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1996

24212. O'Donnell, S. (1996): Dragonflies (Gynacantha nervosa Rambur) avoid wasps (Polybia aequatorialis Zavattari and Mischocyttarus sp.) as prey. J. insect behav. 9(1): 159-162. (in English) ["I observed interactions between G. nervosa and eusocial wasps at dusk (1745 to 1810 local time) on 15 April 1995. I was seated facing Southwest near three colonies of the wasp P. aequatorialis. The nests were located at approximately 1350-m elevation in Monteverde, Puntarenas Piovince, Costa Rica (10°18'N, 85°H'W). Foraging wasps retuming to the nests were clearly visible as silhouettes against the open sky. I estimated that five dragonflies were feeding in the area, although a maximum of two were visible simultaneously. The dragonflies flew at heights of 2-5 m above the ground along the edge of a forest Clearing and along the wall of a building where the wasp nests were located and were observed pursuing and capturing insects near the nests. However, on more than 10 occasions when two dragonflies were visible, and on more than 20 occasions when one was visible, dragonflies approached but did not capture incoming wasp foragers. The dragonflies oriented toward individual wasps, often from distances of several meters, and rapidly approached to hover within 10 cm of the wasps. The dragonflies then remained oriented toward the wasps and followed their slow, looping flight. In all cases the dragonflies flew off rapidly after following the wasps closely for 1-3 s. Most pursuits of wasps involved P. aequatorialis foragers, but on one occasion a Mischocyttarus sp. forager was similarly followed and not captured. Polybia aequatorialis workers are approximately 1 cm in length and are substantially smaller than honey bees; therefore, their size is within the range of prey taken by G. nervosa. I captured two of the dragonflies at 1810." (Author)] Address: O'Donnell, S., Dept of Entomology, Univ. of California, Davis, California 95616, USA. Email: sodonnell@ucdavis.edu

24213. Picknell, A.; Fades, R.A.; Phalan, B. (1996): Dragonflies - food for hobbies? Some answers. Bulletin of the Amateur Entomologists' Society 55(404): 42-43. (in English) [The paper refers and annotates to several publications with notes on Odonata as prey of Falco subbuteo in UK.] Address: not stated

1997

24214. Cochet, G. (1997): Première mention de Boyeria irene (Fonscolombe, 1838) dans les départements de la Côte d'Or et de l'Yonne (Odonata, Anisoptera, Aeshnidae). Martinia 13(2): 47-48. (in French, with English summary) ["First record of B. irene in the Côte-d'Or and Yonne departments. This article relates first observations of B. irene made at the Romane'e (a river south-east of Côte-d'Or department} at 310 meters and 275 meters high. The species was also recorded in the Cousin (Yonne department). B. irene is also mentioned from Haute Loire department at 810 meters and 831 meters high." (Author)] Address: Cochet, G., Le Village, F-07130 St Romain de Lerps, France

24215. Hirata, M. (1997): Some dragonflies collected from Lake Shumarinai and Otoineppu mura. Sylvicola 15: 34. (in Japanese, with English title) [Japan; records of Anotogaster sieboldii, Orthetrum albistylum speciosum, Sympetrum frequens, and Copera annulata are documented.] Address: Hirata, M., 1-11-15, Futagatai dormitory, Futagatai, Shi, Tokyo 085

1999

24216. Avet, J.-L. (1999): Premier inventaire du peuplement d'odonates du Parc naturel régional de la Forêt d'Orient (1998-1999). Courr. sc. Parc nat. rég. Forêt d'Orient 23: 41-59. (in French) ["An initial inventory of the Park's odonate population was conducted through captures and observations in 1998, supplemented by a more detailed study of the Park's ponds. The richness of odonatological diversity (42 species) warrants further studies, the implementation of protective measures, and educational initiatives. ...Odonata populations are highly dependent on the environment. A primary criterion is the presence or absence of a current (even a weak one). However, the most important criterion appears to be vegetation. The least rich populations (in species and abundance) are observed in uniform, dense, and fairly high (over 2 m) belt zones: typhoids and phragmites. The so-called "Frouasse" pond is a good example: uniform vegetation (a single belt of phragmites along the entire perimeter of the body of water) and relatively low species richness. The

highest species richness and the most abundant populations were observed in ponds with a so-called "traditional" profile (gently sloping bottom, depth increasing as one approaches the dike), with fairly wide belts (between five and ten meters) and medium height (between one and two meters), and patches of hydrophytes. Dike zones are generally quite poor due to the limited vegetation present at great depth." (Author/Google translate) Emphasis is given to Lestes barbarus, Coenagrion mercuriale, and Oxygastra curtisii.] Address: Avet, J.-L., Maîtrise de Biologie des Populations et des Ecosystèmes, Université de Bourgogne, 21000 Dijon, France

2002

24217. Tello, P.G.; Claro Jr., L.H.; Vasconcelos, E.; Rebouças Julião, G.; Antunes, V.Z. (2002): Territorialidad e interacciones entre hembra-macho en Diastatops cf. emilia (Odonata, Libellulidae). Curso de Campo Ecologia da Floresta Amazônica - 2002; http://pdbff.inpa.gov.br/cursos/efa/livro/efa20022.pdf: 63-64. (in Spanish) ["Territoriality and Female-Male Interactions in Diastatops cf. emilia. Introduction: Several animal species, both vertebrates and invertebrates, defend their territories to monopolize resources, such as food or breeding sites (Krebs & Davies, 1978). Some other species defend territories solely for display purposes, as they do not compete for resources (Pinheiro, 1990). Territorial behavior is characterized by a male being regularly found in a restricted area, and this area is patrolled and defended against other individuals. When territories are used solely for display, attacks are preferentially directed at conspecific males (Krebs & Davies, 1978). Odonata are insects whose nymphs develop in aquatic environments, although adults use habitats close to water (Borror & De Long, 1988). Dragonflies can be divided into two groups: fliers (those that spend most of their time flying) and empoleirators (those that spend most of their time perching within their territories) (Cobert, 1962). It should be noted that individuals of the Libellulidae family are, in general, empoleirators, but not all are territorialists. Preliminary observations made in the Anavilhanas Archipelago (Central Amazonia) suggest that Diastatops cf. emilia may be territorialists. A characteristic of males of this species is their red wing pigmentation, and they are commonly found on natural nesting sites near water. The objective of this study was to investigate whether Diastatops cf. emilia males are territorial and whether territory size and proximity to the lake influence male attractiveness to females. Methods: The study area was the shore of Lake Prato, located in the Anavilhanas Archipelago, Central Amazonia. Our study was conducted during the dry season (November 2002) between 8:00 and 11:00 a.m. Behavioral samples were of the "focal animal" type, and each Diastatops cf. emilia male was observed for a period of 10 min. During the sampling period, the number of fights (inter- and intraspecific) between males, the number of female visits to the territory, and the number of copulations were recorded. Territory size was measured by multiplying the square area used by males. The perimeter was determined by mapping each male's pollieros. Finally, the distance from the territory to the lake margin was also measured. The number of interactions between males, the number of visits by females, and the number of copulations were correlated with the territory area and its distance from the lake using Spearman's correlation tests. Results: We observed thirteen individuals on the Prato Lake margin, of which 92.3% were found within a restricted area of 9.8 ± 8.0 m². Eight disputes between males were observed, 87.5% of which were intraspecific. Females were observed 11 times visiting the males' territories and copulating in five cases. The number of visits by females was positively correlated with territory area (r_s= 0.579; $p<0.05$). The number of copulations (r_s=0.512) and the number of intraspecific fights (r_s=0.035) were not correlated with territory area ($p>0.05$ for both). None of the behavioral parameters were correlated with the distance of the territory from the water. Discussion The results suggest that Diastatops cf. emilia males exhibit territorial behavior. Apparently, defended territories are used as display arenas by females, since all observed fights were between males of the same species. Territory size seems to influence the number of females visiting the males' territories. This may be explained by the females' preference for more vigorous males capable of defending a larger territory. The defending male's opportunity to copulate would increase with the number of females visiting the territory. We did not yet find a significant relationship between territory size and the number of copulations. Since males spend a lot of time defending their territories, the number of interactions is probably low. Males would be expected to defend their territory with a resource attractive to females, such as oviposition sites. However, this is not the case with Diastatops cf. emilia males, who defend their territory only to display their food and attract females. It is probably not worth defending a resource such as water." (Authors/Google translate)] Address: not stated

2003

24218. Sakoda, T.; Ubukata, H.; Nakatani, M.; Inoue, M.; Hirama, Y.; Ichuo, N.; Kosugi, T.; Baba, K. (2003): Odonate larvae collected at two swamps by Lake Kussharo. Sylvicola 21: 5-7. (in Japanese, with English title) [Verbatim/Google translation: Introduction The dragonfly fauna of Lake Kussharo, located in Kutsu Town, Hokkaido, has been investigated by Asahina (1938), Iijima (1972), Enta (1980a, b), and Ubukata et al. (1994). Ubukata et al. (1994) listed 16 species of dragonflies in Lake Kussharo. These are all based on the collection records of adult insects. Therefore, it does not mean that all 16 species spent their larval stage in the main body of Lake Kussharo and emerged from there. In fact, there are marshes, the flowing Korai River, and even geothermal marshes around Lake Kussharo, providing a variety of habitats for dragonflies. It is highly likely that a large portion of the dragonflies recorded as dragonflies at Lake Kussharo grew and emerged in these surrounding habitats. In this study, we attempted to collect dragonfly larvae in two marshes on the edge of the forest adjacent to the eastern shore of Lake Kussharo, and collected a large number of larvae, so we would like to report the results. Survey location, schedule, and method Swamp A: A shallow muddy area located on the eastern shore of Lake Kussharo. The central part of the swamp is wide and open to the sky, and the surrounding area is a

marsh forest with a complex of swamps and standing trees. Swamp A is where Ikukata (1995) observed the patrol flight of the dragonfly Nariyoshi. On the afternoon of June 14, 2003, seven people, Nakatani, Hiramon, Donjo, Ikukata, Ichijo, Kosugi, and Baba, used a dip net to search for dragonfly larvae. They scooped up the mud itself, between the fallen leaves at the bottom of the waterwheel at the bottom of the pond, and after pushing aside the mud and plant debris with tweezers, they separated the larvae and stored them in plastic cases. Swamp B: It is also located on the eastern shore of Lake Kussharo and has a similar landscape to Swamp A, but Swamp B is slightly deeper and larger. On the morning of June 15, seven people, Sakota, Nakatani, Hirama, Inoue, Ichijo, Kosugi, and Baba, searched for larvae using the same method as the previous day. On this day, a newly emerged adult and a newly hatched Oligoaeschna pryeri were discovered (Ukukata et al., 2003), so a more thorough search was conducted around the site. After Benjo identified some of the collected larvae, Sakoda identified the whole, and Ukukata confirmed and corrected the whole identification. In this case, Sugimura et al. (1999) and Ishida (1996) were used as references. This article was written by Sakoda and added by Ukukata. Discussion The larvae of the above two families and five species of dragonflies were collected in this survey. In terms of population, the common skimmer was the most numerous. Among these, the blue-spotted dragonfly was recorded in Wakoto, the common skimmer and the autumn darter were recorded in Ishikaribetsu (Ukukata et al., 1994), and the four-spotted skimmer was recorded in Minami-Tsukube, Himeshiro-Ko by Hirose and Ito (1993), but the common skimmer had not been recorded in Teshikaga-cho. If we limit ourselves to larvae, all five species are recorded for the first time in Teshikagacho. Ukukata (1995) recorded the adults of the O. pryeri, the blue-spotted skimmer, the Otsunen skimmer, the common skimmer, and the Usupaki skimmer from Swamp A, but we were unable to collect any larvae other than the common skimmer. The reason for this is that most of the O. pryeri has already emerged, while the Otsunento dragonfly's larvae are still young, so it is highly likely that we were unable to find them. The Blue Damselfly may have flown in from the ponds in Kinshu, which are rich in emergent plants. In addition, it is said that the larvae of the Usubakito dragonfly cannot survive the winter in Hokkaido, and even if the adults that came from the south laid eggs, by June the larvae would not have been large enough to be caught in a net. It was particularly unfortunate that we were unable to collect the larvae of the Sawosa dragonfly (adults and emergence shells immediately after emergence will be reported separately in this magazine: Ukukata et al. 2003). In the future, we believe that by collecting emergence shells as well as other methods, the habitat of the larvae of each dragonfly in each water area will become clear.] Address: Ubukata, H., Hokkaido University of Education at Kushiro, Dept Science Education, Shiroyama 1-15-55, Kushiro, 085, Japan. E-mail: ubukata@kus.hokkyodai.ac.jp

24219. Ubukata, H.; Baba, K.; Kosugi, T.; Inoue, M.; Nakatani, M.; Hirma, Y.; Ichijo, N.; Sakoda, T.; Muramatsu, N.; Nakamura, I. (2003): Emergence of Oligoaeschna pryeri at swamps by Lake Kussharo. Sylvicola 21: 1-4. [Verbatim/Google translate: Introduction: O. pryeri has been recorded in Hokkaido from the subprefectures of Oshima, Ishikari, Sorachi, Kushiro, Abashiri, and Nemuro (Hirose and Ito, 1993), but its distribution is limited and it is ranked as a rare species in the Hokkaido Red Data Book. Furthermore, no larvae or exuviae have been reported from Hokkaido. In the Kushiro subprefecture jurisdiction, Asahina (1938) recorded a sighting at "Kuccharo", which was confirmed by the collection of one adult male by Iijima (1977) and three adult males by Ikukata (1995) from the shores of Lake Kussharo. Ikukata (1995) also recorded an observation of the hovering behavior of a mature male on a muddy marsh, and since then, it was predicted that mating, egg-laying, and emergence would be confirmed if one went to the marsh where the male was observed. This time, we conducted a survey in the wetland (or rather, the marsh) in question, as well as another nearby marsh, with the aim of collecting Sarasa dragonfly larvae and exuviae, and we report that we were able to collect newly emerged adults and exuviae. Survey location and method: With the aim of finding O. pryeri larvae, exuviae, and emerged adults, a joint survey was conducted by many members of the Kushiro Insect Club in two deep muddy marshes located in the forest on the eastern shore of Lake Kussharo on June 14th and 15th, 2003. On the first day, a survey was conducted in the first marsh (called Marsh A) from 1:20 pm to 4:20 pm. The dip net team members (Nakatani, Hirama, Kosugi, Ichijo, Baba, Inoue, and Ubukata until partway through) used dip nets to scoop up the mud at the bottom of Marsh A, the undersides of accumulated leaves, and the thickets of sedges near the shore. The members of the insect net team (Muramatsu, followed partway through by Ubukata) searched carefully along the shoreline for emergent shells or emerged adult insects resting on grass stumps and the surfaces of trees. On the second day, starting at 9am, the dip net team (Nakatani, Hirama, Kosugi, Ichijo, Baba, Sakota, Inoue), the insect net team (Ubukata, Muramatsu) and the support team (Suma, Nakamura) conducted a similar survey to that of the previous day in a similar swamp (called Swamp B) about 1km south along the shoreline of the lake from Swamp A. Swamp B was a shallow swamp about 150m long and 50m wide, with deciduous broadleaf trees with a breast height diameter of about 20cm growing on the land that rose up like a small island. Both swamps are watering places for Yezo deer, and there were numerous footprints and droppings of deer there. The dragonfly larvae collected in this survey will be reported separately (Sakoda et al., 2003). Survey results: No clues to the O. pryeri were found during the survey of swamp A on the first day. The survey of swamp B on the second day also yielded few clues, and it was not until 10:40, as the scheduled end time was approaching, that a member of the insect net team, Naruto, finally discovered an O. pryeri. This O. pryeri had just emerged from its cocoon, and the water where it was found was about 10 cm deep from the surface of the muddy bottom, and about 30-40 cm deep from the bottom of a boot sunk in the mud, where there was a colony of Asian skunk cabbage (Fig. 1). When it was discovered, a fresh adult dragonfly that was clearly an O. pryeri was resting

on the underside of a large Asian skunk cabbage leaf, with the exoskeleton nearby. Team member Ubukata first picked up an adult insect, one of the pieces of evidence, and confirmed that it was an O. pryeri, then called out to everyone. The exoskeleton was about 60 cm above ground on the underside of a leaf on the island side of a place where a skunk cabbage tree was growing adjacent to an island about 1 m in diameter, with the larvae hooking their claws on the leaf (Fig.2). The water temperature at the time was 16.0°C, and the air temperature was 14.2°C. The members who had gathered were shown the adult insect he was holding, and a quick photo session ensued of the exoskeleton still attached to the underside of the leaf. Afterwards, team member Baba found the second exoskeleton, team members Kosugi found the third and fifth, and team member Inoue found the fourth. All of them were on the underside of a skunk cabbage leaf (30-60 cm above ground or water surface). We searched carefully for exuviae and adults, paying special attention to grasses and tree trunks other than the Asian skunk cabbage, but we couldn't find any. The dip net team frantically scooped up the water and muddy bottom of the swamp in the area where the exuviae was found, but by the time we called off the search at noon, we hadn't caught any larvae. Collection records: All from a swamp in the forest marsh beside Lake Kussharo, Teshikaga Town (Swamp B); collection date: 15-IV-2003. Oligoaeschna pryeri - 1 male (just after emerging; Fig. 3, 4), 1 exuvium (ex.) (Fig. 5), collected and stored in Ikukata; 1 ex., collected and stored in Baba; 1 ex. collected in Kosugi and stored in Inoue; 1 ex., collected and stored in Inoue; 1 ex., collected in Kosugi and stored in Nakatani. Orthetrum albistylum speciosum: 1 male (just after emerging), 1 ex., collected and stored in Ikukata. Libellula quadrimaculata asahinai: 1 female (mating), collected and stored in Ikukata. Conclusion: The difference between Swamp B, where all five of the dragonfly emergence shells were collected, and Swamp A, where none were collected, is that Swamp B is larger in area, slightly deeper, and has springs in several places. Swamp B has springs and is deeper, so the water seems to be somewhat cleaner than Swamp A. On the other hand, when walking through Swamp A, there are places where you can feel heat through your boots, and when you measure the temperature, it is 23°C, but there is no such place in Swamp B. The observation of emergence this time has revealed that there is a habitat for this species on the shores of Lake Kussharo. In the future, we hope to observe mating, egg-laying, and larvae. This habitat is isolated in eastern Hokkaido, and the population size is small, so it is desirable to conserve the habitat.] Address: Ubukata, H., Hokkaido Univ.of Education at Kushiro, Dept Science Education, Shiroyama 1-15-55, Kushiro, 085, Japan. E-mail: ubukata@kus.hokkyodai.ac.jp

2004

24220. Ichijô, N.; Ubukata, H.; Hariu, T.; Hiruta, S.; Sato, T.; Kakinuma, M. (2004): Deterioration of the odonate larval community in an artificial pond (Tombo-no-ike) by Lake Harutori, Kushiro, Hokkaido, Japan. Sylvicola 22: 1-8. (in Japanese, with English title) [Verbatim/Google translate: Introduction: Recently in Japan, nature restoration has become popular, and biotopes where dragonflies can live are being actively constructed. However, if the management of the biotopes is neglected after construction, they tend to become imperfect for the target organisms due to the accumulation of sediment, polluted water, overgrowth of plants, and the invasion of predators. In this study, a decline in the number of dragonfly larvae was observed in a biotope in Kushiro Port, which is thought to be mainly due to predation by fish and crayfish and deterioration of the environment. The results are reported and some discussion is provided. In 1991, when the term biotope had not yet been widely used, the city invested in the construction of the artificial pond on the shores of Lake Harutori in Kushiro City, a place of relaxation for the citizens of Kushiro, in order to attract and settle dragonflies (Ikukata et al., 1992; Tsuchiya, 2004). The Biology Club of Kushiro Koryo High School set the process by which dragonflies settle in this artificial pond as a research theme, and began surveys in 1992. In 1992, immediately after the construction, 15 adult species were collected in one season. In surveys by the same club from 1994 to 1999, the number of species of dragonflies collected by scooping and rubbing for five consecutive years (2-12 surveys were conducted between May and October of each year) ranged from 6 to 8 species each year (Ichijo et al., 1999). 1999), the pond was considered to be a stable habitat for dragonflies until 1999. However, in 1998, Mabekai confirmed with the naked eye that several artificially introduced carp with a body length of about 30 cm were living there. In response to this, Ichijo et al. (1999) pointed out the need to plant more anadromous plants and to remove the artificially introduced fish. From the irregular observations made by the same group after that, the number of adult dragonflies decreased year by year, and the number of large fishes increased. In addition, Doi (200(4) pointed out that the deterioration of water quality due to the accumulation of sediment washed by spring water was the cause of the deterioration of the bank of the pond. Ichijo, one of the researchers, said that the main cause of the decline of the dragonfly community was the increase in the fish and crayfish released into the pond. We became convinced that this was the case, and in January 2004, together with Naka from the Kushiro Insect Club, we requested the Kushiro City Public Green Space Division, which is in charge of managing the pond, to drain the pond and survey the habitat of the dragonfly larvae, as well as remove the fish, crayfish, and sludge-like bottom mud. Upon receiving this request, the Kushiro City Public Green Space Division, after consulting with the Kushiro Museum of Natural History, decided to carry out the drainage work. Thus, in October 2004, the water was drained using an electric pump made by Sakae, who was commissioned by the city (however, the removal of the bottom mud was postponed this time), and many volunteers helped to catch fish and crayfish and rescue dragonfly larvae. During this work, among the authors, Tsuyoshi was in charge of the fish, Hiruta was in charge of the crayfish, and the other four were mainly Before getting into the main text, I would like to express my gratitude to the City of Ibaraki Parks and Green Spaces Division, who carried out the drainage work, to Tsuchiya Minjo, Nakatani Masahiko, Nakamura Isamu, Kikuma Yasuhiko, and Ryomatsu Yasuo, who participated in the difficult work of catching fish and

crayfish and assisted in the discovery of dragonfly larvae, as well as to the other staff, students from the University of Tokyo, and the general public. Survey location and survey method: The survey site, "Tonbo Pond," is a pond with a diameter of about 20 m located on the shore of Lake Harutori in the eastern part of Zhuanglu City (Fig. 1). The bottom of the pond is two-tiered, with a central depth of about 80 cm and a peripheral depth of 30 to 500 cm. When the artificial pond was first constructed, patches of reeds, cattails, and water lilies were planted in the shallow peripheral area. As shown in Figure 1, the cattail and reed communities remained until 2000, but by 2000 the cattail community had disappeared and the reed community had also declined. In addition, soil had entered the stream on the west side, forming a reed community at the outlet of the stream. On the morning of October 23, drainage began with a large mechanical pump, and by 10 a.m., when the workers gathered, the mud had already been exposed on the shallower tier of the two-tiered pond, and the bottom of the deeper tier, the central part of the pond, was also beginning to be exposed above the water surface. Mr. Ikuya, Mr. Nakamura, and Mr. Tsuchiya, who were in charge of catching fish and crayfish, In the center of the pond, the group caught fish and crayfish one after another with a large rope (Fig. 2) and threw them into a large storage container prepared for them (Fig. 3). After the work was completed, the fish were swept away by the hook and the crayfish by the hook, and the larvae were identified, counted, and measured in body size when necessary. Among the authors, Ichijo, Sato, and Kakinuma used a dip net along the entire circumference of the pond to search for larvae buried in plant debris and mud at the bottom, captured all dragonfly larvae they found, and placed them in a 100-cm plastic container with water. They were brought back to the laboratory at Koryo High School for measurement and identification, and then reared. Ichijo performed the identification, and the results were confirmed and corrected by Ubukata. Ubukata not only collected dragonfly larvae, but also recorded the entire The number of dragonfly larvae: Despite the thorough drainage of water, the number of dragonfly larvae collected from the site was much smaller than expected, with only five individuals of three species. All specimens were kept at the Mononobe site, except for one large blue-and-white dragonfly (kept at the Tono site). Discussion: In this survey, only 3 to 5 dragonfly larvae were found. In contrast, 9 years ago, during the same season, 5 to 31 and 6 to 36 dragonfly larvae were caught on October 8 and 14, 1996, respectively, as shown in Table 1, and 7 years ago, on October 25, 1997, 4 to 5 dragonfly larvae were caught (Ichijo et al., 1999). In previous surveys, dragonfly larvae were collected by scooping up the pond with a dip net when the water level was normal. This time, we investigated the bottom of the pond with the water drained. Although dragonfly larvae were much easier to find this time, they could not be seen with any difficulty, and the number of dragonfly larvae was also less than before. Therefore, the dragonfly larvae population has clearly declined in the past 5 years. Corbet (1999) states in his review of dragonfly behavior and ecology that the animals that prey on dragonfly larvae are mainly fish, crows, and sea urchins, and that crayfish and larger dragonfly larvae are also powerful predators. Table 2 shows the feeding habits of all the fish species and the crayfish captured this time, extracted from various literature. All of the fish species captured this time were carnivorous or omnivorous, and it is thought that the crucian carp, which accounted for a large proportion of the total, more than 100,000 years old, and the large carp, which was a small population, were major enemies of dragonfly larvae. When the Dragonfly Pond was first constructed, no fish or crayfish were released, so these fish and crayfish probably did not inhabit it for some time after its construction. However, as early as 1996, 40 specimens of each of the Ibaratomiyo and the Juzukake goby were caught in a 1M survey (Ichijo, 1999). As mentioned above, several specimens of carp were already spotted in 1998, so it is believed that their populations were already increasing at that time. It is likely that some residents had released into this pond carp that they had no time for at home, or freshwater fish and crayfish that they had caught elsewhere. The Public Lands and Greenery Division of Kushiro City, which noticed the appearance of fish in the Dragonfly Pond, began putting up signs around the pond in 1996 stating, "This pond is for insects to live in. If fish or crayfish are placed in the pond, dragonflies and other insects will not be able to survive, so please do not put fish in the pond." However, the fact that many fish and crayfish were caught this time suggests that releases of fish and crayfish continued and that the fish and crayfish in the pond have increased in number since then. The larvae of the Zygoptera (Coenagrionidae) that were always collected at this time until 1998 have not been collected at all. The reason for this is thought to be that the aquatic plants that serve as the larvae's resting place and hiding place have been shrunk, and they have lost their escape route from the increasing number of fish and crayfish. In contrast, the larvae of the four-spot dragonfly, such as the red and red dragonfly, are more likely to have a habit of burrowing into the mud at the bottom of the pond (Corbet, 1999). They are relatively hard to find, and so they are thought to have survived. However, even so, the number of individuals collected at present is small, and it can be said that the dragonfly larvae are almost completely destroyed. The larvae of the large blue-and-white spotted dragonfly were the most numerous, with three individuals, but it is known that dragonfly larvae have the ability to quickly escape using jet propulsion, and that the pointed parts of their legs have some defensive power against predators (Corbet, 1999). This may explain the existence of only a few larvae. Dragonfly larvae can maintain a certain level of population if there are places to hide even if there are fish in the pond (Corbet 1999). In particular, aquatic plants are useful for dragonfly larvae as a foothold for protection and feeding. When the dragonfly pond on the shore of Lake Harutori was first constructed, reeds and cattails were planted on the bottom of several places near the shore and established a certain degree of habitat. However, the communities did not expand any further and gradually retreated. These aquatic plant communities were slightly reduced by the 12 annual surveys conducted by Ichii et al. (1995), but they had almost recovered by the year after the survey. In addition, since 2000, there have been almost no surveys using aquatic animals, including dragonfly

larvae. However, the decline of aquatic plant communities has progressed rapidly since 2000 (Fig. 1). This suggests that the decline of aquatic plant communities is due to omnivorous It is highly likely that feeding by fish (especially carp and crucian carp) and crayfish was the cause. If so, it is possible that the fish and crayfish released into the pond not only preyed on the dragonfly larvae, but also destroyed the aquatic plant community, causing the dragonfly population to decline. Finally, I would like to mention something that one of the performers, Ikukata, noticed about the structure of the pond. The water supply to the pond depends on rain that falls on the surrounding slopes becoming groundwater, which then springs up and flows. The upper part of the slope is a busy road, which is paved with manholes. This urban development in the surrounding area reduces the amount of water supplied to the pond. Compared to this small water supply, the Dragonfly Pond is large in both surface area and depth, so the natural rate of water replacement seems to be very slow. Therefore, if fish increase in such a pond and food is introduced, the algae will increase due to eutrophication, and the water level will increase due to an increase in sludge, and sufficient light will not reach the bottom of the pond, and the aquatic plants will no longer grow. It is not simply that the aquatic plants are being eaten by fish and crayfish, but rather that they are unable to photosynthesize, especially in the central area more than 50 cm deep. If there were enough aquatic plants, they would absorb phosphorus and nitrogen and purify the water. However, in this pond, the water tank is almost silent, so the water purification function is lost and pollution becomes more and more severe, creating a vicious cycle that is highly likely to cause the pond to become even more impenetrable. This is similar to the deterioration of water quality and the decline of the biota, especially the aquatic plants. This has been pointed out at Renkobu Marsh in the Isoya River System (Takamura et al., 2003). If this is correct, one solution would be to remove the sludge from the dragonfly pond, then cover the bottom of the pond with soil containing little material, and make the pond shallower to about 50cm. In addition, if the pond area is made smaller and the water volume is significantly reduced, the water turnover rate will be improved, creating an environment where aquatic plants can grow easily. Of course, it is also important to plant aquatic plants in about half the pond area to provide hiding places and feeding places for dragonfly larvae. These aquatic plants are also used as territorial, mating, and egg-laying sites for adult dragonflies. In particular, Zygoptera and Acanthidae lay their eggs inside plants, so it is necessary for aquatic plants to be present in the pond. And, although this is quite difficult, it is necessary to take effective measures to prevent the release of fish and crayfish. To do this, it is necessary to post a sign to warn of the release of fish and crayfish. It is important not only to prohibit them, but also to carry out educational activities such as explaining the biology of dragonflies and to help citizens understand why releasing fish and crayfish is wrong.] Address: Ubukata, H., Hokkaido University of Education at Kushiro, Dept Science Education, Shiroyama 1-15-55, Kushiro, 085, Japan. E-mail: ubukata@kus.hokkyodai.ac.jp

2005

24221. Mitra, A.; Thinley, P. (2005): Odonata of Bumdeling Wildlife Sanctuary, Trashi Yangtse, eastern Bhutan, with the description of two new species. Technical Report · January 2005: 23 pp. (in English) [40 odonate species are treated in detail. Taxa of interest are Aciagrion olympicum, Indolestes cyaneus, Anisopleura subplatystyla, Davidius baronii, and Anotogaster nipalensis. Kalkmann et al. (2020): Bhutan checklist, commented on the 'new species': Note 17. "Mitra & Thinley (2006) described Anisopleura bella. Their publication does not fulfil the requirements of Arcticle 8.1 of the Code of zoological nomenclature and therefore the name is not available for zoological nomenclature (Hämäläinen 2016). The characters mentioned for this species seem to fall within the range of variation of A. subplatystyla." https://-www.researchgate.net/publication/279848704_The_Odonata_of_Bumdeling_National_Park] Address: Amit Mitra, A., Dept of Zoology, Sherubtse College, Kanglung, Bhutan

2006

24222. Paulson, D. (2006): Ophiogomphus susbehcha common name changed. Argia 18(3): 23. (in English) ["The Common Names Committee, acting at the request of DSA members in Wisconsin and Minnesota, has voted to change the common name of O. susbehcha from Wisconsin Snaketail to St. Croix SnaketaiL Local people have been calling it St. Croix Snaketail for some time, and it is so listed by government agencies. It was described from the St. Croix River, and it is known from Minnesota as well as Wisconsin, so the original location is as good a geographic locator as a state name. It is quite difficult to assign descriptive names within large genera such as Opbiogomphus, with numerous similar species." (Author)] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@pugetsound.edu

24223. Schmidt-Halewicz, S.; Heitz, S. (2006): Quelljungfern (Cordulegaster boltonii und C. bidentata) in Waldbächen des hohen Bodanrücks. Deutsche Gesellschaft für Limnologie (DGL) - Erweiterte Zusammenfassung der Jahrestagung 2006 in Dresden: 703-707. (in German) [Baden-Württemberg, Germany. " A total of 95 larvae of the two dragonfly species were detected at 77 sampling sites. Colonization with C. boltonii is assumed for three-quarters of all forest streams examined, whereas C. bidentata only inhabits a few headwaters. The high persistence of the two damselfly species demonstrates the generally favorable settlement conditions on the Bodanrück. The forest stands along the streams can influence the composition of the macrozoobenthos colonization and thus the food spectrum of the larvae. In stretches of water with pure conifer stands, the dragonflies do not completely disappear from the stream; rather, their larval density decreases due to a reduced food supply. Negative effects of conifer cover on the prey spectrum of dragonflies were documented at three watercourses, exemplarily through a decrease in the individual densities of the freshwater shrimp (pink area in the graph) (Gammarus fossarum). This confirms the

effects described by Hering et al. (1993). This effect was not observed in larger streams (MÜHL) or those that occasionally dry out (SCHL, shown in the graphic). Factors other than needle litter have a stronger impact on macrozoobenthos colonization here. Conclusion: Pure coniferous stands as small as 35 to 70 meters long, present on both sides of a stream, can have a negative impact on the stream ecosystem." (Authors)] Address: Schmidt-Halewicz, Sabine, Joseph-Belli-Weg 5, 78467 Konstanz, Germany. E-mail: schmidt-halewicz@l-imsa.de

24224. Schubert, P. (2006): Über die Helm-Azurjungfer (Coenagrion mercuriale) im Land Brandenburg. Naturschutz im Hohen Fläming und im Planetal 2006: 9-12. (in German) [Potsdam-Mittelmark district, Brandenburg, Germany; June 2004, near Schlalach and Linthe.] Address: not stated

2007

24225. Bailowitz, R.; Danforth, D. (2007): Argia harknessi Calvert (Harkness' Dancer) new to the United States. Argia 19(2): 24-25. (in English) [We visited the river on 5 and 12 June 2007, sections upstream from the bridge in the town of Clifton, all within Greenlee County, Arizona] Address: Bailowitz, R., 15444 N. Indian Trail, Tucson, AZ 85750 USA. E-mail: raberg2@q.com

24226. Edgar, C. (2007): Anisoptera larvae in the headwater streams of Lake County, Ohio. Argia 19(2): 16-18. (in English) [17 larval taxa are recorded from Lake County, Ohio, USA. Pending confirmation, three new county records have been identified in the collection. These are Cordulegaster erronea, C. diastatops and Lantbus parvulus/vemalis.] Address: Edgar, C., Lake County Soil and Water Conservation District, 125 E Erie Street, Painesville, Ohio 44077, USA. Email: Edgar@lakecountyohio.gov

24227. Hatfield, J. (2007): Dragonflies featured in song. Argia 19(1): 21. (in English) ["Some time ago I ran across a neat little song about dragonflies by singer/songwriter Fernando Ortega. The CD is entitled Fernando Ortega and was produced in 2004. The song was written by Fernando Ortega, Elaine Rubenstein, and John Andrew Schreiner. It is called “Dragonfly" ..." (Author)] Address: Jerry Hatfield: Email: dragonflywatcherl029@yahoo.com

24228. Mechnikov. M.L.; Dyatlova, E. (2007): [Dragonflies (Insecta: Odonata) of the South-Western Ukraine in the collection of the Zoological Museum of the I.I. Mechnikov National University in Odessa]. Proceedings of the Museum Fund named after A. A. Brauner IV (2-3): 29. (in Russian) [Verbatim/Google translate; The collection of the Zoological Museum of I. I. Mechnikov Odessa National University contains dragonflies from various regions of Ukraine (Odessa, Kherson, Zakarpattia regions and Crimea), the museum also presents collections of dragonflies from Moldova, the Gulf of Aden and the Suez Canal. Specimens are stored dry and impaled on entomological pins. Dragonflies of south-west Ukraine were collected by I. V. Maltsev and S. Ya. Blinshtein in the middle of the 20th century. The aim of our work was to search for new information on the distribution of dragonflies in the south-west of Ukraine. The history of dragonfly fauna studies in the southwestern region of Ukraine can be divided into two main stages according to literary data: the first stage includes studies at the beginning of the 20th century; the second stage includes studies at the end of the 20th – beginning of the 21st century. There are insufficient literary data to conduct a comparative analysis of changes in the dragonfly fauna over the last century, since the literature lacks information on the dragonfly fauna of the study area in the mid-20th century. Some dragonfly specimens from the museum collection made it possible to expand the information on the distribution of individual species in the region. Brachytron pratense and Libellula quadrimaculata had not previously been reported for Odessa and its environs. A new location of the migratory Afro-Asian species Anax ephippiger was discovered in the Dnieper delta (Kherson). This find is the earliest find of the species in Ukraine. An extremely interesting find is the rare European species Lestes macrostigma Odessa (Luzanovka). The collection includes dragonflies from the lower reaches of the Dniester River (Mayaki village) collected by S. Ya. Blinshtein on 29.05.1966: Platycnemis pennipes, Coenagrion pulchellum, Ischnura elegans, Erythromma najas, Lestes barbarus and Aeshna isosceles. The listed species are common in the southwest of Ukraine, however, dragonfly collections from the lower reaches of the Dniester are of considerable interest due to the fact that the first information on the dragonfly fauna of the Dniester floodplains was provided in the literature only at the beginning of the 21st century (Dyatlova, 2005). Below are the most interesting dragonfly finds from the southwest of Ukraine from the museum collection: B. pratense: 1. “Odessa, Malaya Dolina, ravines” (Malodolinskoye village, Odessa environs): 9 females, 4 males, leg I. V. Maltsev, det S. Ya. Blinshtein, 7.06.1963. 2. “The upper reaches of the Sukhoi Liman, near the village of Tatarka” (the village of Prilimanskoye, Ovidiopol district, near the city of Odessa): 4 males, leg et det: S. Ya. Blinshtein, 7.05.1966. L. quadrimaculata: “Odessa, irrigation fields”: 1 male, leg et det: S. Ya. Blinshtein, 15.06.1966. L. macrostigma: “Odessa, Luzanovka”: 1 male, leg. I. V. Maltsev, det. S. Ya. Blinshtein, 16.07.1963. A. ephippiger: “Kherson”: 1 male, leg. I. V. Maltsev, det. S. Ya. Blinshtein, 19.04. 1962. Ó E. S. Dyatlova, 2007.] Address: Dyatlova, Elena Sergeyevna, Inst. Zool., Fac. Biol., I.I. Mechnikov Univ. Odessa, Odessa, Ukraine. E-mail: lena.dyatlova@gmail.com

24229. Paulson, D. (2007): Pygmy Snaketail (Ophiogomphus howei) not shy about mating. Argia 19(2): 14-15. (in English) [6 and 11 June 2007, Wisconsin, USA, Chippewa River at US 8, just E of Bruce, Rusk County.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

24230. Riexinger, W.-D.; Schwenninger, H.R. (2007): Flora und Fauna der Frankenbacher Kiesgrube. Museo 24: 104-129. (in German) [Starting in 2002, 17 odonate species could be recorded, in most cases species of early succession stage of water bodies, including Libellula depressa or

Orthetrum brunneum.] Address: Riexinger, W.-D., Stadt Heilbronn, Planungs- & Baurechtsamt (Untere Naturschutzbehörde), Cäcilienstr. 56, D-74072 Heilbronn, Germany

2008

24231. Dyatlova, E.S; Oleynik, Y.N. (2008): Morphometry analysis, ectoparasite infection and fecundity of two Ischnura elegans morphs in SW Ukraine. Abstracts of Papers. The Eighteenth International Symposium of Odonatology, Hislop College, Nagpur, India. 5th - 9th November, 2008: 28. (in English) [Verbatim: Populations of Ischnura elegans were studied in SW Ukraine at the following locations (1) - 45°18'32.34"N, 29°41'21.65"E, (2) - 45°25'59.17"N, 29°31'35.64"E, (3)- 45°23'38.78"N, 29°36'43.23"E and (4) - 46°24'37.81"N, 30°15'34.92"E. Females in tandem were transported to the laboratory and stored separately in ventilated tubes with wet filter paper on the bottom for oviposition; eggs laid were counted on the third day. Females were thereafter divided into two groups: 1) Oviposited females and 2) females which had not laid eggs after copulation. Fecundity was characterized as average fecundity (number of eggs applied to all copulated females) and specific (ecological) fecundity (the number of eggs from individual females). In population 1 alone, “androchromes” from tandems had greater thorax width, body and abdomen lengths than “infuscans”. Intrapopulation heteromorphousness of all linear characteristics (except wing length) was registered for copulated “infuscans” from populations 1-3. There was no difference in mite infections between morphs. Correlation analysis showed that for “infuscans”, fewer ectoparasites equals greater fecundity. Median, 25%+75% quartiles in the fourth population showed higher fecundity for “androchromes”. The differences are significant for specific fecundity.] Address: Dyatlova, E.S, Odessa National Mechnikov University, Biological Faculty, Department of Zoology. Odessa, Ukraine. Email: lena.dyatlova@gmail.com

24232. Rehfeldt, G. (2008): Pflanzen- und Tierartenschutzkonzept Stadt Braunschweig. Im Auftrag der Stadt Braunschweig, Fachbereich Stadtplanung und Umweltschutz: 208 pp + Anhang. (in German) [https://www.braunschweig.de-/leben/umwelt/natur/artenschutz/pdf/artenschutzkonzept/-Artenschutzkonzept-Braunschweig.pdf. Dragonflies are treated on pages 82-93.] Address: https://www.braunschweig.de-/leben/umwelt/natur/artenschutz/pdf/artenschutzkonzept/-Artenschutzkonzept-Brau nschweig.pdf

2009

24233. Deliry, D. (2009): Migration et migrations dans la région Rhône-Alpes. Le Bièvre « Migrations » 23: 66-73. (in French, with English summary) ["The phenomenon of migration is presented in summary form in its various aspects, and in particular according to the specific situation in the Rhône-Alpes region of France, based on a few selected examples. In birds, there is the classic migration from breeding areas to winter quarters, but also daily or seasonal movements according to altitude, or also influxes with or without return movements. The data and size of these movements have been modified by the climatic change which has been observed over recent years. Birds are not the only group to move from place to place. One- or two-way movements are known to exist in several groups of insects such as Sympetrum fonscolombii and butterflies. There is the well-known case of locusts. Changes of altitude are to be obsereved in the case of some dragonflies in Autumn. The curiosity value of some seasonal movements in mammals from one altitude to another take on biological significance in species such as the Alpine Marmot. As for seasonal movements in large mammals in the past, the existence today of many man-made barriers prevent us from knowing their former size and importance." (Author)] Address: Deliry, C.; Email cyrille.deliry@orange.fr

24234. Knijf, G. de (2009): De libellenfauna van het Paddenbroek te Kluisbergen. Limoniet 2(1/2): 30-38. (in Dutch) ["A total of 21 species of dragonflies were observed in the Paddenbroek, 20 of which in the period 2000-2009. During the Lampyris inventory project in 2008, we observed 13 species. Compared to other water-rich areas in the western half of Flanders (see De Knijf et al. 2006), the total number of observed species is rather low. For example, no Red List species occur in the Paddenbroek. Compared to some other water-rich areas in the Scheldt valley, species such as Coenagrion pulchellum are absent here. Species such as Cordulia aenea, Libellula quadrimaculata and Crocothemis erythraea have also only been seen very exceptionally in recent years and almost always as a single individual. During the thorough inventory of Lampyris in 2008, none of these species could be found. Small numbers of the first two were always seen in the past. We suspect that both L. quadrimaculata and C. aenea may still be present in the area in very small numbers. The fact that a striking species such as tC. erythraea, which used to be seen here in large numbers, is no longer frequently observed indicates that Paddenbroek is no longer suitable as a breeding habitat for this species. The sporadic observations of a male in 2007 and 2009 show that the species still knows how to find Paddenbroek. Despite the increased interest in the dragonfly fauna of Paddenbroek and the inventory project in 2008, little is known about most species, whether they reproduce in Paddenbroek and how large the numbers of each species are. These shortcomings can be solved by paying more attention in the future to counting/estimating the numbers of each species and by paying specific attention to the different life stages. In particular, larvae, larval skins, newly hatched animals, copulating animals (tandem formation) and egg-laying females are good indicators for the local reproduction of a species. More attention for dragonflies in spring-early summer (end of April - end of June) is also desirable. This is the period in which a number of specific species have their main flight period. I am thinking of C. aenea and L. qudrimaculata, two species that are mainly found in the pools in wet zone 34. This zone is not so easily accessible and is therefore much less visited than the stream systems. A species such as Erythromma najas, whose numbers have declined sharply in recent years, has a clear preference for pools that are

characterised by well-developed floating and submerged aquatic plant vegetation. Pools with well-developed aquatic plant vegetation and clear water are important for almost all species of dragonflies. These are also, for example, the requirements that a species such as C. pulchellum places on its biotope. Although this species has not yet been observed in the Paddenbroek, it does occur a few kilometres further in the Scheldt valley. It seems to me that this must also be a target species for the area and it can also be used to evaluate the impact of internal and external management. However, we lack qualitative data to substantiate the decline of aquatic plants in the Paddenbroek. Previous visits in the early nineties showed that there was well-developed vegetation present, particularly in ponds 6, 7, 10 and 11, and the water was also relatively clear in places. If we want to restore the species diversity of dragonflies, we will first have to work on good starting conditions for the ponds in the Paddenbroek. In this regard, we must first work on preventing foreign, nutrient-rich water and on restoring a natural fish population. Measures that will not only benefit dragonflies, but the entire group of aquatic organisms." (Author)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

