diplacodes trivialis (Rambur) (22.22%) and Cheilomenes sexmaculata (F.) (20%) in agricultural ecosystems. While, D. triviaus (R) (21.80%) was the most abundant in horticultural ecosystems followed by Ceriagrion coromandalianum (Brauer) (20.30%) and Brachythemis contaminata (F.) (17.29%). Species richness was higher in the horticultural ecosystem and species evenness was almost the same in both the ecosystems. Simpson's diversity value was greater in the horticultural ecosystem." (Authors)] Address: Tamilselvan, R., Department of Agricultural Entomology, Tamil Nadu Agricultural University, Coimbatore 641003, Tamil Nadu, India. Email: rstamil94@gmail.com

18442. Taylor, P.; Smallshire, D.; Parr, A.J.; Brooks, S.J.; Cham, S.A.; Colver, E.F.; Harvey, M.; Hepper, D.; Isaac, N. J.B.; Logie, M.W.; McFerran, D.; McKenna, F.; Nelson, B.; Roy, D.B. (2021): 2021. State of Dragonflies in Britain and Ireland 2021. British Dragonfly Society, Old Weston, Huntingdon: 83 pp. (in English) ["• The current British and Irish list of damselflies and dragonflies (Odonata) comprises 56 species, of which 46 are residents or regular migrants since 2000; a further ten species have occurred as rare vagrants. • Trend analyses carried out by the UK Centre for Ecology & Hydrology for this BDS report show that 19 of our resident and/or regular migrant species (41%) have significantly increased in occupancy since 1970. These included both common and/or widespread species and scarce and/or localised species, as well as five new colonists. • Just five (11%) of our resident and regular migrant species have shown significant declines overall. One of these is a widespread damselfly, two are predominantly upland and/or northern species, and two are specialists of seepages, pools and small streams. In addition, one scarcer migrant has shown some signs of a decline, though appearances have always been somewhat erratic. • The production of species trends does not reveal the underlying causes. There has been little scientific study to determine the precise causes and their relative impacts on dragonfly populations, although climate change and habitat quantity and quality are clearly important. Our assessment of the driving forces behind the observed trends in this report is therefore based principally on expert opinion using what is known of dragonfly biology and ecology. • Dragonfly species new to Britain and Ireland are arriving and colonising at a greater rate than ever before. No less than six species have colonised Britain since 1996, while a seventh has recolonised after an absence of almost 60 years. The new colonists are Anax parthenope (first record 1996), Sympetrum fonscolombii (breeding from 1996), Small Red-eyed Damselfly (first record 1999), Lestes barbarus (first record 2002), Chalcolestes viridis (colonisation from 2007) and Aeshna affinis (colonisation from 2010). Coenagrion scitulum became extinct in Britain during the coastal floods of early 1953, but successfully recolonised around 2010. • Species richness has increased over time, especially in the northern half of Britain, but also in the south as new species arrive and colonise; increased recording intensity in recent

years may explain some of these increases. • Trends for individual species in Britain and Ireland are often mirrored by those in Europe. For example Anax imperator is increasing in the Netherlands and Germany, as well as in Britain and Ireland, while Lestes sponsa has declined in all these areas. • Trends and responses to climate or habitat changes in dragonflies are often matched by other taxa. For example, there is evidence of northwards range shifts for several birds and butterflies, and it has recently been found that despite overall insect declines, more of our larger moth species are increasing in occupancy, than decreasing. Additionally, populations of freshwater invertebrates such as caddisflies and mayflies have recovered in recent decades, a result in line with that seen overall for dragonflies. • Climate change in the form of increased temperatures is behind many of the positive dragonfly species trends and new colonisations, but it should be remembered that climate change does not act in isolation. Increases in the availability of suitable habitats through restoration and creation projects have also played a significant role. Climate change may also have negative impacts for some species, especially in the future. It is important that we continue to record and assess all species, but especially those in northern, upland and specialised habitats, although much still needs to be discovered about the individual needs of dragonfly species, especially during the larval stage. • Species declines are harder to record and explain, but habitat losses and degradation through land drainage, afforestation, acidification and lack of appropriate management are strongly indicated as major factors. Changes in weather patterns, causing both flood and drought conditions, are also implicated, as are pesticides, fertilisers and other pollutants of a similar nature. It is also the case that increases in distribution may mask underlying declines in species abundance. • The 50-year occupancy trends in this report are based on 1.4 million records, collected by some 17,000 individual recorders during 1970-2019. …." (Authors)] Address: www.british-dragonflies.org.uk

