

Odonatological Abstract Service

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1997

5748. Arnqvist, G. (1997): The evolution of animal genitalia: distinguishing between hypotheses by single species studies. *Biological Journal of the Linnean Society* 60: 365-379. (in English). ["Rapid evolution of genitalia is one of the most general patterns of morphological diversification in animals. Despite its generality, the causes of this evolutionary trend remain obscure. Several alternative hypotheses have been suggested to account for the evolution of genitalia (notably the lock-and-key, pleiotropism, and sexual selection hypotheses). Here, I argue that thorough intraspecific studies are the key to gaining insight into the patterns and processes of genitalic evolution. Critical assumptions and predictions that may be used to distinguish between the different hypotheses are identified and discussed. However, current knowledge of selection on genitalia, or even of the degree of phenotypic and genotypic variability of genital morphology, is highly limited, allowing only a very tentative assessment of the various hypotheses. In-depth single species studies of current patterns and processes of selection on genitalia are badly needed, and a single species research program is briefly outlined." (Author) The paper includes many references to Odonata.] Address: Arnqvist, G., Dept. of Animal Ecology, University of Umeå, S-901 87 Umeå, Sweden

5749. Kruuk, L.E.B.; Gilchrist, J.S. (1997): Mechanisms maintaining species differentiation: predator-mediated selection in a *Bombina* hybrid zone. *Proceedings of the Royal Society B: Biological Sciences* 264(1378): 105-110. (in English). ["Mechanisms which prevent gene flow will maintain differentiation between species, and therefore contribute to biological diversity. We describe an experimental study of such mechanisms in a hybrid zone between the fire-bellied toad *Bombina bombina* and the yellow-bellied toad *B. variegata*. In this system, preference for different breeding habitats reduces the frequency of hybridization. A comparison of habitat ecology shows that the semi-permanent ponds in which *B. bombina* usually breeds have higher densities of aquatic predators than the temporary puddles typically used by *B. variegata*. We

test for behavioural adaptations in tadpoles to these different levels of predation. *B. bombina* tadpoles are significantly less active than *B. variegata*, both before and after the introduction of a predator to an experimental arena; this reduces their vulnerability as many predators detect prey through movement. Behavioural differences translate into differential survival: *B. variegata* suffer higher predation rates in laboratory experiments with three main predator types (*Triturus* sp., *Dytiscus* larvae, *Aeshna* nymphs). This differential adaptation to predation will help maintain preference for alternative breeding habitats, and thus serve as a mechanism maintaining the distinctions between the two species." (Authors)] Address: Kruuk, Loeske, Institute of Cell, Animal and Population Biolog., Uni. of Edinburgh, West Mains Road, Edinburgh EH9 3JT, UK. E-mail: loeske@tattoo.ed.ac.uk

5750. Williamson, D.L.; Adams, J.R.; Whitcomb, R.F.; Tully, J.G.; Carle, P.; Konai, M.; Bove, J.M.; Henegar, R.B. (1997): *Spiroplasma platyhelix* sp. nov., a new mollicute with unusual morphology and genome size from the dragonfly *Pachydiplax longipennis*. *International journal of systematic bacteriology* 47(3): 763-766. (in English). ["*Spiroplasma* strain PALS-1T from the gut of the dragonfly *Pachydiplax longipennis* was shown to be distinct from other species, groups, and subgroups of the genus *Spiroplasma* as determined by reciprocal serological metabolism inhibition and deformation tests. However, this strain cross-reacted extensively with representatives of other groups when it was used as an antigen. Electron microscopy of cells of strain PALS-1T revealed cells surrounded by a single cytoplasmic membrane. Light microscopy revealed helical cells that exhibited twisting motility rather than rotatory or flexing motility. Variations in the tightness of coiling were transmitted from one end of the helix to the other. The strain was resistant to penicillin, which confirmed that no cell wall was present. The organism grew well in M1D and SP-4 liquid media under either aerobic or anaerobic conditions. Growth also occurred in 1% serum fraction medium and in conventional horse serum medium. The optimum temperature for growth was 30°C, at which the doubling time was 6.4 h. Multiplication occurred at temperatures from 10 to 32°C. Strain PALS-1T catabolized glucose and hydrolyzed arginine but not

urea. The guanine-plus-cytosine content of the DNA was 29.61 mol%. The genome size was 780 kbp, the smallest genome size in the genus *Spiroplasma*. Strain PALS-1 (5 ATCC 51748) is designated the type strain of a new species, *Spiroplasma platyhelix*." (Authors)] Address: Williamson, D.L., Department of Anatomical Sciences, State University of New York, Stony Brook, New York 117941, USA

5751. Winemiller, K.O.; Adite, A. (1997): Convergent evolution of weakly electric fishes from floodplain habitats in Africa and South America. *Environmental Biology of Fishes* 49: 175-186. (in English). ["An assemblage of seven gymnotiform fishes in Venezuela was compared with an assemblage of six mormyriiform fishes in Zambia to test the assumption of convergent evolution in the two groups of very distantly related, weakly electric, nocturnal fishes. Both assemblages occur in strongly seasonal floodplain habitats, but the upper Zambezi floodplain in Zambia covers a much larger area. The two assemblages had broad diet [including Odonata] overlap but relatively narrow overlap of morphological attributes associated with feeding. The gymnotiform assemblage had greater morphological variation, but mormyriiforms had more dietary variation. There was ample evidence of evolutionary convergence based on both morphology and diet, and this was despite the fact that species pairwise morphological similarity and dietary similarity were uncorrelated in this dataset. For the most part, the two groups have diversified in a convergent fashion within the confines of their broader niche as nocturnal invertebrate feeders. Both assemblages contain midwater planktivores, microphagous vegetation dwellers, macrophagous benthic foragers, and long-snouted benthic probers. The gymnotiform assemblage has one piscivore, a niche not represented in the upper Zambezi mormyriiform assemblage, but present in the form of *Mormyrops deliciosus* in the lower Zambezi and many other regions of Africa." (Authors)] Address: Winemiller, K.O., Adite, A., Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77843, U.S.A.

1998

5752. Lau, P.; Bosque, C.; Strahl, S.D. (1998): Nest predation in relation to nest placement in the Greater Ani (*Crotophaga major*). *Ornitologia Neotropical* 9: 87-92. (in English) [Venezuela, bird predator: only 2.5% of the prey were Odonata] Address: Lau, P., Universidad Simón Bolívar, Departamento de Biología de Organismos, Apartado 89,000, Caracas 1080A, Venezuela.

1999

5753. Alencar, Y.B.; Hamada, N.; Magni-Darwich, S. (1999): Stomach content analysis of potential predators of Simuliidae (Diptera: Nematocera) in two lowland forest streams, Central Amazonia, Brazil. *An. soc. entomol. Brasil* 28: 327-332. (in English, with Portuguese summary). [Odonata (Gomphidae, Agrionidae, Libellulidae, Dictyriidae e Coenagrionidae) are treated in the family level.] Address: Alencar, Y.B., Instituto Nacional

de Pesquisas da Amazônia, Entomologia, Caixa postal 478, 69.011-970, Manaus, AM, Brasil.

5754. Englund, R.A.; Filbert, R.B. (1999): Flow restoration and persistence of introduced species in Waikele stream, O'ahu. *Micronesica* 31(2): 143-154. (in English). ["Unintentional stream flow restoration in Waikele Stream, O'ahu, Hawai'i resulted from the demise of sugar cane cultivation on O'ahu and subsequent cessation of direct surface water diversions in 1989. Previous artificial stream studies in Hawai'i have suggested that increases in the base flow of a diverted stream would displace or reduce introduced fish populations. Surveys of Waikele Stream, conducted in 1993 and 1997-1998 from the Waikele Springs area downstream to the beginning of the tidal reach found that despite an increase in stream flow, introduced fish remained abundant and native species appeared to have declined. In fact, two new introduced aquatic taxa, a dragonfly and a shrimp, had appeared. These results indicate that although restoring hydrological conditions is an important first step in overall restoration of degraded aquatic ecosystems, flow restoration alone is not a panacea, especially in O'ahu streams with naturally low discharge rates. For stream and wetland restoration to fully succeed, introduced fish and other alien aquatic species must be eradicated by methods other than simply increasing stream base flows." (Authors) Tab. 2 lists 7 Odonata species, with the exception of *Pantala flavescens* exclusively introduced species.] Address: Englund, R.A., Hawaii Biological Survey, Bishop Museum, 1525 Bernice Street, Honolulu, HI, 96817, USA. E-mail: englund@bishopmuseum.org

2000

5755. De Marco Júnior, P.; Furieri, K.S. (2000): Ecology of *Leptagrion perlongum* Calvert, 1909: a bromeliad-dweller Odonate species. *Boletim do Museu de Biologia Prof. Mello Leitão (Nova Série)* 11/12: 135-148. (in English, with Portuguese summary). ["*Leptagrion* is an Odonate genus completely associated with bromeliads in South-America. Two species are known as threatened in the Atlantic Forest, but they are still poorly studied. Here we attempt to present an overview of the general population ecology and some aspects of the natural history of one of them, *Leptagrion perlongum*, a common species in Santa Lúcia Biological Station (EBSL), Santa Teresa, ES. We gave special attention to the preferences of this species on some bromeliad species present, the general characteristics of the bromeliads where *L. perlongum* was successfully developed, and the pattern of population fluctuation during a year of study. We determined the preferences among bromeliads using an exuviae sampling, and the adult population abundance using a scan sampling in a site with high concentration of bromeliads. *L. perlongum* preferred *Vriesea jongheii*, *Neoregelia magdalenae* and *Nidularium procerum*, and avoided *V. ensiformis*. These preferences were generally explained, not only by differences in volume of water held, but also by effects of habitat preferences and plant aggregation. In 19.1% of the bromeliads exuviae were found in December 1998. The monthly emergence rate in January 1999 was 0,095 adult/bromeliad, with 7.9% of the bromeliads with new exuviae. Adult abundance rose in the rainy season

and the extension of the dry season was considered the primary regulation factor acting on this population." (Authors) Address: De Marco, P., Lab. Ecologia Quantitativa, DBG, Universidade Federal de Viçosa, 36571-000, Viçosa, MG, Brazil. E-mail: pdemarco@mail.ufv.br

5756. Eklöv, P. (2000): Chemical cues from multiple predator-prey interactions induce changes in behavior and growth of anuran larvae. *Oecologia* 123(2): 192-199. (in English). ["Chemical signals are used as information by prey to assess predation risk in their environment. To evaluate the effects of multiple predators on prey growth, mediated by a change in prey activity, I exposed small and large bullfrog (*Rana catesbeiana*) larvae (tadpoles) to chemical cues from different combinations of bluegill sunfish (*Lepomis macrochirus*) and larval dragonfly (*Anax junius*) predators. Water was regularly transferred from predation trials (outdoor experiment) to aquaria (indoor experiment) in which activity and growth of tadpoles was measured. The highest predation mortality of small bullfrog larvae in the outdoor experiment was due to *Anax*, and it was slightly lower in the presence of both predators, probably resulting from interactions between predators. There was almost no mortality of prey with bluegill. The activity and growth of small bullfrog larvae was highest in the absence of predators and lowest in the presence of *Anax*. In the presence of bluegill only, or with both predators, the activity and growth of small bullfrog tadpoles was intermediate. Predators did not affect large tadpole activity and growth. Regressing mortality of small bullfrog tadpoles against activity and growth of bullfrog tadpoles revealed a significant effect for small bullfrog larvae but a non-significant effect for large bullfrog larvae. This shows that the response of bullfrog tadpoles to predators is related to their own body size. The experiment demonstrates that chemical cues are released both as predator odor and as alarm substances and both have the potential to strongly alter the activity and growth of prey. Different mechanisms by which chemical cues may be transmitted to species interactions in the food web are discussed." (Author)] Address: Eklöv, P., Animal Ecology, Department of Ecology and Environmental Science, Umeå University, S-901 87 Umeå, Sweden. E-mail: Peter.Eklov@eg.umu.se

5757. Geest, G.H. van der; Greve, G.D.; Kroon, A.; Kuijl, S.; Kraak, M.H.S.; Admiraal, W. (2000): Sensitivity of characteristic riverine insects, the caddisfly *Cymus trimaculatus* and the mayfly *Ephoron virgo*, to copper and diazinon. *Environmental Pollution* 109: 177-182. (in English). [In fig. 3 & 4, the acute toxicity of diazinon to *Lestes* congener, and that of copper to *Zygoptera* in general are indicated.] Address: Geest, G.H. van der, Dept Aquatic Ecol. & Ecotox., Univ. Amsterdam, Kruislaan 320, NL-1098 SM Amsterdam, The Netherlands

5758. Kovac, T. (2000): Two rare insects from the Mátra Mountains: *Cordulegaster bidentatus* Sélys, 1843 and *Diura bicaudata* (Linnaeus, 1758) (Insecta: Odonata, Plecoptera). *Fol. hist.-nat. Mus. matraensis* 24: 129-131. (in Hungarian, with English summary). [*Thecagaster bidentata* has been unknown from the Mátra Mountains, Hungary so far. Records starting in 1996 are documented in detail.] Address: Kovacs, T., Matra Mus., Kossuth u. 40, HU-3200 Gyöngyös, Hungary. E-mail: koati@matavnet.hu

5759. McIntyre, P.B.; McCollum, S.A. (2000): Responses of bullfrog tadpoles to hypoxia and predators. *Oecologia* 125(2): 301-308. (in English). ["Low dissolved oxygen concentrations present numerous challenges for non-air-breathing aquatic organisms. Amphibian larvae and their predators can respond to oxygen levels by altering their behavior and physiology, but the ecological consequences of these responses are generally unknown. We conducted two laboratory experiments to study the effects of dissolved oxygen on respiratory behavior and susceptibility to predation of larval bullfrogs (*Rana catesbeiana*). In the first, we exposed small, lungless tadpoles to a predatory salamander larva (*Ambystoma tigrinum*) under high and low oxygen conditions. More tadpoles were consumed in high oxygen tanks than in low ones, presumably because salamanders remained near the surface in the low oxygen tanks while most tadpoles rested on the bottom. Tadpole activity depended on both oxygen and predator presence: swimming decreased after addition of salamanders under high oxygen, but increased under low oxygen. In the second experiment, we examined the effect of predator chemical cues on the air-breathing rate of large tadpoles with well-developed lungs under low oxygen conditions. In the presence of chemical cues produced by dragonfly larvae consuming bullfrog tadpoles, air-breathing and swimming were significantly reduced relative to controls. These experiments demonstrate the potential impact of dissolved oxygen on predator-prey interactions, and suggest that outcomes depend on the respiratory ecology of both predator and prey." (Authors)] Address: McCollum, S.A., Department of Biology, Cornell College, Mount Vernon, IA 52314, USA

5760. Pornsin-Sirirak, T.N.; Lee, S.W.; Nassef, H.; Grasmeyer, J.; Tai, Y.C.; Ho, C.M.; Keennon, M. (2000): Mems wing technology for a battery-powered ornithopter. The 13th IEEE Annual International Conference on MEMS, Miyazaki, Japan, January 23-27, 2000: 709-804. (in English). ["The objective of this project is to develop a battery-powered ornithopter (flapping-wing) Micro Aerial Vehicle (MAV) with MEMS wings. In this paper, we present a novel MEMS-based wing technology that we developed using titanium-alloy metal as wingframe and parylene C as wing membrane. MEMS technology enables systematic research in terms of repeatability, size control, and weight minimization. We constructed a high quality low-speed wind tunnel with velocity uniformity of 0.5% and speeds from 1 m/s to 10 m/s. We have tested and have studied the unsteady-state aerodynamics of various types of MEMS wings (including an anisopteran wing). Finally, we built lightweight ornithopters with electricpowered transmission system and have demonstrated successful free flights with flight duration ranges from 5 to 18 seconds." (Authors)] Address: Pornsin-Sirirak, T.N., Caltech Micromachining Laboratory, 136-93, Pasadena, CA 91125, USA

5761. Seino, M.; Kakazu, Y. (2000): Dynamic pattern formation for wings of Pterygota in an eclosion - Pattern analysis for wings with the imago. *Progress of Theoretical Physics Suppl* (1996-2002), No. 138: 600-601. (in English). ["The vein and cell patterns for the fore and hind wing of Lepidoptera, Hemiptera, Orthoptera and Odonata are analyzed and discussed. For vein patterns of them, the fractal properties are shown and the inequality between four orders is obtained. The nature of wings observed by mass distributions for fractal dimen-

sions of the vein pattern is presented." (Authors)] Address: Seino, M. & Kakazu, Y., Faculty of Science, University of the Ryukyus, Okinawa 903-0213, Japan

2001

5762. Hashimoto, H. (2001): Biomimetics research on flying insects for developing high performance, small-sized actuator. Proceedings of the school of engineering of Tokai university 41(2): 25-34. (in Japanese, with English summary). ["This paper describes the development of highperformance, small sized actuators based on the vibration mechanism of flying insects' wings. At first, the three-dimensional observation of flight muscles in some kinds of winged insects such as bees, dragonflies, and cicadae are presented. In the 3-D observation of flight muscles, sequential sections through thoraces are sliced at the thickness of 30 μ m by the rotating knife and taken photos by camera with three-dimensional internal structure microscope automatically and repeatedly. The 3-D images are reconstructed by a computer based on the digital data after recording. From the 3-D observation, it is confirmed that the winged insects can be classified into three groups at least by the differences of morphology of flight muscles. Then, relation between morphology of flight muscles and function of wings are examined experimentally. In the indirect-flight-muscle type of insects, the deflections of thoracic exoskeleton are measured under the static load. The obtained load-deflection diagrams show linear relation between them. In the direct-flight-muscle type of insects, the ultra high speed video camera is used to record the wing motion under the free flight conditions by making use of their nature of high sensitivity to light. The frequencies of wing vibration are determined from the analyses of recorded data on videotapes. It is found that the vibration frequencies depend on the wing mass in the case of losing weight and independent on it in the case of gaining weight. Finally, the application of these knowledges based on the biological experiments to the development of driving circuit and mechanism for small-sized actuator is presented." (Author) Specimens of *Orthetrum albostylum speciosum*, *Sympetrum darwini*, *S. frequens* and *Pantala flavescens* were used in this study.] Address: not transliterated into English language.

5763. Morita, T.; Yamano, K.; Yamamoto, Y.; Ichinose, T. (2001): Dragonfly fauna of the rainwater storage ponds in a rural landscape in Hokudan-cho, Awaji Island, Hyogo Prefecture. Landscape Planning and Horticulture 2: 51-54. (in Japanese, with English summary). ["There are many rainwater storage ponds in the Awaji Island. Especially, Hokudan-cho has more than 3000 ponds. We surveyed dragonfly fauna of 24 rainwater storage ponds from June 2000 to September 2000 in a rural area of north part of Hokudan-cho. All species were recorded for 40 minutes once a month in all ponds. In the result, 37 species were recorded and some species clearly preferred to coastal area or hilly area. However, it is suggested that some microhabitat structures influenced the distribution of dragonfly species." (Authors)] Address: Ichinose, T., Lab. of Landscape Planning, Awaji Landscape Planning and Horticulture Academy (ALPHA), Institute of Natural and Environmental Science, University of Hyogo, Nojimatokiwa 954-2, Ho-

kudan-cho, Tsuna-gun, Hyogo, Japan. E-mail: tomohiroichinose@yahoo.co.jp

5764. Wells, R.D.S.; Clayton, J.S. (2001): Ecological impacts of water net (*Hydrodictyon reticulatum*) in Lake Aniwhenua, New Zealand. New Zealand Journal of Ecology 25(2): 55-63. (in English). ["The ecological impacts of *Hydrodictyon reticulatum* blooms (1989-94) were studied at Lake Aniwhenua (a constructed lake) in North Island, New Zealand by collating fish, invertebrate and macrophyte data collected towards the end of a four year bloom period and following its decline. *Hydrodictyon reticulatum* had some localised impacts on the biota of the lake. Some macrophyte beds were smothered to the extent that they collapsed and disappeared, and dense compacted accumulations of *H. reticulatum* caused localised anoxic conditions while it decayed. However, fish and some invertebrates in the lake benefited from the *H. reticulatum* blooms. High numbers of *Ceriodaphnia* sp. (maximum, 5.5 x 10⁴ m⁻²) were recorded amongst *H. reticulatum*, and gastropods were exceptionally abundant, the most common being *Potamopyrgus antipodarum* (maximum, 1.8 x 10⁵ m⁻²). *Hydrodictyon reticulatum* was consumed by three species of common gastropods in experimental trials, with *Austropeplea tomentosa* consuming up to 1.3 g dry weight *H. reticulatum* g⁻¹, live weight of snail day⁻¹. Gastropods comprised the major portion of the diet of *Oncorhynchus mykiss* in Lake Aniwhenua during and after the *H. reticulatum* bloom. A marked peak in sports fishing (with exceptional sizes and numbers of fish caught) coincided with the period of *H. reticulatum* blooms and the abundant invertebrate food source associated with the blooms." (Authors) Odonata resp. *Procordulia grayi* are included in the analysis.] Address: Wells, R., National Institute of Water and Atmospheric Research, P.O. Box 11 115, Hamilton, New Zealand. E-mail: r.wells@niwa.cri.nz

2002

5765. Celik, K. (2002): Community structure of macrobenthos of a Southeast Texas sand-pit lake related to water temperature, pH and dissolved oxygen concentration. Turk. J. Zool. 26: 333-339. (in English, with Turkish summary). [Texas, USA; Barry's lake is a warm monomictic lake and no anoxic conditions were observed at any depth during the entire study period (June 1995 to February 1996, which covered climatic extremes). "A total of 50 taxa and 5614 individuals of macrobenthos were collected. The dominant organisms were *Chaoborus punctipennis* (Say), *Limnodrilus hoffmeisteri* (Claparede), and *Dero obtusa* (Udekem). The only established populations at 6.5 m were *Chaoborus punctipennis*, *Limnodrilus hoffmeisteri*, and *Chironomus* sp. Species diversity ranged from 0.9 to 3.9 and generally decreased with depth. The number of individuals increased with depth, while the species and species diversity decreased with depth." (Author) The table includes four odonate taxa.] Address: Celik, K., Department of Biology, Balikesir University, 10100 Balikesir, Turkey

5766. Holmen, M. (2002): Bidrag om fund og status for de i Danmark rødlistede arter af guldsmede og vandnymfer. <http://hem.passagen.se/trollslaenda/nof/pdf/odroe.pdf>: 66 pp. (in Danish, with English summa-

ry). ["A contribution on records and status for the Danish Red List dragonflies and damselflies (Odonata). This publication presents Danish records and status reviews since 1764 for the 21 species of Odonata in the Danish 1997 Red List. Records earlier than 2000 and some additional from 2000-2001 have been included. It has been compiled from studies of some major collections, literature and archived notes and by several private contributions of records. However, some additional records no doubt also exist, as not all relevant collections have been studied and not all information on Danish Odonata records have been available for this publication. Since 1991, at least 4 species have been recorded for the first time from Denmark, but their status and localities are not presented, as they are not in the 1997 Red List and at least partly would appear less relevant for the list. A brief review on previous surveys of Danish Odonata is provided." (Author) Available at: <http://hem.passagen.se/trollslaenda/nof/pdf/odroe.pdf>] Address: Holmen, M., Gadeledsvej 48, Gadevang, DK.-3400 Hillerod, Denmark. E-mail: ma@fa.dk

5767. Huber, A.; Kovacs, T.; Ambrus, A. (2002): Data on the Odonata fauna of North-East Hungary. *Fol. hist.-nat. Mus. matraensis* 26: 179-188. (in Hungarian, with English summary). [The Aggtelek National Park Directorate is bordered by the river Hernád, river Sajó and the state border between Hungary and Slovakia. Dragonfly collections realized between 1997 and 2001 resulted in 47 odonate species. *Coenagrion ornatum*, *Brachytron pratense*, *Stylurus flavipes*, *Ophiogomphus cecilia*, *Leucorrhinia pectoralis*, and *Sympetrum danae* are of particular interest.] Address: Huber, A., Aggteleki Nemzeti Park, Igazgatoság, Tengersizem oldal 1, HU-3758 Josvapo, Hungary

5768. Ichinose, T.; Morita, T. (2002): Factors influencing the distribution of dragonflies (Odonata) in the agricultural landscape in Hokudan-cho, Hyogo prefecture. *Journal of the Japanese Institute of Landscape Architects* 65: 501-506. (in English). ["There is a huge number of small irrigation ponds in the agricultural landscape of the north of Awaji Island, Hyogo Prefecture. Recently, managements of many ponds have been abandoned. However, these ponds are used as habitat by many organisms. They have an important role to maintain biodiversity in this area. Odonata were surveyed in 24 irrigation ponds in Hokudan-cho, the north of Awaji Island. Thirty-seven species were caught and/or observed from June to September 2000. The number of dragonfly species had no relation with water body area of irrigation ponds. Twenty-four ponds were classified to five types by TWINSPAN (Two-way Indicator Species Analysis). The classification of TWINSPAN was analyzed by Classification and Regression Trees using explanatory variables about environmental factors of irrigation ponds. The results showed that altitude, neighboring woodlots, water body area and water quality influenced the component of dragonfly species. Especially, it was important for species preferring edge and/or inside of woodlot that over 45 percents of pond surroundings were adjacent to woodlots. It was also suggested that surrounding land uses influenced the distribution of dragonfly species." (Authors)] Address: Ichinose, T., Lab. of Landscape Planning, Awaji Landscape Planning and Horticulture Academy (ALPHA), Institute of Natural and Environmental Science, University of Hyogo, Nojimatokiwa 954-2, Hokudan-cho, Tsuna-

gun, Hyogo, Japan. E-mail: tomohiroichinose@yahoo.co.jp

5769. Larivière, S. (2002): *Lutra maculicollis*. Mammalian species No. 712: 1-6. (in English). [Odonata are among the prey of the Spotted-necked Otter, Africa.] Address: not stated

5770. Leok, C.S.; Inoue, I.; Sato, T.; Haritani, M.; Tanimura, N.; Okada, K. (2002): Morphology of the oviduct fluke, *Prosthogonimus ovatus*, isolated from Indonesian native chickens and histopathological observation of the infected chickens. *Journal of Veterinary Medical Science* 64(12): 1129-1131. (in English). ["Chickens become infected by ingesting dragonfly or dragonfly naiads, an intermediate host, and chickens affected show inflammation of the oviduct and bursa of Fabricius." "Prosthogonimus ovatus infection was detected in 5 of 130 chickens in the oviduct and 4 chickens in the bursa of Fabricius. Scanning electron microscopy (SEM) revealed that the spines of the *P. ovatus* were densely distributed on the cuticula of the entire dorsal surface of body, but on the ventral surface, they were densely present to the level of ventral sucker but gradually decreased in density posteriorly, and they could not be seen in the posterior 1/3 area. The spines were finger-shaped and denticulate at the tip. Histopathological examination showed that polypous elevations, degeneration and exfoliation of the mucosal epithelium were detected in the bursa of Fabricius possibly by the suction of flukes, in addition to the stratification of the mucosal epithelium, and interstitial cell infiltration." (Authors)] Address: Leok, Chen Sau, Department of Medical Zoology and Laboratory of Veterinary Pathology, College of Bioresource Sciences, Nihon University, Fujisawa, Kanagawa 252-8510, Japan

5771. Ma, Z.-m.; Yang, Z.-z.; Mao, B.-y. (2002): A new record species of *Aristocypha Laidlaw* (1950) (Odonata: Libellaginidae) [sic] from China. *Entomotaxonomia* 24(3): 170. (in Chinese., with English title). [A. hylaryae (Fraser), 2 females, locality not transliterated, alt. 1650 m, 26-VII-1998.] Address: Ma, Z.-m., Dali Medical Coll., Dali, Yunnan-67000, China

5772. Svidersky, V.L.; Plotnikova, S.I. (2002): Insects and vertebrates: Analogous structures in higher integrative centers of the brain. *Journal of Evolutionary Biochemistry and Physiology* 38(5): 627-639. (in English). ["This work deals with studies on anatomical relationships, neuronal composition, and some synaptic connections that exist in the central complex (CC) in the suprasophageal ganglion in larva of dragonfly g. *Aeshna*. It has been shown that CC contains protocerebral bridge of an elongated and slightly curved cylindrical shape, fan-shaped and ellipsoid bodies of a bean-like shape and two small roundish noduli. There were revealed (stained) neurons providing both internal connections of CC and its connections with other CNS regions. Connections with tritocerebrum, the higher center of the autonomic nervous system, and subesophageal ganglion, an intermediate relay between supraesophageal ganglion and truncal brain, have been established. The existence of connections of CC with nuclei of abdominal nervous chain is suggested. Connection of ocelli with the CC has been traced. Unipolar neurons of the same type have been revealed, each of them giving collaterals to protocerebral bridge and ending as bushy terminals that form the main part of glomerule in the fan-

shaped and ellipsoid bodies. Glomeruli are arranged in rows, in which cross connections have been found. It has been established that the structure of neuropils of the fan-shaped and ellipsoid bodies represent a shielding structure described in the cerebral cortex, midbrain cortex, and cerebellar cortex of vertebrates. Thus, in insects, like in vertebrates, the shielding structures developed not only in optic centers, but also in structures performing higher integrative functions. A possible functional role of the central complex is discussed." (Authors)] Address: Svidersky, V.L., Plotnikova, S.I., Sechenov Institute of Evolutionary Physiology and Biochemistry, Russian Academy of Sciences, St. Petersburg, Russia

5773. Takeyama, H.; Kamihogi, A.; Sato, H. (2002): The plan and design of a biotope at a school based on behavior of butterflies and dragonflies. *Journal of the Institute of Landscape Architecture, Annual Scientific Research Meeting Abstracts* 65: 32. (in English). [Verbatim: Even the role as property of the environment of the city is expected in the biotope space at the school that was established aiming at study position where understands the ecosystem of the area into the school site. We grasped the action characteristic of the dragonfly and butterfly by the 1 individual follow-up at the elementary and junior high school of the city area which possesses the biotope space at the school and periphery environment, and searched the plan and design of biotope space at the school. As the result, the case like the following became clear: it is effective to establish the biotope space at the school including the vegetable garden and swimming pool where four sides of the school sites in the school building without existing the place, to create the big tree, to plant trees in the wall of the structure, grassland with rough control is secured.] Address: Takeyama, H., Museum of Nature and Human Activities, Hyogo, Japan

5774. Tsachalidis, E.P.; Goutner, V. (2002): Diet of the White Stork in Greece in relation to habitat. *Waterbirds* 25(4): 417-423. (in English). ["Prey taken by breeding White Storks (*Ciconia ciconia*) were studied using pellets collected from 1993 to 1995 within its breeding area in Greece. Prey consisted of orthopterans, coleopterans, other insects, mollusks and vertebrates. The difference in the proportions of these taxa was significant among major foraging habitats (lakes, rivers, deltas and dry habitats). With the exception of the rivers, major habitats tended to group together in clusters, suggesting that similar prey types were available to the storks in common habitat types." (Authors) Odonata must be of minor importance as prey for *C. ciconia*, but are not quantified in detail.] Address: Tsachalidis, E.P., Technological Education Institute, Department of Forestry, Laboratory of Ecology and Wildlife Management, GR-66100 Drama, Macedonia, Greece. E-mail: etsaxal@teikav.edu.gr

5775. Wang, H.; Zeng, L.; Yin, C. (2002): Measuring the body position, attitude and wing deformation of a free-flight dragonfly by combining a comb fringe pattern with sign points on the wing. *Meas. Sci. Technol.* 13: 903-908. (in English). ["The simultaneous measurements of the body position, attitude and the wing kinematics of a free-flight insect are very important for analysing the flight performance. In this paper, a method based on combining a comb fringe pattern with sign points on the dragonfly wing has been developed to im-

prove the accuracy in body position and attitude measurement or in construction of a local body-fixed coordinate system. Meanwhile, the wing kinematics can be measured simultaneously by the comb fringe pattern method. The method has been used successfully in the measurement of a free-flight dragonfly." (Authors)] Address: Wang, H., State Key Laboratory of Precision Measurement Technology and Instruments, Department of Precision Instruments, Tsinghua University, Beijing 100084, China. E-mail: wanghao@post.pim.tsinghua.edu.cn

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5776. Albertoni, E.F.; Palma-Silva, C.; Esteves, F.A. (2003): Natural diet of three species of shrimp in a tropical coastal lagoon. *Braslian archives of biology and technology* 46(3): 395-403. (in English, with Portuguese summary). ["The gut content of 495 specimens of *Farfantepenaeus brasiliensis*, 131 of *F. paulensis* (Penaeidae) and 102 of *Macrobrachium acanthurus* (Palaemonidae) were analyzed to establish the composition of their diets. *F. brasiliensis* had as the most important feeding items in its diet larvae of Chironomidae, Polychaeta and *Heleobia australis* (Mollusca). For *F. paulensis*, the most important items were the same as for *F. brasiliensis*, but the order of importance of *H. australis* and Polychaeta was inverted. *M. acanthurus* had detritus as the most important item, followed by Chironomidae larvae, Odonata nymphs, and fragments of the macroalgae *Chara*. The results showed that the three species were omnivorous, with a varied diet including both components of macrofauna of benthos and associated to the macroalgae *Chara* and plant fragments and detritus." (Authors)] Address: Albertoni, Edélti Faria, Fundação Universidade Federal do Rio Grande; Departamento de Ciências Morfo-Biológicas; Laboratório de Ecologia; Campus Carreiros; Av. Itália Km 8; 96201-900; Rio Grande, RS, Brazil

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5778. Cannings, S.G. (2003): Status of Western River Cruiser (*Calopteryx aequabilis* Say) in British Columbia. B.C. Ministry of Sustainable Resource Management, Conservation Data Centre, Victoria BC. *Wildlife Bulletin* No. B-110: VII, 10 pp. (in English). ["Because this species is known to occur along only one short watercour-

se in the province (Christina Creek) and because this site is not secured, I recommend maintaining the provincial ranking of S1 (BCCDC 2003) and consequent Red-listing. Although there is a possibility that other populations exist, especially along the Kettle River, the probability is very small that these populations would be large or extensive enough to change the rank to another value. The threats posed by exotic fish and Eurasian water-milfoil, inappropriate recreation use, potential riparian development and pollution are also of concern in this unique stream system." (Author)] Address: Cannings, S., A68, BC Cons. Data Ctr., Resource Inven. Branch, P.P. Box 9344, Stn Prov. Govt, Victoria BC V8W 9M1, Canada

5779. Carchini, G.; die Domenico, M.; Pacione, T., Solimini, A.G.; Tanzilli, C. (2003): Species distribution and habitat features in lentic Odonata. *Ital. J. Zool.* 70: 39-46. (in English). ["The relationships between species assemblages and pond characteristics were investigated in a well preserved Mediterranean coastal woodland. Data on adult abundance were collected fortnightly. Pond area and depth, shade, riparian vegetation, presence of four classes of aquatic plants, presence of fish and both the distances from pond to pond and from pond to sea were considered as pond features. Results showed the presence of 23 Odonata species on 23 ponds. A Mantel test showed that the matrices of pond to pond topographic distances and that of pond to pond faunistic similarity were independent, which supports the hypothesis that the adult Odonata actively choose their breeding site. A stepwise multiple regression showed that only pond size, minimum water level and riparian vegetation had significant effects (all positive) on the total number of Odonata species in each pond. On the other hand, a canonical correspondence analysis showed that the composition of Odonata species assemblages was sensitive to almost all variables. From the point of view of Odonata conservation, both the moderate effect of *Gambusia holbrooki* and the positive effect of the riparian vegetation on the number of Odonata species appear particularly interesting for restoring or creating Odonata habitats." (Authors)] Address: Carchini, G., Dipartimento di Biologia, Università "Tor Vergata", Viale della Ricerca Scientifica, I-00133 Roma, Italy. E-mail: archini@utovrm.it

5780. de Bruyn, U.; Sinning, F. (2003): Kompensationsmaßnahme "Wümme-Nordarm" Bestandsaufnahme ausgewählter Insektengruppen 2002. Gutachten im Auftrag des Wasser- und Schifffahrtsamt Bremerhaven, SKN-14m Ausbau der Außenweser. Büro für Ökologie, Naturschutz und räumliche Planung, Oldenburg: 11 pp. (in German). [Niedersachsen, Germany; 19 odonata species including *Sympetrum pedemontanum* were recorded. For details see: <http://www.wsa-bremerhaven.wsv.de/kompensation/komppdf/WuemmeInsekten02.pdf>] Address: Büro für Ökologie, Naturschutz und räumliche Planung, Dipl.-Ing., Dipl.-Biol. Frank Sinning, Elisabethstr. 23, 26135 Oldenburg

5781. Fabbri, R.; Pavesi, M. (2003): Prima segnalazione per la Lombardia di *Chalcolestes parvidens* (Artobolovski, 1929) (Odonata, Lestidae). *Ann. Mus. civ. St. nat. Ferrara* 6: 95-96. (in Italian, with English summary). [Detailed documentation of four Italian records of *C. parvidens*] Address: Fabbri, R., Museo Civico die Storia Naturale, via De'Pisis, 24-44100 Ferrara, Italy. E-mail: r-fabbri@libero.it

5782. Geschke, S. (2003): Libellenkundliche Bestandsaufnahme im Kasanka National Park 12.03. bis 27.05.2003. Ein Beitrag zur Odonatenfauna Zambias. <http://www.fh-luh.de/fb9/fileadmin/archiv/StudiengangLA/ablauf/Praktikantenamt/Contents/Berichte/Ausland/LibellenZambiaStephanGeschkeklein.pdf>: 60 pp. (in German, with English summary). [Inventory of the Odonata of the Kasanka National Park, Zambia; a total of 72 species was recorded including some more related to the Congo basin. For the full paper see: <http://www.fh-luh.de/fb9/fileadmin/archiv/StudiengangLA/ablauf/Praktikantenamt/Contents/Berichte/Ausland/LibellenZambiaStephanGeschkeklein.pdf>] Address: Geschke, S., Heinrichstr. 8, 32479 Hille, Germany. E-mail: SGeschke@gmx.de

5783. Holly, M. (2003): Monitoring of small ponds faunal colonisation of the Bieszczady National Park. *Roczniki Bieszczadzkie* 11: 249-257. (in Polish, with English summary). [Poland; preliminary results of the monitoring of the faunal succession in five small ponds established in 1999 - 2000 are presented. Data from 2001 and 2003 also document seven (common) odonate species.] Address: Holly, M., Ośrodek Naukowo-Dydaktyczny Bieszczadzkiego Parku Narodowego, ul. Belska 7, 38-700 Ustrzyki Dolne, Poland. E-mail: marekholly@wp.pl

5784. Kravitz, E.A.; Hubery, R. (2003): Aggression in invertebrates. *Current Opinion in Neurobiology* 13: 736-743. (in English). ["Invertebrates are outstanding model systems for the study of aggression. Recent advances and promising new research approaches are bringing investigators closer to the goal of integrating behavioral findings with those from other disciplines of the neurosciences. The presence of highly structured, easily evoked behavioral systems offer unique opportunities to quantify the aggressive state of individuals, to explore the mechanisms underlying the formation and maintenance of dominance relationships, to investigate the dynamic properties of hierarchy formation, and to explore the significance of neural, neurochemical and genetic mechanisms in these behavioral phenomena. [...] Dominance enhances feeding opportunities in dragonflies [Baird J.M., May, M.L.: Fights at the dinner table: agonistic behavior in *Pachydiplax longipennis* (Odonata: Libellulidae) at feeding sites. *J. Insect Behav.* 16:189-216] but few physiological studies that relate specifically to aggression have been carried out using these models." (Authors)] Address: Kravitz, E.A., Department of Neurobiology, Harvard Medical School, 220 Longwood Avenue, Boston, MA 02115, USA. E-mail: edwardkravitz@hms.harvard.edu

5785. Laranjeiro, A.J. (2003): Estabilidade da entomofauna num mosaico de plantação de eucalipto e áreas naturais de conservação. Tese de Doutorado, Escola Superior de Agricultura Luiz de Queiroz (ESALQ), Universidade de São Paulo: XX, 142 pp. (in Portuguese, with English summary). ["Stability of the entomofauna in a region composed by eucalypt plantations and conservation areas. Due to the large spreading of commercial forests in Brazil, in the last decades, one can detect a enormous pressure from the environmentalists and the governmental agencies for evaluation studies and environmental monitoring of forestry enterprises. On the other hand, the forestry enterprises are concerned with the stability of such forests in order to ensure the goals of this agribusiness. The recent spreading of forest

planted areas give chance to a number of pests, either native or introduced ones, to start a process of colonization and adaptation. And one knows that the environmental equilibrium is fundamental for the integrated forest pest management. Therefore this research was carried out to determine the interactions among the main environments of the ecosystem where the plantations are located, as well as the influence of the silvicultural management on the insect communities of the eucalypt plantation and the neighboring natural reservoirs. The entomofauna was monitored by using light and Malaise traps in a watershed of a region with high silvicultural activity, located in the north of the State of Espírito Santo, Brazil, from 1994 to 2002." (Author) Odonata are treated on the family level. For the full paper see: <http://www.teses.usp.br/teses/disponiveis/11/11146/tde-14072003-083640/> Address: Laranjeiro, Alberto Jorge. E-mail, ajl.equilibrio@uol.com.br

5786. Miserendino, M.L. Pizzolon, .A. (2003): Distribution of macroinvertebrate assemblages in the Azul-Quemquemtreu river basin, Patagonia, Argentina. *New Zealand Journal of Marine and Freshwater Research* 37: 525-539. (in English). ["Longitudinal and seasonal changes in physical and chemical variables, and macroinvertebrate community structure-function were examined in the Azul-Quemquemtreu river system in the subantarctic forest of Patagonia, Argentina. Patagonian mountain streams have a marked seasonal discharge pattern and may have high suspended sediment loads because of forestry and other land-use practices. The main physical differences among sites were in substrate size (boulder-pebble/ sand), mean width (3–37 m), discharge ($<1-80 \text{ m}^3 \text{ s}^{-1}$), total alkalinity ($275-1210 \text{ meq litre}^{-1}$) and conductivity ($31-137 \text{ }\mu\text{S cm}^{-1}$). Species richness and Ephemeroptera, Plecoptera, and Trichoptera richness decreased from upstream sites to the mouth of the river system and were affected by land use. Macroinvertebrate assemblages were influenced by physical (substrate size, width, discharge, current velocity) and chemical (alkalinity and conductivity) variables, and mean density of macroinvertebrates was significantly higher at the Quemquemtreu sites than the Azul sites. Canonical Correspondence Analysis indicated that seasonal trends in macroinvertebrate community composition were related to changes in environmental characteristics of the river, especially water temperature and discharge. The composition of benthic communities in rivers of the Patagonian Andes largely reflect characteristics related to stream size, but factors at the reach scale best explain variation in abundance data. Collector-gatherers were the dominant functional feeding group at all sites. Faunas have similarities with those of New Zealand in taxonomic-functional composition, with a predominance of Chironomidae (Diptera), Leptophlebiidae (Ephemeroptera), and Gripopterygidae (Plecoptera)." (Authors) The only odonate species – *Rhinoeschna variegata* - is reported from one of the six localities sampled for macroinvertebrates.] Address: Miserendino, Laura, Laboratorio de Ecología Acuática, Universidad Nacional de la Patagonia, Sarmiento 849, 9200 Esquel, Chubut, Argentina. E.-mail: mlau@ar.inter.net

5787. Mochizuki, H.; Komaki, H.; Morita, M.; Kusamichi I. (2003): Observation of dragonfly flying in air and flow. *Transactions of Visualization Society of Japan* 23(12): 115-121. (in Japanese, with English summary). ["The flapping of a dragonfly, *Pantala flavescens*, hori-

zontally flying in a field was observed with a high speed video camera. As a result, it was clarified that a frequency of the flapping with maximum amplitude in the observation was the same order as one of the flapping in a wind tunnel. Also, it was observed that vortices regularly occurred every one cycle by flapping with large amplitude in the wind tunnel and diverged downstream with combining each other. The flow upstream of the dragonfly flapping was induced in three forms of curved flow lines into the region around the body. Furthermore, wakes were generated in horizontal, downward and upward directions according to these forms." (Authors)] Address: Mochizuki, H., Faculty of Agriculture, Kagoshima University

5788. Samson, N. (2003): Étude du degré de dispersion et des facteurs favorables à la reproduction de la Cordulie à corps fin, *Oxygastra curtisii* (Dale, 1834), dans les Mauges (49). Centre Permanent d'Initiatives pour l'Environnement Loire et Mauges, Maison de Pays « La Loge, F-49600 Beaupreau: 73 pp. (in French). ["L'espèce *Oxygastra curtisii* (Dale, 1834) est présente en France sur l'ensemble du territoire mais sa fréquence est moindre dans le nord. Le CPIE Loire et Mauges s'intéresse à cette espèce d'intérêt patrimonial car sa présence dans les Mauges est marquée. De cette observation est née la volonté de mener une étude plus poussée sur la Cordulie à corps fin. La problématique de cette étude est double. Il s'agit de cerner les conditions favorables à la reproduction de l'espèce ainsi que son degré de dispersion dans le paysage bocager des Mauges. Pour répondre à cette problématique, les recherches ont porté sur les lieux d'émergence et de vie des larves, le comportement des imagos ainsi que leurs déplacements dans le maillage bocager. La méthodologie mise en place a eu pour but d'aborder le plus d'étapes possibles du cycle biologique: l'émergence, par une recherche des exuvies sur des placettes de suivi choisies pour leurs caractéristiques favorables à la présence d'*Oxygastra curtisii*, d'après la bibliographie étudiée, les imagos matures, par la technique de capture/marquage qui permet de récolter des informations à l'échelle de la population, des sexes et de l'individu. Le suivi a lieu dans le paysage bocager, dans le but d'étudier leur comportement et le degré de dispersion, et en contexte aquatique pour observer les comportements liés plus précisément à la reproduction. 115 exuvies ont été récoltées, 102 imagos ont été marqués (80 mâles et 22 femelles), 10% de ces imagos ont été contrôlés et des comportements sexuels ont été constatés (comportements territoriaux, accouplements et pontes). La recherche des exuvies a permis de prouver la reproduction de l'espèce sur l'Evre, de déterminer la période d'émergence et les caractéristiques des sites d'émergence. Le suivi des imagos a permis de préciser le cycle biologique de l'espèce Le but final de cette étude est de prendre en compte la présence d'*Oxygastra curtisii* lors de travaux sur le bocage et les ripisylves." (L'auteur)] Address: Centre Permanent d'Initiatives pour l'Environnement Loire et Mauges, Maison de Pays « La Loge, F-49600 Beaupreau, France

5789. Sukhacheva, G.A.; Kryukova, N.A.; Glupov, V.V. (2003): On the roles of morphological and biochemical criteria in species identification: An example of dragonfly larvae of the genus *Aeshna*. *Biology Bulletin* 30(1): 63-68. (in English). ["Dragonflies belong to the group of organisms with numerous well-differentiated

species-specific characters at the adult stage, on the one hand, and a significantly smaller number or even the absence of such characters at the early ontogenetic stages. An example of the genus *Aeschna* is used to show difficulties in revealing morphological and biochemical characters allowing identification of larval dragonflies belonging to closely related species of the family. Distinct morphometric characters can be found only in late-instar larvae. The presence of species-specific proteins in the homogenates of thoracic muscles provides the possibility of using biochemical tests for species identification of larvae. Infestation by parasites has no effects on the biochemical parameters studied. Species identification of the early-instar dragonfly larvae is still problematic." (Authors)] Address: Sukhacheva, G.A., Siberian Division, Russian Academy of Sciences, Institute of Animal Systematics and Ecology, ul. Frunze 11, Novosibirsk, 630091, Russia. Email: mi@eco.nsc.ru

5790. Sutcliffe, K.E. (2003): The conservation status of aquatic insects in south-western Australia. PhD Thesis, Murdoch University: ["Freshwater ecosystems in south-western Australia have been extensively altered over the last two centuries as a result of human activities. The effect this has had on aquatic fauna, particularly invertebrates, is largely unknown because of inadequate knowledge of the pre-existing fauna. Future changes in the composition of aquatic fauna will also go undetected unless current distributions of existing species are well documented. This thesis addresses the problem by investigating the current distributions and conservation status of aquatic insects in south-western Australia from three orders: Odonata, Plecoptera and Trichoptera. Extensive distributional data was collected by identifying larval specimens from a large number of samples collected throughout the south-west as part of an Australia-wide macroinvertebrate bioassessment project. In addition, a database created from a species-level biological study of the wheatbelt region of Western Australia was utilised, and previously published records of occurrence for species within the south-west were compiled. These results were then used to assess the conservation status of each species using the IUCN red list criteria. Environmental parameters measured at time of sampling were also examined using logistic regression to determine which factors are important in influencing the distributions of aquatic insects in south-western Australia. The conservation value of sites based on Odonata, Plecoptera and Trichoptera compositions was also determined and the degree of protection provided for sites of high conservation value investigated. The high rainfall forested region of the south-west was found to be important for a large number of species, including the majority of those found to be rare and/or restricted. Overall, 37% of species were found to be threatened, with the Trichoptera containing both the greatest number and highest proportion of threatened species. Logistic regression results generally agreed with the distributions obtained for each species, with rainfall and other parameters indicative of streams in the headwaters of forested catchments being positively associated with species found to be restricted to the high rainfall region. Two parameters known to be affected by human disturbance in the south-west, conductivity and nutrient concentrations, were found to be important in determining the occurrence of many species and this could have important consequences for aquatic insect conservation. Widespread species occurring within the low rainfall region of the south-west did not show as

many significant relationships to measured environmental parameters, possibly due to their greater ecological tolerances and adaptations which allow them to persist in a low rainfall environment. The implications of results are discussed, and recommendations for the conservation and management of aquatic insects in south-western Australia are given." (Author)] see: <http://www.lib.murdoch.edu.au/adt/browse/view/adt-MU20040430.153605>

5791. Taborton, W. (2003): Dragonflies. Lajuma Synthesis Workshop, 9–10 May 2003; <http://www.soutpansberg.com/workshop/>: 2 pp. (in English). [Checklist of the Odonata of the Soutpansberg-region, South-Africa.]