24235. Malikova, E.I., (2009): Odonata. Insects of Lazovsky Nature Reserve. – Vladivostok: Dalnauka, 2009. – 464 p. + col. pls 16 p. ISBN 978–5–8044–0992–1: 37-40. (in Russian) ["The book treats the results of the long-term investigations on insects of Lazovsky Nature Reserve named after L.G. Kaplanov. The history of the studies of insects, the characteristics of landscape and vegetation of Reserve, the methods and sites of insect collecting are reviewed. An annotated list of 6108 species in 290 families of insects, 231 species in 31 families of spiders and 18 species in 8 families of millipedes, which are based on more than 100000 specimens collected in Reserve, are given. The most important synonymy, references for Lazovsky Reserve, examined materials, localities in Reserve and its bordering areas, habitat, abundance, and general distribution are given foe each species. Fiftythree species are firstly recorded from Russia, 56 species – from Russian Far East, and 85 species – from Primorskii krai. For the Lazovsky Reserve, 38 species of dragonflies from 7 families are indicated (Malikova, 2007)." (Publisher/Author)] Address: Malikova, E.I.; Dept Zool., Blagoveshchensk State Pedagogical Univ., Lenina Str. 104, 675000 Blagoveshchensk, Amurskaya oblast, Russia. E-mail: helen@amur.ru

24236. Meßlinger, U. (2009): Mond-Azurjungfer. Coenagrion lunulatum Charpentier (1840). Merkblatt Artenschutz (Bayerisches Landesamt für Umweltschutz) 26: 4 pp. (in German) [Leaflet regarding C. lunulatum in Bavaria, Germany.] Address: https://www.bestellen.bayern.de/application/pictureSrv?SID=429881464&ACTIONxSESSxSHOWPIC(BILDxKEY :%27lfu_nat_00151%27,BILDxCLASS:%27Artikel%27,BILDxTYPE:%27PDF%27)=Z

24237. Meßlinger, U. (2009): Vogel-Azurjungfer. Coenagrion ornatum (Sélys 1850). Merkblatt Artenschutz (Bayerisches Landesamt für Umweltschutz) 27: 4 pp. (in German) [Leaflet regarding C. ornatum in Bavaria, Germany.] Address: https://www.lfu.bayern.de/publikationen/get_pdf.htm?art_nr=lfu_nat_00152

24238. Parr, A. (2009): The Willow Emerald Damselfly Lestes viridis (Vander Linden) in East Anglia. Atropos 38: 32-35. [Verbatim: "Introduction: Until 2009 the species had been rarely recorded in Britain. Apart from an old specimen reputedly from Hertfordshire in 1899 that was perhaps mislabelled (Gladwin, 1997), adults had only ever been seen near Hastings, Sussex, sometime around 1980 (D. Chelmick, pers. comm.) and near Trimley, Suffolk, on 17 August 2007 (Brame, 2008). An exuvia had also been discovered at Cliffe Marshes, Kent, on 29 June 1992 (Brook & Brook, 2004), though adults were never seen at this site. On the near Continent the species is, however, widespread and common; it has benefited from urbanisation due to an increase in garden and park ponds bordered by trees, and may be expanding its range northwards (Dijkstra & Lewington, 2006). The 2009 Sightings: In early August 2009 the perceived status of Chalcolestes viridis in Britain was to change rather dramatically. On Saturday 1 August an individual was again found near Trimley by Will Brame, who had also found the 2007 individual in this area. Unable to visit Trimley that weekend, on 2 August Steve Goddard instead decided to look at another part of south-east Suffolk where he knew that favourable habitat for the species existed (such habitat includes ponds, lakes and slow-flowing rivers with overhanging trees). On reaching Staverton Lakes his foresight was rewarded when he discovered several individuals (of both sexes) to be present. Once news of the discovery had spread, and people became aware of the damselfly's characteristic habit of spending time in the trees rather than down at the water's edge or in damp vegetation, further sites were to be discovered in south-east Suffolk over the following days. Notable amongst these were several localities along the River Deben, and also at Alton Water. Records from most of the original sites persisted over the following weeks, and yet further sites were discovered, taking the number of recorded sites to 35 by early October (see Fig. 1). The main centre of distribution was the Wickham Market/Ipswich/ Felixstowe region of Suffolk, where the species was widespread and numbers seen were frequently high. Several sites in this area reported peak counts into double figures, and no less than 150 individuals were seen along a half-mile stretch of the River Deben near Wickham Market on 27 August. Small numbers of individuals were, however, also reported away from this core area. Within Suffolk, sightings on the River Gipping near Needham Market in late August-mid September (R. Rozier et al.) refer to what is currently the most inland site, whilst there were also reports from at least three sites in northern Essex—Fingringhoe Wick on 27 August (R. Cornhill), Colchester in mid-September (P. Carter), and Marks Hall on 20 September (L. McBurney)—and one in south-east Norfolk at Strumpshaw on 4 October (B. & M. Holland). The sheer scale of events in late 2009 with some 400 individuals reported and damselflies present for at least two and a half months (the latest known record to date is 13 October) suggests that a simple influx of L. viridis is unlikely to account

for all the sightings, and it is tempting to speculate that an established breeding population may already be present in the region. This idea is strengthened by the reports of teneral individuals from Alton Water on 21 August (S. Goddard) and from Staverton Lakes on 23 August (P. Bishop). The sighting near Trimley during August 2007 points to a possible origin for this population. As pointed out at the time by Brame (2008), conditions then were favourable for carrying insects from the near Continent towards the central East Anglian coast; the outbreak of Britain's first Bluetongue virus m the region s livestock, which took place during the autumn of 2007 (BBC, 2007), is now thought to have been caused by the arrival of virus-infected midges Culicoides spp. from the Ostend region of Belgium during early August (Gloster et al, 2008). Perhaps numbers of C. viridis sufficient to establish a local breeding population also arrived at the time The lifecycle is known to be one year in length (Corbet et al, 2006), but the absence of records from Suffolk during 2008 does not rule out the establishment of colonies as the species is easily overlooked, particularly if its habit of resting in trees rather than at the water's edge is not fully appreciated. Whatever the status of C. viridis in East Anglia prior to 2009, the year brought numerous reports of oviposition. This takes place into branches of trees and shrubs overhanging water, and reported hosts have included willow Salix spp., Alder Alnus glutinosa, Ash Fraxinus excelsior and Elder Sambucus nigra. It will be interesting to monitor the damselflies in years to come, to see whether a stable population forms and whether the species spreads, as happened with Erythromma viridulum There are indications that dispersal may already be happening, with a few well-watched sites in the region producing isolated one-off records; a singleton was for instance seen and photographed at Landguard Bird Observatory, Suffolk, on 14 September (D. Langois). Away from the areas of highest population density sightings were also often made rather late in the period, suggestive of the appearance of individuals dispersing away from core sites. However, some bias is possible from the tendency for observers to concentrate on known key areas during the weeks immediately following the species' discovery."] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

24239. Stübing, S.; Hill, B.T. (2009): Artensteckbrief Gomphus flavipes (Charpentier, 1825), Asiatische Keiljungfer, Neufassung 2008, Stand Oktober 2009. Hessen-Forst, Fachbereich Forsteinrichtung und Naturschutz (FENA) (Hrsg.): 13 pp. (in German) [Compilation of baseline information on S. flavipes in the Federal State Hessen, Germany.] Address: HESSEN-FORST, Fachbereich Forsteinrichtung und Naturschutz (FENA), Europastr. 10 – 12, 35394 Gießen. E-Mail: naturschutzdaten@forst.hessen.de

24240. Winkler, C. (2009): Hauben-Azurjungfer. Ministerium für Landwirtschaft, Umwelt und ländliche Räume des Landes Schleswig-Holstein (Hrsg.): Jahresbericht 2009. Jagd und Artenschutz. Kiel: 96-98. (in German) [Coenagrion armatum; "Distribution: In Schleswig-Holstein, an unexpectedly large number of locations where C. armatum was recorded in 2008. These are the only known locations in Germany. The species was found in 12 of the 37 areas examined (Table 1). All locations are in the north of Schleswig-Holstein. In terms of natural geography, ten locations are located on the Geest and two on the western edge of the Eastern Hills (Fig. 1). Compared to the 1970s, individual locations in the Eastern Hills appear to have become extinct. In contrast, the distribution area in the north of the Geest has apparently hardly changed in the past 30 years. The current confirmation of C. armatum at seven former locations, which are relatively widely distributed and up to 60 kilometers apart as the crow flies, suggests that these areas were continuously populated by the species. The earlier locations on the west coast of Schleswig-Holstein and in the area around Hamburg were not examined in 2008. Populations: The mapping results from 2008 suggest that C. armatum currently has established populations in at least ten of the twelve inhabited areas. According to current population estimates, large populations (> 100 individuals) exist in five areas and medium-sized populations (11-100 individuals) in two others. Four areas are currently considered to have small populations (two to ten individuals) (Table 12). At one of the 12 localities, only a single male was observed in 2008, although the existence of a small population is also assumed in this area. Outside of Schleswig-Holstein, most Central European locations where C. armatum has been recorded have predominantly contained single or few specimens. Localities where more than 50 or 100 individuals have been recorded appear to be a rare exception at the southwestern edge of the range." (Author/Google translate)] Address: Winkler, C., Bahnhofstr. 25, 24582 Bordesholm; Germany

2010

24241. Alker, P. (2010): Red wing venation in darters. Atropos 40: 49-51. (in English) [Verbatim: "Introduction: On 30 September whilst walking around Carreglwyd Estate on Anglesey I came across a single darter Sympetrum sp. flying over a small pool. It immediately caught my eye, appearing to be bright red in flight. It occasionally came to rest on the hand rail of a small bridge and even at a 3-4m range appeared to show some red veining along the leading edges of each wing. In flight and at rest it gave an overall impression of being a little more red than I would expect a male Common Darter S. striolatum to be. With a little patience and after a few attempts I eventually got to within a foot or so of it a couple of times and was able to photograph it from various angles with a 90mm macro lens. Having a fair degree of experience with Common Darter, Red-veined Darter S. fonscolombii and Ruddy Darter S. sanguineum I am usually fairly confident with their identification. The lack of a pinched waist to the abdomen in particular meant I didn't consider Ruddy Darter as a possibility. However, I quickly realised that I didn't know to what extent, if any, Common Darter could show strong orangey-red to red veining, despite having seen perhaps thousands of Common Darters over the years. Subsequent Research: On returning home I transferred the images to my computer and was able to examine the darter's features in more detail. I also referred to my dragonfly guide

(Hammond, 1983). My pictures clearly showed just how extensive the orangey-red veining was on this individual, but they also showed that the eye lacked the combination of red above and blue below and the black at the top of the frons did not continue down the side of the eye, both of which are features that Red-veined Darter would show. Vagrant Darter S. vulgatum was not something I had considered but this species also has black extending down the side of the eyes, distinguishing it from Common Darter. What I couldn't find in Hammond (1983) or subsequently in Brooks & Lewington (1997) was any reference to Common Darter having red veins; indeed in the latter work Common Darter was not even referred to as appearing similar to Red-veined Darter. So what was I left with? My conclusion was that it had to be a typical mature male Common Darter or an aberrant individual displaying unusually coloured venation. I thought that searches on the Internet would quickly tell me if mature male Common Darters normally show red or orangey-red veins to any extent, or if this was an occasional aberration. To my surprise and despite numerous searches using various key words and phrases I only came across a couple of comments about Common Darter having red veins. These were buried deep in forums correcting tentative identifications of 'Red-veined Darter' photographs. Conversely there were lots of references that could lead the reader to believe red veins to be a diagnostic feature of Red-veined Darter, even on the main pages of some well known sites. In these searches I was surprised to find a number of images identified as Red-veined Darter that were almost identical to the photographs I had taken. Some were very confidently described and attributed to Red-veined Darter but on close examination were clearly misidentified. A few of these photographs, like mine, were also taken in September, at a time when most Red-veined Darter seen are typically 'yellowish' second generation immatures, but the presence of red or reddish veins had clearly been the overriding identification influence on the observer and presumably the website moderator. Conclusion: The degree to which male Common Darters can have extensive red veins is not adequately covered in the key identification works, which could easily lead to misidentification and apparently does so on a regular basis. In my experience there seems to be a small but nevertheless important gap in the literature, both in printed and electronic formats, that could help observers avoid this pitfall. A red coloured darter species with red veins isn't necessarily a Red-veined Darter."] Address: Alker, P., 63 Lodge Road, Orrell, Wigan, Lancashire, WN5 7AT, UK.

24242. Behrends, T. (2010): Libellen in Schleswig-Holstein. Plattbäuche und Flussjungfern gesucht. Betrifft Natur - Magazin des NABU Schleswig-Holstein 1/10: 13-14. (in German) [Call for reports of dragonfly sightings from Schleswig-Holstein (Germany).] Address: Thomas Behrends, T., NABU-Landesstelle Wasser, Lange Straße 43, 24306 Plön, Germany. Email: Thomas.Behrends@NABU-SH.de

24243. Calle, P.; Bird, F. (2010): Study of the relationship between some fauna groups (butterflies, dragonflies and reptiles) and vegetation succession at dry biotopes in the eastern Rhodopes, Bulgaria. Privately published: 68 pp. (in English). [https://www.geldersepoort.net/publicaties/Bulgaria%20report%202011%20final%20version.pdf; "4.2 Dragonflies: The Eastern Rhodopes belong to one of the best studied areas on dragonflies in Bulgaria (Marinov 2004, Calle & Bird 2011 in prep.). Although the studied areas were often relatively far from water (where highest numbers of dragonflies can been found), the dry habitats still have a vital role for the juveniles, females and for some species like Aeshna mixta adult males. The dragonflies showed big differences in presence between the different vegetation succession phases. In total we found 12 species, which is 24 % of the species known in the Eastern Rhodopes (49 sp. including the Greece part) and 18% (68) of all species ever recorded in Bulgaria (Beschovski & Marinov 2007). That this first percentage is relatively low can be easily explained because many of the dragonfly species have a restricted distribution in the Eastern Rhodopes and the majority of the individuals can only be found close to the reproduction habitats (rivers, creeks, ponds etc.). However the collected data gives an impression of the importance of different biotopes for this group. During the fieldwork a new dragonfly species for the Rhodopes, Ophiogomphus cecilia was discovered. In total two individuals (one being a juvenile) were found in two different locations nearby the Arda River. Those observations indicate that the Arda River contains at least a small population of this species. O. cecilia is a species of community interest, listed in the Habitat Directive 92/43 EEC under annex II and under annex IV. Appendix II contains an overview of all the collated dragonfly data. We undertook a more intense study to dragonflies (outside the plots) in this region also, that produced many interesting findings. The results will be published in an article (Calle & Bird 2010 in prep.). An absolute highlight was the rediscovery of a small population of Leucorrhinia pectoralis nearby Madjarovo. The last and only record for Bulgaria when this species was found was in 1921 with an uncertain locality name - Sofia, which could be anywhere within a large region (personal communication Dr. M. Marinov). 4.2.1 Changes during the seasons: There were big differences between the number of individuals and species during the season. The highest numbers were found in July, August and September. From August the numbers of Platycnemis pennipes declined strongly which explains the decrease of numbers in the half open plot in August. The same decrease of P. pennipes occured in the open plots, though an increase in numbers of Sympetrum fonscolombii disguises this fall in numbers in figure 48. It's interesting that one month later (end September / early October) S. meridionalis is also numerous in the half open plots. This biotope might be more attractive to this species at the end of the season when temperatures are falling and the half open biotopes containing warmer spots and cover compared with the open plots. 4.2.2 Differences between the biotopes: There are big differences in biodiversity and the number of individuals in the 3 biotopes. Highest numbers were found in the half open and then open (but difference between them is relative small) plots. Although the amount of the collected data is limited, it seems to show that several species prefer different biotopes. A. mixta was most often found flying around trees and

bushes, this replicates previous research (Dijkstra 2006). P. pennipes preferred high vegetation and low bushes to forage. Most of the Anisoptera seem to require a vantage point from were they hunt, rest, eat and sometimes even mate. This if often a shrub in the half open plots, or some longer vegetation or a place without any vegetation in the open plots. The majority of dragonflies were not found in forest biotopes. Only a very good flyer like A. mixta was observed flying above the tree canopy. Sometimes open places with much sunlight in the forest can attract other true dragonflies like Sympetrum striolatum, but under the closed canopy most of the species did not occur. Although some P. pennipes during the hottest months were observed in the forest plots, they were all found on the edge of the plots and therefore closer to the open habitats. This could be explained by the need to find shade. Deeper in the forest the chance of finding them or other damselfly species is very small. 4.2.3 The importance of a combination of biotopes for species: The enumeration below gives an explanation why dragonflies benefit from of having several biotopes relatively close to each other: - Flowering plants are most often found in the open and half open biotopes and they are attracting huge numbers of insects, which the dragonflies prey on. - Hibernation for Sympecma fusca is most likely inhabiting half open or forest biotopes. This species is not found in the plots but can be expected because of the populations nearby. - Shrubs and trees provide shade for species that go to the shade during the hottest moments of the day. - Under the lee of bushes, protection on windy days, or a warmer microclimate on cooler days, shelter from bad weather conditions and places to sleep. - Shrubs and sometimes low trees are used for a vantage point for hunting, resting and sometimes mating of some species. They use it as a base to look for prey (or predators), and when they succeed to catch prey they land back to eat them." (Authors)] Address: Calle, P., Begijnenstraat 36, 6511 WP Nijmegen, The Netherlands. E-mail: pepijncalle@yahoo.com

24244. Gorizontov, L. (2010): 100 years since the birth of odontologist, Doctor of Biological Sciences B.F. Belyshev (1910–1993). Altai Territory 2010 • Calendar of significant and memorable dates: 117-120. (in Russian) [Verbatim/Google translate: "Boris Fedorovich Belyshev is one of the leading scientists in odonatology, the author of fundamental research on the problems of classification, systematization and geography of the fauna of dragonflies of the globe. He was born on December 13, 1910 in Tomsk in the family of a leading scientist in the field of metallography, a teacher at the Tomsk Technological Institute, Fedor Aleksandrovich Belyshev. Boris Fedorovich's grandfather, Aleksandr Fedorovich Belyshev, an official on special assignments for the Ufa governor, was the son of Count Shuvalov and a serf girl, the beautiful Ulyana. Although the Count could not marry the peasant woman he loved passionately, he built a large house with an estate for her in Ufa and, as was customary, married her to his serf Belyshev, who adopted the little illegitimate Alexander, giving him his own name. Count Shuvalov in return gave Ulyana and Belyshev their freedom. Alexander and the daughter of the Ufa governor Nadezhda Stepanovna had a son, Fyodor Aleksandrovich, who became the father of Boris Fyodorovich. Boris developed an interest in the natural sciences very early. By the age of 16, he had published his first scientific work, "On Owls in Captivity," and became one of the most active members of the Siberian Ornithological Society, and two years later, its chairman and editor of the journal "Uragus." Around the same time, he entered Tomsk University, which he left in 1930 to continue his education at Leningrad University. In 1932, as a result of a conflict with Komsomol activists from the workers' faculty recruitment, he was expelled from the institute. B. F. Belyshev moved to Siberia and from 1932 to 1935 he was engaged in applied zoology as a gamekeeper and research associate at the Novosibirsk Museum. One day, on a train, B. F. Belyshev argued with fellow travelers. One of them reported to the nearest station that a "contra" dressed as an English colonialist was traveling on the train. At that time, Boris Fyodorovich wore a cork helmet, a green jacket, riding breeches, mittens on his feet and yellow boots. He was taken off the train, and after that he spent 10 years in camps and exile. In 1946, his 10-year term of imprisonment ended and he was transferred to a settlement. As B. F. Belyshev himself wrote, from 1946 to 1952 he traveled a lot around Altai, collecting interesting data on the study of the fauna of dragonflies, which later resulted in major studies that allowed him to publish about 200 scientific articles in domestic and foreign journals, as well as publish several books. "And how this work was carried out! They were only an addition to official affairs, and all I had was enthusiasm," Boris Fyodorovich wrote about himself. In 1951, his first odonatological work was published, and from that time on he devoted himself entirely to studying dragonflies. In February 1955, B. F. Belyshev became the head of the nature department of the Biysk Museum of Local History, and in August of the same year, he became a part-time teacher of plant and animal geography at the local pedagogical institute. According to the memoirs of Boris Fedorovich's wife: "We lived in Biysk in different ways: both poorly — on a museum salary of 42 rubles 50 kopecks, and richer. Boris Fedorovich was out of work, but he was not discouraged..." During this period, he defended his candidate's dissertation, dedicated to the dragonflies of the Upper Ob region. In Biysk, a great and lasting friendship was established with the founding members of the Altai Department of the USSR Geographical Society: geologist M. F. Rozen, geographer Ya. K. Bashlakov and zoologist G. D. Dulkeit. In 1959, B. F. Belyshev moved to Irkutsk, where he began studying the dragonflies of the Baikal region, the Far East and the Arctic Circle. In 1964, he defended his doctoral dissertation on the topic of "Odonatofauna of Siberia" and soon moved to the Biological Institute of the USSR Academy of Sciences in Novosibirsk. In 1973–1974, his monograph "Dragonflies of Siberia" was published in three parts, totaling about 1000 pages. This is the first major summary of dragonflies. In 1977 he published "The Identifier of Dragonflies by Wings", which included more than 75% of the genera of the world fauna. In 1981-1983 two volumes of "Geography of Dragonflies" of the world were published, the first of which was devoted to the Boreal faunistic kingdom (approximately corresponding to the Northern Hemisphere), and the second - to the Meridianal kingdom. In 1971, at the first odonatological symposium held in Ghent, Belyshev Boris Fedorovich was elected an Honorary Member of the International Society of Odonatologists and from that time he became

the first referent and border editor of the international scientific journal "Odonatologica". In 1990, this magazine dedicated a separate issue to his 80th anniversary. B. F. Belyshev died on March 9, 1993 in Novosibirsk." (Author)] Address: Gorizontov, Lili; https://akunb.altlib.ru/files/k2010/33.pdf

24245. Klemich, S. (2010): LIFE08/ NAT/ D/ 012 Action A.2: Faunistische & floristische Konkretisierung Amphibien & Libellen „Soonwald" des Maßnahmenkonzeptes. LIFE08/ NAT/ D/ 012 „Entwicklung von Feucht- und Nasswäldern im Soonwald". Action A.2. Faunistische und floristische Konkretisierung des Maßnahmenkonzeptes auch als Grundlage für Action E.4 Monitoring. Erfassung von Amphibien und Libellen an bestehenden Still-/ Kleingewässern. Erfassungszeitraum: Februar 2010 bis Oktober 2010. Stiftung Natur und Umwelt Rheinland-Pfalz. LIFE08/ NAT/ D/ 012 Action A.2: „Soonwald": 46 pp. (in German, with English summary) ["Within EU LIFE Nature project "Development of humid and waterlogged forest types in the Soonwald area" (Hunsrück, Rheinland-Pfalz, Germany) a field survey of amphibians and dragonflies of selected pools and small ponds inside the forest area was conducted. The findings of the survey provide the basis for the planning of conservation actions to restore the small waterbodies. The results of the field studies in 2010 are described, analysed and discussed. ... The studies of dragonflies showed that most waterbodies inside the project area are suitable habitats for a typical, quite common and euryoecious dragonfly community. But because of acid bedrock and therewith acid soil properties there can also mesotrophic ponds/ pools with relatively low pH-values be found in the project area. These possess quite suitable habitat qualities for specialised and endangered "bog dragonflies" – although habitat quality seems to be declining rapidly, probably due to eutrophication processes in course of the succession of the small waterbodies. The existing metapopulation of Leucorrhinia dubia in the project area is of regional interest and is worthy of as well as in need of protection." (Author)] Adress: not stated.

24246. Mišíková Elexová, E.; Haviar, M.; Lešťáková, M.; Ščerbáková, S.; Bitušík, P.; Bulánková, E.; Čejka, T.; Čiamporová–Zaťovičová, Z.; Derka, T.; Hamerlík, L.; Illéšová, D.; Kodada, J.; Košel, V.; Krno, I.; Mláka, M.; Novikmec, M.; Šporka, F. (2010): Checklist of taxa examined at localities monitored in the Slovak surface water bodies. Acta Environmentalica Universitatis Comenianae (Bratislava) 18(1): 5-335. (in Slovakian, with English summary) ["Checklist of taxa examined at localities monitored in the Slovak surface water bodies – Benthic macroinvertebrates. Benthic macroinvertebrate fauna of Slovak running waters was studied in 2003 – 2007 for the purpose of classification schemes derivation. Data from the period of the beginning of the project "Monitoring and water status assessment" (2008) are also included. Survey of reference sites and monitoring localities was carried out within the Water Framework Directive requirements (establishment of reference conditions and evaluation of ecological status in monitored sites). AQEM method was applied for sampling and processing of samples in wadable streams. In case of non-wadable rivers modified AQEM method was used. Both represent quantitative and multi-habitat samplings. Totally 828 taxa belonging to 15 taxonomic groups were recorded in 355 localities, classified into 31 river sub-basins. Compared to the previous checklist new records of 43 taxa were recognized. Presence of many species was recorded in new river sub-basins in comparison to the mentioned checklist as well." (Authors) On pages 89-93, records of the following taxa are documented: Calopteryx splendens, C. virgo, Chalcolestes viridis, Lestes sponsa, L. virens, Sympecma fusca, Platycnemis pennipes, Coenagrion hastulatum, C. puella, C. pulchellum, C. pulchellum/puella, Coenagrionidae Gen. sp., Enallagma cyathigerum, Erythromma najas, E. viridulum, Ischnura elegans, Pyrrhosoma nymphula, Aeshna sp. 1 (new sp. group), Anax imperator, Gomphus flavipes, G. vulgatissimus, Onychogomphus forcipatus, Ophiogomphus cecilia, Cordulegaster bidentata, C. boltonii, Cordulegaster sp., Cordulia aenea, Somatochlora metallica, Libellula depressa, L. fulva, Orthetrum albistylum, O. brunneum, O. cancellatum.] Address: Emília Mišíková Elexová, Emilia, Výskumný ústav vodného hospodárstva, Národné referenèné laboratórium pre oblas' vôd na Slovensku, arm. gen. L. Svobodu 5, 812 49 Bratislava, Slovakia. Email: elexova@vuvh.sk,

24247. Nguyen, V. (2010): A review of insect exoskeleton function and composition. Undergraduate Honors Thesis, presented in Partial Fulfillment of the Requirements for Graduation with Distinction at The Ohio State University: 48 pp. (in English) ["Insect exoskeleton is an interesting and complex system that plays both structural and functional roles. It is a composite that consists of many different types of materials and shapes that vary based on its local function. This review of exoskeleton micro- and macro-structure addresses the performance of exoskeleton based on these two factors. Exoskeleton is a composite whose material properties are dependent on its constituents and fiber orientation. At the macro-structural level, exoskeleton's shape can play many roles in local structural and motional functions. The lessons from this review are examined and considered for potential applications in the fields of material fabrication and development and in microrobotics." Odonata (Coenagrion puella, Ischnura elegans) are treated with respect to prothorax structures ("3.2.1 The Folded Cuticle of a Dragonfly Neck"). The membrane that is found between hard plates and body sections in arthropods can be either highly extensible [...], or folded and laminated to provide a lower degree of extensibility but higher degree of strength. To understand the shape and function of folding cuticle, a study was done where the neck of various species of Odonata, was examined using SEM." (Author)] Address: https://kb.osu.edu/server/api/core/bitstreams/6424ca3e-8584-57d2-98d9-78c658a8edf7/content

24248. Reding, S. (2010): Oshtemo Township Parks. Natural Features Inventory. Flesher Field Park. Oshtemo Township Park. April – October 2010. Kalamazoo Nature Center: 66 pp. (in English) [Oshtemo Township, Kalamazoo County, Michigan, USA. Nine odonate taxa are listed.] Address: https://www.oshtemo.org/files/assets/public/v/1/parks/documents/natural-features-inventory-dec-2010.pdf

24249. Schmidt, Eb. (2010): Odonatenfauna einer renaturierten Autobahn-Sandentnahmestelle (A 43 bei Haltern) im Westmünsterland. Virgo - Mitteilungsblatt des Entomologischen Vereins Mecklenburg 13(1): 47-54. (in English) [Nordrhein-Westfalen, Germany. 29 odonate species have been recorded between 1990 and 2009. Factosr as bisam (Ondatra zibethicus), dogs and horses impacting the habitat, are discussed.] Address: deseaced

24250. Tariq, M. (2010): Systematics of dragon-flies (Anisoptera: Odonata) of Pakistan. PhD Thesis, Department of Entomology, Faculty of Crop and Food Sciences, Pir Mehr Ali Shah, Arid Agriculture University, Rawalpindi, Pakistan: xiv + 190 pp. (in English) ["Extensive field survey to collect Anisopterous fauna of Pakistan was carried out during 2006 – 2009 in different Agro ecological regions of Pakistan. A total of 1349 specimen belonging to 5 families 39 genera and 68 species were collected and identified. Family Aeshnidae having 9 species belonging to 6 genera, Cordulegasteridae only one species, Corduliidae having 3 species of 2 genera, Gomphidae 12 species of 9 genera and Libellulidae have 43 species belonging to 21 genera were recorded from Pakistan. Seven species, viz, Anaciaeschna jaspidea, Anax indicus, Gynacanthaeschna sikkima, Epophthalmia vittata vittata, Macromia moorei, Onychogomphus biforceps and Rhodothemis rufa are reported first time from Pakistan and have been added to the existing anisopterous fauna of the country. Details for the collected material i.e. valid names, their synonyms, measurement of body parts (abdomen, forewing and hindwing length), habitat description, date of collection, distribution range in Pakistan as well as international distribution and differential characters from published description for new records to country have been provided. Coloured images of new to Pakistan species, geographical and climatic condition of all sixty-eight species are also presented first time. Taxonomic keys for families, genera and species are also presented. Check lists of all ten agro-ecological regions are presented first time from Pakistan. As a whole 68 species were recorded from Pakistan with 153 new localities record for 45 species, which include 61 species of Anisoptera that have been reported previously from Pakistan. It was an addition to science and this addition will explore new areas of biological control." (Author) The following taxa are treated in detail: Aeshna juncea, Anaciaeschna jaspidea, Anax indicus, A. immaculifrons, A. nigrofasciatus, A. parthenope, A. ephippiger Cephalaeschna masoni, Gynacanthaeshna sikkima, Cordulegaster brevistigma, Epophthalmia vittata vittata, Macromia cingulata, M. moorei, Anormogomphus kiritshenkoi, Burmagomphus pyramidalis, B. sivalikensis, Gomphidia t-nigrum, Ictinogomphus angulosus, I. rapax, Mesogomphus lineatus, Nepogomphus modestus, Onychogomphus biforceps, O. bistrigatus, Ophiogomphus reductus, Platygomphus dolabratus, Acisoma panorpoides, Brachydiplax sobrina, Brachythemis contaminate, Bradinopyga geminate, Crocothemis erythraea, C. servilia, Diplacodes lefebvrei, D. trivialis, Libellula quadrimaculata, Neurothemis fluctuans, N. tullia, Orthetrum anceps, O. brunneum, O. cancellatum, O. chrysis, O. chrysostigma, O. glaucum, O. japonicum, O. purinosum, O. sabina, O. taeniolatum, O. testaceum, O. triangulare, Palpopleura sexmaculata, Pantala flavescens, Rhodothemis rufa, Rhyothemis variegata, Selysiothemis nigra, Sympetrum commixtum, S. decoloratum, S. fonscolombii, S. haematoneura, S. meridionale, Tramea basilaris burmeisteri, T. virginia, Trithemis aurora, T. festiva, T. kirbyi, T. pallidinervis, Tholymis spp.. Urothemis signata signata, Zygonyx torridus, Zyxomma petiolatum] Address: Tariqch, M., Dept Ent., Arid Agric. Univ., Rawalpindi, Pakistan

24251. Wendzonka, J. (2010): V Ogólnopolskie Seminarium Odonatologiczne "Polska odonatologia - przeszlos'c', teraz'niejszos'c', przyszlos'c'", Jeziory, 23-25 paz'dziernika 2009. - [5th Polish Symposium of Odonatology of the Polish Entomological Society "Polish odonatology in the past, present time and future", Jeziory, October 23-25, 2009]. Wiadomosci entomologiczne 29(2): 133-134. (in Polish) [Verbatim/Google translate: In the privacy of the Ecological Station of Adam Mickiewicz University in Poznan, located in the heart of the Wielkopolska National Park, on Lake Góreckie, the 5th National Odonatological Seminar took place. It was organized, with his characteristic perfection, by Dr. Rafal Bernard from the Department of General Zoology of Adam Mickiewicz University. It was attended by 33 people, one should add, as well as many enthusiasts of the species who dropped in only on Saturday. The subject of the symposium was dominated by the Atlas of the distribution of species in Poland, published a few days earlier. The authors: Rafal Bernard, Pawel Buczynski, Grzegorz Tonczyk and Jacek Wendzonka. This item also summed up the history of odonatological research in our country, hence the all-encompassing main theme of the seminar: Polish odonatology. past, present, future. The introduction to the main, Saturday part of the presentations was a Friday afternoon meeting of participants in a workshop format. In a very relaxed and cheerful atmosphere, a competition for marking threads from photos was held, interspersed with casual conversations, which resulted in its ending late at night. On Saturday, things were not so relaxed, mainly due to the rich and, in fact, tight schedule of presentations. It was arranged so that the speakers delivered them chronologically (in the sense of the times to which their presentations referred). Stanislaw Cios, a researcher of the history of entomology, began by presenting the birth of entomology in Poland until the beginning of the 20th century, against the background of the social conditions in which it was allowed to develop, together with the implications concerning the perception of certain groups of insects and their formation of names. Particularly interesting, almost detective-like, were the methods used and the problems encountered when searching for data, e.g. from fiction. Then Pawel Buczynski presented the profiles of odonatologists working in Poland until the 1930s, and after him Grzegorz Tonczyk, from the end of World War II to the present. This paper was detailed by Alicja Miszty, who talked about the environment of Silesian odonatologists. Almost the next three hours were filled only with the Atlas of the distribution of Odonata in Poland. Rafal Bernard, Pawe Buczynski and Grzegorz Tonczyk talked about how the Atlas was created (from the very idea 11 years ago), what methods were adopted, what problems were encountered, what results were achieved and finally what can actually be read from the Atlas. The lecture, maintained in the convention of

a good documentary report, could not fail to please. During this time it was also possible to view an exhibition of odonatological literature from Rafal Bernard's collection. After this smooth transition, the part devoted to contemporary odonatology began. We listened to and watched several very interesting reports and reports: by Pawel Buczynski on the demographic explosion of Crocothemis erythraea in central-eastern Poland in 2009; by Dawid Tatarkiewicz, who has been studying Libellula fulva for years, who this time presented the sites of its departure, and three by Wiaczeslaw Michalczuk: on monitoring and problems with the implementation of active protection of one of the two existing sites of Coenagrion ornatum; on the results of the inventory of the Zamosc region in 2008-09 and finally on a new species of midge for Polish fauna, Forcipomyia paludis, a tiny midge fly that cuts the wing blades of midges and feeds on their hemolymph. The next part of the seminar concerned the future of odonatology in Poland. Conducted in the form of a discussion, it covered the indication of priority species with particular emphasis on Coenagrion ornatum and C. armatum, the monitoring plan for southern species, the issues of typing and creating refuges for dragonflies, and the first official information on the planned dragonfly monograph appeared. At the end of this part, Pawel Buczynski, the current president of the Odonatology Section of the Polish Society of Ethnography, presented the current affairs of the Section, and Jacek Wendzonka presented the plans and problems of the section's website www.odonata.pl, at the same time encouraging cooperation in its further development. The last part of the day was filled with four presentations. not so closely connected with the Atlas. Boguslaw Dara— presented a wonderful account of his domestic and foreign searches for species of the genus Cordulegaster. Piotr Cuber and Alicja Miszty told about their research on the Odonata of Upper Silesia. Rafal Bernard and Boguslaw Dara— presented a report from their expedition to the northern part of European Russia. The photographs of boundless nature took my breath away, the story of an encounter with a bear froze my blood, and the stories about trillions of midges and mosquitoes discouraged me from going to those regions. Day, already. in the late evening hours, Jacek Wendzonka concluded with his views on the systematics and phylogeny of domestic species of Aeshnidae, mainly based on wing usage. The last day of the seminar was supposed to be a workshop. Grzegorz Tonczyk discussed the methodology of work on river dragonflies (Calopterygidae, Platycnemididae, Gomphidae, Cordulegastridae) starting from habitats to collecting material and identification. This information could be practically confronted after a while, analyzing specimens in the workshop adjacent to the conference room. Rafal Bernard showed how work was carried out on assessing the state of conservation of Gomphidae on the example of the Natura 2000 species Ophiogomphus cecilia, Wiaczes3aw Micjalczuk told about interesting facts from the life of Coenagrion ornatum and Grzegorz Tonczyk characterized the urban odonatofauna on the example of Lódz. Before leaving it was agreed that the next seminar will take place in the Wietokrzyskie Mountains in 2010. See you there!] Address: Wendzonka, J., ul. Graniczna 17, 63-800 Gostyn, Poland. E-mail: wendzonka@wp.pl

2011

24252. Anonymus (2011): Novedades en historia natural. Bol. Cient. Mus. Hist. Nat. Univ. Caldas [online]. 2011, 15, (2): 222-227. (in Spanish) [Verbatim: Late Aptian Insect Fossils (Odonata) in the Paja Formation Remains of insects of the order Odonata (a family that includes dragonflies and damselflies) were recovered from calcareous concretions near Loma Santa Catalina, southwest of Villa de Leiva (see attached photo). The specimens, two in total, are: one consisting of wings and parts of the thorax, and another consisting of a single wing. The fossils belong to the extinct family Aeschnidiidae, whose biochron spans the Tithonian-Cenomanian period. The material is in the upper part of Segment E of the Paja Formation, which dates back to the Late Aptian, according to the ammonite zonation by Fernando Etayo-Serna. Segment E is predominantly clayey with spheroidal calcareous concretions. Thin calcareous levels and local concentrations of gypsum are also common. The facies, insects and other fossil remains suggest that the area was covered by a very shallow body of water near areas covered by tree vegetation. Remains of Aeschnidiidae have been found in: England, Germany, Spain, Kazakhstan, Russia, China, Australia, Egypt and Brazil. (Google translate)] Address: Gómez-Cruz, A., Depts of Geological Sciences & Agricultural Sciences, Univ. of Caldas, Spain. Email: arleygomezc@yahoo.com

24253. Chelmick, D. (2011): Range expansions of European dragonflies - the appearence of African species in Iberia. Atropos 43: 13-24. (in English) [The following species are treated: Macromia splendens, Trithemis annulata, T. arteriosa, T. kirbyi, Crocothemis erythraea, Brachythemis impartita, Orthetrum trinacria, O. chrysostigma, Diplacodes lefebvrii, Selysiothemis nigra, Paragomphus genei, Ischnura elegans, I. graellsi, I. saharensis, Sympetrum fonscolombii, S. sinaiticum, S. striolatum, Anax ephippiger, A. parthenope, and Zygonyx torridus.] Address: Chelmick, D.G., 31 High Beech Lane, Haywards Heath, West Sussex, RH16 1SQ, UK. E-mail: dgc@david.-chelmick.com

24254. De Knijf, G. (2011): Hoe zit het nu met de Kempense heidelibel (Sympetrum depressiusculum) in België? Opstart van het opvolgen van de populaties van deze Europees bedreigde soort. Libellenvereniging Vlaanderen - nieuwsbrief 5(2): 9-10. (in Dutch) [Verbatim: What about the Kempen Darter (Sympetrum depressiusculum) in Belgium? Start-up of monitoring the populations of these endangered European species. S. depressiusculum is the only European Red List species which occurs in Belgium (Kalkman et al 2010). She is limited to the Antwerp Limburg and Kempen. The last sighting of Wallonia dates from 1954 and comes from Beloeil, in the west of the province of Hainaut (The Knijf et al. 2006). S. depressiusculum, the last 10 years have a number of places in the municipalities of Mol, Dessel, Retie, Bale, Neerpelt, and in the middle of Limburg pond area observed and Genk. Usually it was one of only a few animals. The number locations with a few dozen copies is quite limited. Compared with the period of the dragonfly atlas (1990-2000) are the numbers of animals at almost all locations strongly decreased.

