

Odonatological Abstract Service

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1189. **Ali, D.W. (1997):** The aminergic and peptidergic innervation of insect salivary glands. *Journal of Experimental Biology* 20(14): 1941-1949. (in English). ["Insect salivary glands are glands associated with nutrient intake whose secretions are generally involved in the digestion and lubrication of food. They are under the control of neuroactive substances and may be innervated from several sources including the suboesophageal ganglion, the stomatogastric nervous system and the unpaired median nerves. Both amines and peptides have been suggested to play roles in the control of insect salivation, as indicated by their association with terminals on salivary glands, their effects in salivary gland bioassays and their ability to alter second messenger levels and ion channel conformations. Serotonin and dopamine appear to be the most prominent amines associated with insect salivary glands. Either one or both of these amines are found associated with the salivary glands of the locust, stick insect, cockroach, cricket, dragonfly, mosquito, adult moth and kissing bug. Their roles, although not fully elucidated, appear to be in the control of salivary secretion. Several peptides, including members of the FMRFamide-related family of peptides, are also found associated with insect salivary glands. Sources of peptidergic innervation are as varied as those for aminergic innervation, but information regarding the physiological role of these peptides is lacking. The relevance of the different levels of complexity of salivary gland innervation, which range from the absence of innervation in some species (blowfly) to the presence of several distinct sources in others (locust, cockroach), is not well understood. This review serves to consolidate what is known of the phenotype of salivary neurones in relation to the control of salivation." (Author)] Address: Ali, D.W., Institution Montreal Gen. Hosp. Res. Inst., 1650 Cedar Ave., Montreal, PQ H3G 1A4, Canada
1190. **Andrew, R.J.; Tembhare, D.B. (1997):** The development and structure of the ovaries in the dragonfly *Tramea virginia* (Rambur) (Libellulidae: Odonata). *Journal of Advanced Zoology* 18(2): 86-95. (in English). ["In *Tramea virginia*, the ovary is composed of numerous strings of panoistic ovarioles. Each ovariole is differentiated into four regions the apical terminal filament, germarium, vitellarium and the distal pedicel. In the ultimate nymph, the terminal filament comprises a thick strand of germinal tissue. The germarium is filled with the primary and secondary oögonia and primary oocytes. The vitellarium is filled with pre-vitellogenic oocytes while the pedicel is in the form of compact mass of mesodermal cells. Vitellogenesis is evident in mature adults and it passes through the successive early vitellogenic, midvitellogenic, late-vitellogenic and maturation stages. The lateral oviducts are mesodermal in origin and initially run along the outer margin of the ovaries. The median oviduct is short and its anterior region is mesodermal while posterior region is ectodermal in origin." (Authors)] Address: Tembhare, D.B., Post-Grad. Dep. Zool., Nagpur Univ. Campus, Nagpur 440 010, India
1191. **Anselin, A.; Knijf, G. de (1997):** The Belgian Dragonfly Working Group. *Levende Natuur* 98(5): 184-188. (in Dutch). ["The Belgian Dragonfly Working Group Gomphus, a volunteer organization, was founded in 1983. The main goal was to promote studies in dragonfly faunistics and increase protection measures. One major activity from the start was the organization of an atlas project of Odonata distribution in Belgium. This project is now in its last phase. A special effort has been made to achieve a good coverage of the territory during the last five years. These data will form a base for future comparison. As a result of the atlas project, an increasing number of people have carried out detailed faunistical surveys in smaller regions. The Gomphus database has been used for the composition of the Red list of Dragonflies in Flanders, a project of the Institute of Nature Conservation. Gomphus is also active in the field of nature protection and gives advice for dragonfly-friendly management of wetlands. It takes part in a monitoring project in Wallonia and is currently examining the possibilities of setting up a similar scheme in the Flemish part of the country." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussels, Belgium. E-mail: geert.de.knijf@instnat.be
1192. **Bazzanti, M.; Chiavarini, S.; Cremisini, C.; Soldati, P. (1997):** Distribution of PCB congeners in aquatic ecosystems: A case study. *Environment International* 23(6): 799-813. (in English). ["Polychlorinated biphenyls (PCB) congeners were determined in water samples, sediments and animal species in the frame of a survey of the River Arrone (Central Italy, near Rome) after a major contamination episode. Animal species were selected on the basis of their living and feeding habits and evaluated as candidate bioindicators of PCB pollution in this lotic ecosystem. Total PCB concentrations in water were found to be low (ng/L level), and in sediments, ranged from about 10 to 200 µg/kg dry weight, depending on

the distance from the contamination source. PCB patterns in sediments showed a prevalence of higher chlorinated congeners over time. Concentrations in macroinvertebrates (*Calopteryx splendens* and *Anax imperator*) ranged from 60 to 400 mug/kg dry weight, showing significantly different species to species patterns. PCB concentrations were almost parallel in sediments for different sampling stations, while differences in patterns among species can be explained in terms of bioaccumulation/excretion mechanisms. Freshwater shrimps (*Palaemonetes antennarius*) were not found close to the contamination source, as a consequence of their extreme sensitivity to chemicals, and showed a peculiar pattern (almost exclusively determined by congeners 153, 138, and 180) probably originating from biodegradation mechanisms. Fish samples (*Rutilus erythrophthalmus*) showed the highest concentrations, as a combination of feeding habit, lipid content and, probably, less effective biodegradation/excretion pathways. Congener patterns closely match those of Aroclor 1260, which originates from the contamination source. This study confirms that congener physical and chemical parameters, different degradation rates, feeding habits, and mobility of the analysed aquatic organisms, metabolism, and excretion mechanisms, are to be considered to explain the distinctive PCB patterns of different samples." (Authors)] Address: Bazzanti, M., Dep. Human Animal Biol., Univ. "La Sapienza", 00185 Rome, Italy

1193. **Beccaloni, G.W. (1997):** Ecology, natural history and behaviour of ithomiine butterflies and their mimics in Ecuador (Lepidoptera: Nymphalidae: Ithomiinae). *Tropical Lepidoptera* 8(2): 103-124. (in English). ["The ithomiine butterfly species (Nymphalidae: Ithomiinae) which occur at Jatun Sacha Biological Station, Napo Province, Ecuador were found to participate in eight discrete mimicry complexes. These complexes involve a total of 124 insect species: 55 ithomiine species, 34 species which belong to other butterfly families or subfamilies, 34 moth species, and 1 species of damselfly. All species are illustrated and identified, and aspects of their behaviour are discussed. Literature on the chemical defences of the species is reviewed and a study of their ultraviolet reflectance patterns is presented. Data from a mark-release-recapture study show that the majority of individuals in the mimicry complexes studied were ithomiines. Hypotheses to explain polymorphism in Batesian and Mullerian mimics are discussed, in view of the finding that seven species of ithomiines, five other butterfly species, and the single damselfly species were polymorphic at Jatun Sacha." (Author)] Address: Beccaloni, G.W., Dep. Entomol., Natural History Museum, Cromwell Road, London SW7 5BD UK

1194. **Chung, M.G.; Kang, S.S.; Yeeh, Y. (1997):** Genetic diversity and structure in Korean populations of *Sympetrum darwinianum* and *S. eroticum eroticum* (Odonata: Libellulidae). *Jap. J. Ent.* 65(2): 427-435. (in English). ["The levels of genetic diversity and structure in Korean populations of *Sympetrum darwinianum* (Selys, 1883) and *S. eroticum eroticum* (Selys, 1883) were examined. Starch gel electrophoresis was conducted on 343 individuals in eight populations of the two species. Electrophoretic data revealed that the two species exhibit considerably higher levels of genetic variation than those of most other insects. Expected mean population heterozygosity (He, 0.361 vs. 0.333)

and percent polymorphic loci (P, 81.5% vs. 87.2%) found in *S. darwinianum* were very comparable to those for *S. eroticum eroticum*. Analyses of WRIGHT's fixation indices, calculated for all polymorphic loci across populations in each species, indicated that, overall, a near conformance of genotype frequencies to Hardy-Weinberg expectations, suggesting that mating was nearly panmictic. The results indicated that the two species might have very similar phylogenetic histories, and/or ecological and life history traits." (Authors)] Address: Chung Myong Gi Institution Dep. Biol., Gyeongsang Natl. Univ., Chinju 660-701, South Korea

1195. **Clarke, D.; Hewitt, S. (1997):** Vagrant Emperor Dragonfly, *Hemianax ephippiger* (Burmeister) at Caerlaverock, Dumfriesshire. *Glasgow Naturalist* 23(2): 58. (in English). [1 male was observed on 3 November 1996] Address: Clarke, D., Institution Tullie House Mus., Castle St., Carlisle CA3 8TP, UK.

1196. **Currie, R.S.; Fairchild, W.L.; Muir, D.C. (1997):** Remobilization and export of cadmium from lake sediments by emerging insects. *Environmental Toxicology & Chemistry* 16(11): 2333-2338. (in English). ["Emerging insects including, Diptera, Odonata, Ephemeroptera, and Trichoptera were collected from Lake 382 (L382) in 1991 and 1992 to estimate quantitatively the export of Cd by aquatic insects from a natural system having elevated Cd concentrations in the water and sediment. L382 is a Canadian Shield lake, located within the Experimental Lakes Area in northwestern Ontario, that received experimental additions of Cd from 1987 to 1992. Emerging Diptera (mostly Chironomidae), Odonata, and Ephemeroptera had mean Cd concentrations of 1.41, 0.11, and 0.30 mug/g wet weight, respectively. An estimated 1.32 to 3.90 g of Cd per year were exported from the sediments of L382 depending on the estimate of production rates used for these groups of insects. Approximately 0.05 to 0.17% of the whole-lake Cd load in L382 sediments was exported annually or 0.12 to 0.39% of the epilimnion Cd sediment load. Insect emergence may have resulted in greater Cd export from L382 relative to losses via the outflow. Cadmium exported from the sediments by insects may be remobilized and become more available to aquatic organisms or enter the terrestrial ecosystem and become available to insectivores." (Authors)] Address: Fairchild, W.L., Gulf Fisheries Centre, Fisheries Ocean Canada, P.O. Box 5030, Moncton, NB E1C 9B6, Canada

1197. **Dobruskina, I.A.; Ponomarenko, A.G.; Rasnitsyn, A. P. (1997):** Fossil insects found in Israel. *Paleontologicheskii Zhurnal* 5: 91-95. (in Russian). ["Fossil insects found in the Cretaceous of Israel are figured, discussed and, in part, described. Lower Cretaceous (Hauterivian-Barremian) Tayasir volcanites have yielded the beetle *Cretosperchus medievalis* Ponomarenko, sp. nov. related to species described from the Lower Cretaceous of Transbaikalia, a cockroach and a dragonfly nymph. In the Upper Cretaceous (Turonian) Ora Formation there are found the ant-lion *Samsonileon fragmentatus* Ponomarenko, sp. nov., a beetle elytra possibly belonging to *Dytiscidae*, two roach elytra (one assignable to *Blattellidae*), and not identifiable wing. The insects found show Laurasian rather than Gondwanian affinities." (Authors)] Address: Dobruskina, I. A., Heb. Univ. Jerus., Jerusalem, Israel

1198. **Dörfler, G.; Hartmann, G. (1997):** Zur Kenntnis der Libellenfauna des Harzes und seines näheren nördlichen Vorlandes: Fundortliste, Korrekturen und Ergänzungen. Mitt. naturwiss. Verein Goslar 5: 151-154. (in German). [Harz Mountains region, Niedersachsen and Sachsen-Anhalt, Germany; records of 13 species previously unpublished are listed and shortly commented] Address: Hartmann, G., Werenbergstr. 26, D-38640 Goslar, Germany

1199. **Dolmen, D. (1997):** "Freshwater prawns" and other invertebrates: A faunistic report from the lakes Reddalsvannet and Landvikvannet, Grimstad. Fauna (Oslo) 50(1): 36-42. (in Norwegian). ["In June and July 1992 and June and August 1996, numerous "freshwater prawns" Palaemonetes varians were recorded in three brackish-water lakes at Grimstad, Aust-Agder county: Reddalsvannet, Landvikvannet, and lakelet north of Inntjore. This is the first reliable record of the species in Norway, at least for many decades. The remaining fauna consisted of both limnic and marine animals, and included rare species like Brachytron pratense (Odonata) and Gyrrinus caspius (Coleoptera)." (Author)] Address: Dolmen, D., Institution NTNU Vitenskapsmuseet, N-7004 Trondheim, Norway

1200. **Ferreras-Romero, M. (1997):** The life history of *Boyeria irene* (Fonscolombe, 1838) (Odonata: Aeshnidae) in the Sierra Morena mountains (southern Spain). Hydrobiologia 345: 109-116. (in English). ["The life history of *Boyeria irene* is inferred from size-frequency analyses of sweep-net samples taken during five years in a permanent stream in the Sierra Morena Mountains. There the species is apparently mainly semivoltine, although a few larvae require three years to complete development. The instar distribution during winter is that of a 'summer species' (sensu Corbet, 1954). Metamorphosis is confined to spring and there is a long flying season. Similarities between *B. irene* and congeneric species in North America are discussed." (Author)] Address: Ferreras-Romero, M., Departamento de Biología Animal (Zoología), Facultad de Ciencias, Universidad de Córdoba, Avda. San Alberto Magno s/n, E-14004 Córdoba, Spain

1201. **Fincke, O. (1997):** Conflict resolution in the Odonata: implications for understanding female mating patterns and female choice. Biological Journal of the Linnean Society 60(2): 201-220. (in English). ["Predictions of mating patterns in animals have focused on males and how they compete for fertilizations by controlling females. With reference to the Odonata, a taxon in which mating requires cooperation of the female, the active role that females play in mating decisions is often ignored, leading to the premature conclusion that male coercion of females is common. A critical review of the outcome of sexual conflict among odonates leads me to alternative explanations of female mating patterns that need, to be refuted before concluding that males coerce matings. Because Anisoptera males have greater control over tandem formation, they have a greater potential for coercion than Zygoptera males. However, Anisoptera females may simply be willing to remate more often if they receive insufficient sperm to fertilize an entire egg clutch. Contrary to prior assumptions, in both suborders, male defence of oviposition sites does not preclude females from choosing among sites or among males. I find that the evolution of non-aggressive sexual signals by males is a reliable indication that sexual

conflict has been resolved in favour of female interests. Although I predict that the benefits to females of choice of male phenotype should rarely exceed the cost of such discrimination in Odonata, female choice is most likely to evolve in territorial species whose males must endure high physiological stress in order to mate, and when site quality is not a reliable predictor of the genetic quality of a potential mate." (Author)] Address: Finke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA

1202. **Fincke, O.M.; Waage, J.K.; Koenig, W.D. (1997):** Natural and sexual selection components of odonate mating patterns. In: Choe, J.C. & B.J. Crespi (Eds.): The evolution of mating systems in insects and arachnids. Cambridge Univ. Press. Cambridge: 58-74. (in English). ["Traditionally, students of odonate reproductive behavior have focussed on how males compete for access to mates and fertilizations. This tendency has yielded considerable information on male reproductive strategies and on the proximate and ultimate mechanisms involved in male-male competition, but has left numerous gaps in our knowledge of other aspects of odonate mating systems. We review relevant aspects of odonate biology and examine the extent to which current data on mating patterns support predictions arising from sexual selection theory. Although long-term studies offer some such support, they also indicate that natural selection for longevity and stochastic factors such as weather play critical roles in influencing reproductive success. Relatively little of the variance in male reproductive success in odonates has been traced to variance in male phenotype. We emphasize the role of females as determinants of odonate mating patterns and discuss sexual conflicts of interest over mating, fertilization, and oviposition decisions. Finally, we explore ways in which natural selection underlies female mating decisions and how larval and adult ecology interact to influence adult reproductive behavior." (Authors)] Address: Finke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA

1203. **Gee, J.; Smith, B.D.; Lee, K.M.; Griffiths, S. W. (1997):** The ecological basis of freshwater pond management for biodiversity. Aquatic Conservation 7(2): 91-104. (in English). ["1. Macrophyte and macroinvertebrate species richness, and the extent of aquatic vegetation, were surveyed in 51 newly created or renovated ponds in mid and west Wales, together with a range of environmental variables. These data are analysed in relation to management issues including pond size, rate of development, planting for oxygenation, stocking with fish and shading by riparian trees. 2. Richness of both plants and invertebrates increases with vegetated area, but the relationships are weak. Similarities among assemblages in ponds are low and not related to the proximity of the ponds. It is likely that two small ponds would together support more species than a single large pond. 3. New ponds are colonized rapidly by plants and invertebrates. There is no relationship between age and the number of species in ponds that were at least one year old, except for invertebrates in ponds that were isolated from other wetland. As expected, the extent of aquatic vegetation increases with age. 4. Minimum dissolved oxygen levels decrease with the cover of floating plants and with extent of vegetation in relation to pond size. 5. There is no evidence that stocking with fish (mainly salmonids at

low densities) influences the total number of species of either macrophytes or macroinvertebrates. However, the number of anisopteran (Insecta: Odonata) species is lower in stocked ponds and the number of trichopteran (Insecta) species is higher. 6. Macrophyte species richness increases with the percentage of the margin shaded by trees to a peak between 22% (emergent species) and 30% (submerged and floating species), and then declines. The number of species of invertebrates with short-lived flying adults (Odonata, Ephemeroptera, Trichoptera) decreases with the extent of riparian trees. Other invertebrates are unaffected. 7. The relationship between the survey results and existing management recommendations is discussed, emphasizing the need for field experiments to provide empirical support." (Authors)] Address: Gee, J., Inst. Biol. Sci., Univ. Wales, Aberystwyth, Ceredigion SY23 3DA, UK

1204. **Gorb, S.N. (1997):** Ultrastructural architecture of the microtrichia of the insect cuticle. *Journal of Morphology* 234(1): 1-10. (in English). ["The ultrastructure of the microtrichia (MT) of the insect cuticle was studied using scanning electron microscopy (SEM). After dissolving the protein matrix of chitin-protein microfibrils with NaOH, the orientation of the axial chitin fibers was three-dimensionally demonstrated. Microfibrils of the outermost exocuticular lamella lie parallel to the slope of the cone surface of the MT and rotate slightly on the top of the MT. Microfibrils of the external lamella of the transitional area between planar cuticle and conical cuticle of the MT corresponded to the shape of the surface within one lamella and preferred directions of MT's microfibrils in the successive lamella rotated. In the deeper layers of the cuticle, the rotation of both the microfibrils and successive lamella results in the twisted straw architecture of the microfibrils' composition within the MT. The deepest microfibrils that are located close to the axis of the MT form compact clusters of fibrils (1.0-1.5 $\mu\text{-m}$ length). The twisted-straw architecture of microfibrils in the MT is derived from principles of development of extracellular fibrous composites. It is suggested, however, that this architecture has an additional functional significance as a strategic design with particular mechanical properties." (Author)] Address: Gorb, S., Max-Planck-Institut für Entwicklungsbiologie, Spemannstr. 35, D-72076 Tübingen, Germany. E-mail: stas.gorb@tuebingen.mpg.de

1205. **Gryska, A.D.; Hubert, W.A. (1997):** Observations on the reproduction, sources of mortality, and diet of the Kendall Warm Springs dace. *Great Basin Naturalist* 57(4): 338-342. (in English). [Wyoming, USA; life history study of the endangered Kendall Warm Springs dace (*Rhinichthys osculus thermalis*); "We observed 2 sources of mortality: (1) emigration from the warm spring stream over a waterfall into the Green River and (2) predation on larvae by dragonfly (*Libellula saturata*) nymphs." (Authors)] Address: Gryska, A., Institution Wyo. Coop. Fish Wildl. Res. Unit, Univ. Wyo., Laramie, WY 82071-3166, USA.

1206. **Habdija, I.; Radanovic, I.; Primc-Habdija, B. (1997):** Longitudinal distribution of predatory benthic macroinvertebrates in a karstic river. *Archiv für Hydrobiologie* 139(4): 527-546. (in English). ["The longitudinal distribution of predatory macroinvertebrates and their diversity were investigated on boulder, cobble

and gravel substrates along the River Kupa, a karstic river in the NW Dinarid area (Croatia). Depending on substrate type and river section, the predator biomass constituted 6.9% to 20.2% of the total macroinvertebrate biomass. In the headwater streams more than 80% of predator biomass was represented by rhyacophilid, perlid and perlodid larvae. In the upper river section Hirudinea species, rhyacophilids and the dipteran larva, *Atherix ibis*, constituted approximately equal percentages of total predators. In the lower river section Hirudinea species, Odonata larvae, tanipod and ceratopogonid larvae were the most dominant predators. Along the river gradient the increase of predator biomass corresponded with the increase of scraper, collector-gatherer and filterer biomass. The Shannon index of diversity showed that the diversity of predators increased from the area to the downstream reaches. A significant and positive association was found between diversity of predators and diversity of collector-gatherers. This positive relationship between predators and collector-gatherers may be interpreted as the diversity response of predators to the diversity of prey." (Authors) In tab. 2 the mean annual biomass (mg wet biomass m^2) of *Platycnemis* sp., *Cordulidae* not det., *Gomphus vulgatissimus*, and *Onychogomphus* sp. is listed.] Address: Habdija, I., Department of Zoology, Faculty of Science, University of Zagreb, Rooseveltov trg 6, CRO-10000 Zagreb, Croatia

1207. **Hassan, S.T. (1997):** Action thresholds of wet rice arthropods for pest management decision-making in Malaysia. *Pertanika Journal of Tropical Agricultural Science* 20(1): 65-74. (in English). ["Action thresholds to aid pest population management decision-making of 11 categories of wet rice arthropods are suggested in terms of mean population density per hill (x) and proportion of infestation ($P(I)$) of the field sampling units. The thresholds are the (x) and $P(I)$ values at the point of saturation of a polynomial regression curve obtained by plotting (x) against $P(I)$ for each arthropod category. The respective values for pests are: 3.38, 0.92 (*Nephotetix* spp.), 6.28, 1.00 (*Nilaparvata lugens*), 1.37, 0.72 (*Cnaphalocrocis medinalis*-*Pyrallidae*), 2.42, 0.90 (*Recilia dorsalis*), 3.81, 0.97 (*Sogatella furcifera*), and for predators are: 3.89, 0.98 (*Cyrtorhinus lividipennis*), 2.39, 0.85 (*Anatrichus pygmaeus*-*Diptera*), 2.02, 0.82 (Odonata), 1.65, 0.81 (*Casnoidea* spp), 1.61, 0.64 (*Paederus fuscipes*), and 1.60, 0.69 (spiders). $P(I)$ is significantly ($P < 0.001$) affected by arthropod category and growth stage of the crop. The observed $P(I)$ indicated high fits (most $r^2 > 0.90$) to clumped- and Poisson-based distribution models." (Authors)] Address: Hassan, S.T.S., Dep. Biol., Fac. Sci. Environ. Studies, Univ. Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia

1208. **Hassan, S.T.; Rashid, M.M. (1997):** Presence /absence sequential plans for pest management decision-making for arthropods of wet rice ecosystem in Malaysia. *Pertanika Journal of Tropical Agricultural Science* 20(1): 51-63. (in English). ["Presence-absence sequential sampling plans are presented for 11 arthropod categories to assist in management of their populations in the multipest-infested rice crop in Malaysia. Data from visual inspection of 204 samples with 40 and 100 hills per sample, were used to develop the plans. Action threshold for each of the 11 (5 pests 6 predators) arthropod categories was obtained through a fourth-order polynomial regression of proportion of

infestation against mean population densities, at the point of saturation of infestation. The pest species are: *Nephotettix* spp., *Nilaparvata lugens*, *Recilia dorsalis*, *Sogatella furcifera* and *Cnaphalocrocis medinalis* (Pyralidae), and the predators: *Cyrtorhinus lividipennis*, *Anatrichus pygmaeus* (Diptera), spiders, Odonata, *Paederus fuscipes* and *Casnoidea* spp. Risk levels of Type I (a) and Type II error (beta) were prefixed at 0.3, since lower levels entail taking a larger number of samples. The sequential plans were then generated using the SEQUAN computer program of Talerico and Chapman (1970). During field operation on not more than 50 ha at a time, it is suggested that at least then hills should be examined visually before recommending any pest management action. Simultaneous sampling of pests and predators enables status of predators' populations to be considered before recommending any decision." (Authors)] Address: Hassan, S.T.S., Dep. Biol., Fac. Sci. Environ. Studies, Univ. Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia

1209. **Hawking, J.H. (1997):** The conservation status of dragonflies (Odonata) from south-eastern Australia. Mem. Mus. Victoria 56(2): 537-542. (in English). ["The conservation status of the dragonflies from south-eastern Australia is documented and the species with limited distributions and/or larval habitats which are vulnerable are discussed. One hundred and seven species are recorded from South Australia, Victoria, Tasmania and southern New South Wales. No species is considered endangered, but nine species have high conservation priority. These species are endemic to Australia and all have restricted distributions. The vulnerability of the larval habitats is discussed and suggestions for their conservation and management are made." (Author)] Address: Hawking, J.H., Murray-Darling Freshwater Research Centre, Cooperative Research Centre for Freshwater Ecology, P.O. Box 921, Albury, NSW 2640, Australia

1210. **Hooper, R.E.; Siva-Jothy, M.T. (1997):** "Flybys": A prereproductive remote assessment behavior of female *Calopteryx splendens xanthostoma* (Odonata: Calopterygidae). Journal of Insect Behavior 10(2): 165-175. (in English). ["Before reproductive events, female *Calopteryx splendens xanthostoma* show a distinctive flight behavior over patches of oviposition substrate guarded by territorial males. We term such flights 'flybys.' Since females fly most frequently (and nonrandomly) over the site which they eventually utilize, the flight type appears to be related to the female's selection of a reproduction site. When males were experimentally excluded females made flybys over more sites than when males were present. We manipulated the levels of agonistic interactions between males to determine the effect of fighting on flybys. The frequency of flybys by females over each patch did not change with different levels of male agonistic activity, but females landed and copulated on patches where fighting between males was lowest. Moreover, when females secured access to an oviposition site without copulating with the reholding male, they made flybys over more sites than when they secured access to a site by copulating with the territorial male. The results suggest that one function of flybys is to allow females to assess remotely potential male interference at oviposition sites." (Authors)] Address: Hooper, R.E., Lab. Wildlife Conservation, National Inst. Environmental Studies, Tsukuba 305, Japan

1211. **Horwitz, P. (1997):** Comparative endemism and richness of the aquatic invertebrate fauna in peatlands and shrublands of far south-western Australia. Mem. Mus. Victoria 56(2): 313-321. (in English). ["A study of the peatlands and shrublands in far south-western Australia was undertaken to examine patterns of endemism and richness in aquatic invertebrate faunas. Samples of surface water, interstitial water and crayfish burrow water were analysed from about 45 sites and in each season over a twelve month period in 1993. Six groups of aquatic invertebrates were chosen for more detailed analyses (mites, oligochaetes, isopods, decapods, dipterans, and odonats) and resolved to species level. For each species an assessment was made of its distributional status as either widespread and common, regionally endemic (to the southwest), or locally restricted to within the study region. Sites with high levels of local endemism were plotted geographically and their characteristics compared to other sites. The data are related to existing hypotheses concerning the depauperate nature of the freshwater fauna of the south-western part of the continent. It was found that such hypotheses need to be tempered by the role of salt in flowing systems, and the occurrence of hot spots of local endemism for freshwater fauna in the extreme south-west in non-flowing waters (and often subterranean habitats) where groups of non-insect invertebrate fauna show apparently elevated species richness." (Author) *Miniargiolestes minimus* (Tillyard, 1908), *Austrogomphus collaris* Hagen in Selys, 1854, *Austroaeschna anacantha* Tillyard 1908, *Procordulia affinis* (Selys 1871), *Austrosynthemis cyanitincta* (Tillyard, 1908)] Address: Horwitz, P., Institution Dep. Environmental Management, Edith Cowan Univ., Joondalup Drive, Joondalup, WA 6027, Australia

1212. **Hudoklin, A.; Sovinc, A. (1997):** New life for deserted clay pits. *Proteus*, Ljubljana 60(3): 104-110. (in Slovene with English summary). ["The life of man-made biotopes, such as clay and gravel pits, is usually brief. Most frequently they end as waste dumps, eventually to be buried; under the best of circumstances they become ponds for intensive aquaculture. Only rarely are secondary biotopes returned to nature. Just this is now happening at Zalog by Novo Mesto, where re-introduction of plants and animals is leading to an exceptional site. We are attempting to maintain it as a secondary biotope after restoration." (Authors) *Lestes sponsa*, *L. dryas*, *L. virens*, *Aeshna mixta*, *Sympetrum fonscolombii*, *S. striolatum*, and *S. sanguineum* are listed for the locality.] Address: Solvinc, A., Vodnogospodarski institut, PP 3401, Hajdrihova 28, SI-1115 Ljubljana, Slovenia

1213. **Iwasaki, K.; Otsuka, T.; Nakayama, K. (1997):** Middle- and large-sized aquatic animal assemblages associated with submerged riparian plants in the Kamo River, Kyoto. Japanese Journal of Limnology. 58(3): 277-291. (in Japanese with English summary). ["Middle- and large-sized aquatic animal assemblages associated with the submersed leaves, stems and roots of the reed *Phragmites japonica* and other riparian plants were studied in the Kamo River, Kyoto with a focus on the faunal differences in both longitudinal and seasonal distribution. At the upper and middle sites, mayfly larvae inhabiting slow riffles and shallow pools were dominant in winter and spring. Several lentic hemipteran insect species such as water scorpions and back swimmers

associated chiefly with hydrophytes in ponds and marshes were also found in summer or autumn within the stands of monocotyledonous plants on the wide gravel bar of the middle site. At the lower site within the Kyoto city limits, water slaters, leeches and snails were abundant from spring through autumn. In addition, many larvae of calopterygid and coenagrionid dragonflies were collected in spring and summer, respectively. Juvenile fishes of dark chub and lizard goby were abundant in summer and autumn at all three sites. Riparian plants were thus suggested to increase species diversity of lotic fauna, providing habitats not only for lotic invertebrates but also for lentic insects and juvenile fishes." (Authors)] Address: Iwasaki, K., Inst. Natural Sci., Nara Univ., 1500 Misasagi-chou, Nara 631, Japan

1214. **Jacob, J.; Raab, G.; Hoppe, U. (1997):** Surface lipids of the silverfish (*Lepisma saccharina* L.). *Zeitschrift fur Naturforschung (C)* 52(1-2): 109-113. (in English). ["Surface lipids obtained from the silverfish by short-term solvent extraction contain aliphatic hydrocarbons, monoester waxes, cholesteryl esters, triglycerides, free cholesterol, and free fatty acids. [...] The cuticular lipid composition of silverfish resembles that of other more primitive arthropod forms such as stoneflies and dragonflies." (Authors)] Address: Jacob, J., Biochemisches Institut Umweltcarcinogene, Lurup 4, D-22927 Grosshansdorf, Germany