5792. Tanida, Y. (2003): Locomotion by Tandem and Parallel Wings (A Note on the Flight of Dragonflies and Beetles). *JSME International Journal Series B* 46(2): 244-249. (in English). ["A two-dimensional analysis was carried out on the locomotion by tandem and parallel wings in relation to the free flight of dragonflies and beetles, remarking the mutual interference between fore and hind wings. The results obtained are summarized as follows: In the case of tandem wings, (1) High thrust and propulsive efficiency can be achieved when the forewing oscillates with a definite phase lag behind the hindwing, as in the case of real dragonflies, (2) Somewhat smaller amplitude of hindwing leads to optimum condition for work sharing of two wings, (3) The hard forewing does not serve for the thrust and propulsive efficiency, whereas the hard hindwing does for the augmentation of them; In the case of parallel wings, (4) The hard wing placed near the soft wing acts nearly as an infinite plate, as for the ground effect, increasing both thrust and propulsive efficiency." (Author)] Address: Tanida, Y., Univ. Tokyo, 7-17-33 Konan-dai, Kona-Ku, Yokohama 234-0054, Japan. E-mail: taniday@docomo.ne.jp

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5793. Argerich, A.; Puig, M.A.; Pupilli, E. (2004): Effect of floods of different magnitude on the macroinvertebrate communities of Matarranya stream (Ebro river basin, NE Spain). *Limnetica* 23(3-4): 103-114. (in English, with Spanish summary). ["In October 2000, the Matarranya River suffered an extraordinary flood with a measured flow rate of approximately 450 m³/s in the town of Vall-de-roures and a return period of about 500 years, according to the Ebro Hydrographic Confederation. The objective of this study was to determine the influence of the consequent perturbation on the structure and composition of the macroinvertebrate community and its subsequent recovery. To this end, two sites in the headwaters of the river, about which information from previous studies was available, were chosen as sampling sites. The Parrissal station, 8 km from the source with a practically natural flow regime, and at Vall-de-roures, 18 km from the source and from which part of the flow has been deviated, to be returned in summer from the waters collected in the reservoir on the Pena River. Sampling was carried out one, five and fifteen months after the flood and the data was compared with that obtained before the perturbation. (December, 1998 and February, 1999). On the other hand, we analyzed the effects of smaller floods occurring in October 1984

(Parrissal) and June 1986 (Vall-de-roures). The results point to different patterns of recovery in the two sampling points after the 2000 flood, the community density recovering more rapidly in the site less affected by anthropic intervention (Parrissal), while the biological quality of the stretch studied in Vall-de-roures involved increased taxonomic richness and greater structuring of the community. The flood events of lesser magnitude did not seem to affect the community structure in Parrissal, while in Vall-de-roures the abundance of the predominant groups varied." (Authors) Odonata are treated on the order level.] Address: Argerich, A., Departamento de Biogeoquímica Acuática. Centre d'Estudis Avançats de Blanes, CSIC. Acc. Cala Sant Francesc 14, 17300 Blanes, Spain. E-mail: alba@ceab.csic.es

5794. Broomhall, S.D. (2004): Egg temperature modifies predator avoidance and the effects of the insecticide endosulfan on tadpoles of an Australian frog. *Journal of applied ecology* 41: 105-113. (in English). ["1. Attention is shifting from simplistic explanations of global amphibian declines that posit a single cause (such as climate change, pesticide contamination or disease) to more complex scenarios that involve interactive effects. Temperature is a pervasive influence on frog development, particularly during the egg and larval stages. However, the effect of temperatures experienced early in ontogeny on later larval behaviour or response to agrochemicals is little known. 2. Eggs of the Australian frog *Limnodynastes peronii* were reared at two temperatures that simulate naturally occurring cool and warm temperature regimes ($14\pm 3^{\circ}\text{C}$ and $20\pm 3^{\circ}\text{C}$). Tadpoles were then exposed to sublethal concentrations of the organochlorine insecticide endosulfan, at a common temperature. Endosulfan often contaminates aquatic environments, yet its effects on Australian frogs are unknown. Tadpoles reduced feeding after 48 h of exposure to endosulfan concentrations that occur in the field (both $0.03\mu\text{g l}^{-1}$ and $1.3\mu\text{g l}^{-1}$). Feeding remained depressed at $1.3\mu\text{g l}^{-1}$ endosulfan up to 9 days after tadpoles were transferred to endosulfan-free water. 3. Egg-rearing temperature and endosulfan interacted to affect tadpole length. Further, tadpoles exposed to endosulfan were significantly shorter than control tadpoles. They were also more vulnerable to capture by an invertebrate (odonate) predator than controls of the same size when tested 9 days after transfer to clean water. While warm egg-rearing temperatures significantly decreased vulnerability to capture, tadpoles were proportionally more adversely affected by endosulfan. Thus, egg-rearing temperature altered predator avoidance and changed the way in which endosulfan affected growth. Moreover, endosulfan significantly decreased feeding, growth and predator avoidance. 4. Synthesis and applications: Not only can short-term exposure to endosulfan at levels within regulatory guidelines and frequently reported in natural waterbodies influence tadpole viability, but the sensitivity of the tadpoles to this effect depends upon the thermal regimes that they encounter over their first few days of life. These data therefore suggest that existing water quality prescriptions may not provide adequate protection, while also illustrating how aspects of climate and thermal regimes might interact with pesticides to have cumulative effects on amphibian fitness." (Author)] Address: Broomhall, Sara, Richard Shine Laboratory, Biological Sciences, Heydon Laurence Building, University of Sydney, NSW 2006, Australia

5795. Cale, D.J.; Halse, S.A.; Walker, C.D. (2004): Wetland monitoring in the Wheatbelt of south-west Western Australia: site descriptions, waterbird, aquatic invertebrate and groundwater data. *Conservation Science W. Aust.* 5(1): 20-135. (in English). ["The Wheatbelt of south-west Western Australia contains a range of wetland types with varying salinity, including many naturally saline lakes and playas. The increase in salinity of most wetlands during the last 50 years as a result of land-clearing is a major threat to wetland biodiversity. As part of the State Salinity Strategy, a wetland monitoring program began in 1997 at 25 wetlands from locations throughout the wheatbelt. The aim of the monitoring program was to document trends in biodiversity at the 25 wetlands and relate these trends to physical conditions in the wetlands and patterns of surrounding landuse. This report summarizes existing information on the wetlands and provides, as baseline conditions, results of initial waterbird, aquatic invertebrate and groundwater monitoring. It documents the monitoring methods used and highlights the need for a long-term program. There was a strong negative relationship between aquatic invertebrate species richness and salinity. A negative relationship also existed for waterbird richness, although other factors determined numbers of species in many wetlands with salinity being a constraint on maximum potential waterbird richness rather than a determinant of the actual number of species. Further salinization is likely to change detrimentally both invertebrate and waterbird communities. Such changes are apparent in historical waterbird data from some wetlands. The ultimate cause of increased salinity in wetlands is rising groundwater, although sometimes wetlands are more directly affected by the increased surface run-off that results from high watertables in the catchment than by groundwater beneath the wetland." (Authors) The following odonate species are tabled: *Ilschnura aurora aurora*, *Ilschnura heterosticta heterosticta*, *Austroagrion coeruleum*, *Xanthagrion erythronurum*, *Austrolestes annulosus*, *A. aridus*, *A. analis*, *A. io*, *A. psyche*, *Hemianax papuensis*, *Aeshna brevistyla*, *Hemicordulia tau*, *Procordulia affinis*, *Orthetrum caledonicum*, *Diplacodes bipunctata*, and *Agrioptera insignis allogenesis*.] Address: Cale, D.J., Science Division, Department of Conservation and Land Management, PO Box 51 Wanneroo Western Australia 6956. Email: davidca@calm.wa.gov.au

5796. Campos, R.E.; Fernández, L.A.; Sy, V.E. (2004): Study of the insects associated with the floodwater mosquito *Ochlerotatus albifasciatus* (Diptera: Culicidae) and their possible predators in Buenos Aires Province, Argentina. *Hydrobiologia* 524: 91-102. (in English). ["Insects associated with the floodwater mosquito *Ochlerotatus albifasciatus* (Diptera: Culicidae) were studied from intermittent puddles in temperate Argentina in an attempt to detect the main predators. 41 taxa occurred in the puddles from spring to fall. Coleoptera and Diptera were dominant and diverse. Ephemeroptera and Odonata were scarce in numbers and species, and Heteroptera occurred in low numbers of species and high abundance of individuals. The main predators of immature *O. albifasciatus* were detected on the basis of relative abundance (ISA index), ecological dominant groups, and species association ("I" index). *Liodessus* sp. and *Rhantus signatus signatus* (Coleoptera: Dytiscidae) were the most abundant predators in the puddles and *Liodessus* sp., *Lancetes marginatus* (Dytiscidae) and *Psorophora ciliata* (Culicidae) were the

most frequent. *Liodes* sp. and *O. albifasciatus* were the best associated species in all seasons.[...]" (Authors)] Address: Campos, R.E., Instituto de Limnología "Dr. Raúl A. Ringuelet", Universidad Nacional de La Plata, CC 712 (1900) La Plata, Buenos Aires, Argentina. E-mail: rcampos@ilpla.edu.ar

5797. Chen, X.-L. (2004): An annotated list of the name bearing type specimens of species-group names in Odonata in the Insect Collection of the Institute of Zoology, Chinese Academy of Sciences. *Pan-Pacific Entomologist* 80: 81-90. (in English). ["Species-group names of the order Odonata, including Aeshnidae, Calopterygidae, Coenagrionidae, Cordulegastridae, Euphaeidae, Gomphidae, Libellulidae, Megapodagrionidae, Platycnemididae and Synlestidae, deposited in the insect collection of the Institute of Zoology, Chinese Academy of Sciences, are listed alphabetically by species names published originally, along with an abbreviated citation to the original description, museum specimen number, sex, locality data, collector, collecting date, specimen condition and remarks where available. The type collection includes 71 name-bearing types of Odonata consisting of 39 holotypes, 10 allotypes, 12 paratypes, 1 neotype and 9 syntypes, and includes 50 species described by S. J. Navas, H. F. Chao and M. A. Lieftinck." (Author)] Address: Xiao-Lin Chen, Insect Collection, Institute of Zoology, The Chinese Academy of Sciences, Beijing, 100080, P.R.China. E-mail: xlchen@ioz.ac.cn

5798. Deer, L.A.; Gertz, L.; Kelley, C.; Osterrieder, K.; Rice, T.M. (2004): Dragonfly larvae (Insecta:Odonata) have high tolerance to acute metal exposure. Poster presentation at the 25th annual meetings of the Society of Environmental Toxicology and Chemistry, Portland, OR: (in English). [Verbatim. Odonates (Insecta: Odonata; dragonflies and damselflies) occupy important trophic levels in freshwater systems. They have a biphasic lifecycle, with aquatic predatory larvae and aerial terrestrial predatory adults. Additionally, odonates can reach high levels of abundance in some habitats and are important food items of both aquatic and terrestrial predators. Therefore, odonates could be exposed to aquatic toxicants from a variety of sources and could then transfer bioaccumulated toxicants to their predators. Despite their presence and importance in aquatic ecosystems, there is very little field or laboratory data regarding the impact that environmental chemicals have on odonates. We have developed methods for the laboratory maintenance and testing of odonate larvae collected from the Mobile, Alabama region. In acute toxicity tests primarily with *Erythemis simplicicollis* (Libellulidae), larvae approximately 10 mm in length were exposed in individual containers to amounts of copper and cadmium above 100 mg/L. Using immobility as the endpoint, larvae were able to tolerate high levels of both metals, with EC50 values above 25 mg/L. This species of odonate appears to be extremely resistant to metals compared in general to other common aquatic test species (e.g. *Daphnia*, *Xenopus*). High resistance to metal pollution could make odonate larvae a potential indicator of poor water quality in contaminated habitats. Their ability to withstand and accumulate high levels of metals might also put their predators at risk from ingestion of contaminated larvae or adults. We are continuing our laboratory tests with other species and other chemicals, and we are also investigating the use of these organisms as field indicators of water quality from watersheds such as the Mobile Delta.]

5799. Frydrychová, R.; Grossmann, P.; Truba, P.; Vítková, M.; Marec, F. (2004): Phylogeny of TTAGG telomeric repeats in insects. *Genome* 47: 163-178. (in English). ["We examined the presence of TTAGG telomeric repeats in 22 species from 20 insect orders with no or inconclusive information on the telomere composition by single-primer polymerase chain reaction with (TTAGG)₆ primers, Southern hybridization of genomic DNAs, and fluorescence in situ hybridization of chromosomes with (TTAGG)_n probes. The (TTAGG)_n sequence was present in 15 species and absent in 7 species. In a compilation of new and published data, we combined the distribution of (TTAGG)_n telomere motif with the insect phylogenetic tree. The pattern of phylogenetic distribution of the TTAGG repeats clearly supported a hypothesis that the sequence was an ancestral motif of insect telomeres but was lost repeatedly during insect evolution. The motif was conserved in the "primitive" apterous insect orders, the Archaeognatha and Zygentoma, in the "lower" Neoptera (Plecoptera, Phasmoda, Orthoptera, Blattaria, Mantodea, and Isoptera) with the exception of Dermaptera, and in Paraneoptera (Psocoptera, Thysanoptera, Auchenorrhyncha, and Sternorrhyncha) with the exception of Heteroptera. Surprisingly, the (TTAGG)_n motif was not found in the "primitive" pterygotes, the Palaeoptera (Ephemeroptera and Odonata). The Endopterygota were heterogeneous for the occurrence of TTAGG repeats. The motif was conserved in Hymenoptera, Lepidoptera, and Trichoptera but was lost in one clade formed by Diptera, Siphonaptera, and Mecoptera. It was also lost in Raphidioptera, whereas it was present in Megaloptera. In contrast with previous authors, we did not find the motif in Neuroptera. Finally, both TTAGG-positive and TTAGG-negative species were reported in Coleoptera. The repeated losses of TTAGG in different branches of the insect phylogenetic tree and, in particular, in the most successful lineage of insect evolution, the Endopterygota, suggest a backup mechanism in the genome of insects that enabled them frequent evolutionary changes in telomere composition." (Authors)] Address: Marec, F., Institute of Entomology ASCR, Branišovská 31, CZ-370 05, České Budejovice, Czech Republic. E-mail: marec@entu.cas.cz

5800. Hämäläinen, M.; Hulten, L.; Karjalainen, S. (2004): Etelänukonkorennon (*Aeshna mixta* Latreille, 1805) vaellukset Suomeen 2002-2003 (Odonata, Aeshnidae). *Sahlbergia* 8(2) (2003): 49-54. (in Finnish, with English summary; title not stated in English). ["Migrant individuals of *Aeshna mixta* were recorded for the first time in Finland in August-September 2002 and again in August-October 2003. Confirmed observations from several sites along the southern coast of the country (in N: Porvoo, N: Helsinki, N: Espoo, N: Kirkkonummi, Ab: Pohja, Ab: Karjaa) and from Åland archipelago (Al: Lemland) are listed. Most records were made in bays by the sea, but a few also at a distance of 4-6 km from the coast. The distribution *A. mixta* and its migratory tendency are briefly discussed. The nearest autochthonous populations occur in the Riga region in Latvia, and this area might be the source of the migration to Finland. Records made by Doppler weather radar show that very large insects flew from Estonia towards Helsinki in many occasions at the end of July and the beginning of August in 2002, in afternoons when south-eastern winds prevailed; apparently these insects were migrant *A. mixta*." (Authors)] Address: Karjalainen, S., Tyrskykuja 3 B 15, FIN-02330 Espoo, Finland

5801. Hardersen, S. (2004): The dragonflies: species, phenology, larval habitats (Odonata). In: Cerretti, P., S. Hardersen, F. Mason, G. Nardi, M. Tisato, M. Zapparoli (2004, Eds): *Invertebrati di una foresta della Pianura Padana, Bosco della Fontana*. Secondo contributo Conservazione Habitat Invertebrati, 3. Cierre Grafica Editore, Verona, 304 pp. ISBN 88-8314-335-3: 29-50. (in English, with Italian summary). ["The Odonata of the nature reserve "Bosco della Fontana" (Lombardy, Italy) were studied with special regard to their phenology. A total of 31 species were recorded. For many of these, larval habitats were identified. *Lestes sponsa* and *Aeshna affinis* were found for the first time at the nature reserve "Bosco della Fontana". The presence of *Oxygastra curtisii* [...] was reconfirmed. However, the population of this species appears to be small. The observed flight period of a number of species clearly differed from data in the literature." (Author)] Address: Hardersen, S., Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale, Corpo Forestale dello Stato, Strada Mantova, 29, I-46045 Marmirolo (MN), Italy. E-mail: s.hardersen@libero.it

5802. Keeley, C.; Gertz, L.; Osterrieder, K.; Rice, T.M. (2004): Use of dragonfly larvae (Insecta:Odonata) in toxicological tests. Poster presentation at the 25th annual meetings of the Society of Environmental Toxicology and Chemistry, Portland, OR: (in English). [Verbatim: Odonates (Insecta: Odonata; dragonflies and damselflies) are important members of freshwater ecosystems as both predators and prey. They have an aquatic predatory larval stage and an aerial terrestrial predatory adult stage. Additionally, odonates can be very abundant in certain habitats and are preyed upon by a variety of aquatic and terrestrial predators. Despite their presence and importance in aquatic ecosystems, there is very little field or laboratory data regarding the impact that environmental chemicals have on odonates. Odonate larvae could be useful test organisms in toxicological research because many species are easily collected in large numbers and are of a reasonable size. However, before laboratory experiments such as acute and chronic tests can be conducted, methods for the maintenance of odonates need to be established. We have developed methods for housing and feeding odonate larvae. Using primarily *Erythemis simplicicollis* (Libellulidae), we hold larvae in individual ventilated plastic cups in order keep track of individuals and to keep food items in close proximity. Cups are contained in a filtering, recirculation system with reconstituted hard water under a 12L:12D photoperiod regime at 22°C. Larvae are fed small fish or tadpoles as food every few days. We have found that larvae can survive in these conditions and continue to grow and molt for several weeks. They require only infrequent feeding and produce little waste. We prefer that larvae spend at least one week and have one meal under these conditions before being used in toxicity tests. Our system is easy to construct and maintain and should be useful for anyone interested in maintenance of odonates or animals with similar habits.]

5803. Laufer, H. (2004): Zum Beutespektrum einer Population von Ochsenfröschen (Amphibia: Anura: Ranidae) nördlich von Karlsruhe (Baden-Württemberg, Deutschland). *Faunistische Abhandlungen, Dresden* 25: 139-150. (in German, with English summary). [The bullfrog (*Rana catesbeiana*), introduced in the Upper Rhine area (Baden-Württemberg, Germany), is a neo-

zoon suggested by some researchers to having negative effects on native amphibians. To examine this statement the diet was examined of 44 bullfrogs (22 males, 21 females, one young specimen) captured in the field. A total of 12 vertebrates and 65 invertebrates including two Anisoptera was found. The vertebrates were four mammals, two birds, two reptiles, three amphibians and a goldfish. A preference of native amphibians, especially of edible frog as prey could not be verified. These results prove that the bullfrog is an opportunistic omnivore eating all living animals that are smaller than itself and that it can capture.] Address: Laufer, H., Büro für Landschaftsökologie, Friedenstrasse 28, 77654 Ofenbourg, Germany. E-mail: bfl.laufer @ t-online.de

5804. Lehmann, F.-O. (2004): The mechanisms of lift enhancement in insect flight. *Naturwissenschaften* 91: 101-122. (in English). ["Recent studies have revealed a diverse array of fluid dynamic phenomena that enhance lift production during flapping insect flight. Physical and analytical models of oscillating wings have demonstrated that a prominent vortex attached to the wings leading edge augments lift production throughout the translational parts of the stroke cycle, whereas aerodynamic circulation due to wing rotation, and possibly momentum transfer due to a recovery of wake energy, may increase lift at the end of each half stroke. Compared to the predictions derived from conventional steady-state aerodynamic theory, these unsteady aerodynamic mechanisms may account for the majority of total lift produced by a flying insect. In addition to contributing to the lift required to keep the insect aloft, manipulation of the translational and rotational aerodynamic mechanisms may provide a potent means by which a flying animal can modulate direction and magnitude of flight forces for manoeuvring flight control and steering behaviour. The attainment of flight, including the ability to control aerodynamic forces by the neuromuscular system, is a classic paradigm of the remarkable adaptability that flying insects have for utilising the principles of unsteady fluid dynamics. Applying these principles to biology broadens our understanding of how the diverse patterns of wing motion displayed by the different insect species have been developed throughout their long evolutionary history." (Author) Many references to Odonata are made.] Address: Lehmann, F.-O., Department of Neurobiology, University of Ulm, Albert-Einstein-Allee 11, 89081 Ulm, Germany. E-mail: fritz.lehmann@biologie.uni-ulm.de)

5805. Peterson, K.J.; Lyons, J.B.; Nowak, K.S.; Takacs, C.M.; Wargo, M.J.; McPeck, M.A. (2004): Estimating metazoan divergence times with a molecular clock. *Proceedings of the National Academy of Sciences U S A*. 101(17): 6536-6541. (in English). ["Accurately dating when the first bilaterally symmetrical animals arose is crucial to our understanding of early animal evolution. The earliest unequivocally bilaterian fossils are approximately 555 million years old. In contrast, molecular clock analyses calibrated by using the fossil record of vertebrates estimate that vertebrates split from dipterans (*Drosophila*) approximately 900 million years ago (Ma). Nonetheless, comparative genomic analyses suggest that a significant rate difference exists between vertebrates and dipterans, because the percentage difference between the genomes of mosquito and fly is greater than between fish and mouse, even though the vertebrate divergence is almost twice that of the dipteran. Here we show that the dipteran rate of molecular

evolution is similar to other invertebrate taxa (echinoderms and bivalve molluscs) but not to vertebrates, which significantly decreased their rate of molecular evolution with respect to invertebrates. Using a data set consisting of the concatenation of seven different amino acid sequences from 23 ingroup taxa (giving a total of 11 different invertebrate calibration points scattered throughout the bilaterian tree and across the Phanerozoic), we estimate that the last common ancestor of bilaterians arose somewhere between 573 and 656 Ma, depending on the value assigned to the parameter scaling molecular substitution rate heterogeneity. These results are in accord with the known fossil record and support the view that the Cambrian explosion reflects, in part, the diversification of bilaterian phyla." (Authors) The analysis includes *Enallagma aspersum* and *Lestes congener*. For a full text version of the paper see: <http://www.pubmedcentral.gov/articlerender.fcgi?tool=pubmed&pubmedid=15084738> Address: Peterson, K.J., Dept of Biological Sciences, Dartmouth College, Hanover, NH 03755, USA. E-mail: kevin.peterson@dartmouth.edu.

2005

5806. Bechly, G. (2005): A new fossil dragonfly (Anisoptera: Corduliidae) from the Paleocene Fur Formation (Mo clay) of Denmark. *Stuttgarter Beiträge zur Naturkunde - Serie B* 358: 1-7. (in English, with German summary). ["A new fossil dragonfly genus and species, *Molercordulia karinae* n. gen. n. sp. (Anisoptera: Corduliidae), is described from the Paleocene Fur Formation (Mo clay) in Denmark. Considering the rarity of Paleocene odonate fossils and the stratigraphic proximity to the important K-T boundary, this fossil, even though only fragmentarily preserved, represents an interesting contribution to our knowledge of the odonate fauna in the Early Tertiary. The new taxon is identified as oldest fossil record of Corduliidae (sensu Bechly 2002). A new character (post-oblique-vein-gap) that seems to be quite useful in dragonfly systematics is described and is proposed as independently acquired autapomorphy in Macromiidae and Haplohamulida." (Author)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

5807. Bößneck, U. (2005): Fauna des Stadtgebietes von Erfurt, Teil I: Libellen. *Veröff. Naturkundemus Erfurt* 24: 109-145. (in German, with English summary). [oas 19.; Thuringia, Germany; "During a local faunistic investigation, 1500 new records of dragonflies were summarized and viewed critical. From 44 species a distribution map and remarks to population development and ecology in the city area of Erfurt are given. The most important habitat of dragonflies in the city area are the clay pits near Mittelhausen (north part of the city) with current records of 33 species." (Author)] Address: Bößneck, U., Stadtverwaltung Erfurt, Umwelt- und Naturschutzamt, Stauffenbergallee 18, D-99084 Erfurt, Germany

5808. Brodin, T. (2005): Predator effects on behaviour and life-history of prey. Doctoral thesis, Department of Ecology and Environmental Science, S-901 87 Umeå, Sweden. ISBN: 91-7305-964-1: 34 pp. (in English). ["In

this thesis I investigate predator-induced effects on behavioural and life-history characteristics of prey. At any moment a given predator is capable of attacking a small number of prey. However, the mere presence of a predator may impact a much larger number of individuals, as prey implement various behavioural and developmental mechanisms to reduce the risk of predation. It has become increasingly clear that predator induced responses have the potential to affect patterns of species abundance and distribution as well as individual fitness of prey. I study these responses by incorporating field surveys, semi-field experiments and laboratory experiments. All experiments were done in an aquatic environment using fish or large odonate larvae as predators and damselfly-or diving beetle larvae as prey. My work highlights the importance of monitoring prey behaviour when studying life-history characteristics. I show that fish presence is an important factor for determining species abundance and distribution of odonates, and that prey behaviour may be a good predictor for fish vulnerability. Larval damselflies react behaviourally to predator presence by reducing activity and/or restricting habitat use. I confirm that such anti-predator responses have positive effects on prey survival in the presence of a predator but negative effects on growth and development of prey. In addition, my results suggest that the increase in per capita food resources for surviving prey following a predation episode (i.e. thinning) can have a stronger positive effect on prey growth and development than the negative effect of anti-predator responses. I also show that the strength of an anti-predator response is dependent on resource availability of the prey, with prey responding less strongly when resources are scarce. My results also indicate that the strength of the anti-predator response of damselfly larvae depends on predator diet and larval age. Predators feeding on prey conspecifics induce a stronger behavioural response in young larva than predators that feed on prey heterospecifics do. This diet-effect was not found in larvae late in ontogeny, due to an increased activity of larva where predators consumed damselflies. Such increased larval activity can be explained as a reaction to a time-constraint. Finally, I found that activity of damselfly larvae is genetically determined and that this has led to a behavioural syndrome that might limit larval plasticity to a certain activity-range. This phenomenon may have implications for how well larvae are able to react to both biotic and abiotic changes in the environment." (Author)] Address: Brodin, T., Animal Ecology, Department of Ecology and Environmental Science, Umea University, 90187 Umea, Sweden. E-mail: tomas.brodin@eg.umu.se

5809. Buttstedt, L.; Zimmermann, W. (2005): Über Entwicklungsnachweise der Feuerlibelle, *Crocothemis erythraea* (Brülle, 1832), in Thüringen und Sachsen-Anhalt (Odonata). *Entomologische Nachrichten und Berichte* 49(3-4): 171-179. (in German, with English summary). ["An overview of the 24 localities of *C. erythraea* known in Sachsen-Anhalt and Thuringia, Germany in 2005 is provided. In 2003 and 2004, the authors studied six of the inhabited water bodies in detail. Development of the species at one site in Thuringia and at two sites in Sachsen-Anhalt is confirmed. The two sites with the largest number of exuviae are briefly characterized. Observations on biology and behaviour made at the rain water collection basin at Artern are communicated and discussed. The temporal pattern of emergence is documented from 69 exuviae collected in 2004. Variati-

ons in size and pigmentation of the same exuviae are described. Our records of confirmed reproduction are at approximately 51°20'N which agrees reasonably with records from Hesse, Lower Saxony, Sachsen-Anhalt, and Brandenburg." (Authors)] Address: Zimmermann, W., Thomas-Müntzer-Str. 5, D-99423 Weimar, Germany

5810. Carnier (2005): Gemeine Winterlibelle *Sympetma fusca* und Gebänderte Heidelibelle *Sympetrum pedemontanum* im Kreis Wesermarsch. Beitr. Naturk. Nieders. 58: 41-42. (in German). [Niedersachsen, Germany; *S. fusca*: 15-IX-1995; *S. pedemontanum*: 22-VIII-2002] Address: Carnier, T., Haasenstr. 7, D-26919 Brake, Germany

5811. Catling, P.M. (2005): A Potential for the Use of Dragonfly (Odonata) Diversity as a Bioindicator of the Efficiency of Sewage Lagoons. *Canadian Field-Naturalist* 119(2): 233-236. (in English). ["In order to determine whether a relationship existed between water quality and odonate fauna in sewage ponds, data were gathered at each of six ponds of similar construction and equal size and depth in an adjacent series of improving water quality at a lagoon system near Embrun in eastern Ontario. Numbers of nymphs of different species of Odonata were recorded in spring and fall, and similar data was collected on adults in June and July. The data on species presence and abundance for each of three pairs of cells in the sequence was then compared with the corresponding chemical data which included biological oxygen demand, total phosphorus, total nitrogen and suspended solids. Water quality improved through the system and species diversity in the final ponds was twice that of the ponds receiving wastewater. Numbers of individuals also increased through the system. Occurrence of *Anax junius*, *Enallagma civile* and *Ischnura verticalis* alone was associated with poorer water quality. Higher diversity including *Lestes disjunctus*, *Leucorrhinia* spp. and *Erythemis simplicicollis*, indicates higher water quality. A potential exists for Odonata species diversity, numbers of individuals and occurrence of particular species to be used as a bioindicator of water quality and a means of evaluating efficiency of a lagoon system. Advantages include data that reflects a time period rather than a point in time and also low costs." (Author)] Address: Catling, P.M., Biology, University of Ottawa, 30 Marie Curie, Ottawa, Ontario K1N 6N5 Canada; catlingp@em.agr.ca

5812. Céréghino, R.; Cayrou, J. (2005): Life-cycle phenology of some aquatic insects: implications for pond conservation. *Aquatic Conserv: Mar. Freshw. Ecosyst.* 15: 559-571. (in English). ["1. Life-cycles and growth patterns were determined for 21 dominant aquatic insect species in small permanent ponds in an arid, karstic region (SW France, site fr7300909 of the Natura 2000 conservation network). The species studied are widely distributed throughout Europe, but some life-cycle patterns are reported here for the first time. 2. The life-history patterns of the 21 species can be divided into five main types: (i) a semivoltine cycle spreading over 2 years; (ii) slow univoltine cycles; (iii) fast univoltine cycles; (iv) multivoltine life-cycles with a long winter generation and two or three summer generations per year; and (v) bivoltine life-cycles with two fast generations per year. Growth was either exponential over the whole developmental period for a given cohort, or divided into two or three successive periods during each of which

the growth rate was fairly constant. 3. Biodiversity estimates strongly depend on the temporal and spatial scale over which observations are made. Ponds thus provide useful models to show how life-history patterns enable many temporally segregated populations to utilize small ecosystems. Conservation frameworks should therefore carefully consider the time-frame needed to survey ponds, as many species with fast cycles could be overlooked. The spatial scale needed to manage threatened habitats and thus preserve pond networks must be broadened, rather than attempting to target individual water bodies for particular management actions." (Authors) The following Odonata are treated: *Coenagrion scitulum*, *Chalcolestes viridis*, *Libellula depressa*, *Anax imperator*.] Address: Céréghino, R., Laboratoire d'Ecologie des Hydrosystèmes, UMR 5177, Université Paul Sabatier, 118 route de Narbonne, 31062 Toulouse cedex 4, France. E-mail: cereghin@cict.fr

5813. Cheng, P.; Hu, J.; Zhang, G.; Xu, B.; Wu, X. (2005): The measurement of the flight gesture and the wing deformation of dragonfly in free flight. *Proceedings of SPIE -- Volume 5852 Third International Conference on Experimental Mechanics and Third Conference of the Asian Committee on Experimental Mechanics*, Chenggen Quan, Fook Siong Chau, Anand Asundi, Brian Stephen Wong, Chwee Teck Lim, Editors: 879-885. (in English(?)). ["Using the phase shifting and the grating projection method, the kinematical parameters of dragonfly in free flight were measured. In our experiment, during projecting parallel sine fringes on the dragonfly's wings with a projector, the high speed CCD TV camera (1000 frames per second) recorded the dragonfly and the fringes projected on the dragonfly's wing, then the shape of the dragonfly's wings in every frame could be gutted using SCPM (Spatial-Carrier Phase Measurement) method. According to this data, we designed a program which can show the change of the gesture of the dragonfly's wing, the 3-D figure, the contour line and the curve of any transversal of the dragonfly's wing at any given time. From the figures of the 3-D deformation, we also can see that the deformation is not completely negative, it must could be control by the dragonfly via the veins on the wing." (Authors)] Address: Cheng, P., University of Science and Technology of China, Key Laboratory of Mechanical Behavior and Design of Materials, CAS, Hefei 230027, China.