A picture of how large the number of times the Kempen Darter were being well represented by Jannis (1990). On May 23, 1990 he witnessed of early tapering of not less than 5,000 Kempen moorland dragonflies the cooling ponds at Lommel. On August 18 and September 9 of that year he estimated the local population there at about 10,000 animals each. Such large numbers in Flanders not seen for years. Elsewhere in Europe, took the numbers off spectacularly. So there was talk early eighties of millions of animals in the Camargue (France) and very large numbers in the Po valley Italy. In the Camargue, the species almost 20 years and nearly zero in Italy, the numbers are greatly reduced. In Germany the species had a very sharp decrease in the last 20 years, and she belongs to the Red List category 'endangered'. The Kempen Darter has a very specific life cycle that differs from the most other species. So she brings the winter in the egg stage. The eggs crawl in spring the larvae develop very quickly and in the course of Summer tapering. The tapering of the eggs coincides with the spring rains, which is partly filled with water puddles. In the shallow water can rapidly increase the temperature resulting in a fairly large food and So more food for the larvae, so that faster development. The Most of the dragonfly species overwinter as larvae, however, and are not adjusted in tidal pools in the winter and then can not survive. It is therefore suggested that the Kempen moorland dragonfly, one of the few species like benefits of standing pools in the dry autumn and winter. Competition with other species of dragonfly larvae for food is therefore very limited. The puddles on their turn may then dry up at the end of the summer and can then fill again the following spring. Everything seems like the kind of benefits from a very low water to completely run dry even in winter. The right reasons for this decline may need to be sought in a change hydrological regime of many of its breeding places. In northern Italy and The Camargue has in recent decades, a real change occurred in the rice, so most places are winter flooded (pers. comm. Riservato Elisa). In North West Europe, the reason for decline probably sought A distinctive management of a large fish ponds. Previously we showed a lot of empty ponds in the fall for fishing and were going back filled with water the following spring. Such practice was intense in recent decades more and more deserted and be switched to other fishing techniques. Several of those former fishponds were meanwhile in nature and were rarely put on such practices. An exception are a few ponds in the reserve Sizes in Genk, held annually in the autumn and this will be left blank in order to local population of spadefoot promotion. An additional problem in Western Europe is formed by desiccation of wetlands and the decline of swampy areas on the outskirts of large ponds and lakes (Grand & Boudot 2006). S. depressiusculum is currently in Western Europe is limited to a few areas in the German state North Rhine-Westphalia, the Rhone Valley in France, especially north of Lyon, some areas in northern Italy and Flanders in the Kempen. Flanders has a big responsibility for the survival of this kind in Western Europe. It is obvious of importance to have an image of the evolution of livestock numbers at the different locations. Therefore, we organize the Dragonfly Society Flanders late July and August, a few excursions with the main objective for the number of animals of the Kempen heath dragonfly count. This basic assessment will then serve targeted monitoring of this species in Flanders to start. Purpose of these excursions was a day much possible sites to visit and for this we split into smaller groups. Hopefully we succeed in that way at least all large populations to count. I refer to specific appointments by the tour calendar in this newsletter." (Author)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

24255. Festl, F. (2011): Schillernde Schönheiten. natur + kosmos 7/2011: 48-55. (in German) [Verbatim/google translate: In midsummer, they buzz through the countryside and gardens again: dragonflies. As ethereally delicate as these creatures appear, they are just as cunning predators. Once captivated, their fascination never lets you go. The editor of the Society of German-Speaking Odonatologists puts on his rubber boots. He wears short cargo pants and a faded T-shirt. Casual, that guy. Florian Weihrauch is a dragonfly expert. An odonatologist, as he calls it. Weihrauch uses Latin technical terms out of habit because they're in the publications that keep him awake at night. When he speaks about Enallagma cyathigerum at an international conference, the Japanese, English, and Portuguese also know about it; the "Common Darter," on the other hand, isn't familiar to all nations. Weihrauch screws together his net and steps into the water. The gravel pond in Feilenmoos near Geisenfeld in Upper Bavaria lies lazily in the sun. A few carp swim by. Grasses and bushes along the shore had already lost the last drops of morning dew to the shimmering air this morning. It's good weather for dragonflies, as the activity of the flying insects increases with the temperature. As Weihrauch wades through the water, he explains: "These creatures are quite opportunistic, especially when it comes to the substrate." By this, he means that the dragonfly larvae don't care what they cling to when they hatch. Sometimes they spend years in the pond before crawling ashore. At the nearest stalk or stone, they peel themselves out of their chitinous shell, and a dazzling flying creature emerges, taking flight into the most exciting and final weeks of its life. All that remains is the shell: the exuvia. Weihrauch seeks these remnants. They interest him more than the imago, as the fully developed insect is called. If he finds one of the delicate shells on the bank, he usually knows immediately which species of dragonfly has emerged. "Aha, the spine on dorsal segment seven is there, so it's Libellula quadrimaculata. Er, a four-spotted dragonfly." And unlike with other flitting creatures, Weihrauch then also knows that the larva really grew up in this body of water. He has a few thousand such chitinous skins at home, sorted into plastic collection boxes and always labeled with a note indicating the location and date. Among them are specimens from the Rio Tejo in Spain and Portugal and some from the Danube floodplains near Plattling. Weihrauch scans the embankment in search of exuviae, his binoculars dangling in front of his belly. Suddenly, something buzzes behind him, and the collector becomes a hunter. He whirls around, his net shooting up without a hitch, sweeping through the air. "Orthetrum cancellatum!" Weihrauch fumbles through the mesh and soon finds himself holding the dragonfly by its wings.

The dragonfly's elongated, quivering body shimmers dully. The insect's transparent wings are finely veined and refract the sunlight like a glass mosaic. Weihrauch turns the little creature briefly to the left, then to the right, looks into its eyes, and lets it fly again... Weihrauch filzt die Böschung auf der Suche nach Exuvien, das Fernglas baumelt vor seinem Bauch. Da schwirrt etwas hinter ihm, und der Sammler wird zum Jäger. Er wirbelt herum, sein Netz schnellt ansatzlos nach oben und wischt durch die Luft. "Orthetrum cancellatum!" Weihrauch fingert in den Maschen herum, und schon hält er den Großen Blaupfeil an den Flügeln. Der längliche, zitternde Körper der Libelle schimmert matt. Die durchsichtigen Schwingen des Insekts sind fein geädert und brechen das Sonnenlicht wie ein Glasmosaik. Weihrauch dreht das Tierchen kurz nach links, dann nach rechts, schaut ihm in die Augen und lässt es wieder fliegen ...] Address: not stated

24256. Jacquot Pet Mora, F. (2011): Agir en faveur des libellules en Franche-Comté. Déclinaison du plan national d'actions Odonates. Plan régional d'actions en faveur des espèces menacées. 2011-2014. Office pour les insectes et leur environnement de Franche-Comté / Direction Régionale de l'Environnement, de l'Aménagement et du Logement de Franche-Comté: 105p + annexes. (in French) [http://odonates.pnaopie.fr/wp-content/uploads/2010/12/PRA-Odonates-Grand-Public.pdf. Focus is set on the following species: Aeshna subarctica elisabethae, Coenagrion mercuriale, Leucorrhinia albifrons, L. caudalis, L. pectoralis, Nehalennia speciosa, Ophiogomphus cecilia, Oxygastra curtisii, and Somatochlora alpestris.] Address: Conservatoire botanique national de Franche-Comté – Observatoire régional des Invertébrés (CBNFC – ORI), 7 rue Voirin 25000 Besançon - 0381830358, France

24257. Lozano, F. (2011): Filogenia del género Acanthagrion Selys (Odonata, Coenagrionidae) y revisión sistemática del grupo viridescens. Tesis doctoral de la FCNyM. La Plata: Facultad de Ciencias Naturales y Museo. 2011: 601 pp. (in Spanish, with English summary) ["The genus Acanthagrion Selys meets approximately 40 species. In 1934 J. W. Leonard ends the first review where gender defines nine intrageneric groups: ablutum, abunae, adustum, apicale, ascendens, chararum, rubrifrons, viridescens and yungarum. His thesis was published 43 years later, which generated significant taxonomic problems. Viridescens The group consists of eight species, although are abundant in collections, their identification is difficult since they have no specific limits clear. The purpose of This study is to clarify the taxonomic status of the species viridescens group. To this end a review was conducted systematic species and a cladistic analysis of the genus, to redefine and proposed groups rediagnosticar by Leonard. Our results rule out the monophyly of Acanthagrion gender. Only recovered monophyletic abunae and rubrifrons groups; apicale and were yungarum redefined; viridescens was polyphyletic. Settled three synonyms. We describe a new species of Paraguay, the female A. aepiolum, A. chararum and A. minutum and larvae A. cuyabae and A. gracile. Lectotype is designated for A. indefensum and gender is excluded from A. taxaense. Finally, there are diagnosis and geographic distribution of all species of genus. Research areas and future development: Improve knowledge of the last instar larvae to incorporate larval characters cladistic analysis. Solving the generic status of A. taxaense. Conduct an analysis cladistic including both species of Acanthagrion and Oxyagrion such as to establish their conformation and redefine based on their monophyly. Evaluating the position of Acanthagrion genus within the family Coenagrionidae." (Author/-Google translator)] Address: https://pdfs.semanticscholar.-org/8f8e/bbc2ebc285b9bfcb10f94245a70bad08e0df.pdf

24258. Pereira, M.C.S.A.; Souza, M.M.; Souza, B. (2011): Levantamento da diversidade de adultos de Odonata (Insecta) na Mata do Baú, Barroso, MG. X Congresso de Ecologia do Brasil, 16 a 22 de Setembro de 2011, Sao Louren co - MG: 1-2. (in Portuguese) ["Results: 48 species distributed in 30 genera and nine families were recorded. 21 species (45% of the total) of the Libellulidae family were collected, a frequency that was expected since it is the largest family in the group (Costa et al., 2000). The Coenagrionidae family had 10 species collected (21%), with two new species recorded, Oxyagrion sp. and Telebasis sp., standing out. In addition to these two, a new species of the Heteragrion genus, Megapodagrionidae family, was also recorded, with five species collected (11%), among them Heteragrion tiradentensi, the third record in the world. The scarcity of studies in Minas Gerais, combined with the richness of the vegetation, reflecting the transition between Cerrado and Atlantic Forest, favored these new records (Souza et al., 2010)." (Author/Google translate) No further information are given.] Address: Pereira, M.C. S.A., Universidade Federal de Lavras - Depto de Entomologia - Campus Universit ario - Caixa Postal 3037 - CEP 37200 - 000 - Lavras - MG - Brasil. matheus.biou a@gmail.com

24259. Semwal, N.; Akolkar, P. (2011): Bio-mapping, a biological classification of River Bhagirathi in Himalaya basin. Indian Journal of Fundamental and Applied Life Sciences 1(4): 32-44. (in English) ["Bio-mapping is the use of benthic macroinvertebrates (benthos) for classification and zoning of rivers in the form of a colour map which indicates various grades of water quality according to its level of ecological degradation in terms of clean, slight pollution, moderate pollution and severe pollution. River Bhagirathi has unique bio-diversity of benthic macro fauna as compared to any other river in India. Water quality of River Bhagirathi favored establishment of nearly 18 numbers of families of benthic macroinvertebrates during November, 2004, which indicated biologically clean water quality of Class „A" for more than 60% stretch of the river. Further studies have shown decreasing trend of benthos families representing Class "A" water quality in River Bhagirathi resulting in reduction of Class „A" water quality stretch of river from 60 to 30% during year 2004 to 2008. At Gangotri, percent dominance of rare genera of family Heptageniidae like Iron, Ironodes, Epeorus/Ironopsis and Rithrogena has been reduced significantly from 55% in 2006 to 5% in 2008. Presence of rare genera of stone flies such as, Kyphopteryx, Leuctra, Perlomyia, and Eucapniopsis are known from the Oriental region and the Himalayas at high altitude require special attention for habitat protection at Gangotri. There was

total loss of habitat for Olgoneuriella, a rare genus of family Oligonuriidae, observed at upstream of Uttarkashi during 2007, which gradually disappeared with construction of Joshiyara barrage on River Bhagirathi during 2008. Bio-mapping has resulted in development of a saprobic scoring system, universally known as BMWP (Bio Monitoring Working Party) Score of River Bhagirathi comprising of 47 number of families and 62 genera of benthic macro-invertebrates identified during 2004 to 2008. This can be used as the base line information for formulating the action plans for conservation as well as restoration of ecological status of River Bhagirathi in the future course of time." (Authors) The list of odonate taxa counts for four species: Euphaea decorata, Onychogomphus viridicostus [this species doesn't occur in India], Nannophya pygmaea, and Macromia sp.] Address: Semwal, N., Central Pollution Control Board (Ministry of Environment & Forests, Govt of India), Parivesh Bhawan, East Arjun Nagar, Delhi 110 032, India. E-mail: nrip_semwal@yahoo.co.in

24260. Takeuchi, S.S. (2011): Assembleia de larvas de Odonata em ambientes limnicos de Parque Estadual de vila Velha, Paraná, Brasil. X Congresso de Ecologia do Brasil, 16 a 22 de Setembro de 2011, Sao Louren co - MG: 2 pp. (in Portuguese) ["Results: 572 Odonata larvae were recorded (413 in lentic environment and 159 in lotic), belonging to 7 families, distributed in 16 genera: Aeshnidae: Aeshna, Anax, Staurophlebia; Calopterygidae: Hetaerina; Coenagrionidae: Acanthagrion; Telebasis; Argia; Gomphidae: Phyllocycla; Phyllogomphoides; Lestidae: Lestes; Libellulidae: Dasythemis; Dythemis; Macrothemis; Pantala; Tramea; Megapodagrionidae: Megapodagrion. Regarding lentic environments, the highest abundance was recorded in Lagoa Seca (S 25°13' W 50°02') 134 individuals (23.4%), while the lowest abundance occurred in Canal do Barrozinho (S 25°15' W 50°00') 28 individuals (4.9%). Anax, Telebasis, Lestes, Pantala and Tramea were exclusively recorded in lentic waters. In lotic environments, the highest frequency was recorded at point 2 (S 25°13' W 50°00') of the Quebra-Perna river 69 individuals (12.1%) and the lowest abundance was 5 individuals (0.9%) recorded at points 1 (S 25°15' W 49°58') and 3 (S 25°15' W 50°00') of the Barrozinho sub-basin and, points 1 (S 25°15' W 50°01') and 3 (S 25°14' W 50°03') of the Guabiroba river sub-basin. Hetaerina, Phyllocycla, Dasythemis, Dythemis, Megapodagrion, Argia and Phyllogomphoides were only found in lotic environments, and the last two recorded only 1 individual. Considering all sampling areas, the most represented family was Libellulidae. In this, Macrothemis 262 individuals (45.8%) occurred in lentic and lotic environments, as well as Acanthagrion, Aeshna and Staurophlebia. These records corroborate observations by Teitge et al. (2009) in Lagoa Seca do PEW who recorded four families of Odonata larvae: Aeshnidae, Coenagrionidae, Lestidae and Libellulidae." (Author)] Address: Satsuki Takeuchi, Simone, Unive Positivo: Rua Pedro Viriato Parigot de Souza, 5300. Campo Comprido. CEP: 81.280 - 330, Curitiba, Paraná. Email: simonetakeuchi@hotmail.com

24261. Ternois, V. (coord.), (2011): Déclinaison régionale du plan national d'actions en faveur des Odonates - Champagne-Ardenne 2011-2015. CPIE du Pays de Soulaines/ SFO Champagne-Ardenne/DREAL Champagne-Ardenne: 81 pp. (in French) [https://libellules.pnaopie.fr/wp-content/-uploads/2023/07/PRAO_CH-ARD_compressed.pdf; Details information are given to Coenagrion mercuriale, Oxygastra curtisii, Leucorrhinia caudalis, L.pectoralis.] Address: Ternois, V., /c CPIE du Pays de Soulaines, Domaine de Saint-Victor, 10200 Soulaines-Dhuys, France. E-mail: cpie.vincent.ternois@wanadoo.fr

2012

24262. Adamkova, P. (2012): Dragonfly communities on selected water areas in the environs of community Želec na Hané. BSc thesis, Masarykova Univerzita, Pedagogocká Fakultam Katedra Biologie: 81 pp. (in Czech, with English summary) ["Introduction: As the topic of my bachelor's thesis, I chose "Dragonfly communities on selected water bodies in the vicinity of the village of Želec na Hané". The reason is my interest in nature, especially in dragonflies, which with their beauty and elegance attract people at first sight. The goals of this work are: 1) seasonal dynamics of the occurrence of dragonfly species, 2) comparison of occurrence in given localities, 3) determination of dragonfly synusia in the vicinity of Želc, all by means of their observation, capture, photo documentation and determination. In the theoretical part, I deal with the description of the natural conditions of the Prostejov bioregion, the characteristics of the dragonfly order (Odonata - species in the Czech Republic) and their classification into the system. I briefly mention all determined species. This part was prepared on the basis of the study of literary and other available sources. In the practical part, I describe the individual areas investigated. It is a flooded quarry, a water reservoir and the Želecský stream that flows through it. During the observation, I discovered a temporarily created wetland. My original intention was to visit only three locations. In the end, I decided to increase the number of areas to create the most accurate data. In this part of the work, I also deal with the methodology of observation, photo documentation, capture and determination of individuals. Here I present my results of studying dragonflies, their seasonal dynamics, representation and comparison of individual species at selected locations. No one has yet conducted similar mapping in the studied area, and therefore I have no possibility of comparison. In the discussion, I compare these results at least with the data of the authors who obtained them at the places closest to them." (Author) 27 odonate species are treated.] Address: https://is.muni.cz/th/ghcph/Spolecenstva_vazek_v_okoli_obce_Zelec_na_Hane.pdf

24263. Berka, T.; Dvorák, J.; Kodet, V.; Krivan, V. (2012): Pruzkumy mokradu u Jihlavy. Záverecná zpráva projektu. Ministry of the Environment of the Czech Republic and Lesy CR s.p.: 31 pp. (in Czech) [Wetland Surveys near Jihlava. Final Project Report, Czech Republic. "The aim of the project was to determine the basic vegetation characteristics of the Nadejovské nivy and Pístov II sites, the species composition of plants and the characteristics of the sites in terms of the occurrence of amphibians, reptiles, birds and insects: - to carry out initial surveys for comparison in the future - to

capture the state before the start of care - to set up an appropriate management method for both sites, where the main group of interest is amphibians, while respecting the ecological requirements of all identified endangered and rare species of plants and animals. - to assess the draft management measures that are proposed for implementation in 2012 in the part of the "Nadejovské nivy" site below the Obecní rybník; possible adjustments to this draft so that they are in accordance with the requirements of the identified species." (Authors/Google translate). A total of 15 odonate species is listed. "The dragonfly fauna is represented mostly by common species, the most significant ones include the endangered Sympecma fusca and the thermophilic species Crocothemis erythraea, which occurs more rarely in the warmer areas of the Trebíc region in the Bohemian-Moravian Highlands. Among the endangered species of oligotrophic to mesotrophic stagnant waters is S. fusca.] Address: https://mokrady.wbs.cz/nadejov/zaverecna_zprava_mokrady_ji_2012_web.pdf

24264. Conservatoire des Sites Lorrains & Société Lorraine d'Entomologie (2012): Agir ensemble pour les Libellules en Lorraine. Déclinaison régionale du Plan national d'actions en faveur des Odonates. DREAL Lorraine: 61 pp. + annexes. (in French) [France; the following odonate species are given priority action and are treated in details: Coenagrion mercuriale, Ophiogomphus cecilia, Oxygastra curtisii, Leucorrhinia caudalis, L. pectoralis.] Address: https://libellules.pnaopie.fr/agir-ensemble-pour-les-libellules-en-lorraine-declinaison-regionale-2012-2015-du-pna-o donates/

24265. Daigle, J.J. (2012): Whittle Road Soiree #333! Argia 24(3): 20-21. (in English) [Bristol, Florida, USA. Records of the following species are reported: Dromogomphus armatus, Progomphus bellei, Tramea omista, Somatochlora calverti, S. provocans, Stylurus laurae, S. potulentus, Libellula flavida, Argia bipunctulata, Macromia illinoiensis georgina, Gomphus dilatatus, Erpetogomphus designatus, Gomphus vastus, Dythemis velox, Tauriphila azteca, and T. australis.] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

24266. DeGuire, K.; Kuecker, K. (2012): Preliminary assessment of functional and family diversity of macroinvertebrates in the main channel, side channel, and backwater habitat areas of the St. Croix River (June 2009). Wings of Discovery - Edgewood High School Student Science Journal 2009-011: 10-12. (in English) [Minnesota, USA. "Macroinvertebrates play a significant role in their ecosystems and are important bioindicators. Different habitats within a river can affect the distribution and abundance of macroinvertebrate taxa and functional groups. The purpose of this study was to examine macroinvertebrate communities in three major sub-habitats of the upper St. Croix River. Main channel, side channel, and backwater habitat areas were defined by physical parameters. Two sites of each habitat type were sampled along the St. Croix. Macroinvertebrate taxonomic and functional diversity were measured along with basic water chemistry and water speed. Invertebrates were identified to family level and assigned a functional group. It was expected that the backwater and main channel sites would be the most different, but these areas were very similar in taxonomic diversity. The side channel areas had the lowest taxonomic diversity. There were not significant differences in the number or kind of functional groups found in the three habitat areas. Results may change at lower taxonomic resolution, if more sites are sampled, or if the survey is carried out at different times of the year. However, the finding that different habitat areas in the upper St. Croix River support similar taxonomic and functional diversity is ecologically significant." (Authors) A dragonfly larva is figured.] Address: Edgewood High School, 2219 Monroe Street, Madison WI 53711, USA

24267. GRETIA (2012): Déclinaison régionale du Plan national d'actions en faveur des Odonates Libellules & Demoiselles Basse-Normandie 2011-2015. DREAL Basse-Normandie. 81: 88 pp. (in French) [https://libellules.pnaopie.fr/wp-content/uploads/2023/07/PNA-Odonates_Declinaison-BN-_finale-complete_compr essed.pdf; the following speciesa are treated in detail: Coenagrion mercuriale, Oxygastra curtisii, Lestes dryas, L. virens, Aeshna grandis, Gomphus simillimus, Onychogomphus uncatus, Somatochlora flavomaculata, S. metallica, Sympetrum danae, and S. flaveolum.] Address: Groupe d'Etude des Invertébrés Armoricains (GRETIA) (Antenne des Pays de la Loire – 5, rue du Général Leclerc - 44390 Nort-sur-ERDRE, France

24268. Groover, R. (2012): Earlier emergence of anisopterans due to global climate change? Argia 24(4): 27. (in English) [Verbatim: In the spring of 2012, I observed three anisopterans emerged as adults earlier than in previous years. At the Reynolds Stormwater Pond #2, Henrico County, Virginia (N 37.638 W 77A73), Anax junius, Plathemis lydia, and Epitheca cynosura were observed earlier than normal for central Virginia. These species were captured (vouchers are available) on 31 March 2012; the shade temperature was 26°C and the weather was clear and sunny. March had been unusually warm for central Virginia. These three species were possibly first colonizers of a new stormwater pond, which is approximately 0.10 hectares in size. Photoperiod was normal for this time frame, but Corbet (1999) says that temperature also induces cues that activate neuroendocrine responses for metamorphosis into adults...] Address: Richard Groover, Email: rgroover@reynolds.edu

24269. Herbrecht, F. (red.) (2012): Plan national d'actions en faveur des odonates: Déclinaison Pays de la Loire (2012-2015). Rapport pour la DREAL Pays de la Loire: 203 pp. (in French) [http://odonates.pnaopie.fr/wp-content/uploads/2010/12/rapport-PRAO-PdL-valid%c3%a9.pdf. The following species are treated in detail: Isoaeschna isoceles, Coenagrion mercuriale, C. pulchellum, Gomphus flavipes, G. graslinii, G. simillimus, Lestes dryas, L. macrostigma, Leucorrhinia albifrons, L. caudalis, L. pectoralis, Ophiogomphus cecilia, Oxygastra curtisii, Somatochlora flavomaculata, and Sympetrum danae.] Address: Groupe d'Etude des Invertébrés Armoricains (GRETIA) (Antenne des Pays de la Loire – 5, rue du Général Leclerc - 44390 Nort-sur-ERDRE, France

24270. Ishizawa, N. (2012): Radioactivities at reservoirs in Fukushima after one year. Newsletter from Kunugiyama Forest 21: 1-4. (in English) [Verbatim: I reported in the newsletter No. 12 on the investigation of the radiological dosages of dragonfly habitats at Hobara, Date City and Takayu Spa, Fukushima City on 24-26 July last year of 2011. Also the investigation was conducted at the same areas on 22-23 July this year (the examined spots are shown in Fig.1-3, and this time reservoirs at Nakamori and Nagasaku were omitted). Likewise last year I used a Geiger-Muller counter made by Russian manufacturer SOEKS Ltd. (Ecotester SOEKS, range of measuring 0.03-1000μSv/h, maximum measuring duration, 20 seconds), which was wrapped by polyetylene sheet for protection of the scensor. I measured the doses of radiation at heights of 1 m and 10 cm above the ground 10 times at each spots (for ca. two minutes) at one or a few spots of each interval were ca. 100 m. The radiological dosage at each spot at each height is the average of the values of ten times. The recent precipitation in Fukushima Prefecture was large, and this brought the rise of the water level of the reservoirs, therefore, I did not measure the dosages at the water edges of Hayamashita and Echudaira. I haven't a driving license, and investigation was conducted by bicycle, this narrowed the range of investigation. I didn't measure the dosages of dragonflies this time beacause of the lack of suitable measurement apparatus, and only counted the numbers of dragonflies at reservoirs. Results The radiological dosages at the examined reservoirs last year were ca. 2 μSv/h at a height of 10cm from the ground (the dosages at a height of 1 m are omitted). As shown in Fig. 1, the average dosage of the five reservoirs was 1.34 μSv/h, decreasing of 36.6% in comparison with that of last year. The decreasing rate was mostly similar to those at other spots such as Fukushima Station, streets and small parks. The maximum dosage was recorded 2.3 μSv/h at the west bank of Tamukai pond, however, at other reservoirs dosages were low. It was fine in the morning on 25th July last year, however, in the afternoon, the weather changed rapidly to cloudiness, and thundercloud was approaching, then I stopped investigation thereafter. But, as the weather was steady this time, I examined one more spot at Iwasaki 2 km far south from Kakeda, Ryozen-cho. At Iwasaki dosages were examined at two reservoirs, which were adjascent to each other. The maximum dosage at a height of 10 cm at the bank of the downward pond was 3.04 μSv/h, and at the upward pond, 3.18 μSv/h, and the average was 2.56 μSv/h in the former and 2.79 μSv/h in the latter, respectively. These were higher than those of the spots examined last year. The dosages of the two spots are assumed to have been higher than 4 μSv/h then last year, and the maximum dosage might have exceeded 5 μSv/h. This area is located 60 km away from the Fukushima Daiichi Nuclear Plant, however, it is downwind of the east wind that brought a large quantity of radioactivity of the explosion of the nuclear plants, therefore, the dosage there of last year might have been so much high. Sympetrum frequens comes up for summering to the ski slope at Takayu Spa, which is located on the east side of Mt. Azumayama, to the west of Fukushima City, every summer. The dosage at the ski slope was 0.46 μSv/h (0.56 μSv/h, last year), by 17.9% lower than the last year. I measured twice at two spots there last year, however, this time sounds of sneaking around of a seemingly bear were heard during counting S. frequens, I stopped examination thereafter, and came back. Dragonflies decreased Fig. 1 shows a great decreasing of dragonflies by 36.2% (except Takayu Spaski slope, the decreasing amounted -50.7%), with the same result of decreasing of the radiological dosage. As the dosage decreases, reversely the number of dragonflies must increase, but, the fact was reverse. Firstly, Orthetrum albistylum speciosum, was not sighted except at Hayamashita. It might have been due to low Ta, 21-22°C, however, at Tamukai pond many Deielia phaon were perched on the leaves of reed, and some were chasing each other in spite of the coolness. Therefore, if O. albistylum speciosum existed there, some of them might have been found by me. The number of D. phaon was not so changed from that last year. Crochothemis servilia mariannae was sighted more frequently than last year at Takakonuma pond, however, at other places none was sighted. Pseudothemis zonata was found at Takakonuma and Hayamashita, however, the number was less than one 6th of that of last year. In Rhyothemis fuliginosa that was sighted rather many at Takakonuma pond last year, only one and a dead specimen caught by a spider were found on the west shore of the pond this time. Epophthalmia elegans and Synictinogomphus clavatus that were sighted last year were never found this time. Four of Anax parthenope julius were sighted at Takakonuma. Likewise last year, extremely few damselfly was seen, and only one pair of seemingly Coenagrionid species were sighted at Tamukai-pond. In spite that the examination of S. frequens was by 3 days earlier than the last year, it was sighted more than last year at ski slope at Takayu Spa. The number of S. frequens counted on the road along the Azuma Skyline was 593 for the distance of 2.5 km, and this number was seemingly larger than that of last year, though, I did not count there last year. However, I found two abnormal specimens there this time (Photo 1-2); one of which was extremely abnormal (Photo 1), and I have never seen such a specimen. I don't know whether the specimen had been damaged by the radioactivities or not. According to a recent online paper (Atsuki, et al., 2012), „Scientific Reports", 34 % of the 3rd generation bred from the specimens of the pale grass blue butterfly, Pseudozizeeria maha, collected in Fukushima Prefecture, was physiologically and genetically damaged by the radioactivities from the Fukushima Daiichi nuclear power plant. Thus, in the dragonflies that inhabited Fukushima Prefecture, the decreasing changed by the species, and as far as the species that inhabited reservoirs is concerned, the number of them can be said to have decreased. But, I don't know whether this is due to the radioactivities from the accident at Fukushima daiichi nuclear power plant or not. It is necessary for us to watch it carefully. References Atsuki, et al., 2012. The biological impacts of the Fukushima nuclear accident on the pale grass blue butterfly. Sci. Reps. 2, 570:1-10. Ishizawa, 2011. Effects of the radiation on the dragonflies in Fukushima Prefecture and at Tokorozawa City. Newsletter from Kunugiyama Forest, No.12:1-9." (Author)] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozavva City, Saitama Pref., Japan. E-mail: greffect708@jcom.-home.ne.jp

24271. Ishizawa, N. (2012): On the Akatombo. Factors of migration of Sympetrum frequens - Hypothesis of thermoregulation. Hypothesis of prereproductive diapause. Riversible temperature-dependent colour change. Habitat conditions of Sympetrum gracile. Non-contact flying-oviposition and flying-oviposition in to the mud. Duration of oviposition bout. Wingstroke frequency. Recent migration of S. frequens. Newsletter from Kunugiyama forest No.23, September 30, 2012: 1-7. (in English) [On the Akatombo [Sympetrum frequens]. Factors of migration of Sympetrum frequens - Hypothesis of thermoregulation. Hypothesis of prereproductive diapause. Riversible temperature-dependent colour change [Sympetrum frequens, S. darwinianum and S. e. eroticum]. Habitat conditions of Sympetrum gracile. Non-contact flying-oviposition and flying-oviposition in to the mud [Sympetrum frequens]. Duration of oviposition bout [Sympetrum maculatum]. Wingstroke frequency [Sympetrum maculatum, S. frequens]. Recent migration of S. frequens.] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozavva City, Saitama Pref., Japan. E-mail: greffect708@htk.ne.jp

24272. Martin, K. (2012): Color as a stimulus for male aggression in Ebony Jewelwing (Calopteryx maculata). Argia 24(3): 17-18. (in English) ["The study took place on the Scantic River (Somers, Connecticut) on 13 July 2012. FouiHnch diameter plastic discs were covered in Waterproof tape. Disc coloration was as follows: all black (B), all green (G), two inch green stripe centered in a black field (BFGB), two inch black stripe centered in a green field (GFBG), one inch green stripe centered in a black field (BgB), and one inch black stripe centered in a green field (GbG). One disc at a time was placed in the center of a mat of floating Vegetation. Observations were recorded for five minutes, then the disc was removed and a five-minute resting period was allowed before the next disc was placed in the mat. Ten trials for each color disc were conducted. Male aggressive displays were defined as “quick contact with disc, rapid wing movement, body elevated in a 45 degree angle”. Perching behavior was not recorded. A total of556 aggressive displays were recorded during the Observation period. The greatest number of aggressive displays was recorded with the green disc (n=347, m = 24.7, s.d. = A one-way between subjects ANOVA was conducted to compare the effect of color on aggtession. There was a significant effect of color on aggression for the three conditions [F(5, 54) = 12.86, p = 0.0001]. Results of the analysis indicated there was a significant difference (p<0.05) between colors, so a post hoc Statistical analysis was conducted using Tukey’s HSD. Results of the test indicated that the mean score of aggressive hits on the black disc (m = 3.80, s.d. =2.82) was significantly different (p = 0.0004, p<0.05) than the mean score of aggressive hits on the green disc (m= 24.70, s.d. = 13.72); however, the mean number of aggressive hits on the black disc was not significantly different than any of the other colored discs. There were significant differences in the means when the green disc was compared to each of the other disc colors. There were significantly (p<0.05) fewer aggressive hits on black full green stripe (BFGB) disc (m=11.60, s.d.= 8.95, p = 0.002), green full black stripe (GFBG) disc (m= 4.40, s.d.= 1.78, p= 0.0007), black with a half green stripe (BgB) disc (m=7.10, s.d.=4.80, p=0.0002), and the green with a half black stripe (GbG) disc (m=4, s.d. =231, p=0.0005) than the green disc. No significant (p>0.05) difference was found between the means when the four striped discs were compared." (Author)] Address: Martin, Kirsten, Univ. of Saint Joseph, 1678 Asylum Ave., West Hartford, Connecticut, 06117, USA. Email: kirstenmartin@usj.edu

24273. McMurray, P.D. (2012): Eclosion of a Stylogomphus (Gomphidae) nymph from the Middle Fork of the Rockcastle River, Kentucky. Argia 24(3): 21-22. (in English) [Rockcastle River system, Jackson County, eastern Kentucky, USA. Sequence of photographs documenting the eclosion of a Stylogomphus sp.] Address: Paul D. McMurrayJr., 6231 West 300 South, New Palestine, Indiana, 46163, USA. Email: paul.mcmurray79@gmail.com

24274. Monzka, M. (2012): Ökologische Untersuchung der Libellenzönose an einer fischereilichen Versuchsteichanlage im Oberlausitzer Heide- und Teichgebiet, unter besonderer Berücksichtigung der Bewirtschaftungsintensität. Treffpunkt Biologische Vielfalt 11: 19-24. (in German) [The Königswartha Experimental Pond Facility (Versuchsteichanlage - VTA) is located between Bautzen and Kamenz in the Upper Lusatian Heath and Pond Area (Saxony, Germany). A total of 23 dragonfly species have been recorded to date. "Considering the intensive management and the high fish yields that the VTA regularly produces, the dragonfly community there can be described as rich in species and individuals, as well as typical of vegetation-rich ponds. Species with adaptation strategies to drying waters, such as Lestes sponsa, Sympetrum depressiusculum, or Aeshna mixta, particularly find suitable conditions." (Author)] Address: Monzka, Manuela, Burgkstr. 41, 01159 Dresden, Germany. E-mail: m.monzka@gmx.net

24275. Müller, J.; Steglich, R. (2012): Fundort- und Artenliste eigener Libellen-Nachweise (Odonata) in Sachsen-Anhalt für 2011. Entomologische Nachrichten und Berichte 56(3-4): 241-244. (in German) [Federal State Sachsen-Anhalt, Germany. This is the third annual odontological report following the reports for 2008 and 2009-2010.] Address: Steglich, Rosmarie, Zollstr. 1/128, 39114 Magdeburg, Germany. Email: roeseli@mdcc-fun.de

24276. Paulson, D. (2012): Leg position in ovipositing Pondhawks and other dragonflies. Argia 24(3): 16. (in English) [Verbatim: Watching a Western Pondhawk (Erythemis collocata) laying eggs the other day, I noticed that it held its hind legs out behind its thorax as it hovered, and I thought that was interesting enough that I checked my photos of ovipositing pondhawks. The only species for which I have photos are Western and Eastern Pondhawks (E. simplicicollis). Sure enough, in every photo, the female’s hind legs were extended on either side of the abdomen. This included Westerns at Magnuson Park, Seattle, Washington, on 29 July 2011 and 31 July 2012; and Glenwood, New Mexico, 31 July 2007; and Eastems at Lochloosa Lake, Florida, 19 April 2005, and Bass Island, Ohio, 19 September 2007 (this last from William Hüll). Thus both species share this behavior, and it would

be of great interest to see if other species of the genus did likewise. Looking at these photos made me recall a photo of an ovipositing Gomphus australis that I had taken. It too was hovering with legs extended to the rear, as was a female of the same species in a photo sent to me by Marion Dobbs. My only other photo of a clubtail female hovering is of a Gomphus minutus, and it also had the hind legs extended. I have all too few photos of ovipositing females in flight, but I found no others like these. Females of Macromia illinoiensis, Cordulia shurtleffii, Brachymesia forcata, Libellula croceipennis, L. forensis, Micrathyria aequalis, Orthemis ferruginea, Pachydiplax longipennis (2), Perithemis domitia and Plathemis lydia (3) hovered while in the ovipositing mode with the hind legs folded forward as is usual for odonates in flight. Of course exophytic ovipositors that oviposit in tandem (e.g., Celithemis, Sympetrum, Libellula composita) cannot do this, as all of the female's legs are grasping the male abdomen, but a female Tramea onusta had its legs folded after the male released it for a single dip. I haven't photographed a male flying with its legs extended backwards, so I consider that position unusual and wonder about its significance in egg-laying females. Is it typical of gomphids? Is it more likely to occur in ground-perching species? I encourage other observers to watch for this and document it photographically. It will be interesting to learn whether the leg position characterizes species or genera and speculate why the difference. And the value of photo archives is demonstrated once again.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@pugetsound.edu

24277. Sánchez Guillén, R.A. (2012): Selección en el mantenimiento del polimorfismo de color: Evidencia de selección natural en el mantenimiento del polimorfismo de coloración en odonatos. Editorial Académica Española: 104 pp. (in Spanish) ["In this work we have directly tested the existence of some kind of selection acting in the maintenance of color polymorphism in Ceriagrion tenellum we have reviewed the main hypotheses proposed for the maintenance of polymorphism in odonates in order to determine which of the proposed selective mechanisms best explains the maintenance of color polymorphism in C. tenellum. In this study, it is proposed as a null hypothesis that color polymorphism in C. tenellum is neutral to selection, and therefore maintained by random factors such as mutation, migration or genetic drift. As an alternative hypothesis, it has been proposed that there is some type of selection acting in the maintenance of polymorphism in this species." (Publisher/Translated with DeepL.com (free version)] Address: https://www.eae-publishing.com/catalog/details/store/gb/book/978-3-8473-6276-0/selecci%C3%B3n-en-el-mante nimiento-del-polimorfismo-de-color

24278. Sharma, G. (2012): Studies on the Diversity of Odonata and Lepidoptera Fauna of Mount Abu, Rajasthan, India. In: Raghunathan, E., Sivaperuman, C. and Venkataraman, K. 2012. Recent Advances in Biodiversity of India: 1-529 (Published by the Director, Zoo I. Surv. India, Kolkata): 243-250. (in English) [24 odonate species are listed; Libellulidae were the most dominant family of order Odonata, represented by 15 species, followed by Coenagrionidae (4 species), Aeshnidae and Gomphidae (each 2 species) and Protoneuridae (1 species)] Address: Sharma, G., Desert Regional Centre, Zoological Survey of India, Jhalamand, Pali Road, Jodhpur-342005, Rajasthan, India, Email: drgaurav.-zsi.india@gmail.com

24279. Skalon, N.V. (ed) (2012): The Red Book of the Kemerovo region "Rare and Endangered Species of Animals", Volume II, 2nd edition, revised and enlarged. Kemerovo: "Asia Print", 2012: 192 pp. (in English) [Somatochlora alpestris, Stylurus flavipes, Gomphus vulgatissimus, Anax parthenope, Calopteryx japonica, and Macromia amphigena fraenata are treated on pages 23-28. Each species is illustrated, its regional distribution is mapped, the Red List-status is given, followed by a brief description of the adult stage, information on habitat, behaviour and status of regional population. Brief information on conservation measures are also given.] Address: https://www.prlib.ru/item/691631

24280. Teitge, G.R.; Fávaro, L.F. (2012): Análise da colonização e sucessão ecológica da macrofauna bentônica através de substrato artificial. CURITIBA: VII + 27. (in Portuguese, with English summary) [Analysis of colonization and ecological succession of benthic macrofauna through artificial substrate; "This study aimed to analyze the colonization of macrofauna over 60 days in a 3rd order river in the Atlantic Rainforest of Paraná State through artificial substrates. The use of artificial substrates as a method of collection is still little used in Brazil and much discussed by the scientific community in terms of efficiency, are more often used in studies of environmental quality in lentic environments. 4914 organisms were collected in 38 taxa. Insecta were the most representative group (98%). Chironomidae was more abundant at the end of the study; however, families Baetidae and Leptophlebiidae has shown to be potential early settlers, being replaced by Chironomidae from the 7th day of colonization. In terms of guild, group of collectors was the most common throughout the study period, a fact related to the study site and because of the conservation of the riparian zone, followed by the scrapers guild. The analyzes at different taxonomic and ecological resolutions showed that ecological succession occurred cumulatively and not discrete as was expected according to Clements´s theory." (Authors) The following odonate taxa are listed: Perilestes, Libellula, and Megapodagrionidae.] Address: https://acervodigital.ufpr.br/xmlui/bitstream/handle/-1884/29338/R%20-%20D%20-%20GUILHERME%20RODRIG O%20TEITGE.pdf?sequence=1&isAllowed=y

24281. Van der Schoot, P. (2012): Verslag van de excursie naar Lozerheide te Lozen (Bocholt) van 5 augustus 2012. Libellenvereniging Vlaanderen — nieuwsbrief 6(2): 17. (in Dutch) [Verbatim/Google translate: Report of the excursion to Lozerheide in Lozen (Bocholt) of 5 August 2012 Domain Lozerheide is a 206 ha area managed by ANB, most of which is accessible to the public. We were given the opportunity to visit the closed off part of the fish breeding ponds. With high expectations, many interested people came to the faraway Lozen in North Limburg, despite the questionable weather. At the

entrance gate of the fish breeding ponds we saw an inconspicuous brown creature flying, from close up it was quickly clear that it was a Sympecma fusca. It would not be the last of the day, I have rarely seen such numbers of this species, it turned out to be a very common creature. A few metres further on we had also caught a number of dragonflies, which turned out to be mainly the not common Sympetrum vulgatum. We visited all the ponds at an unusually leisurely pace, but at a rapid pace quite a few species were added to the list, but mostly common species. Nice special features were S. fonscolombii, Orthetrum coerulescens and Crocothemis erythraea. After lunch we went to look at the northern, slightly larger ponds of the fish breeding ponds. We saw a Metallic dragonfly for a moment, which was only reserved for a few lucky ones. What was very striking were the numbers of Fire dragonflies. An Anax parthenope caused a stir, and after half an hour of hopping around everyone had seen the creature more than decently. Then we took the public footpath to the beautiful, large pond. Unfortunately, this is currently almost unsuitable for dragonflies. Little bankside vegetation, wooded along the shallow parts. The weather also did not cooperate anymore, and we were in danger of getting very wet. That's why we decided to call it a day and didn't visit the hayfields of the watering anymore. Unfortunately, we couldn't see a Spotted dragonfly, maybe next time. But with a total of 24 species and large numbers of most species we certainly couldn't complain.] Address: not stated

2013

24282. Chadwick, W. (2013): Odonates of Fahnestock State Park, New York. Argia 25(4): 16-17. (in English) [19 Odonata species are listed from Fahnestock State Park, Putnam County, New York.] Address: Chadwick, W., Bronxville, New York, USA. E-mail: mrcnaturally@optonline.net

24283. Daigle, J. (2013): Field key to Heteragrion of Ecuador. Argia 25(4): 10. (in English) ["Below is a simplified key to the known Heteragrion species of Ecuador, for photographic or in-hand determination of male specimens seen or collected alive in the field. Often two to three species will fly together at one time. I have included the recently described Heteragrion bickorum Daigle in the key. Color photos/scans for all species can be found on the Internet. Key to live males of Heteragrion species from Ecuador: H. erytbrogastrum, H. cooki, H. aequatoriale, H. angustipenne, H. bariai, and H. bickorum.] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

24284. Lebrasseur, J. (2013): Note d'aide à la mise en place d'inventaires et de suivis odonates. Rapport GRETIA dans le cadre de la déclinaison régionale du Plan national d'actions en faveur des Odonates: 19 pp. (in French) [http://old.gretia.org/dossiers_liens/nosact/pna_odonates/Docs%20-Odonates%20BN/Note_aide.pdf; Manual with notes to help set up odonate inventories and surveys.] Address: Groupe d'Etude des Invertébrés Armoricains (GRETIA) (Antenne des Pays de la Loire – 5, rue du Général Leclerc - 44390 Nort-sur-ERDRE, France

24285. Natsume, H. (2013): 2012 International Congress of Odonatology, Odawara, Japan, July 28 - August 2, 2012. Agrion 17(1): 10-14. (in English) [Extensive report on the 7th WDA International Congress of Odonatology.] Address: Hide Natsume. Email: romluna@symphony.plala.or.jp