1215. **Kasuya, E.; Edanami, K.; Ohno, I. (1997):** Selection and reproductive success in males of the dragonfly *Orthetrum japonicum* (Odonata: Libellulidae). *Res. popul. ecol.* 39(2): 113-119. (in English). ["Reproductive success, copulation success, and mating success were measured for a population of male dragonflies, *Orthetrum japonicum*. Copulation success explained the greatest variation in reproductive success. The proportion of copulations followed by oviposition was positively correlated with the number of oviposited eggs per mating. Directional selection on four morphological characters was estimated. The effect of selection on correlated traits was comparable to that of direct selection. Directional selection varied between traits and between episodes in a single trait. The probability that the observed directional selection on the four morphological traits was expected under the condition of the selective neutrality of traits was not smaller than 5%." (Authors)] Address: Kasuya, E., Dep. Biol., Fac. Sci., Kyushu Univ., 812-81 Fukuoka Japan

1216. **Kim, T. H. (1997):** A proposal for protection of *Nannophya pygmaea* Rambur (Odonata) and its habitat in Korea. *Korean Journal of Applied Entomology* 36(3): 283-285. (in Korean). [*N. pygmaea* was found breeding at an altitude of 940m, Mt. Chiri, Republic of Korea. The species is strictly limited to bogs at high altitudes, therefore necessary protection measures for the species and its habitat are proposed.] Address: Kim Tae Heung, Fac. Biol. Resources Sci., Coll. Agric., KIBIO, Chonbuk Natl. Univ., Chonju 561-756, Chonbuk, South Korea

1217. **Land, M.F. (1997):** The resolution of insect compound eyes. *Israel Journal of Plant Sciences* 45(2): 79-91. (in English). ["The spatial resolution of compound eyes is determined by their interommatidial angles, by the optical quality and rhabdom dimensions of the ommatidia, and by illumination level. Among insects, interommatidial angles vary from tens of

degrees in Apterygota, to as little as 0.24 degree in dragonflies. Resolution better than this is not attainable in compound eyes of realistic size, because of the limit imposed by diffraction. The smaller the interommatidial angle, the greater the distance at which objects-prey, predators, foliage, or flowers-can be resolved. Insects with different lifestyles have contrasting patterns of interommatidial angle distribution, related to forward flight, capture on the wing, and predation on horizontal surfaces." (Author)] Address: Land, M.F., School Biol. Sci., Univ. Sussex, Brighton BN1 9QG, UK

1218. **Larson, D. (1997):** Habitat and community patterns of tropical Australian hydradephagan water beetles (Coleoptera: Dytiscidae, Gyrinidae, Noteridae). *Australian Journal of Entomology* 36(3): 269-285. (in English). [A study was undertaken to describe patterns of water beetle co-occurrence in a tropical environment and to compare these with water beetle community structure in temperate regions. Dytiscidae, Noteridae, and Gyrinidae were sampled quantitatively and qualitatively from a variety of habitats in the Atherton Tableland region of tropical Queensland from September 1990 to February 1991. "[...] Quantitative samples from rice fields and a temporary pond demonstrated that a suite of species were quick to colonize and breed in newly formed habitat. Many of these species breed before other predators such as fish or Odonata become established."] Address: Larson, D., Institution Dep. Biol., Memorial Univ., St. John's, Newfoundland A1B 3X9, Canada

1219. **Lasswell, J.L.; Mitchell, F.L. (1997):** Survey of dragonflies (Odonata: Anisoptera) in ponds of central Texas. *Journal of the Kansas Entomological Society* 70 (1): 52-63. (in English). [Anisoptera "were collected for five quarters, from October 1994 through December 1995, from 12 ponds located in Erath County, Texas. Nymphs were collected from each of the ponds quarterly, while adults were taken whenever possible. Other collection records from Erath County are also noted. A total of 38 dragonfly species were identified. Nymphs of 28 species were collected from the ponds, while the remaining 10 species were determined from adult collections. Thirty-six species of adults were collected. Two species were found as nymphs, but not collected as adults. Peak dragonfly abundance in ponds occurred during the third quarter - July through September." (Authors)] Address: Lasswell, J.L., Institution Texas Agric. Exp. Stn., Route 2 Box 00, Stephenville, TX 76401, USA.

1220. **Laurila, A.; Kujasalo, J.; Ranta, E. (1997):** Different antipredator behaviour in two anuran tadpoles: effects of predator diet. *Behav. Ecol. Sociobiol.* 40(5): 329-336. (in English). ["Recent investigations have indicated that animals are able to use chemical cues of predators to assess the magnitude of predation risk. One possible of such cues is predator diet. Chemical cues may also be important in the development of antipredator behaviour, especially in animals that possess chemical alarm substances. Tadpoles of the common toad (*Bufo bufo*) are unpalatable to most vertebrate predators and have an alarm substance. Tadpoles of the common frog (*Rana temporaria*) lack both these characters. We experimentally studied how predator diet, previous experience of predators and body size affect antipredator behaviour in these two tadpole species. Late-instar larvae of the dragonfly *Aeshna juncea* were used as predators. The dragonfly

larvae were fed a diet exclusively of insects, *R. temporaria* tadpoles or *B. bufo* tadpoles. *R. temporaria* tadpoles modified their behaviour according to the perceived predation risk. Depending on predator diet, the tadpoles responded with weak antipredatory behaviour (triggered by insect-fed predators) or strong behaviour (triggered by tadpole-fed predators) with distinct spatial avoidance and lowered activity level. The behaviour of *B. bufo* in predator diet treatments was indistinguishable from that in the control treatment. This lack of antipredator behaviour is probably related to the effective post-encounter defenses and more intense competitive regime experienced by *B. bufo*. The behaviour of both tadpole species was dependent on body size, but this was not related to predator treatments. Our results also indicate that antipredator behaviour is largely innate in tadpoles of both species and is not modified by a brief exposure to predators." (Authors)] Address: Laurila, A., Integrative Ecol. Unit, Div. Population Biol., Dep. Ecol. Systematics, P.O. Box 17, FIN-00014 Univ. Helsinki, Finland

1221. **Liebherr, J.K.; Polhemus, D.A. (1997):** Comparison to the century before: the legacy of R.C.L. Perkins and *Fauna hawaiiensis* as the basis for a long-term ecological monitoring program. *Pacif. Sci.* 51(4): 490-504. (in English). ["As one means of assessing the impact of the past 100 yr of development and biological alteration in Hawai'i, the damselfly (Odonata: Coenagrionidae) and carabid beetle (Coleoptera: Carabidae) collections of R. C. L. Perkins made in the 1890s are compared with similar collections made one century later during the 1990s. Two islands that have experienced very different histories of development are compared: O'ahu and Moloka'i. Of eight native damselfly species originally inhabiting O'ahu, one has been extirpated from the island, another is now reduced to a single population, and three more are at risk. Of the eight species originally found on Moloka'i, by contrast, there is only one species that has not been rediscovered, although there is reasonable probability that it has simply eluded capture because of inherent rarity, whereas the remaining species retain large and stable populations. Capture frequencies (based on specimens collected per decade) are lower now than in the preceding century for most species on O'ahu, even allowing for modern collectors retaining fewer specimens. The only species on O'ahu for which captures have increased between the 1890s and the 1990s are those that breed away from lotic and lentic habitats, indicating a severe negative impact from introduced aquatic biota for species that breed in such freshwater situations. On Moloka'i, all damselfly species except one have higher capture rates now than in the 1890s, explainable in large part to improved access to previously remote terrain. [...]. "(Authors)] Address: Liebherr, J.K., Dep. Entomol., Comstock Hall, Cornell Univ., Ithaca, NY 14853-0901, USA

1222. **Limbert, M. (1997):** The white-faced dragonfly *Leucorrhinia dubia* (Vander L.) on Thorne Moors. *Naturalist (Doncaster)*. 122(1022): 88-92. (in English). Address: Limbert, M., Mus. and Art Gallery, Chequer Road, Doncaster DN1 2AE, UK

1223. **Lockwood, J.L.; Fenn, K.H.; Curnutt, J.L.; Rosenthal, D.; Balent, K.L.; Mayer, A.L. (1997):** A Life history of the endangered Cape Sable Seaside Sparrow. *Wilson Bulletin* 109(4): 720-731. (in English). ["Cape Sable Seaside Sparrows (*Ammodramus*

maritimus mirabilis) breeding within eastern Everglades National Park were philopatric and moved only short distances between clutches. Incubation required 12 days, nestlings fledged at 9.2 days, and fledgling care ranged from eight to 20 days. The total nest cycle encompassed 34-44 days. Nestlings were fed spiders and insects, primarily Orthoptera, Lepidoptera, and Odonata. Diet varied between years and study sites. With the onset of summer rains, predation rate increased, and nest success decreased. Breeding activity diminished throughout June, coinciding with rising water in nest areas. Our results indicated that the lack of breeding habitat and the onset of summer flooding limit the breeding potential of Cape Sable Seaside Sparrows."(Authors)] Address: Lockwood, Julie, Dep. Ecol. and Evol. Biol., Univ. Tenn., Knoxville, TN 37996, USA

1224. **Martin, R.; Pibernat, J. (1997):** Dos nuevas citas de *Ischnura graellsii* (Rambur 1842) en la provincia de Gerona. *Navasia* 6: 3-5. (in Spanish). [*I. graellsii* - rare in the Province Gerona, Spain - was sympatric with *I. elegans* in 1994 and 1995.] Address: Martin, R., Avda Martí Pujol 250, 3' 4a, ES-08911 Badalona, Barcelona, Spain

1225. **Müller, J. (1997):** "FFH-Libellen". *Pedemontanum*, Magdeburg 1: 2-3. (in German). [The odonate species of the FFH-Directive of the European Union occurring in Sachsen-Anhalt are listed; these species should be surveyed with priority] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1226. **Müller, J. (1997):** Asiatische Keiljungfer *Stylurus flavipes* (Needham, 1897) oder *Gomphus flavipes* (Charpentier, 1825)?. *Pedemontanum*, Magdeburg 1: 2. (in German). [Some taxonomic annotations to *S. flavipes*] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1227. **Müller, J. (1997):** Editorial zum Mitteilungsblatt der AG Odonatenfauna Sachsen-Anhalt der Entomologen-Vereinigung Sachsen-Anhalt e.V. "pedemontanum". *Pedemontanum*, Magdeburg 1: 1. (in German). [Outline of the development and the tasks of the working group Odonata within the Association to the Entomologists of Sachsen-Anhalt, and some remarks on the name of the leaflet "pedemontanum"] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1228. **Müller, J. (1997):** Kleine Königslibelle *Anax parthenope* (Selys, 1839). *Pedemontanum*, Magdeburg 1: 2. (in German). [Short note on the most recent distribution patterns of *A. parthenope* in Sachsen-Anhalt and the bordering Federal State Niedersachsen, Germany] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1229. **Müller, J. (1997):** Literatur: Odonatenfauna Sachsens-Anhalts. *Pedemontanum*, Magdeburg 1: 3-4. (in German). [27 odonatological titles covering 1993-1996 are listed] Address: Müller, J., Frankefelde 3, D-39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1230. **Müller, J. (1997):** Südliche Mosaikjungfer *Aeshna affinis* Vander Linden, 1820. *Pedemontanum*,

Magdeburg 1: 2. (in German). [The 1995 invasion of *A. affinis* to Sachsen-Anhalt, Germany seems to have been successful; in 1996 the species could be observed on several habitats discovered in 1995] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1231. **Nel, A.; Arillo, A.; Ortuno, V.M. (1997):** New Western Palaearctic Cenozoic Odonata (Zygoptera and Anisoptera). Bull. soc. ent. Fr. 102(3): 265-270. (in French with English summary). [Five new Cenozoic Odonata are described or revised from Spain and France, including a new *Coenagrionoidea*, *Hispanocoenagrion inexpectum* n. gen., n. sp.] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

1232. **Niedringhaus, R. (1997):** Die Limnofauna (Mollusken, Libellen, Köcherfliegen, Wasserkäfer, Wasserwanzen) eines durch Ausbau und Agrarnutzung stark gestörten Gewässersystems in Nordwestdeutschland. Abh. westf. Mus. Naturkunde 59(4): 209-236. (in German). [In the framework of a project to restore an intensively used agricultural landscape situated near the town of Lingen, Niedersachsen, Germany, the limnofauna - including Odonata - of a system of ditches and further water bodies was studied. Between 1989 and 1994 24 odonate species were recorded. The abundance and reproductive status of the species for each of the water bodies is presented in a tab. Most characteristic species are *Calopteryx splendens*, *Lestes sponsa*, *Chaloclestes viridis*, *Coenagrion puella*, *Aeshna cyanea*, and *Libellula depressa*. *Pyrrhosoma nymphula* and *Ischnura elegans* are the dominant species of the periodic water bodies.] Address: Niedringhaus, R., Carl-von-Ossietzky-Universität Oldenburg, Fachbereich Biologie, Postfach 2503, D-26111 Oldenburg, Germany

1233. **Novelo Gutiérrez, R. (1997):** Clave para la determinación de familias y géneros de las náyades de odonata de Mexico. Parte I. Zygoptera. Dugesiana 4(1): 1-10. (in Spanish). [Illustrated key to the families and genera of the larval stages of the Mexican zygopteran Odonata] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Aparatdo Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@sun.ieco.conacyt.mx

1234. **Novelo-Gutiérrez, R. (1997):** Clave para la determinación de familias y géneros de las náyades de odonata de Mexico. Parte II. Anisoptera. Dugesiana 4(2): 31-40. (in Spanish). [Illustrated key to the families and genera of the larval stages of the Mexican anisopteran Odonata] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Aparatdo Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@sun.ieco.conacyt.mx

1235. **Novelo-Gutiérrez, R. (1997):** Primer registro de la familia *Pseudostigmatitae* (Odonata: Zygoptera) para el estado de Morelos, Mexico. Folia ent. mex. 96 (1996): 109-110. (in Spanish). [On 24-10-1996 *Mecistogaster ornata* was caught along Río Sabinos in the Jardins de Xochitepec, town of Xochitepec, Mexico] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5.

antigua carretera a Coatepec, Aparatdo Postal 63, 91000 Xalapa, Veracruz, Mexico

1236. **Orr, A.G.; Cranston, P.S. (1997):** Hitchhiker or parasite? A ceratopogonid midge and its odonate host. J. nat. hist. 31: 1849-1858. (in English). [The ceratopogonid genus *Forcipomyia* Meijyen (Diptera: Ceratopogonidae) contains species with a wide range of adult biologies. Species of the subgenus *Pterobosca* Macfie are phoretic and apparently parasitic on the wing veins of other insects, notably odonates and sometimes lacewings. We describe *F. (Pterobosca) debenhamae* from Brunei as new to science, taking the authorship of Cranston, tabulate the morphological diversity of the subgenus, and speculate on the phylogeny. The behaviour of adult female midges, which have been found only upon the thorax of hosts predominantly of *Libellago hyalina* (Odonata: Chlorocyphidae), appears to deleteriously impact on the quality and duration of territory holding of the host. The lack of any confirmation of host feeding leads us to speculate on the nature of the association." (Authors)] Address: Cranston, P.S., Biol. Dep., Univ. Brunei Darussalam, Bandar Seri Begawan, Negara, Brunei

1237. **Ottvall, R. (1997):** The dragonflies *Hemianax ephippiger* and *Sympetrum fonscolombi* (Odonata: Aeshnidae and Libellulidae) found on the Baltic island of Oland. Entomologisk Tidskrift, Stockholm 118(4): 193-196. (in Swedish with English summary). [The first Swedish records of the dragonflies *Anax ephippiger* and *Sympetrum fonscolombii* are reported. Three males and 3 females of *A. ephippiger* "were accidentally caught in a trap designed for migrating birds at Ottenby Bird Observatory at the southern point of the Baltic island of Oland, June 25 and 26 1995. This record of several individuals, and reports of unusual occurrences in central Europe, suggests an "invasion" reaching at least as far north as the Baltic Sea region. Warm, easterly winds in late May probably carried the dragonflies to Sweden. It is probable that during the unusually hot summer, the species was breeding in Sweden and larval development may have succeeded to emergence. In the same trap 3 males and 1 female of *S. fonscolombii* were trapped between July 7 and 21 1997. Extremely warm and moist air with high temperatures in southern Sweden in early July could explain the occurrence which is the first record of this species in Scandinavia."] Address: Ottvall, R., Ottoson, Dag Hammarskjölds väg 5G, S-224 64, Lund, Sweden