5814. Clistenes de Alcântara Santos, A. (2005): Feeding ecology of the Molé Trachelyopterus galeatus Linnaeus, 1766 (Siluriformes, Auchenipteridae) in the lower course of the São José and Santo Antônio Rivers (Chapada Diamantina, Bahia). *Sitientibus Série Ciências Biológicas* 5(2): 93-98. (in Portuguese, with English summary). ["The São José and Santo Antônio Rivers are representative affluents of the Paraguaçu River, although they have demonstrated different physiographic conditions and differ in their degrees of anthropogenic disturbance. In this work, the feeding ecology of *T. galeatus* was described, as well as the possible effects of the alterations previously caused by former diamond mining on the São José bed and margins. Feeding was analyzed through the Frequency of Occurrence and by the Volumetric method combined in an Alimentary Index. The niche width was then calculated. The results indicate a lesser contribution of allochthonous items in the São José River. This may be due to the effects of deforestation along its margins, which would influence species that are dependent upon

those resources. Among the parameters analyzed, the lesser proportion of allochthonous items in the diet of fish from the São José River was marked and can be considered an indirect result of previous mining activity in the area." (Authors) The diet also includes Odonata.] Address: Clisteres de Alcântara Santos, A., Laboratório de Ictiologia, Departamento de Ciências Biológicas, Universidade Estadual de Feira de Santana, Km 03, BR 116, 44031-460, Feira de Santana, Bahia, Brasil. E-mail: clister@ig.com.br

5815. Cordero Rivera, A.; Lorenzo Carballa, M.O.; Utzeri, C.; Vieira, V. (2005): Parthenogenetic *Ichnura hastata* (Say), widespread in the Azores (Zygoptera: Coenagrionidae). *Odonatologica* 34(1): 1-9. (in English). ["Literature and personal information on the distribution of *I. hastata* and other odon. spp. in the Azores is reported. *I. hastata* and *I. pumilio* are recorded for the first time from the islands of Corvo and Sao Jorge, respectively. *I. hastata* appears the most common and abundant sp. and its population is formed by only females (no males were ever recorded). The asexual reproduction of these populations was demonstrated by means of laboratory rearing during several generations. The dispersal ability of this sp. and the possible origin of parthenogenesis after its colonisation of the Azores are briefly discussed. The possible causes of threat are identified and the need for conservation measures is outlined." (Authors)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

5816. Costa, J.M.; Oldrini, B.B. (2005): Diversity and distribution of Odonata (Insecta) in the State of Espírito Santo, Brazil. *Publ. Avul. Mus. Nac.*, Rio de Janeiro 107: 3-15. (in Portuguese, with English summary). [The paper lists 180 odonate species for the State of Espírito Santo, Brazil, and includes notes on some species and a basic bibliography.] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jacosta@acd.ufrj.br

5817. Culhane, F. (2005): The impact of forest disturbance on Odonata communities and the potential use of Odonata as indicators of environmental disturbance, Buton Island, Indonesia. Department of Zoology, Trinity College Dublin, Moderation Thesis 2005: 105 pp. (in English). ["Odonata have been shown to be sensitive and reliable indicators of environmental disturbance (e.g. Stewart & Samways, 1998). A forest stream is influenced by the nature of the catchment and reflects aspects of forest quality and disturbance. Macroinvertebrate assemblages including Odonata larvae, in streams and rivers, have been used extensively as bioindicators of forest disturbance. The aim of this project was to look at the impact of forest disturbance on communities of Odonata and the implications that might have for use of Odonata in bioindication. Seven sites on Buton Island, Indonesia were sampled over a period of five weeks in autumn 2004. GIS data were used to classify sites into disturbed or undisturbed forest. Odonata larvae were collected by kick sampling in two kinds of habitat at each site. Assessment of environmental variables of forests was carried out at the study sites. Larvae were identified to family level and then divided into morphospecies. The length of each larva was mea-

ured. Differences in species composition, diversity measures, functional groups and size frequency distribution were used to show differences between disturbed and undisturbed sites. Thirty-four morphospecies in nine families of Odonata were found. Species richness and diversity differed among sites and were lower at disturbed sites. It was found that the distribution of Zygopteran larvae differed between habitats, and between disturbed and undisturbed sites based on caudal appendage morphology, implying a potential use for caudal appendage type in biomonitoring. The width of size frequency distribution was lower at disturbed sites. Most sites contained morphospecies which were unique to it, thus, a range of habitats from pristine to moderately disturbed would conserve the greatest number of Odonata species." (Author) For the full paper see: <http://www.opwall.com/Library/Indonesia/Indonesia%20Terrestrial/Invertebrates/Fiona%20Culhane%20The%20impact%20of%20forest%20disturbance%20on%20Odonat%85.pdf>]

5818. DuBois, B. (2005): Damselflies of the North Woods. Kollath-Stensaas Publishers. ISBN 0-9673793-7-7: 132 pp. (in English). [This fieldguide is the damselfly companion to Kurt Mead's Dragonflies of the North Woods (see OAS 3740). Like this book, it is appropriate for a far larger area than the "north woods". It will be appropriate to large areas of Ontario in Canada, Minnesota, Wisconsin, Michigan, and Iowa. The book starts with a long, well-illustrated section on morphology, behaviour, and life history of damselflies. The 39 species recorded (plus a further 7 which may appear in the region) are individually discussed and illustrated on a two-page spread with very good photos. Diagnostic characters or structures are specifically indicated by arrows. Information is also provided on the life cycles. A graph of the flight and a range map are also given for each species. The focus of the field guide is more on colour patterns than structures. (Martin Schorr)] Address: Kollath-Stensaas Publishers. 394 Lake Avenue South, Suite 406, Duluth, MN 55802, USA

5819. Fabbri R.; Pavesi M. (2005): First record for Lombardy of *Chalcolestes parvidens* (Artobolevski, 1929) (Odonata Lestidae). *Ann. Mus. civ. St. nat. Ferrara* 6: 95-96. (in Italian, with English summary). [Records of *C. parvidens* are reported from Brescia and Mantova Provinces, Italy. In addition, some information on the distribution and ecology of the species are given.] Address: Fabbri, R., Museo Civico di Storia Naturale, via De' Pisis, 24 - 44100 Ferrara, Italy. E-mail: r-fabbri@libero.it

5820. García, A.; Báez, M.; Cabrera, A. (2005): Odonata. In: Arechavaleta, M.; Zurita, N.; Marrero, M.C., Martin, J.L. (eds.) (2005): Lista preliminar de especies silvestres de Cabo Verde. Hongos, plantas y animales terrestres. Consejería de Medio Ambiente y Ordenación Territorial, Gobierno de Canarias. ISBN 84-89729-25-5: 155 pp. (in Portuguese and Spanish). [On page 68, the Odonata of the Capverdian Islands are checklist island-wise.] Address: <http://www.gobiernodecanarias.org/cmayot/interreg/atlantico/documentos/LPESCaboVerde.pdf>

5821. Hayashi, F.; Tsuchiya, K. (2005): Functional association between female sperm storage organs and male sperm removal organs in calopterygid damselflies. *Entomological Science* 8(3): 245-252. (in English). ["Fe-

male damselflies in the family Calopterygidae have two sperm storage organs: a spherical bursa copulatrix and a tubular spermatheca. Male flies have a peculiar aedeagus with a recurved head with which to remove bursal sperm, and lateral spiny processes to remove spermathecal sperm. The lateral processes differ among species and populations in terms of their width relative to the spermathecal duct: the narrower processes are physically able to access spermathecal sperm, while the wider ones are not. In the present study, sperm storage patterns and aedeagal structures were compared between two calopterygid species with different spermathecal structures –*Calopteryx cornelia* and *Mnais pruinosa*– with respect to not only sperm quantity (number) but also sperm quality (viability), by using a recently developed method based on live/dead dual fluorescence. *Calopteryx cornelia* is a typical spermathecal sperm remover. In this species, viability was similar between bursal and spermathecal sperm. In contrast, in *M. pruinosa*, the spermatheca was much smaller than the bursa and often contained no sperm. Even when the spermatheca of this species did contain sperm, a high percentage of it was dead. Although the spermatheca of *M. pruinosa* has such atrophic tendencies, males have nevertheless developed long and spiny lateral processes similar to those of *C. cornelia*, suggesting the processes have functions other than spermathecal sperm removal. They possibly function as stoppers or guides for manipulating the aedeagal head to remove the sperm mass from the bursa." (Authors)] Address: Hayashi, F., Department of Biology, Tokyo Metropolitan University, Minamiosawa 1-1, Hachioji, Tokyo, 192-0397 Japan. Email: fhayashi@comp.metro-u.ac.jp

5822. Huber, A.; Kovacs, T.; Olajos, P. (2005): Data to the Odonata fauna of North-East Hungary II. *Folia historico naturalia musei Matraensis* 29: 111-122. (in Hungarian, with English summary). ["The authors present the results of their dragonfly collecting carried out in the territory enclosed by the river Hernád, river Sajó and the state border Hungary and Slovakia. The collecting took place between 25.06.1999 and 31.08.2004. The data come mainly from the valley of the Sajó and Hernád rivers, from the Putnok-hills and from the lowland between the Sajó and Hernád rivers. We found 47 dragonfly species in this area, 39 as larva, 37 as exuvium and 44 as imago. The following species are new in larval and exuvial form to the territory: *Sympetma fusca*, *Sympetrum pedemontanum*." (Authors)] Address: Kovacs, T., Matra Mus., Kossuth u. 40, HU-3200 Gyöngyös, Hungary. E-mail: koati@matavnet.hu

5823. Hufnagel, L.; Gaal, M. (2005): Seasonal dynamic pattern analysis in service of climate change research: A methodical case-study. Monitoring and simulation based on an aquatic insect community. *Applied ecology and environmental research* 3(1): 79-132. (in English). ["Our aim was to approach an important and well-investigable phenomenon – connected to a relatively simple but real field situation – in such a way, that the results of field observations could be directly comparable with the predictions of a simulation model-system which uses a simple mathematical apparatus and to simultaneously gain such a hypothesis-system, which creates the theoretical opportunity for a later experimental series of studies. As a phenomenon of the study, we chose the seasonal coenological changes of aquatic and semiaquatic Heteroptera community. Ba-

sed on the observed data, we developed such an ecological model-system, which is suitable for generating realistic patterns highly resembling to the observed temporal patterns, and by the help of which predictions can be given to alternative situations of climatic circumstances not experienced before (e.g. climate changes), and furthermore; which can simulate experimental circumstances. The stable coenological state-plane, which was constructed based on the principle of indirect ordination is suitable for unified handling of data series of monitoring and simulation, and also fits for their comparison. On the state-plane, such deviations of empirical and model-generated data can be observed and analysed, which could otherwise remain hidden." (Authors) The analysis also includes Odonata.] Address: Hufnagel, L., Department of Mathematics and Informatics, Corvinus University of Budapest, H-1118 Budapest, Villanyi ut 29.43, Hungary. E-mail: levente.hufnagel@uni-corvinus.hu

5824. Ichinose, T.; Morita, T.; Ishii, J. (2005): Characteristics of dispersing Odonata species on irrigation ponds of the northern part of Awaji Island, central Japan. 2 pp. (in Japanese, with English summary). ["From the beginning of July to the end of October 2003, 7 damselfly species of 3368 individuals were captured and marked on 6 irrigation ponds of the northern part of Awaji Island, central Japan. Seven species of 465 individual were recaptured or sighted on the other days. *Lestes sponsa* stayed on the same ponds significantly longer than *Copera annulata*. Three species of 72 individuals moved to the other ponds or rice paddies. The longest dispersal of *Lestes sponsa* was around 150 m. The moving period of *Lestes sponsa* was significantly later than that of *Copera annulata*." (Authors) For the full paper see: <http://www.geocities.jp/tomohiroichinose/presentation/rural-ichinose.pdf>] Address: Ichinose, T., Lab. of Landscape Planning, Awaji Landscape Planning and Horticulture Academy (ALPHA), Institute of Natural and Environmental Science, University of Hyogo, Nojimatokiwa 954-2, Hokudan-cho, Tsuna-gun, Hyogo, Japan. E-mail: tomohiroichinose@yahoo.co.jp

5825. Jenrich (2005): Die Libellenfauna im Naturschutzgebiet Rotes Moor. *Beiträge zur Naturkunde in Osthessen* 41: 25-40. (in German, with English summary). [Hessen, Germany; the 17 odonate species of the bog are briefly characterised by morphology and ecology. The development of the odonate fauna (population trends), based on investigations in 1982-1985, 2002, and 2004, is discussed. Of special interest are records of *Coenagrion hastulatum*, *Aeshna juncea*, *A. subarctica elisabethae*, *Somatochlora arctica*, *S. flavomaculata*, *Sympetrum danae*, and *Leucorrhinia dubia*. *L. pectoralis* seems to have been extinct since the 1980th.] Address: Jenrich, J., Fliegerstr. 11, D-36129 Gersfeld, Germany

5826. Joop, G. (2005): Maintenance of female colour polymorphism in the coenagrionid damselfly *Coenagrion puella*. Dissertation, Fachbereich für Biowissenschaften und Psychologie der technischen Universität Carolo-Wilhelmina zu Braunschweig: 116 pp. (in English, with German summary). ["How colour polymorphisms are maintained is still an unresolved question. Selection should favour the morph best adapted (Moran 1992). Furthermore, the maintenance of a polymorphic system is supposed to be costly, therefore it seems only profitable under quickly or steadily changing envi-

ronmental conditions (Moran 1992). Colour polymorphism is a common trait in damselflies, especially in female coenagrionids (Odonata: Zygoptera). This has been discussed in literature for more than 100 years and several hypotheses to explain these polymorphisms have been developed (Fig. 1). As a model organism I chose the azur damselfly, *Coenagrion puella*. In this species males are blue while females show three colour morphs, green, blue and intermediate. The question is how these female colour morphs are maintained. The focus of the presented work to answer this question is on differences in and colouration on thorax and abdomen of male and polymorphic female *C. puella*, furthermore on differences in immune parameters and reproductive strategies. For black content no differences between the female morphs were found. Males however have a smaller black content than females. In colour composition it was found that blue females are of a different blue than males, and all three female morphs differ in colour composition. The haemolymph's haemocyte numbers and Phenoloxidase activity (PO) and their regulation under the risk of predation and parasitism in the larval stage were investigated as immune parameters. Here differences between the sexes were found. This led to the question, whether there are similar differences between the female morphs. Therefore haemocyte numbers and PO in adult male and polymorphic females were investigated. Furthermore differences in mortality in the presence of a newly introduced entomopathogenic fungi and parasite numbers in the field were examined. For all this parameters no differences between the female morphs were found but differences between the sexes. For reproductive strategies it is discussed, which impact the between the morphs differing egg shapes could have on the choice of oviposition substrate. From these results the question, how this polymorphism evolved and if it evolved parallel in all coenagrionid species, arose. To answer this a new molecular phylogenetic tree of the coenagrionids was build. So far it seems that the female colour polymorphism evolved several times within this group. In summary, I conclude that none of the in figure 1 presented factors maintains this polymorphism alone, but rather a combination of all of them. If I included, that the polymorphism might have evolved several times within the coenagrionids under differing selection pressures, the question of the maintaining factors becomes even more complex." (Author) Address: Joop, Gerrit, Zoologisches Institut, AG Ökologie, Technische Universität Braunschweig, Braunschweig, Germany. Email: g.joop@tu-bs.de

5827. Jourde, P. (2005): Les libellules de Charente-Maritime. Bilan de sept années de prospection et d'étude des Odonates 1999-2005. Annales de la Société des Sciences Naturelles de la Charente-Maritime, supplément, décembre 2005: 144 pp. [This regional fauna directed to the Département Charente-Maritime at the central western (Atlantic) border of France, impresses by a clear layout presenting each of the 62 species on one page. There, you find information on the distribution (with detailed maps), habitats, ecology, conservation status, phenology, and also the vernacular names in French, English, and German, and an explanation of the Latin names. As usual, and necessary for a regional fauna, the general reader is introduced by a brief biology of the Odonata, the geography of the region, and a detailed treatment of all relevant odonatological publications referring to the department. Also appended are a bibliography, checklists, an index, and many impressive

colour photos of habitats and species. The fine resolution of the maps is quite fascinating and some apparently very common European species as *Lestes sponsa*, *Aeshna cyanea*, or *Sympetrum vulgatum* appear not so common after all! This is a very sophisticated presentation of a regional fauna, and it is highly recommended to everyone interested in the Odonata of France or the distribution of the species in Europe. (Martin Schorr)] Address: Société des Sciences naturelles de Charente-Maritime, Muséum d'Histoire naturelle, 28 rue Albert 1er, F-17000 La Rochelle Prix : 20 € (+ 3 € shipping).

5828. Khrokalo, L.K. (2005): Annotated bibliography of the odonatological papers of Ukraine. IDF-Report 9: 1-51. (in English). [261 papers of the Odonata of Ukraine are compiled and annotated. Names of Ukrainian journals and titles are translated into English. Copies are available from IDF.] Address: Khrokalo, Lyudmila, P.O. Box 23, Kyiv-118, Ukraine 03118. E-mail: lkhrokalo@mail.ru

5829. Klausnitzer, B. (2005): Buchbesprechungen: Wildermuth et al (2005): Die Libellen der Schweiz. Entomologische Nachrichten und Berichte 49(3-4): 193-194. (in German). [Review of the book reviewed as OAS 5005.] Address: Klausnitzer, B., PF 202731, D-01193 Dresden, Germany

5830. Kövecses, J.; Sherwood, G.D.; Rasmussen, J. B. (2005): Impacts of altered benthic invertebrate communities on the feeding ecology of yellow perch (*Perca flavescens*) in metal-contaminated lakes. Can. J. Fish. Aquat. Sci. 62: 153-162. (in English, with French summary). ["Metal contamination can disrupt trophic links in food webs by altering the taxonomic composition and size structure of benthic macroinvertebrate communities. Benthic macroinvertebrates and yellow perch (*Perca flavescens*) were collected from six lakes along a gradient of cadmium (Cd) and copper (Cu) contamination in Quebec, Canada. The two most contaminated lakes had significantly lower densities of several benthic macroinvertebrate taxa and significantly lower Shannon's index than less contaminated lakes. The stomach contents of perch from the most contaminated lakes were less diverse, with a greater reliance on chironomids and (or) zooplankton than perch from other study lakes. The size of prey in perch from the most contaminated lakes did not increase with age and the mean prey size was smaller than in other, less contaminated lakes. Perch from lakes with medium to low levels of contamination weighed significantly more than perch from lakes with high levels of contamination. This reduction in growth is attributed to the increased costs of foraging on a simplified prey base in metal-contaminated systems." (Authors)] Address: Kövecses, Jennifer, Department of Biology, McGill University, 1205 Dr. Penfield, Montreal, QC H3A 1B1, Canada. E-mail: Jennifer.kovecses@elf.mcgill.ca

5831. Krauss, V.; Pecyna, M.; Kurz, K.; Sass, H. (2005): Phylogenetic mapping of Intron positions: A case study of translation initiation factor eIF2y. Molecular Biology and Evolution 22: 74-84. (in English). ["Eukaryotic translation initiation factor 2 (eIF2) is a G protein that delivers the methionyl initiator tRNA to the small ribosomal subunit and releases it upon GTP hydrolysis after the recognition of the initiation codon. eIF2 is composed of three subunits, a, b, and c. Subunit c shows the strongest conservation, and it confers both

tRNA and GTP/GDP binding. Using intron positioning and protein sequence alignment, here we show that eIF2y is a suitable phylogenetic marker for eukaryotes. We determined or completed the sequences of 13 arthropod eIF2y genes. Analyzing the phylogenetic distribution of 52 different intron positions in 55 distantly related eIF2y genes, we identified ancient ones and shared derived introns in our data set. Obviously, intron positioning in eIF2y is evolutionarily conserved. However, there were episodes of complete and partial intron losses followed by intron gains. We identified 17 clusters of intron positions based on their distribution. The evolution of these clusters appears to be connected with preferred exon length and can be used to estimate the relative timing of intron gain because nearby precursor introns had to be erased from the gene before the new introns could be inserted. Moreover, we identified a putative case of intron sliding that constitutes a synapomorphic character state supporting monophyly of Coleoptera, Lepidoptera, and Diptera excluding Hymenoptera. We also performed tree reconstructions using the eIF2y protein sequences and intron positioning as phylogenetic information. Our results support the monophyly of Viridiplantae, Ascomycota, Homobasidiomyceta, and Apicomplexa." (Authors) The study includes *Enallagma cyathigerum*.] Address: Krauss, V., Dept of Genetics, Uni. Leipzig, Leipzig, Germany. E-mail address: krauss@rz.uni-leipzig.de

5832. Kuki, N.; Okubo, K. (2005): Relationship between dragonfly communities and environmental conditions at paddy field areas in the Kamiina district, Nagano Prefecture, Central Japan. *Journal of The Japanese Institute of Landscape Architecture* 68(5): 579-584. ["The purpose of this study was to study the relationship between dragonflies in paddy areas and their environmental condition. We selected five study areas which differed in their environment (two non-consolidated paddy areas in hilly and mountainous areas, one consolidated paddy area in hilly and mountainous area, one non-consolidated paddy area in urbanized area, one consolidated paddy area in urbanized area.) in the Kamiina district, Nagano Prefecture. The number and behaviour of dragonflies were recorded by the route census method. The survey of land utilization was carried out on these areas. The number of all of the species was twenty-three. The number of species and individuals were higher in 3 hilly and mountainous areas than in 2 urban areas. Five study areas were classified into 3 hilly and mountainous area region and 2 urban areas by TWINSpan. Dragonfly communities were classified to seven types. Each type corresponded different environment conditions of waterside, forest and others. It was confirmed that the environmental selection and behaviour of mature dragonflies corresponded to the each species character. The environmental selection of mature dragonflies were different between hilly and mountainous area and urban area. It was clear that dragonfly communities were affected by consolidation and urbanization." (Authors)] not stated in English

5833. Kuki, N.; Kumiko, O. (2005): Relationship between dragonfly communities and the environmental conditions at paddy field area in Kamiina district, Nagano Prefecture, Central Japan. *Journal of the Institute of Japanese Landscape Architecture, Annual Scientific Research Meeting Abstracts Vol. 2005*: 122. (in English). ["The purpose of this study was to know relationship between dragonflies in paddy area and envi-

ronmental condition. We selected five various condition study areas (two non-consolidated paddy areas in hilly and mountainous areas, one consolidated paddy area in hilly and mountainous area, one non-consolidated paddy area in urbanized area, one consolidated paddy area in urbanized area.) in the Kamiina district, Nagano Prefecture. The number and behavior of dragonflies were recorded by route census method. The survey of land utilization was carried out on these areas. The number of all of the species was twenty-three. The number of species and individuals were higher in 3 hilly and mountainous areas than in 2 urban areas. Five study areas were classified into 3 hilly and mountainous area region and 2 urban areas by TWINSpan. Dragonfly communities were classified to seven types. Each type corresponded different environment conditions of waterside, forest and others. It was confirmed that the environmental selection and behavior of mature dragonflies corresponded to the each species character. The environmental selection of mature dragonflies were different between hilly and mountainous area and urban area. It was clear that dragonfly communities were affected by consolidation and urbanization." (Authors)] Address: Kuki, N., Graduate School of Agricultural Sciences, Shinshu University, Japan

5834. Kurosawa, N.; Handa, M.; Imai, K.; Sasaki, Y.; Itoh, H.; Urato, H. (2005): A study on the environmental factors of nursery ponds for naiads of the rare damselfly *Coenagrion terue* in consideration of its feeding habit. *Journal of The Japanese Institute of Landscape Architecture* 68 (5): 575-578. (in Japanese, with English summary). ["C. terue living in Sawada Springs in Hitachi Seaside Park, Japan is a rare population as its habitat is near the shore while most other populations of this species are distributed in high lands. Office of Hitachi Seaside Park has been trying to conserve this population by placing ponds and repairing existing ponds in this area. We thought that providing optimal food supply for the larvae was one of the important means to maintain this population and the strength of sunlight was also an important environmental factor for nursery ponds for the naiads. In this study, to clarify which were actual species of prey on larvae and the relationship between food supply and the degree of sunlight, we examined gut contents of larvae, meiobenthos as prey in ponds, the strength of sunlight and the density of larvae. The main prey of larvae were benthic Arthropoda. Body widths of prey were limited to 100-500µm and the maximum body widths of prey were proportional to the head widths of larvae. Not only the density of larvae, but also the number of species and the density of prey tended to be lower in dark ponds than those in bright ponds." (Authors)] Address: not stated in English

5835. Lai, W.; Yan, J.; Motamed, M.; Green, S. (2005): Force Measurements on a Scaled Mechanical Model of Dragonfly in Forward Flight. 12th Int'l Conf. Advanced Robotics (ICAR), Seattle, Washington, USA, July 18-20, 2005: 6 pp. (in English). ["A dynamically scaled flapping-wing model has been developed to investigate the aerodynamic phenomena and flight performance of insect-scale flapping wings. The mechanism consists of two wings, each having 3 rotational degrees of freedom, mounted on a linear stage to permit translation in a fluid-filled tank. Each wing is equipped with a sensor for instantaneous measurement of the time-varying forces and torques. The setup permits one wing to be designated as the forewing and the o-

ther as the hindwing so that interactions between them can be analysed to understand flight for four-winged insects. The apparatus is versatile enough to explore a range of wing morphologies as well as operational wing trajectory parameters." (Authors)] Address: Motamed, M., Electrical and Computer Engineering Department, University of British Columbia, Vancouver, BC, Canada. E-mail: mehranm@ece.ubc.ca

5836. Lefebvre, F.; Poulin, R. (2005): Progenesis in digenean trematodes: a taxonomic and synthetic overview of species reproducing in their second intermediate hosts. *Parasitology* 130: 587-605. (in English). ["Precocious egg production, i.e. progenesis, has been documented for a number of species in scattered reports throughout the trematode literature. The last 2 extensive studies on the subject date from Buttner in the early 1950s (in French) and from Tang in the early 1980s (in Chinese). Overall, 43 species were then known for their ability to produce eggs at the metacercarial stage while still in the second intermediate host. Here, we update the list, and document the existence of progenesis in a total of 79 digenean trematode species, for which we provide information on the taxonomy of the hosts (including Odonata), the facultative or obligate character of progenesis, relevant references, as well as some other pertinent biological information. We then review the subject by asking 7 questions of fundamental evolutionary importance. These include: What favours progenetic development? What are the associated costs and benefits? How are progenetic eggs released from the host? While exposing the various opinions of previous authors, we attempt to give a synthetic overview and stress on the importance of the metacercarial cyst wall (whether it is present, and if so its thickness) in the evolution and the adoption of a progenetic life-cycle." (Authors)] Address: Lefebvre, F., Department of Zoology, University of Otago, P.O. Box 56 Dunedin, New Zealand

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5838. Machida, K.; Shimanuki, J. (2005): Structure analysis of the wing of a dragonfly. *Proceedings of SPIE 5852, Third International Conference on Experimental Mechanics and Third Conference of the Asian Committee on Experimental Mechanics*, Chenggen Quan, Fook Siong Chau, Anand Asundi, Brian Stephen Wong, Chwee Teck Lim, Editors: 671-676. (in English). ["It is considered that wing corrugation increases not only the warping rigidity but also the flexibility. The wing of a dragonfly has some characteristic structures, such as "Nodus", "Stigma". Nodus is located in the center of the leading edge, and stigma like a mark is located near the end of the wing. It is considered that these structures not only increase the flexibility of the wing, but also prevent fatigue fracture of wings. Therefore, to investigate the mechanism of dragonfly's wing, the configura-

tion of wing used for analyses was measured using an optical coordinate profile measuring machine and a laser microscope. Moreover, several 3-D models of the dragonfly's wing were made, and calculated by the 3-D finite element method." (Authors)] Address: Machida, K., Department of Mechanical Engineering, Tokyo University of Science 2641 Yamazaki, Noda-shi, Chiba, 278-8510, Japan

5839. Móra, A.; Csépes, E.; Tóth, M.; Dévai, G. (2005): Changes in spatial and temporal distribution of benthic macroinvertebrates at a cross-section of the River Tisza between Tiszaamorós and Lónya. *Acta Biol. Debr. Oecol. Hung* 13: 131-139. (in Hungarian, with English summary). ["In 2003 benthos samples were taken six times (from March to November) at a cross-section of the River Tisza between Tiszaamorós and Lónya, Hungary. Three sampling sites were assigned within the cross-section based on the water depth and water velocity conditions: (1) at the main flow, (2) at midbed: at the half of the distance between the right and left bank and (3) close to the left bank. The changes in the spatial and temporal distribution of the assemblages of the benthic macroinvertebrates are described. The most diverse assemblages was detected at spring. The chironomids dominated the benthic fauna especially in summer. Our results show the importance of the habitats near the bank for the benthic macroinvertebrates." (Authors) Table 1 includes *Stylurus flavipes*.] Address: Móra, A., Department of Hydrobiology, University of Debrecen, H-4032 Debrecen, Egyetem tér 1., Hungary

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do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, 20940-040 Rio de Janeiro, Brasil

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5843. Rychła, A. (2005): Dragonflies -Odonata- of standing waterbodies from the Landscape Park "Łuk Muzakowa" (district Luuskie) covering species diversity and their protection. *Chrońmy Przyrodę Ojczystą* 61(6): 67-79. (in Polish, with English summary). ["This paper summarizes the investigation of dragonflies in the Landscape Protection Area (LPA) "Luk Muzakowa" in Poland. 39 species were found in 28 anthropogenic waterbodies. These waterbodies varied significantly in their physio-chemical water properties and were at different succession stages. 25 of the species developed in the investigated waterbodies. The reproductive behaviour of 3 species (*Aeshna isosceles*, *Libellula depressa* and *Orthetrum coerulescens*) was observed, but the occurrence of neither larvae nor exuviae could be found. The images of 7 species (*Calopteryx splendens*, *C. virgo*, *Sympecma fusca*, *Gomphus flavipes*, *Syrmpetrum flaveolum*, *S. pedemontanum* and *S. striolatum*) were observed. The highest species diversity (30 species) was noted in the southern part of the "Luk Muzakowa" (group E, with the youngest waterbodies). In the northern part of the LPA (group A, with the oldest waterbodies), 19 species were found. The high habitat diversity in the studied area supports the occurrence of dragonflies with various ecological requirements. Of the species documented, 3 (*G. flavipes*, *Leucorrhinia albifrons* and *L. pectoralis*) are protected by the Polish legislation and the European FFH-directive. The *L. albifrons*, *A. juncea* and *O. coendescens* are included in the Red List of dragonflies in Poland." (Author)] Address: Rychła, Anna, ul. Osiedlowa 12, Płoty, PO-66-016 Czerwieńsk, Poland. E-Mail: rychlan@op.pl

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terans, lepidopterans and dipterans." (Authors)] Address: Srinivasulu, B., Wildlife Biology Section, Zoological Dept, Osmania University, Hyderabad, Andhar Pradesh 500007, India. E-mail: bharisrini@yahoo.co.in

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Hyperolius spinigularis. *Oecologia* 143(2): 280-290. (in English). ["While theoretical studies of the timing of key switch points in complex life cycles such as hatching and metamorphosis have stressed the importance of considering multiple stages, most empirical work has focused on a single life stage. However, the relationship between the fitness components of different life stages may be complex. Ontogenetic switch points such as hatching and metamorphosis do not represent new beginnings—carryover effects across stages can arise when environmental effects on the density and/or traits of early ontogenetic stages subsequently alter mortality or growth in later stages. In this study, I examine the effects of egg- and larval-stage predators on larval performance, size at metamorphosis, and post-metamorphic predation in the African tree frog *Hyperolius spinigularis*. I monitored the density and survival of arboreal *H. spinigularis* clutches in the field to estimate how much egg-stage predation reduced the input of tadpoles into the pond. I then conducted experiments to determine: (1) how reductions in initial larval density due to egg predators affect larval survival and mass and age at metamorphosis in the presence and absence of aquatic larval predators, dragonfly larvae, and (2) how differences in mass or age at metamorphosis arising from predation in the embryonic and larval environments affect encounters with post-metamorphic predators, fishing spiders. Reduction in larval densities due to egg predation tended to increase per capita larval survival, decrease larval duration and increase mass at metamorphosis. Larval predators decreased larval survival and had density-dependent effects on larval duration and mass at metamorphosis. The combined effects of embryonic and larval-stage predators increased mass at metamorphosis of survivors by 91%. Larger mass at metamorphosis may have immediate fitness benefits, as larger metamorphs had higher survival in encounters with fishing spiders. Thus, the effects of predators early in ontogeny can alter predation risk even two life stages later." (Author)] Address: Vonesh, J.R., Tyson Research Center, Washington University at St. Louis, P.O. Box 258, Eureka, MO 63025, USA

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as a non-invasive source of genetic material. DNA extracted from exuviae produced consistent genotypes at five polymorphic microsatellite loci for all of the samples processed using the DNeasy tissue kit and proteinase-K/TNES methods and 4 out of the 6 exuviae treated with Chelex-100. Exuviae offer an effective source of genetic material from endangered odonates and also highly mobile species that are too difficult to catch in significant numbers. As such, we expect DNA extracted from exuviae to be widely applied to odonatological genetic research." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

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5853. Anjos-Santos, D.; Costa, J.M. (2006): A revised checklist of Odonata (Insecta) from Marambaia, Rio de Janeiro, Brazil with eight new records. *Zootaxa* 1300: 37-50. (in English, with Portuguese summary). ["A list of 77 species in 37 genera and 10 families recorded in Marambaia, Rio de Janeiro, Brazil is presented. Eight species (*Hetaerina brighthwelli*, *Lestes tricolor*, *Ischnura*

fluviatilis, Leptagrion andromache, Triacanthagyna nympha, T. septima, Zonophora campanulata campanulata, and Micrathyrta borgmeieri) have been recorded for the first time for the region, enlarging the knowledge about Odonata species of Rio de Janeiro State. Comments about new records and additional relevant literature are discussed." (Authors)] Address: Anjos-Santos, Danielle, Museu Nacional, Universidade Federal do Rio de Janeiro, Departamento de Entomologia, Setor de Insetos, Aquáticos, Quinta da Boa Vista, São Cristóvão 20940-040, Rio de Janeiro, Brazil. Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@acd.ufrj.br

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5856. Azrina, M.Z.; Yap, C.K.; Ismail, A.R.; Ismail, A.; Tan, S.G. (2006): Anthropogenic impacts on the distribution and biodiversity of benthic macroinvertebrates and water quality of the Langat River, Peninsular Malaysia. *Ecotoxicology and Environmental Safety* 64(3): 337-347. (in English). ["A study of the impacts of anthropogenic activities on the distribution and biodiversity of benthic macroinvertebrates and water quality of the

Langat River (Peninsular Malaysia) was conducted. Four pristine stations from the upstream and 4 stations at the downstream receiving anthropogenic impacts were selected along the river. For 4 consecutive months (March–June 1999), based on the Malaysian DOE (Malaysia Environmental Quality Report 2000, Department of Environment, Ministry of Science, Technology and Environment Malaysia. Maskha Sdn. Bhd. Kuala Lumpur, 86pp; Malaysia Environmental Quality Report 2001, Department of Environment, Ministry of Science, Technology and the Environment Malaysia) water quality index classes, the upstream stations recorded significantly ($P<0.05$) higher Biological Monitoring Working Party scores and better water quality indices than those of the downstream. The total number of macrobenthic taxa and their overall richness indices and diversity indices were significantly ($P<0.05$) higher at the upstream stations (54 taxa) than at the downstream stations (5 taxa). The upstream of the Langat River was dominated by Ephemeroptera and chironomid dipterans while other orders found in small quantities included Trichoptera, Diptera, Plecoptera, Odonata, next term Ephemeroptera, Coleoptera, and Gastropoda. On the other hand, the downstream of the river was mainly inhabited by the resistant Oligochaeta worms *Limnodrilus* spp. and *Branchiodrilus* sp. and Hirudinea in small numbers. The relationships between the physicochemical and the macrobenthic data were investigated by Pearson correlation analysis and multiple stepwise regression analysis. These statistical analyses showed that the richness and diversity indices were generally influenced by the total suspended solids and the conductivity of the river water. This study also highlighted the impacts of anthropogenic land-based activities such as urban runoff on the distribution and species diversity of macrobenthic invertebrates in the downstream of the Langat River. The data obtained in this study supported the use of the bioindicator concept for Malaysian rivers. Some sensitive (Trichopteran caddisflies and Ephemeroptera) and resistant species (Oligochaeta such as *Limnodrilus* spp.) are identified as potential bioindicators of clean and polluted river ecosystems, respectively, for Malaysian rivers.] Address: Yap, C.K., Department of Biology, Faculty of Science, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia. E-mail: yapckong1973@yahoo.com.sg

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dent on the viscous parameters in the constitutive relation." (Authors)] Address: Email: tongbg@gucas.ac.cn

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5860. Bedjanic, M.; Conniff, K.; de Silva Wijeyeratne, G. (2006): Dragonflies of Sri Lanka and southern India. *Jetwing Eco Holidays*. Colombo. ISBN 955107908-6: 28 pp. (in English). [78 of the 117 Odonata of Sri Lanka are pictured. For the full paper see: [http://www.jetwingco.com/images/GPB%20Dragonflies%20of%20Sri%20Lanka%20\(1st%20Ed\)%202006%2005.pdf](http://www.jetwingco.com/images/GPB%20Dragonflies%20of%20Sri%20Lanka%20(1st%20Ed)%202006%2005.pdf)]

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539-547. (in English). ["Sex-biased dispersal is well known for birds and mammals, typically by females and males, respectively. Little is known about general patterns of sex-biased dispersal in other animal taxa. We reviewed return rates for a model group of invertebrates (damselflies) and explored putative costs and benefits of dispersal by males and females. We used published capture-mark-recapture data and examined whether a sex bias existed in likelihood of recapture at least once, at both emergence and/or breeding sites. We assessed whether this metric of likelihood of recapture was indicative of dispersal or philopatry, and whether any emerging pattern(s) were consistent across damselfly families. Using a meta-analysis, we found a higher likelihood of recapture at least once for males than for females at both natal sites and breeding sites, which seemed attributable to higher female-biased dispersal, although female-biased mortality cannot be discounted particularly for some species. Sex biases in dispersal among damselflies may be understood based on sex differences in maturation rate and foraging behaviour, both of which should affect the costs and benefits of dispersing. This hypothesis may be useful for explaining patterns of dispersal in other animal taxa." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

5862. Bena, W. (2006): Die Natur der Puszca Zgorzelecka (Görlitzer Heide). *Berichte der naturforschenden Gesellschaft der Oberlausitz* 14: 1001-105. (in German). [The author gives an introduction into the heath and woodlands situated on both sites of the Polish/German border, originally known als "Görlitzer Heide". Facts are compiled more general and organized in three chapters: Situation and history of forestry, flora, and fauna. The chapter on the fauna also contains some odonate highlights, but without any detailed data.] Address: Bena, W., ul. Olszewskiego, PL-59-900 Zgorzelec, Poland. E-mail: benawald@gazeta.pl

5863. Bernard, R.; Buczyński, P.; Tończyk, G. (2006): Historical materials: Dr. Stefan Mielewicz (1933-2005). *Wiad. entomol.* 25(1): 43-54. (in Polish, with English summary). [Obituary and bibliography of the leading Polish odonatologist of the last four decades in the 20th century.] Address: Bernard, R., Department of General Zoology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznań, PL-61-702 Poznan, Poland; E-mail: rbernard@main.amu.edu.pl

5864. Bernard, Y. (2006): *Trithemis annulata* (Palisot de Beauvois, 1805), nouvelle espèce pour le département des Hautes-Pyrénées (Odonata, Anisoptera, Libellulidae). *Martinia* 22(3): 133-134. (in French, with English summary). [France; in summer 2005, two male *T. annulata* were caught at the Lourdes lake. Obviously, the range extension of the species in southwestern France is not restricted to the Atlantic coast.] Address: Bernard, Y., 13 chemin de Gourion, Domaine de Peyre, F-33360 Lignan de Bordeaux. France. E-mail: ybernard@biotope.fr

5865. Bernauer, D.; Grabow, K.; Martens, A. (2006): Fang von Libellenlarven durch Elektrofischung (Odonata: Cordulegastridae). *Libellula* 25(3/4): 165-169. (in German, with English summary). ["On 10-X-2006, at a shallow stream near Wachenheim in the Palatinate Fo-

rest, Germany, the recording of dragonfly larvae by electrofishing was tested successfully. At two 10 m-stretches, ten and 45 larvae of *Cordulegaster boltonii*, respectively, were caught by using the standard techniques for larvae of lampreys." (Authors)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

5866. Berry, R.; Stange, G.; Olberg, R.; van Kleef, J. (2006): The mapping of visual space by identified large second-order neurons in the dragonfly median ocellus. *Journal of Comparative Physiology A: Neuroethology, Sensory, Neural, and Behavioral Physiology*: 1-19. (in English). ["In adult dragonflies, the compound eyes are augmented by three simple eyes known as the dorsal ocelli. The outputs of ocellar photoreceptors converge on relatively few second-order neurons with large axonal diameters (L-neurons). We determine L-neuron morphology by iontophoretic dye injection combined with three-dimensional reconstructions. Using intracellular recording and white noise analysis, we also determine the physiological receptive fields of the L-neurons, in order to identify the extent to which they preserve spatial information. We find a total of 11 median ocellar L-neurons, consisting of five symmetrical pairs and one unpaired neuron. L-neurons are distinguishable by the extent and location of their terminations within the ocellar plexus and brain. In the horizontal dimension, L-neurons project to different regions of the ocellar plexus, in close correlation with their receptive fields. In the vertical dimension, dendritic arborizations overlap widely, paralleled by receptive fields that are narrow and do not differ between different neurons. These results provide the first evidence for the preservation of spatial information by the second-order neurons of any dorsal ocellus. The system essentially forms a one-dimensional image of the equator over a wide azimuthal area, possibly forming an internal representation of the horizon. Potential behavioural roles for the system are discussed." (Authors)] Address: Berry, R., Centre for Visual Sciences, Research School of Biological Sciences, Australian National University, PO Box 475, Canberra, ACT 2601, Australia. E-mail: rberry@rsbs.anu.edu.au

5867. Bönsel, A. (2006): Schnelle und individuenreiche Besiedlung eines revitalisierten Waldmoores durch *Leucorrhinia pectoralis* (Odonata: Libellulidae). *Libellula* 25(3/4): 151-157. (in German, with English summary). ["In 2003 a drained forest mire in Mecklenburg-Pomerania, Germany, was revitalized by damming up the water to a maximum depth of 1.3 m. Three years later a large indigenous population of *L. pectoralis* was recorded at the new water body. In spite of the cryptic situation of the revitalized habitat many individuals must have found it promptly. Forests around the habitats do not constitute dispersal barriers for the sp., which is endangered in central Europe, and large occurrences nearby are not a prerequisite for colonizing new habitats. As in this region the revitalisation of mires is associated with few conflicts of interest and only little financial support is needed, this measure is recommended for the protection and promotion of *L. pectoralis*." (Author)] Address: Bönsel, A., Vasenbusch 15, D-18337 Gresenhorst, Germany. E-mail: andre.boensel@gmx.de

5868. Boyero, L.; Rincón, P.A.; Bosch, J. (2006): Case selection by a limnephilid caddisfly [*Potamophylax*

latipennis (Curtis)] in response to different predators. *Behavioral Ecology and Sociobiology* 59(3): 364-372. (in English). ["Some organisms use morphological structures obtained by behavioural processes to lower mortality by predation. We test whether larvae of the limnephilid caddisfly *Potamophylax latipennis* (Curtis) vary their responses to the presence of different predators (*Cordulegaster boltonii*, fire salamander larvae or brown trout) by choosing organic or mineral cases. We offered both case types to larvae, and simulated differences in predation risk using water conditioned with chemicals from the different predators. Our results show that *Potamophylax* larvae detect and discriminate predators using water-borne chemical cues and alter their choice of case type according to the perceived predation risk. Moreover, the distribution of larvae bearing cases of different anti-predator value matches the spatial variation in predation risk in the field." (Authors)] Address: Boyero, L., Museo Nacional de Ciencias Naturales (CSIC), Madrid, Spain. E-mail: luz.boyero@jcu.edu.au

5869. Boyero, L.; Rincón, P.A.; Bosch, J. (2006): Case selection by a limnephilid caddisfly [*Potamophylax latipennis* (Curtis)] in response to different predators. *Journal Behavioral Ecology and Sociobiology* 59(3): 364-372. (in English). ["Some organisms use morphological structures obtained by behavioural processes to lower mortality by predation. We test whether larvae of the limnephilid caddisfly *Potamophylax latipennis* (Curtis) vary their responses to the presence of different predators (dragonfly naiads [*Cordulegaster boltonii*], fire salamander larvae or brown trout) by choosing organic or mineral cases. We offered both case types to larvae, and simulated differences in predation risk using water conditioned with chemicals from the different predators. Our results show that *Potamophylax* larvae detect and discriminate predators using water-borne chemical cues and alter their choice of case type according to the perceived predation risk. Moreover, the distribution of larvae bearing cases of different anti-predator value matches the spatial variation in predation risk in the field." (Authors)] Address: Boyero, L., Museo Nacional de Ciencias Naturales (CSIC), Madrid, Spain. E-mail: luz.boyero@jcu.edu.au

5870. Brauner, O. (2006): Einjährige Entwicklung von *Leucorrhinia pectoralis* und *Brachytron pratense* in einem Kleingewässer Nordostbrandenburgs (Odonata: Libellulidae, Aeshnidae). *Libellula* 25(1/2): 61-75. (in German, with English summary). ["In a kettle hole near Brodowin, Brandenburg, Germany in the dry and warm summer of 2001, the water body was observed to dry up completely for almost five months. Regular measurements of water conditions showed that the water reached a minimal level of less than 50 cm below ground during that time. In 2003 ten exuviae of *L. pectoralis* and five exuviae of *B. pratense* were found at this water body, indicating univoltine development for at least part of the population of both species. From similar observations at three different localities of the same region, it is likewise inferred that both species may be partly univoltine." (Authors)] Address: Brauner, O., R.-Breitscheidstr. 62, D-16225 Eberswalde, Germany. E-mail: oliverbrauner@web.de

5871. Bressler, D.W.; Stribling, J.B.; Paul, M.J.; Hicks, M.B. (2006): Stressor tolerance values for benthic macroinvertebrates in Mississippi. *Hydrobiologia* 573: 155-

172. (in English). ["Conceptually, tolerance values represent the relative capacity of aquatic organisms to survive and reproduce in the presence of known levels of stressors. Operationally, they represent the relative abundance and colocation of organisms and stressors. These numeric values are then used for calculating tolerance metrics. Defensibility of biological assessments using tolerance metrics is compromised if the origins of the tolerance values or technical foundations of metrics are unknown. To minimize circularity and maximize objectivity, we define stressed conditions using physical and chemical factors. Also, since single, isolated stressors in stream systems are rare, we used an approach that combines multiple physical and chemical characteristics into a single general stressor gradient. In this paper, we describe development of tolerance values for benthic macroinvertebrate taxa collected from 455 wadeable stream sites throughout Mississippi, USA, except the Alluvial Plain. Principal components analysis (PCA) was used to develop a gradient that incorporated direct (instream physical and chemical) and indirect (land use) stressors, which was then scaled from 0 to 10. Weighted averaging of the relative abundance of each taxon was used to assign tolerance values based on the point of greatest relative abundance along the stressor gradient. Tolerance values were derived for 324 (including Odonata on the genus level) of the 567 taxa collected from the study sites, and primarily represented sensitivity to agricultural influences including degradation of physical habitat and nutrient enrichment, the dominant stressors within the state. We suggest that this approach could be used in other areas of the country to develop new tolerance values, refine existing ones, and may be a useful approach for other taxonomic groups." A(uthors)] Address: Bressler, D.W., Tetra Tech, Inc., 400 Red Brook Blvd., Suite 200, Owings Mills, MD, 21117-5159, USA. E-mail: dave.bressler@tetratech.com

5872. Bried, J.T.; Ervin, G.N. (2006): Abundance patterns of dragonflies along a wetland buffer gradient. *Wetlands* 26: 878-883. (in English). ["Local abundance of animals with aquatic and terrestrial life stages may be useful to determine criteria for protective buffers around wetlands. Maiden flights and daily commutes of adult Odonata occur between wetland breeding area and adjacent upland habitat used for foraging, maturation, and nocturnal roosting. We measured abundance of dragonflies adjacent to a wetland in Mississippi, USA to determine if abundance varied with distance from water. Sexually mature males and combined females/prereproductive adult males (females-immatures) were recorded 10–160 m from the littoral edge of a 185 ha shallow reservoir. The number of dragonflies was dominated by *Celithemis eponina* throughout the study period. Mean abundance did not change with distance from water out to 160 m, both for all species combined and for each of three dominant species. In the assemblage, mature males outnumbered females-immatures in the 10–40 m distance, whereas the reverse occurred in the 130–160 m distance. At the species-level, there was a mixed response in the mature male: female-immature ratio, with little resemblance to the assemblage pattern. Results of this study suggest that wide buffer zones around wetlands may be essential to protect Odonata assemblages, especially females and sexually immature adults. Furthermore, odonate flight behavior may serve as a useful bio-criterion to determine the width of ecologically significant wetland buffers." A(uthors)] Address: Bried, J., The Nature Conservancy Eastern New York Chapter & Albany Pine Bush Preserve Commission, 195 New Karner Road, Albany, New York, USA 12205-4605. E-mail: jbried@tnc.org

(Authors)] Address: Bried, J., The Nature Conservancy Eastern New York Chapter & Albany Pine Bush Preserve Commission, 195 New Karner Road, Albany, New York, USA 12205-4605. E-mail: jbried@tnc.org

5873. Buchanan, G.M.; Grant, M.C.; Sanderson, R.A.; Pearce-Higgins, J.W. (2006): The contribution of invertebrate taxa to moorland bird diets and the potential implications of land-use management. *Ibis* 148(4): 615-628. (in English). [A meta analysis of the diet of 14 British bird species was carried out. Odonata played a minor role as food. The results differed between the species considered (in most cases small Passeriformes which are known to prey very rarely on Odonata), and with habitat preferences, which makes encounters between dragonflies and birds quite unlikely. Personal annotation: moorland Odonata are known to be preyed upon selectively by e.g. Hobby (*Falco subbuteo*).] Address: Buchanan, G.M., Royal Society for the Protection of Birds, Dunedin House, 25 Ravelston Terrace, Edinburgh EH4 3TP, UK. E-mail: graeme.buchanan@rspb.org.uk

5874. Buczyński, P.; Lewandowski, K.; Wissig, N. (2006): Materials to the knowledge of dragonflies (Odonata) of the River Narew valley in the vicinity of Drozdowo (north-eastern Poland). *Drozdowskie Zeszyty Przyrodnicze* 3: 5-12. (in Polish, with English summary). [Odonatological surveys in 1985-1987 and 2003 and 2004 at 32 water bodies resulted in 33 dragonfly species: of special interest are *Coenagrion lunulatum*, *Stylurus flavipes*, *Ophiogomphus cecilia*, *Aeshna juncea*, and *A. viridis*.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

5875. Bur, S. (2006): Une nouvelle espèce d'Odonate pour le département de l'Oise: *Leucorrhinia caudalis* (Charpentier, 1840) dans le Marais de Bourneville à Marolles (Odonata, Anisoptera, Libellulidae). *Martinia* 22(2): 73-82. (in French, with English summary). ["A *L. caudalis* population was discovered in 2003 in Oise department, France. It is the first and unique record of this species for this department. The site and the context of the discovery are briefly presented, and the observations described. The author gives a brief synthesis of the distribution of the species in Picardie region and neighbouring areas and discusses the possible origin of the population discovered." (Author)] Address: Bur, S., Conservatoire des sites naturels du Limousin, 6 ruelle du Theil, F-87510 Saint-Gence, France. E-mail: sbur@conservatoirelimousin.com

5876. Burmeister, E.-G. (2006): Im Regenwald am Fuß der Anden. *Mitteilungen des Thüringer Entomologenverbandes* 13(1): 72-81. (in German, with English summary). [The author reports from several of his trips to the cloud forest of Panguana, Peru. On page 75 he notes 27 odonate species without details from the locality. This forest is the type locality of *Polythore spaeteri*, whose larvae have ventral abdominal gills. This is interpreted as an adaption to fluctuating water tables and changing oxygen conditions of the habitat, small rivulets. Some general remarks on oviposition of the Mesostigmatidae are added as is a list of dragonflies caught by light traps. Additional material (unpublished): V. Etscher: »Die Larve von *Polythore spaeteri* Burmeister & Börzsöny, 2003, (Insecta: Odonata: Zygopte-

ra: Polythoridae). Ein Beitrag zur anatomischen Strukturanalyse basaler Libellen und zur Artzuordnung auf molekularer Ebene« (seit April 2004) - LMU. Betreuung: E.-G. Burmeister.] Address: Burmeister, E.-G., Zoologische Staatssammlung München, Münchhausenstraße 21, D-81247 München, Germany. E-mail: Burmeister@zsm.mwn.de.