24286. Newbrey, J.L.; Paszkowski, C.A.; Dumenko, E.D. (2013): A comparison of natural and restored wetlands as breeding bird habitat using a novel yolk carotenoid approach. Wetlands 33(3): 471-482. (in English) ["Restored wetlands are commonly assessed as avian breeding habitat using surveys, but data on reproductive parameters are needed to better understand how restoration affects wetland-dependent bird populations. A novel way to assess differences in breeding habitat quality is to compare the maternal allocation of carotenoids (i.e., biologically active yellow, orange and red pigments) to egg yolks, which is both diet and habitat dependent. We compared yolk carotenoid concentrations of red-winged (Agelaius phoeniceus) and yellow-headed blackbirds (Xanthocephalus xanthocephalus) that bred in natural, recently restored (i.e., restored $\leq$6 yrs ago) and restored (i.e., restored 9–16 yrs ago) wetlands to determine if restored wetlands provided critical reproductive resources at levels similar to natural sites. We also measured emerging insect abundances, water chemistry, and landscape-level parameters for study wetlands and related these variables to yolk carotenoid concentrations. Moreover, to understand the importance of damselflies to the diet of blackbirds, we measured the carotenoid content of damselflies and compared this to the yolk carotenoid content found in blackbird eggs. Bird abundances were also measured at each wetland to compare the traditional method of assessing breeding habitat to our novel yolk-carotenoid approach. In 2008, red-winged blackbirds in natural wetlands had higher carotenoid concentrations than birds in recently restored wetlands, suggesting that natural wetlands provided better breeding habitats. In 2009 there was a severe drought and we found contrasting results, with red-winged blackbirds in restored wetlands having higher carotenoid concentrations. Adult damselflies contained five carotenoids commonly found in avian tissues, suggesting they are likely an important source of carotenoids for wetland-breeding blackbirds. In contrast to yolk carotenoids, neither avian species richness nor abundance was significantly related to wetland type. Based on model selection results for water chemistry parameters, variation in concentrations of yolk carotenoids in red-winged blackbirds was best explained by conductivity, whereas variation in avian abundance was explained by total nitrogen, and avian species richness by chlorophyll-a concentration. Model selection results for landscape-level parameters revealed that variation in concentrations of red-winged blackbird yolk carotenoids was best explained by percent water in a 500 m buffer and variation in both avian abundance and avian species richness by wetland surface area. Our novel yolk carotenoid approach allowed us to identify differences in breeding bird habitat quality across wetland types, which we failed to detect with traditional bird survey data; our results highlight the need for additional studies comparing methods for assessing wetlands as breeding habitat for

wetland-dependent birds." (Authors)] Address: Newbrey, Jennifer, Dept Biol., Columbus State Univ., Columbus, GA, 31907, USA. E-mail: newbrey_jennifer@columbusstate.edu

24287. Panov, E.N.; Opaev, A.S. (2013): [Behavior of males in reproductive colonies of the splendens (Calopteryx splendens , Insecta, Odonata)]. Zoologicheskii zhurnal 92(1): 24-33. (in Russian, with English summary) ["The idea that male damselflies use two alternative tactics to access females during the breeding season has been questioned. Some ("territorial") males are considered to have priority as breeding grounds, while others ("sneakers") are unable to hold onto an individual territory. They manage to mate with a female only by seizing an opportune moment during a fleeting intrusion into the territory of a "territorial" male. The behavior of a "territorial" male is limited to waiting for females on his territory and copulating "by agreement" with his partner, while "non-territorial" males perform forced matings. Tracking the fates of individually identifiable males (48 out of 118 tagged) forces us to conclude that each male can be considered "territorial" at one time and "non-territorial" at another. Thus, no correlations between the nature of the male's use of space (sedentary/mobile) and any features of his external morphology and/or signaling behavior can be identified in principle. We failed to find such correlations. According to the data obtained, a more plausible explanation is that the female does not select a male as such, based on his phenotype and behavioral pattern, but on the area of one or another of them that is optimal for laying eggs. In addition, it was possible to establish that the commitment to violent sexual contacts in itself cannot be considered a successful "tactic", since they rarely lead to insemination of the female. Neither "territorial" nor "non-territorial" males achieve success in this case. In other words, we are not dealing with some alternative tactics (like specialized adaptive mechanisms) developed by the species in the course of its evolution, but simply the result of a different confluence of circumstances at a given moment in time." (Authors)] Address: Panov, E., Institute of Ecology and Evolution. AN Severtsov Russian Academy of Sciences, Moscow 119071, Russia

24288. Plotnikova, S.I.; Isavnina, I.L. (2013): Olfaction in dragonfly Aeshna grandis. Journal of Evolutionary Biochemistry and Physiology 49(2): 259-261. (in English) ["Antennae in dragonfly larvae, as compared with those in other insects, are short (they contain but 5-7 segments in imago) and thin (filiform). Nevertheless, we have managed to prepare the antennal nerve along its entire length and trace some of its axons in the subesophageal ganglion. The methylene blue-stained preparations show that the afferent axons (major constituents of the antennal nerve), upon ascending the subesophageal ganglion (see figure), enter a complex formation called an "antennal ganglion" at the boundary between the proto- and deutocerebrum. Here there also come axons of interneurons from α-lobes of mushroom bodies, and from here there seem to continue their pathway to α-lobes some axons of the antennal nerve. The antennal ganglion contains cell bodies of efferent neurons; their axons are running into the antennal nerve and form synaptic contacts on the muscles that move the antenna as well as numerous interneuronal bodies providing connections inside the ganglion with neurons of lateral protocerebrum. It is particularly important to indicate that in the antennal ganglion there are present the neuronal bodies that form a glomerulus identical by all parameters to glomerulus in other insects. The same glomerulus was detected in the antennal ganglion by N. Strausfeld [5]. Unfortunately, processes of olfactory neurons in our preparations were stained not completely. Nevertheless, axons of the olfactory neurons can be observed to enter the lateral protocerebrum and to terminate on long dendrites of Kenyon cells. Interestingly, some axons coming from the visual system terminate on the short dendrites of the same cells. A few words about the Kenyon cells in dragonfly larvae. These cells differ from the same cells in other insects. In larvae, bodies of these cells are located near the anterior boundary of protocerebrum and form a peculiar cap. Each Kenyon cell forms a process, from which there go out several very short dendrites as well as a long, sometimes bifurcating dendrite. Information from olfactory neurons is transduced along the Kenyon cell axons to the mushroom body α-lobe, where it is analyzed and enters directly (without further synaptic relays) into the abdominal chain. There are no calyces in nerve centers of dragonfly larvae. But if to compare the olfactory system in dragonfly larvae with that of other insects in general, it can be noted that in larvae, several centers of this system are absent. Thus, larvae have no olfactory lobes. To some extent, the antennal ganglia correspond to them, although they receive not only olfactory axons, but also those from the hearing and tactile receptor cells. The olfactory system in dragonfly larvae also lacks a motor-associative center, while signals from the mushroom bodies are transduced into the abdominal nerve chain along the direct pathways (without additional interneurons). All this indicates a poor development of the olfactory system in dragonfly larvae." (Authors)] Address: Isavnina, I.L., Sechenov Institute of Evolutionary Physiology and Biochemistry, Russian Academy of Sciences, St. Petersburg, Russia. Email: isavnina@iephb.ru

24289. Westermann, K.; Knoch, D.; Westermann, E.; Geis, G. (2013): Die Moore im Oberen Hotzenwald: Weitläufiges, bedrohtes Netz von nationaler Bedeutung. Ein Restitutionsprogramm von NABU und Schwarzwaldverein. Naturschutz am südlichen Oberrhein 7(1): 128 pp. (in German) ["Despite legal requirements and the importance of the moors in the Upper Hotzenwald, there is still a great need for their restoration. NABU and the Black Forest Association are therefore presenting a comprehensive moorland conservation program. Introductory chapters describe moors in general, moorland structures and vegetation in the Upper Hotzenwald, the use and cultivation of these moors, and the current status of state moorland conservation. In addition to general facts and principles, as well as information on flora and fauna, the program includes a description of 54 small moors covering an area of ??approximately 60 km² and key elements of their restoration." (Author) The book includes many references to Odonata. https://www.fosor.de/index.php?page=moore] Address: Westermann, K., Buchenweg 2, 79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

24290. Abukenova, V.S. (2014): Dragonflies of Libellulidae family (Insecta: Odonata) in the environs of the city of Karaganda. Westnik Karagandskogo unversiteta = Herald of the University of Karaganda 1(73): 30-37. (in Russian, with English summary) [Kazakhstan; "This article has results about kriptobionts invertebrates of the mosses of Karaganda region. The article is presents the faunistic data about dragonflies of family Libellulidae, which were obtained in the educational field practice in the vicinity of the city of Karaganda. On the territory of the city and beyond we registered 14 species of dragonflies. … (Author) The paper includes many misidentifications.] Address: Abukenova, Veronika Sergeevna, Zoology, Dept of biology & geography, Academician Ye.A. Buketov Karaganda State Univ., Russia

24291. Bailowitz, R.; Danforth, D. (2014): Narrow-striped Forceptail (Aphylla protracta) on the Increase in Arizona. Argia 26(3): 11-12. (in English) [San Manual Pond, Pinal County, Arizona, USA, 25 July 2014.] Address: Douglas Danforth. Email: dougofbis@vahoo.com

24292. Bedell, P. (2014): Celithemis bertha (Red-veined Pennant), New for Virginia. Argia 26(3): 10-11. (in English) [Chesterfield County, Virginia, USA, 15 July 2014] Address: Bedell, P., 10120 Silvcrleaf Terrace, Richmond, Virginia, 23236, USA. Email: pbedcll@richmond.cdu

24293. Bedell, P. (2014): Epitheca semiaquaea (Mantled Baskettail) Confirmed for New Hampshire. Argia 26(3): 9. (in English) [9-VII-2014 at Gregg Lake, Hillsborough County, New Hampshire, USA.Address: Paul Bedell. Email: pbedell-@richmond.edu

24294. Biggs, K.; Biggs, D. (2014): Wasted away again in Margaritaville, a.k.a. Ten days in Yelapa, Mexico. Argia 26(1): 30-32. (in English) [Yelapa is quite a unique place to visit. Mileage-wise, it is only about 25 miles south of Puerto Yrallarta on the west coast of Mexico, also Hing within the Bay of Banderas. The trip resulted in 31 odonate species.] Address: Biggs, Kathy, 308 Bloomfield Road, Sebastopol CA, 95472, USA. E-mail: bigsnest@sonic.net

24295. Chovanec, A. (2014): Libellen als Indikatoren für den Erfolg von Renaturierungsmaßnahmen an Fließgewässern am Beispiel der Krems im Bereich Ansfelden/Oberaudorf. ÖKO·L 36/2: 17-26. (in German) [Dragonflies as indicators for the success of renaturation measures on rivers using the example of the Krems in the Ansfelden/Oberaudorf area. Austria "A total of 20 dragonfly species were recorded in the study area, representing approximately 25% of the 78 species found in Austria. Of these 20 species, 16 were native. ... The measures implemented on the lower Krems River in the Ansfelden/Oberaudorf area increased the habitat availability relevant from a dragonfly conservation perspective. The recorded species spectrum includes upstream and downstream species of the water type-specific dragonfly associations, but the occurrence of the most indicative species is limited to only a few sections within the study area. Furthermore, section (D) with the highest number of individuals became dry from August 2013 onwards. The study area has high potential from a dragonfly research perspective; the following measures are recommended to stabilize or strengthen the populations of species specific to this water type: * Increase the structural availability in the main channel of the Krems River: Promote the development of gravel banks, such as those upstream of the inflow into the left-bank tributary. * Increase the endowment of the left-bank tributary and convert it into a permanently flowing tributary through hydraulic engineering measures (instead of the current two "water bodies" – a permanently water-bearing backwater area and a temporarily flowing section)." (Author/Google translate).] Address: Chovanec, A., Krotenbachgasse 68, 2345 Brunn am Gebirge, Austria. E-mail: a.chovanec@kabsi.at

24296. Daigle, J.J. (2014): Amphiagrion (Red Damsel) Update. Argia 26(1): 19. (in English) [Verbatim: While Amphiagrion abbreviatum (Western Red Damsel) and A. saucium (Eastern Red Damsel) appear morphologically distinct in the extreme ends of their distribution, some workers feel there is an intermediate form or third species in the Great Plains and central U.S. Based on our DNA barcode testing of recently collected specimens (less than 10 years) contributed to the project from 15 States around the U.S., I believe two species occur in North America. There are no genetic difference between A. abbreviatum from Oregon, California, and Nebraska, and those Amphiagrion from Wisconsin, Illinois, and Indiana. Amphiagrion from Western Ohio, Michigan, and Tennessee show no genetic differences compared to A. saucium from New York and Vermont. Using Nick Donnelly's Amphiagrion Dot map (right), I would extend the ränge of Amphiagrion abbreviatum to the Indiana/Ohio border. If anyone has recent specimens from the Ohio River Valley and Central U.S. (i.e. taken within the past 10 years), we would like to see and test them. If anyone has any questions, please contact me at jdaigle@nettally.com.Thanks!] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle-@nettally.com

24297. Danforth, D.; Bailowitz, R. (2014): The Reappearance of Black-winged Dragonlet (Erythrodiplax funerea) in Arizona. Argia 26(3): 10. (in English) [Arivaca Cienega, Pima County, Arizona, USA, 30 July 2014] Address: Douglas Danforth. Email: dougofbis@vahoo.com

24298. Danforth, D. (2014): Gomphus lynnae (Columbia Clubtail), a New Species for Nevada. Argia 26(3): 13. (in English) [Humboldt River below Rye Patch Dam, Pershing County, Nevada, USA, 29 June 2014. The note includes a picture of G. lynnae feeding on Erythemis collocata), same date and location.] Address: D. Danforth. Email: dougofbis@vahoo.com

24299. De Knijf, G. (2014): Boeken & Bytes: Libellen van Europa. Veldgids met alle libellen tussen Noordpool en Sahara. Dijkstra K.-D. & Lewington R. 2014. Tweede druk. Tirion Natuur i.s.m. De Vlinderstichting en Natuurpunt. 320 blz. ISBN: 978-90-5210-700-4. Natuur.focus juni 2014: 94.

(in Dutch) [Review of the first edition of "Field Guide to the Dragonflies of Britain and Europe".] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

24300. Díaz-Paniagua, C.; Martín-Franquelo, R.; de los Reyes, L.; Fernández-Díaz, P.; Prunier, F. (2014): The dragonflies of Doñana: 1959-2013. Boletín Rola nº 4: 5-15. (in English, with Spanish summary) ["The Espacio Natural Doñana, referred to here simply as Doñana, is internationally considered as an area of particular interest for the conservation of Odonata. We have compiled data on the species recorded in this area between 1959 and 2013, including the results of intensive surveys and observations of adults which took place between 2009 and 2013. Of the 42 species recorded, we have only observed 25 species in recent years. There appears to be a considerable reduction in species numbers since 1980's even taking account of five species that had not previously been cited. Due to the absence of some threatened species since the 1980's, the authors consider that a more intensive survey is required to confirm their status. The conservation of the aquatic habitats network in this area is required to preserve high Odonata richness in Doñana." (Authors)] Address: Díaz-Paniagua, Carmen, Estación Biológica de Doñana-CSIC, Spain. E-mail: poli@ebd.csic.es

24301. DuBois, R.; Tennessen, K.; Mead, K.; Lind, J. (2014): What can we learn from incorrect determinations of adult Odonata in an Upper Midwestern University insect collection? Argia 26(1): 19-22. (in English) ["In conclusion, this taxonomic assessment involving 102 species showed that a small percentage of the species were responsible for most of the errors in a well-curated insect collection. Five species (L. intacta, L proxima, S. internum, S. obtrusum, and S. vicinum) were involved in 78% of the misdeterminations. This study identified some problematic species groups that can be vexingly similar in both field characters like body size and color, and in-hand characters like the shapes of reproductive parts. Because of these identification problems, those who teach others how to identify odonates, construct key couplets, and produce field guides for this region should be very clear and careful when describing or illustrating field and in-hand differences within these groups. Field guides especially should show clear illustrations or photographs of the hamules and subgenital plates at optimal angles for all problematic species. Although sample sizes in genera of the corduliids were rather small, it is clear that identifications within this family can be difficult, especially with the enigmatic genus Epitheca. Within Leucorrhinia, frequent misdeterminations among L. hudsonica, L. Intacta, and L. proxima suggest that separating these species can be tricky in large areas of the northern United States where their ranges overlap. Keys and field guides to Leucorrhinia should use more than one reliable character to identify them. We applaud Donnelly (2013) for providing the first clearly illustrated ventral vie\vs of the hamules of male Sympetrum species in the difficult internum group. When identifying females of S. obtrusum and S. internum in the field, we suggest whenever possible that a selection of males with which they are associated be examined as well. We also note the potential for the confounding effects of hybridization between species, particularly within Epitheca and Sympetrum, which evidently occurs with some frequency in some parts of their North American ranges. However, it is beyond the scope of this note to comment further on this issue since intergrades within Epitheca and Sympetrum appear to be rare in the Upper Midwest and were not a problem in this study." (Authors)] Address: DuBois, R., Wisconsin Dept of Natural Resources, 1701 N. 4th St., Superior, Wisconsin 54880, USA. Email: robert. dubois@wisconsin.gov

24302. DuBois, R.B.; Berkopec, J.; Eichhorn, R. (2014): First record of Mocha Emerald (Somatochlora linearis) for Wisconsin. Argia 26(3): 29-30. (in English) [Haller Creek, Brown County, Wisconsin, USA, July and August 2014] Address: DuBois, R., Wisconsin Department of Natural Resources, 1401 Tower Ave., Superior, WI 54880, USA. E-mail: robert.dubois@Wisconsin.gov

24303. Glotzhober, R. (2014): Ohio adds new dragonfly species to the list. Argia 26(3): 21-22. (in English) [Dythemis velox, Champaign County, Ohio, USA, 25 July and 3 August 2014.] Address: Glotzhober, R., Ohio Natural history society, 1982 Velma Ave., Columbus OH 43211-2497, USA. E-mail: bglotzhober@ohiohistory.org

24304. Iorio, E. (2014): Les habitats des espèces de la déclinaison régionale bas-normande du Plan national d'actions en faveur des Odonates: La Cordulie à corps fin (Oxygastra curtisii). Fiche GRETIA pour la DREAL Basse-Normandie, l'Europe et l'Agence de l'Eau Seine-Normandie: 21 pp. (in French) [https://odonates.pnaopie.fr/wp-content/uploads/-2013/01/Habitats_Oxygastra_curtisii_FINAL.pdf] Address: Iorio, E., chargé d'études au GRoupe d'ETude des Invertébrés Armoricains (GRETIA) - Antenne Pays-de-la-Loire – 5 rue Général Leclerc – 44390 Nort-sur-Erdre, France. Email: e.iorio@gretia.org

24305. Iorio, E. (2014): Les habitats des espèces de la déclinaison régionale bas-normande du Plan national d'actions en faveur des Odonates: L'Agrion de Mercure (Coenagrion mercuriale). Fiche GRETIA pour la DREAL Basse-Normandie, l'Europe et l'Agence de l'Eau Seine-Normandie: 22 pp. (in French) ["https://odonates.pnaopie.fr/wp-content/-uploads/2013/01/Habitats_Coenagrion_mercuriale_FINAL.-pdf] Address: Iorio, E., chargé d'études au GRoupe d'ETude des Invertébrés Armoricains (GRETIA) - Antenne Pays-de-la-Loire – 5 rue Général Leclerc – 44390 Nort-sur-Erdre, France. E-mail: e.iorio@gretia.org

24306. Keppner, E.J. (2014): Note on the distribution of Progomphus bellei Knopf and Tennessen, 1980 (Belle's Sanddragon) in Bay and Washington counties, Florida, U.S.A. Argia 26(1): 12-15. (in English) ["I conducted a survey for P. bellei at 52 water bodies in Bay and Washington counties in Florida from 2007-2013. P. bellei was found at 29 locations: three in Bay County and 26 in Washington County. Two additional records from Bay County and one from Washington County were provided by others for a total of32 locations

(five in Bay County and 27 in Washington County)." (Author)] Address: Keppner, Lisa, Garrison Road, Panama City, FL 32404 USA. E-mail: lkeppner@bellsouth.net

24307. Patten, M.A.; Smith-Patten, B. (2014): First record of the Seaside Dragonlet (Erythrodiplax berenice) for Oklahoma. Argia 26(3): 17-18. (in English) [Jackson county, Oklahoma, USA, 14-VIII-2014] Address: Patten, M.A. & Smith-Patten, Brenda, Oklahoma Biological Survey, Univ. of Oklahoma, Norman, Oklahoma, 73109, USA. Email: argia#ou.edu

24308. Peterson, B. (2014): Dromogomphus spoliatus (Flag-tailed Spinyleg) confirmed in Nebraska. Argia 26(3): 23-24. (in English) [Fremont Lakes State Recreation Area, Nebraska, USA, 3 August 2014.] Address: Brian Peterson, Omaha, Nebraska, USA. Email: gordilly#gmail.com

24309. Schmidt, B. (2014): Die Zwerglibelle in Oberschwaben – Winzling mit hohen ökologischen Ansprüchen. Oberschwaben Naturnah 2014: 24-28. (in German) [Nehalennia speciosa is one of the rarest dragonfly species in Germany and only occurs in a few glacially formed regions with bog complexes. It requires special aquatic, microclimatic and vegetation-ecological resources in transition bogs for its development. Only very few plant communities meet the species' high ecological requirements in terms of texture and structure. All current occurrences in Baden-Württemberg are located in the district of Ravensburg, which has a state-wide conservation responsibility for the damselfly. (Author/Translated with DeepL-.com)] Address: Schmidt, B., Alpenstr. 27, 88045 Friedrichshafen, Germany. E-Mail: bertrand.schmidt@gmx.de

24310. Sibley, F. (2014): Notes from Wyoming and Nebraska 2014. Argia 26(3): 24-26. (in English) [Wyoming, new state records: Lestes australis, Epitheca cynosura. Noteworthy county records: Argia apicalis, Argia moesta, Enallagma antennatum, Libellula luctuosa, Plathemis subomata, Tramea lacerata. Nebraska: Noteworthy county records: Argia nahuana, Erpetogomphus designatus, Epitheca cynosura, Sympetrum internum, Tramea onusta, Rhionaeschna californica] Address: Sibley, F.C., 2325 County Road 6, Alpine, New York, USA. Email: fcsibley@empaqcc.net

24311. Tennessen, K. (2014): Fashioning small individual containers for rearing Odonata. Argia 26(1): 29. (in English) [Figure 1 introduces a lid of peanut butter jar, shown upside-down, with small holes drilled in the top and a small slat glued to the center, and a finished emergence container made from a peanut butter jar.] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

24312. Waldhauser, M.; Cerny, M. (2014): Vážky Èeské republiky - pøíruèka pro urèování našich druhù [Dragonflies of the Czech Republic – A guide to identifying our species and their larvae]. CSOP Vlašim: 184 pp. (in Czech) ["This field guide will help all dragonfly lovers, whether experts or the public, in identifying the dragonfly species that you can encounter in the vicinity of our waters. The image key clearly shows the main determining features of adults and larvae in photographs, supplemented by brief descriptions. The publication also contains simple graphs of seasonal phenology and maps with the distribution of individual species in the Czech Republic. The most important biotopes where dragonflies mainly occur are also listed. The book also includes photographs documenting the main characteristics of individual dragonfly families and their morphology, ethology and ecology." (Publisher/Google Translate)]

24313. Walker, J.S. (2014): One-and-a-half damselflies. Argia 26(3): 20. (in English) [The observations described here occurred at Cranberry Lake in Anacortes, Washington. It was a warm, sunny day in mid-July. A male Rhionaeschna californica preyed on a tandem of Enallagma carunculatum. "Apparently the darner snipped off the abdomen of the male and made off with the thorax, a meal it could handle easily. The female bluet seemed unharmed, but was left with an attached male abdomen." (Author)] Address: James S. Walker, Anacortes, Washington, USA. Email: jswphys@aol.com

24314. Walker, J.S. (2014): Splash-dunk analysis for 2011–2013, including temporal distribution. Argia 26(1): 33-34. (in English) [Aeshna palmata "The most spectacular dragonfly behavior we know of is the splash-dunk (for bathing) followed by the spin-dry (to shed the water.) ... Conclusions: Splash-dunking and spin-drying are fascinating aspects of dragonfly behavior that can be shared with others on a field trip. Most splash-dunk events consist of a single splash-dunk, but a significant percentage have 2-4 or more splash-dunks. In the Pacific Northwest, the best month to observe this behavior is September, and the best dragonflies to watch are darners." (Author)] Address: Walker, J.S., Anacortes, Washington, USA. E-mail: jswphys@aol.com

2015

24315. Bedjanic, M. (2015): Slovensko odonatološko društvo izdalo jubilejno 30. številko biltena Erjavecia. Trdoziv 4(2): 10. (in Slovenian) [Verbatim/Google translat: Erjavecia, named after Fran Erjavec, who was one of the first to use the term "dragonfly" in the first Slovenian textbook on the natural history of animals, is the bulletin of the Slovenian Odontological Society. It has been published regularly since 1995. In the twenty years of publication, 30 volumes have already been published, as until 2005 two were published per year, and since then a single issue for the current year has been published every end of October. Our intention and desire is to forever snatch from oblivion as much interesting and valuable odonatological information from our region as possible by publishing it in the society's bulletin. There are a huge number of various odonatological crumbs, scraps and often quite substantial stories and reports from the faunistic, ecological, nature conservation, historical, literary and other fields that we have touched on so far on a total of more than 1,100 pages of Erjavecia. The anniversary issue of the bulletin also touches on many interesting topics on 144 pages; among other things, it also brings a substantial Odonatological Bibliography of Slovenia for the period from 1685 to 2015. This includes all known written sources on dragonflies

of Slovenia. The number of titles cited so far in the collection, which we have been continuously updating for two decades, has also risen to almost 1,100. The Slovenian Odonatological Society will continue to strive to ensure that Erjavecia remains the central place for collecting a wide variety of information on dragonflies in Slovenia and beyond. The Erjavecia Bulletin is received in printed form by all members of the Slovenian Odonatological Society and authors of contributions. You are kindly invited to send your field observations, experiences or any odonatological notes to matjaz_bedjanic@yahoo.com. https://botanicnodrustvo.splet.arnes.si/files/2019/03/Trdoziv08_web.pdf] Address: Bedjanic, M., M., National Institute of Biology, Vecna pot 111, 1000 Ljubljana, Slovenia. Emal: matjaz.bedjanic@nib.si

24316. Iorio, E. (2015): Bien gérer ses rivières pour la Cordulie à corps fin (Oxygastra curtisii) en Basse-Normandie. Brochure GRETIA pour la DREAL Basse-Normandie, l'Europe et l'Agence de l'Eau Seine-Normandie: 18 pp. (in French) [https://libellules.pnaopie.fr/wp-content/uploads/2023/06/-IORIO_2015_rivieres_pour_Oxygastra_curtisii.pdf] Address: Groupe d'Etude des Invertébrés Armoricains (GRETIA) (Antenne des Pays de la Loire – 5, rue du Général Leclerc - 44390 Nort-sur-ERDRE, France

2016

24317. Diniarsih, S. (2016): Studi mikrohabitat dan populasi capung endemik Jawa anggota genus Drepanosticta (Odonata: Platystictidae) di Gunung Ungaran, Jawa Tengah. M.Sc. thesis, Untuk memenuhi sebagian persyaratan, mencapai derajat Master of Science, Program Studi Biologi, Universitas Gadjah Mada, Perpustakaan Pusat UGM: 92 pp. (in Indonesian, with English summary) ["Drepanosticta sundana, D. gazella, and D. spatulifera are members of Javan endemic platystictid damselflies. These species found in forest habitat of Mount Ungaran, Central Java. The data relates to microhabitat and population of these species remains insufficient up until now. The aims of this research were to study about the vegetation as damselflies microhabitat, to measure the factors that influence the occurrence of damselflies, and to assess the population of each damselfly in Mount Ungaran. Vegetation data of the tree stands was collected by using Point-centered Quarter Method (PCQM) while shrub riparian using Quadrats Method. Microhabitat data was collected by measuring several parameters such as: dissolved oxygen (DO), light intensity, wind velocity, stream velocity, soil moisture, humidity, height of waterfall, altitude, water pH, soil pH, water temperature, air temperature and forest canopy (coverage). Data was analyzed by using Canonical Correspondence Analysis (CCA). Population data was analyzed by census method. Distribution map then be constructed based on sampling locations. The results showed that: 1) vegetation composition and structure on Drepanosticta microhabitat in Mt Ungaran were very diverse, consisted of shrubs riparian and tree vegetation with wide canopy cover, providing shades along streams, 2) microhabitat variables which more affected the existence of: D. spatulifera were light intensity, altitude, DO; whereas D. sundana were coverage, humidity; and for D. gazella were stream velocity, wind velocity, height of waterfall, 3) Individual number which counted during the data collection were 72 individuals of D. sundana, 136 individuals of D. spatulifera and 47 individuals of D. gazella." (Author)] Address: https://etd.repository.ugm.ac.id/penelitian/detail/103864

24318. He, Z.; Qi, Z.; Wang, X.; Tang, Z.; Zeng, G.; Gao, Y.; Zaho, B.; Chu, Z. (2016): The acute toxicity of Lambda-cyhalothrin and Trichlorfon to Ischnura heterosticta larva. Journal of Zhejiang Ocean University (Natural Science Edition) 35(4): 315-321. (in Chinese, with English summary) ["The acute toxicity of lambda-cyhalothrin and trichlorfon to Ischnura heterosticta larva was tested under the hydrostatic conditions and establish corresponding mortality-drug concentration logarithm linear regression equation. The results showed that the sensitivity of I. heterosticta larva to lambda-cyhalothrin is greater than to trichlorfon. The LC50 (24, 48 and 96 h) of lambda-cyhalothrin were 6.44 μg/L, 5.31 μg/L and 4.57 μg/L, respectively, and the safety concentration was 0.89 μg/L. The LC50(24, 48 and 96 h) of trichlorfon were 0.81 mg/L, 0.65 mg/L and 0.56 mg/L, respectively, and the safety concentration was 0.11 mg/L. Further carried out the acute toxicity of the two aquacultural drugs to the 5-day-age and 25-day-age of Misgurnus anguillicaudatus larvae. The results showed that the mortality rate of lambda-cyhalothrin on I. heterosticta larva was less than or equal to 5.8%, not as the drug for prevention and control of I. heterosticta larva in the M. anguillicaudatus larvae rearing pond. But, it was obvious killing effect that the mortality rate of trichlorfon on I. heterosticta larva can reach 89.6% above. Thus, trichlorfon could be conventional drug for killing I. heterosticta larva." (Authors)] Address: He, Z, Dept Fisheries, Zhejiang Ocean Univ., Zhoushan 316022, China

24319. Monnerat, M. (2016): Les Libellules (Odonata) du plan d'eau temporaire de Lavigny (VD). Entomo Helvetica 9: 79-93. (in French, with English and German summaries) ["The Odonata of the vernal pond of Lavigny (VD). - A ten-year follow-up (2001–2010) of the vernal pond of Lavigny (1.2 ha) enabled to characterise its dragonfly community and to notice the presence of 34 species. During that period, 11 species reproduced with certainty, 3 of which on a regular basis. For 6 other species, reproduction behaviour was regularly recorded. The opportunities of development of the species in that area are determined by the annual variations of the water level, whose limiting factor is usually the summery drying up. The vernal ponds shelter distinctive species, such as Lestes dryas and Sympetrum flaveolum, both threatened at a national level. Lestes barbarus, Aeshna affinis and Sympetrum meridionale, for which evidence of reproduction is unusual in Switzerland, have been noticed more or less regularly in that area." (Author)] Address: Monnerat, M., Info fauna – CSCF, Maximilien de Meuron 6, CH-2000 Neuchâtel, Switzerland. Email: christian.monnerat@unine.ch

24320. Société Limousine d'Odonatologie (2016): Etude des odonates des prairies humides de Cieux - Cieux (87). http://www.conservatoirelimousin.com/tlfiles/cenlimousin/-contenus/biblio/slo2016prairieshumidescieux.pdf: 11 pp. (in French) [The Limousin Natural Spaces Conservatory has

commissioned the Société Limousin d'Odonatologie to conduct an inventory of odonates in the wet meadows of Cieux, in Haute-Vienne. This study is part of the development of the management plan. Its aim is to conduct an inventory of the site in order to identify the odonatological issues at stake. These issues will lead to management proposals." (Authors/-Google translate) 12 odonate species have been recorded including Oxygastra curtisii.] Address: Société Limousine d'Odonatologie, Pôle Nature Limousin, ZA du Moulin Cheyroux, 87700 Aixe-sur-Vienne, France

24321. Ussa, C.E.A.; Realpe, E.A. (2016): Revisión taxonómica y áreas de distribución de la familia Protoneuridae (Odonata: Zygoptera) para Colombia con la descripción de dos nuevas especies, Neoneura barrameja sp. nov., Epipleoneura leucochlora sp. nov. y cinco nuevos registros. MSc. thesis, Univ. de los Andes. (in Spanish) ["A general review of the family Protoneuridae for the country is carried out, establishing the distribution areas, making a taxonomic key for the identification of the species of the region, describing Neoneura barrameja sp. nov. Epipleoneura leucochlora sp. nov. and adding five new records to the list of known species from Colombia published by Pérez and Palacino (2011): Protoneura tenuis, Protoneura woytkowskii, Neoneura desana, Epipleoneura venezuelensis, E. spatulata. In the case of the genus Protoneura, the elaboration of taxonomic keys and diagnosis was not possible due to the low number of specimens found in entomological collections and field trips." (Authors/Google translate) https://repositorio.uniandes.edu.-co/handle/1992/13249] Address: Ussa C.E.A., Lab. zool. y ecol. acuática –LAZOEA-, Univ. de los Andes Cra 1 Nº 18A- 12 Bogotá, Colombia. Email: ea.ussa67@uniandes.edu.co

2017

24322. Amina, S.Y. (2017): Contribution à l'étude comparative des peuplements Odonatologiques des oueds du Nord-Est algérien. Thèse en vue de l'obtention du diplôme de Doctorat, Université 8 Mai 1945 de Guelma, Faculté SNV STU, Département d'écologie e genie de l'environment: 18 + 191 + 28 pp. (in French and English) ["Our research is a contribution to the knowledge of the Odonata of running waters. In 2011, we focused on two sub- bassins localised in the Norh-East of Algeria: The Kebir-East where very little research was made there and Kebir-Rhumel the largest sub-bassin in Algeria which no systematic research has been made yet. The monthly monitoring of 24 stations enabled to inventory 34 species including two species Coenagrion caerulescens and Trithemis kirbyi ardens which are noted for the first time in Numidia which increases Numidia Odonata Fauna to 51 species. At Kebir-Rhumel, 32 species were identified. Species richness is focused in the areas of crenon rivers that are still in pristine condition and can therefore be considered as reference sites. Our first investigations conducted in 2007, at Seybouse watershed revealed the existence of 33 species which 32 are specific to wadi Seybouse and its main tributaries. We also rediscovered Calopteryx exul an endemic species after a century and half." (Author)] Address: https://dspace.univ-guelma.dz/-jspui/handle/123456789/435

24323. Bahor, M. (2017): Stališèa in znanje slovenskih dijakov o kaèjih pastirjih [Attitudes and knowledge of Slovenian students about dragonflies]. Trodotiv: Bilten slovenskih terenskih biologov in ljubiteljev narave 6(2): 18-19. (in Slovene) [Verbatim: Attitudes are feelings and behavior towards various objects or situations that guide our actions. The formation of attitudes is influenced by the environment, knowledge about the object of attitudes and direct experience with it. Dragonflies are attractive insects due to their ability to fly and colorful colors, so people have mostly positive attitudes towards them. Dragonflies are potential umbrella species for wetland conservation and protection. They are a well-studied order of insects, but little is known about the knowledge and attitudes of the lay public about them. The perception of dragonflies is otherwise reflected in local names and legends that are known from different cultures. In Japan, dragonflies symbolize strength, victory and luck, while in many places in Central Europe they are emissaries of the devil, and their names are often associated with snakes or dragons. In the research within the framework of my master's thesis entitled Attitudes and knowledge of students about dragonflies, we used a questionnaire and a knowledge test, which were used to check the attitudes and knowledge of Slovenian students about dragonflies. 288 students from two high schools participated in the research, from 1st to 3rd year. The results of the survey showed poor knowledge about dragonflies. On average, students scored 38% on the knowledge test. Students have more general knowledge about dragonflies and less knowledge about the evolution, ecology or anatomy of dragonflies. They know very little about the life cycle of dragonflies, as they were the worst at answering questions about their reproduction and development. Knowledge of the external morphology of a dragonfly larva is also very poor, as only 11% of respondents correctly identified a dragonfly larva, and as many as 51% of students confused it with a mosquito larva. The results show that Slovenian students have little direct experience with aquatic invertebrates. We found that girls have worse knowledge than boys, while living environment and year have no effect on dragonfly knowledge. We also identified misconceptions about dragonflies, which on average are present in as many as 63% of students. They mistakenly imagine that they use their color to warn of toxicity, that they can sting us with the growths at the end of their butts, and that they stay only near snakes. Students' attitudes towards dragonflies are positive, except in the scientific category of attitudes, which is manifested in the desire to (not) learn about the object. This may also be a result of the very extensive curricula in the gymnasium. But it was knowledge that had the greatest impact on attitudes in our research, as students with more knowledge have more positive attitudes towards dragonflies and a greater interest in learning about them. In addition, they are more willing to protect them, and their awareness that dragonflies are an important link in the ecosystem is also better. Knowledge is an important factor in decisions to protect species, as people with a higher level of knowledge choose to protect rare and endangered species, while people with a lower level of knowledge prefer to choose "useful" or human-like species to protect. We detected more positive attitudes among students who already had direct experience with dragonflies. The living environment does not affect attitudes, as we did not detect

any differences between students living in the city and those living in the countryside. The curricula in our schools are uniform, and in addition, both in the city and in the village, there are enough bodies of water where people can observe dragonflies. Children everywhere have access to modern technology, with which they spend significantly more time behind four walls than in nature. We also checked how much students are willing to protect dragonflies in their immediate vicinity. The students are of the opinion that from the point of view of nature protection and natural heritage, the preservation of dragonflies in their Some sketches of dragonflies made by the surveyed students. useful, wise, necessary, responsible, acceptable and undemanding to the surroundings. They are not sure whether dragonfly conservation is feasible or not and whether it is important or not. In any case, the students find it interesting to preserve dragonflies in their immediate surroundings. Attitudes guided our actions, which is why the attitudes of the local population, who live in the immediate vicinity of endangered habitats and species and whose actions contribute to their protection, or endanger them even more, are very important in nature conservation." (Google translate)] Address: https://botanicnodrustvo.splet.arnes.si/files/-2019/03/Trdoziv12_web.pdf

24324. Baird, I.R.C. (2017): A review of current knowledge of the coastal petaltail dragonfly, Petalura litorea (Odonata: Petaluridae). Prepared on behalf of the New South Wales Office of Environment and Heritage Save Our Species Program, North East Region: 59 pp. (in English) [Contents: 1 Introduction, 2 Background, 3 Description, 4 Phylogenetics, 5 Distribution, 6 Habitat, 7 Life history, 8 Ecology, 8.1 Larval burrow morphology and groundwater dependence, 8.2 Frequently associated odonates, 8.3 Water quality requirements, 8.4 Prey and foraging behaviour, 8.5 Predation, 8.6 Other causes of mortality, 9 Behaviour, 9.1 Male territoriality, 9.2 Sex-biased adult habitat preferences, 9.3 Rendezvous and copulation, 9.4 Post-copulatory resting period, 9.5 Post-copulatory mate guarding, 9.6 Oviposition, 9.7 Emergence behaviour and location, 9.8 Emergence timing and spatial clustering, 10 Population dynamics, 10.1 Sex ratio at emergence, 10.2 Commencement, duration and pattern of the emergence season, 10.3 Larval cohort splitting, 10.4 Within-patch flying season population dynamics, 10.5 Landscape-scale population dynamics, 11 Identifying swamp patches used by the species for reproduction, 12 Identified and potential threats, 13 Identified knowledge gaps, 14 Recommendations, Acknowledgements, References] Address: https://www.researchgate.net-/publication/315795472_A_review_of_current_knowledge-_of_the_coastal_petaltail_ dragonfly_Petalura_litorea_Odonata_Petaluridae_Prepared_on_behalf_of_the_New_South_-Wales_Office_of_Envi ronment_and_Heritage_Save_Our_-Species_Prog

24325. Chakour, R.; L'Mohdi, Q.; El Haissoufi, M.; Slimani, M.; Himmi, O.; El Agbani, M.A.; Bennas, N. (2017): Nouvelles donnees sur les insectes aquatiques du Basin Versant de Bouregreg (Plateau central, Marocain) I: Coleoptera, Hemiptera et Odonata. Boletín de la Sociedad Entomológica Aragonesa 61: 306-322. (in French, with Spanish and English summaries) ["New data on the aquatic insects of the Bouregreg catchment basin (central plateau of Morocco). I: Coleoptera, Hemiptera and Odonata. Abstract: Within the framework of an assessment of the ecological quality of the Bouregreg catchment basin (Morocco) based on the PRECE protocol (Rapid Ecological Quality Assessment Protocol), seasonal sampling was carried out between 2012 and 2013 in order to collect macroinvertebrates at 17 sites in the three main rivers of the Bouregreg catchment basin (Bouregreg, Grou and Korifla). A total of 2101 specimens were collected, belonging to 90 especies: 63 of Coleoptera, 17 of Hemiptera and 10 of Odonata. The study area's species list of these three orders, which until now amounted to 94 taxa, rises by a further 31 to 125 species, which is almost 30% of the diversity for the three orders in Morocco. Of the collected species, the odonate Paragomphus genei is here newly recorded from the Middle Atlas, 43 species are new to Khénifra province, 23 to Khémisset province and 14 to Rabat province. ...." (Authors) The following odonate taxa are discussed: Lestes viridis, Coenagrionidae, Anax sp., Onychogomphus costae, O. forcipatus unguiculatus, O. uncatus, Paragomphus genei, Crocothemis erythraea, Sympetrum fonscolombii, Trithemis kirbyi, Zygonyx torridus torridus.] Address: Bennes, N., Université Abdelmalek Essaâdi, Faculté des Sciences, Département de Biologie, Tétouan, Maroc. nbennas@hotmail.com

24326. Iorio, E. (2017): Les habitats des espèces de la déclinaison régionale bas-normande du Plan national d'actions en faveur des Odonates: Le Gomphe à crochets (Onychogomphus uncatus). Fiche GRETIA pour la DREAL Basse-Normandie, l'Europe et les Agences de l'Eau Seine-Normandie et Loire-Bretagne. 2ème version revue et augmenté: 24 pp. (in French) [http://old.gretia.org/dossiers_liens/nosact/pna_odonates/Docs%20Odonates%20BN/Habitats_Onychogomphus_uncatus_FINAL.pdf] Address: Iorio, E., ECO-MED (Ecologie & Mediation), Pole Entomologie, TourMediterranee, 65 av. Jules Cantini, 13298 Marseille Cedex 20, France. Email: e.iorio@ecomed.fr

24327. Khelifa, R. (2017): Faking death to avoid male coercion: extreme sexual conflict resolution in a dragonfly. Ecology 98(6): 1724-1726. (in English) [Swiss Alps, Aeshna juncea; https://www.researchgate.net/publication/314036662_Faking_death_to_avoid_male_coercion_Extreme_sexual_conflict_resolution_in_a_dragonfly] Address: Khelifa, R., Department of Evolutionary Biology and Environmental Studies, University of Zürich, Winterthurerstr. 190, CH-8057, Zürich, Switzerland. E-mail: rassimkhelifa@gmail.com

24328. Miyagi ken dragonfly inventory (2017): The Dragonflies and Damselflies of Miyagi Prefecture. Noriaki Yanagida: 247 pp. (in Japanese) ["This is an insect catalogue that includes 93 species of dragonflies from 12 families that inhabit Miyagi Prefecture. Since the 2013 edition of the Miyagi Prefecture Red List, quantitative assessments have been conducted on the former 75 cities, wards, towns, and villages, and this book corresponds to this. For each species, the records from before 1939 to the 2010s, whether there are records after the Great East Japan Earthquake, first and last

sightings of adults (showing the place where they were seen or collected), and the category in the Red List are shown in a table, followed by habitats, detailed records for each region in Miyagi Prefecture, ecology, and special notes on changes in records and reexamination of the original descriptions. It also contains a bibliography of 775 publications related to dragonflies found in Miyagi Prefecture, a list of species recorded by former municipality, a list of species on the Red List, records of hybrids, and unpublished records. This book allows you to learn about the dragonfly fauna of Miyagi Prefecture with detailed records." (Publisher)] Address: http://kawamo.co.-jp/roppon-ashi/sub725.htm