1238. **Papazin, M. (1997):** Anomalie morphologique à caractère gyandromorphe chez *Gynacantha kirbyi* Krüger, 1898 (Odonata, Aeshnidae). Bull. soc. ent. Fr. 102(2): 103-108. (in French with English summary). [Some general annotations of gynandromorphism on Odonata are presented; the female specimen of *G. kirbyi* has oreillets on the second abdominal segment similar to the male ones.] Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France

1239. **Peacor, S.D.; Werner, E.E. (1997):** Trait-mediated indirect interactions in a simple aquatic food web. Ecology 78(4): 1146-1156. (in English). [This investigation examines the role of trait-mediated indirect interactions in a simple aquatic food web. We conducted the experiments in cattle watering tanks in order to establish whether competitive and predator-prey interactions between two species are affected by

other species in the system; i.e., are pairwise interaction strengths affected by the background species assemblage? We examined the survival and growth response of small bullfrog (*Rana catesbeiana*) and small green frog (*Rana clamitans*) tadpoles in the presence and absence of a competitor (large bullfrogs), the lethal presence of the larval odonate predator *Traema lacerata*, and the nonlethal (caged) presence of the larval odonate predators *Anax junius* and *Anax longipes*. We demonstrate that large bullfrog competitors and caged *Anax* affect traits (foraging activity level) of small bullfrog and small green frog tadpoles and that these changes in traits, in turn, affect interactions of the small tadpole species with each other and with the other species. In particular, the following four trait-mediated indirect interactions were evident: (1) Presence of large bullfrog competitors increased the predation rate of *Traema* on small green frogs and small bullfrogs. (2) Presence of nonlethal *Anax* reduced the predation rate of *Traema* on small green frogs. (3) Presence of nonlethal *Anax* increased the competitive advantage of bullfrogs over green frogs. (4) Presence of nonlethal *Anax* facilitated midge invasion of the experimental units. The proposed mechanisms (changes in small tadpole activity) involved in these trait-mediated indirect interactions were supported by observational data on tadpole activity and relevels in the experimental units, and in laboratory experiments examining tadpole activity responses to predators. The occurrence of strong trait-mediated indirect interactions in this simple food web underscores the potential importance of such interactions in animal communities." (Authors)] Address: Werner, E.E., Dep. Biol., Univ. Michigan, Ann Arbor, MI 48109, USA

1240. **Richter, B.D.; Braun, D.P.; Mendelson, M.A.; Master, L.L. (1997):** Threats to imperiled freshwater fauna. *Conservation Biology* 11(5): 1081-1093. (in English). ["Threats to imperiled freshwater fauna in the U.S. were assessed through an experts survey addressing anthropogenic stressors and their sources. Specifically, causes of historic declines and current limits to recovery were identified for 135 imperiled freshwater species of fishes, crayfishes, dragonflies and damselflies, mussels, and amphibians. The survey was designed to identify threats with sufficient specificity to inform remanagers and regulators faced with translating information about predominant biological threats into specific, responsive actions. The findings point to altered sediment loads and nutrient inputs from agricultural nonpoint pollution; interference from exotic species; and altered hydrologic regimes associated with impoundment operations as the three leading threats nationwide, accompanied by many lesser but still significant threats. Variations in threats among regions and among taxa were also evident. Eastern species are most commonly affected by altered sediment loads from agricultural activities, exotic species, habitat removal/damage, and altered hydrologic regimes predominate in the West. Altered sediment loading from agricultural activities and exotic species are dominant problems for both eastern mussels and fishes. However, eastern fishes also appear to be suffering from municipal nonpoint pollution (nutrients and sediments), whereas eastern mussels appear to be more severely affected by altered nutrient impacts from hydroelectric impoundments and agricultural runoff. Our findings suggest that control of nonpoint pollution associated with agriculture activities should be a very

high priority for agricultural producers and governmental support programs. Additionally, the large number of hydropower dams in the US. subject to federal relicensing in coming years suggests a significant opportunity to restore natural hydrologic regimes in the affected rivers." (Authors)] Address: Richter, B.D., Biohydrology Program, Nature Conservancy, P.O. Box 430, Hayden, CO 816399, USA

1241. **Rödel, M.-O.; Lensenmair, K.E. (1997):** Predator-induced swarms in the tadpoles of an African savanna frog, *Phrynomantis microps*. *Ethology* 103(11): 902-914. ["Aggregations in tadpoles of the West African savanna frog *Phrynomantis microps* were often observed in their breeding ponds in our study area, situated in Comoe National Park, Ivory Coast. Experiments under seminatural conditions demonstrated that this behaviour was only shown while predators were present. The tadpoles reacted differently to different predators. Factors inducing swarm behaviour were optical (the predator) and/or chemical (liquid from injured tadpoles). Alarm substances are not species-specific. Kinship seems not to play a role in swarm formation." (Author). Odonate predators tested are *Traema basilaris*, *Pantala flavescens*, and *Anax imperator*. Swarm formation was induced solely via visual stimuli, for odonate larvae with their labium amputated induced swarm formation as well. "... Our results showed that swarms considerably outlived the removal of predators (*Traema*). In 160 controls during 50 h following the removal of the predator we found 41 swarms in those containers where the dragonfly larvae had successfully hunted and 19 swarms in those with dragonfly larvae with amputated labium. Median duration of swarm persistence was 6 h when predation had really happened and 1 h in those trials with manipulated dragonfly larvae. In both cases however, the range of swarm persistence duration was 1-48h after the removal of the predators. Thus differences between the two experiments were not significant. After 50 h all swarms had dissolved."] Address: Rödel, M.-O., Lehrstuhl Tierökologie, Theodor-Boveri-Inst. Biowissenschaften, Am Hubland, D-97074 Würzburg, Germany. E-mail: roedel@biozentrum.uni-wuerzburg.de

1242. **Rogelio, D.-L.; Rodriguez, M.H.; Arrendondo-Jimenez, J.I.; Hernandez-Avila, M.; Mallorca, C. (1997):** Aquatic insects associated with *Anopheles albimanus* (Diptera: Culicidae) breeding sites in southern Mexico. *Environmental Entomology* 26(4): 828-838. (in English). ["Aquatic Coleoptera, Hemiptera, and Odonata associated with *Anopheles albimanus* Wiedemann larval habitats (defined by dominant plant vegetation) were investigated in various hydrological types along the coastal plain of southern Chiapas, Mexico. Aquatic insects were sampled by manual dragging nets, and mosquito larvae were sampled with standard dippers. Aquatic Coleoptera were the most abundant and diverse group, represented by 20 genera, followed by Hemiptera and Odonata, each with 16 genera. Aquatic insects were more abundant in permanent and temporary lagoons in *Hymenachne amplexicaulis* (Rudge) Nees and *Lippia nodosa* (L.) Michx. habitats, whereas mosquito larvae were most abundant in *Ceratophyllum demersum* L. and *Crinum erubescens* Soland. habitats, where aquatic insects were moderately abundant. Significant association in

regression models with the addition of quadratic terms were found in aquatic Coleoptera and Odonata with respect to mosquito larvae. However, adjusted models that included environmental parameters proved these associations to be nonsignificant." (Authors)] Address: Danis-Lozano, R., Centro Investigacion Paludismo, Inst. Nac. Salud Publica, P.O. Box 537, Tapachula, Chipas 30700, Mexico

1243. **Rolff, J.; Martens, A. (1997):** Completing the life cycle detachment of an aquatic parasite (*Arrenurus cuspidator*, Hydrachnellae) from an aerial host (*Coenagrion puella*, Odonata). *Canadian Journal of Zoology* 75(4): 655-659. (in English). ["Water mites are very important parasites of aerial stages of aquatic insects. Their larvae parasitize semiaquatic hosts and must detach while the host is in a suitable habitat for reproduction of parasite and host. Therefore, water mites should respond to stimuli indicating this situation. Different stimuli were tested experimentally in the host-parasite system *Coenagrion puella* - *Arrenurus cuspidator* in outdoor cages; this method provides exact data on the initial intensity of mite larvae per host. It was found that mites detach during tandem oviposition by the host. The detachment rate does not correlate with the host's sex or with the intensity of mite larvae per host. Ectoparasitic water mites are apparently influenced by the host's condition because mites did not detach from dead hosts even in water. Proximity to water also seems to have an impact: mites exposed at a height of 10 mm above water detached, whereas mites exposed at 25 mm or higher did not. We suggest that detachment of mite larvae is triggered by a group of stimuli associated with the egg-deposition behaviour of the host." (Authors)] Address: Rolff, J., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1244. **Sandberg, E. (1997):** Benthic predator-prey relationships and abiotic stress. The effects of physical disturbance and oxygen deficiency. *Acta Academiae Aboensis Ser. B Mathematica et Physica - Matematik Naturvetenskaper Teknik* 56(2): 1-42. (in English). ["Potential competition for food between predators of different ecological origin in the Baltic Sea was evident as the marine isopod, *Saduria entomon* (L.), and the limnic dragonfly larva, *Libellula quadrimaculata* (L.), exhibited similar prey choice and similar predation efficiency in a series of aquarium experiments. Despite the potential for the predators to affect a specific prey population no effect on the total community was seen in a field enclosure experiment. To examine these contradictory results from aquarium and field experiments the relative importance of direct predation, sediment stability (sediment resuspension) and sediment quality (sand and mud) was studied separately and combined using *S. entomon* as predator and juvenile bivalves, *Macoma balthica* (L.) as prey. Direct predation, sediment stability and quality had little effect on the survival of juvenile clams. The combined effect of these factors significantly increased the mortality of the clams as the combination of predation and sediment resuspension demonstrated synergistic negative effects on *M. balthica* survival. [...] As a secondary effect of eutrophication, the risk for exposure to oxygen deficiency (hypoxia) of benthic communities is increasing and important biotic couplings might be altered. [...] These results show that important structuring functions, such as predator-prey

interactions, are altered already at sublethal oxygen levels, which consequently affect the benthic community structure before the system shows numerical signs of changes beyond background variation." (Author)] Address: Sandberg, Eva, Kaskisgatan 2 C 14, FIN-20700 Abo Finland

1245. **Sandhu, R.; Walia, G.K. (1997):** Chromosome analysis of *Ischnura inarmata* (Coenagrionidae: Zygoptera: Odonata). *Chromosome Science* 1(2-3): 115-116. (in English). ["The results of chromosomal studies on a cytogenetically new species *Ischnura inarmata* have been described and illustrated. These include behaviour of chromosomes in cell cycle, chromosome number, karyotype and m: X ratio. The karyological description of this species is $2n = 27$ m with XO sex determining mechanism." (Author)] Address: Sandhu, R., Dep. Zool., Punjabi Univ., Patiala-147 002, Punjab, India

1246. **Sarkar, N.K. (1997):** Observations of three new and one known species of cephaline gregarines (Apicomplexa: Sporozoa: Eugregarinida: Septatina) from the odonates of Mahananda Forest, West Bengal, India. *Archiv für Protistenkunde* 148(1-2): 209-213. (in English). ["Three new species of actinocephalid gregarines (Apicomplexa: Sporozoa: Eugregarinida: Septatina), *Actinocephalus longus* sp. n., *Mukundaella vannus* sp. n. and *Odonaticola truncatus* sp.n. from the midguts of *Enallagma pervum* Selys [???], *Onychargia atrocyana* Selys, and *Pseudagrion decorum* Rambur respectively, are described. One known species, *Hoshidea polyhamatus* (Hoshide, 1977) Sarkar, 1995 is reported from a new locality, i.e. the Mahananda Forest of West Bengal, India." (Author)] Address: Sarkar, N.K., Institution Dep. Zool., Rishi Bankim Chandra Coll., Naihati 743165, West Bengal, India

1247. **Sauman, V.F.S. (1997):** Immunohistochemistry of the products of male accessory glands in several hemimetabolous insects and the control of their secretion in *Pyrrhocoris apterus* (Heteroptera: Pyrrhocoridae). *European Journal of Entomology* 94(3): 349-360. (in English). ["Three antibodies against secretions of the male accessory glands of *Tenebrio molitor* react with specific regions of the male reproductive system in a damselfly, cockroach, cricket and the bug *Pyrrhocoris apterus*. [...]"] (Author)] Address: Sauman, V., Inst. Entomol., Acad. Sci., Fac. Biol. Sci., Univ. South Bohemia, Branisovska 31, 370 05 Ceske Budejovice, Czech Republic

1248. **Scheuhammer, A.M.; McNicol, D.K.; Mallory, M.L.; Kerekes, J J. (1997):** Relationships between lake chemistry and calcium and trace metal concentrations of aquatic invertebrates eaten by breeding insectivorous waterfowl. *Environmental Pollution* 96(2): 235-247. (in English). ["Ca, P, Al, and trace metal (Cu, Ni, Zn, Cd, and Pb) concentrations were measured in several aquatic invertebrate taxa used as food by breeding insectivorous waterfowl, sampled from three sites in eastern Canada with widely varying water chemistry. Ca concentrations were highest in molluscs (snails and clams), averaging 200-300mg g⁻¹ (shells included). Aquatic insects of varying sizes, life stages and habits (caddisfly larvae, dragonfly larvae, adult backswimmers, waterstriders, and whirligig beetles) had much lower mean Ca concentrations, ranging from about 0.6 mg g⁻¹ (beetles) to 1.8 mg g⁻¹ (caddisflies). Invertebrate-Ca

concentrations decreased with increasing body mass for several taxa with smaller and larger individuals providing similar absolute amounts of Ca. Ca concentrations in most aquatic insects (but not molluscs) were reduced under acidic, low Ca, high Al, low dissolved organic carbon (DOC) and/or low total phosphorus (TP) conditions. In stepwise multiple regressions, pH was consistently the main factor explaining variability in invertebrate-Ca, after controlling for the negative relationship between invertebrate-Ca and body mass for some taxa. Molluscs were absent from lakes below pH 5.3. In general, concentrations of P and metals in invertebrate taxa were not significantly correlated with lake pH. Levels of Al, Cd, or Pb were not sufficiently high to be considered toxic to potential consumers of these organisms. For waterfowl and other birds breeding in acid-stressed habitats and relying on aquatic invertebrates as a source of food, a reduced availability of dietary Ca is more likely than an increased exposure to toxic metals to negatively affect reproductive success, especially when other adverse effects of acidification (lower diversity of prey) are considered." (Authors)] Address: Scheuhammer, A.M., Canadian Wildlife Serv., Natl. Wildlife Res. Cent., 100 Gamelin Blvd., Hull, Quebec K1A 0H3 Canada

1249. **Skevington, J.; Carmichael, I. (1997):** Dragonflies and damselflies (Odonata) of Bosanquet (North Lambton County, Ontario). Proceedings of the Entomological Society of Ontario 128: 3-12. (in English). ["The odonate fauna of Bosanquet (North Lambton County, Ontario) is surveyed. Sixty-two species of Odonata are recorded for Bosanquet, bringing the Lambton County odonate total to 66 species. Thirty-five species are added as new to Lambton County. *Enallagma traviatum* is new to Canada and the record of *Enallagma basidens* signifies that this species is continuing to expand its range northward. *Pachydiplax longipennis* is discovered on the Lake Huron shoreline for the first time, away from its regular haunts along Lakes Erie and Ontario. *Libellula quadrimaculata* and *Nannothemis bella* were recorded in Lambton County by Walker and Corbet (1973) but were not discovered in our study. They are presumed to be extirpated." (Authors)] Address: Skevington, J.; Dep. Entomol., Univ. Queensland, Brisbane, QLD 4072, Australia