5877. Butler, R.G.; de Maynadier, P. (2006): Significance of littoral and shoreline habitat integrity to lacustrine damselfly conservation. Abstracts of the Northeast Natural History Conference IX. April 20 – April 21, 2006. N.Y. State Mus. Circ. 70. ISBN: 1-55557-233-2: 23. (in English). [Verbatim: Shoreline development can have significant impacts on native lacustrine biota including a variety of aquatic macroinvertebrate groups. In an effort to better understand the habitat associations and sensitivities of lacustrine damselflies (Odonata: Zygoptera), we sampled adults in littoral macrophyte habitat during two flight periods at 35 randomly selected pond and lake sites in southern Maine during 2000 and 2001. Habitat data were collected during the same period to help characterize water body, shoreline disturbance, and aquatic vegetation at each study site. Non-metric multidimensional scaling was used for ordination of damselfly assemblages, and resulting coordinates from the most stable three-axis solution were related to site variables using forward stepwise multiple regression. Our results suggest that the diversity and composition of damselfly assemblages were related to the abundance and richness of littoral zone macrophytes, extent of riparian habitat conversion, benthic substrate granularity, and habitat productivity; all variables subject to anthropogenic degradation on excessively developed waterbodies. Additionally, we developed a Habitat Tolerance Index useful for distinguishing between relative habitat specialists and generalists from among a diverse community of 19 lacustrine species. Finally, species-specific damselfly associations with multiple genera of floating and emergent macrophytes were assessed using both nonparametric correlation and multiplicative regression yielding significant relationships for 17 species, including two damselflies of regional conservation concern, *Enallagma laterale* and *E. pictum*. We conclude that the protection of littoral habitat integrity, with special emphasis on emergent and floating macrophytes, is critical to the conservation of a diverse lacustrine damselfly fauna.] Address: University of the State of New York, The State Education Dept, ALBANY, NY 12230, USA; <http://www.nysm.nysed.gov/nhc/nhcabstracts2006.pdf>

5878. Carvalho, A.L.; Souza, P.H.R.; Calil, E.R. (2006): Description of the larvae of *Castoraeschna colorata* (Martin, 1908) and *C. longfieldae* (Kimmins, 1929) (Insecta: Odonata: Aeshnidae), with a key to the known larvae of the genus. *Zootaxa* 1296: 19-28. (in English). ["The ultimate instar larvae of *C. colorata* and *C. longfieldae* are described and illustrated based on reared specimens from Parque Nacional das Emas, GO, and Chapada dos Guimarnes, MT, Brazil, respectively. A comparative table and an identification key for all described larvae of *Castoraeschna* (in addition: *C. castor*, *C. decurvata*, *C. tepuica*) are also presented." (Authors)] Address: Carvalho, A.L., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro (UFRJ), Caixa Postal 68044, BR-21944-970 Rio de Janeiro, RJ, Brazil. E-mail: alagoc@acd.ufrj.br

5879. Castillo, L.E.; Martínez, E.; Ruepert, C.; Savage, C.; Gilek, M.; Pinnock, M.; Solis, E. (2006): Water quality and macroinvertebrate community response following pesticide applications in a banana plantation, Limon, Costa Rica. *Science of The Total Environment* 367(1): 418-432. (in English). ["Pesticides used in banana production may enter watercourses and pose ecological risks for aquatic ecosystems. The occurrence and effects of pesticides in a stream draining a banana plantation was evaluated using chemical characterization, toxicity testing and macrobenthic community composition. All nematicides studied were detected in the surface waters of the banana plantation during application periods, with peak concentrations following applications. Toxicity tests were limited to the carbofuran application and no toxicity was observed with the acute tests used. However, since pesticide concentrations were generally below the lowest LC50 value for crustaceans but above calculated aquatic quality criteria, there remains a risk of chronic toxicity. Accurate ecological assessments of pesticide use in banana plantations are currently limited by the lack of local short-term chronic toxicity tests and tests using sensitive native species. Relatively constant levels of four pesticides (imazalil, thiabendazole, chlorpyrifos and propiconazole), which had toxic effects according to the 96h hydra and 21d daphnia chronic test, were recorded in the effluent of the packing plant throughout the study, indicating that the solid waste trap used in this facility was not effective in eliminating toxic chemicals. Certain taxa, such as *Heterelmis* sp. (Elmidae), *Heteragrion* sp. (Megapodagrionidae, Odonata), *Caenis* sp. (Caenidae, Ephemeroptera), and *Smicridea* sp. (Hidropsychidae, Trichoptera), were more abundant at reference sites than in the banana farm waters, and may be good candidates for toxicity testing. Multivariate analyses of the macroinvertebrate communities clearly showed that the banana plantation sites were significantly different from the reference sites. Moreover, following the pesticide applications, all the banana plantation sites showed significant changes in community composition, with the same genera being affected at all sites and for all pesticides (terbufos, cadusafos and carbofuran). Consequently, the results presented here show that multivariate analysis of community composition was more sensitive in distinguishing pesticide effects than the toxicity tests and richness and composition measures used. We conclude that monitoring macroinvertebrate communities can be a powerful tool in the assessment of ecological effects of banana production." (Authors)] Address: Castillo, Luisa Eugenia, Sonia Miner Salari, Central American Institute for Studies on Toxic Substances (I-RET), Universidad Nacional, Heredia, Costa Rica. E-mail: lcastill@una.ac.cr

5880. Césard, N. (2006): Des libellules dans l'assiette: les insectes consommés à Bali. *Insects* 160: 3-6. (in French). [This is an impressively illustrated article on Odonata as food of people in Bali, Indonesia. For details see: <http://www.inra.fr/internet/Hebergement/OPIE-Insectes/pdf/i140cesard.pdf>] Address: E-mail: ncesard@wanadoo.fr

5881. Che Salmah, M.R.; Wardhani Tribuana, S.; Abu Hassan, A. (2006): The population of Odonata (dragonflies) in small tropical rivers with reference to asynchronous growth patterns. *Aquatic Insects* 28(3): 195-209. (in English). ["The odonate larval communities in three small rivers in Penang Island were studied. Mo-

re species of dragonflies were found in the Botanical Garden and Titi Teras rivers (13 and 11 respectively) of relatively similar environmental parameters. Fewer (nine) dragonfly species were collected from the Youth Park River which has a lower dissolved oxygen (DO) and a higher biological oxygen demand (BOD), conductivity and turbidity. A mixture of sand, gravel and pebble substrate of Botanical Garden River with dense growth of submerged *Hydrilla*, grasses and *Cladias* (Araceae) provided suitable habitats for the dragonflies. The sandy substrate and relatively fast flowing water of Titi Teras River was highly preferred by gomphids. In the Youth Park River, the small community of dragonfly larvae was dominated by tolerant *Pseudagrion rubriceps*, *P. microcephalum*, *Orthetrum chrysis* and *Crocothemis servilia*. Based on the larval instar distribution of *Ictinogomphus decoratus* and *O. chrysis*, very asynchronous populations of these dragonflies occurred in each river. Young larvae were continuously introduced into the populations resulting in undulating growth rate curves. The growth rates of these two species were higher in the Titi Teras River when compared to those in other rivers. Density-dependent mortality, asynchronous cannibalism and fish predation could play important roles in regulating the larval dragonfly population in these rivers." (Authors)] Address: Che Salmah, M.R., School of Biological Sciences, Universiti Sains Malaysia, Penang, Malaysia

5882. Chelmick, D. (2006): Some observations of *Macromia splendens* (Pictet) in Andalusia, Spain (Anisoptera: Macromiidae). *Notulae Odontologicae* 6(7): 69-72. (in English). ["The occurrence of *M. splendens* in southern Spain is discussed; it appears to be well established on the Guadiaro river system in Andalusia. Adult, exuviae and larval observations are included. Its status on other southern Spanish river systems remains uncertain and more research work is required." (Author)] Address: Chelmick, D., 31 High Beech Lane, Haywards Heath, West Sussex, RH16 1SQ, United Kingdom. E-mail: dgc@davidchelmick.com

5883. Commission of Zoological Nomenclature (2006): OPINION 2148 (Case 3294). *Bulletin of Zoological Nomenclature* 63(2): 136-137. (in English). ["The Commission has ruled that the usage of the names *Gynacantha Rambur*, 1842 and *Triacanthagyna Selys*, 1883 for two genera of aeshnid dragonflies is conserved by the designation of *Gynacantha nervosa Rambur*, 1842 as the type species of *Gynacantha*." (Authors)] Address: Garrison, R.W., Associate Insect Biosystematist, Plant Pest Diagnostics, California Department of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

5884. Conze, K.-J. (2006): *Libellenkartierung in der Stadt Essen. Elektronische Aufsätze der Biologischen Station Westliches Ruhrgebiet* 6.12: 1-3. (in German). [Brief introduction into current activities in mapping the odonate fauna of the town of Essen, Nordrhein-Westfalen, Germany. The paper includes a brief commented checklist of the Odonata hitherto recorded.] Address: Conze, K.-J., Listerstr. 13, D-45147 Essen, Germany. E-mail: Klaus-Juergen.Conze@t-online.de

5885. Córdoba-Aguilar, A. (2006): Sperm ejection as a possible cryptic female choice mechanism in Odonata (Insecta). *Physiological Entomology* 31(2): 146-153. (in

English). ["The few odonate studies of sperm use suggest that females spend apparently more sperm than appears necessary during oviposition (sometimes females may have their sperm stores reduced to 50% after a single oviposition episode). Furthermore, some studies document that females eject sperm during and after copulation. This raises the question of whether sperm reduction may be interpreted as a cryptic female choice mechanism. Using two zygopterans, *Ischnura denticollis* Burmeister and *Enallagma praevarum* Hagen, and one anisopteran, *Pantala flavescens* Fabricius, it is shown that females mate more than once, show a marked reduction in stored sperm, and that this is by ejection of sperm before to oviposition. The extent of sperm reduction is inversely related to the number of eggs laid. When mated to the same male, females show similar reductions in sperm stores and egg load and only rarely does the vaginal duct contain sperm. This suggests that marked sperm reduction is common in this insect order and is not explained by an excess of sperm obstructing the egg passage. It is suggested that female's sperm shortage is better explained as a cryptic female choice mechanism aimed at favouring the sperm of some males. This study provides exciting research avenues for future studies of female choice in an animal taxa whose sexual biology is otherwise regarded as controlled by males." (Author)] Address: Córdoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

5886. Costa, J.M.; De Souza, L.O.; Muzon, J. (2006): Descriptions of three new species of Odonata from Brazil. *Zootaxa* 1314: 53-68. (in English). ["Three new species are described here: *Oxyagrion zielmae* sp. nov. (Coenagrionidae) from one male collected at Costa Rica, Mato Grosso do Sul state; *Lestes fernandoi* sp. nov. (Lestidae) from a pair from Imperatriz, Maranhão state and *Perithemis capixaba* sp. nov. (Libellulidae) from one male from Mutum Preto, Espírito Santo state, all deposited at Museu Nacional, Rio de Janeiro, Brazil. *Oxyagrion zielmae* is similar to *O. pavidum* Selys, 1876 but differs by having cerci and paraprocts the same size, pterostigma long and narrow and terminal segment of genital ligula with the two lobes larger than in *O. pavidum*. *Lestes fernandoi* is compared with *L. auritus* Hagen in Selys, 1862; *L. bipupillatus* Calvert, 1909; *L. dichrostigma* Calvert, 1909; *Lestes falcifer* Sjöstedt, 1918; *L. forcifera* Rambur, 1842; *L. minutus* Selys, 1862 and *L. paulistus* Calvert, 1909. The new species is most similar to *Lestes falcifer* and *L. paulistus*, but differ by the peculiar color of pterothorax, caudal appendages and genital ligula. *Perithemis capixaba* is similar to *P. mooma* Kirby, 1889 but differs by having the first segment of vesica spermalis slowly rounded, in *P. mooma* this structure is trapezoidal. Illustrated keys to new species are included." (Authors)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@acd.ufrj.br

5887. Coupry, Y.; Nepoux, V. (2006): *Tauriphila australis* (Hagen, 1867), nouvelle espèce pour la Guyane. *Martinia* 22(3): 108. (in French). [French Guyana; 11-VIII-2002] Address: Coupry, Y., allée des Glycines, F-70170 Port sur Saône Allée des Marcassins, F-60360 Lamorlaye, France

5888. Couteyen, S. (2006): Effets de l'introduction de la truite arc-en-ciel (*Oncorhynchus mykiss* Walbaum, 1792) sur les populations larvaires de deux espèces de Zygoptères de l'Île de la Réunion. *Martinia* 22(2): 55-63. (in French, with English summary). ["The effect of predation by rainbow trout on the larval populations of *Coenagrion reuiniensis* (Fraser, 1957) and *Enallagma glaucum* (Burmeister, 1839) has been studied. Faced with the predator, the two species react differently: a local extinction of *C. reuiniensis* has been observed as the larval density has shifted from over 4 larvae per square metre to 0, while no significant impact of the predator on the *E. glaucum* has been recorded. The fact that 7 larvae of *C. reuiniensis* were discovered in the analysis of 30 trout stomachs' contents whereas no larva of *E. glaucum* was found, confirms the greater susceptibility of *C. reuiniensis* to the predation. These two types of response can be explained by the different larval ways of life. The larvae of *C. reuiniensis*, an endemic species, are epibenthic and usually colonise vegetationless habitats. On the contrary, the larvae of *E. glaucum*, which can also be found in Africa, hide in underwater grass-banks. This makes them difficult to reach for a predator moving in free water." (Author)] Address: Couteyen, S., 188 chemin Nid Joli, F-97430 Le Tampon, La Réunion, France. E-mail: couteyensf@vanadoo.fr

5889. Danks, H.V. (2006): Key themes in the study of seasonal adaptations in insects II. Life-cycle patterns. *Applied Entomology and Zoology* 41(1): 1-13. (in English). ["Recent work on selected topics of particular interest for understanding insect life-cycles is reviewed, including habitat patterns, kinds of variation, the spreading of risk and prolonged diapause, trade-offs and developmental plasticity, circannual rhythms, the concept of life cycles as developmental choices, and development or delay as the default response. Seasonal adaptations have a wider range of components than has often been appreciated. Variation in life-cycle traits, including the duration of development and the timing of emergence, can be wide, narrow, or discontinuous. Trade-offs encompass multiple simultaneous traits and are not always structured as might be expected. Diapause, cold hardiness, reproductive pattern, and other traits have evolved many times independently. Such complex interactions can be understood only by examining the detailed features of a species' habitat, because how developmental decisions are made and whether continuous development or delays are programmed reflect the predictability of habitats and the environmental signals they supply. Ecological context is important, not just mechanisms of adaptation. Therefore, although most previous studies have paid more attention to insect response than to habitat, interpreting the seasonal relevance of life-cycle patterns requires measurement and analysis for individual species of habitat characteristics and their variation, on a range of temporal and spatial scales, in much more detail than has been customary." (Author) Reference is given to *Aeshna viridis*.] Address: Danks, H.V., Group of Insect Physiology and Molecular Biology, Research Institute for Bioresources, Okayama University; Kurashiki, 710-0046, Japan

5890. De Knijf, G.; Anselin, A.; Goffart, P.; Tailly, M. (2006): *De Libellen van België. Verspreiding. Evolutie. Habitats. Libellenwerkgroep Gomphus*. ISBN 90-403-0249-9: 369 pp. (in Dutch, with English and German summaries). [Long years of intensive work finally resul-

ted in this impressive compilation of the knowledge on the Belgian Odonata. On approximately 150 pages, the distribution of the 69 Belgian species is documented in detail and mapped in different time scales. In a monographic style and condensed on two pages, the range of each species, the present distribution, and range extensions or range contractions are discussed extensively. Information on habitat and the phenology are added. Plenty of additional information like a history of Belgian odonatology, habitats and their characteristic Odonata, Red Lists, monitoring schemes, and an outlook on future developments of the regional odonata fauna, and many many impressive pictures and graphs which helps to interpret the data are included into this book. Vernacular names, a bibliography and very extensive summaries in English (Adrian Parr) and German (Martin Schorr) are added. This review is a brief one, but it refers to a very big book on a regional odonate fauna, and a significant contribution to the knowledge of the European Odonata. The book is recommended to everyone interested in European Odonata. Congratulations!! (Martin Schorr) Address: www.gomphus.be

5891. Deubel, T.; Wanke, S.; Weber, C.; Wedekind, F. (2006): Modelling and manufacturing of a dragonfly wing as basis for bionic research. design 2006 - 9th International Design Conference, Dubrovnik / Kroatien, 15.-18.05.2006. "Design Society", DS 36: Proceedings of the Design 2006 (D. Marjanovic, ed.), S. Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb 2006: 215-220. (in English). ["In nature we find many examples for highly optimised principles and solutions. The wing of the dragonfly is such a structure. The wing is very light and at the same time very stiff and has impressive aerodynamic properties. In order to understand how nature could achieve such opposed properties it was necessary to build an enlarged model to carry out further research into the aerodynamics of the single wing on the one hand and into the effects of the interferences between the four wings on the other hand in a wind tunnel. The enlarged model of the dragonfly wing was derived from cross cut sections of an actual dragonfly wing using the CAD/CAM/NC solution CATIA V5 and a NC-milling machine. In the future the findings may be useful to develop light aircraft which have a high fuel efficiency and great manoeuvrability." (Authors)] Address: Wanke, S., Saarland University, Institute of Engineering Design/CAD, Building A 4.2, POB 15 1150, D-66041 Saarbrücken, Germany. E-mail: wanke@cad.uni-saarland.de

5892. Dijkstra, K.-D. (2006): African Diplacodes: the status of the small species and the genus *Philonomon* (Odonata: Libellulidae). *International Journal of Odonatology* 9(2): 119-132. (in English). ["The small African species of *Diplacodes* have been confused for a long time, in part because the black mature males are difficult to separate. The holotype of *D. deminuta* belongs to the species commonly known as *D. okavangoensis*, the former name taking priority, while its paratypes belong to that known erroneously as *D. deminuta*, which is described as the new species *D. pumila*. *Philonomon* is considered a junior synonym of *Diplacodes* and the sole species, *P. luminans*, is transferred accordingly. Species identification relative to sex and developmental state is clarified: some specimens, either very old or young, will be difficult to separate without reference material." (Author)] Address: Dijkstra, K.D., Gortestraat 11,

NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

5893. Dijkstra, K.-D.; Lewington, R. (2006): Field guide to the dragonflies of Britain and Europe. British Wildlife Publishing. ISBN-0-953-1399-4-8 (paperback): 320 pp. (in English). [This guide to the European and north African dragonflies, drawing on the knowledge of experts from throughout Europe, brings together much of the latest thinking on identifying the region's 160 species of dragonflies. Illustrated by Richard Lewington with his superb artwork, as well as more than 100 photographs, this guide is intended to enable dragonfly-watchers to identify any species they might encounter. The book has been designed to allow rapid comparison of similar species, and in most cases the artwork and text for each species are placed together. There is a general introduction, including a full glossary of terms and simple keys and tables to families and genera. A full checklist is also included at the end of the guide. In addition to the identification material there is a country-by-country section, written by regional experts. The text on each country provides a summary of the main geographical features relating to dragonfly habitats, followed by a more detailed 'tour' of some of the best places to see dragonflies. Such section is necessarily full of omissions and personal tastes, and if one would use the information, it would often not be sufficiently precise to find the relevant localities. Appendix 1 contains a discussion platform on taxonomic problems. This is a highly welcomed contribution to the debate, but it may prove less useful for a general reader of the book. On the other hand some problems are "solved" "en passant" such as *Aeshna serrata* - *A. ossiliensis* and *Coenagrion mercuriale* - *C. castellani* without discussion among the European odonatologists or any publication on this subject known to me. Appendix 2 relates to "vernacular names" - the English ones. What about the vernacular names in, say, Polish? No odonatologist in Europe is using other names than the Latin ones, otherwise it definitely would be impossible to talk about the same species. For someone outside Britain it is also difficult to understand why 'Britain' is treated separately from Europe (A Field guide to the Dragonflies of Britain and Europe), while on the other hand a large part of Europe, Russia till the Ural mountains is missing. Likewise, the north African countries and Turkey (in most parts) belong to the continents of Africa or Asia. Dear publisher: welcome in Europe! However including the species of Turkey - what of course is welcome, as for the African ones! - would have made it necessary also to include *Pseudagrion syriacum* (Selys, 1887) and *Ischnura intermedia* Dumont 1974. When I used this book and tried to identify a dragonfly from the Canary island from some brilliant photographs, I ended up with female of *Diplacodes lefebvrei* - which does not occur on the Canaries. An expert in the Canary odonate fauna by contrast, identified the specimen as a female of *Trithemis arteriosa* (which regrettably is not pictured laterally in the book). So it was not always possible to make a correct identification. Trying to read the labels of the illustrations, and even some of the text made me hope that the publisher will prepare a larger-sized edition to be used on the desk top. Yes, I think this book isn't perfect. But it is great! Nowhere you will find as much information on identification European, north African, and Turkish Odonata as in this book, including many species most of us never have seen pictured anywhere. The detailed descriptions of the species and the brilliant

colour pictures will enable you to determine most of the species without any problems. This book is indispensable for everyone interested in the European odonate fauna. Thanks KD and co-workers, Thanks Richard Lewington, Thanks dear publisher! (Martin Schorr)] Address: British wildlife Publishing, The Old Dairy, Milton on Stour, Gillingham, Dorset, SP8 5PX, UK

5894. Dijkstra, K.-D.; Suhling, F.; Müller, O. (2006): Review of the genus *Zygonoides*, with description of the larvae and notes on 'zygonychine' Libellulidae (Odonata). *Tijdschrift voor Entomologie* 149: 275-292. (in English). ["*Zygonoides* Fraser, 1957 – formerly considered a subgenus of *Olpogastra* Karsch, 1895 – is reinstated as a genus. It comprises *Z. fuelleborni* (Grünberg, 1902), *Z. fraseri* (Pinhey, 1956), *Z. lachesis* (Ris, 1912) and *Z. occidentis* (Ris, 1912). The latter was formerly considered a subspecies or form of *Z. fuelleborni*, but is found to be a good species near *Z. fraseri*. The larvae of *Z. fuelleborni*, *Z. fraseri* and *Z. occidentis* are described. Adult and larval characters are compared with those of the other 'zygonychine' genera *Celebothemis*, *Olpogastra*, *Onychothemis*, *Zygonychidium* and *Zygonyx*. Identification, distribution and ecology of the species are outlined." (Authors)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

5895. Dijkstra, K.-D. (2006): The *Atoconeura* problem revisited: taxonomy, phylogeny and bio-geography of a dragonfly genus in the highlands of Africa (Odonata, Libellulidae). *Tijdschrift voor Entomologie* 149: 121-144. (in English). ["The genus *Atoconeura* previously comprised two species; one with five subspecies. Principal Component Analysis of 33 characters of 148 specimens and cladistic analysis of 28 characters revealed six discrete taxa, partly with narrowly overlapping ranges. Subspecies *aethiopica*, *kenya* and *pseudeudoxia* of *biordinata* are raised to specific rank; the synonymy of *chirinda* with *biordinata* is confirmed; *A. luxata* sp. n. is described from West Africa. A key to the species is provided and the poorly known behaviour, ecology and biogeography are discussed. The author has not witnessed oviposition; one report suggests that it may be perched, solitary and epiphytic, which is unusual within the family. The species are largely restricted to streams above 1000 m, except *A. luxata* sp. n. that is only known below that altitude, but always at the foot of highlands. Four species demonstrate a distribution pattern recalling a 'ring species' in highlands, circling Lake Victoria and the dry north of Tanzania. The phylogeny suggests an expansion of the genus from the western lowlands to the eastern highlands, or vice versa, followed by an expansion through the Albertine Rift and Eastern Arc Mts to the Kenyan and ultimately Ethiopian highlands. Especially in the case of a western origin there appears to have been a tendency of the species to occur at increasing altitudes in the course of their evolution." (Author)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

5896. Dijkstra, K.-D.B. (2006): Taxonomy and biogeography of *Porpax*, a dragonfly genus centred in the Congo Basin (Odonata, Libellulidae). *Tijdschrift voor Entomologie* 149: 71-88. (in English). ["The tropical African genus *Porpax* is revised, five species are recognised, including the new species *P. sentipes* from Congo-Kinshasa. All species are fully diagnosed for both sexes

and new records are included. A key to the species and illustrations of important characters are provided. The peculiarities of the genus are discussed, but little is known of its ecology. *P. garambensis* and *P. sentipes* sp. n. are confined to the Congo Basin, while *P. asperipes* is also present in the adjacent Lower Guinean forest. *P. risi* is spread out across highlands in south-central Africa. *P. bipunctus* is known from four disjunct rainforest regions from Liberia to eastern Congo and has different markings in each region. This distribution coincides with Africa's main rainforest refugia and is the best example of such disjunction seen in Afrotropical Odonata so far. The species' isolation appears to be linked to an ephemeral habitat, confining it to areas with perennial and predictable rainfall." (Author)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

5897. Dijkstra K.-D.; Clausnitzer, V.; Vick, G.S. (2006): Revision of the three-striped species of *Phyllogomphus* (Odonata, Gomphidae). *Tijdschrift voor Entomologie* 149: 1-14. (in English). ["The taxonomy of the *Phyllogomphus* species occurring from Cameroon eastwards, characterised by three-striped sides of the thorax, has been confused by misinterpretation of the identity of the most widespread species, *P. selysi*, and substantial variation in the species. Of sixteen named taxa, only four are considered valid species after clarifying the identity of *P. selysi*, matching females to the correct males, and accounting for variation, particularly of size, colour and the morphology of the vulvar scale: *P. annulus* is not a synonym of the true *P. selysi* but of Fraser's interpretation of the latter species; *P. dundomajoricus* and *P. dundominusculus* are junior synonyms of *P. annulus*; *P. montanus*, *P. hartwigi*, *P. perisi* and *P. margaritae* of *P. coloratus*; *P. orientalis*, *P. edentatus*, *P. latifasciae*, *P. symoensi*, *P. brunneus* and *P. corbetiae* of *P. selysi*. Keys to the species and distribution maps are provided, and the taxonomy of the genus is discussed." (Authors)] Address: Dijkstra, K.D., Gortestr. 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

5898. Donath, H. (2006): Blauflügel-Prachtlibelle (*Calopteryx virgo* L.) besiedelt die Schuge. *Biologische Studien*, Luckau 35: 82-86. (in German). [The regional situation of *C. virgo* is outlined in some detail. Management of local running waters resulted in the colonisation by *C. virgo* of a few stretches along the river Schuge, Brandenburg, Germany. The factors enabling this recolonisation of the stream are discussed: primarily an alteration of the vegetation by shading.] Address: Donath, H., Caule Nr. 1, D-15926 Zieckau, Germany

5899. Donath, H. (2006): Die Südliche Heidelibelle (*Sympetrum meridionale* (SELYS 1841)): Erstnachweis für das Land Brandenburg. *Biologische Studien*, Luckau: 86-87. (in German). [Records of *S. meridionale* from five localities in Brandenburg, Germany from August and September 2006 are documented. These are the first records for this Federal State.] Address: Donath, H., Caule Nr. 1, D-15926 Zieckau, Germany

5900. Dyatlova, E.S. (2006): *Orthetrum coerulescens anceps* (Odonata, Libellulidae) in Odessa and its vicinities (Ukraine). *Vestnik zoologii* 40(3): 275-278. (in Ukrainian, with English summary). ["The absence of *O. c. coerulescens* (Fabricius, 1798) and the presence of *O. c. anceps* (Schneider, 1845) in Odessa and its vicini-

ties are shown. Some morphological characteristics of males are discussed." (Author)] Address: Dyatlova, E.S., Frantsuzkij bul'var 37, kv. 3, UKR-65044 Odessa, Ukraine

5901. Ellenrieder, N. von; Muzón, J. (2006): The genus *Andinagrion*, with description of *A. garrisoni* sp. nov. and its larva from Argentina (Odonata: Coenagrionidae). *International Journal of Odonatology* 9(2): 205-223. (in English). ["This study includes the description of a new species of the genus *Andinagrion*, *A. garrisoni* (holotype: Argentina, Río Caldera, Salta prov., 11 xi 2005, deposited at MLP), both from its adult and larval stages, a diagnosis of all known species, including a key to adults, synonymic lists, illustrations of diagnostic characters, and distribution maps." (Authors)] Address: Ellenrieder, Natalie von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: odonata@hotmail.com

5902. Esquivel, C. (2006): Libélulas de Mesoamérica y el Caribe - Dragonflies and damselflies of Middle America and the Caribbean. ISBN 9968-927-13-9: 319 pp. (in Bilingual in Spanish and English). ["With an estimated total of over 500 species, Middle America and the Caribbean is one of the richest dragonfly regions in the world. However, there is very little information about them available to the general reader. For the first time ever, this book presents easy-to-read descriptions of the morphology, habitat, behaviour, larvae, and geographical distribution of all the 16 families occurring here, plus accounts on the natural history of more than 75 of their commonest species illustrated with color-photos, some of them pictured for the first time. Also included is a user-friendly Illustrated Key to all the families of this region and up-to-date, per country lists of all the species. Given the wide geographical distribution of the species treated here, both scientists and amateurs working with odonates in North and South America will also find valuable, novel information in this book." (Publisher)] Address: INBio, Santo Domingo, Heredia, Costa Rica. www.inbio.ac.cr

5903. Evenhuis, N.L.; Polhemus, D.A. (2006): Checklist of Odonata of Fiji. Bishop Museum Technical Report 35(15): 3 pp. (in English). [45 species resp. 46 taxa are listed.] Address: Polhemus, D., Dept. of Entomology, MRC 105, Smithsonian Institution, Washington, D.C. 20560, USA. Email: bugman@bpbm.org

5904. Feng, H.-Q.; Wu, K.-M.; Ni, Y.-X.; Cheng, D.-F.; Guo, Y.-Y. (2006): Nocturnal migration of dragonflies over the Bohai Sea in northern China. *Ecological Entomology* 31(5): 511-520. (in English). ["A sudden increase and subsequent sharp decrease of catches of dragonflies in a searchlight trap, with *Pantala flavescens* predominating, observed at Beihuang Island in the centre of the Bohai Gulf, in 2003 and 2004, indicated a seasonal migration of these insects over the sea during the night in China. The movements were associated with the onset of fog. 2. Simultaneous radar observations indicated that the nocturnally migrating dragonflies generally flew at altitudes of up to 1000 m above sea level, with high density concentrations at about 200-300 or 500 m; these concentrations were coincident with the temperature inversion. 3. During early summer, the dragonflies oriented in a downwind direction, so that the displacement direction varied between different altitudes. In contrast, during late summer, the dragonflies

were able to compensate for wind drift, even headwind drift, so as to orient south-westward no matter how the wind changed, and thus the displacement direction was towards the south-west. 4. The duration of flight, estimated from the variation of area density derived from radar data and hourly catches in the searchlight trap through the night, was about 9–10 h. The displacement speed detected using radar was $\sim 5\text{--}11\text{ m s}^{-1}$. Therefore, the dragonflies might migrate 150–400 km in a single flight. 5. The dragonflies were thought to originate in Jiangsu province and they migrated into north-east China to exploit the temporary environment of paddy fields in early summer. Their offspring probably migrated back south during late summer and autumn." (Authors)] Address: Wu, Kong-Ming, State Key Laboratory for Biology of Plant Diseases and Insect Pests, Institute of Plant Protection, Chinese Academy of Agricultural Sciences, Beijing 100094, PR China. E-mail: wkm@caascope.net.cn

5905. Fichet, V. (2006): Compte-rendu de l'excursion du 14 mai dans l'Avesnois "à la découverte d'*Epitheca bimaculata*". *Gomphus* 20(2): 39-40. (in French). [A large population of *E. bimaculata* is reported from an expedition to northern France.] Address: Fichet, Violaine, bservatoire de la Faune, de la Flore et des Habitats, Centre de Recherche de la Nature, des Forêts et du Bois, Avenue Maréchal Juin, 23, B-5030 Gembloux, Belgium. E-mail: V.fichet@mrw.wallonie.be

5906. Fichet, V. (2006): Compte-rendu des observations d'espèces prioritaires d'Odonates en Wallonie durant les saisons 2003, 2004 et 2005, dans le cadre du programme d'Inventaire et Surveillance de la Biodiversité (ISB). *Gomphus* 20(2): 13-28. (in French, with English and Dutch summaries). ["This report give an account of the observations made in 2003, 2004 and 2005 by the Gomphus Working Group collaborators about Odonata priority species, pointed out in the "Biodiversity Survey and Monitoring" program in Wallonie because of their great rarity and/or decline. It also present collected informations dealing with southern species. New populations were discovered for the following species: *Lestes virens*, *Sympetma fusca*, *Coenagrion hastulatum*, *C. mercuriale*, *C. pulchellum*, *Ceragrion tenellum*, *Aeshna subarctica*, *Brachytron pratense*, *Gomphus vulgatissimus*, *Somatochlora arctica*, *Libellula fulva*, *Orthemtrum coerulescens*, *Sympetrum pedemontanum*, and *Leucorrhinia pectoralis*. Moreover, new data on scarce southern species have been collected: *Lestes barbarus*, *Coenagrion scitulum*, *Aeshna affinis*, *Anax parthenope*, *Orthemtrum brunneum*, *Crocothemis erythraea*, and *Sympetrum fonscolombii*." (Author)] Address: Fichet, Violaine, bservatoire de la Faune, de la Flore et des Habitats, Centre de Recherche de la Nature, des Forêts et du Bois, Avenue Maréchal Juin, 23, B-5030 Gembloux, Belgium. E-mail: V.fichet@mrw.wallonie.be

5907. Finch, J.M.; Samways, M.J.; Hill, T.R.; Piper, S.E.; Taylor, S. (2006): Application of predictive distribution modelling to invertebrates: Odonata in South Africa. *Biodiversity and Conservation* 15(13): 4239-4251. (in English). ["The application of distributional modelling techniques to invertebrates has seldom been explored, primarily due to a lack in adequate distributional data for these taxa. Here, we have selected a simple modelling approach for the generation of distribution maps from a limited dataset, as a first step to the atlas-ing of Odonata in South Africa. The BIOCLIM-type ap-

proach was selected for this purpose, as it requires minimal data for model building and validation procedures. BIOCLIM partitions an area climatically prior to survey, and predicts species distributions on a bioclimatic basis. Conservative deterministic models were developed using point presence/absence data for each of the regions' 160 described species. These models were validated by cross-validation, and the Jaccard coefficient of similarity was used as an index of model performance. A sensitivity analysis investigated the influence of extreme values and errors in the data on predictive ability. Models identified disjunct distribution patterns and accurately predicted the restricted ranges of habitat-specialist species. However, models overstated the distribution of habitat generalists and species with distinct outlier records. For accurate predictions of broad-ranging species, it is suggested that a probabilistic approach be adopted. Nevertheless, basic distribution patterns generated through this conservative approach can be further applied to the investigation of species richness and issues relating to conservation, such as reserve design. The BIOCLIM-type approach provided a means of predicting species distributions, allowing for broad-scale atlassing and thereby providing the first step towards Odonata conservation in South Africa." (Authors)] Address: Finch, Jemma M., Discipline of Geography, University of KwaZulu-Natal, Scottsville, Pietermaritzburg, Private Bag X01, 3209, South Africa. Email: finch@sai.co.za

5908. Fishar, M.R.; Williams, W.P. (2006): A feasibility study to monitor the macroinvertebrate diversity of the River Nile using three sampling methods. *Hydrobiologia* 556: 137-147. (in English). ["The River Nile (Africa) is one of the world's major rivers. Its' catchment in Egypt has a population of 75,000,000. River flow is highly regulated and there are known discharges of pollutants. 1035 km of the river downstream of the Aswan high dam was studied to test the hypothesis that representative qualitative samples can be used to estimate macroinvertebrate biodiversity. Benthic macroinvertebrates are difficult to sample in large rivers and a reliable sampling strategy is required to evaluate their ecological status. Three methods for sampling have been investigated. Ekman Grab, macrophyte sweep netting and Artificial Substrate Samplers (ASS) were used to sample 15 sites from Aswan to Cairo between September 2001 and June 2002. Organisms were identified to species level where possible. Taxon accretion curves indicated that the all taxa present at a site should be collected using either 15 grab samples, 10 macrophyte samples or 5 ASS. The best time to sample was May–June. The biodiversity of macroinvertebrates in the Nile was recorded as 50 taxa with values of 7–31 at individual bank-side sites. Mid-stream biodiversity was much lower (0–19). Lowest biodiversity occurred at sites with known pollution inputs whilst highest occurred at sites with high levels of sedimentation. A regular programme for biomonitoring is recommended which will allow current status to be confirmed and future changes detected." (Authors) The mentioning in table 5 of *Neurocordulia* sp., *Amphiagrion* sp., *Plathemis* sp., *Perithemis* sp., and *Celithemis* sp. indicates that from an odonological point of view this study is not very useful.] Address: Williams, P., Department of Life Sciences, King's College, University of London, Franklin Wilkins Building, 150 Stamford Street, SE1 9NN, UK. E-mail: peter.williams@kcl.ac.uk

5909. Fleck, G.; Brenk, M.; Misof, B. (2006): DNA Taxonomy and the identification of immature insect stages: the true larva of *Tauriphila argo* (Hagen 1869) (Odonata: Anisoptera: Libellulidae). *Ann. soc. entomol. Fr.* (n.s.) 42(1): 91-98. (in English, with French summary). ["For many insect taxa, larval morphology plays a decisive role in various fields like taxonomy, phylogeny or ecology. However, species identification is usually based on imaginal characters and the identification of larvae depends upon an established link to unequivocally identified imagines. This taxonomic correspondence of larvae and imagines is far from being established in many odonate species. We have employed a molecular approach to link larval and adult specimens in *Tauriphila argo* (Hagen, 1869). The sequenced mt SSU gene fragments of the reared female, supposedly a *T. argo* female, and a clearly identified male specimen of the species were identical. However, the larva of the reared female clearly differed from the described *T. argo* larva, previously matched to the species. From this observation, we conclude that the previously described larva of *T. argo* does not belong to this species because of too many phenotypic differences that far exceed the generally observed intraspecific variation. It can be foreseen that the molecular approach will prove to be effective in identifying unknown larvae in many insect species. Additionally, the discrimination of sibling species or the linkage of allotypes and holotypes will become feasible with this approach." (Authors)] Address: Fleck, G., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleck@mnhn.fr

5910. Flenner, I.; Olne, K. (2006): Differences in exocuticle thickness in *Leucorrhinia dubia* (Odonata) larvae from habitats with and without fish. Halmstad University, School of Business and Engineering, Degree project in Biology 10p, Supervisor: Göran Sahlén, 2006-05-31: 14 pp. (in English). ["Many prey species are able to develop different morphological structures as defence against for example predators. Some of these structures are induced only by individuals exposed to a predator. This phenomenon is called phenotypic plasticity. In this paper we examine whether cuticle thickness in *L. dubia* larvae differed between specimens caught in fish containing lakes and fish-free lakes respectively. We measured the thickness of the cuticle from four different parts of the larvae; profemur, pronotum, ninth segment sternite and ninth segment tergite. Our results showed a significantly thicker exocuticle on profemur in larvae with a head width bigger than 4.5 mm caught in lakes with fish. The smaller larvae showed a tendency to have thinner exocuticle on profemur in presence of fish. We discuss the probability that the differences in exocuticle thickness on profemur could be some kind of trade-off situation. The results also showed a tendency among the large larvae; the large individuals from lakes containing fish had a slightly thicker exocuticle on pronotum than the bigger individuals from fish-free lakes." (Authors) For the full paper see: <http://dSPACE.hh.se/dspace/bitstream/2082/422/1/C-uppsatspdf.pdf>] Address: not stated

5911. Fliedner, H. (2006): Die wissenschaftlichen Namen der Libellen in Burmeisters 'Handbuch der Entomologie'. *Virgo - Mitteilungsblatt des Entomologischen Vereins Mecklenburg e.V.* 9: 5-23. (in German). ["This paper gives some information on the odonatological activities of Hermann Burmeister (1807-1897) and his sources and explains the meaning of the actual scienti-

fic names of the dragonflies, which are described in his 'Handbuch der Entomologie, Vol. II.' " (Author) An English version of the paper is available from the author.] Address: Fliedner, H., Louis-Seegelken Str., D-28717 Bremen, Germany. E-mail: H.Fliedner@t-online.de