24329. Vinko, D. (2017): Kaèjepastirska mušata – sopotnik pisanih akrobatov. Trodotiv: Bilten slovenskih terenskih biologov in ljubiteljev narave 6(2): 8. (in Slovene) [Verbatim/Google translate: Dragonfly - a companion of colorful acrobats: Many consider dragonflies to be the most beautiful insects. They are colorful, have acrobatic flight skills, and at the same time, as bioindicators, they also carry with them the story of the environment in which they are located. In recent years, they have become a kind of fashion trend, they are increasingly "captured" by macro photos, in which they are admired even by the completely lay public. The latter also contributed to the discovery of a new species in Slovenia, a small dipteran, a parasite on the wings of dragonflies: the dragonfly flycatcher. My discovery of the dragonfly (Forcipomyia paludis) began with collecting photos of dragonflies in the Vipava Valley. I also invited local nature lovers to submit photos. Among those received was a photo by Bojan Zadravec, in which I noticed unexplained "black spots" on the wings of a virgin shepherd. They were later clarified for me by the German entomologist Andreas Martens, who confirmed the new species for Slovenia. This prompted me to review thousands of mostly publicly released photos. You can read the results of this work in the magazine Natura Sloveniae (19/1). The dragonfly is a two-millimeter temporary external parasite on adult dragonflies and the only species of dragonfly (Ceratopogonidae, Diptera) in Europe whose females feed on hemolymph exclusively on this group of insects. Dragonflies are bitten in a non-species-specific manner, mostly on the wings, rarely on the breast. When a dragonfly is caught with a butterfly, the dragonfly fly most often leaves its host. In addition to its small size and our inattention, this is also why most of what is known about the species comes from photographs of dragonflies. On them, individuals of this species can be recognized as oval, darker spots on the wings of dragonflies. Their body is dark brown to reddish brown on two unpigmented wings that do not significantly exceed the length of the back. What eating them does to dragonflies has not yet been studied, and they leave no visible consequences on their bodies after feeding. One to several dozen dragonflies can be found on an individual dragonfly. But we have to be careful. Not every live "smear" on dragonflies is a fly; they can also be eaten by other dipterans, and most often by reddish-colored balls - mites. So far, we have recorded the species on 13 adult dragonflies from 11 locations, namely in Podsabotin, Mlaki near Vipava, in the vicinity of Bled and Koper, in Ljubljana, in Kocevsko and in Bela Krajina. We have not found it in the eastern half of the country. In Europe, it has been recorded in 18 countries so far, but almost all finds of the dragonfly muscat are accidental. The ecology of the species is still unknown to us. It is also unclear at what stage of dragonfly development the dragonfly fly begins to eat its host; foreign experts conclude that she "prefers" freshly metamorphosed and juvenile specimens whose cuticle has not yet completely hardened. After reviewing the photographic material and due to the increased attention in field work, I expect an even greater number of data on the prevalence of the dragonfly muscat in our country, so I invite you to further research.] Address: Vinko, D., Slovensko odonatološko društvo, Verovškova 56, Si-1000 Ljubljana, Slovenia. E-mail: damjan.vinko@gmail.com

2018

24330. Baranova, B.; Hrivniak, L.; Oboòa, J.; Krumpálová, Z.; Manko, P.; Matusová, Z. (2018): Short-term faunistic monitoring of four Sites of Community Importance (SCI) in the Pieniny National Park with suggestions of land management proposal. Oecologia Montana 27: 7-20. ["Sites of Community Importance (SCI) represent rare and endangered biotopes of the Natura 2000 network. The objective of SCI protection and management is to keep their landscape and ecological function as well as their biological diversity in good condition. In our study, four SCI in the buffer zone of Pieniny National Park, Slovakia were investigated. We surveyed selected aquatic and terrestrial invertebrates during a short-term period in early summer 2015, in the water and water dependent biotopes and their coastal zones. The consistent reconnaissance of the actual status of sampling sites was important, as we confirmed the presence of several rare, endangered and Natura Directive species of flies, mayflies and dragonflies as well as terrestrial spiders and ground beetles. Application of the management proposal, which we suggested with respect to the bionomy and habitat requirements of present protected species, should lead to improvement of actual conditions of the monitored SCI." (Authors) Records of Coenagrion hastulatum and Onychogomphus forcipatus are briefly documented.] Address: Baranova, B., Dept of Ecology, Fac. of Humanities & Natural Sciences, University of Prešov, 17. novembra 1, SK-081 16 Prešov, Slovakia. Email: baranova@gmail.com

24331. Behr, H. (2018): Daten zur Libellenfauna der Landeshauptstadt Schwerin (Mecklenburg-Vorpommern) von 1981 bis 2017 unter besonderer Berücksichtigung faunistischer Daten des Neumühler Sees (Odonata). Virgo 20(1): 43-57. (in German) [A summary analysis of all individuals of 46 species observed in the urban area between 1992 and 2017 reveals a species-specific ranking of relative individual dominance. The relatively dominant species include Coenagrion puella, Enallagma cyathigerum, Coenagrion pulchellum, Erythromma najas, and Ischnura elegans, followed by Sympetrum sanguineum, Libellula quadrimaculata, and Orthetrum cancellatum. The species with the lowest numbers of individuals, Coenagrion hastulatum, Aeshna juncea, Calopteryx splendens, and Somatochlora flavomaculata, were only recorded before 1995.] Address: Behr, H., Herrengrabenweg 57, 19061 Schwerin, Germany. Email: hauke-behr@web.de

24332. Buczynski, P.; Rychla, A.; Wendzonka, J.; Brodachi, M.; Golab, M.J. et al. (2018): Wazki (Odonata) stwierdzone w Pieniñskim Parku Narodowym i jego okolicach podczas XIV Ogólnopolskiego Sympozjum Odonatologicznego PTE (Krocœcienko nad Dunajcem, 6-9 VII 2017). Odonatrix 145 (2018): 16 pp. (in Polish, with English summary) [Dragonflies (Odonata) recorded in the Pieniny National Park and its surroundings during the 14th Polish Odonatological Symposium of the PTE (Krocœcienko nad Dunajcem, 6-9 VII 2017): "During the field sessions of the 14th National Odonatological Symposium of the Polish Entomological Society, the Pieniński National Park (PPN) and its vicinity were faunistically in-vestigated. The main purpose of the study was to prove the current status of Somatochlora alpestris, which was observed in the Pieniny Mts. in 2016. Further, other aquatic habitats were investigated to improve the poor state of knowledge on the contemporary dragonfly fauna within the PPN and in its vicinity. This article presents collected data, supplemented with observations from several additional individual trips in 2017. In total, 28 dragonfly spp. were recorded: 17 within the area of the PPN and 26 in its vicinity. Overall, the species richness was low at most of the investigated sites reaching maximally 6 spp. per site within the PPN and 17 out of the PPN. New spp. for the Pieniny Mts. were Chalcolestes viridis, Erythromma viridulum, Orthetrum cancellatum and Crocothemis erythraea. Overall, the species number for the region of the Pieniny Mts. raised up to 44, which makes actually 59% of the dragonfly spp. occurring in Poland. This fauna is becoming richer by the colonization of the region by stagnophilic spp., including thermophilic ones, whose presence is mainly facilitated by the creation of water bodies for the protection of amphibians. 14 dragonfly spp. were recorded for the first time for the PPN, which enhanced the total species number of this area up to 18. Calopteryx virgo and Cordulegaster bidentata were exclusively observed within the PPN, whereas 11 spp. only at the surrounding sites. Additionally, a negative non-linear relation between altitude of site and species richness was demonstrated. In general, 26 spp. were found below 500 m a.s.L., whereas only 2 were present above 700 m a.s.l. The greatest collapse of species richness occurred at elevations between 600 and 700 m a.s.l., which was result of both, harsher climatic conditions as well as of quantitative and qualitative poorness of aquatic habitats. S. alpestris was not rediscovered during our investigation, although all potential habitats were carefully checked for the presence of all stages of this species. The occurrence of an autochthonous population in Pieniny Mts. is, therefore, doubtful. Relatively mild climate, low elevations (640-790 m a.s.l.) as well as the type of the potential habitats (eutrophic bog-springs) are disadvantageous for permanent development of this boreo-alpine species. Consequently, the imago observed in 2016 has to be interpreted as a migrant, probably from the next standing populations in Tatra Mts." (Authors)] Address: Buczynski, P., Dept of Zool., Maria Curie-Sklodowska University, Akademicka 19, 20-033 Lublin, Poland. Email: pawbucz@gmail.com

24333. Jai, K.; Maryati, M. (2018): Serangga dan mitos suku kaum jakun, Kampung peta, Mersing Johor. Serangga 23(1): 1-11. (in Malaysian, with English summary) [Insects and myths of the Jakun tribe, Kampung Peta, Mersing Johor: "Myths are based on facts. They are elements that are not merely designed but have their own meaning. There is no such thing as a myth but no reason for as a human being, we are never far from myth because the myth is in the belief of the person. This is because myths are in the social and cultural contexts that link the human behavior itself. Humans have high social level and are able to use good sense compared to other creatures. But humans can not explain all the phenomena that exists around them. Although insects and myths are not getting attention in Malaysia, they are tested in this study. This is because insect-related myths have existed and are believed to be ancient practice. This study focuses on seeing insects from the mythical perspective of the Orang Asli tribe of Jakun, Kampung Peta, Mersing Johor. The existence of insects in the life of every ethnic in Malaysia has brought various elements of myths. Therefore, when combine myths and insects, it could be said that myth is a human way of understanding, expressing and linking insects to him/herself as well as a group/culture. The practice of using insects among ethnic groups in daily life is called etnoentomology. In this study, the insects studied are the butterfly ('Lepidoptera), the odonates (Odonata) and the cicadas (Homoptera). This is because these insects are very popular in the community and have their own myths that are brought into the local culture of belief." (Author)] Address: Maryati Mohamed, Pusat Penyelidikan & Penggunaan Mapan Sumber-Sumber Asli. (COR-SUNR), Fakulti Sains Gunaan dan Teknologi Universiti Tun Hussein Onn, Malaysia, Kampus Pagoh, KM 1, Jalan Panchor, 84000, Muar, Johor, Malaysia. Email: maryati@uthm.edu.my

24334. Wahizatul, A.A.; Nur, H.H.; Nakisah, M.A. (2018): Monitoring of water quality using aquatic insects as biological indicators in three streams of Terengganu. Journal of Sustainability Science and Management 13(1): 67-76. (in English) ["Aquatic insects are amongst of the most frequently benthic macroinvertebrates used in freshwater monitoring and assessment worldwide. However, relatively less attention has been paid to include aquatic insects for purposes of health and water quality bioassessment particularly in Malaysia. Here, we investigated the abundance of aquatic insects as well as its relationship with physico-chemical parameters in three streams of Terengganu (i.e. Lata Changkah, Sungai Peres and Sungai Ular) which experienced different levels of human disturbance from September to November 2015. A total of 1,361 individuals from seven orders belonging to 35 families of aquatic insects were identified in the streams. The total abundance was significantly greater in Lata Changkah than in Sungai Ular and Sungai Peres ($F=5.146$, $df=2$, $p=0.035$). The most dominant family of aquatic insects in Lata Changkah and Sungai Peres was Heptageniidae (Ephemeroptera), followed by Perlidae (Plecoptera), Stenopsychidae and Hydropsychidae (Trichoptera). In contrast, Libellulidae was the most dominant family found in Sungai Ular. High abundance of intolerant taxa such as Ephemeroptera, Plecoptera and Trichoptera were observed in the least disturbed streams; Lata Changkah and Sungai Peres. Decreasing abundance of intolerant taxa and a high number of the

most tolerant taxa (Chironomidae, Diptera) were collected from the most highly disturbed stream, Sungai Ular. Based on physico-chemical parameters and biological indices, Lata Changkah and Sungai Peres were categorized as of “Excellent” to “Good” water quality, while Sungai Ular was classified as “Moderately Good”. Findings from this study provide a useful baseline for appropriate water management using aquatic insects as bioindicators for assessing anthropogenic impacts on streams of Malaysia." (Authors) Taxa are treated at family level.] Address: Wahizatul, A.A., School of Marine & Environmental Sciences, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia. Email: wahizatul@umt.edu.my

2019

24335. Briggs, A.; Pryke, J.S.; Samways, M.J.; Conlong, D.E. (2019): Macrophytes promote aquatic insect conservation in artificial ponds. Aquatic conservation: marine and freshwater ecosystems 29(8): 1190-1201. (in English) ["Farmland ponds promote regional aquatic biodiversity; however, optimally managing these ponds requires knowledge on how the biodiversity differs between ponds across catchments with different land uses. (1) This study investigated the response of macrophytes, both those in the pond and on the bank, as well as dragonfly and water beetle species richness, diversity and composition in artificial ponds, to numerous environmental variables in catchments dominated by three land uses: protected areas (as reference sites), sugarcane-dominated and forestry-dominated landscapes, across two seasons. (2) There was a strong association between insect species richness and vegetation cover, particularly sedges (Cyperus spp.) in spring and bulrushes (Typha capensis) in summer. There was also a positive response between insect species richness and sedges up to 70% cover, and bulrushes up to 40% cover, after which there was a decrease. Furthermore, the protected area ponds contained more rare and specialist insect species. Pond size was not a major variable for biodiversity overall. (3) Although there was generally little congruence in composition among the three taxa, dragonflies were a good surrogate for water beetles and floating macrophytes. (4) Well-vegetated ponds, both in the water and along the margin, are the most suited to promoting biodiversity, as long as the vegetation is not too dense, and not dominated by one plant species. (5) Artificial ponds in production landscapes have great potential for conserving aquatic species, irrespective of land use, as long as there is management for macrophyte density and heterogeneity." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

24336. DeBlieux, T.S.; Hoverman, J.T. (2019): Parasite-induced vulnerability to predation in larval anurans. Diseases of Aquatic Organisms 135: 241-250. (in English) ["Within communities, pathogens and parasites have the potential to indirectly influence predator-prey interactions. For instance, prey that exhibit pathology or altered traits (e.g. behavioral shifts) following infection could be more prone to predation, which is known as parasite-induced vulnerability to predation (PIVP). PIVP has been frequently documented for pathogens with trophic transmission, because predators are often critical in the pathogen’s life cycle. However, for pathogens without trophic transmission, PIVP can lead to a healthy herds effect, thereby reducing transmission in the system. In this study, we explored whether the pathogen ranavirus (family Iridoviridae) enhances vulnerability of 4 species of larval amphibians (spring peepers Pseudacris crucifer, gray treefrogs Hyla versicolor, American toads Anaxyrus americanus, and northern leopard frogs Lithobates pipiens) to 2 common tadpole predators (larval Anax junius [hereinafter Anax] and adult water bugs Belostoma flumineum [hereinafter Belostoma]). For each anuran species, we conducted short-term microcosm experiments to assess predation rates on individuals that were or were not exposed to virus. For 3 of the 4 species, we found that exposure to ranavirus decreased survival rates with Anax between 2- and 9-fold. However, we did not see the same trend with Belostoma, which indicates that predator identity is important in this interaction. More specifically, the higher efficiency of Anax in capturing and consuming prey, relative to Belostoma, may allow Anax to capitalize on trait changes induced by virus exposure and enhance the PIVP effect. Our results indicate that trait-mediated indirect effects could play a role in creating healthy herds in amphibian communities." (Authors)] Address: DeBlieux, T.S., Department of Forestry and Natural Resources, Purdue University, West Lafayette, IN 47907, USA. Email: tdeblieu@purdue.edu

24337. Dow, R.A.; Butler, S.G.; Reels, G.T.; Steinhoff, P.O.M.; Stokvis, F.R.; Unggang, J. (2019): Previously unpublished Odonata records from Sarawak, Borneo, part IV: Bintulu Division including the Planted Forest Project and Similajau National Park. Faunistic Studies in Southeast Asian and Pacific Island Odonata 27: 1-66. (in English) ["Records of Odonata from Sarawak’s Bintulu Division are presented. 166 (or more) species are listed, of which three (Oligoaeschna amata (Förster, 1903), O. buehri (Förster, 1903) and Oligoaeschna (?) species) had not previously been recorded in Sarawak and Macromia species cf dione Lieftinck, 1971 had not previously been recorded from Borneo. Additionally, this is the first published record of Prodasineura tenebricosa Lieftinck, 1937 from Sarawak, although it had been found at another location in the state prior to its discovery in Bintulu, and the first published record of Phyllothemis raymondi Lieftinck, 1950 from Borneo, although specimens from Kalimantan are present in the collections of the Naturalis Biodiversity Center, Leiden. Other notable records include “Elattoneura” longispina Lieftinck, 1937, Pericnemis dowi Orr & Hämäläinen, 2013, Linaeschna polli Martin, 1909, Burmagomphus arthuri Lieftinck, 1953, Heliogomphus borneensis Lieftinck, 1964, Merogomphus femoralis Laidlaw, 1931, Chlorogomphus species, Macromidia genialis erratica Lieftinck, 1948 and Tetrathemis flavescens Kirby, 1889. Altogether there do not appear to be any previous published records from Bintulu Division of 52 of the species listed in this paper. The status of Rhyothemis fulgens Kirby, 1889 is discussed and illustrations of its anal appendages and those of R. pygmaea (Brauer, 1867) are provided. Illustrations of the anal appendages of Tetrathemis hyalina Kirby, 1889 and T. irregularis Brauer, 1868 are also provided. Identification

problems when using COIbased DNA barcoding with some species of Archibasis are discussed, and the nuclear marker ITS is shown to be a successful alternative in these cases; COI and ITS gene trees for part of the genus are included. Some COI data for Macromia species are published and the marker is used to identify larvae of M. corycia Laidlaw, 1922 and establish the relationship of another Macromia larva with M. dione, a very poorly known species from Sumatra. Macromia euterpe Laidlaw, 1915 is considered to be the same species as M. westwoodii Selys, 1874 and dropped from the list of species known from Sarawak however formal combination of the two species is left for a peer reviewed publication. A detailed list of previously unpublished specimens from the locations covered is given in an appendix. Concise checklists for two of the locations covered Similajau National Park (54 species) and the Bukit Mina Wildlife Corridor (84 species) are given in another appendix." (Authors)] Address: Dow, R.A., Naturalis Biodiversity Center, P.O. Box 9517, 2300 RA Leiden, The Netherlands. Email: rory.dow230@yahoo.co.uk

24338. Gabor, C.R.; Perkins, H.R.; Heitmann, A.T.; Forsburg, Z.R.; Aspbury, A.S. (2019): RoundupTM with Corticosterone functions as an Infodisruptor to antipredator response in tadpoles. Front. Ecol. Evol. 7:114. doi: 10.3389/fevo.2019.00114: 7 pp. (in English) ["Larval amphibians are frequently exposed to multiple stressors in aquatic environments, so understanding how individual stressors and synergisms of multiple stressors affect amphibians is integral to conservation efforts. Glyphosate, the active ingredient in RoundupTM, is a common pollutant found in aquatic environments. Exposure to glyphosate induces morphological, behavioral, and physiological changes in tadpoles possibly via infodisruption. Urban aquatic environments may have environmentally relevant levels of glyphosate, as well as higher concentrations of exogenous corticosterone (CORT) than rural areas. Elevated CORT levels also affect the morphology and physiology of tadpoles. Dragonfly larvae are common predators of tadpoles, and tadpoles often show elevated CORT and reduced activity in the presence of dragonfly larvae. We tested the hypothesis that combined effects of exogenous CORT and RoundupTM exposure would affect the antipredator behavior, morphology, and stress hormone responses of Gulf coast toad, Incilius nebulifer, tadpoles. We exposed tadpoles to one of four treatments: RoundupTM, CORT, RoundupTM+CORT, or control, for 7 days. Tadpoles exposed to CORT or RoundupTM+CORT had elevated CORT release rates. Tadpoles exposed to exogenous CORT had lower tail depth compared to tadpoles in other treatments. Subsequently, we exposed tadpoles to dragonfly diet cues. Tadpoles increased activity after predator cue exposure when they had previously been exposed to RoundupTM+CORT. Taken together, our results suggest that there may be synergistic effects between RoundupTM and exogeneous CORT on organismal behavior but not their physiology or morphology. It appears that glyphosate is an infordisruptor, that prevents tadpoles from demonstrating adaptive antipredator responses, which may contribute to population declines." (Authors)] Address: Gabor, C.R., Department of Biology, Texas State University, San Marcos, TX, USA. E-mail: gabor@txstate.edu

24339. Kim, M.J.; Kim, J.S.; Kim, S.-S.; Kim, I. (2019): Development and validation of microsatellite markers for an endangered dragonfly, Libellula angelina (Odonata: Libellulidae), with notes on population structures and genetic diversity. 2019 Spring International Conference of KSAE, A New Challenge and Response to Invasive Alien Pests: 143. (in English) [Verbatim: In this study, we developed ten microsatellite markers specific to L. angelina using the Illumina NextSeq 500 platform. 43 individuals of L. angelina collected from three localities in South Korea were genotyped to validate these markers and to preliminarily assess population genetic characteristics. The observed number of alleles, observed heterozygosity (HO), and expected heterozygosity (HE) at a locus ranged from 4–13, 0.211–0.950, and 0.659–0.871 in the population with the largest sample size (20 individuals), respectively, thereby validating the suitability of the markers for population analyses. Our preliminarily assessment of the population genetic characteristics indicates the presence of inbreeding in all populations, an isolation of the most geographically distant population (Seocheon), and lower HO than HE. The microsatellite markers developed in this study will be useful for studying the population genetics of L. angelina collected from additional sites in South Korea and from other regions. [For more details see: Kim, M.J.; Kim, J.S.; Kim, S.-S.; Kim, I. (2020): Development and validation of microsatellite markers for an endangered dragonfly, Libellula angelina (Odonata: Libellulidae), with notes on population structures and genetic diversity. International Journal of Odonatology 23(2): 93-102] Address: Kim, I., Dept of Applied Biol., College of Agriculture & Life Sciences, Chonnam National Univ., Gwangju, Republic of Korea. Email: ikkim81@chonnam.ac.kr

24340. Kosterin, O.E. (2019): Odonatological results of a trip across the southern Far East of Russia in the first half of July 2014. International Dragonfly Fund - Report 136: 1-65. (in English) ["Odonatological results of a trip across the southern Far East of Russia, from nearly the border of North Korea to Khabarovsk from July 1st to 16th, 2014, are presented. In total, 50 species were recorded, including those with limited presence in Russia, such as Paracercion calamorum, P. hieroglyphicum, P. plagiosum (for this species the 3rd Russian locality is reported), Pseudocopera tokyoensis, Stylurus annulatus (2nd Russian locality), Sinictinogomphus clavatus; Trigomphus citimus, Macromia daimoji (3rd Russian locality), M. manchurica, Deielia phaon, Lyriothemis pachygastra (2nd Russian locality). For S. annulatus, M. manchurica and D. phaon the northernmost known localities in the world are reported. D. phaon, earlier reported from one locality in Russia, have been found in five localities in Primorye and for the first time reported for Khabarovskiy Kray in general and Bol'shekhekhtsirskiy State Nature Reserve in particular. A trend of mutual exclusion of two abundant Shaogomphus postocularis epophthalmus and S. schmidti is supposed: the lowermost Ussuri River / Amur River, respectively. Variation in Paracercion spp. and Macromia amphigena fraenata is discussed." (Author)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

24341. Rudolf, J.; Wang, L.Y.; Gorb, S.N.; Rajabi, H. (2019): On the fracture resistance of dragonfly wings. Journal of the Mechanical Behavior of Biomedical Materials 99(11): 127-133. (in English) ["The biological success of insects is attributed to evolution of their wings. Over 400 million years of evolution, insect wings have become one of the most complex and adaptive locomotor structures in the animal kingdom. Although seemingly fragile, they satisfactorily perform their intended function under millions of cycles of repeated stress without failure. However, mechanistic origins of wing resistance to failure remain largely unknown. Most of our understanding of biomechanics of insect wing and flight is based on computer simulations and laboratory experiments. While those studies are needed to reveal certain aspects of wing design, a full understanding can be achieved only by linking obtained data with results of studies in natural conditions. In this study, we tracked the initiation and progression of wing damage of dragonflies in their natural habitats. By quantifying wing area loss over the flight season, we aimed to find a link between the wing structure and accumulated damage. Our results showed that dragonfly wings are exceptionally damage tolerant. Even at the very end of the flight season, the mean wing area loss does not exceed 1.3% of the total wing area. Crack termination, deflection, bifurcation and bridging are the mechanisms that raise the resistance of wings to fracture. This study suggests that insect wings are adapted not only for flight efficiency, but also for damage tolerance. Hence, they should be studied not only from the perspective of aerodynamic performance, but also from that of fracture mechanics." (Authors)] Address: Gorb, S.N., Functional Morphology & Biomechanics, Institute of Zoology, Kiel University, Kiel, Germany

24342. Sandamini, P.M.M.A.; Gunarathna, S.D.; Chandana, E.P.S. (2019): Habitat quality and climate variability determine odonate species diversity and distribution patterns in selected habitats of southern Sri Lanka. Asian Journal of Conservation Biology 8(1): 47-57. (in English) ["Present study was conducted to reveal the odonate diversity and distribution patterns in selected habitats with reference to habitat quality and climate variability in order to determine the conservation status of odonate species and to predict any future threats to odonate assemblages in selected habitats. Odonate assemblages were investigated for six month period at seven different sites in Matara and Hambantota district, Sri Lanka. Their exuviae, key vegetation types, water quality parameters and habitat disturbances were also studied. Climate data from 1998 to 2018 for studied habitats were analyzed. A total 40 odonate species were identified including 11 endemic species. Heat tolerant species and species which can scarcely be seen in dry zone were abundantly recorded at dry zone habitats in present study. Present study reveals that there might be a significant direct effect of habitat quality on odonate species assemblages and distribution patterns in studied habitats and there might be an indirect effect of climate variability on odonate species assemblages and distribution patterns in studied habitats. Therefore, these data of relationship among odonate species diversity, habitat quality and climate variability in different ecological habitats will useful for conservation of odonates in particular habitats." (Author) Neurothemis tullia, Diplacodes nebulosa, Crocothemis sevilia, Pantala flavescens, Diplacodes trivialis, Orthetrum glaucum, O. luzonicum, O. sabina, O. chrysis, O. pruinosum, Rhyothemis variegate, Acisoma panorpoides, Brachythemis contaminata, Trithemis pallidinervis, Macrodiplax cora, Trithemis festiva, Rhodothemis rufa, Trithemis aurora, Tramea limbata, Indothemis limbata, Ictinogomphus rapax, Heliogomphus walli, Ischnura senegalensis, Ceriagrion coromandelianum, Agriocnemis pygmaea, Ischnura aurora, Pseudagrion microcephalum, P. malabaricum, Vestalis apicalis, Libellago greeni, L. corbeti, L. adami, Euphaea splendens, Copera marginipes, Elattoneura tenax, E. centralis, E. oculata, E. caesia, Onychargia atrocyana, Platysticta apicalis] Address: Chandana, E.P.S., Dept of Zoology, Fac. of Science, Univ. of Ruhuna, Matara 81000, Sri Lanka. E-mail: epschandana@zoo.ruh.ac.lk

24343. Shih, C.; Wang, Y.; Ren, D. (2019): Chapter 29: Camouflage, mimicry or eyespot warning. In: Dong Ren, Chung Kun Shih, Taiping Gao, Yunzhi Yao & Yongjie Wang (eds.): Rhythms of Insect Evolution: Evidence from the Jurassic and Cretaceous in Northern China. John Wiley & Sons Ltd: 651-665. (in English) ["Mimicry is very common for insects, displayed in various stages of eggs, nymphs, larvae, pupae or adults. Since eye-to-eye has a powerful impact on vertebrates, eyespots become an important anti-predation strategy for diurnal insects and other animals. In today's ecosystems, eyespots are still one of important self-defense methods for insects, especially for extant Lepidoptera. There are many documented examples of camouflage by various fossil insects of Odonata, Orthoptera, Homoptera, Neuroptera and Mecoptera from the Early Cretaceous Jehol Biota and the Middle Jurassic Yanliao Biota in the Northeastern China. Some fossil insects have dark spots and markings with various sizes irregularly distributed on their wings. A typical mimicry system comprises three parties: mimic, model and dupe. To ensure that mimicry occurs, all three parties should, to some extent, coexist in the same living ecosystem at the same time." (Authors)] Address: Shih, C., Capital Normal University, China

24344. Silva Barbosa, M.; Rodrigues Borges, L.; Silva Diogo, D.; Venâncio, H.; Santos, J.C. (2019): Odonate communities of the Sucupira Reservoir, Rio Uberabinha, Minas Gerais, Brazil. Pap. Avulsos Zool., 2019; v.59: e20195922: 10 pp. ["Odonata are widely distributed among freshwater ecosystems of tropical and temperate environments. They are also particularly sensitive to anthropogenic changes. The objective of this study was to inventory the odonate fauna of a section of the Sucupira Reservoir on Rio Uberabinha, Uberlândia, Minas Gerais, Brazil, and to document the species composition of the odonate fauna during the dry and rainy seasons. The study also aimed to describe the distribution of the sampled species in Brazilian states. Sampling took place in August and September of 2017 (dry season) and in February and March of 2018 (rainy season), and recorded 860 individuals of 43 species belonging to 26 genera and six families. Six new records representing the families Gomphidae, Libellulidae and Coenagrionidae were recorded for the state of Minas Gerais. 17 species were collected only during the rainy season and eight only during the dry season,

while 18 species were found in both seasons. The rainy season had greater abundance, with four times as many individuals as the dry season. This study increases the number of records for Odonata in the Minas Gerais state, and reinforces the trend for greater predominance of this group during the rainy season in this biome." (Authors)] Address: Silva Barbosa, M., Univ. Federal de Uberlândia (UFU), Inst. Biol. (INBIO), Lab. Ecol., Evolução e Biodivers. (LEEBIO) - Uberlândia, MG, Brasil.

24345. Stepnicka, M.; Cao, N.; Behounek, L.; Burda, M.; Dolný, A. (2019): Missing values and dragonfly operations in fuzzy relational compositions? International Journal of Approximate Reasoning 113: 149-170. (in English) ["Three-valued logics were found by logicians as an important topic focusing on dealing with truth-values different from the standard True and False values. The variety of such values, including “Irrelevant”, “Non-applicable”, “Indeterminable”, “Incosistent”, “Graded truth” or “Unknown”, generated a wide variety of distinct three-valued logics, each focusing on a distinct type of the third value and the consequent aspects of the related logic. Indeed, there is no single approach that would correctly model all the motivating situations and serve perfectly to all practical problems. Furthermore, one has to keep in mind that these logical or even only purely algebraic approaches serve as a sort of approximation of the modeled real situation. Indeed, some of them might deserve very complex approaches using several other techniques and scientific fields related to the uncertainty theories. However, the logical/algebraic approaches may serve as very appropriate, comprehensible, elegant and efficient way to treat such truth values that are neither True, nor False. Following some of the previous works, we will call such values by the word “undefined” and make a short revision of the three-valued logics dealing with such undefined values. Secondly, we will review some extensions of these three-valued logics to many-valued logics, i.e., in particular partial fuzzy logics, which extend typical, usually [0,1]-valued fuzzy logics by a dummy value $*$ in order to represent the undefined truth value. Furthermore, we recall that none of them is primarily proposed in order to deal with the missing values in fuzzy relational compositions and thus, the first attempts to deal with such values in fuzzy relational compositions was built on a combination of two algebras for partial fuzzy logics, namely Bochvar and Sobocinski. However, it is clear that this combination of two algebras in the definition of fuzzy relational compositions is a sort of higher-level construction of a rather heuristic origin. Therefore, in this paper, we go back one level lower and design a new set of operations for the purpose of dealing with missing values. This algebra employs the lower estimation approach and it is designed in order to preserve as many properties from the residuated lattices as possible. Further properties of the proposed operations are provided and formally proved. Finally, the application potential is demonstrated on a real example of the taxonomical classification of dragonflies. Based on the primary application, we call the proposed algebra of operations as Dragonfly algebra or simply Dragonfly operations." (Authors)] Address: Štepnicka, M., Inst. for Research & Applications of Fuzzy Modeling, Univ. of Ostrava, CE IT4Innovations, 30. dubna 22, 701 03 Ostrava, Czech Republic. E-mail: Martin.Stepnicka@osu.cz

24346. Tatarinov, A.G.; Kulakova, O.I. (2019): Local faunas of dragonflies (Insecta, Odonata) in the European North-East of Russia: downstream of the Sysola river. Vestnik Insituta Biologii Komi NC UrO RAN, (1 (208): 18-24. (in Russian, with English summary) ["The article presents the long-term study results on the fauna and population structure of dragonflies in the lower reaches of the Sysola River (near Syktyvkar, Komi Republic). The authors have identified 41 species of 8 Odonata families. The taxonomic diversity of local Odonata fauna mainly thanks to three families as Coenagrionidae (10 species), Aeshnidae (9), and Libellulidae (9). The most numerous species are Coenagrion johanssoni, C. hastulatum, Aeshna juncea, A. grandis, Cordulia aenea, Somatochlora metallica, S. vulgatum, S. flaveolum, S. danae. The species of Calopteryx splendens, A. serrata, A. mixta, A. isosceles, Ophiogomphus cecilia are extremely rare or single-met. Sympecma fusca has been found for the first time on the territory of the Komi Republic. More than a half of the habitat types are associated with the water bodies located in the floodplain lakes. The structure of the Odonata population in three lakes is described. The shore habitats temporarily or permanently inhabit 28 species, 22 of which have larval development stages in these water-bodies. The Odonata population in the lakes has a characteristic structure of numerical species domination that has developed here for many years. The perennial changes are possible due to the natural dynamics in species abundance but they are cyclical and generally do not affect its stability. By the general species diversity indicators, the population of dragonflies in the floodplain lakes is formed of stable, mature communities. The species composition similarity is more than 90 % due to location of the reservoirs within one local fauna and to the similar habitation conditions." (Authors)Address: Tatarinov, A.G., Institute of Biology of Komi Scientific Centre of the Ural Branch of the Russian Academy of Sciences, Syktyvkar

24347. Torres-Cambas, Y.; Ferreira, S.; Cordero-Rivera, A.; Lorenzo-Carballa, M.O. (2019): Mechanisms of allopatric speciation in an Antillean damselfly genus (Odonata, Zygoptera): vicariance or long-distance dispersal? Molecular Phylogenetics and Evolution 37: 14-21. (in English) ["Highlights: • Hypolestes comprises four geographically and genetically isolated lineages. • These lineages diverged during Late Miocene and Pleistocene. • Lineages divergence can be better explained by a long-distance dispersal mechanism. • The Cuban lineages of H. trinitatis constitute different molecular taxonomic units (MOTU). Abstract: We have examined divergence times of the Antillean damselfly genus Hypolestes, to elucidate which mechanism of allopatric speciation, vicariance or long-distance dispersal, could better explain the currently observed disjunct distributions of this genus. Samples of the three extant species of the genus, Hypolestes clara (Jamaica), H. hatuey (Hispaniola) and H. trinitatis (Cuba), were collected. Mitochondrial and nuclear DNA gene fragments were amplified to reconstruct phylogenetic relationships and estimate divergence times in this genus. Hypolestes comprises currently three species, which consist in four geographically and genetically isolated lineages located in Jamaica, Hispaniola, Eastern Cuba and Central Cuba. Results of our analyses suggest that the

three species diverged between ~ 5.91 and 1.69 mya, and that the separation between the lineages from Central Cuba and Eastern Cuba occurred between ~ 2.0 and 0.62 mya. Disjunct distributions in the genus Hypolestes can be better explained by a long-distance dispersal mechanism, since the divergence times of the three species do not coincide with the timeline formation of the geographic barriers between Cuba, Hispaniola and Jamaica. The Cuban lineages of H. trinitatis constitute different molecular operational taxonomic units (MOTU). The elevation of these MOTU to the species category requires the analysis of additional characters." (Authors)] Address: Torres-Cambas, Y., Depto Biol., Fac. de Ciencias Naturales y Exactas, Univ.de Oriente, Patricio Lumumba s/n, Santiago de Cuba, Cuba. E-mail: ytcambas@uo.edu.cu

24348. Trueman, J.W.H.; Rowe, R.J. (2019): Reply to Nel, Garrouste, Schubnel (2019) "The wing venation of Odonata. International Journal of Odonatology. International Journal of Odonatology 22(3-4): 167-172. (in English) ["We address six issues raised by Nel, Garrouste and Schubnel (2019) concerning the scheme of wing vein homology and nomenclature proposed by Trueman and Rowe (2019); showing in particular how evidence presented in a tomographical study of a dragonfly wing by Jacquelin et al. (2018) fits into this scheme." (Authors)] Address: Trueman, J.W.H., Research School of Biology, Australian National University, Canberra, Australia

2020

24349. Bellstedt, R. (2020): Herzliche Glückwünsche zum 85. Geburtstag an Dr. Wolfgang Zimmermann. Mitteilungen des Thüringer Entomologenverbandes 27(2): 233-234. (in German) [The members of the Thuringian Entomologists' Association congratulate Museum Councillor Dr. rer. nat. Wolfgang Zimmermann, Weimar, on his 85th birthday on November 9, 2020.] Address: Bellstedt, R., Brühl 2, 99867 Gotha, Germany. Email: ronald.bellsted@t-online.de

24350. Kittelberger, K.; Bockhahn, B. (2020): Novel behavioral observations from North Carolina of the poorly known Neurocordulia alabamensis (Alabama Shadowdragon). Argia 32(3): 24-25. (in English) [N. alabamensis is one of the most poorly known dragonfly species in eastern North America. On 8 June 2020, we observed three N. alabamensis along Bones Fork, the outflow creek below Lake Baggett in Richmond County, North Carolina.] Address: Email: Brian.Bockhahn@nparks.gov.

2021

24351. Adelmann, J.; von Blanckenhagen, B. (2021): Im Fokus: Kleine Moosjungfer (Leucorrhinia dubia) und Schwarze Heidelibelle (Sympetrum danae) - eine Analyse der Verbreitung zweier „klimasensibler Arten" in Hessen (Odonata: Libellulidae). Libellen in Hessen 14: 77-93. (in German) ["For the two "moorland species" (L. dubia) and the Black Darter (S. danae), the current distribution in Hesse is presented, and the status of the species in their distribution areas is discussed. Individual occurrences in northern Hesse, particularly in the Reinhardswald and Burgwald forests, can be considered secure in the medium term. In large parts of the state, the populations are either very small or already extinct. Many of the more recent observations are to be classified as isolated reports and are likely the result of dispersal flights." (Authors/Google translate)] Address: Adelmann, J., Potsdamer Str. 70, 64372 Ober-Ramstadt, Germany. Email: jadelmann@web.de

2022

24352. Ait Taleb, L.; Houhamdi, M.; Sadoudi, D.A.A. (2022): Biodiversité odonatologique de la région de Kabylie avec une approche comparative entre écosystème. Faculté des Sciences de la Nature et de la Vie. Conférences et Séminaires. Séminaire. 1er Séminaire National sur la Biodiversité de la Faune Et la Flore en Algérie. Communications Orales. Thème 01: Biodiversité Faune et Flore: (in French) [Verbatim: "The odonatological fauna of North Africa is well documented, particularly in the Maghreb regions (Algeria, Tunisia and Morocco), thanks to numerous studies. The global and regional assessments currently carried out by the IUCN on the conservation status of species call for up-to-date and comprehensive data, and because of the intensification of anthropic activities, habitat degradation and global warming, information on biodiversity must be integrated as a relevant factor in ecosystem management. Little is known about the odonatofauna of the north-central part of the country, and the Kabylia of the Djurdjura is one of them. Our study therefore consists in making an initial assessment of the odonatological diversity in the region. A study was therefore carried out over the period 2021-2022, covering an annual cycle in a total of 16 localities. Our investigations focused on two ecosystems: lotic and lentic. To characterize these odonate assemblages, composition and structure indices were calculated. To determine the dissimilarities between the two ecosystems, a Beta diversity was assessed using Sorensen "s index, and the affinities of species in the two ecosystems were evaluated using a hierarchical ascending classification. A total of 2078 specimens belonging to 37 species were inventoried, divided into two sub-orders, Anisoptera (24 species) and Zygoptera (13 species). The Libellulidae family is the most abundant (37%), followed by the Coenagrionidae (26%), Aeshnidae (18%), Gomphidae and Lestidae (8%) and Calopterygidae (3%) families. The lentic ecosystem has the highest number of species (31) compared with the lotic ecosystem (23). This study presents new data that may improve our knowledge of odonates in North Africa, and has enabled us to draw up an initial odonatological list for the region." (Authors) Translated with DeepL.com (free version)] Address: Ait Taleb, Lamia, Laboratoire PSEMRVC, Dépt de Biologie, Faculté des Sciences Biologiques et des Sciences Agronomiques, Université Mouloud Mammeri, Tizi-Ouzou, Algérie. Email: lamia.aittaleb@ummto.dz

24353. Bockhahn, B. (2022): First record for North Carolina of Rhionaeschna multicolor (Blue-eyed Darner). Argia 34(1):

23-24. (in English) [10 December 2020, Stones Creek Game Land, Onslow County, North Carolina, USA.] Address: not stated

24354. Falk, H. (2022): Tümpel für Amphibien, Libellen & Co. Schutzgemeinschaft Ammersee. Jahresbericht 2022: 43-46. (in German) [Bavaria, Germany. Ponds for amphibians, dragonflies & co. Calopteryx splendens, Platycnemis pennipes, Pyrrhosoma nymphula, Ischnura elegans, Libellula depressa, Sympetrum vulgatum, S. danae and Aeshna cyanea are listed] Address: https://www.schutzgemeinschaft-ammersee.de/wp/wp-content/uploads/2023/04/11_Tuempel-fuer-Amphibien-Lib ellen-Co.pdf

24355. Stoll, E.; Roopsind, A.; Maharaj, G.; Velazco, S.; Caughlin, T.T. (2022): Detecting gold mining impacts on insect biodiversity in a tropical mining frontier with SmallSat imagery. Remote Sensing in Ecology and Conservation 8(3): 379-390. (in English) ["Gold mining is a major driver of Amazonian forest loss and degradation. As mining activity encroaches on primary forest in remote and inaccessible areas, satellite imagery provides crucial data for monitoring mining-related deforestation. Highresolution imagery, in particular, has shown promise for detecting artisanal gold mining at the forest frontier. An important next step will be to establish relationships between satellite-derived land cover change and biodiversity impacts of gold mining. In this study, we set out to detect artisanal gold mining using highresolution imagery and relate mining land cover to insects, a taxonomic group that accounts for the majority of faunal biodiversity in tropical forests. We applied an object-based image analysis (OBIA) to classify mined areas in an Indigenous territory in Guyana, using PlanetScope imagery with ~3.7 m resolution. We complemented our OBIA with field surveys of insect family presence or absence in field plots (n = 105) that captured a wide range of mining disturbances. Our OBIA was able to identify mined objects with high accuracy (>90% balanced accuracy). Field plots with a higher proportion of OBIA-derived mine cover had significantly lower insect family richness. The effects of mine cover on individual insect taxa were highly variable. Insect groups that respond strongly to mining disturbance could potentially serve as bioindicators for monitoring ecosystem health during and after gold mining. With the advent of global partnerships that provide universal access to PlanetScope imagery for tropical forest monitoring, our approach represents a low-cost and rapid way to assess the biodiversity impacts of gold mining in remote landscapes. ... Rapid biodiversity assessments that pair field surveys with remotely sensed data can generate new hypotheses for future studies. For example, an unexpected finding from our work was that mosquitoes (Diptera: Culicidae) were negatively affected by mine cover. This result was somewhat surprising given that mining disturbance generates aquatic habitats needed for reproduction in mosquito species (Moreno et al., 2007). Conversely, several dragonfly families, including Libellulidae and Coenagrionidae, were among the taxonomic groups with the highest increase in the probability of occurrence with increased mine cover. One hypothesis for decreased mosquito occurrence in mined areas is that mining activity promotes habitat for mosquito predators, including odonate species which benefit from ponds created by mining, potentially enabling these species to control mosquito populations (Saha et al., 2012). An alternate hypothesis is that mosquito adults rely on vegetated microhabitats to rest during the day (Hutchings et al., 2011), and mining disturbance decreases the availability of these resting spots. Disentangling these hypotheses could inform malaria control efforts in human communities near gold mines." (Authors)] Address: Stoll, E., Dept Biol., Univ. of Guyana, Turkeyen Campus. Georgetown, Guyana. Email: ericstoll@rocketmail.com