18443. Viitaniemi, H.M.; Leder, E.H.; Suhonen, J. (2021): Influence of interspecific interference competition on the genetic structure of Calopteryx splendens populations. Ann. Zool. Fennici 59: 35-45. (in English) ["Understanding the effects of interspecific competition on genetic diversity will deepen our knowledge on species evolution. In the case of Calopteryx splendens and C. virgo, sympatric damselfly species, interspecific interference competition by C. virgo has remarkable effects on territoriality of C. splendens resulting in reproductive character displacement. Since territoriality is correlated with phenotype and mating success, we investigated the effects of interspecific interference competition on genetic diversity of C. splendens populations. Using amplified fragment length polymorphisms (AFLP), we determined the population genetic structure of 12 C. splendens populations and used the genetic diversity information to relate heterozygosity of C. splendens to abundance of C. virgo in sympatric populations. We found that heterozygosity of C. splendens males decreased with increasing abundance of C. virgo males. This result most likely reflects changes in effective population size due to interspecific interference competition and shows an effect on genetic structure in damselfly populations." (Authors)] Address: Viitaniemi, H.M., Dept Biol., 20014 University of Turku, Finland. E-mail: hmviit@utu.fi

18444. Wu, G.; Tang, S.; Han, J.; Li, C.; Liu, L.; Xu, X.; Xu, Z.; Chen, Z.; Wang, Y.; Qiu, G. 2021): Distributions of total mercury and methylmercury in dragonflies from a large abandoned mercury mining region in China. Archives of Environmental Contamination and Toxicology 81: 25-35. (In English) ["Odonata are often considered to be biosentinels of environmental contamination. Dragonflies (n = 439) belonging to 15 species of eight genera were collected from an abandoned mercury (Hg) mining region in China to investigate the bioaccumulation of total Hg (THg) and methylmercury (MeHg). The THg and MeHg concentrations in dragonflies varied widely within ranges of 0.06–19 mg/kg and 0.02–5.7 mg/kg, respectively. THg and MeHg were positively correlated with bodyweight (THg: $r^2 = 0.10$, P = 0.000; MeHg: $r^2 = 0.09$, P = 0.000). Significant variations were observed among species, with the highest MeHg value (in Orthetrum triangulare) being 5-fold higher than the lowest (in Pantala flavescens). These variations were consistent with those of nitrogen isotope ($\delta^{15}N$) values. A health risk assessment found hazard quotients for specialist dragonfly-consuming birds of up to 7.2, which is 2.4 times greater than the permissible limit of 3, suggesting a potential health risk of exposure." (Authors)] Address: Qiu, G., State Key Laboratory of Environmental Geochemistry, Institute of Geochemistry, Chinese Academy of Sciences, Guiyang, 550081, China. E-mail: qiuguangle@vip.skleg.cn

18445. Yamada, S.; Urabe, J. (2021): Role of sediment in determining the vulnerability of three littoral cladoceran species to odonate larvae predation. Inland Waters 11(898): 1-8. (in English) ["Small cladocerans, found abundantly on surfaces of macrophytes and sediments in the littoral zone, are important prey not only for small fish but also for various invertebrates such as larvae of odonates in freshwater habitats. However, no study has documented how habitat substrates affect their behavior and vulnerability to predators and predation. We conducted laboratory experiments to examine the movement of 3 littoral cladoceran species, Chydorus sphaericus, Alona sp., and Ilyocryptus spinifer, to determine if their vulnerabilities to predation by odonate larvae changed depending on the presence or absence of bottom sediment. We observed that when sediment was present, Ilyocryptus crawled in and ceased movement. However, in the containers without sediment, they continuously swam or crawled. Similarly, Chydorus also reduced frequency of movement in a container with sediment, but Alona movement did not change regardless of the presence or absence of sediment. In the predation experiments with 2 or 3 prey species, Ilyocryptus was the most vulnerable to predation by odonate larvae in the containers without sediment but least vulnerable in those with sediment. The vulnerability of Chydorus to the odonate larvae was as low as that of Ilyocryptus in the containers with sediment. Alona was less preyed upon by odonates in containers with sediment but highly vulnerable to predation when containers

had sediment with Chydorus and Ilyocryptus. These results indicate that behavior and vulnerability to predation of littoral cladocerans are species-specific and change depending on the presence of sediment and the existence of other species." (Authors)] Address: Yamada, S., Aquatic Ecology Lab, Graduate School of Life Sciences, Tohoku University, Aoba 6-3, Aramaki Aoba-ku, Sendai 980-8578, Japan. E-mail: sayumi.yamada127@gmail.com