5912. Frank, M. (2006): Erstfund der Feuerlibelle (*Crocothemis erythraea*) in Mecklenburg-Vorpommern (Odonata, Libellulidae). *Virgo, Mitteilungsblatt des entomologischen Vereins Mecklenburg* 9(1): 69-70. (in German). [Schönberg, Mecklenburg-Vorpommern, Germany; the northern most German record of *C. erythraea* dated 31-VII - 03-VIII 2006 is discussed.] Address: Frank, M., Lion-Feuchtwanger-Str. 25, 55129 Mainz, Germany. E-mail: mikel.frank@gmx.de

5913. Garrison, R.W. (2006): A synopsis of the genera *Mnesarete* Cowley, *Bryoplathanon* gen. nov., and *Ormenophlebia* gen. nov. (Odonata: Calopterygidae). *Contributions to Science, Natural History Museum of Los Angeles County* 506: 1-84. (in English, with Spanish summary). ["This synopsis of the exclusively South American genus *Mnesarete* includes keys to both sexes based primarily on morphology of the caudal appendage in males and the posterior margin of the prothorax and intersternite in females, diagnoses, distribution maps, and diagnostic illustrations. Two new genera, *Bryoplathanon* (type species: *Lais globifer* Hagen in Selys) and *Ormenophlebia* (type species: *Lais imperatrix* McLachlan) are described. The following nomenclatural changes are proposed: *M. regina* (Ris), *M. rollinoti* (Martin), and *M. saltuum* (Ris) are transferred to *Ormenophlebia*; and *Hetaerina borchgravi* Selys and *H. fuscibasis* Calvert are transferred to *Mnesarete*. Seven new species (*M. drepane*, *M. ebbippium*, *M. lencionii*, *M. loutoni*, *M. machadoi*, *M. rhopalon*, and *M. williamsoni*) are described. A generic key to all New World Calopterygidae and a discussion of the generic concepts of *Hetaerina* and the 24 species of *Mnesarete* are presented, and descriptions for the last larval stadium of *M. grisea* and *O. imperatrix* are provided." (Author)] Address: Garrison, R.W., Associate Insect Biosystematist, Plant Pest Diagnostics, California Department of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

5914. Garrison, R.W.; Ellenrieder, N. von; Louton, J.A. (2006): Dragonfly genera of the New World. An illustrated and annotated key to the Anisoptera. The John Hopkins University Press, Baltimore: vii + 368pp. (in English). [Until now there has been no reliable means to identify the New World genera of Odonata. Now, this volume provides fully illustrated and up-to-date keys for all anisopteran genera with descriptive text for each genus, accompanied by more than 1,600 diagnostic illustrations, including wing patterns and characteristics of the genitalia, and 124 distribution maps, and covering all genera of Anisoptera occurring in North, Middle, and South America. A brief introduction into morphology of Anisoptera with excellent drawings of all morphologically relevant structures necessary to use this book, is followed by a key to the anisopteran families. Following this, each family is briefly characterized by distribution area, number of known genera and species, and diagnostic characters. The status of family classification is compiled, indicating the current status of the discussion on its phylogenetic position. On the genus basis males and females are keyed separately. Then, each genus is briefly introduced by all information necessary

for nomenclature and taxonomic work, and listing all known species. This is followed by key references, and the distribution of the genus, including a map. The genus is described in detail using morphological structures which are illustrated. This is followed by identifying the "unique characters" of the genus. The current status on phylogenetic classification is outlined, also the potential for new species. The genus section is closed by condensed information on the habitat of the species. The volume ends with an extensive bibliography, a list of the 1626 figures with locality information, and a table with distribution information on genera by country. Dragonfly Genera of the New World is a beautifully illustrated and comprehensive guide to the taxonomy and ecology of dragonflies in North, Central, and South America. A reference of the highest quality, this book reveals their striking beauty and complexity. It is a real monumental work on odonate taxonomy and identification, and indispensable for every one working with the Odonata of the Americas. A great book. Congratulation to the authors!!! (Martin Schorr) Address: The John Hopkins University Press, 2715 North Charles Street, Baltimore, Maryland 21218-4363, USA. www.press.jhu.edu

5915. Garrison, R.W.; Ellenrieder, N. von (2006): Generic diagnoses within a closely related group of genera: *Brechmorhoga*, *Gynothemis*, *Macrothemis*, and *Scapanea* (Odonata: Libellulidae). *Canadian Entomologist* 138(3): 269-284. (in English, with French and Spanish summaries). ["Based on examination of most species of *Brechmorhoga*, *Gynothemis*, *Macrothemis*, and *Scapanea*, these four genera are re-diagnosed, resulting in the following taxonomic changes: *Brechmorhoga archboldi* (Donnelly, 1970) comb. nov., *Gynothemis pumila* (Karsch, 1890) comb. nov., *Macrothemis heteronycha* (Calvert, 1909) comb. nov., and *Macrothemis calliste* (Ris, 1913) comb. nov. The male of *M. calliste* is described and illustrated for the first time." (Authors)] Address: Garrison, R.W., Associate Insect Biosystematist, Plant Pest Diagnostics, California Department of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

5916. Gassmann, D. (2006): *Artenvielfalt philippinischer Libellen*. *Naturwissenschaftliche Rundschau* 59 (11): 617-618. (in German). [Brief account on the biogeography of the Philippinean (odonate) fauna, endemism, and threat of odonate biodiversity.] Address: Gassmann, D., Institute of Evolutionary and Ecological Sciences, Leiden University, c/o National Museum of Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: gassmann@naturalis.nnm.nl

5917. Ghose, K.; Horiuchi, T.K.; Krishnaprasad, P.S.; Moss, C.F. (2006): Echolocating bats use a nearly time-optimal strategy to intercept prey. *PLoS Biology* 4(5) (e108): 865-873. (in English). ["Acquisition of food in many animal species depends on the pursuit and capture of moving prey. Among modern humans, the pursuit and interception of moving targets plays a central role in a variety of sports, such as tennis, football, Frisbee, and baseball. Studies of target pursuit in animals, ranging from dragonflies to fish and dogs to humans, have suggested that they all use a constant bearing (CB) strategy to pursue prey or other moving targets. CB is best known as the interception strategy employed by baseball outfielders to catch ballistic fly balls. CB is a time-optimal solution to catch targets moving along a straight line, or in a predictable fashion—such as a ballistic baseball, or a piece of food sinking in

water. Many animals, however, have to capture prey that may make evasive and unpredictable maneuvers. Is CB an optimum solution to pursuing erratically moving targets? Do animals faced with such erratic prey also use CB? In this paper, we address these questions by studying prey capture in an insectivorous echolocating bat. Echolocating bats rely on sonar to pursue and capture flying insects. The bat's prey may emerge from foliage for a brief time, fly in erratic three-dimensional paths before returning to cover. Bats typically take less than one second to detect, localize and capture such insects. We used high speed stereo infra-red videography to study the three dimensional flight paths of the big brown bat, *Eptesicus fuscus*, as it chased erratically moving insects in a dark laboratory flight room. We quantified the bat's complex pursuit trajectories using a simple delay differential equation. Our analysis of the pursuit trajectories suggests that bats use a constant absolute target direction strategy during pursuit. We show mathematically that, unlike CB, this approach minimizes the time it takes for a pursuer to intercept an unpredictably moving target. Interestingly, the bat's behavior is similar to the interception strategy implemented in some guided missiles. We suggest that the time-optimal strategy adopted by the bat is in response to the evolutionary pressures of having to capture erratic and fast moving insects." (Authors) The paper is available at: <http://biology.plosjournals.org/archive/1545-7885/4/5/pdf/10.1371journal.pbio.0040108-S.pdf> Address: Ghose, K., Neuroscience and Cognitive Science Program, University of Maryland, College Park, Maryland, USA. E-mail: kaushik.ghose@gmail.com

5918. Giere, S.; Hadrys, H. (2006): Polymorphic microsatellite loci to study population dynamics in a dragonfly, the libellulid *Trithemis arteriosa* (Burmeister, 1839). *Molecular Ecology Notes* 6(3): 933-935. (in English). ["One of the most widely distributed dragonfly species in Africa is the red-veined-drooping *Trithemis arteriosa*. It is an indicator for permanent water bodies, which are freshwater ecosystems of high environmental value especially in arid regions. For studies to determine population structures, assess species viability and monitor environmental changes, a panel of 10 polymorphic microsatellite loci was developed. The number of alleles per locus ranged from four to 12, with an observed heterozygosity ranging from 0.149 to 0.843." (Authors)] Address: Hadrys, Heike, ITZ, Ecology and Evolution, TiHo Hannover, Bünteweg 17d, D-30559, Hannover, Germany. E-mail: heike.hadrys@ecolevol.de

5919. Glotzhober, R.C. (2006): Life history studies of *Cordulegaster erronea* Hagen (Odonata: Cordulegasteridae) in the laboratory and the field. *Bulletin of American Odonatology* 10(1): 1-18. (in English). ["The life history of *C. erronea* was studied for ten years utilizing field observations of adults and both field and laboratory studies of larvae. The documented adult flight period in Ohio is from 1 June to 3 September. Adult patrolling and larval habitat utilized consists of persistent but very narrow and shallow headwater streams, fed by seeps or springs in densely forested areas. Stream areas utilized have no fish and almost no other Odonata. The only aquatic predators observed were salamander larvae and an occasional very small crayfish. Adult males patrol regular beats during the heat of mid-day, flying low over the streamlets. Multiple males patrol the same streamlets. Adult females are uncommonly seen on the

streams. Oviposition was observed between 18 June and 2 August and females made up to 370 oviposition thrusts in a single event. The author was able to establish criteria to recognize larval instars between F0 and F4 with a 92% confidence level. The larval period appears to be typically three to four years long. Some discussion and tentative hypothesis are made concerning egg development, but there is a need for direct study of the timing of hatching." (Author)] Address: Glotzhober, R., Ohio Natural history society, 1982 Velma Ave., Columbus OH 43211-2497, USA. E-mail: bglotzhober@ohiohistory.org

5920. Goffart, P.; Paternoster, T. (2006): Redécouverte du Leste verdoyant (*Lestes virens*) en Wallonie. *Gomphus* 20(2): 29-38. (in French, with English and Dutch summaries). ["A small population of *Lestes virens* has been found in the Hainaut county, Belgium during the summer 2005 (July to September), after more than 50 years without certified record of the species in Wallonia. It is established on three oligotrophic and acid pools on a sandy substrate lying within the forest massif to the north of the Haine valley (often called "Campine hennuyère"). Counts' tentatives gave a maximum of 14 males and 7 females, namely 21 individuals, on the 31th of August. All the females were grasped by male in tandem position and where egg-laying in *Juncus effusus* twig tips. One recently emerged male has been observed on the 11th of July. This population might have been present since a long time and been overlooked despite former prospects. Though less probable a priori, it could also result of a recent colonisation event, from populations living in neighbouring regions. The closest known, in Flanders and France, lie however at a distance of one hundred kilometres from the Hainaut site, but other populations could have been overlooked in a shorter radius." (Authors)] Address: Goffart, P., Observatoire de la Faune, de la Flore et des Habitats, Centre de Recherche de la Nature, des Forêts et du Bois, Avenue Maréchal Juin, 23, 5030 Gembloux, Belgium. E-mail: p.goffart@mrw.wallonie.be

5921. Grebe, B.; Hofland, R.; Rodenkirchen, J. (2006): Neue Nachweise von *Coenagrion scitulum* in Nordrhein-Westfalen (Odonata: Coenagrionidae). *Libellula* 25(1/2): 19-26. (in German, with English summary). ["More than 40 years after the first record in 1961, *C. scitulum* has been rediscovered in North Rhine-Westphalia, Germany. New records are reported from the Nonnenbach valley in the northern Eifel in 2002, and from the Neffelbach valley near Zülpich where the species was observed several times in 2005. The new localities are in the southern part of the country, at a distance of approximately 35 km between them. Unlike historical observations in Germany, which all comprised only one individual at a time, several males and ovipositing tandems were observed. Current records of *C. scitulum* from Belgium, Luxembourg and The Netherlands indicate that the sp. is expanding northwards in western Europe. Hence, an increased occurrence of *C. scitulum* in Germany and its permanent settlement in suitable habitats seems to be in prospect." (Authors)] Address: Grebe, B., Oberdorfallee 7a, D-53909 Zülpich, Germany. E-mail: burkhard.grebe@t-online.de

5922. Günther, A. (2006): Reproductive behaviour of *Neurobasis kaupi* (Odonata: Calopterygidae). *International Journal of Odonatology* 9(2): 151-164. (in English). ["The reproductive behaviour of *Neurobasis kaupi* was

studied for the first time in Central and South Sulawesi. The species was recorded in a wide variety of clear and fast flowing creeks, streams and rivers, mostly in forested areas. The males were territorial and defended potential oviposition sites, a limited resource. Territory owners demonstrated their presence by brief synchronized flashings of their hindwings as well as by regular inspection flights. Intruders were first driven off by short chasing flights. Longer lasting conflicts led to three different types of threatening flights, depending on the number of males involved and the level of excitation. As in other Calopterygidae males of *N. kaupi* led receptive females to potential oviposition sites. In courtship flight the male presented the upper sides of his stationary, depressed, quivering hindwings, with the hind margins broadly touching the water surface. Oviposition substrates were mostly submerged floating root mats or plants, optimally floating loosely at a depth of 5-15 cm below the water surface. The general patterns of behaviour of *N. kaupi* correspond to the known behaviour of other *Neurobasis* species. However, within this general framework there are clear differences between this species and others, especially *N. chinensis*." (Author)] Address: Günther, A., TU Bergakademie Freiberg, AG Biologie/Ökologie, Leipziger Str. 29, 09599 Freiberg, Germany. E-mail: andre.guenther@ioez.tu-freiberg.de

5923. Günther, A.; Olias, M.; (2006): Rote Liste Libellen Sachsens. Sächsisches Landesamt für Umwelt und Geologie (Ed.) Materialien zu Naturschutz und Landschaftspflege: 22 pp. (in German). [Sachsen, Germany; red list of Odonata.] Address: Herausgeber: Sächsisches Landesamt für Umwelt und Geologie, Zur Wetterwarte 11, 01109 Dresden, Germany. E-Mail: Abteilung4@lflug.smul.sachsen.de

5924. Gupta, N.; Anthwal, A.; Bahuguna, A. (2006): Biodiversity of Mothronwala Swamp, Doon Valley, Biodiversity of Mothronwala Swamp, Doon Valley, Uttarakhand. *The Journal of American Science*, 2(3): 33-40. (in English). [India; "Enallagma" and "Agrion" are listed.] Address: Gupta, N., Ecology and Environment Division, Forest Research Institute, Dehradun, Uttarakhand, 248006, India. E-mail: nutangupta100@rediffmail.com

5925. Hacet, N.; Aktaş, N. (2006): The Odonata of Gökçeada Island, Turkey: a biogeographical assessment. *Entomological news* 117(4): 357-368. (in English). ["This study was conducted in the years 1998, 1999 and 2003, and it is the first one on the Odonata fauna found in Gökçeada Island (northern Aegean Sea, Turkey). During the study period, 29 taxa were collected, or observed, and identified. One of the species observed on Gökçeada Island, *Lindenia tetraphylla*, is also found on the mainland of Turkey (Anatolian Peninsula, but only in five areas, Köyceğiz, Marmaris, Adıaman, Sanlıurfa and N of Hatay). As far as Aegean islands are concerned *L. tetraphylla* is found only in Island Thasos. *Onychogomphus forcipatus albotibialis* and *Pantala flavescens*, whose distribution range in the Aegean Islands is unclear, are other zoogeographically noteworthy records. Biogeographical data is congruent with island biogeography theory (Mac Arthur and Wilson, 2001)." (Authors)] Address: Aktaş, N., Trakya University, Faculty of Arts and Sciences, Department of Biology, Tr-22030 Edirne, Turkey. E-mails: nhacet@hotmail.com; nihata@trakya.edu.tr

- 5926.** Hämäläinen, M.; Sasamoto, A.; Karube, H. (2006): Description of *Devadatta cyanocephala* sp. nov. from Vietnam (Zygoptera: Amphipterygidae). Tombo 48: 1-6. (in English). ["A new amphipterygid damselfly species, *Devadatta cyanocephala* sp. nov. (holotype male from Vietnam, Thua Thien Hue Province, Bach Ma), is described and illustrated in both sexes and compared with other In-dochinese taxa in the genus." (Authors)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi
- 5927.** Hall, M. (2006): Dragonflies. Capstone Press. Mankato. ISBN 0-7368-4252-7: 24 pp. (in English). [Book for children resp. first reading.]
- 5928.** Hansch, W.; Mailänder, S.; Riexinger, W.D.; Rosendahl, W.; Simon, T. (2006): Frankenbacher Schotter. Die Kiesgrube Ingelfinger als Geotop und Biotop - ein geplantes Naturschutzgebiet bei Heilbronn. ISBN-10: 3-00-019821-0: 46 pp. (in German). [The dragonflies are treated on pages 32 / 33; ten species are noted.] Address: Riexinger, S., Stadt Heilbronn, PF 3440, D-74024 Heilbronn, Germany. E-mail: Wolf-Dieter.Riexinger@stadt-heilbronn.de
- 5929.** Hayashi, M.; Fujiwara, J.; Shimada, T.; Yoneda, Y.; Muguruma, K.; Narita, Y. (2006): A list of insects collected from Dogo, Oki Islands, Shimane Prefecture, Japan, with notes on new records of Coleoptera and the Other Orders from the Island. Bull. Hoshizaki Green Found. 9: 245-263. (in Japanese, with English summary). [A survey from the first decade of August 2005 resulted in 305 insect species including *Paracercion calamorum*, *P. sieboldii*, and *Anotogaster sieboldii*.] Address: Hayashi, M., Hoshizaki Green Foundation, Okinoshima, 1659-5, Sono, Izumo, Shimane Pref., 691-0076, Japan
- 5930.** Hayashi, M. (2006): Aquatic Insects of Syakunouchi Park, Un'nan City, Shimane Prefecture, Japan. Bull. Hoshizaki Green Found. 9: 113-119. (in Japanese, with English summary). [42 species of aquatic insects were recorded from seven sites including 10 odonate species] Address: Hayashi, M., Hoshizaki Green Foundation, Okinoshima, 1659-5, Sono, Izumo, Shimane Pref., 691-0076, Japan
- 5931.** Heckman, C.W. (2006): Encyclopedia of South American Aquatic Insects: Odonata - Anisoptera. ISBN: 978-1-4020-4801-2 : VIII, 725 pp. ["Anisoptera, the first of two volumes on the Odonata in the series Encyclopedia of South American Aquatic Insects, encompasses the large dragonfly species. A brief review of the biology of the group includes illustrations of the main morphological features as well as explanations of alternative systems for naming the wing veins and other structures. The review is then followed by keys to facilitate identification of the adult dragonflies and the known larvae, allowing the user a high probability of identifying his specimens correctly. In addition to anatomical features, the keys include the known ranges of the species, synonyms, and citations of literature in which more information about each individual species can be obtained. These citations are compiled in an extensive bibliography. To provide the user with the best possible opportunity to distinguish the species, the keys are richly illustrated with pen and ink drawings of thousands of individual morphological structures, arranged in 797 figures." (Publisher)]
- 5932.** Herbrecht, F.; Dommange, J.-L. (2006): Sur le développement larvaire d'*Oxygastra curtisii* (Dale, 1834) dans les eaux stagnantes (Odonata, Anisoptera, Corduliidae). *Martinia* 22(2): 89-94. (in French, with English summary). [Compilation of old (literature) and new records with reproduction of *O. curtisii* in stagnant waterbodies.] Address: Dommange, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France
- 5933.** Hernandez, K.M.; Reece, B.A.; McIntyre, N.E. (2006): Effects of anthropogenic land use on Odonata in Playas of the southern high plains. *Western North American Naturalist* 66(3): 273-278. (in English). ["Playas are ephemeral wetlands that are the only source of aboveground freshwater in the southern Great Plains, making them of vital importance to aquatic and amphibious animals. Playas are also highly threatened from anthropogenic land use (chiefly agriculture, which decreases hydroperiod through increased sedimentation). We examined community structure of adult odonates (dragonflies and damselflies) in playas differing in the 2 main regional forms of surrounding land use (cropland vs. grassland). Analysis of odonate diversity revealed high overlap between cropland and grassland playas. Traditional species-area theory did not fit observed patterns, as there appears to be a threshold playa size that supports maximal odonate diversity; this nonlinear response may reflect a tradeoff between hydroperiod and availability of emergent vegetation that is required for perching and oviposition. Since agriculture effectively reduces playa depth but not size of the overall playa watershed, this may mean that cropland playas serve as "ecological traps." This property has important implications for regional odonate diversity." (Authors)] Address: McIntyre, Nancy, Dept of Biological Sciences, Purdue University, 915 W State St, West Lafayette, IN 4790, USA; E-mail nancymcintyre@ttuedu
- 5934.** Hoang, D.H.; Bae Y.J. (2006): Aquatic insect diversity in a tropical Vietnamese stream in comparison with that in a temperate Korean stream. *Limnology* 7: 45-55. (in English). ["A comparative investigation on aquatic insect diversity was conducted in a tropical stream in Southeast Asia (the Dak Pri stream in southern Vietnam; stream orders II-V, two sites per stream order) with a reference temperate stream in Northeast Asia (the Gapyeong stream in central Korea) in March 2001 and April 2000, respectively. The numbers of aquatic insect taxa in Dak Pri stream (268 species, mostly undescribed, 230 genera, 91 families, and 9 orders; 110.5 ± 17.1 species per site) were about twice those in Gapyeong stream (133 species, 98 genera, 51 families, and 8 orders; 60.3 ± 8.5 species per site). Coleoptera, Trichoptera, Ephemeroptera, and Diptera were the major aquatic insect orders with high taxonomic richness, and Coleoptera, Odonata, and Hemiptera contributed to the higher degree of aquatic insect diversity in Dak Pri stream. The species diversity indices of Dak Pri stream (4.37 ± 0.19) were higher than those of Gapyeong stream (3.73 ± 0.42), whereas the dominance indices of Dak Pri stream (0.195 ± 0.046) were lower than those of Gapyeong stream (0.346 ± 0.113). Collector-gatherers were predominant in both streams; shredders were more abundant in Dak Pri stream while scrapers were more abundant in Gapyeong stream. Factors affecting the higher degree of aquatic insect diversity in Dak Pri stream are discussed." (Authors) Odonata are identified on the genus level.] Address: Bae, Yeon Jae, Department of Biology, Seoul Women's University, 126

Gongneungdong, Nowon-gu, Seoul 139-774, Korea. E-mail: yjbae@swu.ac.kr

5935. Hölker, M.; Wagner, T. (2006): Nahrungsökologie der Wiesenweihe *Circus pygargus* in der ackerbau-lich intensiv genutzten Feldlandschaft der Hellwegbör-
de, Nordrhein-Westfalen. *Vogelwelt* 127: 37-50. (in Ger-
man, with English summary). [Germany, Nordrhein-
Westfalen; A population of *C. pygargus* (Aves) was stu-
died between 1993 and 2002. Only in 2000 a single
"Aeshna spec." was among the prey observed.] Ad-
dress: Hölker, M., Auf'm Alten Garten 17, D-595005
Bad Sassendorf, Germany. E-mail: manfredhoelker@
freenet.de

5936. Hooper, I.R.; Vukusic, P.; Wootton, R.J. (2006):
Detailed optical study of the transparent wing membra-
nes of the dragonfly *Aeshna cyanea*. *Optics Express*
14(11): 4891-4897. (in English). ["The optical prop-
erties of transparent single membranes on the wings of *A.*
cyanea have been investigated. These membranes
comprise one central thick cuticular layer covered dor-
sally and ventrally with typical odonatan wax pruinosity.
Optical characterisation of individual membranes re-
veals they can support optical guided modes compri-
sing differential polarisation reflection. We suggest this
may offer an intraspecific signalling channel. The gui-
ded modes' characteristics depend on membrane
thickness and the nature of the wax pruinosity. We ac-
curately modelled multiple optical data sets simultane-
ously, thereby inaugurally quantifying the roughness of
the pruinosity and the complex refractive indices of the
wax and the odonatan cuticle." (Authors)] Address:
Hooper, I.R., School of Physics, University of Exeter,
Exeter, EX4 4QL, UK. e-mail: i.r.hooper@exeter.ac.uk

5937. Hoshizaki Green Foundation (2006): Records
on Invertebrate and Vertebrate of Reservoirs in Hirata
Area, Izumo City, Shimane Prefecture, Japan. *Bull.*
Hoshizaki Green Found 9: 1-12. (in Japanese, with
English summary). [Between 2001 and 2003, 214 re-
servoirs in Hirata Area, Izumo City, Shimane Prefec-
ture, Japan were surveyed. The list includes 35 odonate
taxa, 5 of them are briefly commented: *Trigomphus*
melampus, *Oligoaeschna pryleri*, *Aeschnophlebia*
longistigma, *Aeshna nigroflava*, *Anaciaeschna martini*,
and *Epitheca marginata*.] Address: Hoshizaki Green
Foundation, Okinoshima, 1659-5, Sono, Izumo, Shimane
Pref., 691-0076, Japan

5938. Hottenbacher, N.; Koch, K. (2006): Influence of
egg size on egg and larval development of *Sympetrum*
striolatum at different prey availability (Odonata: Libellu-
lidae). *International Journal of Odonatology* 9(2): 165-
174. (in English). ["Egg size differences might have an
important influence on reproductive success because
they may lead to different offspring conditions, hatching
date or larval size. We presumed that egg size in odo-
nates positively correlates with egg development time,
and larger eggs lead to larger larvae. However, we as-
sumed that the size benefit could only be maintained
under harsh, but not under good conditions. Harsh and
good conditions were simulated by different diets with
specific feeding intervals; high prey level fed every day,
low prey level fed every second day. The prey orga-
nisms used were *Artemia salina* and *Chironomus*
riparius. The study was conducted with the libellulid
Sympetrum striolatum. Our results showed that larger
eggs caused a longer development time. Larger eggs resul-

ted in significantly larger first instar larvae. However,
larger larvae maintained their size benefit only in the
high prey level with *C. riparius*. We found no significant
differences between low prey and high prey level within
the two prey types. We therefore assume that the diffe-
rences between the two prey levels in this study were
not large enough. In general, *A. salina* seems to be mo-
re nutritious than *C. riparius* for the first larval stadia."
(Authors)] Address: Hottenbacher, N., Zoologisches In-
stitut, Technische Universität Braunschweig, Spiel-
mannstraße 8, 38102 Braunschweig, Germany. E-mail:
n.hottenbacher@tu-bs.de

5939. Hovmöller, R. (2006): Molecular phylogenetics
and taxonomic issues in dragonfly systematics (Insecta:
Odonata). Doctoral thesis. Stockholm University, De-
partment of Zoology. ISBN: 91-7155-282-0: VI, 59 pp.
(in English, with Swedish summary). ["Dragonflies (O-
donata) are one of the ancestral groups of extant in-
sects. They represent one of the three most basal bran-
ches in the phylogeny of winged insects. The other two
groups are the Ephemeroptera, mayflies, and Neoptera,
the latter which covers the remaining winged insects.
The first paper is about the phylogenetic position of
Odonata in relation to the other basal insect clades u-
sing 18S and 28S rDNA sequences. It was demonst-
rated that there are under certain parameters a strong
statistical support for a sister-group relationship be-
tween Odonata and Neoptera forming the group Pa-
laeoptera. The second paper is about the phylogeny of
the Holarctic dragonfly *Leucorrhinia*. Dragonfly lar-
vae are frequently equipped with spines on the abdom-
en, with great variation in spinyness between species.
From an analysis of sequences of ITS and 5.8S rDNA it
was found that spines have been lost at least twice in
Leucorrhinia, in the European *L. rubicunda* and again in
a clade of North American species. The third paper is
on the subfamily *Ischnurinae* (Odonata: *Coenagrioni-*
dae), a group dominated by the two larger genera *Isch-*
nura and *Enallagma* along with several mono- or oligo-
typic genera. From the presented molecular study, u-
sing mitochondrial 16S rDNA and COII sequences, it is
demonstrated that *Ischnurinae*, and *Ischnura* are mo-
nophyletic. *Enallagma* is not monophyletic, and the ge-
nus name *Enallagma* should be restricted to the *E.*
cyathigerum clade. The fourth paper is a catalogue of
the genus *Coenagrion*, with full information on synony-
my, type material and bibliographical data. The fifth
paper is an appeal to the International Commission on
Zoological Nomenclature to suppress the genus group
name *Agrion*. The letter of appeal elucidates the priority
of *Agrion*, and demonstrates why it has fallen out of
use. A case is made for why *Agrion* should be placed on
the list of unavailable names, and *Calopteryx* given full
validity." (Author)] Address: Hovmöller, R., Dept of
Entomology, Swedish Museum of Natural History and
Dept of Zoology, Stockholm University, P.O. Box 500
07, 10405 Stockholm, Sweden

5940. Hunger, H.; Schiel, F.-J. (2006): Rote Liste der
Libellen Baden-Württembergs und der Naturräume,
Stand November 2005 (Odonata). *Libellula Suppl.* 7: 3-
14. (in German, with English summary). ["The here-
with presented Red List of the Odonata of Baden-Würt-
temberg, Germany and its biogeographic regions is
based on digital data analyses of about 80.700 data
sets and the classification method of the German
Federal Agency for Nature Conservation. Compared to
the previous version of the Red List, the number of
species

listed has declined considerably. The reasons for this have to be discussed carefully and can be contributed to three main factors: First, the classification method has become more objective and more concise; second, increased knowledge about some species leads to a more optimistic evaluation of their population vulnerability; and third, the improved water quality of rivers has simultaneously led to an improved habitat quality. Nevertheless, the Red List of Odonata of Baden-Württemberg still includes more than half of the species, with two species being extinct, 12 critically endangered and 11 endangered." (Authors)] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INULA), August-Ganther-Straße 16, D-79117 Freiburg, Germany. E-mail: holger.hunger@inula.de

5941. Hunger, H.; Schiel, F.-J.; Kunz, B. (2006): Verbreitung und Phänologie der Libellen Baden-Württembergs (Odonata). *Libellula Suppl.* 7: 15-188. (in German, with English summary). ["Distribution maps for all Odonata species currently or formerly known from the German federal state of Baden-Württemberg are presented in an ordinance map grid resolution of ca 6 x 6 km for the periods 1980-1995 and 1996-2005. The seasonal activity pattern of each species is shown as a diagram in 10-day-periods, with differentiation between observations of imagines, observations of reproductive activities, and records of exuviae or emergence. The vertical distribution is, likewise, differentiated between the described observation types, and shown in a diagram with 100-m-classes. The steps towards the Red List category assigned to each species are made transparent by tables. Short descriptions of preferred habitat, noteworthy observations in the five biogeographical regions, and the situation with special respect to the Red List status, vertical distribution, and phenology are given for each species." (Authors)] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INULA), August-Ganther-Straße 16, D-79117 Freiburg, Germany. E-mail: holger.hunger@inula.de

5942. Inberga-Petrovska, S.S. (2006): Sparu daudzveidiba. <http://www.biosfera.gov.lv/docgef/SabMR101-117-spares.pdf>: 16 pp. (in Latvian). [At <http://www.biosfera.gov.lv/indexEng.htm> (<http://www.biosfera.gov.lv/docgef/SabMR101-117-spares.pdf>) an identification key for the dragonflies of the North Vidzeme Biosphere Reserve, Latvia is available.]

5943. Jakubik, B.; Kufel, L.; Lewandowski, K. (2006): Macrobenthos differentiation among ox-box lakes of the river Bug within the Bug River Valley Landscape Park. *Teka Kom. Ochr. Kszt. Środ. Przyr.* 3: 55-59. (in English, with Polish summary). [With focus on Mollusca, the macrozoobenthos of six ox-bow lakes of varied hydrological regimes - ranging from lakes connected with the river to lakes isolated from the channel - was studied in the Bug River floodplain, NE Poland. Odonata are treated on the sub-order level.] Address: Jakubik, Beata, Inst. Biol., Univ. Podlasie, B. Prusa str. 12., PL-08-110 Siedlce, Poland. E-mail: bjakubik@ap.siedlce.pl

5944. Jara, F.G.; Perotti, M.G. (2006): Variación ontogenética en la palatabilidad de los renacuajos de *Bufo spinulosus papillosus* Philippi, 1902 (Anura, Bufonidae). *Cuadernos de Herpetología* 19(2): 37-42. (in Spanish, with English summary). ["We evaluated the ontogenetic variation in the palatability of *B. spinulosus papillosus* tadpoles exposed to odonate larvae of *Rhinoaeshna*

variegata. We exposed tadpoles to direct predation and determined the number of consumed tadpoles in 4 developmental categories. *B. spinulosus papillosus* tadpoles of categories I (stages 24-26) and II (stages 32-34) were unpalatable, while categories III (stages 38-40) and IV (stages 42-45) were progressively palatable. We observed a post-capture rejection behavior when they caught unpalatable tadpoles in categories I and II. The palatability pattern observed in *B. spinulosus papillosus* was different from related *Bufo* species (Brodie & Formanowicz, 1987; Kehr & Schnack, 1991; Lawler & Hero, 1997)."] Address: Jara, F.G., Laboratorio de Fotobiología, CRUB-UNCOMA (CONICET), Quintral 1250, (8400) San Carlos de Bariloche, Río Negro, Argentina. E-mail: fjara@crub.uncoma.edu.ar

5945. Johansson, F.; Englund, G.; Brodin, T.; Gardfjell, H. (2006): Species abundance models and patterns in dragonfly communities: effects of fish predators. *Oikos* 114(1): 27-36. (in English). ["We investigated if dragonfly larvae community composition and species abundance curves are sensitive to variation in predation intensity, and whether the fit to a particular niche partitioning model could be used to make inferences about mechanisms structuring communities. The approach taken was to compare communities in lakes either having or lacking fish predation. Dragonfly species classified as active, strongly dominated the dragonfly communities in fishless lakes, and low active species dominated fishless lakes. As activity level is known to correlate with susceptibility to fish predation this indicates that these communities are structured by fish predation. Fitting relative abundance data to five niche partitioning models showed that the same model fitted data from both types of habitats (fish/no fish). This means that the observed differences in relative abundances were substitutive, i.e. the relative abundance of a rank stayed constant, even though the identity of the species having this rank changed. The best fit to data from both types of lakes was found for the random assortment model, which is usually interpreted as an indication that the community is not structured by within-guild interactions. This interpretation for fishless lakes did not seem to agree with other community measures (i.e. lowered diversity and evenness and no relationship between species richness and dragonfly biomass), which indicate that the community is structured by within-guild interactions. Moreover, a detail in the fitting procedure, the number of species included in the analysis, affected which model that fitted data best. Thus, we question if fitting niche partitioning models to data can provide mechanistic understanding of how resources are partitioned in natural communities." (Authors)] Address: Johansson, F., Department of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Umea, Sweden. E-mail: frank.johansson@eg.umu.se

5946. Jourde, P.; Hussey, R. (2006): Première mention de *Trithemis annulata* (Palisot de Beauvois, 1805) en Charente-Maritime (Odonata, Anisoptera, Libellulidae). *Martinia* 22(2): 71-72. (in French, with English summary). [*T. annulata* has recently been mentioned from the Gironde Department, France. On 18.IX.2005, a single male was discovered along the estuary of the Gironde, in Charente-Maritime (Western France). This seems to be the present northernmost record for this expanding species.] Address: Jourde, P., LPO, La Cor-

derie Royale, BP 90263, F-17305 Rochefort, France. E-mail: philippe.jourde@lpo.fr

5947. Jourde, P.; Perret, B. (2006): *Sympetrum flaveolum* (L., 1758), nouvelle donnée pour le Poitou-Charentes et statut récent dans les plaines de l'Ouest de la France (Odonata, Anisoptera, Libellulidae). *Martinia* 22(3): 135-142. (in French, with English summary). ["Following sightings of this species in Charente-Maritime, a literature search was conducted to investigate its supposed presence across the low-lying regions of Western France. At present, distribution maps, published in many works for the identification of dragonflies, show a large distribution of *S. flaveolum* in France. It appears that the species is very rare in these areas, with the majority of observations being of vagrants. Consequently, species distribution maps should differentiate geographically those regions where the populations are known to breed regularly from those regions where the species is only occasional." (Authors)] Address: Jourde, P., LPO, La Corderie Royale, BP 90263, F-17305 Rochefort, France. E-mail: philippe.jourde@lpo.fr

5948. Juillerat, L.; Wildermuth, H. (2006): Landmilben als Libellenparasiten: Befall von *Orthetrum coerulescens* mit *Leptus* sp. (Odonata: Libellulidae; Parasitengona: Erythraeidae). *Libellula* 25(3/4): 171-184. (in German, with English and French summaries). ["During the 2001 flying season 110 mites of the genus *Leptus* were recorded on adults in five of six local populations of *O. coerulescens* in the Swiss Jura mountains. Of the host individuals 72.8 % were teneral, 24.3 % immature, and 2.9 % mature. On average 29 % of the tenerals bore mites, this proportion varying between 0 and 53 % within six local populations. The parasite load amounted to one to five mites per individual; it averaged 1.57 and did not differ significantly between sexes. Almost two thirds of the host individuals bore a single mite. Most parasites were attached to the host's legs. Infested hosts survived an average of 18.1 days from emergence and non-infested hosts 28.0 days. The observed infestation of *O. coerulescens* by terrestrial mites may reflect the superposition of the host's and parasite's preferred habitats, namely spring mires comprising mosaics of tiny seepages and streams intimately intermingled with extensively grazed fen vegetation." (Authors)] Address: Juillerat, J., Fahys 21, CH-2000 Neuchâtel, Schweiz. E-mail: juillerat.l@bluewin.ch

5949. Kalkman, V.; Lopau, W. (2006): Identification of *Pyrrhosoma elisabethae* with notes on its distribution and habitat (Odonata: Coenagrionidae). *International Journal of Odonatology* 9(2): 175-184. (in English). ["*Pyrrhosoma elisabethae* is one of the rarest and least known odonate taxa in Europe and is often considered to be a subspecies of *P. nymphula*. The taxon is known from eight localities, four on the Peloponnisos, Greece, three on Kérkira (Corfu), Greece, and one in southern Albania. We describe structural differences between *P. elisabethae* and *P. nymphula* in both males and females, and present a key that distinguishes these two taxa. These structural differences, combined with the lack of intermediates, suggests that *P. elisabethae* should be treated as a full species. Notes on habitat associations and flying season of *P. elisabethae* are also given." (Authors)] Address: Kalkman, V.J., Oude Rijnsburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands. E-mail: Kalkman@naturalis.nnm.nlk

5950. Karle-Fendt, A. (2006): Erstnachweis von *Coenagrion scitulum* in Bayern (Odonata: Coenagrionidae). *Libellula* 25(3/4): 129-134. (in German, with English summary). ["In July 2006, *C. scitulum* was discovered for the first time in Bavaria, Germany. Two exuviae of the species were found in the Felmer Moos, Oberallgäu district, situated in the southwestern part of Bavaria near the border to Austria and Switzerland. These records as well as one in the Swiss-Austrian Rhine valley (2001) may indicate a recent expansion of the species to southern Germany. Possible migration routes are discussed." (Authors)] Address: Karle-Fendt, A., Hofener Straße 49, D-87527 Sonthofen, Germany

5951. Karube, H.; Ozono, A. (2006): Biogeography of Odonata in the Ryukyu Archipelago. *Insect and nature* 41(4): 23-29. (in Japanese, with English translation of the title). [The distribution of *Planaeschna* is mapped.] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

5952. Kasangaki, A.; Babaasa, D.; Efitre, J.; McNeillage, A.; Bitariho, R. (2006): Links between anthropogenic perturbations and benthic macroinvertebrate assemblages in Afromontane forest streams in Uganda. *Hydrobiologia* 563: 231-245. (in English). ["Relationships between environmental variables and benthic macroinvertebrate assemblages were investigated among several sites that varied in disturbance history in Bwindi Impenetrable National Park, an Afromontane site in East Africa. Environmental variables were correlated with the level of past catchment disturbance – logging, agricultural encroachment, and present tourism activity. For example, sites in medium and high disturbance categories had higher values of specific conductance and lower water transparency than low disturbance category sites, these environmental variables may therefore act indicators of ecological quality of rivers. Environmental variables such as conductivity and water transparency were found to be good predictors of benthic macroinvertebrate assemblages, with anthropogenically stressed sites having lower diversity than the reference sites. Impacted sites were dominated by tolerant taxa such as chironomid and leeches, while 'clean water' taxa such as Ephemeroptera, Plecoptera and Trichoptera dominated at minimally impacted sites. Comparison of sites with different disturbance histories provided evidence for differences in benthic macroinvertebrate communities that reflect the state of forest restoration and recovery. We recommend quarterly monitoring of water quality to act as an early warning system of deterioration and tracking ecological recovery of previously impacted sites." (Authors) Odonata are treated on the family level.] Address: Kasangaki, A., Institute of Tropical Forest Conservation, Mbarara University of Science & Technology, PO Box 44, Kabale, Uganda. E-mail: kasangaki@itfc.org

5953. Kawano, K.; Nakano, H.; Hayashi, M.; Yamachi, T. (2006): Aquatic Insects in the Ponds of Hirata Area (Izumo City) in Shimane Prefecture, Japan. *Bull. Hoshizaki Green Found.* 9: 13-37. (in Japanese, with English summary). [The aquatic insect fauna of irrigation ponds was surveyed in the Hirata Area of Izumo City, Shimane Prefecture, Japan between 2001 and 2003. A total of 218 ponds was sampled resulting in 108 species. The list of species includes 34 odonate species.] Address: The Firefly Museum of Toyota Town, Naka-

mura, 50-3 Toyota, Shimonoseki, Yamaguchi Pref., 750-0441, Japan

5954. Kéry, M.; Muñoz Lopez, S. (2006): Reconfirmation of *Gomphus graslinii*, Rambur, 1842, in Navarra and *Onychogomphus costae*, Sélys, 1885, in Aragón in 2006 (Odonata: Gomphidae). *Boletín Sociedad Entomologías Aragonesa* 39: 138. (in English, with Spanish summary). [Spain; *G. graslinii*: 13 VII 2006, Rio Salazar immediately at the upriver edge of the village of Lumbier, Navarra, at about 420 m a.s.l.. *O. costae*: 11 VII 2006, Rio Alcanadre at Ontiñena, Aragón.] Address: Kéry, M., Swiss Ornithological Institute, 6204 Sempach, Switzerland. E-mail: marc.kery@vogelwarte.ch

5955. Khodabandeh, S. (2006): Na⁺,K⁺-ATPase in the gut of larvae of the zygopteran, *Ischnura elegans*, and the Anisoptera, *Libellula lydia*, (Odonata): Activity and immunocytochemical localization. *Zoological Studies* 45(4): 510-516. (in English). ["Na⁺,K⁺-ATPase activity and immunolocalization were demonstrated in the gut of *Ischnura elegans* and *Libellula lydia* larvae. Localization was performed through immunofluorescence light microscopy using the IgGa5 mouse monoclonal antibody. The Na⁺,K⁺-ATPase activity was significantly higher in the hindgut than in the foregut-midgut in both species. In *I. elegans*, Na⁺,K⁺-ATPase activities were 29.44 and 5.12 $\mu\text{M Pi/mg/protein/h}$ in the hindgut and foregut-midgut, while in *L. lydia*, the activities were 16.24 and 1.98 $\mu\text{M Pi/mg/protein/h}$ in the hindgut and foregut-midgut, respectively. No specific fluorescence staining was observed in the cells of the foregut or midgut regions in either species. Na⁺,K⁺-ATPase was found in the malpighian tubules and rectal pad epithelium in *I. elegans*, and in the epithelium of the basal pads of the rectal gill lamellae in *L. lydia*. A consistently high immunoreactivity was observed in the sides of the lumen of malpighian tubule cells, and a positive and strong fluorescence signal was found in the basolateral sides of the pads of epithelium cells. These findings show that as in crustaceans, this antibody is useful for locating of Na⁺,K⁺-ATPase and ionocytes in insect osmoregulatory tissues. A high concentration of Na⁺,K⁺-ATPase activity in these tissues confirms their participation in osmoregulation through active ion exchange." (Author)] Address: Khodabandeh, Saber, Department of Marine Biology, Faculty of Marine Sciences, University of Tarbiat Modarres, Mazandaran, Noor, PO Box 46414-356, Iran. E-mail: surp78@yahoo.com