24356. Van Eupen, C.; Maes, D.; Herremans, M.; Swinnen, K.R.R.; Somers, B.; Luca, S. (2022): Species profiles support recommendations for quality filtering of opportunistic citizen science data. Ecological Modelling Volume 467, May 2022, 109910: (in English) ["Highlights: •Taxonomy and relative species traits support data quality filtering recommendations. •Species profiles reveal relative importance of species traits. •Clearest recommendations for filters based on observer activity/validation status. •Improving species knowledge and record validation protocols increase data quality. •Filtering is not recommended when sample size decreases over 75 percent. Abstract: Opportunistic citizen science data are commonly filtered in an attempt to improve their applicability for relating species occurrences with environmental variables. Recommendations on when and how to filter, however, have remained relatively general and associations between species traits and filtering recommendations are sparse. We collected six traits (body size, detectability, classification error rate, familiarity, reporting probability and range size) of 52 birds, 25 butterflies and 14 dragonflies. Both absolute (values not rescaled) and relative traits (values rescaled per taxonomic group) were linked to filter effects, i.e. the impact on three different measures of species distribution model performance caused by applying three different quality filters, for different degrees of sample size reduction. First, we applied multiple regressions that predicted the filter effects by either absolute (including taxonomic group) or relative traits. Second, a principal component and clustering analysis were performed to define five species profiles based on species traits that were retained after a multiple regression model selection. The analysis of the profiles indicated the relative importance of species traits and revealed new insights into the association of species traits with changes in model performance after data quality filtering. Both taxonomic group (more than absolute traits) and relative species traits (mainly classification error rate, range size and familiarity) defined the impact of data quality filtering on model performance and we discourage the selection of a quality filtering strategy based on one single species trait. Results further confirmed the importance of considering the goal of the study (i.e. increasing model discrimination capacity, sensitivity or specificity) as well as the change in sample size caused by stringent filtering. The general species knowledge amongst citizen scientists (importance of observer experience), together with the mechanism of record verification in an opportunistic data platform (importance of verifiable metadata) have the largest potential for enhancing the quality of opportunistic records." (Authors)] Address: Van Eupen, Camille, Ghent University, Dept of Data Analysis and Mathematical

Modelling, Coupure Links 653, 9000 Ghent, Belgium. Email: camille.vaneupen@kuleuven.be

24357. Yablokov, E.O. (2022): Faunistic review of dragonfly (Insecta: Odonata), Poksha River Valley, Kostroma region. All-Russian competition for young environmental researchers "Discoveries 2030": 15 pp. (in Russian) [Conclusions: 1. The total list of dragonflies of the Poksha River valley amounted to 21 species. The main share in it is occupied by stenotopic species with a narrow topical range of occurrence, and Somatochlora metallica, Platycnemis pennipes and Sympetrum flaveolum can be considered the most widespread in the middle Poksha River valley. 2. The greatest species richness of the odonate fauna is found in the area of the Sledovo estate in the vicinity of the pond, where 16 species of dragonflies were recorded. The lowest number of species (n = 4) was recorded in the area of grassy meadow near Kondratovo, which is probably due to the greatest remoteness of this habitat from the nearest water body. 3. The closest (70%) biotopes in terms of odonate fauna composition are two river floodplain areas near the villages of Kondratovo and Semenovskoye. Between the other biotopes the measure of commonality in dragonflies does not exceed 40%, which is not a high indicator and indicates a heterogeneous, mosaic character of dragonfly distribution within the Poksha River valley. This conclusion is also confirmed by cluster analysis. 4. The present studies allowed to correct the distribution area of a rare and poorly studied species - Cordulegaster boltonii and recommend it for inclusion in the Red Data Book. The information on the new localization of the protected species - Libellula depressa, expands the idea of its distribution and abundance in the Kostroma region and replenishes the database for the Red Data Book monitoring." (Author/DeepL) The following species are listed: Cordulegaster boltonii, Aeshna grandis, A. cyanea, A. juncea, Cordulia aenea, Somatochlora metallica, Epitheca bimaculata, Onychogomphus forcipatus, Gomphus vulgatissimus, Libellula quadrimaculata, Coenagrion pulchellum, Erythromma najas, and Platycnemis pennipes] Address: https://uios.fedcdo.ru/wp-content/uploads/2022/01/-Yablokov_RABOTA_JuIOS_2021.pdf

2023

24358. Cachazo, L.M.; Makati, E.K.; Chadwick, M.A.; Catford, J.A.; Price, B.W.; Mackay, A.W.; Guiry, M.D.; Murray-Hudson, M.; Murray.Hudson, F. (2023): A review of the freshwater diversity in the Okavango Delta and Lake Ngami (Botswana): taxonomic composition, ecology, comparison with similar systems and conservation status. Aquatic Sciences (2023) 85:115: 19 pp. (in English) ["Freshwater organisms in the Okavango Delta and Lake Ngami (Botswana) provide direct and indirect benefits to people and the economy of the region. However, their existence could be potentially threatened by human activities (primarily, upstream water abstraction and planned hydropower structures) coupled with climate change. For their protection, it is essential to know their distribution, ecology, and status of the ecosystems that they inhabit. Publications that record taxa from the Delta at species level are scarce, particularly aquatic macroinvertebrates. Identifying organisms to species level can provide more accurate information for environmental monitoring and conservation programmes but requires significant training and expertise. Here, we present a comprehensive taxonomical review of 2204 freshwater species from the Okavango Delta and Lake Ngami, with additional 355 species found in other areas of Botswana that are likely to be present in the study region. We also compare the diversity of the Okavango Delta and Lake Ngami with two other tropical wetlands: the Pantanal (Brazil) and the Kakadu Region (Australia). We show that biodiversity in the Okavango Delta and Lake Ngami is higher than in previous estimates, with recorded species richness dominated by phytoplankton and macroinvertebrates. Most species are widespread across the system and southern Africa. The resulting database includes new records (Bryozoa, Porifera), information on species conservation status, habitat, ecology, distribution in continental Africa, site details and taxonomical notes. This will be an essential resource for researchers, conservation managers, policy makers and consultants investigating freshwater biodiversity in tropical wetlands in the region." (Authors) The study includes references to Odonata.] Address: Moliner Cachazo, L., Dep Geography, King's College London, Bush House, North East Wing, 40 Aldwych, London WC2B 4BG, UK. Email: luis.moliner_cachazo@kcl.ac.uk

24359. Ferraille, T.; Kerbiriou, C.; Bigard, C.; Claireau, F.; Thompson, J.D. (2023): Integrating biodiversity assessments into local conservation planning: the importance of assessing suitable data sources. Peer Community Journal, 3: e98: 21 pp. (in English) ["Strategic Environmental Assessment (SEA) of land-use planning is a fundamental tool to minimize environmental impacts of artificialization. In this context, Systematic Conservation Planning (SCP) tools based on Species Distribution Models (SDM) are frequently used for the elaboration of spatially exhaustive biodiversity diagnostics. Despite the paradigm of "garbage in - garbage out" that emphasises the importance of testing the suitability of data for SDM and priority conservation areas, the assessment of database sources remains relatively rare. In addition, the lack of practical recommendations for the use of open-access databases by SEA stakeholders remains a problem. The aim of this study is to explore the quality of data sources that can be used in SEA to assess priority conservation areas in SEA. The study used data for nine taxonomic groups (commonly used in inventories for environmental impact assessment [including Odonata]) and three databases available to SEA stakeholders. Three local administrative entities in very different socio-ecological contexts were used to examine three main issues: (i) the suitability of local versus regional or country databases for assessing conservation priorities, (ii) differences among taxonomic groups or territories in terms of the suitability of databases, (iii) the importance of the quality of databases for the application of SDM to assess priority conservation areas. Our study provides several clear messages for potential users of open-access databases. First, the need for prudence in the interpretation of biodiversity maps. Second, the collection of individual databases at the country scale is necessary to complete local data and ensure the suitability of SDM in a local context. Third, a data driven approach can lead to the use of

notably different species communities to identify priority conservation areas when compared to the community in the original database. Finally, we propose a workflow to guide SEA stakeholders through the process of data rationalization and use in conservation planning." (Authors)] Address: Ferraille, T., CEFE, Université de Montpellier, CNRS, EPHE, IRD, Montpellier, France. Email: thibaut.ferraille@gmail.com

24360. Garrison, M.; Tennessen, K.J. (2023): Nymph Cove: Identification to genus: Cordulegastridae and Macromiidae. Argia 35(4): 26-29. (in English) [Advice is given (a) to identify the two genera of Cordulegastridae (Cordulegaster and Zoraena) in North America (n = 10 species) and (b) the two genera of Macromidae with nine species (Didymops and Macromia).] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

2024

24361. Adak, R.; Mandal, A.; Saha, S. (2024): Direct numerical simulations of Dragonfly-inspired tandem wing configuration at low Reynolds number. APS March Meeting 2024, Monday–Friday, March 4–8, 2024; Minneapolis & Virtual, Session RR03: V: DFD II, 11:30 AM–1:30 PM, Friday, March 8, 2024. Room: Virtual Room 03: (in English) [Verbatim: Dragonflies are naturally optimized fliers operating at low Reynolds number (Re) of O (102-4) and are comparable in size, making them a potent candidate for the design of micro air vehicles. We conducted the direct numerical simulations (DNS) of the tandem corrugated wing adapted from the dragonfly wing at chord Re of 104 and up to 5? angle of attack (AOA). The 6th-order compact finite difference code is used for computations. Initially, Reynolds-averaged Navier Stokes simulations are performed to obtain near-boundary conditions for DNS. This methodology allows the reduction of the computational domain for DNS without compromising the output. Different tandem configurations with an offset gap of up to 0.2 chord length demonstrate that reducing the horizontal gap and positioning the hindwing below the forewing enhances the aerodynamic performance. Generally, the forewing lift increases and its drag decreases relative to its single isolated wing, while it is reversed for the hindwing. However, in a scenario with zero vertical offset and a horizontal gap of 0.1 chord at 3? AOA, the drag reduction is noted in each of the wings. Thus, the tandem configuration is able to reduce drag during the gliding mode of flight, in addition to excellent maneuverability known from the literature.] Address: Adak, R., Dept of Aerospace Engineering, IIT Kharagpur, Kharagpur-721302, India

24362. Akpan, A.U; Ukpan, O.M; Ehisianya, C.N; Esenowo, I.K. (2024): Community structure of Jaja Creek and downstream sections of Imo River in Uta Ewa village, Akwa Ibom State, Nigeria. J. Appl. Sci. Environ. Manage. 28(3): 889-899. (in English) [Arthropods are considered the most successful animals on earth. They are an essential part of the aquatic food chain and efficient bioindicators depicting the biotic community structure and water quality. This study aimed to generate baseline data on the arthropod community structure of Jaja Creek and downstream sections of Imo River in Uta Ewa village, Ikot-Abasi Local Government Area, Akwa-Ibom State, Nigeria. A variety of sampling techniques, including the scoop net method at low tides in the littoral zone, square lift net anchored on a paddling boat, sweep net, and locally made crab traps were adopted for the sampling of the arthropods. Fourty-six arthropod species were identified and classified into three classes: Arachnida, Crustaceans, and Insecta, with nine orders and 26 families…" (Author) Brachythemis sp., Aciagrion sp. Pseudagrion sp. and Elattoneura sp. are listed.] Address: Akpan, A.U., Dept of Animal & Environmental Biology, Fac. Biol. Sciences, Univ. of Uyo, Uyo. Akwa Ibom State. Nigeria. Email: akpanau13001f@gmail.com

24363. Arnold, A.; Held, M. (2024): Libellen (Odonata) im NSG „Luppeaue“ südlich Schkeuditz: ein Vergleich des Artenspektrums der Zeiträume 1985 bis 1993 und 2010 bis 2024. Mitteilungen Sächsischer Entomologen 44 (Nr. 151): (in German) ["Decades after the first author recorded the species spectrum in the period 1985 to 1993, these data are compared with more recent results in the period 2010 to 2024 in the study area (UG). Changes in the species spectrum and suspected causes are discussed. However, the second observation period was almost twice as long and two observers were involved. It is advantageous for a comparison that the recordings in both periods were not only mostly carried out by the same observer, but he also published an overview of the dragonflies he recorded in the former Leipzig administrative district up to 1996 (ARNOLD 2000), which can be used for comparison. Of the total of 45 (up to 46) species recorded in the UG, fourteen species were new in the second study period and six of the species observed in the first period could no longer be found in the later observation period. 45 species, which are 77.6 percent of the dragonfly species identified in the Leipzig Regional Park up to 1996 according to ARNOLD (2000) and 66.2 percent of the 68 species native to Saxony according to the Red List." (Author/Google translate)] Address: Arnold, A., Zur schönen Aussicht 25, 04435 Schkeuditz, Germany

24364. Austen, P.; Jarzembowski, E. (2024): Field meeting report: ‘Smokejacks’ brickworks – 2024. Hastings & District Geological Society Journal, Vol. 30, December 2024: 43-47. (in English) ["On the Hastings/Horsham visit the freshly scraped North-West face (Fig. 4) yielded a good selection of insect-bearing concretions. Simon Penn found a number of ex situ insects, the dragonfly Angloaeschnidium extending the range of a species previously described from the former Rudgwick brickworks (Fleck and Nel 2003, p.83, figs 93.95), the elcanid (Orthoptera) Panorpidium cf. bimaculatum (Fig. 6) with paired eyespots on the forewings (see Jarzembowski 2011, p.151, text-fig. 13.11C)); figure 7 gives a reconstruction of its Asian relative, Panorpidium spica (Kim et al. 2021). Simon also found a pair of cockroach hindwings (Blattodea) (Fig. 8). Whilst on the North-West face, Joyce Austen found an ex situ wing base of the dragonfly Cooperaeschnidium (Fig. 9). Approximately 15 metres above the base of the quarry on the North-West face, Simon Penn found a partial dragonfly wing in an ex situ block of siltstone showing dark pigmentation along much of its entire length

apart from the distal-most portion of the wing and near the middle (Fig. 10). EJ confirmed that it was aeschnidiid; in life the dark colouration playing a possible role in warming up, recognition and even protection (Jouault et al. 2022) - further investigation is needed." (Authors)] Address: Jarzembowski, E., Dept of Earth Sciences, The Natural History Museum, Cromwell Road, London SW7 5BD, UK. Email: jarzembowski2@live.co.uk

24365. Bakare, A.B.; Adu, B.W.; Ehikhamele, E.I. (2024): Effects of anthropogenic disturbances on adult Odonata fauna in Akure, south west Nigeria. The Journal of Basic and Applied Zoology 85, 56: 8 pp. (in English) ["Background: Human activities such as deforestation, urbanization, industrialization, canalization, and water abstraction, negatively affect biodiversity. This study was carried out to determine the effect of anthropogenic activities on the composition, distribution, and abundance of Odonata of Akure South Local Government Area. Results: A total of 2376 Odonata individuals (1363 dragonflies and 1013 damselflies) in 6 families (Libellulidae, Coenagrionidae, Calopterygidae, Platycnemididae, Chlorocyphidae) and Gomphidae, 19 genera and 36 species were recorded in this study. Pseudagrion 'A' kersteni (651) is the most frequent species followed closely by Trithemis arteriosa, they were found in all the sites, therefore are generalists. Eight species including Lestinogomphus minutus, Pantala flavescens, Copera sikassoensis, etc., are least represented in the study, they were made up of one individual each. Leo study site has the richest odonate fauna (Simpson dominance: 0.8497, Shannon–Wiener H_: 2.234 and Margalef: 3.021); while, the least was Oda (Simpson dominance: 0.7899 and Shannon Wiener H_: 1.932). The distribution of the species was highest at Oda (evenness E: 0.4931), followed closely by Leo (evenness E: 0.4916); while, Ijapo (evenness E: 0.3852) is the least. Conclusion: The few stenotopic species and, proliferation of eurytopic species in the study sites proved that the sites are undergoing intense anthropogenic disturbance and conservation efforts must therefore be put in place to prevent the extinction of these species and their restoration in sites they were absent." (Authors)] Address: Bakare, A.B., Department of Biology, Federal University of Technology, Akure, Nigeria. Email: bakareayo4success@gmail.com

24366. Baltus, H.; Vandaudenard, T.; Opdekamp, K. (2024): Réserves naturelles Natagora: Gestion des données biologiques – Faits marquants 2023. Natagora, Rapport du Département Conservation: 48 pp. (in French, with Dutch and Germany summaries) [Belgium; in 2023, twelve Odonata species have been observed: Aeshna isoceles, Brachytron pratense, Coenagrion mercuriale, Gomphus vulgatissimus, Lestes barbarus, L. dryas, L. virens, Libellula fulva, Orthetrum coerulescens, Sympecma fusca, Sympetrum meridionale, S. vulgatum.] Address: NATAGORA, Département Conservation Traverse des Muses 1, 5000 Namur, Belgium

24367. Behnke, R. (2024): Verbesserung und Schutz von Kalktuffquellen in OWL. Natur in NRW 4/2024: 11-17. (in German) ["From 2018 to 2024, the Hochstift Regional Forestry Office (State Forest and Timber Authority of North Rhine-Westphalia, Germany) implemented the Tuff-LIFE project, funded by the EU Commission and the State of North Rhine-Westphalia, in five FFH areas in the districts of Höxter and Paderborn. The aim was to improve tufa springs (7220*) and the adjacent stream headwaters, to improve and restore permeability and structural diversity, and to improve connectivity with the two streamside forest habitats 91E0* and 9180*. In addition, the spring habitat was to be specifically upgraded and improved, with a particular focus on the two indicator species, the fire salamander and Thecagaster bidentata. The successful implementation of the measures is of great relevance, not least due to the occurrence of Bsal for the fire salamander, which is on the early warning list. This article presents the project components, the preparatory work, and the implemented measures. Extensive public relations activities also played a major role, as did the professional exchange between all project participants." (Author/Google translate)] Address: Behnke, R.: robert.behnke@gmx.net

24368. Chovanec, A. (2024): Notizen zum Verhalten immaturer Imagines der Südlichen Mosaikjungfer (Aeshna affinis Vander Linden, 1820) (Odonata: Aeshnidae). Mercuriale 24: 91-111. (in German, with English summary) ["Notes on the behaviour of immature imagines of Aeshna. - From 30-v-2024 until 19-vi-2024, immature males and females of A. affinis were recorded at different locations in the district of Mödling in the east of Austria. Most of the observation areas were situated in a settlement area with extensive green areas in a small town called Maria Enzersdorf. On several occasions, groups consisting of 10-50 individuals were hunting, in other cases smaller groups and single individuals could be detected. Hunting areas within the maturation habitat were characterised by a clearly structured topography: Horizontal sunny meadows, open to the south and/or east, providing prey were limited by vertical features, such as trees or house walls on the side facing away from the sun, which favoured thermal conditions. Groups of higher trees and groves situated near the hunting areas are assumed to be an essential component of the maturation habitat. Size and structuring of the sites seemed to be responsible for behavioural patterns, for example concerning maximum flying altitudes and the size of groups. Flying and hunting was performed exclusively at sunny spots and started early in the morning and lasts until the early evening. In the case of beginning shading due to cloud cover, individuals immediately perched in the trees with the body axis directed to the sun. Another example of behavioural thermoregulation was observed when hunting took place above asphalted ways and streets and, thus, the individuals used warmer air when overall air temperatures were not so high. Aeshna affinis showed a drop in flight activity in the early afternoon in the case of high temperatures. In individual cases, territorial behaviour was registered." (Author)] Address: Chovanec, A., Krotenbachgasse 68, 2345 Brunn am Gebirge, Austria. Email: andreas.chovanec@gmail.com

24369. Chovanec, A. (2024): Fehlkopplung und versuchte Kopplung zwischen Sympecma fusca und Pyrrhosoma nymphula (Odonata: Lestidae, Coenagrionidae). Mercuriale 24: 113-121. (in German, with English summary) ["Erroneous

connection and connection attempt between Sympecma fusca and Pyrrhosoma nymphula (Odonata: Lestidae, Coenagrionidae). - On 9-v-2024, a male S. fusca was observed when unsuccessfully trying to connect with a male P. nymphula, which was engaged in a tandem with a homospecific female. Three days later, on 12-v-2024, a linkage between a male P. nymphula and a female S. fusca was detected. The female refused the male's "invitation" to close the pairing wheel. In both cases, a very low number of conspecific females may have driven the behaviour of the males." (Author)] Address: Chovanec, A., Krotenbachgasse 68, 2345 Brunn am Gebirge, Austria. Email: andreas.chovanec@gmail.com

24370. Delsinne, T. (2024): Inventaire des Odonates de l'Espace Naturel Sensible du Lac de Servières (63). Prospections 2023-2024. Rapport de la Société d'Histoire Naturelle Alcide-d'Orbigny pour le Syndicat Mixte du Parc Naturel Régional des Volcans d'Auvergne.: 41 pp + annexes. (in French) ["An inventory of odonates on the Lac de Servières ENS was carried out by the SHNAO in 2023 and 2024 (4 survey days per year). A total of 30 species were documented, to which 3 additional taxa were added by consulting naturalist databases. As a result, 33 odonates were found at least once within the perimeter of the Lac de Servières ENS. The most valuable species observed are: Lestes dryas, L. sponsa, Aeshna juncea, Sympetrum danae and S. flaveolum. These species depend on the peat bogs on the south shore of the lake (A. juncea, S. danae and, more marginally, L. sponsa and S. flaveolum), but also on the rushes in the wetlands to the east of the ENS (L. dryas, L. sponsa, S. flaveolum). While the site's species richness appears to be good, abundances are often low, with the exception of Enallagma cyathigerum and Cordulia aenea. It is possible that the lake's current piscicultural management, which favors the presence of salmonid predators of aquatic insect larvae, at least partly explains this result." (Author/DeepL.com)] Address: https://www.researchgate.net/profile/Thibaut-Delsinne/publication/390052268_Inventaire_des_Odonates_de_l'Esp ace_Naturel_Sensible_du_Lac_de_Servieres_63/links/67dd328a35f7044c924e15aa/Inventaire-des-Odonates-de-l Espace-Naturel-Sensible-du-Lac-de-Servieres-63.pdf

24371. Djamai, C.; Memeche, F.; Chettibi, A.; Memeche, H. (2024): Pollution monitoring for aquaic ecosystem integrity usig biotic indices based on macroinvertebrates: Case study, Tonga Lake, North-east Algeria. Geo-Eco-Marina 30/2024: 10 p. (in English) ["The aim of this study was to estimate the diversity of aquatic macroinvertebrates and evaluate the water quality of Tonga Lake (Algeria). Tonga is about 2,700 ha with an average depth of 1.20 m. It is communicating with the Mediterranean Sea through an artificial channel called Messida. The collection of aquatic macroinvertebrates from the seven stations was carried out in the coastal area from March 2017 to February 2018. For this purpose, we used both physicochemical variables and three biotic indices: 1) the FBI (Family Biotic Index); 2) the BMWP (Biological Monitoring Working Party); and 3) the ASPT (Average Score Per Taxon). The indices were calculated using fauna collected from seven stations along the littoral of Tonga Lake. The fauna recorded in this work is composed of seven orders; the most dominant orders were Heteroptera (24.87%), Diptera (21.41%), followed by Coleoptera (19.39%), Ephemeroptera (17.20%), Basommatophora (13.56%), Odonata (3.46%), and Acari (0.12%). The results also revealed that the BMWP index value classified Tonga Lake as having medium biological quality, while the FBI and ASPT indices classified it as having poor biological water quality." (Authors) Taxa are treated at family level.] Address: Memeche, F., Fa. of Sciences, Dept Agricultural Sciences, University of M'Sila, PO Box166, Ichebilia, 28000, M'Sila, Algeria. Email: fateh.mimeche@univ-msila.dz

24372. Ellers, O.; Gordon, C.M.; Hukill, M.T.; Kukaj, A.; Cannell, A.; Nel, A. (2024): Induced power scaling alone cannot explain griffenfly gigantism. Integrative and Comparative Biology 64(2): 598-610. (in English) ["Paleozoic skies were ruled by extinct odonatopteran insects called 'griffenflies', some with wingspans three times that of the largest extant dragonflies and ten times that of common extant dragonflies. Previous studies suggested that flight was possible for larger fliers because of higher atmospheric oxygen levels that would have increased air density. We use actuator disk theory to evaluate this hypothesis. Actuator disk theory gives similar estimates of induced power as has been estimated for micro-air vehicles based on insect flight. We calculate that for a given mass of griffenfly, and assuming isometry, a higher density atmosphere would only have reduced the induced power required to hover by 11%, which would have supported a flyer 3% larger in linear dimensions. Steady level forward flight would have further reduced induced power but could only account for a flier 5% larger in linear dimensions. Further accounting for the higher power available due to high oxygen air, and assuming isometry, we calculate that the largest flyer hovering would have been only 1.19 times longer than extant dragonflies. We also consider known allometry in dragonflies and estimated allometry in extinct griffenflies. But such allometry only increases flyer size to 1.22 times longer while hovering. We also consider profile and parasite power, but both would have been higher in denser air and thus would not have enhanced the flyability of larger griffenflies. The largest meganeurid griffenflies might have adjusted flight behaviors to reduce power required. Alternatively, the scaling of flight muscle power may have been sufficient to support the power demands of large griffenflies. In literature estimates, mass-specific power output scales as mass0.24 in extant dragonflies. We need only more conservatively assume that mass-specific muscle power scales with mass0, when combined with higher oxygen concentrations and induced power reductions in higher density air to explain griffenflies 3.4 times larger than extant odonates. Experimental measurement of flight muscle power scaling in odonates is necessary to test this hypothesis." (Authors)] Address: Ellers, O., Dept of Biology, Bowdoin College, Brunswick, ME, 04011, USA. E-mail: oellers@bowdoin.edu

24373. Fan, G.; Nel, A.; Zhang, L.; Xiao, C.; Zheng, D. (2024): The oldest-known Cymatophlebiinae (Odonata: Aeshnoptera: Cymatophlebiidae) from the Upper Jurassic of Inner Mongolia, northeastern China. Historical Biology 37(2): 234-

239. (in English) ["The dragonfly Aeshnoptera greatly diversified with a wide distribution during the Mesozoic. The genus Cymatophlebia is one of the most diversified aeshnopteran dragonflies, which survived during the Middle Jurassic and Early Cretaceous. In the present study, Cymatophlebia daohugouensis sp. nov. the oldest-known representative of this genus is described from the Middle Jurassic (upper Callovian) Haifanggou Formation of northeastern China. It differs from the other species of Cymatophlebia in having three rows of cells in the postdiscoidal area before the midfork, four-celled discoidal and subdiscoidal triangles, and two rows of cells between Rspl and IR2 basally. This study provides new clues for exploring the early origination and evolution of the cymatophlebiid dragonflies in Laurasia." (Authors)] Address: Xiao, C., School of GeoSciences, Yangtze University, Wuhan, China. Email: ctxiao@yangtzeu.edu.cn

24374. Farhadian, O.; Bagheri, J.; Soofiani, N.M.; Heidari, S.; ebrahimi, E. (2024): Determining nutritional indices of Dori bleak (Alburnus doriae) and Brond Snout (Chondrostoma regium) in Zayandehroud River. Aquatic Animals Nutrition 10(3), 29: 49-64. (in Persian, with English summary) ["In this study, nutritional indices of A. doriae and C. regium were investigated by collecting 200 samples of each species (male, female, juvenile) seasonally from the Zayndehroud river located in Chaharmahal and Bakhtiari province. The results showed that the Vacuity index was 11.5% and 24% in A. doriae and C. regium, respectively, and this index have a significant difference during the year. The highest amount for both species was in autumn and the lowest amount was for A. doriae in winter and C. regium in summer. The calculated average Relative length of the gut for A. doriae and C. regium was 0.73 and 1.36, respectively, which was not significantly different in different age groups. According to the results of the selection index, A. doriae, in order of preference, has a greater tendency to feed on the orders of Odonata (0.94), Plecoptera (0.77), Coleoptera (0.74), Hemiptera (0.42), Arachnida (0.15) and Hirudinea (0.02) and C. regium have a greater tendency to feed from Plecoptera (0.73), Odonata (0.49), Ephemeroptera (0.49) and Hirudinea (0.37). In general, the findings of this research showed that A. doriae could be considered as a carnivorous species and C. regium as an omnivorous species in the food chain of Zayandehroud River." (Authors)] Address: Farhadian, O., Dept Natural Resources Isfahan Univ. of Technology, Isfahan 84156-83111, Iran

24375. Fiebrich, M.; Medinger, V.; Schiel, F.-J. (2024): Erste Reproduktionsnachweise der Östlichen Moosjungfer (Leucorrhinia albifrons) in Baden-Württemberg (Odonata: Libellulidae). Mercuriale 24: 31-38. (in German, with English summary) ["First records of reproduction of Leucorrhinia albifrons in the German federal state 1,1 Baden-Württemberg (Odonata: Libellulidae). –L. albifrons is listed 1. (extinct (RL 0) in the Red List of Baden-Württemberg. In recent years there have been several observations of this species in different areas in Baden-Württemberg. On 28-V-2024 and 6-vi-2024, reproduction was confirmed at a gravel pit lake in Dettenheim (Upper Rhine valley north of the city of Karlsruhe) with two exuviae. In the protected area Ehinger Ried in the Hegau (district of Konstanz) one freshly emerged female L. albifrons was observed on 18-vi-2024. These are the first records of successful reproduction of this species in southwestern Germany." (Authors)] Address: Schiel, F.-J., Inst. Naturschutz & Landschaftsanalyse, Turenenweg 9, 77880 Sasbach, Germany. Email: Franz-Josef.Schiel@INULA.de

24376. Fiebrich, M.; Medinger, V. (2024): Libellenbeobachtungen im NSG Wollmatinger Ried im Jahr 2024. Mercuriale 24: 123-130. (in German, with English summary) ["Dragonfly observations in the nature reserve “Wollmatinger Ried” in 2024. - Because of sustained high water levels at Lake Constance in 2024 large parts of the wet meadows in the nature reserve “Wollmatinger Ried” on the northwestern shore of Lake Constance (district of Konstanz) were flooded during the summer months. These temporary waters are an important habitat for dragonflies. Dragonfly surveys were carried out on several days, and 30 Odonata species were recorded. We discuss records of the following species, which are specialities in Germany or in our study area “Wollmatinger Ried”: Anax ephippiger, Lestes virens, L. barbarus and Orthetrum albistylum. The last records of L. virens at this site are from 2005, those of 0. albistylum from 1992." (Authors)] Address: Fiebrich, M., Liggeringerstr.15, D-78315 Radolfzell, Germany. Email: fiebrich@posteo.de

24377. Fukaya, W. (2024): An abnormally blackened individual of Orthetrum albistylum (Selys,1848) with whitish wax appearing after soaking in acetone Watarn. Tombo 67(1): 98-99. (in Japanese, with English summary) [" I collected an abnormally blackened individual of a O. albistylum in Tochigi Prefecture, Japan. The mature male or 0. albistylum is normally covered with whitish wax on the abdomen, but this individual was black. After soaking this individual in acetone for 10 minutes, the whitish wax on the abdomen appeared. Therefore, it is suggested that the abdomen of this individual may have been blackened by a substance soluble in acetone." (Author)] Address: Email: aeshna2074@gmail.com

24378. Futahashi, R. (2024): A female of Sympetrum frequens (Selys, 1883) with a rotated dorsoventral axis of the abdomen. Tombo 67(1): 100-102. (in Japanese, with English summary) ["A female of S. frequens with a rotated dorsoventral axis of the abdomen was recorded. This individual exhibited abnormalities in the dorsal connection of the left ana right abdominal segments 4 to 6. In the dorsoventral inverted region, red coloration due to pigment reduction and secretion of UV-reflecting waxes composed of very long-chain aldehydes upon maturation were suppressed." (Author)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

24379. Hamilton, V.; Stepenuck, K.F.; Zinna, R.A.; Traylor, A.M.; Penrose, D.; Sigler, W.A. (2024): Volunteer accuracy in a benthic macroinvertebrate participatory science project. Citizen Science: Theory and Practice 9(1): 27. DOI: https://doi.org/10.5334/cstp.756: 14 pp. (in English) ["Concerns about the accuracy of volunteer-derived aquatic macroinvertebrate

identifications and the resulting influence on calculated water quality metrics can limit use of volunteer-generated data in freshwater-focused participatory science programs. To address these concerns, we assessed 357 benthic macroinvertebrate quality control (QC) samples collected by volunteers using leaf packs, kick nets, and visual assessments between 2011 and 2016 for the Environmental Quality Institute (EQI) in North Carolina, USA. We reviewed each sample for quality, and compared macroinvertebrate identifications and water quality metric scores determined by volunteers to identification and metrics determined by an entomologist. About 80% of the QC samples were identified to be of high quality, indicating proper preparation, preservation, and labeling of samples. The majority of samples that received low quality ratings were improperly or poorly preserved. We recommend use of 95% (rather than 70%) ethanol for macroinvertebrate preservation, and increased communication to volunteers during QC sampling periods to enhance their success in properly preserving samples. We observed significant ($p < 0.005$) linear relationships between volunteer and entomologist-derived water quality metrics including a biotic index, Taxa Richness, and percent intolerant Ephemeroptera, Plecoptera and Trichoptera (EPT) taxa. However, visual assessments – those in which no sampling equipment was used to collect aquatic macroinvertebrates – reduced the goodness of fit between volunteer and entomologist-derived biotic index scores and artificially increased the goodness of fit between volunteer and entomologist derived Taxa Richness and percent EPT scores. We recommend calculating water quality metrics based only on leaf pack and kick net samples collected by volunteers." (Authors) The study includes data on Odonata.] Address: Hamilton, Virginia, Montana State University, Bozeman, Montana, USA

24380. Herrmann, A.; Riexinger, W.D. (2024): Die Libellenfauna des Altneckars zwischen Neckarsulm und Bad Wimpfen. Mercuriale 24: 57-69. (in German, with English summary) ["The dragonfly fauna of the Altneckar between Neckarsulm and Bad Wimpfen (State Baden-Württemberg, Southern Germany - In the summer of 2023, the dragonfly along the river Altneckar between Neckarsulm and Bad Wimpfen was recorded on five sections between the dam in Neckarsulm and the footbridge between Bad Friedrichshall-Kochendorf and Untereissesheim. 19 species were recorded in total. The potential occurrence of nine additional dragonfly species that inhabit comparable habitats in the surrounding area, and which may appear at the Altneckar between Neckarsulm and Bad Wimpfen in the future, is discussed. Through sampling of suitable larval habitats was found that larvae could not be confirmed for most species. The importance of the habitat for dragonflies is discussed." (Authors)] Address: Herrmann, A., Modus Consult Cericke GmbH & Co. KG Pforzheimer Str. 15B, 76227 Karlsruhe, Germany. Email: a.herrmann@modusconsult.net

24381. Hirakawa, Y.; Sugimura, M.; Futahashi, R. (2024): A record of Rhyothemis variegata (Linnaeus,1763) with blackened wings. Tombo 67(1): 90-92. (in Japanese, with English summary) ["We report on an individual with significantly darkened wings of R. variegata. The wing markings are similar to those of R. regia, but the nuclear DNA sequence and the morphology of the head, male secondary genitalia and caudal appendages are consistent with those of R. variegata." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science & Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

24382. Hunger, H. (2024): Die Bestandssituation des Östlichen Blaupfeils (Orthetrum albistylum) in Baden-Württemberg (Odonata: Libellulidae). Mercuriale 24: 9-21. (in German, with English summary) ["The population of Orthetrum albistylum m Baden-Württemberg. - O. albistylum was not assessed in the current Red List of Baden-Württemberg (Hunger & Schiel 2006) due to insufficient data. In the subsequent 19 years, an area around Freiburg has emerged as a stable regional distribution centre, loosely connected to a distribution centre in Alsace south of Mulhouse. In other parts of Baden-Württemberg, there have only been isolated sightings to date. Long-term stable populations are still only found in a few waterbodies. New colonisations in recent years show intensive metapopulation processes within the distribution centre around Freiburg. However, a permanent, climate-change-driven range expansion in Baden-Württemberg is not yet recognisable. In particular, a range expansion to the north within the Upper Rhine Plain is to be expected, but has not yet occurred on the Baden-Württemberg side." (Author)] Address: Hunger, H., INULA - Institut für Naturschutz & Landschaftsanalyse Basler Landstr. 49e, 79111 Freiburg i. Br., Germany. Email: holger.hunger@inula.de

24383. Jarzembowski, E.; Austen, P. (2024): Field meeting report: Wealden 'Smokejacks' brickworks - Digging in the rain. Led by Pete Austen & Ed Jarzembowski. Magazine of the Geologists' Association 23(3): 18-19. (in English) ["Pete Austen's display included ... dragonfly wings of Angloaeschnidium and Cooperaeschnidium in trimmed concretions, the first extending the range of a species previously described from the former Rudgwick brickworks." (Authors)] Address: Jarzembowski, E., Dept Earth Sciences, Natural History Museum, Cromwell Rd, London SW7 5BD, UK. Email: jarzembowski2@live.co.uk

24384. Kaga, R.; Karube, H. (2024): First record of a Diplacodes trivialis (Rambur, 1842) from Tsushima Island, Nagasaki Prefecture. Tombo 67(1): 58-60. (in Japanese, with English summary) ["D. trivialis was first recorded from Tsushima Island located in the northwestern part of Kyushu. This paper discusses the origin of this specimen as follows.1) arrival from the Southwest Islands, 2) migration associated with horticultural aquatic plants from Southeast Asia, and 3) anthropogenic migration. Of these, we believe that case of 2) is the most likely. As global warming progresses, the risk of transfers and temporary occurrences associated with horticultural aquatic plants of southern species may increase." (Authors)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

24385. Karube, H.; Sano, S.; Kaga, R.; Ozono, A. (2024): Ceriagrion auranticum ryukyuanum Asahma, 1970 collected from Tsushima Island. Tombo 67(1): 54-57. (in Japanese,

with English summary) ["C. auranticum ryukyuanum was recorded for the first time from Tsushima island. We were able to identify this species at two localities in the northern part of Tsushima. This species has recently moved northward in distribution, and most northern distribution is now into central Kyushu. The present record shows great deviation from the known distribution range, and its origin can be attributed to:(1) originally distributed but not discovered, (2) spread from populations on the Korean Peninsula, (3) spread from populations in Kyushu, and (4) accompanying transfers associated with aquatic plant migrations. We believe that case (4) is a strong possibility, but would like to further investigate this possibility through genetic verification." (Authors)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

24386. Kitayama, T.; Kozen, M.; Umeda, T.; Sugimura, M.; Futahashi, R. (2024): Interspecific hybrids between Rhyothemis regia (Brauer, 1867) and Rhyothemis variegata (Linnaeus, 1763). Tombo 67(1): 81-89. (in Japanese, with English summary) ["We collected five males and one female of the interspecific hybrids between R. regia and R. variegata on Iriomote and Yonaguni Islands, Okinawa Prefecture, Japan. One male for which RNA sequencing was performed was considered to be an F1 hybrid derived from an R. variegata male and an R. regia female. The interspecific hybrids were very similar to R. regia in external morphology such as wing markings, but had more yellowish wings than R. regia, with yellowish-brown areas on the head as in R. variegata, and yellowish-brown hairs around the secondary male genitalia as in R. variegata. The male secondary genitalia and caudal appendages showed an intermediate morphology. Mitochondrial DNA could not distinguish the two species, suggesting the possibility of mitochondrial introgression through hybridization. Since R. regia is a very recently established species in Japan, it is important to note how speciation with R. variegata will progress in the future." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science & Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

24387. Kotabe, A.; Futahashi, R. (2024): The record of interspecific hybrid between Sympetrum eroticum eroticum (Selys, 1883) and Sympetrum baccha matutinum Ris, 1911 from Aomori Prefecture. Tombo 67(1): 93-96. (in Japanese, with English summary) ["A male interspecific hybrid between S. e. eroticum and S. baccha matutinum was collected from Aomori Prefecture. Mitochondrial DNA matched S. baccha, indicating that the maternal species was S. baccha. DNA analysis of the nuclear DNA ITS region revealed trace amounts of S. eroticum-derived sequences mixed with S. baccha-derived sequences. To confirm whether the sequence bias in the ITS region is due to the copy number difference in the parental species or because the individual is an F2 hybrid or later, a comprehensive comparative analysis using RNA sequencing was performed. About a quarter of the reads in the ITS region were from S. eroticum and three quarters from S. baccha, consistent with the results of DNA analysis. Next, we sequenced 10 ribosomal proteins on different autosomal chromosomes and found that all 10 genes showed the hybrid type. These results indicated that the observed individual is an F1 hybrid between a S. eroticum male and a S. baccha female, and that there was a copy number bias in the ITS region of the parental species." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science & Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

24388. Kotabe, A.; Nitobe, T.; Futahashi, R. (2024): The second record of Anax junius (Drury, 1773) in Japan. Tombo 67(1): 111-113. (in Japanese, with English summary) ["A male A. junius was collected at Okinawa, Japan. This is the second record of this species from Japan, since only one male was recorded at Iwo Jima, Ogasawara, in 1995." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science & Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

24389. Leveque, A. (2024): Structure génétique spatiale et flux de gènes chez l'Agrion de Mercure (Coenagrion mercuriale, Zygoptera): impact de l'agglomération Strasbourgeoise et de son autoroute de contournement. Thèse de doctorat de l'Université de Lille: 261 pp. (in French, with English summary) ["Spatial genetic structure and gene flow in C. mercuriale: impact of urban area of Strasbourg district and its newly-built bypass highway. In the context of the environmental changes currently observed, the study of the evolution of the neutral and adaptive genetic structure of species subject to strong anthropogenic pressures (intensive agriculture, urbanization, fragmentation by infrastructures) is booming for reasons both applied, in conservation biology, but also fundamental because areas subject to pressure are the scene of very rapid adaptive evolution. The purpose of this thesis work is thus to study on a fine and large spatial scale the genetic and genomic structure of populations of C. mercuriale, a species protected by the Habitat Directive and essentially dependent on the topography of the courtyards. of water. This description of spatial genetic structuring will make it possible to infer the intensity of gene flow occurring between populations of Agrion on Mercury. This study is placed in the directly applied context of the study of the effects of watercourse modifications and habitat recreations within the framework of the Strasbourg bypass motorway project. The different research aspects addressed as part of this thesis project will be as follows: 1) A detailed analysis of the spatial genetic structure of populations along the Strasbourg bypass motorway axis will be carried out. The aim here will be to define whether there are distinct genetic units due to the barrier effect of certain elements of the landscape or, on the contrary, to visualize the existence of a simple pattern of isolation by distance with passive diffusion. individuals. The evolution of genetic relatedness between individuals can also be studied at the scale of a river and its tributaries, if sampling allows it. The fine-scale effect of the hydrographic network and the restoration of watercourses can be discussed in the light of the genetic structure patterns thus revealed. 2) An analysis of the regional genetic structure of this species over

the entire Strasbourg metropolitan area will be carried out in order to have a broader vision of the effect of an urbanized habitat on the presence of the species and flows. of genes between populations. However, in order to generalize these results beyond an instantaneous image of the regional spatial genetic structure of the Strasbourg metropolitan area and to better understand the biology of the species, it is necessary to have a comparison with other regions. less subject to anthropogenic impact. With this in mind, the genetic structure and gene flow patterns highlighted along the motorway axis and throughout the Strasbourg metropolitan area can be compared with populations of C. mercuriale already sampled and presenting a gradient of urbanization within less anthropized territories and located in the Hauts-De-France Region. The cumulative effects of the impacts exerted by agriculture, urbanization, and existing and current infrastructure around Strasbourg will thus be analyzed. This approach will be carried out by simultaneously taking into account the different characteristics of the landscape by producing multivariate friction maps integrating the effect of several landscape variables, in particular the aforementioned anthropogenic pressures. An in situ description (surface occupied by halophytic species, bank vegetation, width and nature of watercourses) of the Strasbourg sites surveyed will also be carried out during the sampling of individuals in the field for genotyping purposes. This aspect will be carried out using samples which will be taken in spring 2021 and 2022. 3) A study of the recolonization processes once the watercourse restorations have been carried out will also be carried out. This research component will make it possible to define the type of metapopulation we are dealing with and to see if source-sink type systems are at work or, on the contrary, if the colonizers come from different sources “all over the place”. As for the previous point, this aspect will be carried out from the samples which will be taken in 2021 and 2022. 4) A final possible aspect of study, which depends on the reproductive system of C. mercuriale, would involve a molecular analysis spawns. Under the hypothesis that females of this species can mate with several males, it would be interesting to compare the genetic diversity (revealing the number of fathers) of the offspring contained in clutches sampled in formerly established and newly colonized sites. Provided the sampling is substantial, a paternity analysis would also provide additional information on the dispersal of male individuals. 5) Finally, with regard to the assessment aspects of the environment recreation operations for this species and the millet restoration aspects." (Author(Google translate)] Address: https://theses.hal.science/tel-04831893v1/file/-These_LEVEQUE_Agathe.pdf