18446. Yu, X. (2021): A survey of Odonata diversity in Zoige wetland, Sichuan Province, China. International Dragonfly Fund - Report 158: 1-22. (in English) ["At Zoige alpine Wetland, a total of 10 species belonging to 4 families and 6 genera were recorded. Obvious melanism in Coenagrion lunulatum and feigning death behaviour in Enallagma cyathigerum were observed. A preliminary trial on avoiding behaviour of E. cyathigerum confirmed that feigning death is one of the major strategies to protect themselves. All these new findings are discussed briefly." (Authors)] Address: Yu, X., College of Life Sciences, Chongqing Normal University, Chongqing, PR China. E-mail: lannysummer@163.com

18447. Zach, P. (2021): Libellen-Artengemeinschaften des Raabtals. M.Sc. thesis, Karl-Franzens-Universität Graz: 134 pp. (in German, with English summary) ["Dragonfly species community of the Raab Valley (Styria, Austria). The present study is dedicated to the Dragonfly species community of the Raab Valley, located in Eastern Styria, and the assessment of the ecological status of this river valley area, which was formerly characterised by floodplains. For this purpose, nine 500 m long transects were defined in the study area, representing the range of water body types in the Raab Valley. The - largely homogeneous - transects, represent the river Raab itself, a stream (Schwengentalbach), ditches located in the val-ley bottom, a spring stream, and a still water body. Based on the hydromorphological models and the postulated original state of the water bodies, a water body type-specific dragonfly community (reference fauna) was derived. In 2020, the dragonfly fauna of the Raab Valley was documented in course of five field surveys per transect from May to September. The autochthony status and the abundance of the species were documented. The current dragonfly fauna was compared with the reference fauna and the dragonfly ecological status was determined. In the study area, 24 dragonfly species were detected, 18 of which could be classified as autochthonous and seven of which are sensitive species. According to the Austrian Red List, two of the detected species are “endangered”: Somatochlora meridionalis, that was spotted at the pond in Pertlstein, and Libellula fulva, that was documented at one of the ditches. Despite these remarkable dragonfly records, the surveyed dragonfly species community is clearly impoverished compared to the model. In particular, there is a lack of still water habitats in the Raab Valley. There is a lack of reed beds, floating leaf vegetation and submerged vegetation, which leads to the lack of dragonfly species associated with these vegetation types. Thus, the Raab Valley was ranked with a “moderate to good ecological status”, which represents the third- to second-best class in the 5-tiered classification scheme." (Author)] Address: not stated

18448. Zawal, A.; Olechwir, T.; Stepien, E. (2021): Odonates (Insecta: Odonata) of the ”Golczewskie Uroczysko” nature reserve (North-West Poland). Ecologica Montenegrina 43: 30-36. (in English) ["The „Golczewskie Uroczysko” nature reserve was established on 5 May 2004 to protect the raised peat bog and the dystrophic Lake Zabie with its surrounding transitional bog and adjacent forest complexes containing valuable plants. In May, July and October 2006 the research of odonates (Odonata) fauna has been conducted in this area. A total of 575 odonates individuals belonging to 29 species (366 imagines, 152 larvae, 57 exuviae) were collected and among these 489 specimens belonging to 28 species were collected in Lake ¯abie, 26 specimens belonging to 7 species on the beat boog, 52 specimens belonging to 3 species in flooded alder forest and 8 specimens belonging to 2 species were collected in ditches in the forest. The eurytopic species were dominated with substantial parts of tyrphobiontic and tyrphophilous species." (Authors)] Address: Zawal, A., Institute of Marine and Environmental Sciences, Center of Molecular Biology and Biotechnology, University of Szczecin, Waska 13, 71–415 Szczecin, Poland. E-mail: andrzej.zawal@usz.edu.pl

18449. Zheng, D.-R., Li, S.; Zhao, Y.-S.; Zhang, H.-C. (2021): A potential telephlebiid dragonfly (Odonata: Anisoptera: Aeshnoidea) from Miocene of Yunnan, southwestern China. Palaeoentomology 4(3): 237-242. ["A new aeshnoid dragonfly, Jingguaeshna taoae gen. et sp. nov., is described based on an incomplete hindwing from a new Miocene deposit in Jinggu, Yunnan Province, southwestern China. Jingguaeshna gen. nov. is most likely a member of the Telephlebiidae, sharing a number of typical characters of this family. Jingguaeshna taoae gen. et sp. nov. is the first aeshnoid dragonfly fossil found from Yunnan and probably the oldest-known telephlebiid dragonfly. This study also reveals a new entomofauna in southwestern China, contributing new information to the understanding of the Miocene ecosystems in this region." (Authors)] Address: Zheng, D.-R., Dept of Earth Sciences, Univ. Hong Kong, Hong Kong Special Administrative Region, China