1250. **Switzer, P.V. (1997):** Past reproductive success affects future habitat selection. Behavioral Ecology & Sociobiology 40(5): 307-312. (in English). ["Correlational studies have shown that an individual's past reproductive success often increases its breeding site fidelity (i.e., the tendency to return to a previously occupied location), suggesting that individuals use their reproductive experience to assess habitat quality. However, the causality of the relationship between reproductive success and site fidelity is still uncertain. In a field experiment, the effect of mating success on site fidelity was isolated from potential confounding variables in a territorial dragonfly, the eastern amberwing (*Perithemis tenera*). The experiment controlled for site quality, intrinsic characteristics of males, previous territorial experience at the site, arrival order, and territorial evictions. Males that were prevented from mating were much more likely to change sites the following day than control males that were allowed to mate. This result was not affected by age, the amount of time a male spent on the site, or

mortality. These results imply that individuals use their own reproductive success to assess the quality of the habitat. The benefit to an individual of using its reproductive success to determine habitat quality is discussed relative to other sources of information." (Author)] Address: Switzer, P.V., Eastern Illinois Univ., Dept Biol, Sci., Charleston IL 61920; Usa. E-mail: cfpvs@eiu.edu

1251. **Thorp, A.G.; Jones, R.C.; Kelso, D.P. (1997):** A comparison of water-column macroinvertebrate communities in beds of differing submersed aquatic vegetation in the tidal freshwater Potomac River. Estuaries 20(1): 86-95. (in English). ["Macroinvertebrates are a major food for fish species and macrophyte beds are hypothesized to harbor a rich community of these organisms. Macroinvertebrates inhabiting the water column in two macrophyte beds and an adjacent open area were sampled in a small embayment of the tidal freshwater Potomac River. One macrophyte bed consisted of an almost complete monoculture of *Hydrilla verticillata*, while the second community was a more diverse mixture of plant species. In samples with substantial amounts of submersed aquatic vegetation (SAV), macroinvertebrate density was two orders of magnitude higher than and substantially more taxa were found than at the open water site. Total macroinvertebrate abundance was significantly greater at the *H. verticillata* site than at the mixed site in July, but no significant difference was observed in August. Taxa richness did not vary between the two vegetated sites in July but was higher in the mixed bed in August. While the two vegetated sites shared similar taxa, they differed in their abundance. The *H. verticillata* site harbored more hydrobiid snails, and the mixed site was characterized by more chironomids and hydroptilid caddisflies. Differences between July and August collections were even greater than between sites. Numbers of hydroptilid caddisflies, baetid mayflies, and coenagrionid damselflies were substantially higher in August, while oligochaetes, hydrobiids, and chironomids were reduced. Results support the hypothesis that water-column macroinvertebrates are greatly enhanced in the presence of macrophytes. The ecological significance of the less substantial differences in macroinvertebrates between macrophyte beds requires further study." (Authors)] Address: Jones, R.C., Dep. Biol., George Mason Univ., 4400 University Dr., Fairfax, VA 22030, USA

1252. **Tsubaki, Y.; Hooper, R.E.; Siva-Jothy, M.T. (1997):** Differences in adult and reproductive lifespan in two male forms of *Mnais pruinosa costalis* Selys (Odonata: Calopterygidae). Researches on Population Ecology 39(2): 149-155. (in English). [Males of *Mnais pruinosa costalis* are dimorphic, existing as clear-winged 'non-territorial 'sneakers'- and orange-winged territorial 'fighters'. "Here we report the results of population census data and behavioural observations in the field and laboratory, and present estimates of emergence period, reproductive period, total lifespan, and reproductive success of each morph. Clear-winged males are smaller and have lower daily reproductive success than orange-winged males, but live for longer in the field and laboratory. We accounted for the difference in the 'operational reproductive life' of the two morphs and estimated lifetime reproductive success: there was no difference between clear-winged and

orange-winged males. We discuss possible mechanisms for the maintenance of the two forms." (Authors)] Address: Siva-Jothy, M.T., Department of Animal and Plant Sciences, University of Sheffield, Sheffield, S10 2TN, UK

1253. **Van Buskirk, J.; McCollum, S.A.; Werner, E.E. (1997):** Natural selection for environmentally induced phenotypes in tadpoles. *Evolution* 51(6): 1983-1992. (in English). ["Models suggest that phenotypic plasticity is maintained in situations where the optimal phenotype differs through time or space, so that selection acts in different directions in different environments. Some empirical work supports the general premise of this prediction because phenotypes induced by a particular environment sometimes perform better than other phenotypes when tested in that environment. We have extended these results by estimating the targets of selection in *Pseudacris triseriata* tadpoles in environments without predators and with larval *Anax* dragonflies. Tadpoles displayed significant behavioral and morphological plasticity when reared in the presence and absence of nonlethal dragonflies for 32 days in cattle tanks. We measured selection in the absence of free predators by regressing growth and survival in the tanks against activity and several measures of tail and body shape. We measured selection in the presence of predators by exposing groups of 10 tadpoles to *Anax* in overnight predation trials and regressing the average phenotype of survivors against the number of tadpoles killed. Selection in the two environments acted in opposite directions on both tail and body shape, although the affected fitness components were different. In the presence of *Anax*, tadpoles with shallow and narrow body, deep tail fin, and wide tail muscle survived best. In the absence of free predators, tadpoles with narrow tail muscle grew significantly faster, and those with shallow tail fin and deep body grew somewhat faster. Activity was unrelated to survival or growth in either environment. Developmental plasticity in tail shape closely paralleled selection, because tail fin depth increased after long-term exposure to *Anax* and tail muscle width tended to increase. In contrast, there was no plasticity in body shape in spite of strong selection for decreasing body depth. Thus, when confronted with a dragonfly predator, *P. triseriata* tadpoles adjusted their tail shape (but not body shape) almost exactly in the direction of selection imposed by *Anax*. These results suggest that phenotypic plasticity in some morphological traits, such as tail depth and tail muscle width, has evolved under intermittent selection by dragonflies. Other traits that undergo selection by dragonflies, such as body morphology, appear developmentally rigid, perhaps because of historically strong opposing selection in nature or other constraints." (Authors)] Address: Van Buskirk, J., Inst. Zool., Univ. Zürich, CH-8057 Zürich Switzerland

1254. **Weihler, B.; Kornick, H. (1997):** Digestion of phosphatidylcholines, absorption and esterification of lipolytic products by *Aeshna cyanea* larvae as studied in vivo and in vitro. *Arch. Insect Biochem. Physiol.* 36(4): 273-293. (in English). ["Digestion and absorption of phosphatidylcholine by *Aeshna cyanea* larvae were studied in vivo and in vitro with the isolated digestive juice and isolated midgut. The experiments were performed with stable ether analogues (1-alkyl-2-acyl-1,2-dialkyl phosphatidylcholine, and 1-monoalkyl-

lysophosphatidylcholine) with radioactive 1,2-diacylphosphatidylcholine alternatively labelled in the acyl- and choline moieties, and with several phosphatidylcholine derivatives (1-(1-14C)acyl- and 1-(3H)alkyl-lysophosphatidylcholine, (1-14C)oleic acid, (2-14C)glycerol, phosphoryl (methyl-14C)choline, and (methyl-14C)choline). Chromatographic analyses of the digestion products revealed that phosphatidylcholine was degraded via two interconnected hydrolytic pathways involving phospholipase C, phospholipase A2, lipase, and alkaline phosphatase. Complete hydrolysis by these pathways yielded the same four end products: free fatty acid, glycerol, choline, and Pi, which were absorbed by the midgut enterocytes. Of the intermediate hydrolysates, lysophosphatidylcholine, monoacylglycerol, and possibly phosphorylcholine were also absorbed. Radiolabelled oleic acid, glycerol, lysophosphatidylcholine and monoacylglycerol (as judged from monoalkylglycerol absorption) were incorporated into phospholipids and acylglycerols of the midgut enterocytes and were released into the haemolymph primarily in the form of diacylglycerols. In the case of glycerol ingestion, a small fraction of haemolymph radioactivity was associated with free glycerol and glycerolphosphate. After absorption by the enterocytes, radiolabelled choline was partly oxidized to betaine, partly phosphorylated, and partly incorporated into lyso- and phosphatidylcholine. It was recovered from the haemolymph predominantly as free choline, phosphorylcholine, and betaine." (Authors)] Address: Kornick, H., Univ. Bonn, Inst. Cell Biol., Ulrich-Haberland-Str. 61a, 53121 Bonn, Germany

1255. **Whiting, M.F.; Carpenter, J.C.; Wheeler, Q.D.; Wheeler, W.C. (1997):** The strepsiptera problem: Phylogeny of the holometabolous insect orders inferred from 18S and 28S ribosomal DNA sequences and morphology. *Systematic Biology* 46(1): 1-68. (in English). [Phylogenetic relationships among the holometabolous insect orders were inferred from cladistic analysis of nucleotide sequences of 18S ribosomal DNA (rDNA) (85 exemplars) and 28S rDNA (52 exemplars) and morphological characters. Odonata were used as outgroup taxa.] Address: Whiting, M.F., Dep. Zool., M.L. Bean Life Sci. Museum, Brigham Young Univ., Provo, UT 84602 USA.

1256. **Wolf, L.L.; Waltz, E.C.; Klockowski, D.; Wakeley, K. (1997):** Influence on variation in territorial tenures of male white-faced dragonflies (*Leucorrhinia intacta*) (Odonata: Libellulidae). *Journal of Insect Behavior* 10(1): 31-47. (in English). ["Some individuals in species with extended periods of territorial occupancy may change territory locations within a single bout of territorial activity. Length of occupancy of mating territories among males in a local population of white-faced dragonflies (*Leucorrhinia intacta*) varied from more than 6 h to 15 min or less. Males with short tenures often established territories in several locations on the pond during a day. Several hypotheses have been proposed to explain shifting territorial sites rather than remaining in a single site during one bout of territoriality. We attempted to test the hypothesis that males shift to leave low-quality sites. Site quality may be affected by costs of defense in relation to intruder rate and the mating benefits of holding the territory. To test whether variation in these possible effects of benefits and costs of territoriality influenced tenure, we manipulated local quality of oviposition substrate and

perch density. The quality of oviposition substrate, but not perch density, influenced both potential benefits and costs of territoriality. Female density was higher in areas with good substrate, but so were rates of males intruding into the territories, rates of chasing by territorial males, and local density of territorial males. More matings occurred in areas with good substrate, but among males with tenures of 15 min or more, mating success per male and tenure lengths did not differ statistically among treatments. Defense costs were low for all treatments and perhaps were not an important influence on tenure duration. Territorial males in this population probably adjusted local density to expected mating success by initial choice of site rather than by varying tenure length. Variation in tenure length at a site resulted, in part, from stochastic external factors, such as predation attempts." (Authors)] Address: Wolf, L., Institution Dep. Biol., Syracuse Univ., Syracuse, New York 13244-1270, USA

1998

1257. **Åbro, A. (1998):** Structure and development of sperm bundles in the dragonfly *Aeshna juncea* L. (Odonata). *J. Morphol.* 235: 239-247. (in English). ["A re-examination of the origin and development of sperm bundles in aeshnid dragonflies (Odonata, Anisoptera) was carried out using light and electron microscopy. During their elongation, intracyst spermatids of the testis of the dragonfly *A. juncea* form a slender cytoplasmic protrusion, the acrosomal conicoid, beyond the nucleus and acrosome rodlet. Gathering and parallel alignment of the transforming spermatids into a tight bundle take place inside the cyst. The original, rigid spermatid foreparts eventually associate, initially by becoming adhesive and swelling progressively to intertwine, and thus come to constitute a cap that binds together all sperm heads within a cyst in a spermatodesma. The development of the spermatodesma seems to occur disjunct from somatic cyst cells. Bundled in this form, the sperms are transferred to the intratestis canal and moved down the spermiduct to the seminal vesicle. They are then forwarded to the male copulatory apparatus, from which they are transmitted to the female. Individual, fully formed sperms are seen to be liberated from the bundle when in the female receptaculum seminis. The remnant of the cytoplasmic acrosomal conicoid, which is considered an envelope of the acrosome rodlet, is then dissolved. The spermatodesmata are large sperm aggregates that constitute efficient vehicles for transmission of amounts of filamentous sperm to the female." (Author)] Address: Åbro, A., Inst. Anat., Univ. Bergen, Årstadveien 19, N-5009 Bergen, Norway

1258. **Adelman, T.L ; Oliver, T.A.; Olberg, R.M. (1998):** Multiunit recordings of descending visual interneurons in dragonflies. *Society for Neuroscience Abstracts* 24(1-2): 2113. (in English). [Cervical nerve cord: nervous system; visual interneurons: nervous system, receptive field] Address: Adelman, T., Cornell Univ., Ithaca, NY 14850, USA

1259. **Agüero-Peagrín, M.; Herrera-Grao, A.F.; Ferreras-Romero, M. (1998):** Plecópteros y odonatos de la parte superior de la cuenca del río Hozgarganta. *Almoraima* 19: 241-248. (in Spanish with English summary). [24 Odonate species from the headwater

region of the Rio Hozgarganta catchment (Spain, north of Gibraltar) are listed and commented. The records of *Oxygastra curtisii* and *Macromia splendens* are of special interest.] Address: Ferreras-Romero, M., Departamento de Biología Animal (Zoología), Facultad de Ciencias, Universidad de Córdoba, Avda. San Alberto Magno s/n, ES-14004 Córdoba, Spain

1260. **Ambrus, A.; Bánkuti, K.; Kovács, T. (1998):** Data to the Odonata fauna of the Kisalföld and the West-Hungarian marginal zone II. *Odonata - stadium larvale* 2: 9-16. (in English). [87 localities were odonatologically surveyed between 03.05.1997 and 25.08.1998. 48 species (34 as larva and exuvium, 45 as imago) were recorded. *Coenagrion ornatum*, *C. scitulum*, *C. pulchellum*, *Stylurus flavipes*, *Ophiogomphus cecilia*, *Cordulegaster heros*, *Epitheca bimaculata*, and *Leucorrhinia pectoralis* are of some faunistic interest] Address: Ambrus, A., Hortobágy National Park, Directorate, Thematic Information Centre of Nature Conservation, H-9495 Kópháza, Jurisich M. u. 16, Hungary

1261. **Ambrus, A.; Bánkuti, K.; Csóka, G.; Kovács, T. (1998):** Faunistic data to the Odonata fauna of the Körös-Maros National Park. *Odonata - stadium larvale* 2: 53-60. (in English). [45 odonate species of 43 sites visited between 03.07.1987 and 23.07.1996 are documented. *Erythromma najas*, *Coenagrion scitulum*, *Anax ephippiger*, *Ophiogomphus cecilia*, *Cordulia aenea*, and *Sympetrum pedemontanum* are new to the fauna of the National Park.] Address: Ambrus, A., Hortobágy National Park, Directorate, Thematic Information Centre of Nature Conservation, H-9495 Kópháza, Jurisich M. u. 16, Hungary

1262. **Ambrus, A.; Bánkuti, K.; Kovács, T. (1998):** Larval and adult data on the Odonata fauna of Burgenland (Austria) II. *Odonata - stadium larvale* 2: 5-8. (in English). [17 localities in Burgenland, Austria were surveyed for the Odonata between 13.05.1998 and 21.09.1998. 22 species were recorded, 19 of these as larvae and exuvia, and 12 species as imago. *Chalcolestes viridis*, *Coenagrion scitulum*, *Enallagma cyathigerum*, *Ischnura pumilio*, *Libellula quadrimaculata*, *Orthetrum albistylum*, and *Orthetrum coerulescens* were recorded for the first time in the larval stage or as exuvia.] Address: Ambrus, A., Hortobágy National Park, Directorate, Thematic Information Centre of Nature Conservation, H-9495 Kópháza, Jurisich M. u. 16, Hungary