24390. Ma, H.; Gong, P.; Tian, Y.; Wu, Q.; Pan, M.; Yin, H.; Liu, Y.; Chen, C. (2024): HiFly-Dragon: A dragonfly inspired flapping flying robot with modified, resonant, direct-driven flapping mechanisms. Drones 2024, 8, 126. https://doi.org-/10.3390/drones8040126: 17 pp. (in English) ["This paper describes a dragonfly-inspired Flapping Wing Micro Air Vehicle (FW-MAV), named HiFly-Dragon. Dragonflies exhibit exceptional flight performance in nature, surpassing most of the other insects, and benefit from their abilities to independently move each of their four wings, including adjusting the flapping amplitude and the flapping amplitude offset. However, designing and fabricating a flapping robot with multi-degree-of-freedom (multi-DOF) flapping driving mechanisms under stringent size, weight, and power (SWaP) constraints poses a significant challenge. In this work, we propose a compact microrobot dragonfly with four tandem independently controllable wings, which is directly driven by four modified resonant flapping mechanisms integrated on the Printed Circuit Boards (PCBs) of the avionics. The proposed resonant flapping mechanism was tested to be able to enduringly generate 10 gf lift at a frequency of 28 Hz and an amplitude of 180° for a single wing with an external DC power supply, demonstrating the effectiveness of the resonance and durability improvement. All of the mechanical parts were integrated on two PCBs, and the robot demonstrates a substantial weight reduction. The latest prototype has a wingspan of 180 mm, a total mass of 32.97 g, and a total lift of 34 gf. The prototype achieved lifting off on a balance beam, demonstrating that the directly driven robot dragonfly is capable of overcoming self-gravity with onboard batteries." (Authors)] Address: Ma, H., Hefei Institutes of Physical Science, Chinese Academy of Sciences, Hefei 230031, China. Email: mach@mail.ustc.edu.cn

24391. Ma, T.; Ding, Y.; Xu, F.; Zhang, C.; Zhou, M.; Tang, Y.; Chen, Y.; Wen, Y.; Chen, R.; Tang, B.; Wang, S. (2024): Effects of acute and chronic chromium stress on the expression of heat shock protein genes and activities of antioxidant enzymes in larvae of Orthetrum albistylum? Environmental Pollution 340(2), 122712: 9 pp. (in English) ["O. albistylum can accumulate heavy metals from its aquatic environment and thus serves as a biological indicator for monitoring and evaluating water quality. Heat shock proteins (HSPs) play important biological roles in resistance to various types of environmental stress. The full-length cDNA sequences of the heat shock cognate (hsc) 70 and heat shock protein (hsp) 70 genes were cloned from O. albistylum larvae. Relative levels of expression of hsc70 and hsp70 in the head, epidermis, midgut, and adipose tissue were measured by qRT-PCR after chronic and acute contamination of 5–8 instar larvae with chromium (Cr) solution, and under control conditions. Activities of superoxide dismutase (SOD) and catalase (CAT) in chronically contaminated larvae were also measured. Phylogenetic analysis revealed that the cloned hsc70 and hsp70 genes were highly homologous to known HSP70 family members reported in other insects. The mRNA levels of hsc70 and hsp70 did not differ significantly in various larval tissues. Under chronic chromium stress, hsc70 and hsp70 expression were upregulated to a maximum and then downregulated; hsp70 mRNA levels were higher than those of hsc70 at all concentrations of chromium. Under acute chromium stress, hsc70 expression was inhibited at low chromium concentrations and upregulated at chromium concentrations higher than 125mg/L. However, hsp70 expression was higher than that in the control group and markedly higher than that of hsc70. Changes in SOD and CAT activities displayed consistent trends for different chronic chromium concentrations, first increasing and then decreasing over time. Collectively, these findings demonstrated the response of the HSP family of genes and antioxidant enzymes following exposure to

heavy metal stress, as well as their potential applicability as biomarkers for monitoring environmental pollutants." (Authors)] Address: Wang, S., Hangzhou Key Laboratory of Animal Adaptation and Evolution, College of Life and Environmental Sciences, Hangzhou Normal University, Hangzhou, 310036, China. Email: sgwang@hznu.edu.cn

24392. Mehendale, T.; Padiyar, A. (2024): Northernmost record of the endemic damselfly Indosticta deccanensis (Laidlaw, 1915) (Odonata, Zygoptera, Platystictidae) from Western Ghats, Karnataka, India. Entomon 49(4): 549-552. (in English) ["I. deccanensis is an endemic damselfly found in the evergreen forests of Western Ghats of southern India. This species was observed and photographed at Madugundi, Chikkamagaluru district, Karnataka. This is the first photographic record for Karnataka and the northernmost in Western Ghats." (Authors)] Address: Mehendale, T., 21601, Manisha CHS, VP Road, Pendse Nagar, Dombivli (E), Thane 421-201, Maharashtra, India.284, 6th A Main, Tata Silk Farm, Basavanagudi, Bangalore 560004, Karnataka, India. Email: tmehendale28@gmail

24393. Miyazaki, T.; Yago, M.; Futahashi, R. (2024): Record of Tholymis tillarga (Fabricius, 1798) from Kyoto Prefecture in the Masayo Kato Insect Collection. Tombo 67(1): 116-117. (in Japanese, with English summary) ["We reported on a male T. tillarga collected at Kinugasa, Kyoto in 1923, in the Masayo Kato Insect Collection. This is the only record of this species from Kyoto Prefecture, Japan." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

24394. Morita, R. (2024): The first record of Sympetrum cordulegaster (Selys, 1883) from Ibaraki Prefecture, Honshu, Japan. Tombo 67(1): 118. (in Japanese, with English summary) ["A male of S. cordulegaster was collected in Okunoya, Kamisu City, Ibaraki Prefecture, on 3 November 2023. This species is supposed to migrate from the continent and is often recorded near the coast of the Sea of Japan. This is the first record from Ibaraki Prefecture." (Author)] Address: Email: mamtan.morita@gmail.co

24395. Nel, N.; Poschmann, M.; Nungesser, K.; Schindler, T.; Stenger, M.-J. (2024): New records of damsel-and dragonflies (Odonata: Zygoptera, Anisoptera) from the Miocene of the Mainz Basin (Tertiary; SW-Germany). Mainzer Geowissenschaftliche Mitteilungen 52: 137-144. (in English, with German summary) [" New finds of damsel- and dragonflies from the Miocene Wiesbaden Formation of the Mainz Basin are figured and described. The wing fragment of the family Libellulidae and an almost complete specimen of Lestes sp. (Lestidae) widen our knowledge of the biota of the Wiesbaden Formation, in particular as historical finds must be considered lost or their repository unknown, respectively. The Lestidae constitutes the first record of Zygoptera for the Tertiary of the Mainz Basin." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, 75005 Paris, France. E-mail: anel@mnhn.fr

24396. Okada, K. (2024): Toys played with by Fujito Takeki - Garigari Tombo (Dragonfly). Bulletin of the Hokkaido Museum of Northern Peoples 33: 75-86. (in Japanese, with English summary) ["This paper introduces the toy "Garigaritombo" created by sculptor Takeyoshi Fujito (1934-2018) based on interviews I conducted with Takeyoshi Fujito and his wife Shigeko Fujito in 2017. Takeki Fujito was a leading Hokkaido sculptor and artist of Ainu origin. He started wood carving at the age of 12, spent three years by Lake Akan from the age of 15, and later worked in Asahikawa and other locations throughout Hokkaido. In 1964, he built the“ Bear House,”a store and residence by Lake Akan, and in 1970 married Shigeko, with whom he had two sons and a daughter. In 1998, in addition to the “Bear House,”he built the “Takeki Fujito Wood Carving Museum.” In 2017, he held a solo exhibition,“ The World of Takeki Fujito, Woodcarver.”At the Sapporo Art Museum venue, Takeki Fujito was demonstrating wood carving. At this exhibition, the author was introduced by Takeki Fujito to“ Garigari Tombo ,” a dragonfly that he used to play with as a child. The propeller is 10 cm long and the shaft is 20 cm long. The propeller is 10 cm long and the stick on the shaft is 20 cm long. The shaft has a series of grooves carved on it. The propeller and the shaft are fixed with a nail. In addition, there is a stick that vibrates the dragonfly. This stick is 20 cm long and tapers toward the tip. The propeller rotates by rubbing against the stick. In this paper, the author records the method of making Garigari Tombo introduced to me by Takeki Fujito, as well as the background and method of playing with it. The author received help from Shigeko, Takeki's wife, in writing this article." (Author)] Address: https://www.jstage.jst.go.jp/article/hoppohmbulletin/33/0/33_05/-_pdf/-char/en

24397. Okude, G.; Futahashi, R. (2024): Relationship between the type of non-woven meshes and the adult emergence rate of the dragonfly Pseudothemis zonata (Burmeister, 1839). Tombo 67(1): 119-120. (in Japanese, with English summary) [" We have been using a rearing container covered with a non-woven mesh to allow the final instar larvae of dragonflies and damselflies to climb terrestrially for the emergence of adults, here we report on a case in which the adult emergence rate of the dragonfly Pseudothemis zonata was significantly reduced when a certain type of non-woven mesh was used." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

24398. Oliveira, G.C.; Custódio, R.H.; Vilela, D.S.; Magalhães de Souza, M. (2024): Reords of insects in the diet of social wasps of the genus Polybia Lepeletier, 1836 (Vespidae: Polistinae) in southeastern Brazil. Acta Ambiental Catarinense 21(1): 1-7. (in English, with Portuguese summary) ["Social wasps of the genus Polybia Lepeletier, 1836, have a generalist feeding habit and are predators of a wide variety of other insects, however there are no reports of the feeding of hemipterans and odonates by Polybia fastidiosuscula Saussure, 1864 and Polybia platycephala Richards, 1951, respectively. Therefore, this study aims to record the predation of a Dictyopharidae individual by P. fastidiosuscula and

the feeding of a Coenagrionidae individual by P. platycephala. Both records occurred occasionally in Southeast Brazil and contribute to the knowledge about the diet of these vespids. ... In the second record, an individual of P. platycephala was observed feeding on a recently emerged adult odonate from the Coenagrionidae family, on the aquatic macrophyte Egeria najas Planch. (Hydrocharitaceae) (Figure 2). At the time of observation, the dragonfly was entirely consumed, with only the wings left (the only parts we have collected), so it was not possible to determine if it was the social wasp that actally killed it, and due to the preservation state, it was only possible to identify it at the family level. ... Dragonflies apparently are not a usual prey of social wasps (Polistinae), but there are records of Odonata in the diet of Polybia sericea (Oliver, 1792) in southeastern Brazil (Machado et al. 1988). In this report, it was also not possible to determine if the social wasp preyed on or took advantage of an already dead individual. It is possible that P. platycephala preyed on the dragonfly individual. Since it was newly emerged, they are particularly vulnerable at this teneral stage, mainly due to the fragile condition of the body cuticle and wings, which are not yet hardened, so the dragonfly remains at rest and tries to fly only when threatened by a possible predator (Corbet, 1999). Another possibility would be that the P. platycephala individual took advantage of the dragonfly carcass as food. The necrophagous habit has already been recorded for other species of Polybia (Simões et al., 2013)." (Authors)] Address: Vilela, D.S., Instituto Federal de Educação, Ciência e Tecnologia do Sul de Minas – Campus Inconfidentes, Inconfidentes, Minas Gerais, Brazil. Email: deeogoo@gmail.com

24399. Olthoff, M.; Ikemeyer, D. (2024): Veränderung der Libellenfauna (Odonata) in neun Mooren des Münsterlandes (Nordrhein-Westfalen). Libellula 43(3/4): 127-162. (in German, with English summary) ["Changes in the dragonfly fauna of nine bogs in the Münsterland region (North Rhine-Westphalia, Germany) – The dragonfly fauna of nine bogs in the Münsterland region (Borken district) was studied over two periods (1999–2003, 2019–2023). During the first period, 45 dragonfly species were recorded, while the number increased to 50 species twenty years later. In total, 52 dragonfly species were identified throughout the entire study period. Coenagrion hastulatum and Sympetrum flaveolum could no longer be found, whereas several southern species were recorded for the first time in recent years including C. scitulum, Anax ephippiger, A. parthenope, Brachytron pratense, Aeshna affinis, Isoaeshna isoceles, and S. meridionale. Northern species populations have drastically declined in these bogs, with previously characteristic species – like Leucorrhinia rubicunda, L. dubia, S. danae, and C. lunulatum – showing reductions of over 90%. Instead of typical bog species, ubiquitous species and southern immigrants are becoming more prevalent. Climate change and habitat degradation are considered main factors contributing to the decline of many bog species. The hot summers from 2018 to 2022 were particularly detrimental. In addition to widespread atmospheric nutrient inputs, the establishment of goose roosts has also negatively impacted bog dragonfly populations. Today, the bog dragonfly populations are concentrated in large protected areas. Smaller bogs, especially those affected by severe drying out, are increasingly being abandoned. In order to prevent the extinction of critically endangered species such as A. subarctica and C. lunulatum, immediate optimization measures in the large, partially cross-border boglands are considered necessary. The population of L. pectoralis, a species listed in Annexes II and IV of the Habitats Directive, has increased in recent years. In addition to increasing temperatures this species has benefited from nutrient enrichment and damming measures in the marginal areas of the bogs." (Authors)] Address: Olthoff, M., Waldweg 66, 48163 Münster, Germany. Email: matthias.olthoff@gmx.de

24400. Pinto, Â.P. (2024): Capítulo 15: Odonata Fabricius, 1793. In: Rafael, J.A.; Melo, G.A.R.; Carvalho, C.J.B. de; Casari, S. & Constantino, R. (eds). Insetos do Brasil: Diversidade e Taxonomia. 2ª ed. Instituto Nacional de Pesquisas da Amazônia, Manaus. 880 pp: 187-233. (in Portuguese) ["This second edition follows the same line as the first, providing a basis for increasing scientific knowledge regarding Brazilian entomology in its most diverse aspects, with general information on morphology, biology, classifications, phylogenetic relationships, agricultural, medical and veterinary importance, collection methods and identification keys. This second edition presents a comprehensive text and emphasis on the identification of all 28 orders and 679 families of insects with records for Brazil." "Representatives of the order Odonata, popularly known as dragonflies, are among the most charismatic insects, with enormous appeal to the general public, due in part to their elegant flight, high maneuverability, showy colors and large size. Like other animals that have similar sympathy with humans, such as butterflies, they stand out for their presence in various cultural manifestations (Carvalho 2014). Such popularity has resulted in a varied collection of vernacular names with their own meanings in many cultures, which commonly allude to good luck in Eastern countries, especially in Japan, while in the West, they often refer to potentially harmful or ill-omened aspects. (Montgomery 1972; Corbet 1999; Silsby 2001). The ubiquitous appearance of these insects and the observation of their different behaviors and biology have given rise to many regional names, such as laundress, washer, jacina, jew's horse, devil's horse, little plane, helicopter and zig-zig. (Lenko & Papavero 1997)." (Author/Google translate) ISBN: 978-65-5633-046-4; DOI: https://doi.org/10.-61818/56330464c15 The article contains many very good illustrations with very clearly arranged captions.] Address: https://repositorio.inpa.gov.br/handle/1/40239

24401. Piretta, L.; Soldato, G.; Assandri, G. (2024): Three new species for the odonatofauna of Piedmont (NW Italy). Natural History Sciences 11(2): 21-27. (in English, with Italian summary) ["Between 2020 and 2023, three new species of Odonates were recorded in Piedmont. Lestes barbarus was observed at an artificial wetland in the Turin Plain in 2021. Even though at least one individual was fresh, we cannot conclude that the species developed at the site. Subsequent visits did not permit to confirm the species. Coenagrion hastulatum was discovered at a peat bog in the NW Alps (Lac Falin, Valle di Viù) in 2023 and here reproduction was confirmed.

This population is the fifth to be recorded for the central and western Italian Alps. Trithemis annulata was first recorded in Piedmont in July 2020, and subsequently, the observations of the species in the region rapidly increased, with a total of 66 records relative to 29 sites up to the end of 2023. These are distributed in most of the low-altitude areas of the region. The species was reported mostly in late summer, with only one site where the early spring records suggest successful overwintering. However, this needs further confirmation. The odonate list of Piedmont now accounts for 70 species, representing 73.6% of the taxa reported for Italy, and this makes Piedmont, along with Lombardy, the most odonate-rich region of Italy." (Autors)] Address: Piretta, Lorenza, 1 Via Valle Balbiana 33/1, 10025, Pino Torinese, Italy. Email: lorenza.piretta@gmail.com

24402. Riexinger, W.D. (2024): Der Kleine Blaupfeil (Orthetrum coerulescens) im Naturschutzgebiet Brühl - Winsberg/-Landkreis Heilbronn sowie an weiteren Stellen im Nordosten von Baden-Württemberg. Mercuriale 24: 71-84. (in German, with English summary) ["O. coerulescens in the nature reserve Brühl - city of Weinsberg/county of Heilbronn and at other sites in the northeastern part of the German federal state of Baden-Württemberg. - On a sunny section of a small watercourse (upper reaches of the Brühlbach) in the nature reserve (NSG) "Brühl" …, Bernd Kunz and the author conducted a series of surveys over several days at the end of September 2018, documenting two old males of O. coerulescens. In the summer of 2019, the stream fell completely dry, and the species remained unconfirmed. On August 4th 2024, a copulating pair was observed. On all eight observation dates in August and September 2024, territorial males were recorded. The males were observed in two habitat types: on a sunny part of the watercourse and on small, shallow and equally sunny pools with a slight flow. Based on the evidence of copulation and the regular presence of up to five territorial males in species-typical habitats, it is assumed that an established, reproducing population exists. Further records from five other sites in the northeast of Baden-Württemberg are also presented." (Author)] Address: Riexinger, W.-D., Finkenstr. 58, 74254 Offenau, Germany. Email: Wolf-Dieter.Riexinger@web.de

24403. Sampa, T. (2024): Species composition and seasonal prevalence of Odonata larvae in school swimming pools in Yokohama City and suburbs, Kanagawa Prefecture, Japan based on field survey from 2017 to 2018. Tombo 67(1): 61-80. (in Japanese, with English summary) [From December 2017 to December 2018, we investigated the species composition and seasonal prevalence of Odonata larvae appearing in school swimming pools (artificial water bodies) in Yokohama Citv, Kawasaki City, Fujisawa City, and Kamakura City, Kanagawa Prefecture, Japan. We found that 11 species in 3 famines appeared in swimming pools over all the survey sites. Of these, the larvae of Sympetrum baccha matutinum were most common in school swimming pools until around June, with the relative proportion of individuals appearing higher, compared to other species. From September to December after the swimming classes were ended, larvae of Pantala flavescens predominated. Comparing the species composition in this study and a previous study in Tokyo and Chiba Prefecture in 2012, it became clear that the most frequently occurring species differ, even over a relatively short geographical distance. The diversity of the species of Odonata that appears in school swimming pools is considered to be influenced by the amount of organic matter flowing into the pool. In particular, there was a significant difference in the number of species in the rooftop pool, where it was more difficult for organic matter to enter the pool, compared to ground level pools. Therefore, it was suggested that the positioning of the pool is an important factor, related to the amount of organic matter input." (Author)] Address: Email: tatsuya3848@yahoo.co.jp

24404. Sasamoto, A.; Futahashi, R. (2024): Historical background on the change of scientific names for the genera Planaeschna and Aeschnophlebia. Tombo 67(1): 103-110. (in Japanese, with English summary) ["We reviewed recent changes in the three genera or the Japanese Aeshnidae, formerly Aeschnophlebia, Polycanthagyna, and Planaeschna, which are treated as Brachytron, Indaeschna, and Aeschnophlebia, respectively, according to Schneider et al. (2023) and Kosterin (2023). In particular, we summarized the confusions of the genus Aeschnophlebia since the first description by Selys (1883a), including enigmatic species Aeschnophlebia optata. In addition, photographs of the type specimen of Aeschnophlebia optata (= Aeschnophlebia milnei), which is also the type species of this genus, are shown for the first time." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science &Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

24405. Schiel, F.-J.; Martens, A.1 & Andreas Martens (2024): Beobachtungen und Schlupfnachweise der Schabracken-Königslibelle (Anax ephippiger) in der Oberrheinebene 2023 und 2024 (Odonata: Aeshnidae). Mercuriale 24: 23-30. (in German, with English summary) ["Adult and emergence records of A. ephippiger in the Upper Rhine valley in 2023 and 2024. Altogether, the species has been recorded 14 times at 11 waters between Philippsburg in the North and Breisach in the south. Exuviae were found at six localities." (Authors)] Address: Schiel, F.-J., INULA, Turenenweg 9, 77880 Sasbach, Germany. Email: Franz-Josef.Schiel@INULA.de

24406. Schröder-Esch, S.; Schiel, F.-J. (2024): Erfolgreiche Fortpflanzung von Orthetrum coerulescens (Odonata: Libellulidae) am Feldberg - ein neuer Höhenrekord für Baden-Württemberg. Mercuriale 24: 85-89. (in German, with English summary) ["Successful reproduction of O. coerulescens at the Feldberg - a new altitudinal record for the German federal state of Baden-Württemberg. - On July 27th 2024, successful reproduction of O. coerulescens was observed by means of two freshly emerged imagines and five exuviae at Mount Feldberg in the southern Black Forest at an altitude of 975 m a.s.l. The species developed in a small rivulet, that was fed by water from a mire. This is a new altitudinal record for this species in southwestern Germany." (Authors)] Address: Schröder-Esch, S., Hauptstr. 38b, 79199 Kirchzarten, Germany. Email: mail@schroeder-esch.de

24407. Shimbori, O.; Futahashi, R. (2024): A record of a presumptive gynandromorph or Lyriothemis pachygastra (Selys, 1878). Tombo 67(1): 97. (in Japanese, with English summary) ["A supposed gynandromorph of L. pachygastra was photographed in Oguro, Tovama Citv, Toyama Prefecture, Japan, on July 10, 2023. Approximately the right half of the body showed the semi-mature male coloration, while the left half showed the female coloration. The left superior appendage matched to female, while the length of the right superior appendage was intermediate between male and female." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science & Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

24408. Wildermuth, H. (2024): Ungewöhnliche Wachsbereifung bei Segellibellenweibchen (Odonata: Libellulidae). Mercuriale 24: 39-55. (in German, with English summary) ["Unusual pruinosity in female Libellulidae Odonata). - In many species of libellulid dragonflies, the mature males have a conspicuous blue wax coat. The males usually lack this. With age, however, females may also develop blue patches on the upper side of the abdomen, albeit rarely and to a different extent. Using photos of species of Central European Libellulidae of the genera Crocothemis, Leucorrhinia, Libellula, Orthetrum and Sympetrum, it is documented to what extent pruinosity in old females can occur. Depending on the species and individual, it is only developed in patches, but can cover the entire body as a thin coating. Biochemical processes and possible functional importance are discussed to explain this phenomenon." (Author)] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rüti, Switzerland. Email: hansruedi@wildermuth.ch

24409. Yui, M.; Morita, R.; Futahashi, R. (2024): The first records of Trithemis aurora (Burmeister, 1839) from Shizuoka Prefecture, Honshu, Japan. Tombo 67(1): 114-115. (in Japanese, with English summary) ["We collected one male and one female of T. aurora in Hamamatsu Citv, Shizuoka Prefecture. These are the first records of this species in Shizuoka Prefecture, and the easternmost record to date." (Authors)] Address: Futahashi, R., National Inst. of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

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24410. Aiwale, J.M.; Hiragond, N.C.; Patil, R.N.; Wandre, S.T.; Patil, S.S.; Sadavar, N.R.; Varpe, P.N. (2025): Studies on the diversity and species composition of Odonata (Arthropoda: Insecta) from Chandgad Taluk of Kolhapur District, Maharashtra, India. Uttar Pradesh Journal of Zoology 46(8): 95-112. (in English) ["In present study, a total of 66 odonate species belonging to 41 genera representing 10 families were recorded from Chandgad taluka of Kolhapur district in Northern Western Ghats. Anisoptera with 38 species (58%) were dominating the study area followed by 28 species (42%) of Zygoptera. Among the genera, Orthetrum were in maximum number (6) of species followed by Pseudagrion were of 5 species. Libellulidae family members are recorded in the highest number (30) followed by Coenagrionidae (15). Among the study sites highest numbers of odonates were recorded from slow running stream Kitwade with 33 species and weedy pond Tawarewadi with 32 species. The fast-running stream Tilari represents the least number (3) of species. The slow running stream and weedy pond habitat support the odonate diversity compared to fast running stream, semi forest and lake side habitat." (Authors)] Address: Aiwale, J.M., Department of Zoology, Karnatak University, Dharwad, Karnataka, India.

24411. Anooj, S.S.; Susanth, C.; Kalesh, S.; Sadasivan, K.; Bhakare, S.D.; Sawant, D.; Nair, V.P. (2025): A new species of Euphaea Selys, 1840 (Odonata, Euphaeidae) from Wayanad, Western Ghats, Kerala, India. Entomon 50(1): 73-84. (in English) ["A new species of Euphaea Selys, 1840 (Odonata, Euphaeidae) is described from the Wayanad landscape of Western Ghats of Kerala State based on integrated taxonomy. Euphaea wayanadensis sp. nov. is differentiated morphologically from the closely similar E. pseudodispar Sadasivan & Bhakare, 2021, based on the longer black hind wing patch; broader humeral and antehumeral stripes of males, which are never interrupted and not significantly tapering towards the alar sinus; humeral stripes not terminating in a distinct spot; S10 distal margin wavy at midventrum and apex of the dorsal keel on S10 stepped in lateral view; and the difference in length ratios of male aedeagus and structure of the male genital vesicle. Molecular analysis of the mitochondrial cytochrome oxidase subunit I (mt COI) region showed 12.9 per cent nucleotide divergence between the two species. Phylogenetic analysis with Maximum Likelihood method using MEGA 11 also revealed the distinctiveness of E. wayanadensis sp. nov. The habitat, distribution and ecology of the new species are discussed, and a key to Euphaea species of Western Ghats is also provided." (Authors) The distribution of E. wayanadensis sp. nov., E. dispar, E. cardinalis and E. fraseri in the Western Ghats is mapped.] Address: Anooj, S.S., Department of Entomology, College of Agriculture, Kerala Agricultural University, Vellayani, Thiruvananthapuram 695522, Kerala, India. Email: anooj.ss@kau.in;

24412. Bakare, A.B.; Adu, B.W.; Ashamo, M.O. (2025): Evaluating water quality and Odonata diversity in relation to land usse pattern in Akure, South West, Nigeria. Futa, Journal of Life Sciences 5(1): 81-99. (in English) ["Land use intensification and transformation have profound impact on both terrestrial and aquatic ecosystems upon which the biodiversity relied on. The study aims to provide information on the effect of land uses on Odonates community structure and the water quality of water bodies in the study area. The physicochemical parameters examined revealed that, Total Dissolve Solids (TDS), Dissolve Oxygen (DO), Biological Oxygen Demands (BOD) and Conductivity (CD) of Afo 3 were significantly different (at $p<0.05$) from other stations. A total of 2376 Odonata individuals in 7 families, 19 genera and 35 species were recorded in this study. Pseudagrion 'A' kersteni (651) is the most frequent species followed closely by Trithemis arteriosa, (451). Two species of Lestinogomphus minutus, an endemic species in tropical Africa was collected

in the forest habitats. The Odonata community structure of 21 paired stations compared revealed four paired similar stations and 17 paired dissimilar stations. Conclusively, urgent conservation efforts are required in the study area as species sampled are eurytopic species with exceptions of very few stenotopic species in the forest habitat." (Authors)] Address: Bakare, A.B., Dept Biology, School of Life Sciences, Federal University of Technology, PMB 704, Akure, Nigeria. Email: bakareayodeji54@gmail.com

24413. Bota-Sierra, C.; Bedoya-Arteaga, L.P.; Atehortua-Mejía, M.A.; Cuello-Montes, L.M.; Cuevas-Flórez, O.; Duque-Bedoya, L.F.; Navarro-Barreto, I..; Santos-Arzuza, C.A.; Vargas-Acosta, J.C.; Verbel, J.; Zúñiga-Ortega, J. (2025): Lista actualizada de odonatos (Insecta) en el departamento de Córdoba, Colombia - Updated list of odonates (Insecta) in the department of Córdoba, Colombia. Biota Colombiana 26: 1-12. (in Spanish, with English summary) ["This research documents 27 new dragonfly records for the department of Córdoba, Colombia. Identified specimens include rare and endangered species, such as Drepanoneura letitia, Agriogomphus jessei, Oligoclada heliophila and Perigomphus pallydistilus. In total, 151 dragonflies were collected in four localities in the department's southern region. Benthic and aerial nets were used, in addition to a combination of methods to search for aquatic larvae and terrestrial adults. The sampled areas, rich in biodiversity, are threatened by human activities such as agriculture and mining, which underline the need for ecosystem conservation." (Authors)] Address: Bota-Sierra, C.A., Grupo de Entomología Univ. de Antioquia (GEUA), Medellín-Colombia. AA 1226

24414. Boyd, A.M. (2025): Optical design of generalised Gradient-Index lenses for the optimisation of size, mass, and cost-critical optical systems. Dissertation, Delft University of Technology: xviii + 201 pp. (in English, with Dutch summary) [There are no references to dragonflies in the scientific content of the thesis, but obviously it was inspired by Odonata: "Preface: Cover image: Emperor dragonfly (Anax imperator adapted from a drawing in "British Dragonflies (Odonata)" by W. J. Lucas, 1900. These elegant insects inspired the cover of this work in several ways. The dragonfly itself is one of nature's great designs, largely unchanged in hundreds of millions of years. The dragonfly is one of the most successful aerial hunters known, which is in no small part due to its sophisticated visual system comprising not just the striking compound eyes, but also three remarkably complex "simple eyes" or ocelli. Both contain significant refractive index gradients. The dragonfly's eyes (and those of most animal life on earth) serve as a reminder for the technologist to remain optimistic. A key research question of this work was to determine if gradient-index optics can be advantageously deployed in future optical systems. When we consider the success of this phenomenon in innumerable organisms over millions of years, it is clear that they already have a past and a present. We should be optimistic in our ability to one day replicate this success in human-made optics, with awe for the natural processes can still assemble GRIN distributions that exceed the sophistication of what can be manufactured today. The inner beauty within the eyes of a dragonfly also reminds us to be humble. For all humankind's ambition and invention, we are perhaps not as smart as we like to think. For unlike the dragonfly, our two simple eyes cannot take in both the detail and the perspective at once. So often, our intense focus blinds us to the bigger picture, and perhaps impending danger. We must remember, that for gradient-index optics to have a future, so must all life on earth. Finally, the dragonfly reminds me of some happy times amongst the long journey that is a PhD. The image overleaf depicts a pond of waterlilies in St Asaph, not far from the Qioptiq site. Over the years I have spent many a lunchtime sat by this small, secluded pool, thronged by all manner of dragonflies and damselflies nurtured by the lush Denbighshire climate. Indeed it was the site of many of the ideas contained within, a place to contemplate impending fatherhood, and a sanctuary from stress, pandemics, war, bellicose politicians, and every other worry bar getting back to my desk before 1. Dear reader, wherever you are in life's journey, I do hope you find and cherish your own lily pond. [AMB, January 2025.] "Within the optics industry, there is a continuous drive to reduce the size, weight, power consumption and cost of optical systems (known as SWAP-C). A new generation of fabrication technologies for GRadient-INdex (GRIN) materials promise the capability to manufacture GRIN media of arbitrary refractive index distribution (within index variation and spatial resolution limits). This represents an opportunity to further optimise the SWAP-C of lens systems, yet also presents challenges for the optical designer. The necessary optical design tools for arbitary GRINs are not widely implemented, and the potential applications where arbitrary GRINs provide a benefit are not widely explored….] (Author)] Address: https://pure.tudelft.nl/ws/portalfiles/portal/238981736/Optical_Design_of_Generalised_GRIN_Lenses_-_A_M_Boy d_-_Digital_Version.pdf

24415. Dias-Oliveira, T.M.; Santos, J.C.; Souza, M.M.D.; Vilela, D.S. (2025): Description of the F-0 exuviae of Argia claussenii Selys, 1865 (Odonata: Coenagrionidae). Zootaxa 5613(3): 577-584. (in English) ["Here we describe, illustrate and diagnose the F-0 exuviae of A. clausseni, collected in Minas Gerais state, Brazil (18°23'14.8" S, 43°18'14.3" W) between May and November 2024. It can be separated from other congeners by the morphology of the mandible, prementum and gonapophyses." (Authors)] Address: Dias de Oliveira, T.M., Inst. Federal de Educação, Ciência e Tecnologia do Sul de Minas - Campus Inconfidentes, Inconfidentes, Minas Gerais, Brazil.

24416. Dias-Oliveira, T.M.; Vilela, D.S.; Chaves Júnior. L.E.; Jacques, G.; de Souza, M.M. (2025): Predation of Gripopteryx sp. (Plecoptera: Gripopterygidae) by Argia claussenii Selys, 1865 (Odonata: Coenagrionidae) in Campo Rupestre, Minas Gerais. Food Webs 42(5): e00387: (in English) ["Highlights: • Presents unprecedented data on the feeding behavior of Argia clausseni. • Includes data on interactions among insect species in Campo Rupestre, a rare and understudied environment. • Provides data that may aid in defining conservation strategies for this environment. Abstract: This study reports, as a pioneer effort, the predation of adult Plecoptera by adult Odonata in a Campo Rupestre environment, at the

Pico do Itambé State Park, Minas Gerais, Brazil. The event was recorded in September 2024, in a rocky lotic area, where A. claussenii was feeding on Gripopteryx sp.. The predation is attributed to the generalist predatory behavior of damselflies, known for capturing a wide range of prey during their adult phase. This study contributes to the knowledge of trophic interactions involving Odonata and Plecoptera in ecosystems of high biodiversity and ecological relevance, such as the Campo Rupestre, and highlights the need for further investigations into the biology and ecology of these species in environments threatened by habitat loss." (Authors)] Address: Magalhães de Souza, M., Inst. Federal de Educação, Ciência e Tecnologia do Sul de Minas Gerais, Lab. Zoologia, Inconfidentes, MG, Brazil. Email: marcos.souza@ifsuldeminas.edu.br

24417. Dolai, S.; Mallick, M.A.I.; Ghorai, N. (2025): Diversity and abundance of odonates (dragonflies and damselflies) and lepidopteran (butterflies) fauna of Kalyani Lake Park, Nadia district, West Bengal, India. Academia Journal of Biology 47(1): 87-109. (in English) ["The study on Odonata and butterfly species were conducted from August 2021 to September 2023. A modified “Pollard Walk” method was used to record species and abundance. ... During the study period, 35 species of odonates were recorded, including 25 species of Anisoptera belonging to 3 families and 10 species of Zygoptera belonging to 2 families. In the case of Anisopterans, 25 species were recorded belonging to three families namely Gomphidae (1 species), Macromiidae (1 species) and Libellulidae (23 species). In the case of Zygoptera, 10 species were recorded belonging to two families namely: Coenagrionidae (8 species) and Platycnemididae (2 species). The highest diversity of odonates was recorded belonging to Diversity and abundance of odonates the family Libellulidae (65.71%), followed by Coenagrionidae (22.86%), Platycnemididae (5.71%), Gomphidae (2.86%) and Macromiidae (2.86%). It was observed that, among the Anispoteran, Brachythemis contaminata and Orthetrum sabina were the most common species, whereas among the Zygopteran, Ceriagrion coromandelianum and Pseudagrion rubriceps were the most common species" (Authors)] Address: Dolai, S., Dept Microbiology, Vijaygarh Jyotish Ray College, 8/2, Bejoygarh, Kolkata - 700032, West Bengal, India. Email: imranmallick708@gmail.com

24418. Doucet, G.; Guimier, H. (2025): Combat à mort pour l’imperator: prédation d’une femelle Anax imperator Leach in Brewster, 1815 par un Frelon d'Europe (Vespa crabro Linnaeus, 1758) (Odonata: Aeshnidae; Hymenoptera: Vespidae) - Fight to the death for the Emperor Dragonfly: predation of a female Anax imperator Leach in Brewster, 1815 by a European Hornet (Vespa crabro Linnaeus, 1758) (Odonata: Aeshnidae; Hymenoptera: Vespidae). Martinia 39(3): 17-20. (in French and English) [On July 24th, 2024, at around 7 p.m., while we were near the river Doubs in Besançon's Parc Micaud (Latitude: 47.24016 N; Longitude: 6.03345 E), we were intrigued by the sound of crumpling wings at a height of around 3 to 4 meters. The sounds then moved closer to us. Once on the ground, we were able to observe the protagonists: there was an adult female Anax imperator Leach in Brewster, 1815 on its back and an imago of European Hornet (Vespa crabro Linnaeus, 1758) on top.] Address: Doucet, G., 22, rue de la Grette, 25000 Besançon, France. Email: guillaume.-doucet@yahoo.fr

24419. Fahrenholz, A. (2025): Blaue Thoraxbereifung bei Orthetrum coerulescens – jetzt auch bei uns normal? (Odonata: Libellulidae). Mitteilungen der AG Libellen in Niedersachsen und Bremen 7: 59-68. (in German) ["During the fieldwork for a bachelor thesis on a population of O. coerulescens in north-western Germany, many males showed extended pruinosity on various body parts beyond the abdomen. In the literature, the occurrence of these kinds of males in Central Europe is partly neglected. Photos and notes from the fieldwork combined with a photo-based search on the internet platform iNaturalist revealed numerous examples of strong pruinosity in male O. coerulescens in Central and Northern Europe. The results are discussed regarding the cause of the strong thoracic pruinosity and potential problems in a clear identification of O. brunneum and O. coerulescens." (Author)] Address: Fahrenholz, A., Ellernbroek 25, 26817 Rhauderfehn, Gemany. Email: arnefahrenholz@posteo.de

24420. Hernández Lima, D.I. (2025): Odonatos asociados a la vegetación riparia del río San Pedro Mártir, Balancán-Tenosique, Tabasco, México (Insecta: Odonata). Tesis para obtener el titulo de Licenciado en Biologia, Universidad Juárez Autónoma de tabasco, División académica de ciencias biológicas: 63 pp. (in Spanish) ["The objective of this study was to generate a list of odonate species for the San Pedro Mártir River, compare their richness between the rainy and dry seasons, and develop a species identification key. Collections were carried out at four sites on the San Pedro Mártir River between December 2021 and November 2022. Collections were carried out in two 2-hour periods (4 hours total) from 7:00 a.m. to 12:00 p.m. A total of 215 specimens were collected, recording 5 families, 22 genera, and 40 species, equivalent to 10.7% of the species cited for Mexico and 40.4% of the species cited for Tabasco. The best represented suborder was Anisoptera, with 21 species, while Zygoptera has 19 species. highlighting the presence of 10 species that had not been recorded for the state of Tabasco. A dichotomous key of 40 species was generated. Taking into account the lists for Tabasco and the list for the Laguna del Tigre Biosphere Reserve, more sampling is needed for the RSMP. It is recommended that further studies be conducted using different methodologies (for example, changes in collection times or collection sites) to obtain the total number of species present at the site." (Author/google translate) Argia oenea, Ischnura posita, Leptobasis lucifer, Nehalennia minuta, Neoerythromma cultellatum, Aphylla protracta, Phyllogomphoides duodentatus, Macrothemis delia, Pantala hymenaea, Dythemis maya] Address: https://ri.ujat.mx/handle/200.500.12107/5723

24421. Hu, F.-S. (2025): Amendment for the occurences of Calicnemia eximia (Selys, 1863) and Orthetrum testaceum (Burmeister, 1839) in Taiwan (Odonata: Platycnemididae, Libellulidae). Taiwanese Journal of Entomological Studies 10(1): 1-4. (in English, with Chinese summary) ["The status of C. eximia and O. testaceum in Taiwan is reviewed based on

the examination of voucher specimens and distributional patterns. Both species are considered doubtfully recorded from Taiwan and are therefore excluded from the Taiwanese fauna." (Authors)] Address: Hu, F.-S., Natural History Museum of Denmark at the Univ. of Copenhagen, Zoological Museum, Universitetsparken 15, Copenhagen, 2100, Denmark. Email: fangshuo_hu@smail.nchu.edu.tw

24422. Huang, W.; Zhao, T.; Fan, M.; Duan, Y.; Tian, L.; Li, H.; Cai, W. (2025): Phylogenetic relationships and divergence times of Odonata inferred from mitochondrial genome. iScience 28, Issue 2, 21 February 2025, 111806: 15 pp. (in English) ["Highlights: •53 mitogenomes of Odonata was sequenced and determined. •A newly evolutionary hypothesis of Odonata was derived from mitochondrial phylogenomics. •Mito-nuclear discordance in estimating divergence time was observed within Odonata. Summary: Understanding the origin and evolutionary history of Odonata are crucial, as they represent central members of the first winged lineages. Here, we assembled the largest mitogenome dataset to date, comprising 143 mitogenomes representing three suborders, 18 families, of which 53 mitogenomes were newly sequenced. Phylogenetic inferences demonstrate that the mitogenome is a powerful tool for resolving lower-level divergence within Odonata, and it falls short in addressing higher-level relationships like suborder, superfamily, and interfamily classifications. The evolutionary history of Odonata was reconstructed by incorporating 11 fossil records, estimating the origin of Odonata occurred in the Jurassic, with the Cretaceous emerging as a critical period for the initial radiation of main Odonata lineages. Furthermore, we employed fossil calibration strategies from various studies to calibrate our analyses, enabling the investigation of mito-nuclear discordance patterns in divergence time inferences. Our results revealed significant differences in divergence time estimates inferred solely from mitochondrial or nuclear data within Odonata, particularly pronounced when using older upper bounds values for fossils." (Authors)] Address: Huang, W., Dept of Entomology & MOA Key Lab of Pest Monitoring & Green Management College of Plant Protection, China Agricultural Univ., Beijing, China

24423. Khedir, H.; Aouadi, A.; Seddik, Seddik, S. (2025): Parasitic infestation patterns of water mites (Arrenurus spp.) on Odonata species in North African freshwater habitats. Journal of the Entomological Research Society 27(1): 139-149. (in English) ["This study investigates the parasitic relationship between water mites and Odonata species in a lotic environment in Souk Ahras, analyzing 27 species including both Zygoptera and Anisoptera. Over a two-year period, we recorded 744 parasitic larvae on 110 individuals belonging to four Zygoptera species: Platycnemis subdilatata, Coenagrion caerulescens, C. mercuriale, and Ischnura graellsii. Generalized linear model revealed significant differences in infestation levels based on species and body parts, while sex differences were not significant. P. subdilatata exhibited the highest infestation rate of 2.74%, accounting for 75 infested individuals. In contrast, C. caerulescens, C. mercuriale, and I. graellsii showed lower prevalence rates of 1.28%, 1.01%, and 0.95%, respectively. Mites were predominantly found attached to the thorax, probably because it provides better survival chances and more favorable conditions for larval development. Our findings highlight a strong host preference by water mites, indicating that only certain damselflies serve as hosts, thus contributing to the understanding of parasitism dynamics in freshwater ecosystems." (Authors)] Address: Khedir, H., Dept of Biology, Laboratory of Sciences and Technology of water and Environment, Mohamed Cherif Messaadia University, Souk-Ahras, Algeria. Email: h.khedir@univ-soukahras.dz