5956. Khrokalo, L. A.; Sheshurak, P. M. (2006): Flight seasonality of dragonflies (Insecta, Odonata) in northeastern Ukraine. *Vestnik Zoologii* 40(2): 145-154. (in English, with summary). [Data on seasonal flight periods of Odonata in Northeastern Ukraine (Kyiv, Chernigiv, Sumy, Chekasy and Kharkiv administrative regions) based on field observations and a review of material collected during 1992–2004 are provided. Field data by the authors (numbers of species occurring during the six seasons as adults) were compared with literature data. The study resulted in new resp. amended insights into the regional phenology of *Chalcolestes parvidens*, *Coenagrion armatum*, *Brachytron pratensis*, *Aeshna affinis*, *Anax imperator*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Cordulia aenea*, *Epitheca bimaculata*, *Sympetrum danae*, *Leucorrhinia rubicunda*, and *L. caudalis*. Flight seasonalities are depicted of 13 frequently occurring species. The regional total of 55 species can be grouped in six phenological groups.] Address: Khro-

kalo, Lyudmila, P.O. Box 23, Kyiv-118, Ukraine 03118. E-mail: lkrokalo@mail.ru

5957. Kipping, J. (2006): Globalisierung und Libellen: Verschleppung von exotischen Libellenarten nach Deutschland (Odonata: Coenagrionidae, Libellulidae). *Libellula* 25(1/2): 109-116. (in German, with English summary). ["Recent records from Germany of four exotic dragonfly species are provided. One individual of the Asian *Ceragrion cerinorubellum* (Brauer) was probably imported accidentally with aquatic plants to Leipzig, Saxony. Two species, including *Ischnura senegalensis* (Rambur), definitely reached Dessau, Saxony-Anhalt in the same way, whereas an adult *Pantala flavescens* (Fabricius) was brought into Saxony with bananas from Ecuador." (Authors)] Address: Kipping, J., BioCart – Ökologische Gutachten & Studien, Albrecht-Dürer-Weg 8, D-04425 Taucha, Germany. E-mail: BioCartKipping@web.de

5958. Kishida, O.; Nishimura, K. (2006): Flexible architecture of inducible morphological plasticity. *Journal of Animal Ecology* 75: 705-712. (in English). ["Predator-induced morphological defences are produced in response to an emergent predator regime. In natural systems, prey organisms usually experience temporal shifting of the composition of the predator assemblage and of the intensity of predation risk from each predator species. Although, a repetitive morphological change in response to a sequential shift of the predator regime such as alteration of the predator species or diminution of the predation risk may be adaptive, such flexible inducible morphological defences are not ubiquitous. We experimentally addressed whether a flexible inducible morphological defence is accomplished in response to serial changes in the predation regime, using a model prey species which adopt different defensive morphological phenotypes in response to different predator species. *Rana pirica* (Matsui) tadpoles increased body depth and tail depth against the predatory larval salamander *Hynobius retardatus* (Dunn); on the other hand, they only increased tail depth against the predatory larval dragonfly *Aeshna nigroflava* (Martin). *Rana pirica* tadpoles with the predator-specific phenotypes were subjected to removal or exchange of the predator species. After removal of the predator species, tadpoles with each predator-specific phenotype changed their phenotype to the nondefensive basic one, suggesting that both predator-specific phenotypes are costly to maintain. After an exchange of the predator species, tadpoles with each predator-specific phenotype reciprocally, flexibly shifted their phenotype to the now more suitable predator-specific one only by modifying their body part. The partial modification can effectively reduce time and energy expenditures involved in repetitive morphological changes, and therefore suggest that the costs of the flexible morphological changes are reduced." (Authors)] Address: Kishida, O., Graduate School of Fisheries Sciences, Hokkaido University, Hakodate 041-8611, Hokkaido, Japan. E-mail: kishida@fish.hokudai.ac.jp

5959. Kraft, P.G.; Franklin, C.E.; Blows, M.W. (2006): Predator-induced phenotypic plasticity in tadpoles: extension or innovation? *Journal of Evolutionary Biology* 19(2): 450-458. (in English). ["Phenotypic plasticity, the ability of a trait to change as a function of the environment, is central to many ideas in evolutionary biology. A special case of phenotypic plasticity observed in many

organisms is mediated by their natural predators. Here, we used a predator-prey system of dragonfly larvae and tadpoles to determine if predator-mediated phenotypic plasticity provides a novel way of surviving in the presence of predators (an innovation) or if it represents a simple extension of the way noninduced tadpoles survive predation. Tadpoles of *Limnodynastes peronii* were raised in the presence and absence of predation, which then entered a survival experiment. Induced morphological traits, primarily tail height and tail muscle height, were found to be under selection, indicating that predator-mediated phenotypic plasticity may be adaptive. Although predator-induced animals survived better, the multivariate linear selection gradients were similar between the two tadpole groups, suggesting that predator-mediated phenotypic plasticity is an extension of existing survival strategies. In addition, nonlinear selection gradients indicated a cost of predator-induced plasticity that may limit the ability of phenotypic plasticity to enhance survival in the presence of predators." (Authors)] Address: Kraft, P.G., School of Integrative Biology, University of Queensland, Brisbane, Australia. E-mail: pkraft@zoology.uq.edu.au

5960. Krauss, V.; Fassl, A.; Fiebig, P.; Patties, I.; Sass, H. (2006): The evolution of the histone methyltransferase gene *Su(var)3-9* in metazoans includes a fusion with and a re-fission from a functionally unrelated gene. *BMC Evolutionary Biology* 2006, 6:18: 15 pp. (in English). ["Background: In eukaryotes, histone H3 lysine 9 (H3K9) methylation is a common mechanism involved in gene silencing and the establishment of heterochromatin. The loci of the major heterochromatic H3K9 methyltransferase *Su(var)3-9* and the functionally unrelated α subunit of the translation initiation factor eIF2 are fused in *Drosophila melanogaster*. Here we examined the phylogenetic distribution of this unusual gene fusion and the molecular evolution of the H3K9 HMTase *Su(var)3-9*. Results: We show that the gene fusion had taken place in the ancestral line of winged insects and silverfishes (Dicondylia) about 400 million years ago. We cloned *Su(var)3-9* genes from a collembolan and a spider where both genes ancestrally exist as independent transcription units. In contrast, we found a *Su(var)3-9*-specific exon inside the conserved intron position 81-1 of the eIF2 α gene structure in species of eight different insect orders. Intriguingly, in the pea aphid *Acyrtosiphon pisum*, we detected only sequence remains of this *Su(var)3-9* exon in the eIF2 α intron, along with an eIF2 α -independent *Su(var)3-9* gene. This reveals an evolutionary re-fission of both genes in aphids. *Su(var)3-9* chromo domains are similar to HP1 chromo domains, which points to a potential binding activity to methylated K9 of histone H3. SET domain comparisons suggest a weaker methyltransferase activity of *Su(var)3-9* in comparison to other H3K9 HMTases. Astonishingly, 11 of 19 previously described, deleterious amino acid substitutions found in *Drosophila Su(var)3-9* are seemingly compensable through accompanying substitutions during evolution. Conclusion: Examination of the *Su(var)3-9* evolution revealed strong evidence for the establishment of the *Su(var)3-9/eIF2 α* gene fusion in an ancestor of dicondylid insects and a re-fission of this fusion during the evolution of aphids. Our comparison of 65 selected chromo domains and 93 selected SET domains from *Su(var)3-9* and related proteins offers functional predictions concerning both domains in *Su(var)3-9* proteins." (Authors) The study includes *Enallagma cyathigerum*.] Address: Krauss, V.,

Dept of Genetics, Institute of Biology II, University of Leipzig, Johannisallee 21-23, 04103 Leipzig, Germany. Email: krauss@rz.uni-leipzig.de

5961. Kumar, R.; Hwang, J.-S. (2006): Larvicidal efficiency of aquatic predators: A perspective for mosquito biocontrol. *Zoological Studies* 45(4): 447-466. (in English). ["Biological control of mosquito larvae with predators and other biocontrol agents would be a more-effective and eco-friendly approach, avoiding the use of synthetic chemicals and concomitant damage to the environment. Manipulating or introducing an auto-reproducing predator into the ecosystem may provide sustained biological control of pest populations. The selection of a biological control agent should be based on its self-replicating capacity, preference for the target pest population in the presence of alternate natural prey, adaptability to the introduced environment, and overall interaction with indigenous organisms. In order to achieve an acceptable range of control, a sound knowledge of various attributes of interactions between a pest population and the predator to be introduced is desirable. Herein, we qualitatively review a wide range of literature sources discussing the ability of different aquatic predators to control mosquito larval populations in environments where mosquitoes naturally breed. Different predators of mosquito larvae include amphibian tadpoles, fish, dragonfly larvae, aquatic bugs, mites, malacostracans, anostracans, cyclopoid copepods, and helminths. The most widely used biocontrol agents of mosquito populations are the western mosquito fish, *Gambusia affinis*, and the eastern mosquito fish, *G. holbrooki*. The effect of these fishes on native faunal composition and their inability to survive in small containers, tree holes etc., which are ideal breeding sites of vectorially important mosquitoes, make them inefficient in controlling mosquito populations. On the basis of larvicidal efficiency, the ability to produce dormant eggs, the hatchability of dormant eggs after rehydration, faster developmental rates, and higher fecundity, various tadpole shrimp can be considered to mosquito ideal control agents in temporary water bodies and rice paddy fields. Among various predators of mosquito larvae, the cyclopoid copepods are efficient, found naturally, are safe for human beings, and are also economical in their application. The mosquito larval selectivity patterns of many cyclopoids, their adaptability to variable aquatic environments which are ideal breeding sites for mosquitoes, their resistance to starvation, and their day-night prey detection ability using hydromechanical signals make them an ideal biocontrol agent. Therefore, there is a need to test the feasibility of cyclopoid copepods by putting them into operational use as eco-compatible means of biocontrol." (Authors)] Address: Hwang, Jiang-Shiou, Institute of Marine Biology, National Taiwan Ocean University, 2 Pei-Ning Rd., Keelung, Taiwan 202, R.O.C.

5962. Kunz, B. (2006): Entwicklung von *Onychogomphus forcipatus unguiculatus* in einer Kiesgrube in der Provence (Odonata: Gomphidae). *Libellula* 25 (3/4): 147-150. (in German, with English and French summaries). ["On 15-V-2006 an emerging female and another exuvia were found in a gravel pit situated close to the left bank of river Durance, west of the airfield of Vinon-sur-Verdon in the Var district, southern France. This is the first record of successful development for this taxon in standing waters in France, and the second in Europe." (Author)] Address: Kunz, B., Hauptstr. 111, D-

74595 Langenburg, Germany. E-mail: libellen@berndkunj.de

5963. Kunz, B.; Seidenbusch, R. (2006): Erfolgreiche Larvalentwicklung bei *Sympetrum sinaiticum* trotz erheblicher Missbildung der Fangmaske (Odonata: Libellulidae). *Libellula* 25(1/2): 77-82. (in German, with English summary). ["During the analysis of a collection of final-stadium exuviae from Tunisia, a specimen of *S. sinaiticum* was detected with the left labial palp missing. Only a small part of the labial palp had begun to regenerate. Obviously the larva had been able successfully to feed, moult and emerge, in spite of this impairment." (Authors)] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: libellen@berndkunj.de

5964. Kunz, B.; Wildermuth, H. (2006): Prädation zwischen Libellen und Heuschrecken (Odonata; Saltatoria). *Libellula* 25 (3/4): 199-208. (in German, with English summary). ["Reciprocal predation of dragonflies and grasshoppers (Odonata, Saltatoria) — On 14-VI--1998 a nearly full-grown larva of *Tettigonia viridissima* was observed catching a flying male *Calopteryx splendens*, and on 12-VI-2005 a male *Ischnura elegans* was photographed devouring a young larva of *Phaneroptera falcata*. The hitherto available records of corresponding predation events available to us are compiled and the nutritional interrelation between Odonata and Saltatoria (Ensifera, Caelifera) is discussed." (Authors)] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: libellen@berndkunj.de

5965. Kunz, B.; Ober, S.V.; Jödicke, R. (2006): The distribution of *Zygonyx torridus* in the Palaearctic (Odonata: Libellulidae). *Libellula* 25(1/2): 89-108. (in English, with German summary). ["*Z. torridus* is an Oriental-Afrotropical species, whose range also covers the southern margin of the Palaearctic. All known records from the latter region are listed, mapped and discussed. Records from single localities covering a longer period of time are available for the Canary Islands, the Jordan Valley, and Spain. The known occurrence in northern Africa is restricted to Morocco and Tunisia. In southern Europe the species is rare, and several populations seem to have been lost recently. Records are known from Portugal, Spain and Italy. One visual observation originates from southwestern Turkey. A record from Iran indicates a bridge to the population on the Indian subcontinent. The species is new to the fauna of Italy, Tunisia and Turkey. (Authors)] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: libellen@berndkunj.de

5966. Lambrechts, J.; Guelinckx, R. (2006): De balans na het natuurherstel in Het Vinne te Zoutleeuw (Vlaams-Brabant): in één jaar van 7 naar 27 libellensoorten. *Gomphus* 20(2): 3-12. (in Dutch, with English and French summaries). ["The results after the restoration of the Vinne at Zoutleeuw (province of Vlaams-Brabant) as a natural lake in Flanders: in 1 year from 7 to 27 of Odonata species. This contribution gives an overview of the dragonfly fauna (Odonata) of Het Vinne, a site in the extreme south eastern part of the province of Vlaams-Brabant (Belgium). Het Vinne was the only natural lake (> 100 hectares) in Flanders, but disappeared completely 150 years ago due to land reclamation. A nature restoration project has been undertaken by the Flemish land Agency (VLM) in 2004. As a result, the species poor plantations of poplar disappeared in fa-

vor of open water and reed marshes. The dragonfly survey undertaken in 2005 resulted in a list of 27 species for this site. The most interesting species are *Lestes dryas*, *Sympecma fusca* and *Orthetrum coerulescens*. Because of its relatively isolated location in the dry loamy region of Belgium many more species are unexpected. Worth mentioning are the big populations of *Ischnura pumilio* and *Libellula quad-rimaculata*. Also the following southern species were notified: *Lestes barbarus*, *Erythromma lindenii* and *Crocothemis erythraea*." (Authors)] Address: Lambrechts, J., Zuurbemde 9, B-3380 Glabbeek, Belgium. E-mail: Jorglambrechts@hotmail.com

5967. Lambrechts, J.; De Knijf, G. (2006): Libellen in het Nationaal Park Hoge Kempen. *Likona* jaarboek 2005 – n°15: 50-57. (in Dutch, with English summary). ["Since 1990, 50 dragonfly species (with populations of 45 species) or 83% of all recent Flemish species have been observed in the National Park Hoge Kempen. 14 from the 17 Red List species have been noted, and with populations of 9 species. Also all the 3 species belonging to the category 'rare' are present. We can conclude that this National Park is a real biodiversity hotspot for dragonflies in Flanders. Nearly all Red List species characteristic for oligotrophic and running waters (brooks and rivulets) are present in high numbers. Only the species typical for meso-eutrophic standing waters are lacking, due to the nearly complete absence of this habitat type in the Park. The Park is also of international importance due to the presence of *Leucorrhinia pectoralis*, a species mentioned in the Annexes II and IV of the Habitat Directive. Within the Park, the Vallei van de Zijpbeek is the most important site for dragonflies. Gravel pits can be of great importance for Odonata, also for Red List species, if they were reshaped after exploitation." (Authors)] Address: Lambrechts, J., Milieu-adviesbureau AEOLUS, Vroentestraat 2b, B-3290 Diest, Belgium. E-mail: natuur@aeolus-milieu.be

5968. Landwer, B.; Sites, R.W. (2006): Variability in larval characters states used to distinguish between species of *Pantala* Hagen (Odonata: Libellulidae). *Florida Entomologist* 89(3): 354-360. (in English). ["Despite widespread distributions and abundance, previously published diagnoses of the larvae of the two species of the dragonfly genus *Pantala* often were contradictory or confusing. Morphometric analysis of mensural characters and qualitative analysis of relative character states were used to determine the ability of previously published characterizations to accurately distinguish larvae of the two species. We found that many published characterizations were inaccurate or insufficient, and their use in making species level determinations would result in frequent misidentifications. In distinguishing between the two species, the most useful and reliable characteristic was the palpal setal count. However, in specimens where this count is intermediate, other characteristics may need to be evaluated." (Authors)] Address: Landwer, Brett, Enns Entomology Museum, Division of Plant Sciences, University of Missouri, Columbia, Missouri 65211, USA. E-mail: brett.landwer@mdc.mo.gov

5969. Latty, T.M. (2006): Flexible mate guarding tactics in the dragonfly *Sympetrum internum* (Odonata: Libellulidae). *Journal of Insect Behavior* 19(4): 469-477. (in English). ["Mate guarding—a behaviour prevalent in odonates—is a post copulatory association during which males prevent females from re-mating. Some species

use two forms of guarding: contact mate guarding, which is energetically costly but highly effective and non-contact mate guarding, which is less costly but less effective. This study aimed to determine if male *S. internum* adjust the duration of contact mate guarding according to environmental, temporal and physiological factors. There was a significant interaction between male density and season on duration of contact mate guarding. Early in the season males increased the duration of contact guarding as the density of rivals increased. Later in the season males guarded mates longer irrespective of male density. Wind and temperature did not detectably alter the duration of contact mate guarding, suggesting that the trade-off between current and future reproductive success was more important than were physiological costs." (Author)] Address: Latty, Tany, Department of Biological Sciences, University of Calgary, 2500 University drive, Calgary, Alberta, Canada T2N 1N4. E-mail: tmlatty@ucalgary.ca.

5970. Laurila, A.; Pakkasmaa, S.; Merilä, J. (2006): Population divergence in growth rate and antipredator defences in *Rana arvalis*. *Oecologia* 147(4): 585-595. (in English). ["Growth and development rates often differ among populations of the same species, yet the factors maintaining this differentiation are not well understood. We investigated the antipredator defences and their efficiency in two moor frog *Rana arvalis* populations differing in growth and development rates by raising tadpoles in outdoor containers in the nonlethal presence and absence of three different predators (newt, fish, dragonfly larva [*Aeshna*']), and by estimating tadpole survival in the presence of free-ranging predators in a laboratory experiment. Young tadpoles in both populations reduced activity in the presence of predators and increased hiding behaviour in the presence of newt and fish. Older tadpoles from the slow-growing Gotland population (G) had stronger hiding behaviour and lower activity in all treatments than tadpoles from the fast-growing Upland population (U). However, both populations showed a plastic behavioural response in terms of reduced activity. The populations differed in induced morphological defences especially in response to fish. G tadpoles responded with relatively long and deep body, short tail and shallow tail muscle, whereas the responses in U tadpoles were often the opposite and closer to the responses induced by the other predators. U tadpoles metamorphosed earlier, but at a similar size to G tadpoles. There was no evidence that growth rate was affected by predator treatments, but tadpoles metamorphosed later and at larger size in the predator treatments. G tadpoles survived better in the presence of free-ranging predators than U tadpoles. These results suggest that in these two populations, low growth rate was linked with low activity and increased hiding, whereas high growth rate was linked with high activity and less hiding. The differences in behaviour may explain the difference in survival between the populations, but other mechanisms (i.e. differences in swimming speed) may also be involved. There appears to be considerable differentiation in antipredator responses between these two *R. arvalis* populations, as well as with respect to different predators." (Authors)] Address: Laurila, A., Population Biology/ Department of Ecology and Evolution, Evolutionary Biology Center, Uppsala University, Norbyvägen 18d, 75236 Uppsala, Sweden. Email: Anssi.Laurila@ebc.uu.se

5971. Lencioni, F.A.A. (2006): Damselflies of Brazil. 2 - Coenagrionidae families. ISBN 85-7718-034-4: 419 pp. (in English and Portuguese). ["This is the second volume of the guide to the species of Zygoptera of Brazil. This volume is organized as was the first volume, treating all 154 described species of Brazilian Coenagrionidae, and includes the following four appendices: 1. species of non-Coenagrionidae described since the publication of the 1st volume, 2. illustrations of 46 described larvae, 3. a description of the larva of *Mecistogaster asticta* Selys, 1860, including notes on its biology, 4. 43 colored images (photos and specimen scans) of Brazilian species. The book has 1570 illustrations of which 380 are original. Dr. R.W. Garrison, at my request, examined the male syntype of *Leptagrion? obsoletum* Selys, 1876, and determined this to be a senior synonym of *Helveciagrion chirihuanum* (Calvert, 1909). The status of *Leptagrion auriceps* St. Quentin, originally relegated to synonymy is re-examined and illustrated here." (Author)] Address: Lencioni, F.A.A., Rua dos Ferroviarios 55, Jardim Mesquita, BR-12300-000, Jacareí, S.P., Brazil. E-mail: odonata@iconet.com.br. Orders should be directed to the following e-mail address: odonata@zygoptera.bio.br

5972. Leroy, T. (2006): Évolution du peuplement d'Odonates adultes au cours d'une saison sur les rives d'un lac-tourbière d'Auvergne (France). *Martinia* 22(3): 109-118. (in French, with English summary). ["A survey of adult Odonata along the banks of a peaty lake, 1100 m a.s.l., in the Cézallier Plateau, Auvergne region, was performed from spring to autumn in 2000 and 2001. Although the specific richness in adult Dragonflies reached about 15 species during three months, from June to August, the density was high only from June to the beginning of July. *Enallagma cyathigerum* is by far the most abundant species and represents 50 to 75 % of the adult community present within the breeding locality. This prevalence is obvious from June to August so that the community appears poorly diversified and unbalanced, although the specific richness is high. The apparent population of September (autumn species) differed greatly from that of end May (spring species)." (Author)] Address: Leroy, T., Le Bourg, F-63210 Heume-l'Eglise, France. E-mail: thierry-leroy@caramail.com

5973. Levasseur, M. (2006): Le comportement d'immersion partielle brève et répétée en vol chez les Odonates. *Martinia* 22(3): 143-144. (in French, with English summary). ["The author comments on a few observations of male Anisoptera, touching three times the water surface in flight. This behaviour is briefly described and explanations are proposed (action not correlated to egg-laying)." (Author)] Address: Levasseur, M., 11 rue du Pont Colbert, F-78000 Versailles, France.

5974. Levasseur, M. (2006): Prospection odonatologique de quelques milieux intéressants de la Martinique. *Martinia* 22(2): 83-88. (in French, with English summary). ["On a journey allowing the visit of 3 wetland spots in Martinique, 15 species have been recorded. After a brief description of the sites, a synthetic table - listing the species, their behaviour and numbers - is presented. Remarks in relation with identification of some taxa and conservation of sites follow." (Author)] Address: Levasseur, M., 11 rue du Pont Colbert, F-78000 Versailles, France

- 5975.** Lieckweg, T.; Niedringhaus, R. (2006): Eine neue Sammlung westafrikanischer Odonaten des Überseemuseums Bremen. Jahrbuch des Überseemuseum Bremen 13: 67-88. (in German, with English summary). ["In 2004, a collection of West African Odonata was handed over to the Überseemuseum at Bremen (Germany) to be permanently housed there. This collection of more than 2000 specimens of 131 species (60 Zygoptera, 71 Anisoptera) was acquired by U. Bröring and R. Niedringhaus between 1980 and 1983 at different localities in the West African countries of Ghana, Togo, Benin, Nigeria, and Cameroon. The present paper provides the identifications of all specimens and a brief description of the localities sampled." (Authors)] Address: Niedringhaus, R., Carl-von-Ossietzky-Universität Oldenburg, Fakultät 5, Institut für Biologie- und Umweltwissenschaften, Postfach 2503, 26111 Oldenburg, Germany; rolf.niedringhaus@uni-oldenburg.de
- 5976.** Loewen, N.; Peterson, R. (2006): Dancing dragonflies. Dragonflies in your backyard. Picture Window Books. Minneapolis. ISBN 1-4048-1142-7: 24 pp. (in English). [Introduction into dragonflies for kids.]
- 5977.** Lohr, M. (2006): Libellenbeobachtungen in Südpotugal (Odonata). *Libellula* 25(1/2): 117-118. (in German, with English summary). ["Due to not specifiable problems, figure 2a of this article, formerly published in *Libellula* 24 (2005), contained three erroneous givings. The correct presentation of this map with hitherto published records of *Gomphus graslinii* in Portugal is given." (Author)] Address: Lohr, M., FH Lippe und Höxter, Fachgebiet Tierökologie und Landschaftsökologie, An der Wilhelmshöhe 44, D-37671 Höxter, Germany. E-mail: mlohr@fh-luh.de
- 5978.** Longcore, J.R.; McAuley, D.G.; Pendelton, G.W.; Reid Bennatti, C.; Mingo, T.M.; Stromborg, K.L. (2006): Macroinvertebrate abundance, water chemistry, and wetland characteristics affect use of wetlands by avian species in Maine. *Hydrobiologia* 567: 143-167. (in English). ["Our objective was to determine use by avian species (e.g., piscivores, marsh birds, waterfowl, selected passerines) of 29 wetlands in areas with low (<200 $\mu\text{eq l}^{-1}$) acid-neutralizing capacity (ANC) in southeastern Maine. We documented bird, pair, and brood use during 1982-1984 and in 1982 we sampled 10 wetlands with a sweep net to collect invertebrates. We related mean numbers of invertebrates per wetland to water chemistry, basin characteristics, and avian use of different wetland types. Shallow, beaver (*Castor canadensis*)-created wetlands with the highest phosphorus levels and abundant and varied macrophyte assemblages supported greater densities of macroinvertebrates and numbers of duck broods (88.3% of all broods) in contrast to deep, glacial type wetlands with sparse vegetation and lower invertebrate densities that supported fewer broods (11.7%). Low pH may have affected some acid-intolerant invertebrate taxa (i.e., Ephemeroptera), but high mean numbers of Insecta per wetland were recorded from wetlands with a pH of 5.51. Other Classes and Orders of invertebrates were more abundant on wetlands with pH>5.51. All years combined use of wetlands by broods was greater on wetlands with pH \leq 5.51 (77.4%) in contrast to wetlands with pH>5.51 that supported 21.8% of the broods. High mean brood density was associated with mean number of Insecta per wetland. For lentic wetlands created by beaver, those habitats contained vegetative structure and nutrients necessary to provide cover to support invertebrate populations that are prey of omnivore and insectivore species. The fishless status of a few wetlands may have affected use by some waterfowl species and obligate piscivores." (Authors) Odonata are treated on the family level.] Address: Longcore, J., U.S. Geological Survey, Patuxent Wildlife Research Center, 5768 South Annex A, Orono, ME 04469, USA. E-mail: JerryLongcore@usgs.gov
- 5979.** Luo, G.; Sun, M. (2006): The effects of corrugation and wing planform on the aerodynamic force production of sweeping model insect wings. *Acta Mechanica Sinica* 21(6): 531-541. (in English). ["The effects of corrugation and wing planform (shape and aspect ratio) on the aerodynamic force production of model insect wings in sweeping (rotating after an initial start) motion at Reynolds number 200 and 3500 at angle of attack 40° are investigated, using the method of computational fluid dynamics. A representative wing corrugation is considered. Wing-shape and aspect ratio (AR) of ten representative insect wings are considered; they are the wings of fruit fly, crane fly, drone fly, hoverfly, ladybird, bumblebee, honeybee, lacewing (forewing), hawkmoth and dragonfly (forewing), respectively (AR of these wings varies greatly, from 2.84 to 5.45). The following facts are shown. (1) The corrugated and flat-plate wings produce approximately the same aerodynamic forces. This is because for a sweeping wing at large angle of attack, the length scale of the corrugation is much smaller than the size of the separated flow region or the size of the leading edge vortex (LEV). (2) The variation in wing shape can have considerable effects on the aerodynamic force; but it has only minor effects on the force coefficients when the velocity at r^2 (the radius of the second moment of wing area) is used as the reference velocity; i.e. the force coefficients are almost unaffected by the variation in wing shape. (3) The effects of AR are remarkably small: when AR increases from 2.8 to 5.5, the force coefficients vary only slightly; flow-field results show that when AR is relatively large, the part of the LEV on the outer part of the wings sheds during the sweeping motion. As AR is increased, on one hand, the force coefficients will be increased due to the reduction of 3-dimensional flow effects; on the other hand, they will be decreased due to the shedding of part of the LEV; these two effects approximately cancel each other, resulting in only minor change of the force coefficients." (Authors)] Address: Luo, G.y.; Sun, M., Ministry of Education Key Laboratory of Fluid Mechanics, Institute of Fluid Mechanics, Beihang University, Beijing, 100083, China
- 5980.** Machida, K.; Oikawa, T.; Shimanuki, J. (2006): The effect of the costal vein configuration of the wings of a dragonfly. *Key Engineering Materials* 326-328: 819-822. (in English). ["In generally, it is known that structures of living thing are optimized. The wings of a dragonfly are thin and light. Although it is having the structure of bearing the load produced in the case of an advanced flight such as "Flapping flight", "Glide", and "Hovering". The wings of a dragonfly are made by veins and membranes. In addition, the wings of a dragonfly have some characteristic structures, such as "Nodus". Thus, the wings of dragonfly have many complicated structures. The configuration of costal vein of the wings is different from them of other insects. So, we paid attention to the configuration of costal vein of the wings. Therefore, in this study, we researched about the effect

of costal vein. As a result, it was showed that the configuration of costal vein became bending and torsional deformation small. In addition, it was showed that the configuration of costal vein related to nodus. In this study, several 3-D models of the dragonfly's wing were made and calculated by the 3-D finite element method." (Authors)] Address: Machida, M., Tokyo University of Science, 2641 Yamazaki, Noda-shi, Chiba, 278-8510, Japan. E-mail: mac@rs.noda.tus.ac.jp

5981. Macken, J.E. (2006): The life cycle of a dragonfly. Milwaukee. ISBN 0-8368-6388-7 (softcover): 24 pp. (in English). [Book for children resp. first reading.]

5982. Marshall, J.C.; Steward, A.L.; Harch, B.D. (2006): Taxonomic resolution and quantification of freshwater macroinvertebrate samples from an Australian dryland river: the benefits and costs of using species abundance data. *Hydrobiologia* 572: 171-194. (in English). ["In studies using macroinvertebrates as indicators for monitoring rivers and streams, species level identifications in comparison with lower resolution identifications can have greater information content and result in more reliable site classifications and better capacity to discriminate between sites, yet many such programmes identify specimens to the resolution of family rather than species. This is often because it is cheaper to obtain family level data than species level data. Choice of appropriate taxonomic resolution is a compromise between the cost of obtaining data at high taxonomic resolutions and the loss of information at lower resolutions. Optimum taxonomic resolution should be determined by the information required to address programme objectives. Costs saved in identifying macroinvertebrates to family level may not be justified if family level data can not give the answers required and expending the extra cost to obtain species level data may not be warranted if cheaper family level data retains sufficient information to meet objectives. We investigated the influence of taxonomic resolution and sample quantification (abundance vs. presence/absence) on the representation of aquatic macroinvertebrate species assemblage patterns and species richness estimates. The study was conducted in a physically harsh dryland river system (Condamine-Balonne River system, located in south-western Queensland, Australia), characterised by low macroinvertebrate diversity. Our 29 study sites covered a wide geographic range and a diversity of lotic conditions and this was reflected by differences between sites in macroinvertebrate assemblage composition and richness. The usefulness of expending the extra cost necessary to identify macroinvertebrates to species was quantified via the benefits this higher resolution data offered in its capacity to discriminate between sites and give accurate estimates of site species richness. We found that very little information (<6%) was lost by identifying taxa to family (or genus), as opposed to species, and that quantifying the abundance of taxa provided greater resolution for pattern interpretation than simply noting their presence/absence. Species richness was very well represented by genus, family and order richness, so that each of these could be used as surrogates of species richness if, for example, surveying to identify diversity hot-spots. It is suggested that sharing of common ecological responses among species within higher taxonomic units is the most plausible mechanism for the results. Based on a cost/benefit analysis, family level abundance data is recommended as the best resolution for resolving pat-

terns in macroinvertebrate assemblages in this system. The relevance of these findings are discussed in the context of other low diversity, harsh, dryland river systems." (Authors) The study includes Odonata.] Address: Marshall, J.C., Qld Department of Natural Resources and Mines, 120 Meiers Road, 4068, Indooroopilly, QLD, Australia. E-mail: marshallj@nrm.qld.gov.au, jonathan.marshall@nrm.qld.gov.au)

5983. Martens, A. (2006): Gomphidenlarven als Substrat für Wohnröhren des Flohkrebsses *Chelicorophium robustum*? (Odonata: Gomphidae; Amphipoda: Corophiidae). *Libellula* 25(1/2): 83-87. (in German, with English summary). ["*Chelicorophium robustum* is a semi-sessile amphipod of Ponto-Caspian origin which has recently spread rapidly through Central Europe. Under laboratory conditions, adults settled on final-stadium larvae of *Gomphus vulgatissimus*, *Ophiogomphus cecilia* and *Onychogomphus forcipatus*. By using other particles they built dwelling tubes similar to those of caddisfly larvae on the ventral side of the abdomen of the dragonfly larvae. This represents the first reported example of an amphipod living sporadically as an epizoon on dragonfly larvae, an association not yet recorded from the wild." (Author)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

5984. Mauersberger, R. (2006): Verbreitung und Phänologie des Zweiflecks, *Epitheca bimaculata* Charpentier, 1825 (Odonata, Corduliidae), im Norden Brandenburgs. *Entomologische Nachrichten und Berichte* 50(1-2): 45-53. (in German). [Germany; "The author recorded *E. bimaculata* at 551 occasions in the study area between Prenzlau, Schwedt, Eberswalde and Rheinsberg (about 3500 km²), at 140 localities listed in this paper. From 1987 to 2006, breeding was observed in 88 water bodies in this lake landscape shaped during the Pleistocene. It represents the centre of distribution of the species in Germany. At the lake with the largest breeding colony, up to 394 exuviae in a year were found. The greatest recorded abundance of the species in this region was 193 exuviae along 80 meters of lake shore. *E. bimaculata* reaches a frequency of at least 29 % in 216 lakes with a water surface of more than one hectare existing in the UNESCO-biosphere reserve „Schorfheide-Chorin“ in the eastern part of the study area. The cornerstone data of adult phenology in the period 1992-2004 were as follows: earliest emerging adults, 11 May; peak emergence, 16 May; first males appearing in their territory over the water surface, 25 May; last living specimens, 24 June." (Author)] Address: Mauersberger, R., Bahnhofstr. 24, D-17268 Templin, Germany. E-mail: FoerdervereinUeckermark.Seen@t-online.de

5985. May, B.; Blumenkamp, K. (2006): Erstnachweis einer Brut des Bienenfressers *Merops apiaster* im Kreis Mettmann 2005. *Charadrius* 41(4) (2005): 208-213. (in German, with English summary). [Germany, Nordrhein-Westfalen; 2005; Anisoptera are among the preferred prey of *M. apiaster* (Aves).] Address: May, B., Schildheider Str. 126b, D-40699 Erkrath, Germany. E-mail: buero@naturschutzzentrum-bruchhausen.de

5986. McCauley, S.J. (2006): The effects of dispersal and recruitment limitation on community structure of odonates in artificial ponds. *Ecography* 29(4): 585-595.

(in English). ["I examined the effects of isolation on the structure of both adult and larval dragonfly (Odonata: Anisoptera) communities forming at physically identical artificial ponds over two years. Isolation, whether measured by distance to the nearest source habitat or by connectivity to multiple sources, was significantly negatively related to the species richness of dragonflies observed at and collected in these ponds. These results indicate that dispersal and recruitment limitation acted as filters on the richness of communities at these artificial ponds. The richness of larval recruits in artificial ponds was lower than the richness of adult dispersers observed at ponds, and distance from a source habitat explained a greater fraction of the variation in larval than adult richness (83 and 50%, respectively). These results and a male biased sex-ratio in adults observed at artificial ponds suggest that isolated habitats may be more recruitment limited than observations of dispersers would suggest. A Mantel test indicated there was a spatial component to the composition of communities forming in tanks, and that distance between tanks and community dissimilarity (1-Jaccard's) were significantly positively related ($r=0.52$). This pattern suggests that their position with respect to alternative source environments influenced the composition of the communities that recruited into these ponds. These results provide further evidence of recruitment limitation in this system. Results from this study highlight the importance behaviorally limited dispersal may have in taxa morphologically capable of broad dispersal and suggest that the role of dispersal and recruitment limitation may be critical in shaping community structure across habitat gradients that include variation in habitat duration." (Author)] Address: McCauley, S. J., Center for Population Biology, One Shields Avenue, 2320 Storer Hall, Univ. of California, Davis, CA 95616, USA. E-mail: sjmccauley@ucdavis.edu

5987. McGuffin, M.A.; Baker, R.L.; Forbes, M.R. (2006): Detection and avoidance of fish predators by adult *Enallagma damselflies*. *Journal of Insect Behavior* 19(1): 77-91. (in English). ["Reproductive success of iteroparous insects depends on their own survival as well as that of their offspring and thus adults should consider risk of predation to both themselves and their offspring when selecting a suitable place to lay eggs. We surveyed species composition of *Enallagma damselflies* from sites in eastern Ontario and found that, similar to studies in Michigan, USA, *Enallagma boreale* does not co-exist with fish, whereas *E. signatum* is apparently restricted to sites with fish. *E. ebrium* is found at fish and fishless sites. Laboratory experiments on these species showed no effect of chemical cues of fish presence on propensity to oviposit or number of eggs released. By using field enclosures, we found adult *E. ebrium* could detect and avoid fish during visits to a site, but females visiting fish sites did not significantly reduce oviposition duration." (Authors)] Address: Baker, R.L., Dept Zoo], Erindale Coll., Univ. Toronto, Mississauga, ON, L6L 2C6. Canada. e-mail: rbaker@credit.erin.utoronto.ca

5988. McMillan, V.E. (2006): Preliminary observations of reproductive behavior in *Arigomphus villosipes* (Selys) (Anisoptera: Gomphidae). *Bulletin of American Odonatology* 10(1): 19-22. (in English). ["I studied the behavior of the *A. villosipes* (Unicorn Clubtail) at a small artificial pond in New York State from 6 June-8 July 2002. Throughout the day males adopted perch sites

along the shoreline, typically 3 m or farther apart. Most of their time was spent perching, interrupted by brief patrols or chases of other males. Marking records showed that most males (79%) returned to the pond on one or more subsequent days. Individual males displayed only weak attachment to perch sites, often occupying two or more different areas along the shoreline over several hours on a given day. Female visits to the pond were brief and infrequent; pair formation occurred at the water, whereupon the pair left the pond to mate. Females oviposited by flying slowly over shallow water, dipping the abdomen once or twice at multiple sites; mate-guarding was never observed. Suggestions are given for future studies of this species." (Author)] Address: McMillan, Vicky, Colgate Univ., Dept. Biol., 13 Oak Dr. Hamilton, NY 13346-1398, USA . E-mail: vmcmillan@mail.colgate.edu

5989. Meurgey, F. (2006): A possible economic impact of libellulid larvae on production of freshwater shrimps in Guadeloupe, French West Indies (Anisoptera: Libellulidae). *Notulae Odonatologicae* 6(7): 79-80. (in English). [Tentatively impacts of *Pantala flavescens* - larvae on shrimp farming are reported.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5990. Meurgey, F. (2006): Les Odonates du département de Loire-Atlantique Nouvelles espèces et observations récentes. *Martinia* 22(2): 65-70. (in French, with English summary). ["Since the publication (2000) of a survey of Loire-Atlantique department odonata fauna (France), new records resulting from prospecting carried out from 2000 to 2005 are presented. Three species are new for the department (*Anax junius*, *A. parthenope* and *Lestes macrostigma*) and for eight others, previously known, our knowledge on their status and distribution increased." (Author)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5991. Meurgey, F. (2006): Présence ancienne de *Sympetrum danae* (Sulzer, 1776) dans le département de Loire-Atlantique (Odonata, Anisoptera, Libellulidae). *Martinia* 22(2): 82. (in French). [France; a historic record of *S. danae* is documented and discussed.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5992. Meurgey, F. (2006): Richesse et diversité des Odonates de 51 mares de l'archipel guadeloupéen. Extrait du rapport de mission Muséum Nantes 2004. *Martinia* 22(3): 119-132. (in French, with English summary). ["A study carried out in March-April 2004 on 51 ponds of Guadeloupe archipelago, shows that 22 species of dragonflies breed regularly in this type of habitat. In a context of regular dryness and increasing urbanization, ponds of Guadeloupe tend to rarefy. A typology based on the uses and the general environment is proposed as a working tool for the future surveys." (Author)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5993. Meurgey, F. (2006): Signalement de *Sympetma fusca* (Vander Linden, 1820), *Gomphus vulgatissimus* (L., 1758) et *Libellula fulva* (Müller, 1764) dans le dé-

partement des Pyrénées-Orientales. *Martinia* 22(2): 64. (in French). [France; records of the three species are documented. These records update the regional list to 52 species.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5994. Meurgey, F. (Coord. & Red.) (2006): Les Odonates des Départements et Collectivités d'Outre-mer français. Société française d'odonatologie. ISBN: 2950729169: 144 pp. (in French, with English summary). ["France counts 10 overseas territories distributed around the world. Mainly located in the Tropics, these territories relate to a great diversity of habitats and species. In 1999, the "Société Française d'Odonatologie" created a study group on dragonflies fauna of the French overseas territories. This group is in charge to contribute to the advance of knowledge on faunas still imperfectly known, as well from a systematic point of view as of biology and ecology. The level of knowledge of each department or territory of Overseas is not equal, since is subjected to various constraints such as the surface, accessibility and also number of species to be considered. The Nantes Museum of Natural History takes part in these studies in various manners, such as conservation of collections, missions in West Indies, publications. Since the creation of this group, 42 papers were published (31 in *Martinia* review), solely or included in a supplement (2001), and two thematic issues (2002, 2004). 179 new species could be added to the lists of the geographical areas by the members of this Group. The French Overseas departments and territories currently gather 363 species. France gathers 8% of world dragonfly fauna, and thus has an important responsibility as regards conservation of the species and their habitats." (Author)] Address: Société française d'odonatologie (SFO), 7, rue Lamartine, F-78390 Bois d'Arcy, France

5995. Michalski, J. (2006): *Neurobasis awamena* sp. nov. from New Guinea, with a discussion of the Sulawesi and Papuan species in the genus (Odonata: Calopterygidae). *International Journal of Odonatology* 9 (2): 185-195. (in English). [*N. awamena* "from the southern highlands of New Guinea (holotype: Pimaga area, 6°30'S, 143°30'E, 27 vii 1994, deposited at Naturalis, Leiden) is described and figured. It is distinguished from the widespread *N. australis* by its longer legs, irregular teeth on the male cerci, and the sharp demarcation of the iridescent color on the male hindwings. Its combined characters prompted a re-examination of the variability of *N. australis* throughout its range, and of the characters formerly used to distinguish the species of *Neurobasis* occurring from Sulawesi to the Bismarck Archipelago. A table comparing these species, a key, and a distribution map of the New Guinean species are provided." (Author)] Address: Michalski, J., 223 Mount Kemble Avenue, Morristown New Jersey 07960, USA. E-mail: jmichalski@easthanoverschools.org

5996. Mikolajewski, D.J.; Johansson, F.; Wohlfahrt, B.; Stoks, R. (2006): Invertebrate predation selects for the loss of a morphological antipredator trait. *Evolution* 60(6): 1306-1310. (in English). ["Antagonistic selection by different predators has been suggested to underlie variation in morphological antipredator traits among and within species. Direct empirical proof is equivocal, however, given the potential interrelationships of morphological and behavioral traits. Here, we tested whether

spines in larvae of the dragonfly *Leucorrhinia caudalis*, which are selected for by fish predators, are selected against by invertebrate aeshnid predators. Using a manipulative approach by cutting spines instead of making comparisons among species or inducing spines, we were able to decouple the presence of spines from other potentially covarying morphological antipredator traits. Results showed survival selection for the loss of spines imposed by invertebrate predation. Moreover, spined and nonspined larval *L. caudalis* did not differ in the key antipredator behaviors, activity level, and escape burst swimming speed. The observed higher mortality of spined larvae can therefore be directly linked to selection by aeshnid predation against spines." (Authors)] Address: Mikolajewski, D.J., Laboratory for Aquatic Ecology, Katholieke Universiteit Leuven, Charles de Bériotstr. 32, B-3000 Leuven, Belgium. E-mail: d.mikolajewski@tu-bs.de