1263. **Ambrus, A.; Bánkuti, K.; Csányi, B.; Juhász, P.; Kovács, T. (1998):** Larval data to the Odonata fauna of Hungary. *Odonata - stadium larvale* 2: 41-52. (in English). [The authors publish the data of Odonata collected between 07.09.1987 and 28.11.1997 for the Water Resources Research Centre, Budapest, Hungary. The material comprises the major Hungarian geographical regions (147 UTM squares). 38 species (1026 larval and 10 exuvial data) were gathered from 284 sites, in most cases running waters. This results in a considerable addition to the knowledge of the distribution of Gomphid species in Hungary.] Address: Ambrus, A., Hortobágy National Park, Directorate, Thematic Information Centre of Nature Conservation, H-9495 Kópháza, Jurisich M. u. 16, Hungary

1264. **Ambrus, A.; Bánkuti, K.; Kovács, T. (1998):** The Odonata fauna of the Szigetköz. *Odonata - stadium larvale* 2: 17-39. (in English). [65 localities in the

Szigetköz region resulted in 51 odonate, of which 5 (*Lestes macrostigma*, *Coenagrion ornatum*, *Anax ephippiger*, *Orthetrum coerulescens*, *Leucorrhinia pectoralis*) are new compared with previous studies. A total of 55 species is known in this region, 54 as imago and 48 as larva and exuvium.] Address: Ambrus, A., Hortobágy National Park, Directorate, Thematic Information Centre of Nature Conservation, H-9495 Kópháza, Jurisich M. u. 16, Hungary

1265. **Banning, M. (1998):** Auswirkungen des Aufstaus größerer Flüsse auf das Makrozoobenthos - dargestellt am Beispiel der Donau. Essener Ökologische Schriften 9: 285 pp, Appendices. (in German). [Impact of dams on macrozoobenthos of the River Danube, Bavaria, Germany; Odonata are quite rare in the Danube; the following species are listed: *Calopteryx splendens*, *Platycnemis pennipes*, *Somatochlora metallica*, *Orthetrum cancellatum*, *Ophiogomphus cecilia*, and *Gomphus vulgatissimus*; the population development of *G. vulgatissimus* is said - due to improved water quality - to be positive.] Address: Banning, Mechtild, c/o Bundesanstalt für Gewässerkunde, Postfach 309, D-56003 Koblenz, Germany

1266. **Barrett, M.D.; Williams, M.R. (1998):** Distribution of the Western *Petalura* dragonfly *Petalura hesperia* Watson in Western Australia. *Pacific Conservation Biology* 4(2): 149-154. (in English). ["A comprehensive survey of the Western *Petalura* dragonfly *Petalura hesperia* Watson was conducted in December 1995 and January 1996 during the annual flight period. This represents the first systematic survey of the distribution of this dragonfly, which is restricted to the south-west of Western Australia. Survey effort was concentrated around the headwaters of permanent streams with the aim of identifying those habitats most important for the long-term survival of the species. Twelve individuals representing six isolated populations were recorded, raising the total number of recorded localities to 19, although one population (at the type locality) is believed extinct and a further four are under threat from urbanization. The populations are scattered along the eastern fringe of the Darling scarp, between 31 degree and 32 degree S latitude and 115 degree and 116 degree E longitude." (Authors)] Address: Barrett, Michelle Dianne, P.O. Box 395, Werribee, Victoria 3030, Australia

1267. **Bauer, S. (1998):** Libellenbeobachtungen im westlichen Allgäu. *Mitteilungen der Arbeitsgemeinschaft Naturschutz Wangen Allgäu* 5: 104-112. (in German). [Baden-Württemberg, Germany; 32 habitats were odonatologically surveyed in the early 90th. 41 species could be observed including *Sympecma paedisca*, *Coenagrion pulchellum*, *Nehalennia speciosa*, *Anaciaeschna isosceles*, *Anax parthenope*, *Brachytron pratense*, *Epitheca bimaculata*, *Somatochlora arctica*, *Crocothemis erythraea*, *Leucorrhinia pectoralis*, and *Sympetrum fonscolombii*.] Address: not stated

1268. **Becnel, J.J.; Johnson, M.A. (1998):** Pathogenicity tests on nine mosquito species and several non-target organisms with *Strelkovimermis spiculatus* (Nematoda Mermithidae). *Journal of Nematology* 30(4): 411-414. (in English). ["Nine species of mosquitoes and several species of non-target aquatic organisms were tested for susceptibility to the mermithid nematode, *Strelkovimermis spiculatus*. All

species of *Anopheles*, *Aedes*, *Culex*, and *Toxorhynchites* exposed to *S. spiculatus* were susceptible. Of the nine mosquito species tested, *C. pipiens quinquefasciatus* had the greatest tolerance to initial invasion and the highest percent infection of those that survived. High levels of infection were also achieved with *Aedes taeniorhynchus* and *A. albopictus*, but these mosquitoes were significantly less tolerant to parasitism than *C. pipiens quinquefasciatus*. *Strelkovimermis spiculatus* did not infect or develop in any of the non-target hosts tested." (Authors) Target species: "damselfly and dragonfly larvae"] Address: Becnel, J.J., Center for Medical, Agricultural and Veterinary Entomology, USDA ARS, Gainesville, FL, 32604 USA

1269. **Buschendorf, J. (1998):** Zur Bedeutung von UVP für die Odonaten-Faunistik. *Pedemontanum, Magdeburg* 2: 5-6. (in German). [The relevance of odonatological data in environment impact studies for a regional faunistic record scheme is discussed; Sachsen-Anhalt, Germany] Address: Buschendorf, J., Ahornring 61, 06184 Zwintschöna, Germany

1270. **Caldwell, J.P.; De Araujo, M.C. (1998):** Cannibalistic interactions resulting from indiscriminate predatory behavior in poison frogs (Anura: Dendrobatidae). *Biotropica* 30(1): 92-103. (in English). ["Poison frogs in the genus *Dendrobates* have very small clutch sizes (2-6 eggs among species for which there are data) and typically transport their tadpoles singly to small phytotelmata [...]. Tadpoles of many species are predaceous, consuming larvae of insects that use the same microhabitat for breeding, such as giant damselflies and mosquitoes. Previous studies and observations on the behavior of poison frog tadpoles led us to question whether tadpoles might be cannibalistic. We studied a population of *Dendrobates castaneoticus* in lowland rainforest in Para, Brazil; additional data were collected on *Dendrobates auratus* in Nicaragua. At the study site in Brazil, we established a grid of 40 Brazil nut capsules, the microhabitat used by *D. castaneoticus* for tadpole deposition. Of 42 tadpoles deposited during the 55 days of the study, 20 were killed or died; 16 of these were presumably killed by conspecific tadpoles. Growth rate and time to metamorphosis was higher among tadpoles that consumed three or more tadpoles or relatively large larvae of the mosquito *Trichoprosopon digitatum*, a colonist of newly opened Brazil nut capsules. We propose that selection has favored the development of predatory behavior in poison frog tadpoles primarily as a mechanism to eliminate predators from the small phytotelmata in which they develop and that cannibalism is a secondary outcome of this behavior. Predatory behavior also provides tadpoles with food, which is frequently limited in these microhabitats. Additional studies of the biology of tadpoles of other species of *Dendrobates* are needed to determine the evolution of predatory and cannibalistic behavior in the clade." (Authors)] Address: Caldwell, Janalee, Dep. Zool., Oklahoma Mus. Natural History, Univ. Oklahoma, Norman, OK 73019 USA

1271. **Dannelid, E.; Berglund, H. (1998):** Scarce Chaser *Libellula fulva* found in Botkyrka kommun, new provincial record for Södermanland. *Entomologisk Tidskrift* 119(3-4): 149-150. (in Swedish). [*Libellula fulva* is rare in Sweden, in recent years thought to be limited to Eman in Småland in SE Sweden. It has now been

observed and collected on a locality in Botkyrka kommun S of Stockholm, where it was recorded both in 1997 and 1998 and appears to be rather common. This is the northernmost locality for the species in Sweden.] Address: Dannelid, E., Zoologiska Institutionen, Stockholms Universitet, 106 91, Stockholm Sweden

1272. **Eda, S. (1998):** A review on the migration of *Anax guttatus* to the main-lands of Japan. Tombo 41: 4. (in Japanese with English translation of the title). [List of published records of *A. guttatus* in Japan] Address: Eda, S., Matsumoto Dental University, Gobara, Hirooka, Shiojiri, Nagano 399-0781, Japan

1273. **Eda, S. (1998):** Welcome visitors of a southern species, *Anax guttatus*, to Nagano Pref. in autumn of 1998. Tombo 41: 2-3. (in Japanese with English summary). [Between September 19 and 26, 1998, *A. guttatus* was captured at a small pond in Miasa in Nagano Pref., Japan at 800 m above sea-level. Average length of 23 males and one female was measured. Tandem oviposition took place on October 3.] Address: Eda, S., Matsumoto Dental University, Gobara, Hirooka, Shiojiri, Nagano 399-0781, Japan

1274. **Feldmann, R.M.; Vega, F.J.; Applegate, S.P.; Bishop, G.A. (1998):** Early Cretaceous arthropods from the Tlayua Formation at Tepexi de Rodriguez, Puebla, Mexico. *Journal of Paleontology* 72(1): 79-90. (in English). ["The arthropod macrofauna from the Middle Member of the lithographic limestones of the Tlayua Formation, in quarries at Tepexi, Mexico, is comprised of marine and nonmarine components. [...] Remains of an arachnid and an odonate nymph represent nonmarine constituents. [...]"] Address: Feldmann, R.M., Dep. Geol., Kent State Univ., Kent, OH 44242 USA.

1275. **France, R.L. (1998):** Density-weighted delta13C analysis of detritivory and algivory in littoral macroinvertebrate communities of boreal headwater lakes. *Annales Zoologici Fennici* 35(3): 187-193. (in English). ["Investigations of the incorporation of terrestrial detritus into aquatic macroinvertebrates through delta13C analysis are becoming frequent for streams and wetlands, but comparatively little information exists for forest-fringed oligotrophic lakes. Although the most accurate assessment of community patterns in carbon dependency will be made through an organism density-weighted analysis of delta13C, this has never previously been undertaken for any freshwater system. Littoral macroinvertebrates (predominantly amphipods, ephemeropterans and dipterans, as well as odonates and trichopteran) from boreal lakes in northwestern Ontario, Canada displayed ranges of 6 per mill to 9 per mill in delta13C, all centred about -26 per mill. The closer agreement between the density-weighted delta13C distribution for these macroinvertebrates to tree rather than epilithon values, suggests that these organisms may be relying more substantially upon allochthonous detritivory than upon autochthonous algivory for energy sustenance. This finding therefore challenges the precept in some timber management guidelines that dismisses riparian trees as an important energy for lake foodwebs." (Author)] Address: France, R.L., Harvard Univ., Graduate Sch. Design, 48 Quincy St., Cambridge, MA 02138, USA

1276. **Fuhrmann, M. (1998):** Untersuchungen zur Libellenfauna (Odonata) der Neyetalsperre im Oberbergischen Kreis (NRW). *Bucklige Welt*, Wiehl 2:

48-60. (in German). [Transect study of the Odonata of the damed brook Neye, Nordrhein-Westfalen, Germany; 19 species were recorded; dominance of species is presented for each of the four transects] Address: Fuhrmann, M., Zum Großen Wald 19, D-57223 Kreuztal, Germany

1277. **Fuller, R.M.; Groom, G.B.; Mugisha, S.; Ipulet, P.; Pomeroy, D.; Katende, A.; Bailey, R.; Ogutu-Ohwayo, R. (1998):** The integration of field survey and remote sensing for biodiversity assessment: A case study in the tropical forests and wetlands of Sango Bay, Uganda. *Biological Conservation* 86(3): 379-391. (in English). ["Field surveys of plants and animals were combined with satellite remote sensing of broad vegetation types to map biodiversity and thereby help plan conservation in the Sango Bay area, some 30 by 100 km bordering Lake Victoria in Uganda. A statistical classifier applied to satellite images identified 14 land-cover classes including water, swamp, dry grasslands, degraded woody vegetation, semi-natural forest classes and intensive land uses. Validation, using 240 sample sites, recorded 86% correspondence between field and map data. Intensive land use makes up 23% of the area, water and swamps 27%, dry grasslands 29%, woody vegetation 21% with semi-natural forests covering 15% of the area. The species data from sample-based field surveys included flowering plant species, dragonflies, butterflies, fish, amphibians, reptiles, birds and mammals. The species data were used to generate biodiversity ratings, based on species 'richness' and 'rarity', which could be related to the vegetation cover. This inter-relation helped to generate a biodiversity map of the Sango Bay area which has since been used to aid conservation planning." (Authors)] Address: Fuller, R.M., Inst. Terrestrial Ecol., Monks Wood, Huntingdon, Cambridgeshire PE17 2LS, UK

1278. **Futahashi, R.; Araki, Y. (1998):** New records of *Anax guttatus* from Toyama Pref. Tombo 41: 6-8. (in Japanese with English summary). [At 76 areas in Toyama Pref., Japan between August and November 1998 many adult of the species were collected.] Address: not stated

1279. **Geister, I. (1998):** A list of Slovene dragonfly names. *Exuviae* 5(1): 1-5. (in Slovenian with English summary). ["The Slovene standard nomenclature is presented for the families, genera and species known or expected to occur in Slovenia and adjacent regions. The names are artificial rather than based on the available folk appellations. They were constructed with reference to the peculiarities in general appearance, colour, behaviour, habitat and phenology of the taxa concerned. Family and generic names are uninominal, species-group names are binominal, the infraspecific taxa are not considered. This nomenclature was in experimental use since 1992, and becomes compulsory with the present publication." (Author)] Address: Geister, I., Kocjancici 18, SI-6276 Pobegi, Slovenia

1280. **Glaser, B. (1998):** Besiedlung von neugeschaffenen Gewässern in der Chemnitzau bei Heinersdorf durch Libellen, Fische und Lurche. *Veröffentlichungen des Museums für Naturkunde Chemnitz* 21: 131-138. (in German). [Documentation of colonisation by Odonata, Amphibia, and Pisces of six newly created water bodies near Chemnitz, Saxonia, Germany; 27 odonate species could be recorded three years after

finishing work on the water bodies; of some regional faunistic interest are *Erythromma viridulum*, *Ischnura pumilio*, *Lestes barbarus*, *L. dryas*, *Sympetma fusca*, and *Sympetrum pedemontanum*.] Address: Glaser, E., Alfred-Neubert-Str. 8, D-09123 Chemnitz, Germany

1281. **González Soriano, E.; Novelo-Gutiérrez, R. (1998):** *Oplonaeschna magna* sp. nov. (Odonata: Aeshnidae), from Mexico with a description of its larva. *Rev. biol. trop.* 46(3): 705-715. (in English). ["*Oplonaeschna magna* sp. nov. (Odonata: Aeshnidae) (holotype male and allotype female deposited at CNIN UNAM-MEX., Mexico, D. F.) is described and illustrated from specimens collected in the states of Estado de Mexico, Guerrero, Hidalgo, and Morelos, Mexico. This is the second species of the genus *Oplonaeschna*. Adults of *O. magna* can be separated from those of *O. armata* (Hagen, 1861) by their larger size and broader thoracic stripes. The larva of the new species is also easily distinguished from that of *O. armata* by its larger size and longer prementum, and by structural differences of palpal lobes and epiproct. The larva of *O. armata* is briefly redescribed, illustrated and compared to that of *O. magna*. Notes on the biology of the new species are provided." (Authors)] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Aparatdo Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@sun.ieco.conacyt.mx