24424. Mikolajcuk, P.; Góral, N. (2025): The earliest damselfly and dragonfly (Odonata) records in April and May 2024 compared to the earliest ones in 2018-2019 and 2022. Odonatrix 215: 11 pp. (in Polish, with English summary) ["This study sets out the earliest spring records of odonates in Poland during the exceptionally warm spring of 2024, and compares them with the earliest observations from two distinctly cooler springs (2019 and 2022) and the previous exceptionally warm spring of 2018. A significant part of the material presented here was collected through a citizen science initiative, specifically by the Facebook group „Ważki (Odonata) w Polsce" ("Dragonflies (Odonata) in Poland"). The authors also undertook a critical evaluation of the currently available sources of information on the past phenologies of odonates in Poland. In April and May 2024, 43 odonate species were recorded, 18 phenologically earlier than in 2018, 40 earlier than in 2019 and 41 earlier than in 2022. Overall, odonate emergences in 2019 and 2022 were later than in 2018 and 2024, which is consistent with the average daily temperature anomalies for the March–May periods in those years. The spring of 2024 was highlighted by exceptionally early emergences of nine odonate species in early and mid-April, probably driven by the warmest period between March and April since 1951. This event was most likely unprecedented in the history of odonate observations in Poland. Similarly early flight dates were recorded only three times in 2018-2019 and 2022, all in mid-April. In most cases, however, it will be challenging to determine the extent to which individual early records deviate from the hitherto observed "norm" and by how much. The authors argue that sources previously often used as references for Poland do not represent true syntheses of historical literature data, and therefore should not be treated as such." (Authors)] Address: Góral, N., Uniwersytet Adama Mickiewicza, Wydział Biologii, Lab. Dydaktyki i Ochrony Przyrody, ul. Uniw. Poznańskiego 6, 61-614 Poznań, Poland. Email: goral.nikola@gmail.com

24425. Mikolajczuk, P.; Góral, N. (2025): A record of a single stray male Sedgling Nehalennia speciosa (Charpentier 1840) (Odonata: Coenagrionidae) at an anthropogenic waterbody in the Lublin city suburbs. Odonatrix 216: 9 pp. (in Polish, with English summary) ["Nehalennia speciosa is predominantly inhabiting environments with a high degree of naturalness that support vegetation with a distinctive spatial structure. Until recently, it was considered a low-mobile species with limited dispersal abilities, but this view is being challenged ever more frequently. This study describes the record of a single stray male in a shallow anthropogenic waterbody in the suburbs of Lublin (E Poland), a city with approximately 330,000 inhabitants. Between 2022 and 2024, this

waterbody exhibited extreme astatic conditions, with water appearing only sporadically after significant rainfall, making it unsuitable for the species' development. Based on aerial photographic map analysis and field surveys, the nearest active population of the species was estimated to be 17.4 km away. This observation provides further evidence of the species' potential for long-distance dispersal. Previous findings suggest that such dispersal can occur at high altitudes, assisted by air currents, so that detecting it by means of capture-mark-recapture (CMR) studies, for example, is practically impossible." (Authors)] Address: Góral, N., Uniwersytet Adama Mickiewicza, Wydział Biologii, Laboratorium Dydaktyki i Ochrony Przyrody, ul. Uniwersytetu Poznańskiego 6, 61-614 Poznań, Poland. Email: goral.nikola@gmail.com

24426. Montes-Fontalvo, J.; Stand-Pérez, M. (2025): The larva of Hetaerina duplex Selys, 1853 (Odonata: Calopterygidae) with a key to known Colombian larvae species. International Journal of Odonatology 28: 16-22. (in English) ["The larva of Hetaerina duplex is described and illustrated for the first time based on specimens from Quindío and Risaralda departments of Colombia. Larvae of H. duplex differ from other species of the genus by well-developed spines on the lateral carina from S2 to S10 and S10 with one well-developed mid-dorsal spine on the posterior border. In addition, habitat and habits information are commented on. Finally, a comparative key for known larvae of all Colombian species is presented with their distribution maps." (Authors) Hetaerina fuscoguttata, H. laesa, H. miniata, H. occisa, H. sanguinea, H. westfalli.] Address: Montes-Fontalvo, Jenilee, Sección Entomología, Colecciones Biológicas, Centro Colecciones y Gestión de Especies, Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, Villa de Leyva, Boyacá, Colombia. Email: jmontes@humboldt.org.co

24427. Nel, A.; Mottequin, B. (2025): Redescription of the Upper Jurassic Aeshna antiqua Vander Linden, 1827 in the Anisopteran family Protolindeniidae (Odonata). Mesozoic 2(1): 4-9. (in English) ["The holotype of the Upper Jurassic species 'Aeshna' antiqua Vander Linden, 1827, from the lithographic limestone of Bavaria (Solnhofen Konservat-Lagerstätte), is redescribed. It turns out that it is conspecific with Protolindenia wittei (Giebel, 1860), the type species of the genus Protolindenia Deichmüller, 1886. We therefore transfer 'Aeshna' antiqua to the genus Protolindenia under the name Protolindenia antiqua (Vander Linden, 1827) comb. nov., and Protolindenia wittei is considered as a junior synonym of P. antiqua (Vander Linden, 1827)." (Authors)] Address: Mottequin, B., Earth and History of Life O.D., Royal Belgian Institute of Natural Sciences, rue Vautier 29, 1000 Brussels, Belgium. Email: bmottequin@naturalsciences.be

24428. Nicolai, B. (2025): Libellen am Leth (Nordharzvorland, Sachsen-Anhalt) im Klimawandel Hotspot der Odonatenfauna und seine Wiederbesiedlung. Abhandlungen und Berichte aus dem Museum Heineanum 14: 115-136. (in German, with English summary) ["Dragonflies on the Leth (Northern Harz Foreland, Saxony-Anhalt) in climate change – Hotspot of the Odonatenfauna and its recolonisation: The Leth is a small isolated subsurface lake in the arable landscape of the north-eastern Harz foreland. The hot summers and lack of rainfall in recent years led to the very shallow lake completely drying out in 2020. After the increased precipitation in the winter half-year 2023/24, it formed again. The recolonisation by dragonflies in the 2024 season is described here. Between the beginning of May and mid-October, a total of 36 dragonfly species (17 Zygoptera, 19 Anisoptera) were recorded on 27 days, of which 9 species (5 Zygoptera, 4 Anisoptera) were recorded for the first time. For 19 species there was evidence of reproduction at the water body (mating, oviposition, exuviae or emergences). These (8) species were regular and relatively common: Chalcolestes viridis, Sympecma fusca, Erythromma viridulum, Coenagrion puella, Ischnura elegans, Enallagma cyathigerum, Orthetrum cancellatum and Crocothemis erythraea. The species S. fusca, C. mercuriale, Erythromma lindenii, I. pumilio and Anax ephippiger are new for MTBQ 4033-3, while Lestes sponsa, L. dryas, Aeshna affinis, Libellula depressa, Leucorrhinia rubicunda and Sympetrum danae were only recorded once in the 2024 season. The occurrence of two annual generations was proven for S. fusca and I. elegans and considered probable for E. cyathigerum." (Author)] Address: Nicolai, B., Herbingstr. 20, 38820 Halberstadt, Germany. Email: nicolaibea@gmx.de

24429. Nsengimana, V.; Twagirayezu, E.; de Dieu Habiyaremye, J.; Rutegwa, M.; Nyandwi, V.; Ndatimana, G. (2025): Application of aquatic macroinvertebrates in water quality assessment of the Nyabarongo and Akagera Rivers in Rwanda. Environmental Monitoring and Assessment 197(4), 370: 22 pp. (in English) ["Riverine pollution is an increasing threat to ecosystem integrity and economic development, thus a need for effective monitoring to guide the management of ecosystem health. Opportunely, aquatic macroinvertebrates have been proven to indicate the health status of the rivers. However, there is scanty information about their use in Rwanda. This study used macroinvertebrates to assess the water quality of the Nyabarongo and Akagera Rivers following the Tanzania River Scoring System (TARISS). The study was carried out between May 2023 and March 2024 and covered 13 sampling sites. Macroinvertebrates were collected using a kick sampling method while water samples were collected following standard methods for measuring water properties. Sites were clustered, and multivariate methods were used to assess dissimilarities in taxa distribution. Further, the Focal Principal Component Analysis (FPCA) was performed to assess the association of macroinvertebrates with water physico-chemical parameters. Collected macroinvertebrates belonged to 34 families dominated by Chironomidae, Baetidae, and Culicidae. The TARISS metrics (mean ± standard deviation) indicated a score of 44.53 (±?2.69), a taxa number of 11 (±?0.6), and an average scope per taxa (ASPT) of 4.07 (±?0.8). Dissolved oxygen had a significant positive influence on the distribution and abundance of the Libellulidae family. Conversely, dissolved oxygen and electric conductivity had a significant negative relationship with the Caenidae and Aeshnidae families, respectively. The low values of the TARISS metrics portend the poor water quality of the Nyabarongo and Akagera Rivers. Thus, management practices and regular biomonitoring are recommended to

ensure that the ecosystem health of these rivers is maintained." (Authors) Odonate taxa are treated at family level.] Address: Nsengimana, Venuste, Dept of Biology, School of Science, College of Science & Technology, Univ. Rwanda, Kigali, Rwanda

24430. Nüß, H.; Nüß, R. (2025): Neuer Bestimmungschlüssel: „Libellen der Lüneburger Heide“ von A. Lehmann, H. Nüß und R. Nüß. Mitteilungen der AG Libellen in Niedersachsen und Bremen 7: 101-102. (in German) [The authors are introducing a new identification key authored by themselves. Considering on a regional basis (Lüneburger Heide, Federal State Niedersachsen, Germany), 65 species are illustrated.] Address: not stated

24431. Payra, A.; Dash, S.K. (2025): First report on Odonates from Ghandhamardan Hills, Western Odisha, India. Entomologia Hellenica 34(1): 1-8. (in English) ["In this paper, we provide the first Odonata checklist of Ghandhamardan Hills, Western Odisha, India. Surveys were carried out at Nrusinghanath and Harishankar Waterfalls on April 1st and 2nd, 2016. We recorded a total of 23 odonate species under 19 genera and 8 families based on photographic evidence. Our survey recorded Camacinia gigantea for the first time from Western Odisha, extending its range in the central Indian landscape. Moreover, this study highlights the necessity of further systematic surveys in this little-explored area of Odisha to determine the actual diversity of odonates, in this potential odonate habitat in Gandhamardan hill range." (Authors)] Address: Dash, S.K., Dept of Wildlife and Biodiversity Conservation, Maharaja Sriram Chandra Bhanja Deo University, Odisha, India. Email: surajkumardash5584@gmail.com

24432. Sarwat, M.S. (2025): Diversity of insects related to paddy field in Tala Taluka of Raigad district. International Journal of Research Studies on Environment, Earth, and Allied Sciences 2(1): 1-5. (in English) ["Rice, a major agricultural crop grown in India, has undergone changes in its insect pest dynamics in recent times. The quantity and diversity of insects in the rice ecosystem vary alongside the growth phases of the sowing season. Although some arthropod species pose a threat to rice crops, most are benign and coexist within rice fields. The study was conducted in a paddy field (Oryza sativa) from August 2024 to October 24 during the rainy season. The quadrant method is involved in insect collection. The process entails arranging ropes of uniform length at right angles to create squares of suitable dimensions and documenting the count of various species within the quadrant. There were 2 quadrants in a single field and nearly 15 paddy fields were selected. The data was collected from August 2024 to October 2024 through net sweeping and handpicking revealed the diversity of insects in rice fields, highlighting their richness and rarity. The collected insects comprises of 9 orders, 21 families, and 33 species (191 individuals). The orders and number of individuals include Diptera, Hemiptera, Mantodea, Orthopteran, Lepidoptera, Hymenoptera, Odonata [Heliocypha bisignata, Ischnura aurora, Lestes viridulus, Aciagrion occidentale, Acisoma variegatum], Thysanoptera and Coleoptera. Quadrant method is used to study insect communities where different indices were used like Index of dominance = 2.0638, Index of frequency: =0.9961, Shannon Index of general diversity=277.954 and Index of species diversity= 69.10. Rarity Indices of Diptera sp-0.07, Hemiptera sp-6.25, Mantodea sp-66.66, Orthopteran sp-12.82, Lepidoptera sp-3.546, Hymenoptera sp-38.46, Odonata sp-5.319, Thysanoptera sp-96.15 and Coleoptera sp-10.10." (Author)] Address: Sarwat, M.S., G. M. Vedak College of Science, Tala, District Raigad, India. Email: drmirzashah@gmail.com

24433. Satour, A. (2025): Les macroinvertébrés des Hauts Plateaux du nord-est algérien. Thèse en vue de l’obtention du Diplômede, Doctorat en Troisième Cycle, Faculté des Sciences de la Nature et de la Vie et Sciences de la Terre et de l’Univers, Département d´Écologie et Génie de l´Environnement, Laboratoire de domiciliation: Laboratoire de Conservation des Zones Humides, Université 8 Mai 1945 Guelma: XIII, 113 pp. (in French, with English and Arabian summaries) ["Wetlands are important naturel resources. In Algeria, especially in the northeastern part, wetlands contain extremely rich biodiversity, but it is declining and rarely protected from anthropogenic pressures. The main objective of this study is contribute to a better knowledge of macroinvertebrates in Oum El Bouaghi region, high plain of eastern Algeria. The study was carried out at 31 stations, selected according to their accessibility, vegetation cover and substrate. Sampling was carried out monthly over a period running from September 2019 to August 2020. Results of this study were used to establish a checklist of macroinvertebrates. Insects represent the richest class with 40 families. In total 1351 Odonata individuals (including 1192 larvae and 159 adults) belonging to 18 species and 6 families were successfully collected during the study period. No significant differences were detected of abundance and species richness of Odonata between lotic and lentic systems (two-way Anova test, p= 0.84 and two-way Anova, p=0.072 respectively). This study also allowed the counting of 18 taxa of aquatic Hemiptera divided into 8 families. The results of Mann-whitney test revealed a significant difference in the total abundance of Hemiptera between the lotic and lentic systems (Mannwhitney test, p= 0.037), whereas no significant difference in richness was detected by T-test between the two systems (T-test, p=0.63). Among 120 Trichpterans, Hydropsyche resmineda was the most dominant species (82%), followed by Mesophylax aspersus (17%), while Hydroptila sp was the least presented species. Our study also identified 10 species of Larges Branchiopodes, including seven Anostraca, two Notostraca and a single species of Spinicaudata." (Author) The following odonate species are listed: Platycnemis subdilatata, Calopteryx haemorrhoidalis, Lestes virens, Chalcolestes viridis, Sympecma fusca, Enallagma deserti, Ischnura graellsii, Coenagrion mercuriale, C. caerulescens, Trithemis annulata, Erythromma lindenii, Anax parthenope, A. imperator, Orthetrum nitidinerve, O. chrysostigma, Sympetrum fonscolombii, S. striolatum, and Crocothemis erythraea.] Address: https://dspace.univ-guelma.dz/xmlui/bitstream/handle/123456789/16896/THESE%20DE%20DOCTORAT%20SA T-OUR%20ABDELLATIF.pdf?sequence=1&isAllowed=y

24434. Shukla, A.; Tiwari, S. (2025): First report of Zygoptera and Anisoptera (Odonata: Insecta) near Johilla river at Umaria district (M.P.). International Journal of Entomology Research 8(3): 36-41. (in English) ["Odonates are potential biocontrol agents for many invertebrates, and biodiversity conservation and protection is a national and international agenda that is responsible for the long-term development of a region or country. The first report of Odonates from the Johilla River in Umaria District has been investigated. During the study 35 species of Odonata Belonging to 6 families. Out of 35 species recorded, 17 species belonged to family Libellulidae (48%) making it the most specious and dominant family. Second most abundant family was Coenagrionidae (29%) which consisted of 10 species. This was followed by family Lestidae 3 Species (08%), Aeshnidae and Gomphidae both with 2 species (6%) each, Platycnemiidae with 1 species (3%). The Shannon's Index of Odonata H=3.210710732 and Simpson C=0.0490-64332 was determined. For the first time, a comprehensive catalogue of odonates recorded from the Umaria district's Johila river area is presented. More research is needed to examine sources and a much wider geographic area." (Authors)] Address: Shukla, A., Faculty, Dept Zool., Govt. M. H. Coll. of H. Science & Sci., Jabalpur, Madhya Pradesh, India

24435. Siddi, L.; Battisti, A.; Gheza, G.; Leandri, F.; Sindaco, R.; Soldato, G.; Pegolo, R.; Brambilla, M.; Assandri, G. (2025): Distribution and ecology of the threatened Siberian winter damselfly (Sympecma paedisca) at the southernmost margin of its European range. Journal of Insect Conservation (2025) 29:33: 15 pp. (in English) ["Insects are under global threat from human activities, with aquatic species particularly vulnerable. S. paedisca, a Palearctic damselfly that overwinters as an adult, has undergone significant declines in Europe and is classified as 'Critically Endangered' in Italy. Poor knowledge about its distribution and ecology in the country prevents effective conservation actions. This study aims to: (1) assess the species' current and historical range in Italy, (2) describe habitat selection outside the breeding season, (3) identify breeding habitat preferences, and (4) evaluate the role of protected areas for its conservation. We collected data from the literature, unpublished records, citizen science, and targeted field surveys, significantly expanding knowledge on distribution, and specifically on breeding areas. The species' range is now restricted to 4824 km² in northwestern Italy, representing a marked contraction over the past century. During winter, S. paedisca shows a strong preference for heathland, shrubland, and fallows, while avoiding urban areas, annual crops, woodland, and rice fields. Conversely, rice fields and their associated marginal habitats were identified as key breeding habitats, an ecological aspect previously overlooked. Only 20% of its breeding sites are included within protected areas. Implications for insect conservation: We showed the importance of lowland heathlands (as overwintering habitats) and rice fields (as breeding habitats) for the conservation of S. paedisca in Italy. The main threats to the species are forest encroachment on heathlands and the transition to dry rice cultivation in rice fields. This is harshened considering that only one-fifth of the breeding sites are protected.] Address: Siddi, L., Dipartimento di Scienze e Innovazione Tecnologica, Univ. del Piemonte Orientale "Amedeo Avogadro", 15121 Alessandria, AL, Italy. Email: leonardo.siddi@uniupo.it

24436. Suwarno; Saidi, A.Y.; Yasmin, Y.; Siregar, Z. (2025): Diversity and spatial distribution of dragonflies (Odonata) at Soraya Research Station, Leuser Ecosystem Area, Northern Sumatra, Indonesia. Biodiversitas 26(2): 681-689. (in English) ["Odonata, a fascinating subject of study, are distributed from the tropics, subtropics to the temperate zones, and the type of habitat strongly influences their presence. This research, conducted from February to May 2021, holds substantial role as it aimed to investigate the dragonfly species in several habitats at the Soraya Research Station, Leuser Ecosystem Area, Northern Sumatra, Indonesia, and analyze their diversity index values. Samples were meticulously collected in the forest, scrub, and river habitats, which collected data from February to March between 9:00 am to 3:00 pm. Three different location points for each habitat were selected with five transect lines, each 200 m long and 5 m wide. The results showed that, dragonflies mostly distributed in the river, while the fewest species were found in the forest habitat. The total in all habitats, Libellulidae dominated both the number of species (39.6%; 19 species) and the number of individuals (30.4%; 129 individuals). In Zygoptera, the majority of species were from Chorocyphidae and Coenagrionidae, about 12.5%, meanwhile the number of individuals was in Calopterygidae (18.63%; 79 individuals). The species of dragonflies were found generally belonging to the category of least concern, but one of them is classified as an endangered species called Rhinocypha orea. The Shannon-Weiner diversity index (H') value of dragonflies in the three habitats was included in the moderate category, underscoring the importance of our findings." (Authors) Regrettably, the paper includes mnay misidentifications.] Address: Suwarno, Dept Biology, Faculty of Mathematics and Natural Sciences, Universitas Syiah Kuala. Jl. Teuku Nyak Arief 441, Banda Aceh 23111, Aceh, Indonesia

24437. Sysiak, M.; Baczyñski, J.; Mikulski, A. (2025): Non-consumptive effects of cannibalism elicit a metabolic response in dragonfly larvae. Ecology and Evolution, 2025; 15:e70852: 7 pp. (in English) ["Predator–prey interactions typically involve changes in metabolic rates associated with hunting, foraging, and activation/maintenance of defense mechanisms. Similar response can result from non-consumptive effects mediated by chemical cues, such as alarm cues (indicating predation), diet cues (signaling food resources), and kairomones (indicating predator or prey availability). While the impact of interspecific chemical communication on energy expenditure is well-studied, the role of conspecific chemical cues is less understood. This study examines non-consumptive effects of cannibalism on metabolic rates in dragonfly larvae (Sympetrum sanguineum). During the respiratory experiment, larvae were exposed to low and high concentrations of conspecific kairomones and kairomones with cues from injured conspecifics to simulate different population densities and conspecific interactions. Our results showed that high concentrations of kairomones and cues from injured conspecifics significantly increased larval respiration rates in comparison with controls and low

concentrations. This suggests that in an environment with constant exposure to each other's cues, larvae face ongoing readiness costs, impacting their individual fitness and population dynamics." (Authors)] Address: Sysiak, Monika, Department of Hydrobiology, Institute of Ecology, Faculty of Biology, University of Warsaw, Zwirki i Wigury 101, Warsaw 02-089, Poland. Email: ma.sysiak@student.uw.edu.pl

24438. Tanczuk, A. (2025): Występowanie ważek (Odonata) w torfiankach na torfowiskach niskich na tle sukcesji tych siedlisk i warunków środowiskowych - Occurrence of dragonflies (Odonata) in peat excavations in fens on the background of the succession of these habitats and environmental conditions. Szkoła Doktorska Nauk Ścisłych i Przyrodniczych, w Instytucie Nauk Biologicznych, Uniwersytet Marii Curie Sklodowskiej w Lublinie: 216 pp. (in Polish, with English summary) ["Peatlands are the most threatened ecosystems on a global scale. Regarding degradation of natural habitats, greater attention has been drawn to the peat excavations on calcareous fens as secondary habitats for aquatic organisms, specific for alkaline fens. Dragonflies are good indicators of biological diversity and environmental conditions, therefore, they were used as a research model. In 2022 and 2023, odonatofauna of 30 peat excavations in the central-eastern Poland has been studied and environmental conditions in these water bodies and their surroundings have been analysed. 44 species of dragonflies have been recorded. Qualitative and quantitative structures of their populations have been characterised. Odonata occurrence has been evaluated on the background of environmental factors. Based on the results, possibilities of using peat excavations on calcareous fens in active protection have been presented. It has been proved that studied peat excavations are important for tyrphophiles (especially to Lestes virens, Nehalennia speciosa, Aeshna juncea, Somatochlora flavomaculata, Sympetrum danae, Leucorrhinia pectoralis). Peat pools are also favourable habitats for the species of small water bodies which are threatened in their natural habitats; the fauna of astatic waters is primarily affected (Lestes barbarus, L. dryas, Sympetrum flaveolum). Furthermore, peat excavations can protect biodiversity of dragonflies in general. Environmental factors most importantly affecting dragonflies were: the structure of the water body, including vegetation within peat excavations and in their surroundings. Moreover, land cover nearby the peat pools was important for odonatofauna. Many of these factors may be modified to use peat excavations for active protection of dragonflies. Such procedures might be invasive to some extent, including alterations of particular parts of the water body, or even, digging it up in order to restore earlier stages of succession. Already existing peat pools may be reused, and if necessary, new ones might be dug up. In addition, it is beneficial to create protected areas with peat pools and even in the vicinity of water bodies." (Author)] Address: Tanczuk, Agnieszka, Institute of Biol.Sciences, Maria Curie-Sklodowska Univ., Poland. Email: atanczuk@gmail.com

24439. Tchibozo, S.; Maes, J.M. (2025): Catalogue illustré des Odonates du Bénin. Revista Nicaraguense de Entomologia 357: 541 pp. (in French, with English summary) ["The 121 Odonata reported from Bénin are presented and illustrated. 20 species are published as new for the Benin fauna, even if some of them are already listed in ADDO web page: Lestes ochraceus, L. pallidus, Africallagma subtile, Agriocnemis exilis, Anax ephippiger, Gynacantha nigeriensis, Lestinogomphus obtusus, Paragomphus genei, Phyllogomphus occidentalis, Phyllomacromia contumax, P. hervei, P. pseudafricana, Hadrothemis camarensis, Nesciothemis nigeriensis, Orthetrum trinacria, Palpopleura jucunda, Rhyothemis fenestrina, Tetrathemis polleni, Tramea limbata and Trithemis kalula." (Author)] Address: Tchibozo, S., Centre de Recherche pour la Gestion de la Biodiversité (CRGB), 04 B.P. 0385 Cotonou, Bénin. Email: s.tchibozo@crgbbj.org

24440. Tomingas, P.; Kont, R.; Lõhmus, A.; Vaikre, M. (2025): Diversity of small waterbodies sustains aquatic biodiversity in drained forest landscapes. Hydrobiologia 852(6): 1677-1692. (in English) ["Small freshwater bodies (streams, pools, ponds, ditches) are biodiversity hotspots that are vulnerable to hydrological modification of landscapes. The impacts of landscape-scale modifications are difficult to study because multiple processes combine (loss, creation and modification of waterbodies and their surroundings). For an insight, we sampled sensitive insect orders (Ephemeroptera, Plecoptera, Trichoptera, Odonata [n=20 species]) in small waterbodies in naturally comparable more and less drained forested catchments in Estonia. We asked how the landscape-scale species richness, abundance and assemblage composition are formed by contributions of different waterbodies. The mean abundances and assemblages were similar, but overall species richness was higher in more drained landscapes, primarily due to added man-made ponds (with distinct assemblages) and the heterogeneous surroundings of waterbodies. Ditches did not host specialist species and could not compensate for the loss of natural waterbodies. Natural pools supported the fewest species, but at a comparable mean abundance with the other waterbody types. The results indicate that a mid-term landscape-scale impact of forestry drainage on freshwater biota depends on which waterbodies and how abundantly are added and retained. To better regulate hydrological interventions, it is necessary to develop such regionally observed patterns into a functional understanding of long-term effects across different landscapes." (Authors)] Address: Tomingas, Piia, Institute of Ecology and Earth Sciences, University of Tartu, J. Liivi 2, 50409, Tartu, Estonia. Email: piia.tomingas4@gmail.com

24441. Tsoumou, A.; Olabi-Obath, D.B.C.; Mikia, M.; Dirat, I.M. (2025): Diversity of entomofauna of the Scientific City of Brazzaville (Republic of Congo). Open Journal of Ecology 15: 135-152. (in English) ["The entomofauna in the Republic of Congo is very little known. Studies carried out in natural forests are few. It is in this context that this inventory of entomofauna was carried out from April to July 2022 in the Scientific City Forest. The general objective is to contribute to the knowledge of the trapping, mowing and sight hunting; the three types of traps used are: Barber pots, colored plates and aerial traps. This study made it possible to invent 1523 specimens belonging to 106 species, 99 genera, 59 families and 12

orders. The order Diptera is the most abundant and richest in species (47% and 26%). This order is followed by Hymenoptera (23% and 23%). Formicidae (14%) and Calliphoridae (13%) are the most abundant families. The Formicidae family presents the greatest species richness (7%), Calliphora sp and Polyrhachis cyaniventris present the highest specific relative abundance of the entire collection. These preliminary results of the entomofauna of Scientific City constitute a database. However, this study must be continued and extended to other areas of Brazzaville, using other capture techniques and taking into account the seasons." (Authors) The authors list three odonate taxa: Libellula sp. Palpopleura lucia, and Aeshna affinis [this is a misidentification].] Address: Tsoumou, A., Lab. of Research of Animal Biology and Ecology, ENS, University Marien NGOUABI, Brazzaville, Congo. Email: anthelmejordy@gmail

24442. Verekar, P.; Baloor, S.S.; Yusoff, H.; Magami, I.A.B.; Kamangar, S.; Zuber, M. (2025): Aerodynamic performance of dragonfly-inspired wings in gliding flight for varying angle of attack and Reynolds number: a numerical study. Progress in Computational Fluid Dynamics 25(1): 54-61. (in English) ["This paper numerically investigates the aerodynamic performance of dragonfly-inspired wings for gliding flight. Dragonfly hind wing morphology (planform and thickness) is considered to create a three-dimensional model. The morphology was obtained from the Aethriamanta brevipennis (Scarlet Marsh Hawk) species of Odonata using a digital micrometer instrument and scanning electron microscope. Gliding flight is known for energy-saving applications. The present study was conducted to assess the effects of the angle of attack (a) (0° to 40°) on the glide performance. The Reynolds numbers of 550, 1,400, and 10,000 were used. The flow separation was witnessed beyond 10° of the angle of attack, and the peak value of glide ratio was near 10° angle of attack. This study shows that dragonfly will sustain flight at Reynolds number of 550 and 1,400 by orienting its wing for an angle of attack of 10°. This study has potential to aid in developing an appropriate wing orientation for insect-scale aerial vehicle applications." (Authors)] Address: Verekar, P., Dept of Aeronautical & Automobile Engineering, Manipal Institute of Technology, Manipal Academy of Higher Education, Manipal, Karnataka, 576104, India

24443. Verekar, P.P.; Shenoy B., S.; Yusoff, H.; Magami, I.A.B.; Kamangar, S.; Zuber, M. (2025): Analysing the aerodynamic performance of dragonfly-inspired wing in forward flight: A computational approach. CFD Letters 17(6): 28-44. (in English) ["This paper presents a numerical investigation into the forward flight dynamics of a dragonfly-inspired wing [Aethriamanta brevipennis]. A three-dimensional (3-D) profiled wing model, specifically the right hind wing, was utilized for simulations. The wing model featured a tapering thickness from the wing root to the wing tip and from the leading edge to the trailing edge, replicating the morphological characteristics observed in dragonfly wings. Morphological data were acquired using a digital micrometre instrument, DSLR camera and Scanning Electron Microscope. The study aimed to evaluate the impact of advance ratio on the aerodynamic performance of the dragonfly-inspired wing during forward flight. Analysis was conducted on a single-degree-of-freedom flapping mechanism, with a flapping frequency set at 36 Hz to mimic the natural wingbeat frequency of a dragonfly. Results revealed a notable pressure disparity between the upper and lower surfaces during the downstroke, indicative of substantial lift generation during flapping motion. Additionally, the visualization of the leading-edge vortex formation provided further insights into the aerodynamic mechanisms at play. Overall, this study contributes valuable insights into the aerodynamic performance of insect-scale flapping wing micro air vehicles, offering potential advancements in their design and development" (Authors)] Address: Verekar, P.P., Department of Aeronautical and Automobile Engineering, Manipal Institute of Technology, Manipal, Manipal Academy of Higher Education, Manipal 576104, India

24444. Vijayakumaran, V.; Sadasivan, K.; Nair, V.P. (2025): Odonata diversity of mid-elevation catchments of the Bavali river from Coorg landscape of central Western Ghats, peninsular India. Entomon 50(1): 47-60. (in English) ["The odonate diversity and distribution of the mid-elevation catchment area of Bavali River in the Coorg landscape of central Western Ghats is discussed. A total of 114 species of odonates including 32 Western Ghat endemic species were recorded from the study areas of Kanichar Gramapanchayath (KGP) which include 69 Anisoptera and 45 Zygoptera. Family Libellulidae dominated the odonate diversity with 39 species followed by Coenagrionidae (18 species) and Gomphidae (15 species). Cyclogomphus flavoannulatus Rangnekar et al., 2019 reported in this study is the first report from Coorg landscape of central Western Ghats. The study area harbours 52.53% of the Western Ghats (WG) and 60.64% of the odonate diversity of Kerala. Additionally, it includes 36.78% of WG and 42.67%of endemic odonates of Kerala. About 28.07% of the odonates recorded from the area are endemic to WG. Among the 114 species identified from the area, as per the IUCN Red List of Threatened species, there were 87 'least concern' species, 18 species were 'data deficient', four species belong to 'near threatened' category, three species belong to 'not assessed' category and two species belong to 'vulnerable' category. None of the species listed in the study area is protected under the Indian Wildlife (Protection) Amendment Act, 2022. This area lying outside any designated Protected Area harbours the largest number of odonate species in any region of Kerala known so far and shows high diversity and endemism comparable to that of other protected areas." (Authors) Records of the following species are figured: Burmagomphus chaukulensis, Melligomphus acinaces, Gomphidia kodaguensis, Epithemis mariae, Microgomphus souteri, Merogomphus tamaracherriensis, Megalogomphus hannyngtoni, Idionyx saffronata, Euphaea dispar, Ceriagrion chromothorax, Indosticta deccanensis, Pseudagrion indicum, Euphaea fraseri, Elattoneura souteri, Protosticta francyi, and P. mortonii.] Address: Vijayakumaran, V., Vipanchika, Kanichar 670674, Kannur, Kerala, India. Email: drvibhunair@gmail.com

24445. Ware, J.L.; Hulick, C.P.; Newton, L.; Kohli, M.K.; Tolman, E.R.; Goodman, A.; Beatty, C.D.; Guralnick, R.; Abbott, J.C.;

Frandsen, P.B.; Soto-Centeno, J.A.; Bybee, S. (2025): Bringing Shadowdragons to light: Neurocordulia (Anisoptera: Corduliidae) systematics. International Journal of Odonatology 28: 1-15. (in English) ["Neurocordulia, commonly called shadowdragons, are crepuscular dragonflies, flying mainly at dusk. The genus comprises seven species [Neurocordulia alabamensis, N. obsoleta, N. michaeli, N. yamaskanensis, N. xanthosoma, N. virginiensis, N. molesta.], which occur across the eastern part of Canada and the US. Here, we used targeted enrichment probes to sequence ~1000 loci for all specimens of each species, allowing for the first phylogenetic assessment of the genus. Additionally, we collected individuals of N. yamaskanensis from a population in Ontario, Canada, and used whole genome resequencing to estimate population structure. Beyond broadly reconstructing the phylogeny of Neurocordulia, we provided a comprehensive bibliography review of past research on the genus, a key to the species, and distribution models for each species." (Authors)] Address: Ware, Jessica, American Museum of Natural History, New York, NY, 10024, USA. Email: jware@amnh.org

24446. Weiß, S.B.; Allgeier, S.; Brühl, C.; Frör, O. (2025): Assessing the trade-offs in more nature-friendly mosquito control in the Upper Rhine region. Journal of Environmental Planning and Management 68(1): 84-103. (in English) ["Recent studies show that the widely used mosquito control agent Bti has more negative effects on nature than previously expected. However, it is not yet clear whether people support a more nature-friendly mosquito control, as such an adaptation could potentially lead to higher nuisance. This study explores this question by assessing the willingness to pay for an adapted mosquito control strategy that reduces the use of Bti, while maintaining nuisance protection within settlements. For this purpose, a Contingent Valuation Study was conducted in the German Upper Rhine Valley. The results show that the majority of the surveyed population attaches a high value to a more nature-friendly mosquito control in terms of willingness to pay and is willing to accept a higher nuisance outside the villages. Policy makers should, thus, foster the development and implementation of such more nature-friendly mosquito control strategies to increase both environmental and societal benefits." (Authors) The study includes references to negative effects of Bti to Odonata.] Address: Weiß, S.B., Institute for Environmental Sciences, Environmental Economics, RPTU Kaiserslautern-Landau, Landau, Germany. Email: soeren.weiss@rptu.de

24447. Wilson, K. (2025): New books. Agrion 29(1): 26-28. (in English) [Reviews of three books: (1) Measuring the pulse of European biodiversity. European Red List of Dragonflies & Damselflies (Odonata), (2) Dragonfly Behavior. Discovering the Dynamic Life of an Ancient Order of Insects, and (3) Dragonflies and Damselflies of the World. A Guide to Their Diversity.] Address: Wilson, K.D.P., 18 Chatsworth Rd, Brighton, E Sussex, BN1 5DB, UK. E-mail: kdpwilson@gmail.com

24448. Vikhrev, N.E. (2025): Anthropogenic origin of island entomofaunas: a case study of Diptera and Odonata. Acta Biologica Sibirica 11: 385-400. (in English) ["Several examples of modern entomofaunas (particularly orders Diptera and Odonata) of remote islands, and to a lesser degree, recently colonised continents were considered. The author presents taxonomic, biogeographical, logical, and molecular-genetic arguments to support the idea that the modern composition of these entomofaunas can be effectively explained by the anthropogenic invasion that has occurred within the last 3000 years. The author estimates that rare undoubted cases of natural colonisation do occur on islands once every one to three million years. It is assumed that preanthropogenic entomofaunas were poorer, but much more endemic. If so, entomologists should consider this when proposing taxonomic hypotheses. Molecular genetic methods can verify the author's conceptual idea." (Author)] Address: Vikhrev, N.E., Zool. Mus. Moscow State Univ., Bolshaya Nikitskaya St., 2, Moscow, 125009, Russia. Email: nikita6510@yandex.ru

24449. Yu, Y.; Fu, B.; Liu, J. (2025): Assessment of the biodiversity value of benthic macroinvertebrates in the Tuojiang River Basin, Chengdu. Sustainability 2025, 17(2), 446; https://doi.org/10.3390/su17020446: 28 pp. (in English) ["Benthic macroinvertebrates are crucial to the health of river ecosystems. However, their conservation status is often overlooked. Due to their limited mobility and sensitivity to habitat changes, their survival is threatened. Given the current lack of research on their value composition and evaluation, this study refers to the total economic value (TEV) framework to preliminarily construct a systematic evaluation framework for freshwater benthic macroinvertebrates. Through field surveys, questionnaires, and market survey data, the value composition of benthic macroinvertebrates in the Tuojiang River Basin of Chengdu was systematically clarified. The total value was monetized using methods such as the market price method, substitute market method, and simulated market method. The main conclusions are as follows: (1) The biodiversity value of benthic macroinvertebrates in the study area ranges from 6.36 × 108 to 12.76 × 108 CNY/a, accounting for 0.17–0.34% of the region's 2019 GDP. The various values in order of proportion are as follows: non-use value > direct service value > Direct Material value > indirect use value. This indicates that this biological group has enormous potential value and significant conservation importance. (2) The proportions of the value amounts of various species in the total value differ. The proportions of Viviparidae, Odonata [according supplementary material: Coenagrionidae and Libellulidae], Ephemeroptera, and Palaemonidae are relatively high, reaching 9.8–23.8%. The proportions of Atyidae, Semisulcospiridae, and Bithyniidae are about 5%. The proportions of Unionidae, Corbiculidae, and Aillpullaridae are less than 3%. These differences are mainly influenced by factors such as species population numbers in the region, public value perception, aesthetic preferences, and dietary habits. This evaluation framework scientifically and comprehensively assesses the biodiversity value of regional benthic macroinvertebrates, providing a reference for the value assessment of other biological groups within the region and offering a scientific basis for the conservation and sustainable utilization of the target biological groups." (Authors)] Address: Fu, B., Inst. of Mountain Hazards & Environment, Chinese Acad. Sciences, Chengdu 610200, China. Email: fubin@imde.ac.cn

24450. Zhao, N.; Sang, C.; Cao, R.; Yao, Z.; Gao, F.; Tian, S.; Hou, Y. (2025): Impacts of mining on the diversity of benthic macroinvertebrates-A case study of molybdenum mining area in Luanchuan county. Environmental Pollution, 364, 125335: 12 pp. (in English) ["Highlights: •Mining activities have altered macroinvertebrate communities distribution patterns. •The response of macroinvertebrate Functional Diversity to mining activities has been poorly studied. •Mining resulted in a decrease in TaD and FaD of macroinvertebrates. •Mining resulted in an increase in TßD and FßD of macroinvertebrates. •FßD was more sensitive to heavy metal exceedance, compared with TßD. Abstract: Mineral exploitation is one of the human activities that seriously affect freshwater ecosystems. It is of great significance to study the impact of mining on the α and ß diversity of macroinvertebrates. This study reveals the response of taxonomic and functional α and ß diversity of macroinvertebrates to mining activities in the Luanchuan molybdenum mining area. A total of 40 sets of macroinvertebrates, sediment and water samples in the Taowan North River (TR), Yu River (UR) and Hongluo River (HR) in the molybdenum mining area were collected. The results show that: 1) the mining activities led to obvious differences in the environmental factors of the three rivers. The heavy metals in the sediments and water bodies of TR and UR showed different degrees of exceedance, while there was no exceedance of heavy metals in HR; 2) The taxonomic and functional a diversity was much lower in the TR and the UR than in the HR. The concentrations of heavy metals in sediments and water bodies were significantly negatively correlated with the taxonomic and functional a diversity; 3) Mineral extraction resulted in significant differences in macroinvertebrate ß diversity among the three rivers. The taxonomic and functional ß diversity of the macroinvertebrate communities in TR and UR was much higher than that in HR. The turnover and nestedness of functional ß diversity showed significant differences. Functional ß diversity was more obviously affected by heavy metal exceedance than taxonomic ß diversity. Nestedness were more sensitive to exceedance of heavy metals than turnover. The results of this study can provide a theoretical basis for ecological restoration and protection of rivers in mining areas." (Authors) Odonata are treated at order level.] Address: Zhao, Na., College of Agricultural Equipment Engineering, Henan University of Science and Technology, Luoyang, 471000, China. Email: zhn@haust.edu.cn

24451. Zhi, Y., Shen, H., Ji, A. (2025): Analysis of the climbing and forward flight mechanism of dragonflies. In: Hu, J., Zhang, J. (eds) Proceedings of the 2nd International Conference on the Frontiers of Robotics and Software Engineering (FRSE 2024). FRSE 2024. Lecture Notes in Networks and Systems, vol 1271. Springer, Singapore. https://doi.org/-10.1007/978-981-96-3013-416: 161-169. (in English) ["In recent years, bionic micro air vehicles have garnered significant attention. Compared to other insects and birds, dragonflies exhibit unique flight capabilities, making them one of the best bionic prototypes. To better understand the flight characteristics of dragonflies and to delve into their flapping aerodynamics, this study investigates the kinematic parameters of dragonflies during escape flight (climbing) and normal flight (forward flight). Using four synchronously triggered high-speed cameras, the motion of the dragonflies was tracked and captured, followed by system calibration, feature point matching, and 3D reconstruction. Analysis revealed that dragonflies utilize a figure-8 wingtip trajectory during both climbing and forward flight. The intersection of the trajectory occurs near the pronation phase, which helps generate higher lift and thrust. During forward flight, the phase difference between the forewings and hindwings is smaller compared to climbing, with the downstroke occupying approximately 24% more of the flapping cycle during forward flight than climbing. Additionally, the results indicate that dragonflies do not maintain a fixed linear flight path in either state but exhibit periodic changes in the pitch angle. Climbing requires greater pitch angles and variations in pitch angle compared to forward flight to achieve higher lift." (Authors)] Address: Ji, A., Lab of Locomotion Bioinspiration & Intelligent Robots, The College of Mechanical and Electrical Engineering, Nanjing University of Aeronautics and Astronautics, Nanjing, 210016, China

24452. Zizka, V.; Schwesig, K.; Engel, N.; Hölzel, N.; Scherber, C. (2025): Environmental DNA supports importance of heterogeneous pond landscapes for arthropod diversity conservation. Ecosphere 16(2), e70171: 14 pp. (in English) ["Freshwater ponds host diverse arthropod communities, but conservation frameworks are scarce. Heterogeneous pond mosaics of various sizes and successional stages can develop during raw material extraction in mining sites, acting as refugia for a variety of species. Here, we investigate arthropod diversity and conservation status across lakes and ponds in mining sites; analyze how water body size, age, and vegetation cover affect diversity patterns; and discuss how results can contribute to management actions and conservation schemes. Using environmental DNA metabarcoding, we determine arthropod diversity at 55 pond and lake plots located in active mining sites in Germany. We assess the effect of structural parameters on arthropod species richness, beta diversity, and the occurrence of rare and endangered species. Overall, we detected 436 arthropod species [including Sympetrum striolatum], many of which lacking a threat status evaluation, potentially hampering analyses of conservation aspects. We identify different effects of structural variables on species richness and beta diversity, and variable responses at the order level. Further, results reveal comparable diversity of accumulated pond network area, compared with single large water bodies of similar size, supporting high importance of heterogeneous pond networks for arthropod diversity conservation. Our study shows that systematic biodiversity management concepts both during active mining and at later stages of succession will be needed. Monitoring should go beyond just measuring taxonomic richness, including also assessments of community composition, the presence of rare and endangered taxa, and functional diversity." (Authors)] Address: Zizka, Vera, Centre for Biodiversity Monitoring & Conservation Science, Leibniz Institute for the Analysis of Biodiversity Change (LIB), Bonn, Germany. Email: v.zizka@leibniz-lib.de