5997. Miller, E.; Miller, J. (2006): Beobachtungen zum winterlichen Verhalten von *Sympecma fusca* (Odonata: Libellula 25(3/4): 119-128. (in German, with English summary). ["In the region of Starnberg (Bavaria, Germany) we found that in autumn most individuals disappeared from the surroundings of a pond and probably moved by stages to their hibernation site. They first stayed at forest edges and subsequently moved to a sunny clearing where they foraged until the first cold snap. During periods with frost and snow they were found perched on plants close to the ground and stayed immobile during snowfall. In cold they were able to move on plant stems up to temperatures of -4°C. Some individuals died because they were trapped in thawing snow, unable to climb higher. Dead individuals were recognized by their brown-red eyes." (Authors)] Address: Miller, Elfi, Miller, J., Leharstraße 6c, D-861 79 Augsburg, Germany

5998. Mitra, T.R. (2006): Handbook on Common Indian Dragonflies : Insecta: Odonata . ISBN 8181710886: 136 pp. (in English). [119 odonate species are described and in most cases pictured with (colour) photographs and/or hand-made paintings. In addition, some brief information of habitat, habits, and distribution are outlined. The following species are treated: 1. *Matrona basilaris basilaris* Selys. 2. *Neurobasis chinensis chinensis* Linnaeus. 3. *Vestalis smaragdina smaragdina* Selys. 4. *Vestalis gracilis* (Rambur). 5. *Vestalis apicalis apicalis* Selys. 6. *Echo margarita margarita* Selys. 7. *Euphaea cardinalis* (Fraser). 8. *Euphaea guerini masoni* Selys. 9. *Euphaea ochracea ochracea* Selys. 10. *Bayadera indica* (Selys). 11. *Anisopleura comes* Selys. 12. *Anisopleura subplatystyla* Fraser. 13. *Rhinocypha cuneata* Selys. 14. *Rhinocypha immculata* Selys. 15. *Rhinocypha bisignata* Selys. 16. *Rhinocypha bifasciata* Selys. 17. *Rhinocypha trifasciata* Selys. 18. *Rhinocypha unimaculata* Selys. 19. *Rhinocypha ignipennis* Selys. 20. *Rhinocypha spuria* Selys. 21. *Rhinocypha quadrimaculata* Selys. 22. *Rhinocypha fenestrella fenestrella* Rambur. 23. *Libellago lineata* (Burmeister). 24. *Disparoneura quadrimaculata* (Rambur). 25. *Caconeura gomphoides* (Rambur). Family Platygnemididae 26. *Cocliccia bimaculata* Laidlaw. 27. *Copera marginipes* (Rambur) 28. *Copera vittata serapica* (Selys). 29. *Copera vittata assamensis* Laidlaw. 30. *Copera ciliata* (Selys). 31. *Calicnemia miniata* (Selys). 32. *Calicnemia miles* Laidlaw. 33. *Calicnemia eximia* Selys. 34. *Lestes elatus* Hagen. 35. *Lestes viridulus* Rambur. 36. *Lestes nodalis* Selys. 37. *Lestes umbrinus*

Selys. Family Synlestidae 38. *Megalestes major* Selys. 39. *Pseudagrion microcephalum* (Rambur). 40. *Pseudagrion decorum* (Rambur). 41. *Pseudagrion rubriced* Selys. 42. *Pseudagrion hypermelas* Selys. 43. *Pseudagrion australasiae* Selys. 44. *Ceriagrion coromandelianum* (Fabricius). 45. *Ceriagrion cerinorubellum* (Brauer). 46. *Ceriagrion olivaceum* Laidlaw. 47. *Ischnura senegalensis* Rambur. 48. *Ischnura forcipata* Morton. 49. *Ischnura aurora aurora* (Brauer). 50. *Rhodischnura nursei* (Morton). 51. *Agriocnemis femina femina* (Brauer). 52. *Agriocnemis lacteola* Selys. 53. *Agriocnemis pygmaea pygmaea* (Rambur). 54. *Onychargia atrocyana* Selys. 55. *Enallagma parvum* Selys. 56. *Cercion malayanum* (Selys). 57. *Aciagrion azureum* Fraser. 58. *Aciagrion hisopa hisopa* (Selys). 59. *Aciagrion approximans* (Selys). 60. *Aciagrion pallidum* Selys. 61. *Macrogomphus montanus* Selys. 62. *Paragomphus lineatus* (Selys). 63. *Stylogomphus inglisi* Fraser. 64. *Phaenandrogomphus aureus* (Laidlaw) 65. *Onychogomphus striatus* Fraser. 66. *Ictinogomphus rapax* (Rambur). 67. *Hemianax ephippiger* (Burmeister) 68. *Anax parthenope parthenope* Selys. 69. *Anaciaeschna jaspædia* (Burmesister). 70. *Anax guttatus* (Burmeister). 71. *Gynacantha dravida* Lieftinck. 72. *Gynacantha bainbriggei* Fraser. 73. *Gynacantha bayadera* Selys. 74. *Gynacantha basiguttata* selys. 75. *Chlorogomphus preciosus preciosus* Fraser. 76. *Chlorogomphus atkinsoni* (Selys). 77. *Anotogaster nipalensis* Selys. Family Corduliidae 78. *Epophthalmia vittata vittata* Burmeister. 79. *Macromia moorei moorei* Selys. 80. *Macrodiplax cora* (Brauer). 81. *Potamarcha congener* (Rambur). 82. *Acisoma panorpoides panorpoides* Rambur. 83. *Lathrecista asiatica asiatica* (Fabricius). 84. *Neurothemis tullia tullia* (Drury). 85. *Neurothemis fluctuans* (Fabricius). 86. *Neurothemis intermedia intermedia* (Rambur). 87. *Neurothemis fulvia* (Drury). 88. *Brachydiplax farinosa* Kruger. 89. *Brachydiplax chalybea chalybea* Brauer. 90. *Brachydiplax sobrina* (Rambur). 91. *Indothemis carnatica* (Fabricius). 92. *Tramea basilaris burmeisteri* Kirby. 93. *Tramea virginia* Rambur. 94. *Pantala flavescens* (Fabricius). 95. *Tholymis fillarga* (Fabricius). 96. *Zyxomma petiolatum* Rambur. 97. *Diplacodes trivialis* (Rambur). 98. *Diplacodes nebulosa* (Fabricius). 99. *Urothemis signata signata* Rambur. 100. *Aethriamanta brevipennis brevipennis* (Rambur). 101. *Nannophya pygmaea* Rambur. 102. *Orthetrum pruinosum neglectum* (Rambur). 103. *Orthetrum subina sabina* (Drury). 104. *Orthetrum trianguläre trianguläre* (Selys). 105. *Orthetrum chrysis* Selys. 106. *Orthetrum glaucum* (Brauer). 107. *Orthetrum taeniolatum* (Schneider). 108. *Orthetrum cancellatum cancellatum* (Linnaeus). 109. *Orthetrum japonicum internum* MacLachlan. 110. *Orthetrum luzonicum* (Brauer). 111. *Palpopleura sexmaculata sexmaculata* (Fabricius). 112. *Crocothemis servilia servilia* (Drury). 113. *Bradinopyga geninata* (Rambur). 114. *Brachythemis contaminata* (Fabricius). 115. *Sympetrum hypomelas* (Selys). 116. *Trithemis pallidinervis* (Kirby). 117. *Trithemis aurora* (Burmeister). 118. *Trithemis festiva* (Rambur). 119. *Rhyothemis variegata variegata* (Linnaeus).] Address: Mitra, T.R., Zoological Survey of India, M-Block, New Alipore, Kolkata-70053, India

5999. Müller, J. (2006): Libellen als Nachhaltigkeitsindikatoren für die ökologische Gewässerqualität. halophila, Mitt.-Bl. FG Faun. u. Ökol. Staßfurt 50: 6-7. (in German). [Sachsen-Anhalt, Germany; indicator system for habitat characterisation by Odonata.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

6000. Müller, J.; Steglich, R.; Lotzing, J.; Hahn, W. (2006): Vorläufige Mitteilung über bemerkenswerte Beobachtungen im Jahre 2005 (Odonata, Saltatoria; Aves). 1. Erneuter Fund der Gestreiften Quelljungfer *Cordulegaster bidentata* im Harz; 2. Erstnachweise von Grüner Flußjungfer *Ophiogomphus cecilia* und Feuerlibelle *Crocothemis erythraea* in der Bodeniederung als Schwalben-Nahrung. halophila, Mitt.-Bl. FG Faun. u. Ökol. Staßfurt, 49: 9-10. (in German). [1. On August 2, 2006, larvae of *Thecagaster bidentata* were recorded in the NSG Großer Ronneberg-Bielstein (Harz mountains), Wolfsbach, Sachsen-Anhalt, Germany. 2. In June 29, 2006, nestlings of *Hirundo rustica* (Aves) were tried to be fed in vain with large dragonfly imagines. Among these have been *Calopteryx splendens*, *Ophiogomphus cecilia* (Beleg in coll. JM), *Orthetrum cancellatum*, and *Crocothemis erythraea*. The latter record is the third proof of this range extending species in Sachsen-Anhalt, Germany.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.Jmueller@t-online.de

6001. Nel, A.; Arillo, A. (2006): The first Baltic amber dysagrionine damselfly (Odonata: Zygoptera: Thaumatoeuridae: Dysagrioninae). Ann. soc. entomol. Fr. (n.s.) 42(2): 179-182. (in English, with French summary). [Poland; "A new genus and species *Electrophenacolestes serafini* is described. It is the first Thaumatoeuridae recorded from an amber deposit and the second record of the family in the European Paleogene. A comparison with related genera and families is done." (Authors)] Address: Nel, A., Lab. Ent., Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

6002. Novelo-Gutiérrez, R.; Gómez-Anaya, J.A. (2006): A description of the larva of *Argia funcki* (Selys, 1854) (Odonata: Zygoptera: Coenagrionidae). Proceedings of the Entomological Society of Washington 108(2): 261-266. (in English, with Spanish summary). ["The last instar larva of *Argia funcki* (Selys) is described and illustrated. A comparison to its closest relative, *Argia lugens* (Hagen), is provided. The scalelike setae on sternite 8 and gonapophyses, and the bluntly-tipped gonapophyses easily separate *A. funcki* larva from that of *A. lugens*. The larva of *A. funcki* belongs to the group of species with ligula very prominent and one palpal seta; it is the largest of all known larvae of the genus." (Authors)] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@ecologia.edu.mx

6003. Nuckowska, K.; Krzyżanowska, I. (2006): Fauna and flora in two city-centre water reservoirs in Gorzów Wielkopolski. Teka Kom. Ochr. Kszt. Środ. Przyn. 3: 153-159. (in English, with Polish summary). [Poland; 2003, 7 taxa of generally common species are listed from the two water bodys.] Address: Nuckowska, Kinga, State School of Higher Vocational Education in Gorzów, Teatralna str. 25, PL-66-400 Gorzów Wielkopolski, Poland. E-mail: kinianuc@wp.pl

6004. Ott, J. (2006): Der Zweifleck - *Epithea bimaculata* (Charpentier, 1825) - nun auch am Gelterswoog bei Kaiserslautern (Insecta: Odonata: Corduliidae). Fauna Flora Rheinland-Pfalz 10(4): 1339-1347. (in German, with English summary). ["*E. bimaculata* is an endange-

red corduliid dragonfly which is listed in the federal state and national red list of dragonflies, but presently obviously increasing its range. A new population from the Gelterswoog (a lake near Kaiserslautern/Rhineland-Palatinate, Germany, which is part of a nature reserve and an area according to the EC habitats directive) is reported. The circumstances of this observation are discussed as well as some nature conservation problems concerning the lake which is also used for recreation purposes." (Author)] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.-GmbH@t-online.de

6005. Ott, J. (2006): Die Arktische Smaragdlibelle - *Somatochlora arctica* (Zetterstedt, 1840) - in der Pfalz: übersehen oder kurz vor dem Aussterben? (Insecta: Odonata: Corduliidae). Fauna Flora Rheinland-Pfalz 10 (4): 1323-1338. (in German, with English summary). ["*S. arctica* is one of the rarest dragonflies in the Palatinate and presently only one autochthonous population south of Trippstadt (near Kaiserslautern / Rhineland-Palatinate, Germany) is known to be existing. Several former breeding sites of the species were degraded or destroyed in the past but there is still in principal the possibility of a resettlement from populations of the French sites in the Northern Vosges; presently however the biotope conditions for the species in most of the waters are not adequate due to the lack of water and also effects of climatic changes. As the species could have been overlooked in some areas due to not being conspicuous an intensive mapping in the remaining 'good' biotopes is recommended which should take place as part of a special species protection programme for mooreland dragonflies in the Palatinate." (Author)] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

6006. Ott, J. (2006): Die Südliche Binsenjunger – *Lestes barbarus* (Fabricius, 1798) - erobert den Pfälzerwald (Insecta: Odonata: Lestidae). Fauna Flora Rheinland-Pfalz 10(4): 1315-1321. (in German, with English summary). ["In 2005 *L. barbarus* was discovered for the first time in the central Palatinate forest at the nature reserve „Pfälzerwoog“ near Fischbach/Dahn (Rhineland-Palatinate, Germany), where the species meanwhile is breeding, as in 2006 a big population was registered. The reasons for settling at the water are the new and extensive open shores with a scarce *Juncus*-vegetation as a consequence of the decrease of the water table in the lake and general climatic changes in the area. The origin of the population is probably the „Bienwald“, a nature reserve situated east of the area in a distance of 20 kilometers, separated by more or less dense forests. Another new locality of *Lestes barbarus* was recently discovered near Kaiserslautern, which is located about 35 km north of the Fischbach population and 30 km west of the „Haardtrand“ or „Donnersberg“ populations." (Author)] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

6007. Ott, J. (2006): Libellen im Bienwald -Ergebnisse der Untersuchungen im Rahmen des Naturschutzgroßprojektes - Vortrag von Dr. Jürgen Ott im Rahmen des AK Pfalz-Treffen am 11.03.2006. GNOR Info 102: 10. (in German). [Brief introduction and assessment of the odonate fauna of the Bienwald region in southern Rhineland-Palatinate, Germany.] Address: Ott, J., Friedhof-

str. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.-GmbH@t-online.de

6008. Parr, A. (2006): Views and Reviews: Field guide to the Dragonflies of Britain and Europe.. *Atropos* 29: 59-60. (in English). [Review of Dijkstra & Lewington 2006; see OAS 5893.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

6009. Peacor, S.D. (2006): Behavioural response of bullfrog tadpoles to chemical cues of predation risk are affected by cue age and water source. *Hydrobiologia* 573: 39-44. (in English). ["When confronted by signals of predators presence, many aquatic organisms modify their phenotype (e.g., behaviour or morphology) to reduce their risk of predation. A principal means by which organisms assess predation risk is through chemical cues produced by the predators and/or prey during predation events. Such responses to predation risk can directly affect prey fitness and indirectly affect the fitness of species with which the prey interacts. Accurate assessment of the cue will affect the adaptive nature, and hence evolution, of the phenotypic response. It is therefore, important to understand factors affecting the assessment of chemical cues. Here I examined the effect of the age of chemical cues arising from an invertebrate predator, a larval dragonfly (*Anax junius*), which was fed bullfrog tadpoles, on the behavioural response (activity level and position) of bullfrog tadpoles. The bullfrog response to chemical cues declined as a function of chemical cue age, indicating the degradation of the chemical cue was on the order of 2–4 days. Further, the decay occurred more rapidly when the chemical cue was placed in pond water rather than well water. These results indicate a limitation of the tadpoles to interpret factors that affect the magnitude of the chemical cue and hence accurately assess predation risk. These findings also have implications for experimental design and the adaptation of phenotypic responses to chemical cues of predation risk." (Author)] Address: Peacor, S.D., Department of Fisheries and Wildlife, Michigan State University, 13 Natural Resources Building, East Lansing, MI 48824-1222, USA. E-mail: Peacor@msu.edu

6010. Pelny, H.-J. (2006): Erster Nachweis von *Anax parthenope* auf dem Madeira-Archipel (Odonata: Aeshnidae). *Libellula* 25(1/2): 27-30. (in German, with English summary). [30.VIII. 2005; island of Porto Santo, Madeira archipelago, Portugal] Address: Pelny, H.-J., Zieritz 2, D-29597 Stötze, Germany. E-mail: hans.pelny@web.de

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6012. Petzold, F. (2006): Parasitierung von Libellen durch Wassermilben an einem Moorsee in Nordbrandenburg (Odonata; Hydrachnidia). *Libellula* 25(3/4): 185-198. (in German, with English summary). ["All those odonate species of which numerous individuals from the locality were investigated proved to be infested by

water mite larvae. The infestation rate of the different species amounted to 0.24 to 0.98 (mean: 0.65). In all species half of the infested individuals bore less than 15 mites. Occasionally, heavy parasite load was found, the maximum value per individual being 278 for Zygoptera (*Pyrrhosoma nymphula*) and 1136 for Anisoptera (*Corulia aenea*). With respect to the attachment sites of the mites on the dragonfly body clear differences between Zygoptera and Anisoptera were found. While in the former the parasites clung to the underside of the thorax and abdomen, in the latter they were attached ventrally to the abdomen, preferentially to S7-S9. Both, non-infested and infested as well as formerly heavily parasitized individuals participated in tandem formation in a proportion corresponding to that in the whole population. Compared with non-infested individuals, infested individuals exhibited no impairment of their reproductive behaviour." (Author)] Address: Petzold, F., Pappelallee 73, D-10437 Berlin, Germany. E-mail: falkpetzold@web.de

6013. Piksa, K.; Wachowicz, B.; Kwarcńska, M. (2006): Dragonflies (Odonata) of some small anthropogenic water bodies in Cracow City. *Fragmenta faunistica* 49(2): 81-89. (in English with Polish summary). [A survey of the Odonata of small anthropogenic water bodies in Cracow (southern Poland) in the years 2001–2004 resulted in records of 38 species. Of special interest are many southern and southeastern species e.g. *Aeshna affinis*, *Orthetrum albistylum*, *Sympetrum fonscolombii*, and *Crocothemis erythraea*, and tyrphobiontic and tyrphophilous species as *Coenagrion hastulatum*, *Lestes sponsa*, *S. danae*, *Leucorrhinia dubia*, and *L. rubicunda*. The importance of these secondary habitats for the conservation of dragonflies is discussed.] Address: Piksa, K., Cracow Pedagogical University, Institute of Biology, ul. Podbrzezie 3, 31-054 Kraków, Poland. E-mail: krzychu@ap.krakow.pl

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from several Late Mesozoic sites in eastern Transbaikalia (Ukurei, Tergen', Glushkovo, and Byankino formations), new genera and species are described: *Xeta olivica*, *Dahurium draco*, and *Sinitsia sophia*. The insect-bearing deposits are dated Late Jurassic according to analysis of their odonatofauna." (Author)] Address: Pritykina, L.N., Paleontological Institute, Russian Academy of Sciences, Profsoyuznaya ul. 123, Moscow 117997, Russia. E-mail: lab@palaeoentomolog.ru

6016. Proess, R. (2006): Rote Liste der Libellen Luxemburgs. 3. Fassung, 2006 (Insecta, Odonata). *Bulletin de la Société des naturalistes luxembourgeois* 107: 123-130. (in German, with English summary). ["The third, updated Red Data List including all 62 species of dragonflies (Odonata) so far recorded in Luxembourg is presented. 12 species are considered to be Regionally Extinct (RE), 1 is Critically Endangered (CR), 2 are Endangered (EN), 2 are Vulnerable (VU), 2 are Near Threatened (NT), 6 are Extremely Rare (R) and 35 others (56%) may be considered safe (LC)." (Author)] Address: Proess, R., Umweltplanungsbüro Ecotop, 6, rue Gustave Kahnt, L-1851 Luxemburg. E-mail: ecotop@pt.lu

6017. Reece, B.A. (2006): Growth and development of a model research organism (*Enallagma civile*, Insecta: Odonata) in Playa lakes of the southern high plains, TX. Texas Tech University, Department of Biological Sciences. Graduate Student Forum. Program and Abstracts. April 10-14, 2006: (in English). [Verbatim: Cropland agriculture and grazing grassland represent the two major land uses for the Southern High Plains of Texas. These different land uses have varying impacts on surrounding biological systems. Playa lakes (the only source of aquatic habitat in a region over 100,000 km² in area) are greatly affected by these forms of land use. In particular, hydroperiod has been shown to be significantly shortened in cropland regions due to increased sedimentation. The impacts of this disturbance have been hypothesized to affect the rate of growth of larval damselflies in playa lakes surrounded by cropland. Like many other amphibious organisms, damselflies exhibit phenotypic plasticity in growth rate in response to environmental cues about habitat longevity or quality, resulting in a tradeoff between rapid growth and large body size at adult emergence. However, this tradeoff has not been examined as a function of anthropogenic land use surrounding playas. The impacts of different surrounding forms of land use were investigated using a model organism (*Enallagma civile*) placed in field enclosures in a transfer experiment in a replicated series of playa lakes. Growth and development parameters were estimated as well as various environmental correlates such as temperature, turbidity, pH, dissolved oxygen, and prey availability. Results to date suggest that growth and development are influenced by at least some these environmental correlates. Because various population and community parameters are dictated by adult body size (such as fitness), an understanding of how human land use affects individual ontogeny can shed light on higher-order ecological properties.] Address: <http://www.orgs.ttu.edu/biologistassociation/TTUABGradForum2006.pdf>

6018. Reels, G.T.; Dow, R. (2006): Underwater oviposition behaviour in two species of *Euphaea* in Borneo and Hong Kong (Odonata: Euphaeidae). *International Journal of Odonatology* 9(2): 197-204. (in English).

["Submerged oviposition behaviour by female *Euphaea decorata* and *E. subcostalis* is reported. *E. decorata* descended to within 10 cm of the stream bottom and oviposited endophytically for a total of 59 min. An *E. subcostalis* female descended 3 cm to dead leaves at the stream bottom and stayed submerged for 20-25 s. Noncontact guarding by the male was observed in both cases. Submerged oviposition into substrates near to the stream bottom may be common behaviour for members of the Euphaeidae." (Authors)] Address: Reels, G.T., 1C-6-26, Fairview Park, Yuen Long, N.T., Hong Kong. E-mail: gtreels@asiaecol.com.hk

6019. Rollinger, F. (2006): Feuchtgebiete und Rote Listen: *Gomphus flavipes* und *Libellula fulva*. *Regulus* 11: 9. (in German). [*Stylurus flavipes* is reported as extinct in Luxembourg. In 2006, *L. fulva* established along the rivers Alzette and Kiemelbach near Schifflingen a quite strong population.] Address: Rollinger, Françoise, c/o *Regulus*-Redaktion, Kräizhäf, route de Luxembourg, L-1899 Kockelscheuer, Luxemburg

6020. Rouquette, J. (2006): Itchen Navigation Odonata & Butterflies Survey 2006. <http://www.hwt.org.uk/files/odonata%20and%20butterfly%20survey%202006.pdf>: 32 pp. (in English). ["The Itchen Navigation Heritage Trail Project is a major Lottery funded scheme to restore and enhance the historic, cultural and wildlife value of this historic waterway. Major engineering works will shortly be undertaken to improve the structural integrity and the wildlife value of the Navigation. This study was therefore commissioned to carry out a comprehensive survey for Odonata (dragonflies and damselflies) and butterflies. The main aims were to provide information on the existing status of the Navigation and to make recommendations on habitat enhancement to guide the engineering works. The survey has focussed particular attention on the Southern Damselfly (*Coenagrion mercuriale*), a BAP priority species that is listed on the EC Habitats Directive. The Itchen valley contains an internationally important population of this endangered species and much of the valley has been designated as an SAC with the Southern Damselfly as a key interest feature. The entire length of the Navigation was divided into 500m sections and surveyed in July 2006. The key findings are: • The Southern Damselfly was recorded at one location on the Navigation (Section 22) and a review of previous surveys has revealed that it has been recorded in low numbers at 3 further locations (Sections 14, 16 and 20). • 9 other species of Odonata were recorded, with *Calopteryx splendens* (the Banded Demoiselle) the most common species present. • 20 species of butterfly were seen. None of these are restricted to habitat in or around the Navigation, but the Navigation still has an important role to play in providing nectar sources, shelter and foodplants. None of the Itchen Navigation provides optimal habitat for the Southern Damselfly at present, but many sections could be improved with sympathetic management works. Furthermore, the Navigation can act as a corridor providing vital links between existing colonies, and as a water source for re-wetting the surrounding meadows. Detailed management recommendations for the Southern Damselfly and other species are provided. Principally this involves the creation of wide shallow margins at the edge of the Navigation where broad leaved emergent vegetation can flourish. Re-profiling of the banksides is required in many places, along with tree and scrub clearance in some areas to reduce the amount of shading."] Address: Rou-

quette, J.R., 3 Arreton Close, Leicester LE2 3PP, UK. E-mail: jimrouquette@hotmail.com

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6022. Šácha, D.; Bulánková, E. (2006): New records of *Aeshna subarctica elisabethae* (Odonata, Aeshnidae) from the Tatra Mountains (Slovakia). *Biologia, Bratislava* 61 (Suppl. 18): S221. (in English). [High Tatra Mts (49.07.488N, 20.03.208 E), 1379 m a.s.l.; records from 2002-2004 are documented in detail] Address: Bulankova, Eva, Institute of Ecology, Faculty of Natural Sciences, Comenius University, Mlynská dolina B-II, SK-84215 Bratislava., Slovakia; tel.+ 421-7-728 922, e-mail: Bulankova@fns.uniba.sk

6023. Salur, A.; Kryak, S. (2006): Additional records for the Odonata fauna of east mediterranean region of Turkey. *Munis Entomology & Zoology* 1(2): 239-252. (in English). [52 species and subspecies are documented with details from the Turkish provinces Mersin, Adana, Hatay, Kahramanmars and Osmaniye in the east mediterranean region and collected in July-September 2002 and April-August 2003. *Ischnura intermedia* is a new record for the regional fauna.] Address: Salur, A., Hitit University, Arts & Sciences Fac. of Corum, Biology Dept, 19030 Corum, Turkey. E-mail: alisalur@gmail.com

6024. Schiel, F.-J.; Hunger, H. (2006): Bestandssituation und Verbreitung von *Ophiogomphus cecilia* in Baden-Württemberg (Odonata: Gomphidae). *Libellula* 25 (1/2): 1-18. (in German, with English summary). ["From 2003 to 2005, 185 sections of 81 running waters in Baden-Württemberg, Germany were surveyed for the presence of *O. cecilia*. Prior to 2003, only 19 waters were known to harbour this species. In 2005, this number had risen to 35. In at least 28 (80 %) of these waters with a total length of 188 km, *O. cecilia* was indigenous. Larger populations existed exclusively in a few waters in the region of Nordbaden, at altitudes of less than 150 m above sea level, where the density of colonised waters was also the highest in Baden-Württemberg, and in the High Rhine. All other populations were small and more or less isolated. The positive trend of the species coincides with an improvement of water quality since the 1970s. With the exception of the High Rhine

upstream of the mouth of River Aare, 'moderately contaminated' and 'critically contaminated' waters were colonised equally well. In spite of this positive population trend, the sp. is still subject to various threats: intensive management as well as inappropriate restoration of water courses, especially establishment of dense woody vegetation along the shores, and eutrophication." (Authors)] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

6025. Schiel, F.-J. (2006): Nachweis einer zweiten Jahresgeneration von *Erythromma najas* (Odonata: Coenagrionidae). *Libellula* 25(3/4): 159-164. (in German, with English summary). ["At a pond southwest of Karlsruhe (Upper Rhine valley, Germany), which was created in December 2005, eight exuviae of *E. najas* were recorded on 19-VII and 03-VIII-2006. Exuviae of *E. lindenii*, *Ischnura elegans*, *Anax imperator*, *Crocothemis erythraea* and *Sympetrum fonscolombii* were also found at this site in 2006. The pond was created in December 2005, had no connection with other waterbodies and no hydrophytes were introduced. Therefore, the exuviae collected could only have originated from eggs laid in May and June 2006. So this is the first record of bivoltine development of *E. najas* under natural conditions and the first central European record of a bivoltine life cycle of *E. lindenii* and *A. imperator*. Probably part of the population of central European coenagrionids has two generations per year, while the main cohort emerges one year after oviposition." (Author)] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

6026. Schneider, T.; Müller, O. (2006): Der Endemit *Boyeria cretensis*: Beobachtungen zur Verhaltensbiologie der Imagines (Odonata: Aeshnidae). *Libellula* 25 (3/4): 135-146. (in German, with English summary). ["Because of its very restricted distribution and its high level of stenotopy, *B. cretensis* belongs to one of the most threatened European dragonfly species. The distribution of this endemic dragonfly is restricted to rivulets with permanent water and pronounced gallery vegetation in a narrow belt between 50 and 400 m a.s.l. belonging to the thermomediterranean and mesomediterranean zone of the island of Crete. The behaviour of the species was studied at several rivulets in Crete and interpreted in connection with the biotope. The species shows a clear preference for shaded rivulets. Different strategies during patrolling, hunting and oviposition were described. The current agricultural policy of the European Community by reducing the survival of *B. cretensis* by changing the water regime of rivulets and by destruction of their gallery vegetation is discussed." (Authors)] Address: Müller, O., Birkenweg 6d, D-15306 Lindendorf OT Libbenichen, Germany. E-mail: olemueller@bioscience-art.de

6027. Serrano Meneses, M.A. (2006): Sexual size dimorphism in damselflies, dragonflies and birds: function and development. A thesis submitted for the degree of Doctor of Philosophy, University of Bath, Department of Biology and Biochemistry: 35 pp. (in English). [For the full paper see. <http://www.bath.ac.uk/bio-sci/biodiversity-lab/sexualconflict11.pdf>] Address: not stated

6028. Simaika, J.P.; Cannings, R.A. (2006): The Odonata of Hamilton Marsh. Vancouver Island, British Co-

lumbia, Canada. *Notulae Odonatologicae* 6(7): 72-79. (in English). ["Specimen and sight records of Odonata from Hamilton Marsh, a small wetland on the east coast of Vancouver Island, British Columbia, are presented. Thirty-three species [...] are listed. The biogeography of the fauna is discussed - the site lies at a crossroads of several faunal elements - and notes on behaviour, ecology, habitat structure and succession are included." (Authors)] Address: Simaika, J.P., No. 323-3969 Shelbourne Street, Victoria, British Columbia, V8N 6J5, Canada

6029. Srivastava, D.S. (2006): Habitat structure, trophic structure and ecosystem function: interactive effects in a bromeliad-insect community. *Oecologia* 149 (3) : 493-504. (in English). ["Although previous studies have shown that ecosystem functions are affected by either trophic structure or habitat structure, there has been little consideration of their combined effects. Such interactions may be particularly important in systems where habitat and trophic structure covary. I use the aquatic insects in bromeliads to examine the combined effects of trophic structure and habitat structure on a key ecosystem function: detrital processing. In Costa Rican bromeliads, trophic structure naturally covaries with both habitat complexity and habitat size, precluding any observational analysis of interactions between factors. I therefore designed mesocosms that allowed each factor to be manipulated separately. Increases in mesocosm complexity reduced predator (damselfly larva) efficiency, resulting in high detritivore abundances, indirectly increasing detrital processing rates. However, increased complexity also directly reduced the per capita foraging efficiency of the detritivores. Over short time periods, these trends effectively cancelled each other out in terms of detrital processing. Over longer time periods, more complex patterns emerged. Increases in mesocosm size also reduced both predator efficiency and detritivore efficiency, leading to no net effect on detrital processing. In many systems, ecosystem functions may be impacted by strong interactions between trophic structure and habitat structure, cautioning against examining either effect in isolation."(Author)] Address: Srivastava, Diane S., Department of Zoology and Biodiversity Research Centre, University of British Columbia, 6270 University Blvd., Vancouver, BC, Canada, V6T 1Z4. Email: srivast@zoology.ubc.ca

6030. stax (2006): Die Kleinen Boten des Klimawandels. Die Umschichtung der Lebensräume hat begonnen. In der Pfalz beobachtet der Biologe Jürgen Ott die Auswirkungen des Klimawandels an der Ausbreitung der Feuerlibelle. *Die Rheinpfalz* 242: pp? (in German). [Newspaper report on the bioindication of climatic change in the Pfälzerwald-region, Rhineland-Palatinate, Germany stressing Odonata, and the research activities of Dr. Jürgen Ott, chair of the society of the German speaking odonatologists.] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O. GmbH@t-online.de

6031. Steglich, R.; Müller, J. (2006): Südliche Heidelibelle *Sympetrum meridionale* 2006 auch in der Magdeburger Elbaue. *halophila*, Mitt.-Bl. FG Faun. u. Ökol. Staßfurt 50: 24. (in German). [Magdeburg, Sachsen-Anhalt, Germany; Sept. 2006] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

- 6032.** Tennesen, K.J. (2006): Description of the larva of *Gomphus sandrius* Tennesen (Odonata: Gomphidae). Proceedings of the Entomological Society of Washington 108(2): 381-388. (in English). ["The final stadium larva of *Gomphus sandrius* Tennesen is described based on reared specimens from Tennessee. The larva is distinct from *G. exilis* Selys and *G. lividus* Selys (the only species in the subgenus *Gomphus* sympatric with *G. sandrius*) by the greater width to length ratio of abdominal segment 9 venter (mean 1.82, range 1.69–1.96 in *G. sandrius* vs. mean 1.43, range 1.23–1.57 in *G. lividus* and mean 1.40, range 1.26–1.52 in *G. exilis*). It differs further from *G. lividus* in the narrower prementum (2.40–2.90 mm vs. 3.00–3.75 mm and shorter antennal segment 3 (1.15–1.35 mm vs. 1.50–1.90 mm). The larva of *G. sandrius* is most similar to the allopatric *G. graslinellus* Walsh, but antennal segment 3 is shorter (*G. sandrius*: mean 1.25 mm, range 1.15–1.35 mm; *G. graslinellus*: mean 1.45 mm, range 1.35–1.55 mm)."] (Author)] Address: Tennesen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennesen@centurytel.net
- 6033.** Ternois, V. (2006): Sur la présence d'*Oxygastra curtisii* (Dale, 1834) dans le Parc naturel régional de la Forêt d'Orient et le département de l'Aube (Odonata, Anisoptera, Corduliidae). *Martinia* 22(3): 99-107. (in French, with English summary). [New records of *O. curtisii* in the Champagne-Ardenne region are presented from 2005 for the Département Aude, France.] Address: Ternois, V., CPIE du Pays de Soulaïnes, Domaine de Saint-Victor, F-10200 Soulaïnes-Dhuys, France. E-mail: cpie.pays.soulaïnes@wanadoo.fr
- 6034.** Theischinger, G.; Hawking, J. (2006): The complete field guide to dragonflies of Australia. CSIRO Publishing. ISBN 0 643 09073 8 (paperback). 366 pp. (in English) [The book covers all 30 families, 110 genera and 324 species found in Australia. Features: Full colour images of all species. Distribution maps for all species. Separate identification keys for both adults and larvae. Contents: Introduction; Species guide - Zygoptera, Species guide - Epiproctophora/Anisoptera; illustrated glossary; keys to adults; keys to larvae; checklist of species; references and further reading; index of scientific names; index of common names.] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia
- 6035.** Torralba-Burrial, A.; Ocharan, F.J. (2006): Dispersión y proporción sexual en la emergencia en una población de *Sympecma fusca* (Odonata, Lestidae) en Huesca (NE de España). *Bol. R. Soc. Esp. Hist. Nat. (Sec. Biol.)*, 101 (1-4): 29-36. (in Spanish, with English summary). ["Dispersal is a life-history key trait, which is usually due to the adult flight in Odonata. A population of *S. fusca*, inhabiting a temporary pond in the NE of Iberian Peninsula, was analysed by mark-recapture methods. 236 individuals (101 males, 135 females) were marked between July and October of 2000. Sex ratio at emergence was not significantly different from 1:1 and both sexes dispersed equally. They left the pond upon emergence, and returned neither to it nor its surrounding area in summer. Any marked individual was found neither in the nearest ponds (< 3 km) nor in other ponds of the shire. Overwintering individuals were observed amid the vegetation at pond edge, however there was not any marked one among them. This suggests a total absence of philopatry in this species, unlike behaviour observed in other lestid damselflies, what is discussed." (Authors)] Address: Ocharan, F.J., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain: E-mail: focharan@oonreo.uniovi.es
- 6036.** Tsubaki, Y.; Kato, C.; Shintani, S. (2006): On the respiratory mechanism during underwater oviposition in a damselfly *Calopteryx corneria* (Selys). *Journal of Insect Physiology* 52: 499-505. (in English). ["*C. cornelia* females oviposit almost exclusively underwater in forest streams. Field observation showed that the duration of uninterrupted submerged oviposition ranged between 20 and 120 min and the number of eggs laid was linearly related to the time spent underwater. By holding a damselfly under water in a small jar, we measured the maximum 'submergence potential', which was defined as the time elapsed between placing the insect underwater and asphyxiation. A series of experiments showed that there was no gender difference in the submergence potential. This was about 120 min if a damselfly was allowed to change its position while under water. The submergence potential was shorter if the damselflies were kept motionless, if air bubbles trapped on the wing surfaces were removed by coating with Vaseline or if the water was hypoxic. By contrast, submergence potential was longer if a part of the wings were kept above the water surface, or if the water was agitated using a magnetic stirrer. These results suggest that ovipositing *C. cornelia* females depend for oxygen on the physical-gill action of the thin air layer trapped on the body and wing surfaces. Respiration capacity under water is not likely to be a limiting factor for ovipositing females during the production of a single clutch." (Authors)] Address: Tsubaki, Y., Biodiversity Conservation Research Group, National Institute for Environmental Studies, Tsukuba 305-8506, Japan. E-mail: tsubaki@nies.go.jp
- 6037.** Tsuyuki, K.; Sudo, S.; Tani, J. (2006): Morphology of insect wings and airflow produced by flapping insects. *Journal of Intelligent Material Systems and Structures* 17(8-9): 743-751. ["This article describes the results of some experiments concerning wing morphology and flight performance of some flying insects: cicadas, dragonflies, and gadflies. First, the wing structures of these insects are measured down to the minutest detail by a three-dimensional curve-shaped measuring system. The surface shapes of the insect wings are mapped by distinct three-dimensional images. From the three-dimensional images, correlation coefficients are calculated by comparisons of the distribution of undulation on the wings. The surface shapes and the correlation coefficients show a difference in functions for flapping flight between each wing. Second, the distribution of velocity fields around a flapping cicada and a flapping dragonfly are visualized with a PIV system to identify the airflow generated by the wings. The distribution of velocity vectors for one stroke of a dragonfly wing is explained in the article. Additionally, the difference of airflow around the wings of a dragonfly and a cicada are revealed. It is found that the flapping forewing of the dragonfly carries out an important motion in its highly efficient flight." (Authors)] Address: Tsuyuki, K., Dept of Mechanical Systems and Design Engineering, Iwaki Meisei University, Iino 5-5-1, Chuohdai, Iwaki 970-8551, Japan. E-mail: koji@iwakimu.ac.jp

- 6038.** Wallace, I.D.; Lawson, N.J.; Harvey, A.R.; Jones, J.D.C.; Moore, A.A.J. (2006): High-speed photogrammetry system for measuring the kinematics of insect wings. *Applied Optics* 45(17): 4165-4173. (in English). ["We describe and characterize an experimental system to perform shape measurements on deformable objects using high-speed close-range photogrammetry. The eventual application is to extract the kinematics of several marked points on an insect wing during tethered and hovering flight. We investigate the performance of the system with a small number of views and determine an empirical relation between the mean pixel error of the optimization routine and the position error. Velocity and acceleration are calculated by numerical differencing, and their relation to the position errors is verified. For a field of view of 40 mm x 40 mm, a rms accuracy of 30 µm in position, 150 µm/s in velocity, and 750 µm/s² in acceleration at 5000 frames/s is achieved. This accuracy is sufficient to measure the kinematics of hoverfly flight." (Authors) The paper contains many references to Odonata.] Address: Moor, A.J., School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh, EH14 4AS, United Kingdom. E-mail: a.moore@hw.ac.uk
- 6039.** Wang, Y.P.; Wang, Y.H.; Lu, P.; Zhang, F.; Li, Y. (2006): Diet composition of post-metamorphic bullfrogs (*Rana catesbeiana*) in the Zhoushan Archipelago, Zhejiang Province. *Biodiversity Science* 14(5): 363-371. (in Chinese, with English summary). ["Bullfrogs are listed as one of the 100 worst invasive alien species in the world. They are generalist predators and thus may affect native species through predation. However, in previous diet studies, the food contents of bullfrogs were mostly examined at a single site. From June 30 to August 11 in 2005, we examined the diet composition of post-metamorphic bullfrogs on eight islands (Daishan, Liheng, Xiushan, Fodu, Taohua, Xiashi, Cezi, and Putuoshan) in the Zhoushan Archipelago, Zhejiang Province, with the stomach flushing method. A total of 391 bullfrogs were measured during the study period, including 113 adults and 278 juveniles. Analyses of stomach contents showed that, for adult bullfrogs, the most important prey items (by diet volume) overall were Decapoda, Coleoptera, Odonata, Mesogastropoda, Raniformes, and Cypriniformes; while for juvenile bullfrogs, they were Decapoda, Coleoptera, Cypriniformes, Odonata, Orthoptera, Hymenoptera, Lepidoptera larvae, Mesogastropoda, and Raniformes. Moreover, prey size and diet volume increased with the body size of both adult and juvenile bullfrogs. The diet composition of primary preys of bullfrogs was significantly different among different islands. The results indicate that bullfrogs exert different predatory influences on native fauna at different sites, and that bullfrogs are generalist predators with extensive ecological impacts on native fauna." (Authors)] Address: Li, Yiming, Key Laboratory of Animal Ecology and Conservation Biology, Institute of Zoology, Chinese Academy of Sciences, Beijing, 100080, China. E-mail: liym@ioz.ac.cn
- 6040.** Weihrauch, F. (2006): Der Zahnkärfpling *Gambusia holbrooki* als Prädator von Libelleneiern (Teleostei: Poeciliidae; Odonata: Libellulidae). *Libellula* 25 (3/4): 209-214. (in German, with English summary). ["At an irrigation ditch NE of El Rocío, Huelva province, Andalusia, Spain, on 18 and 21-IX-2006 repeated egg predation by swarms of *C. holbrooki* was observed during the exophytic oviposition of two *Crocothemis* erythraea females and seven *Sympetrum fonscolombii* tandems into open water. Other, endophytically ovipositing Odonata species were not bothered, as well as *C. erythraea* females that were hidden from the fish by carpets of algae or duckweed during oviposition. During all observed interactions, swarms of approximately 20-30 *C. holbrooki* chased the dragonflies immediately after the first dips, attacking the tip of the female's abdomen in a number of cases, and obviously struggling for each sinking egg. The dragonflies responded to these attacks by changing their behaviour from a chain of subsequent dips into the water to single or, at most, triple dips that were followed by rapid changes of oviposition sites. In one exactly noted case, a *S. fonscolombii* tandem performed 42 dips and 25 changes of place in almost two minutes. However, this avoidance behaviour was not successful due to the high fish density in the ditch. Judging from swallowing movements and other reactions of the fish, most eggs seen to be laid were consumed." (Author)] Address: Weihrauch, F., Jägerstr. 21A, D-85283 Wolnzach, Germany. E-mail: Florian.Weihrauch@t-online.de
- 6041.** Weihrauch, F.; Weihrauch, S. (2006): Records of protected dragonflies from Rio Tera, Zamora province, Spain (Odonata). *Boletín Sociedad Entomológica Aragonesa* 38: 337-338. (in English, with Spanish summary). ["Breeding records of *Gomphus graslinii*, *Macromia splendens*, and *Oxygastra curtisii* are provided from Rio Tera, the outlet of Lago de Sanabria, in Zamora province, Castilla y León. With 1000 m a.s.l. this site is the highest altitude at which the three spp. have hitherto been recorded. This is most probably due to the exceptionally warm waters feeding Rio Tera at the outlet that are provided by the summer stratification of the lake." (Authors)] Address: Weihrauch, F., Jägerstr. 21A, D-85283 Wolnzach, Germany. E-mail: Florian.Weihrauch@t-online.de
- 6042.** Wennemann, L. (2006): Kulturelle Entomologie: Insektenterminologie in der deutschen Sprache. *Mitt. dtsh. Ges. allg. angew. Ent.* 15: 435-438. (in German, with English summary). ["German articles in newspapers (Ruhr Nachrichten, Westdeutsche Allgemeine Zeitung, Frankfurter Allgemeine Zeitung, Die Zeit) and general journals (Audimax, Bunte, DB Mobil, Focus, DLG Mitteilungen etc.) were analyzed for their colloquial language containing entomological terms and phrases. Some examples are given here: The German term 'Fliegenfänger' (fly catcher) is used when a goalkeeper has a bad day allowing the opponent team to score avoidable goals. This example is put into the category 'Diptera' whereby the second example 'einmotten' (to put in mothballs) is put into the category 'Lepidoptera'. 'Moskitos Essen' is the name of an ice hockey team from the town Essen (Germany) and is categorized under 'Diptera'. Results show that sayings and entomological terms are often used and found in printed matters. It is obvious that terms associated with the holometabol insect orders such as Hymenoptera, Lepidoptera und Diptera are most frequently used in contrary to hemi- or paurometabol insect orders such as Blattodea, Orthoptera and Odonata. Preliminary explanations are given why certain insect orders are more frequently used than others. This paper should be a new approach to put cultural entomology into focus and to advertise for his diverse, interesting and fascinating scientific topic within the field of entomology." (Author)] Address: Wennemann, L., Jägerstr. 21A, D-85283 Wolnzach, Germany. E-mail: Wennemann.L@t-online.de

mann, L., Napoleonsweg 39, 45721 Haltern am See, Germany. E-mail: ludger.wennemann@t-online.de