1282. **Hutchinson, R. (1998):** Observations de quelques émergences de *Lanthus parvulus* (Sélys) (Odonata: Gomphidae) à Port-au-Saumon (Charlevoix-Est) et les environs. *Fabriques* 23: 117-119. (in French with English summary). ["The author reports the discovery of twenty emergences of individuals of *Lanthus parvulus* (Selys) at Port-au-Saumon (Quebec) on June 6 and 7, 1998. He compares his observations with data from the literature and records these emergences as the earliest to date for the species in Quebec." (Author)] Address: Hutchinson, R., 12, chemin de la Savane, apt. 12, Gatineau (Québec), Canada, J8T 1P7

1283. **Huth, J.; Oelerich, H.-M.; Reuter, M. (1998):** Zur faunistischen Charakterisierung der Biotoptypen in der Braunkohlefolgelandschaft Sachsen-Anhalts. *Berichte des Landesamtes für Umweltschutz Sachsen-Anhalt, Sonderheft 1:* 32-41. (in German). [The presentation of the results of the odonatological survey is quite identical to Al Hussein, I. et al (1999) (see OAS 1325)] Address: Huth, J., OEKOKART GmbH, Georg-Cantor-Str. 31, D-06108 Halle/Saale, Germany

1284. **Inoue, K.; Piper, W.; Tabata, O. (1998):** Small observation records of *Zygomma obtusum* in Iriomote Island, Okinawa Prefecture. *Tombo* 41: 37-40. (in Japanese with English summary). [Crepuscular behaviour of *Z. obtusum* in the afternoon and in the morning hours, and the reproductive flight are described. "Females oviposited beating their tips of abdomens against the surface of floating dead branch, then immediately turn round, beat, turn round. A female continued this [beat-turn round] sequence 80 times in 40 seconds. The oviposition surface of dead branch was covered layer by layer by red brown eggs forming a hard rubber like mass (Fig. 1). Males flew rapidly circulating around the floating branch in search of females (Fig. 2), and they form tandems when finding females. Soon they copulate, fly about above water for

some seconds, then separate and females start oviposition."] Address: Piper, W., Kollenhof 31, D-22527 Hamburg, Germany

1285. **Jiang, Y.-H. (1998):** A new species of the genus *Epopthalmia* (Odonata: Corduliidae) from China. *Chinese Journal of Entomology* 18: 231-234. (in English). [*Epopthalmia kuani* n. sp. (Corduliidae), Yuntai Mountain, northern Jiangsu Province, China.] Address: Jiang, Yao-Hua, Lianyungang City Yuntaixiang Diversified Management Office, Jiangsu, 222064 China

1286. **Lange, L. (1998):** Beitrag zur Libellenfauna des einsteilig sichergestellten NSG "Plauer Stadtwald". *Naturschutzarbeit in Mecklenburg-Vorpommern* 41(1/2): 72-74. (in German). [Mecklenburg-Vorpommern, Germany; documentation of an odonatological survey in 1996 and 1997; 33 (including 24 reproducing) species could be recorded in different habitats (high bogs, meadows, lakes)] Address: Lange, L., Deichreihe 21, D-25599 Wewelsfleth, Germany

1287. **Lepori, F.; Maddalena, T.; Moretti, M.; Patocchi, N.; Maibach, A. (1998):** Inventario odonatologico delle zone umide di importanza nazionale del canton Ticino (Svizzera): stato della banca-dati e primi risultati. *Boll. soc. tician. sci. nat.* 86: 43-46. (in Italian with English summary). [De Marmels & Schiess (1977) surveyed more than 600 sites throughout the canton Ticino (Southern part of Switzerland) in the 70th. Since then, only a few local studies have been carried out there. Therefore an up date of the odontological data is considered necessary. The Gruppo di lavoro "Libellule Ticino" started in 1996 to collect the available data concerning Odonata with the purpose to set up a new data base which would be the first step of a new inventory of the odonate fauna in the south of the Swiss Alps. This paper presents a check-list of the odonate fauna of the canton Ticino and gives an outlook on the inventory for the period 1997-1999.] Address: Maibach Sàrl, A., Études en environnement, La Croix Rte de Moudon, CH-1610 Oron-la-Ville, Switzerland

1288. **Lotzing, K. (1998):** Kurzübersicht einiger Odonatenfunde im ehemaligen Landkreis Staßfurt für den Zeitraum 1980 bis 1996. *Pedemontanum, Magdeburg* 2: 2-3. (in German). [Checklist of Odonata of the Landkreis (County) Staßfurt, Sachsen-Anhalt, Germany; the frequency of settled localities for each species is given] Address: Lotzing, K., Straße der Deutschen Einheit 7, D-39418 Staßfurt, Germany

1289. **Martens, A. (1998):** Aktuelle Funde von *Cercion lindenii* in Salzgitter - nur 15 km von der Landesgrenze Sachsen-Anhalts entfernt. *Pedemontanum, Magdeburg* 2: 1. (in German). [Short summary of the results published in Martens, A. & W. Wimmer, 1997, *Braunschweig. naturk. Schr.* 5(2): 343-352.] Address: Martens, A., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1290. **Matsuda, I. (1998):** *Anax guttatus* collected at Oizumi-Ryokuchi, Sakai City, Osaka Pref.. *Tombo* 41: 12. (in Japanese with English summary). [Two specimens were caught on 12 July and 1 August, 1998, prior a typhoon.] Address: not stated

1291. **Merceron, E. (1998):** Observations sur la Riviera française (Coleoptera, Lepidoptera, Odonata,

Hymenoptera, Homoptera, Heteroptera, Diptera). *Entomologiste* 54(2): 55. (in French). [Calopteryx haemorrhoidalis; "Sur le Paillon de la Grave, avant Blausasc"; France] Address: Merceron, E., les Glaieuls, 16 Avenue Scuderi, F-06100 Nice, France

1292. **Ministerium für Landwirtschaft, Naturschutz und Umwelt Thüringen (1998)**: Besonders geschützte Biotope in Thüringen. 2., unveränderte Auflage: 84 pp. (free of charge). (in German). [§ 18 of the "Vorläufige Thüringer Gesetz über Naturschutz und Landschaftspflege" defines habitats of special protection purposes. In this book, each of the habitats is characterized with a short text contribution and colour photographs of the habitat, some typical plants, and typical animals including Odonata.] Address: Ministerium für Landwirtschaft, Naturschutz und Umwelt Thüringen, Öffentlichkeitsarbeit, Beethovenplatz 3, 99096 Erfurt, Germany

1293. **Müller, J.; Steglich, R. (1998)**: Aeshna affinis hat 1996 / 1997 erfolgreich überwintert. *Pedemontanum*, Magdeburg 2: 4-5. (in German). [Confirmation of the autochthonous status of A. affinis in the floodplains of River Elbe, Sachsen-Anhalt, Germany, in 1997] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1294. **Müller, J. (1998)**: Aufruf zur Mitarbeit: Anax parthenope in Sachsen-Anhalt. *Pedemontanum*, Magdeburg 2: 5. (in German). [Data on the distribution of A. parthenope in Sachsen-Anhalt, Germany are required for a compilation of all records of the species for the mid-eastern part of Germany] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1295. **Müller, J.; Steglich, R. (1998)**: Die Flußjungfern Gomphus flavipes und Ophiogomphus cecilia in Donau und Nebenflüssen 1998. *Halophila* 36: 3. (in German). [Records of the species from different localities along the River Danube in Hungaria, Slovakia, Austria, and Germany (Bayern)] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1296. **Müller, J. (1998)**: Editorial. *Pedemontanum*, Magdeburg 2: 1. (in German). [Special attention should given to species with range extension due to global warming, and species which could re-establish itself in waters with improved water quality] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1297. **Müller, J.; Steglich, R. (1998)**: Ergebnis der "Aktion flavipes 1997". *Pedemontanum*, Magdeburg 2: 3-4. (in German). [In 1996 and 1997 the River Elbe systematically was surveyed for Stylurus flavipes; numerous autochthonous subpopulations along the river could be traced; the threat for River Elbe and its biocoenosis by the scheduled impoundment and removal of the groynes, and the importance of S. flavipes as bioindicator are outlined] Address: Müller, J., Frankefelde 3, D-39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1298. **Müller, J.; Steglich, R. (1998)**: Libellen- und Heuschrecken-Funde im NSG "Untere Mulde". *Halophila* 36: 3. (in German). [Ophiogomphus cecilia] Address:

Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1299. **Müller, J. (1998)**: Literatur. *Pedemontanum*, Magdeburg 2: 6-8. (in German). [Titles No. 28-50 of the bibliography of Odonata of Sachsen-Anhalt, Germany are listed] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1300. **Müller, J.; Steglich, R. (1998)**: Neues von der Elbe bzw. aus dem Elbetal 1998. 2. Gemeine Keiljungfer Gomphus vulgatissimus nun auch an der Elbe. *Halophila* 36: 2. (in German). [G. vulgatissimus was traced between several groynes in River Elbe in May 1998; Sachsen-Anhalt, Germany] Address: Müller, J., Frankefelde 3, D-39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1301. **Müller, J.; Steglich, R. (1998)**: Neues von der Elbe bzw. aus dem Elbetal 1998. 3. Weitere Nachweise von Ophiogomphus cecilia und Gomphus flavipes. *Halophila* 36: 2. (in German). [Records of the species between several groynes in River Elbe in May 1998; Sachsen-Anhalt, Germany] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1302. **Olajos, P.; Kiss, B.; Juhász, P. (1998)**: Faunistical research on the dragonfly (Odonata) fauna of the Körös-Maros National Park. *Odonata - stadium larvale* 2: 61-70. (in Hungarian with English summary). [Odonata were collected in the South-East-Plain of Hungary, Körös-Maros National Park. A total of 41 species, 29 species as larva, 19 species as exuvia and 36 as adult, was recorded at 61 localities. The species frequency plotted against the localities is as follows: 1 species is very frequent, 18 are frequent, 11 are less frequent, 6 are rare, and 5 are sporadic. Leucorrhinia pectoralis is new to the region. It is stressed that Epithea bimaculata is of special regional importance.] Address: Olajos, P., Hortobágy Nemzeti Park, Igazgatóság, H-4024 Debrecen, Sumen u.2, Hungary

1303. **Onore, G.; Cevallos, V. (1998)**: Massive movement in Panoquina sylvicola in southern Ecuador (Lepidoptera: Hesperidae). *Tropical Lepidoptera* 9(1): 28. (in English). ["A large mass of Panoquina sylvicola (Herrich-Schäffer) (Lepidoptera: Hesperidae), accompanied by limited numbers of Siproeta epaphus Latreille (Nymphalidae) and an unidentified species of Aeshnidae [...], were observed moving west to east near Loja, Ecuador, on 18 April 1992. Approximately 100-150 butterflies per minute were counted over a road at 3100 m, flying about 18 km per hour against a wind speed of 12 km per hour." (Authors)] Address: Onore, G., Dep. Biol., Pontificia Univ. Catol. Ecuador, 12 de Octubre y Roca, Quito Ecuador

1304. **Papazian, M. (1998)**: Les odonates et les plantes épizoochores. *Entomologiste* 54(5): 193-196. (in French with English summary). [In Camargue, France, Orthetrum cancellatum, Crocothemis erythraea, and Sympetrum fonscolombii are potential victims of the epizoochoric plant Setaria verticillata, which is used as perch when the wind blows strong. In this situation the wings of specimens are immobilized by the numerous spikelets.] Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France

1305. **Perron, J.-M.; Ruel, Y. (1998):** Deux gomphides rares, *Stylurus amnicola* (Walsh) et *Stylurus spiniceps* (Walsh) (Odonata, Gomphidae) à l'anse du Moulin Banal, Saint-Augustin-de-Desmaures, Québec. *Faberies* 23(374): 131-133. (in French with English summary). [New data on the geographical distribution in Quebec of *S. amnicola* and *S. spiniceps*. The species have been discovered recently at Anse du Moulin Banal, Saint-Augustin-de-Desmaures.] Address: Perron, J.-M., 963, rue Grandjean, app. 506, Sainte-Foy, Québec G1X 4P9, Canada. E-mail: collections@coll.ulaval.ca

1306. **Polyanovskii, A.D. (1998):** Phototransduction in insects: Two strategies of calcium homeostasis? *Sensornye Sistemy* 12(3): 245-254. (in Russian). ["In rhabdomeral photoreceptors of arthropods, light causes steep elevation of cytosolic free calcium concentration. The consensus model of the phosphoinositide signalling cascade attributes this phenomenon to the inositol 1,4,5-trisphosphate (InsP3)-mediated calcium release from the intracellular stores, submicrovillar endoplasmic cisternae (SMC). It is generally accepted that the depletion of SMC is an indispensable step in photoexcitation. This paradigm appears to fit most of insects with a fused-type rhabdom (Hymenoptera, Orthoptera, Odonata, Blattodea), whose photoreceptors contain large SMC able to actively accumulate calcium and release it upon illumination through the InsP3- and ryanodine-sensitive mechanisms. However those with an open-type rhabdoms (Diptera, some Hemiptera and Coleoptera) conflict with the paradigm. Studies on *Drosophila* suggest that in open-rhabdom eyes the calcium homeostasis is mediated via a co-operation of at least three distinct mechanisms: (1) extracellular ommatidial cavity represents a principal calcium store responsible for a light-induced calcium influx; (2) specialized cytosolic domain containing a novel calcium-binding protein, calphotin, might function as a calcium-buffering "sponge"; (3) heavily reduced SMC do not express an InsP3-sensitive calcium release mechanism and do not participate in phototransduction directly. Hence the same task of the transformation of light into a receptor signal seems to be resolved in insects." (Authors)] Address: Polyanovskii, A.D., I. M. Sechenov Inst. Evol. Physiol. Biochem., Russ. Acad. Sci., pr. M. Toreza 44, St. Petersburg 194223, Russia

1307. **Ramirez, J.; Vogt, R.C.; Villarreal-Benitez, J.-L. (1998):** Population biology of a neotropical frog (*Rana vaillanti*). *Journal of Herpetology* 32(3): 338-344. (in English). ["We studied the population dynamics, food habits, and growth of a population of *Rana vaillanti* in a permanent lake in Southern Veracruz, Mexico from April 1984 through March 1985. [...] *Rana vaillanti* is a sit and wait predator with a diverse diet including birds, fish, and conspecifics. They consume a higher proportion of invertebrates than vertebrates, principally insects (Coleoptera and Odonata) and spiders." (Authors)] Address: Vogt, R.C., Estacion Biol. Tropical "Los Tuxtlas", Inst. Biol.-U.N.A.M., A.P. 91, San Andres Tuxtla, Veracruz, C.P. 95700 Mexico

1308. **Roehrdanz, R.L.; Degrugillier, M.E. (1998):** Long sections of mitochondrial DNA amplified from fourteen orders of insects using conserved polymerase chain reaction primers. *Annals of the Entomological Society of America* 91(6): 771-778. (in English). ["The combination of highly conserved or universal polymerase chain reaction (PCR) primers with

techniques that allow for the amplification of PCR products greater than a few thousand base pairs (long PCR) makes it possible to amplify the complete mitochondrial genome of virtually any insect as a small number of overlapping segments. Twelve conserved primers from 7 mitochondrial genes were used in 17 pair combinations. The size of the amplified segments ranged from 3.3 to 14.1 kb. Total genomic DNA from 33 insect species representing 14 orders served as the template. In most instances, 2 fragments sufficed to include the whole mitochondrial DNA (mtDNA). Less frequently 3 or more fragments were required to cover the complete mtDNA. Fragments that combined contain all of the mtDNA were amplified from 26 of 33 species. For the remaining species, >67% of the mtDNA was amplified. Any of the large amplicons are convenient for restriction fragment comparisons and they are also suitable as a template for nucleotide sequencing of either small mtDNA regions or the complete mtDNA of diverse taxa in conjunction with population or phylogenetic investigations. The procedures described here can be used to amplify the A+T or control region as part of a larger fragment and provides an opportunity for a more detailed analysis of this region." (Authors)] Address: Roehrdanz, R.L, Institution Biosci. Res. Lab., USDA-ARS, P.O. Box 5674, Fargo, ND 58105, USA