6043. Westermann, K. (2006): Die Eiablagegehölze der Gemeinen Weidenjungfer (*Lestes viridis*) am südlichen Oberrhein und im Schwarzwald. *Naturschutz am südlichen Oberrhein* 4(2): 239-244. (in German, with English summary). [Baden-Württemberg, German; *Chalcolestes viridis* "lays its eggs into the twigs of woody plants. Until now, I have recorded 49 woody plant species used for oviposition in the southern Upper Rhine plains, and 13 species in the Black Forest. Out of these, 14 species have not been mentioned in the literature before." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

6044. Westermann, K.; Schiel, F.-J. (2006): Einwanderungsversuche der Schwarzen Heidelibelle (*Sympetrum danae*) in die Oberrheinebene. *Naturschutz am südlichen Oberrhein* 4(2): 245-250. (in German, with English summary). ["From 1976 to 2005, 80 observations of *S. danae* were recorded for the Upper Rhine Valley in the administrative districts Rastatt, Ortenaukreis, Emmendingen, Breisgau-Hochschwarzwald, Freiburg, and Lörrach (federal state of Baden-Württemberg, SW Germany). In six cases, successful reproduction had taken place. In contrast to former times, the species is not autochthonous in the Upper Rhine Valley, but immigrates from the Black Forest and maybe from the Vosges Mountains and the Jura Mountains. The main reason for this decline is probably the almost complete loss of small waters due to hydraulic engineering. swamplands, small ephemeral depressions and ponds, can be created and managed with reasonable effort and therefore should be recreated systematically." (Authors)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

6045. Westermann, K. (2006): Erster Bodenständigkeitsnachweis der Westlichen Keiljungfer (*Gomphus pulchellus*) für den höheren Schwarzwald. *Naturschutz am südlichen Oberrhein* 4(2): 235-237. (in German, with English summary). ["In the year 2005, we discovered the first evidence of successful reproduction of *G. pulchellus* in higher elevations of the Black Forest at a naturally-looking pond in a park in Hinterzarten at 880 m a.s.l. (Baden-Württemberg, SW Germany). This locality is the highest known reproductive site in central Europe." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

6046. Westermann, K. (2006): Strategien frisch geschlüpfter *Lestes viridis* zur Vermeidung von Regenschäden (Odonata: Lestidae). *Libellula* 25(1/2): 47-60. (in German, with English summary). ["In detailed daily studies of the emergence of *L. viridis* it was found that newly emerged imagines use several strategies to minimize damage from rain. The most effective one is the ability of the larvae to postpone emergence during rainy or cool weather for up to 14 hours at the emergence site, or by at least one day in the water. In early and late stages of emergence, imagines are relatively insensitive to rain. Larvae attach to the emergence support at angles between 90 and 180 degrees, which frequently provides the imagines with a degree of protection from rain under leaves and oblique stems. In case of sudden onset of heavy rain, imagines are able to climb, flutter

or fly to more protected sites. It is remarkable that in case of rain most larvae choose better protected sites for emergence. Losses caused by rain were approximately 1 % of the total number of imagines emerging." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

6047. Westermann, K.; Westermann, E. (2006): Zur Phänologie der Gebänderten Heidelibelle (*Sympetrum pedemontanum*) im NSG „Elzwiesen“ in den Jahren 2003 bis 2005. *Naturschutz am südlichen Oberrhein* 4(2): 251-257. (in German, with English summary). ["Our results show that the periods of emergence and flight activity of *S. pedemontanum* in Baden-Württemberg, Germany are much more extended than formerly known. In most cases, emergence was not notably synchronised. Reproductive activities lasted almost until the end of the flight period. The maximum life span of imagoes of *S. pedemontanum* was determined as at least 56 days." (Authors)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

6048. Wikelski, M.; Moskowitz, D.; Adelman, J.S.; Cochran, J.; Wilcove, D.S.; May, M.L. (2006): Simple rules guide dragonfly migration. *Biology letters* 3(2): 325-329. (in English). ["Every year billions of butterflies, dragonflies, moths and other insects migrate across continents, and considerable progress has been made in understanding population-level migratory phenomena. However, little is known about destinations and strategies of individual insects. We attached miniaturized radio transmitters (ca 300 mg) to the thoraxes of 14 individual dragonflies (common green darners, *Anax junius*) and followed them during their autumn migration for up to 12 days, using receiver-equipped Cessna airplanes and ground teams. Green darners exhibited distinct stopover and migration days. On average, they migrated every 2.9G0.3 days, and their average net advance was 58G11 km in 6.1G0.9 days (11.9G2.8 kmdL1) in a generally southward direction (186G528). They migrated exclusively during the daytime, when wind speeds were less than 25 km hL1, regardless of wind direction, but only after two nights of successively lower temperatures (decrease of 2.1G0.6 8C in minimum temperature). The migratory patterns and apparent decision rules of green darners are strikingly similar to those proposed for songbirds, and may represent a general migration strategy for long-distance migration of organisms with high self-propelled flight speeds." (Authors)] Address: Wikelski, M., Department of Ecology and Evolutionary Biology, and 4Woodrow, Wilson School, Princeton University, Princeton, NJ 08544, USA. E-mail: wikelski@princeton.edu

6049. Wildermuth, H. (2006): Reciprocal predation involving Odonata, Asilidae and Saltatoria. *International Journal of Odonatology* 9(2): 225-234. (in English). ["A singular observation of an adult *Tettigonia viridissima* (*Tettigoniidae*) that captured a female *Eutolmus rufibarbis* (*Asilidae*) sucking a male *Lestes sponsa* (*Lestidae*) is reported. The reciprocal predation of Odonata, Asilidae, and Saltatoria (*Ensifera*, *Caelifera*) hitherto recorded in Europe is compiled and augmented by unpublished data on asilids as predators of odonates. Heavy predation by robberflies may occur only on grasshoppers and dragonflies; all other reciprocal predation events are occasional." (Author)] Address: Wildermuth,

H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

6050. Wildermuth, H. (2006): Verhaltensgesteuerte Thermoregulation bei *Somatochlora flavomaculata* (Odonata: Corduliidae). *Libellula* 25(1/2): 31-46. (in German, with English summary). ["The species is a 'flier' that typically regulates its body temperature by physiological means. In a field study on the Alpine foothills it was shown that it also thermoregulates behaviourally. The flight activity ranged from 19 to 35°C ambient temperature. Below 28°C males patrolled exclusively in the sun, and basking individuals achieved optimal incident insolation by adopting an appropriate posture. Above 32.5°C active males stayed completely in the shade of trees and bushes. Between 28 and 32.5°C all transitions existed: more than half of the males patrolled partly in the shade, while the others flew either completely in the sun or entirely in the shade. As ambient temperatures rose, on their patrol stretches, males had a tendency to stay longer in the shade than in the sun. At high temperatures they often perched on the shaded side of a plant stem with their body axis pointing towards the sun. The results are discussed in the context of the relation between physiological and behavioural thermoregulation by 'fliers', especially Corduliidae." (Authors)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

6051. Worthen, W.B.; Jones, C.M. (2006): Relationships between body size, wing morphology, and perch height selection in a guild of Libellulidae species (Odonata). *International Journal of Odonatology* 9(2): 235-250. (in English). ["Ten common libellulid species perch along the shoreline of lakes and ponds in South Carolina, USA. We collected individuals at five ponds throughout summer 2005, weighed them in the field, and calculated wing loading ($N \cdot m^{-2}$) and wing aspect ratios from digital photographs. We measured the perch-height preferences of these species in 'low perch' (10, 20, 30, and 40 cm) and 'high perch' (20, 40, 60 and 80 cm) experiments. Flywheel anemometers recorded wind speeds at each perch height. Species differed significantly in mean body mass, spanning nearly an order of magnitude from *Perithemis tenera* (67 mg) to *Libellula vibrans* (633 mg). There were also significant differences in wing morphology that correlated with mean mass; larger species had greater wing loadings and greater wing aspect ratios than smaller species. Species also differed significantly in their perch-height preferences in both experiments, in a manner correlating with body mass and hindwing aspect ratios. *Erythemis simplicicollis* and *P. tenera* preferred short perches, *Celithemis fasciata*, *Pachydiplax longipennis* and *Platthemis lydia* used perches of intermediate height, and *Libellula auripennis*, *L. cyanea*, *L. incesta*, *L. luctuosa*, and *L. vibrans* preferred the tallest perches. Because mean wind speed and maximum wind speed also increased with perch height, larger species may prefer taller perches to experience greater wind speed and generate more compensatory lift to offset their larger wing loadings. However, it is also possible that correlations between body mass and perch height are the result of large species competitively restricting smaller species to lower perches." (Authors)] Address: Worthen, W.B., Biology Department, Furman University, Greenville, SC 29613, USA. E-mail: worthen@furman.edu

6052. Xu, Q-h. (2006): A New Species of the Genus *Cephalaeschna* (Odonata: Aeshnidae) from Fujian Province, China. *Entomotaxonomia* 28(2): 94-96. (in Chinese, with English summary). [*Cephalaeschna shao-wuensis*, sp. nov. is described and illustrated (Abdomen: female 54 mm, hindwing female 50 mm.). It "is closely similar to *Cephalaeschna risi* Asahina in frons/head ratio, ovipositor processes and colour pattern of synthorax, but different from the latter and other species of *Cephalaeschna* as follows: 1) body form larger; 2) ground colour of body black; 3) dorsal stripes shorter and smaller; 4) venation closer; 5) base of wing amber-yellow; 6) the abdominal colour pattern is very distinct, namely, on dorsum only segments I-II have stripes, but on sides there are different markings on segments I-IX." Holotype: female, Shaowu City, Fujian Province, 19-VII-2004, coll. XU Qi-han. The type specimen is deposited in Zhangzhou Education College, Fujian, China.] Address: Xu Qi-han, Zhangzhou Education College, Zhangzhou, Fujian 363000, China

6053. Xu, Q.-h. (2006): *Coeliccia mingxiensis* sp. nov. from Fujian, China (Odonata: Platycnemididae). *International journal of odonatology* 9(2): 251-254. (in English). [*Coeliccia mingxiensis* Xu, 2006; holotype male: 26-VIII-2004, Mingxi County, Fujian Province, China; deposited at Zhangzhou Education College, Fujian, China.] Address: Xu, Qi-han, Zhangzhou Education College 363000, Fujian, China. E-mail: qihanx@yahoo.com.cn

6054. Xu, Q.-H. (2006): The genus *Prodasineura* Cowley in China (Odonata, Protoneuridae). *Acta Zootaxonomica Sinica* 31(4): 807-810. (in English, with Chinese summary). [Nine species of the genus *Prodasineura* from China are dealt with and keys for their identification are given. *Prodasineura fujianensis* Xu, 2006 is described.] Address: Xu, Qi-han, Zhangzhou Education College 363000, Fujian, China. E-mail: qihanx@yahoo.com.cn

6055. Xu J.; Zhao C.; Zhang, Y.; Zhang, Y. (2006): Effect of flapping trajectories on the dragonfly aerodynamics. *Chinese Science Bulletin* 51(7): 777-784. (in English). ["The effects of translational, figure-eight and double-figure-eight flapping trajectories on the dragonfly aerodynamics were numerically studied by solving the Navier-Stokes equations. There is a common characteristic regarding the lift/drag force coefficients that the downstroke flapping provides the lift forces while the upstroke flapping creates the thrust forces for different flapping trajectories. The maximum lift force coefficient exceeds five for the translational trajectory. It is greater than six for the figure-eight and double-figure-eight flapping trajectories, which is sufficiently larger than unity under the steady state flight condition. The ellipse and double-figure-eight flapping trajectories yield the decrease of the lift force, while the figure-eight flapping trajectory yields higher lift force as well as the thrust force than the translational flapping one. During the insect flight, the wing flapping status should be changed instantaneously to satisfy various requirements. Study of the flapping trajectories on the insect aerodynamics is helpful for the design of the Micro-air-vehicles (MAVs)." (Authors)] Address: Xu, Jinliang, Micro Energy System Laboratory, Guangzhou Institute of Energy Conversion, Chinese Academy of Sciences, Guangzhou, 510640, China. Email: xujl@ms.giec.ac.cn

- 6056.** Yang, G.-H.; Mao, B.-Y.; Zhang, D.-Z. (2006): A new species of the genus *Asiagomphus* *Asahina* from Yunnan, China (Odonata, Gomphidae). *Acta Zootaxonomica Sinica* 31(4): 811-812. (in Chinese, with English summary). [*Asiagomphus gongshanensis* sp. nov. is described and depicted. The new species is similar to *A. personatus* (Selys), but differs from the latter by its rather smaller size; 2) the lack of an antehumeral stripe on the synthorax and 3) a black anteclypeus with a central yellow spot. The specimen is deposited in the Department of Science and Chemistry, Dali College, Yunnan. Etymology: The new species is named after its type locality. Holotype male, Mt. Gaoligong, Baoshan, Yunnan, China, 31 July 2005, leg. Mao Ben-Yong] Address: Yang, Guo-Hui, Department of Science and Chemistry, Dali College, Yunnan 671000, China. E-mail: yanggh727@sina.com
- 6057.** Yeh, W.-C., (2006): Three dragonflies (Odonata) newly recorded in Taiwan. *Formosan Entomol.* 26: 187-195. (in English). [*Sinolestes edita*, *Zyxomma obtusum*, and *Macromidia ishidai* are reported from Taiwan for the first time. Morphological diagnosis of both sexes of the three species is provided, including descriptions of their habitats and ecological habits.] Address: Yeh, Wen-Chi, Division of Forest Protection, Taiwan Forestry Research Institute, 53 Nanhai Road, Taipei 100, Taiwan. E-mail. wcyeh@tfri.gov.tw
- 6058.** Yusa, Y.; Sugiura, N.; Wada, T. (2006): Predatory potential of freshwater animals on an invasive agricultural pest, the apple snail *Pomacea canaliculata* (Gastropoda: Ampullariidae), in southern Japan. *Biological Invasions* 8: 137-147. (in English). ["The apple snail *Pomacea canaliculata* is an invasive species and a serious pest of rice in many Asian countries. We studied predatory activities of various animals living in Japanese freshwater habitats, by keeping each individual of a potential predator species with 36 snails of various sizes for three days in the aquarium. Forty-six species were tested, and 26 in eight classes fed on small snails. A species of leech, crabs, the common carp, turtles, the mallard duck and the Norway rat attacked even adult snails of 20–30 mm in shell height. These findings will be helpful in identifying effective predators for biological control of the pest snail. In addition, most of the animals attacking snails are reported to be common in rivers or ponds, but few live in modernized paddy fields having little connections with natural water systems. This may be a reason why this snail maintains large populations in paddy fields but not in other freshwater habitats." (Authors) *Sieboldius albardae*, *Anotogaster sieboldii*, *Anax parthenope*, *Macromia amphigena*, and *Pantala flavescens* were tested for their predatory potential. They seem to be of minor importance as predators of the snails, and if, only for early stages of the snails.] Address: Yusa, Yoichi, Faculty of Science, Nara Women's University, Kitaouya-Nishimachi, Nara 630-8506, Japan. E-mail: yusa@cc.nara-wu.ac.jp
- 6059.** Zessin, W. (2006): Zwei neue Insektenreste (Megasecoptera, Odonoptera) aus dem Westfalium D (Oberkarbon) des Piesberges bei Osnabrück, Deutschland. *Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg* 9(1): 37-45. (in German, with English summary). ["Two new fossil insects, one belongs to the Megasecoptera: *Brodidiidae*, *Pyobrodia janseni* n. sp., the other to the Odonoptera: *Meganeuridae*, *Piesbergitupinae* n. subfam., *Piesbergitupus hielscheri* n. gen. et sp. from Westphalian D (Upper carboniferous) beds of the Piesberg quarry in the north of Osnabrück (Lower Saxony, Germany) are described. For *Stephanotypus schneideri* Zessin, 1983 (Odonoptera, Meganeuroptera) a new subfamily *Stephanotypinae* n. subfam. is erected." (Author)] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zooschwerin.de
- 6060.** Zhang, B.; Ren, D.; Zhou, Ch.-q.; Pang, H. (2006): New genus and species of fossil dragonflies (Insecta: Odonata) from the Yixian Formation of Northeastern China. *Acta Geologica Sinica* 80(3): 327-335. (in English). ["Two well-preserved fossil dragonflies from the Late Mesozoic Yixian Formation, Liaoning Province, China are described and assigned to a new genus, *Sopholibellula* gen. nov. in *Araripelibellulidae* Bechly, 1996, closely related to the type genus *Araripelibellula*. This new genus differs from *Araripelibellula* in the following characters: origins of RP and MA distinctly separated at arculus in both pairs of wings; anal loop wider and shorter, with Y-shaped veins inside; MA and IR2 not zigzag; several small intercalary veins present in the postdiscoidal area of hindwing; cells smaller and much more dense, especially in the apex and hind margin; bigger in size. Structures, including head, abdomen and parts of legs, were first described in details of this family." (Authors)] Address: Ren Dong, College of Life Sciences, Capital Normal University, Beijing 100037, China. E-mail: rendong@mail.cnu.edu.cn
- 6061.** Zhang, B.-L.; Fleck, G.; Huang, D.Y.; Nel, A.; Ren, D.; Cheng, X.-D.; Lin, Q.B. (2006): New isophlebioid dragonflies (Odonata: Isophlebioptera: Camptero-phlebiidae) from the Middle Jurassic of China. *Zootaxa* 1339: 51-68. (in English). ["Three new representatives of the Odonata *Camptero-phlebiidae* are described from the Middle Jurassic of Daohugou (Inner Mongolia, China), i.e. *Amnifleckia guttata* n. gen., n. sp., *Amnifleckia splendida* n. sp., and *Parabrunetia celinea* n. gen., n. sp. Their close affinities with the genus *Pteropteron* (Dogger of Kirgizia) support a similar age for the Daohugou fauna." (Authors)] Address: Ren, D., College of Life Science, Capital Normal University, 105 Xisanhuanbeilu, Haidian District, Beijing, 100037, P.R.China, China. E-mail: rendong@mail.cnu.edu.cn
- 6062.** Zhang, Zh.; Hong, Y.; Lu, L.; Fang, X.; Jin, Y. (2006): *Shenzhousia qilianshanensis* gen. et sp. nov. (Protodonata, Meganeuridae), a giant dragonfly from the Upper Carboniferous of China. *Progress in Natural Science* 16(3): 328-330. (in English). ["A new dragonfly of family *Meganeuridae* *Shenzhousia qilianshanensis* gen. et sp. nov., discovered from Ningxia Hui Autonomous Region in North China, is described in the present paper. It has an estimated wingspan of about 450–500 mm and may be the largest fossil insect in Late Carboniferous Namurian Stage discovered by far. The new species is referred to *Meganeuridae* because of the presence of the characteristic oblique vein between anterior branch of radius (RA) and posterior branch of radius (RP) near the base of RP2. It differs from other genera within the family in the following characteristics: Precostal area short and not extending to the midwing; posterior branch of subcostal vein short, merging into costal vein near the level of originating point of IR2; RP forking earlier than anterior branch of media basally; RP1+2 and RP3+4 parallel and close to each other for a long distance, and then diverge gradually surpass

midwing." (Authors)] Address: Zhang Zhijun, Department of Palaeontology, The Geological Museum of China, Beijing, 100034, China

6063. Zhou, X.; Zhou, W.-b. (2006): Two new species of the family Chlorocyphidae (Odonata) from China. *Entomotaxonomia* 28(1): 13-16. (in Chinese, with English summary). ["The paper reports two new species of the Family Chlorocyphidae. *Heliocypha huai*, sp. nov.: Measurements (mm): Male abdomen+anal appendages 23, hind wing 24. This species is similar to *Heliocypha malanensis* (Zhou et Bao), but differs from the latter as follows: 1) labrum black; 2) a narrow distal stripe just below the second lateral suture on thorax; 3) 2nd abdomen segment with a middorsal orange marking. Holotype: male, Jianfengling, Hainan Province, 2I-IX-1981, Coll. HUA Li-zhong; Paratype: 1 male, same date as holotype. *Indocypha chishuiensis*, sp. nov.: Measurements (mm): Male abdomen+anal appendages 24, hind wing 25. This species is closely allied to *Indocypha katharina* (Needham), but easily distinguishable by the following characters: 1) 1 reddish yellow "+" shaped marking in dorsal center of 2nd abdomen segment; 2) 1 large triangular marking on 3rd abdomen segment; 3) a pair of subapical transverse spots on 4th abdomen segments. Holotype: male, Jinshagou, Chishui City, Guizhou Province, 31-VII-2000, Coll. LI Zi-zhong. The type specimens are deposited in the Zhejiang Museum of Natural History, China." (Authors)] Address: Zhou, X., Zhejiang Museum of Natural History, Hangzhou, Zhejiang 310012, China

6064. Živic, I.; Markovic, Z.; Brajkovic, M. (2006): Influence of the temperature regime on the composition of the macrozoobenthos community in a thermal brook in Serbia. *Biologia, Bratislava* 61(2): 179-191. (in English). ["In contrast to cold and eurythermal waters, benthic communities of warm brooks in temperate regions have been inadequately studied. In order to investigate the effects of water thermal regime on the benthic communities of warm waters and their relationships with those of cold and eurythermic ones, the macrozoobenthos was studied at eight sites in the Toplica River, and at four sites in its tributary, the Termalni brook. Investigations were carried out seasonally from April 2000 to January 2001. Warm waters of the Termalni brook were characterized by specific macrozoobenthos assemblages that exhibited significant differences to the populations of eurythermal and cold waters of the Toplica River. The dominant taxa in the macrozoobenthos community of warm waters were mainly Gastropoda species. Moreover, benthic communities of warm waters were characterized by lower diversity and greater biomass in comparison with those of cold and eurythermal waters. The gradient of average annual temperatures represented the main ecological factor influencing changes of diversity and biomass along the course of the investigated Termalni brook. Inflow of warm waters at site T6 lead to a decrease in macrozoobenthos abundance and changes in qualitative and quantitative composition of the benthocoenosis of a highland stream, but did not significantly alter diversity." (Authors) Odonata are referred on the order-level at several occasions. In the appendix are documented records of *Cordulegaster boltonii*, *Gomphus vulgatissimus*, *Onychogomphus forcipatus*, and *Orthetrum albistylum*.] Address: Zivic, Ivana, Faculty of Biology, University of Belgrade, 11000 Belgrade, Serbia and Montenegro. E-mail: ivanas@bf.bio.bg.ac.yu

6065. Zuanon, J.; Bockmann, F.A.; Sazima, I. (2006): A remarkable sand-dwelling fish assemblage from central Amazonia, with comments on the evolution of psammophily in South American freshwater fishes. *Neotropical Ichthyology* 4(1): 107-118. (in English). [The night-time forager, *Gymnorhamphichthys rondoni* (Rhamphichthyidae), preys on Gomphidae larvae.] Address: Zuanon, J., CPBA, Caixa Postal 478, INPA-Instituto Nacional de Pesquisas da Amazônia, 69083-970 Manaus, Amazonas, Brazil. E-mail: zuanon@inpa.gov.br

6066. Zuellig, R.E.; Kondratieff, B.C.; Schmidt, J.P.; Durfee, R.S.; Ruitter, D.E.; Prather, I.E. (2006): An annotated list of aquatic insects of Fort Sill, Oklahoma, excluding Diptera with notes on several new state records. *Journal of the Kansas Entomological Society* 79(1): 34-54. (in English). ["Qualitative collections of aquatic insects were made at Fort Sill, Lawton, Oklahoma, between 2002 and 2004. Ephemeroptera, Plecoptera, Trichoptera, Odonata, Coleoptera, aquatic Heteroptera, Neuroptera, and Megaloptera were targeted. Additional records are included from a survey that took place in 1999. More than 11,000 specimens from more than 290 collections were examined. Based on the current understanding of aquatic insect systematics, 276 taxa distributed over 8 orders, 46 families, and 141 genera were identified. Twenty-three of the 276 taxa [...] are reported from Oklahoma for the first time. The three most diverse orders included Coleoptera (86 species), Odonata (67 species) and Trichoptera (59 species), and the remaining taxa were distributed among Heteroptera, (30 species), Ephemeroptera (21 species), Plecoptera (6 species), Megaloptera (4 species), and Neuroptera (3 species). Based on previous published records, many of the species collected during this study were expected to be found at Fort Sill; however, 276 taxa of aquatic insects identified from such a small geographic area is noteworthy, especially when considering local climatic conditions and the relatively small size of Fort Sill (38,300 ha). Despite agricultural practices in Oklahoma, the dust bowl days, and the development of water-based recreation at Fort Sill, a high percentage of the total known aquatic insect fauna of Oklahoma can be found in a small geographic area." (Authors)] Address: Zuellig, R.E., U. S. Geological Survey, Denver Federal Center, MS 415, Denver, Colorado 80225, USA

6067. Clarke, G.M.; Spier-Ashcroft, F. (2006(?)): A review of the conservation status of selected Australian non-marine invertebrates. <http://www.deh.gov.au/biodiversity/threatened/action/non-marine-invertebrates/index.html>: III, 142 pp. (in English). [This review represents a first attempt to objectively assess the conservation status of a selected suite of the over 300000 Australian non-marine invertebrates. Any attempt to provide a detailed and comprehensive overview of the conservation status of such a large and diverse group is obviously impractical. The authors have taken a selection of 25 taxa (including 'Petalura species': *P. gigantea* and *P. litorea* on pages 90-94) that are representative of the diversity of our invertebrate fauna, their geographic distribution, different habitat requirements and associations and potential threats. For each selected species the following information is provided: General taxonomic status of the species, including an illustration; 2. Species survival status; 3. Species distribution – a map of current distribution is provided at the end of each synopsis overlaid with Conservation and Protected Areas; 4. Ha-

bitat details; 5. Biological overview; 6. Significance – details of the biological, ecological, and scientific significance of the species which have contributed to its inclusion in the plan; 7. Threats; 8. Conservation objectives; 9. Conservation actions already initiated for the taxon; 10. Conservation actions required for long-term conservation of the species. This section is subdivided into research and management needs. 11. A list of relevant experts who provided information. Available at: <http://www.deh.gov.au/biodiversity/threatened/action/non-marine-invertebrates/index.html>]

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6068. Brooks, S. (2007): The dragonflies of Europe. *Zoological Journal of the Linnean Society* 149(1): 139. (in English) [Review of the second edition of the classic book of Askew (see OAS 4113).] Address: Brooks, S.J., Entomology, The Natural History Museum, Cromwell Road, London, SW7 5BD, United Kingdom

6069. Burgmer, T.; Hillebrand, H.; Pfenninger, M. (2007): Effects of climate-driven temperature changes on the diversity of freshwater macroinvertebrates. *Oecologia* 151: 93-103 (in English) ["Increasing temperatures due to climate change were found to influence abundance and timing of species in numerous ways. Whereas many studies have investigated climate-induced effects on the phenology and abundance of single species, less is known about climate-driven shifts in the diversity and composition of entire communities. Analyses of long-term data sets provide the potential to reveal such relationships. We analysed time series of entire communities of macrozoobenthos in lakes and streams in Northern Europe. There were no direct linear effects of temperature and climate indices (North Atlantic Oscillation index) on species composition and diversity, but using multivariate statistics we were able to show that trends in average temperature have already had profound impacts on species composition in lakes. These significant temperature signals on species composition were evident even though we analysed comparatively short time periods of 10–15 years. Future climate shifts may thus induce strong variance in community composition." [...] "Species correlated with high Trend-Temp, and thus likely to increase both in abundance and range, were: ... *Coenagrion* sp./Zygoptera, Libellulidae indet./Anisoptera, ..."] (Authors) Address: Burgmer, Tanja; Aquatic Ecology, Institute for Botany, University of Cologne, Gyrhofstr. 15, 50931 Köln, Germany. E-mail: tanja.burgmer@uni-koeln.de

6070. Cordero Rivera, A. (Ed.) (2007): Forests and Dragonflies (4th WDA Symposium of Odonatology, Pontevedra, Spain, July 2005). Pensoft Series Faunistica 61, ISSN 1312-0174: 300pp. (in English). ["Over the world, forests provide diverse habitats for a range of organisms, including dragonflies and other animals, that at a first sight seem not to depend on forests. For instance, *Macromia splendens*, one of Europe's most endangered dragonflies, uses forest roads as hunting places, and larvae are sometimes found amongst tree roots. As the authors of this book show, dragonflies are highly dependent on forest cover and composition, and this is true from the boreal forests to the tropics. The aim of this book is therefore to explore the ways in

which forests affect dragonfly life, and to show that forests are much more than places where timber is produced." (Publisher) Table of content: Adolfo Cordero Rivera: Introduction: Dragonflies as forest-dependent animals 7; Corbet, P.S.: Forests as habitats for dragonflies (Odonata) 13; Graga, M.: Allochthonous organic matter as a food resource for aquatic invertebrates in forested streams 37; The Importance of Forests for Dragonflies in Different Continents: Orr, A.G.: Odonata in Bornean tropical rain forest formations: diversity, endemism and implications for conservation management 51; Paulson, D.: The importance of forests to neotropical dragonflies 79; Fincke, O.M.: Use of forest and tree species, and dispersal by giant damselflies (Pseudostigmatidae): future prospects in fragmented forests 103; Dijkstra, K.-D. & Clausnitzer, V.: Thoughts from Africa: how can forest influence species composition, diversity and speciation in tropical Odonata? 127; Sahlin, G.: Specialists vs. generalists among dragonflies - the importance of forest environments in the formation of diverse species pools 153; Tsubaki, Y. & Tsuji, N.: Dragonfly habitat maps based on landcover and habitat relation models 181; Conservation and Behavioral Issues: Samways, M.: Threat levels to odonate assemblages from invasive alien tree canopies 209; Taylor, P.: Movement behaviours of a forest odonate in two heterogeneous landscapes 225; Thompson, D.J. & Watts, Ph.C.: The structure of the *Coenagrion mercuriale* populations in the New Forest, southern England 239; Watanabe, M.: Mate location and competition for mates in relation to sunflecks of forest floors 259; Cordoba-Aguilar, A. & Contreras-Garduño, J.: Differences in immune ability in forest habitats of varying quality: dragonflies as study models 269; Hadrys, H.: The present role and future promise of conservation genetics for forest Odonates 279] Address: www.pensoft.net

6071. Dallas, H.F.; Day, J.A. (2007): Natural variation in macroinvertebrate assemblages and the development of a biological banding system for interpreting bioassessment data—a preliminary evaluation using data from upland sites in the south-western Cape, South Africa. *Hydrobiologia* 575: 231-244 (in English): ["The variability of macroinvertebrate assemblages - (including Odonata on the family level) - was investigated at 27 upland reference sites in the south-western Cape, South Africa. Multivariate analyses showed that sites did not group on the basis of geomorphological zonation, i.e. mountain stream and foothill-cobble bed. When separate analyses were undertaken for mountain stream (n = 21) and foothill-cobble bed sites (n = 6), assemblages formed three and two groups, respectively. Similarity amongst groups ranged from 47% to 52%, while within-group similarity was between 54% and 67%. Environmental variables shown to contribute to this variability included distance from source, cation ratio ($([Na^+]+[K^+])/([Na^+]+[K^+]+[Ca^{2+}]+[Mg^{2+}])$), pH, longitude and stream width. Whilst overall variability in the metrics of the biotic index, SASS (South African Scoring System), is high at reference sites, the interpretation of monitoring-site data using biological bands derived from a range of reference sites, ensured that variability was taken into account and that detection of disturbance at a monitoring site was not impeded. A biological banding system has been developed for upland sites in the south-western Cape, together with a list of reference or expected SASS-taxa. This list includes details pertaining to seasonality and biotope preferences. The ability to define reference conditions that take

intrinsic variability amongst reference sites into account is important for the accurate interpretation of bioassessment data." (Authors) Address: Dallas, Helen, Department of Zoology, University of Cape Town, Private Bag Rondebosch, Cape Town, Western Cape 7700, South Africa. E-mail: hdallas@botzoo.uct.ac.za

6072. Groeneveld, L.F.; Clausnitzer, V.; Hadrys, H. (2007): Convergent evolution of gigantism in damselflies of Africa and South America? Evidence from nuclear and mitochondrial sequence data. *Molecular Phylogenetics and Evolution* 42(2): 339-346 (in English) [Extreme large body size is rare in modern Zygoptera (damselflies). Only the South and Central American damselfly family Pseudostigmatidae and one African species, *Coryphagrion grandis*, share the morphological trait of gigantism. By means of phylogenetic analyses using two mitochondrial markers (16S rDNA and ND1) and one nuclear marker (EF1) in combination with an existing morphological data set, we trace the evolution of gigantism in damselflies. Individual and combined data sets were analyzed using the maximum parsimony, minimum evolution and maximum likelihood algorithms. Regardless of the algorithm used and the data set analyzed all principal tree topologies support a monophyly of the damselfly taxa displaying giant body size. This supports the view that the evolution of gigantism in damselflies from Africa and South America is not the result of convergent evolution due to strikingly similar habitat preferences, but rather the result of close genealogical relationship. Because modern odonates evolved before the split of Africa from Gondwanaland, the proposed phylogeny suggests that *C. grandis* represents a Gondwana relict.] Address: Hadrys, Heike, ITZ, Ecology and Evolution, TiHo Hannover, Bünteweg 17d, D-30559, Hannover, Germany. E-mail: heike.hadrys@ecolevol.de

6073. McCauley, S.J. (2007): The role of local and regional processes in structuring larval dragonfly distributions across habitat gradients. *Oikos* 116(1): 121-133. (in English). ["Despite the importance of community-structuring processes operating at both local and regional scales, there is relatively little work examining both forces within a single system. I used a combination of observational and experimental approaches to examine the processes structuring larval dragonfly distributions in lentic habitats that encompass a gradient of both permanence and top predator type. I compared the relative vulnerability of species to predators from different portions of this gradient to assess the role of predation as a local force structuring communities. I also assessed the role of regional processes on species' distributions by examining species' propensity to disperse to and colonize artificial ponds distributed across a landscape. In both studies I contrasted habitat specialist species, which had larvae restricted to permanent lakes, with habitat generalist species, which had larvae that occur broadly across the habitat permanence and top predator transition. Results from this work suggest that dispersal and colonization behavior were critical mechanisms restricting the distributions of habitat specialist species, but that predation may act to reinforce this pattern. The habitat specialists dispersed less frequently, colonized artificial ponds less often when they did reach them, and most moved shorter distances than the habitat generalist species. Habitat specialists were also more vulnerable than habitat generalists to an invertebrate top predator with which they do not co-exist.

Results from these studies suggest that species distributions can be shaped by processes operating at both regional and local spatial scales. The role of dispersal and recruitment limitation may be generally underestimated as a force shaping species distributions and community structure across habitat gradients in which there is a transition in both the biotic interactions and the disturbance interval across that gradient." (Author)] Address: McCauley, S. J., Center for Population Biology, One Shields Avenue, 2320 Storer Hall, Univ. of California, Davis, CA 95616, USA. E-mail: sjmccauley@ucdavis.edu

6074. Moseley, M. (2007): Acadian biospeleology: composition and ecology of cave fauna of Nova Scotia and southern New Brunswick, Canada. *International Journal of Speleology* 36(1): 1-21. (in English) ["The vertebrate and invertebrate fauna, environment and habitats of caves and disused mines in Nova Scotia and southern New Brunswick are provisionally catalogued and described, based on field collections made over many years. The area was glaciated and the subterranean fauna consists of non-troglobites all of which have arrived and colonised the caves during or following final recession of the Pleistocene glaciers. The statistical composition of the fauna at the higher taxonomic level is similar to that in Ontario, but is less species rich and there are some notable ecological and other differences. Porcupine dung accumulations are an important habitat in the region, constituting a cold-temperate analogue of the diverse guano habitats of southern and tropical caves. Parietal assemblages are, as in other cold temperate regions, an important component of the invertebrate fauna but here include species derived directly from dung communities: another parallel with tropical guano caves. An unanticipated finding is the number of non-indigenous species now utilising local caves. These appear to have colonised unrefilled ecological niches, suggesting that post-glacial recolonisation of the subterranean habitat in Nova Scotia has been relatively delayed. Finally the general and regional significance of the subterranean fauna is briefly discussed." (Author) *Aeshna umbrosa* nymphs, *Aeshna* sp. indet. nymphs, *Cordulegaster maculata* imago, and *Macromia illinoensis* nymphs are compiled as records from the surveyed caves.] Address: Moseley, M., Research Associate, Nova Scotia Museum of Natural History, 1747 Summer Street, Halifax, Canada B3H 3A6. E-mail: moleslei@yahoo.ca

6075. Munyuli, M.B.T.; Luther, G.C.; Kyamanywa, S. (2007): Effects of cowpea cropping systems and insecticides on arthropod predators in Uganda and Democratic Republic of the Congo. *Crop Protection* 26(2): 114-126 (in English) ["Knowledge of the distribution, abundance, species diversity and effectiveness of indigenous natural enemies of cowpea pests in Uganda and the Democratic Republic of the Congo (DRC) is poor. Similarly, effects of insecticides commonly used by cowpea farmers on arthropod predators are not well documented in these countries, so effects of insecticides on these natural enemies were monitored in field trials with cowpea grown solely and in association with sorghum or greengram. The abundance of predators (Coccinellidae, Staphylinidae, Syrphidae, Anthocoridae, Mantidae, Dermaptera, ground beetle, predatory mite, lygaeid bugs, Anthocoridae, dragonflies and spiders) were considerably affected by insecticides and the cropping system. Polyculture had a higher index of di-

versity than monocultures. In terms of species diversity supported, there was no significant difference between cowpea/greengram and cowpea/sorghum. There was a seasonal variation in similarity ($MS=0.71$, long rains; $MS=0.77$, short rains) of the predator community supported by the cowpea cropping system, between Mulungu (DRC) and Kumi (Uganda) habitats. Lower pests pressure on cowpea crop, higher abundance of predators and higher cowpea yields were observed to be associated with cowpea/greengram cropping systems. Therefore cowpea/greengram should be promoted among other biological control conservation strategies, aiming at enhancing natural enemies in cowpea systems, through habitat manipulation. This study indicated that generalist predators, through their activities might be important natural enemies of cowpea pests in Uganda and in DRC." (Authors) Address: Munyuli, M.B.T., Makerere University Institute of Environment and Natural Resources, P.O. Box 7062, Kampala, Uganda. E-mail. tmunyuli@yahoo.com

6076. Nummelin, M.; Lodenius, M.; Tulisalo, E.; Hirvonena, H.; Alanko, T. (2007): Predatory insects as bioindicators of heavy metal pollution. *Environmental Pollution* 145(1): 339-347 (in English) ["Heavy metal concentrations of different predatory insects were studied near by a steel factory and from control sites. Waterstriders (Gerridae), dragon fly larvae (Odonata), antlion larvae (Myrmeleontidae) and ants (Formicidae) were analyzed by AAS. In most cases the metal concentrations were higher near the factory, but e.g. waterstriders had higher cadmium concentrations in control area. Discriminant analysis clearly reveals that all these insect groups can be used as heavy metal indicators. However, the commonly used ants were the least effective in indicating the differences between the factory and control sites. Waterstriders are good in detecting differences in iron and manganese, but seem to be poor in accumulating nickel and lead. Antlions are efficient in detecting differences in iron. Antlions and ants are effective in accumulating manganese; as well antlions are efficient in accumulating cadmium. Waterstriders are poor in accumulating lead, but antlions and ants are effective." (Authors). Address: Nummelin, M., Dept for Development Policy, Ministry for Foreign Affairs, P.O. Box 176, FIN-00161 Helsinki, Finland

6077. Schorr, M. (2007): Vorläufige Bibliographie der Veröffentlichungen zu den Libellen (Insecta: Odonata) in Deutschland mit Registern zu den Bundesländern und Arten (Arbeitsstand: 02. Februar 2007). *Dragonfly Research* 4: 1-246. (In German, with English abstract) [About 3600 publications referring to the German fauna of Odonata are compiled in a bibliography and keyworded by species and geography.] Address: Schorr, M., Schulstr. 7B, 54314 Zerf, Germany. E-mail. martinschorr@onlinehome.de

6078. Salur, A.; Mesci, S. (2007): Additional records for the Odonata fauna of Çorum province (Turkey). *Munis Entomology & Zoology* 2(1): 169-170. (in English). [Records from 7 localities representing 20 odonate species are documented.] Address: Salur, A., Hitit University Arts and Sciences Faculty Department of Biology, 19030, Corum, Turkey. E-mails: alialalur@gmail.com

6079. Salur, A.; Kiyak, S. (2007): Additional records for the Odonata fauna of South-Western Anatolia - Part I: Anisoptera. *Munis Entomology & Zoology* 2(1): 63-78.

(in English). [43 species and subspecies of Anisoptera were collected in the provinces of Antalya, Aydın, Burdur, Denizli, Isparta and Muğla in South-Western Anatolia, April-September between 2000 - 2002. These records are documented in detail.] Address: Salur, A., Hitit University Arts and Sciences Faculty Department of Biology, 19030, Corum, Turkey. E-mails: alialalur@gmail.com

6080. Shostell, J.M.; Williams, B.S. (2007): Habitat complexity as a determinate of benthic macroinvertebrate community structure in cypress tree reservoirs. *Hydrobiologia* 575: 389-399 (in English). ["We analyzed benthic samples ($n = 128$) collected from four cypress-tree population areas within a large, shallow Arkansas reservoir over a 2-year period to investigate macroinvertebrate community distribution patterns and their relation to physical and chemical parameters. The calculated biomass, abundance and diversity of the benthic macroinvertebrate community varied significantly both temporally and spatially. Variations of these variables are most likely explained by significant differences in the concentration of carbon and nitrogen in sediments across lake sites, and on a smaller scale, the presence or absence of cypress trees. Benthic macroinvertebrate abundance, biomass, and diversity significantly decreased with distance from tree." (Authors) Tab. 2 lists as an odonate species "Cynacantha sp." (sic). Address: Shostell, J.M., Department of Biology, Penn State University-Fayette, Route 119N, Uniontown, PA 15401, USA. E-mail: jms88@psu.edu

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