1309. **Schaffner, A.K.; Anholt, B.R. (1998):** Influence of predator presence and prey density on behavior and growth of damselfly larvae (*Ischnura elegans*) (Odonata: Zygoptera). *Journal of Insect Behavior* 11(6): 793-809. (in English). ["Foraging behaviour is often determined by the conflicting benefits of energy gain and the risk of mortality from predation or other causes. Theory predicts that animals should have lower activity levels when either the risk of predation or the availability of resources in the environment is high. We investigated the adjustment of the behaviour of *I. elegans* larvae to predator presence (*Anax imperator*) and prey density (*Daphnia* sp.) and their interaction in a completely crossed factorial experiment in the lab and the effect of behaviour on growth. The foraging activity of the *I. elegans* larvae was significantly reduced in the presence of a free-swimming predator but not a caged predator. Abdominal movements were significantly reduced at a low prey density. Growth was significantly reduced by the presence of a free swimming predator and low prey densities. These results provide evidence that these damselfly larvae adjust their behaviour to the presence of predators to increase their survival at the expense of reduced growth and development." (Authors)] Address: Anholt, B.R., Dept Biology, University of Victoria, PO Box 3020, Victoria, BC, V8W 3N5, Canada; E-mail: banholt@uvic.ca

1310. **Schmidt, E. (1998):** Aphorismen zur Odonatenfauna der Ruhraue bei Mühlheim. *Verh. West. Entomol. Tag* 1997: 205-212. (in German). [Checklist of the odonate fauna of the alluvion of Ruhr, Nordrhein-Westfalen, Germany; detailed discussion of factors determining the odonate habitat suitability in the region incl. interesting observations on the (negative) influence of *Branta canadensis* (Aves) on habitat of *Cercion lindenii* and *Erythromma viridulum*; of special faunistic interest are records of *Libellula fulva*, *Sympetrum pedemontanum*, and *Coenagrion pulchellum*] Address: Schmidt, E., Biologie und ihre Didaktik, FB9/S05, Universität GH Essen, D-45117 Essen, Germany

1311. **Schmidt, E. (1998):** Die ökologische Nische von *Sympetrum flaveolum* (L., 1758) und die Problematik von Artenschutz und Einstufung in Rote Listen bei Odonaten mit temporärer Habitat-Besiedlung (Odonata: Libellulidae). *Entomologia Generalis* 23(1-2): 129-138. (in German). ["[...] The ecological niche of *Sympetrum flaveolum* has the following key stone factors: • Water regime, which fits only in certain years, thus breeding only temporarily can be successful and dispersal is necessary for a new colonisation. • Good weather conditions during spring for the larval development and during the flying season as well for reproductive behaviour as for dispersal. • Microclimate: The microhabitats have a more continental microclimate compared with the surroundings. This fits to the rather northern distribution across the Euro-Siberian continent and preference of mountain regions in the southern parts of the distribution area. In NW-Germany temporarily floated areas at running waters, lakes and swamps decreased strongly. So the species lost most breeding habitats except some few places (mainly under nature conservancy or in sand dune valleys on the wadden sea islands). The vegetation structure preferred under natural conditions is favoured by poor soil, and so it suffered very much from fertilization everywhere. Special water and vegetation management in swamps may help for saving breeding habitats. [...] Red Data Books do not have an adequate category for species like *S. flaveolum* confined to only temporarily fitting breeding microhabitats." (Author)] Address: Schmidt, E.G., Univ. Essen (GHS), FB 9 SO5, D-45117 Essen, Germany

1312. **Schmude, K.L.; Jennings, M.J.; Otis, K.J.; Piette, R.R. (1998):** Effects of habitat complexity on macroinvertebrate colonization of artificial substrates in north temperate lakes. *Journal of the North American Benthological Society* 17(1): 73-80. (in English). ["The purpose of this study was to determine the effects of substrate complexity on community structure of macroinvertebrates in littoral zones of lakes. Artificial substrates were used to simulate characteristics of structures commonly placed on the lake bed along shorelines. Cement balls in a wire basket simulated rock riprap, whereas concrete patio blocks simulated retaining walls; the samplers had nearly equal surface areas. Samplers were placed in the littoral zones of 3 dissimilar lakes in Wisconsin, and in front of 3 types of shorelines: rock riprap, vertical retaining wall, and natural shorelines. Colonization periods were 40-45 d starting immediately after ice-out. Significantly greater numbers of organisms colonized basket samplers ($1947 \pm 155/m^2$, mean ± 1 SE) than block samplers ($951 \pm 73/m^2$). Taxa richness was significantly higher on baskets (31 ± 1) versus blocks (22 ± 1). Hydra, Turbellaria, Oligochaeta, Crustacea, Ephemeroptera, and Odonata were significantly more abundant on baskets than on blocks. [...] Neither abundance nor richness differed significantly among shoreline types, but a trend of higher values for both variables was observed along rock riprap. The results were consistent with the hypothesis that the more complex, 3-dimensional artificial substrate with its greater substrate heterogeneity, surface complexity, and interstitial space, will support a more diverse and abundant macroinvertebrate community in lakes compared to the less complex, 2-dimensional artificial substrate. Shoreline management practices that reduce habitat complexity may reduce local invertebrate diversity." (Authors)] Address: Schmude, K.L., Lake Superior Res. Inst., Univ. Wis.-Superior, Superior, WI 54880, USA

(Authors)] Address: Schmude, K.L., Lake Superior Res. Inst., Univ. Wis.-Superior, Superior, WI 54880, USA

1313. **Seki, T.; Vogt, K. (1998):** Evolutionary aspects of the diversity of visual pigment chromophores in the class insecta. *Comparative Biochemistry & Physiology - B: Comparative Biochemistry* 119(1): 53-64. (in English). ["In the class Insecta, three retinal congeners are used as the chromophore of visual pigments: retinal, (3R)-3-hydroxyretinal and (3S)-3-hydroxyretinal. The distribution of retinal and 3-hydroxyretinal superimposed on the phyletic tree of insects indicates that the original chromophore of visual pigments was retinal, and that some insects arose around the end of the Carboniferous period acquired the ability to use 3-hydroxyretinal. Xanthophylls possessing 3-hydroxy-beta-ring have been considered to be precursors of 3-hydroxyretinal, and the "oxygen pulse" in the late Paleozoic era is discussed as a possible contributory factor in obtaining the ability to use 3-hydroxyretinal as the visual pigment chromophore. Xanthophylls possessing 3-hydroxy-beta-ring produced by plants and bacteria have only the (3R)-beta-ring, so the 3-hydroxyretinal produced directly from such xanthophylls is expected to be (3R)-3-hydroxyretinal. On investigating the absolute structure of 3-hydroxyretinal in insect compound eyes, using a chiral column, the orders Odonata, Hemiptera, Neuroptera, Coleoptera, and Lepidoptera, and suborders Nematocera and Brachycera of the Diptera were found to have only (3R)-3-hydroxyretinal. The members of the dipteran suborder Cyclorrhapha, however, were found to contain a mixture of both the (3R)- and (3S)-enantiomers of all-trans 3-hydroxyretinal and (3S)-11-cis 3-hydroxyretinal. The Cyclorrhapha, which arose in the Jurassic period, have obtained the ability to produce (3S)-3-hydroxyretinal, but the metabolic pathway by which these "higher flies" form (3S)-3-hydroxyretinal has yet to be clarified." (Authors)] Address: Seki T., Div. Health Sci., Osaka Kyoiku Univ., 4-698-1, Asahigaoka, Kashiwara, Osaka 582 Japan

1314. **Swisher, B.J.; Soluk, D.A.; Wahl, D.H. (1998):** Non-additive predation in littoral habitats: influence of habitat complexity. *Oikos* 81(1): 30-37. (in English). ["The combined effects of predators on prey in structurally complex habitats may not always be described by additive models. Changes in habitat complexity can affect the rates of consumption by individual predators as well as alter the interactive, combined effects of predators with contrasting foraging styles. We examined the combined consumption of a common prey by two predators across a gradient of three habitat complexities. In microcosm experiments, consumption of larval mayfly prey (*Cloeon cognatum*) by juvenile bluegill sunfish (*Lepomis macrochirus*) and libellulid dragonfly larvae (*Erythemis simplicicollis*) exceeded additivity at low habitat complexity, but were additive at higher levels of complexity. Prey capture by odonates was unaffected by fish presence during both day and night. At low stem density, fish capture more mayfly larvae than expected in the presence of dragonflies than in their absence, while consumption by dragonflies is unchanged in the presence of fish. Both the behavioral attributes of predators and prey as well as structural complexity of their habitat affect encounter rates, and thus their net interaction." (Authors)] Address: Swisher, B., Institution Cent. Aquatic Ecol., Ill.

Natural History Survey, 607 E. Peabody Dr.,
Champaign, IL 61820, USA

1315. **Tóth, S. (1998):** Data to the dragonfly fauna of the Duna-Dráva National Park, South Hungary (Odonata). *Dunántúli Dolg. Term. tud. Sorozat* 9: 135-150. (in Hungarian with English and German summaries). [55 species were traced between 1992 and 1997 in the Duna-Dráva NP. Of special faunistic interest are according to the author *Calopteryx virgo virgo*, *Pyrrhosoma nymphula interposita* Varga, *Aeshna grandis*, *A. viridis*, *Epithea bimaculata*, *Stylurus flavipes*, *Leucorrhinia caudalis*, and *L. pectoralis*. In addition the following species should be mentioned: *Coenagrion ornatum*, *C. scitulum*, *Brachytron pratense*, and *Sympetrum pedemontanum*.] Address: Toth, S., Széchenyi u. 2, H-8420 Zirc, Hungaria. E-mail: flycatcher@freemail.hu

1316. **Velasco, J.; Millan, A. (1998):** Feeding habits of two large insects from a desert stream: *Abedus herberti* (Hemiptera: Belostomatidae) and *Thermonectus marmoratus* (Coleoptera: Dytiscidae). *Aquatic Insects* 20(2): 85-96. (in English). ["Feeding preference experiments were conducted to determine the feeding habits of *Abedus herberti* (Heteroptera, Belostomatidae) and *Thermonectus marmoratus* (Coleoptera, Dytiscidae), two large insects in Sycamore Creek, an intermittent Sonoran desert stream, Arizona, U.S.A. Numbers of live versus dead prey consumed were tested between and across three prey sizes. Five prey species were offered simultaneously (5 live and 5 dead specimens) in each size class. We found that *A. herberti* preferred live prey of small and medium size, but it chose mainly dead prey in the large size class. These results fitted the model of size-selective predation (Zaret, 1980). Size dependent predators selected prey of increased size, according to their visibility, but only up to where difficulty in handling and probability of escape affect successful consumption. Snails were the most preferred prey of *A. herberti*. By contrast, *T. marmoratus* consumed only dead prey of all sizes, but it preferred soft organisms with thin cuticle, such as immature larvae of some mayflies, beetles, dragonflies or fishes." (Authors)] Address: Velasco, J., Institution Dep. Ecol. Hidrol., Univ. Murcia, Campus Univ. Espinardo, E-30100 Murcia, Spain

1317. **Wada, S. (1998):** Observation on *Anax guttatus* in Fukui Pref., 1998. *Tombo* 41: 9-11. (in Japanese with English translation of the title). Address: not stated

1318. **Williams, D.D.; Williams, N.E. (1998):** Fresh-water invertebrates from the Bermuda Islands and their zoogeographical affinities. *Tropical Zoology* 11(2): 353-369. (in English). ["The Bermuda Islands lie in the western Atlantic Ocean with the closest mainland being North Carolina, some 965 km to the west. [...] Because of the proximity of many sites to the coast, this survey reports some species with brackishwater tolerance, and also, as in the case of the mites, species that were riparian in distribution. The samples revealed a total of 51 fresh/brackish water species with 24 of these being recorded from the islands for the first time. Predominant amongst this fauna were oligochaetes, gastropods, microcrustaceans, peracarids, odonates, corixids, hydrophilid beetles, and chironomid, ceratopogonid and ephydrid dipterans. ..."] (Authors)] Address: Williams, D.D., Univ. Toronto, Div. Life Sci., 1265 Mil Trail, Scarborough; ON M1C 1A4; Canada

1319. **Williams, P.H.; Gaston, K.J. (1998):** Biodiversity indicators: Graphical techniques, smoothing and searching for what makes relationships work. *Ecography* 21(5): 551-560. (in English). ["Knowledge of the distribution of biodiversity remains poor. This situation might more readily be resolved if the species richness of certain groups of organisms indicated the richness of other, less well known groups. A spatially explicit exploration of the pattern in the predictive power that one taxon (a potential 'indicator group') might have for the diversity of another has been performed previously. In this paper we respond to three important points that have been raised. First, we describe an additional graphical technique for visualizing spatial aspects of indicator relationships. Second, we examine some of the consequences of smoothing species richness data on observed indicator relationships. Third, we consider some of the factors that may contribute to strong indicator relationships." (Authors)] Address: Williams, P.H., Biogeography Conservation Lab., Natural Hist. Museum, London SW7 5BD, UK

1320. **Yokoyama, T.; Hirose, Y. (1998):** Records of *Somatochlora alpestris* from the lowest altitude at Daisetsu Mts. *Tombo* 41: 40. (in Japanese). Address: not stated

1321. **Zhou, W. (1998):** A new species of the genus *Anotogaster* from China (Odonata: Cordulegastridae). *Wuyi Sci. Jour.* 14: 16-17. (in Chinese with English summary). [*Anotogaster chaoi* n.sp.; holotype: male, Ruli, Yunnan Prov. 6 May 1984; the species is allied to *Anotogaster gregoryi* Fraser 1924] Address: Zhou Wen-bao, Department of Entomology, Zhejiang Museum of Natural History, Jiaokonglou 10, Hang Zhou - 310012, China

1322. **Zhou, W. (1998):** A report on *Petaliaeschna corneliae*. *Wuyi Sci. Jour.* 14: 1-2. (in Chinese with English translation of the title). [A female *P. corneliae* is figured] Address: Zhou Wen-bao, Department of Entomology, Zhejiang Museum of Natural History, Jiaokonglou 10, Hang Zhou - 310012, China

1999

1323. **Abbingh, G. (1999):** Larvenhuidjesdag "gevorderden" 6 februari 1999. *Mededelingen van de Nederlandse Vereniging voor Libellenstudie* 3(4): 5. (in Dutch). [Meeting of some experienced experts to identify dragonfly exuviae; new identification characters of genitalia of *Aeshna subarctica elisabethae* and *A. juncea* are figured and outlined] Address: Abbingh, G., Muddegoorn 78, NL-9403 NK Assen, The Netherlands. E-mail: G.Abbingh@SoftHome.net

1324. **Abbingh, G. (1999):** Verslag NVL-Excursie Appelscha, na 2 jaar dan toch *Mededelingen van de Nederlandse Vereniging voor Libellenstudie* 3(4): 5-6. (in Dutch). [Report on a trip to Appelscha/Smilde (Drenthe, The Netherlands) on 28 August 1999; 17 species were recorded including *Lestes barbarus*, *Ceriatrigon tenellum*, and *Aeshna subarctica elisabethae*] Address: Abbingh, G., Muddegoorn 78, NL-9403 NK Assen, The Netherlands. E-mail: G.Abbingh@SoftHome.net

1325. **Al Hussein, I.; Bergmann, S.; Funke, T.; Huth, J.; Oelerich, H.-M.; Reuter, M.; Tietze, F.; Witsack, W. (1999):** Die Tierwelt der

Bergbaufolgelandschaften. Naturschutz im Land Sachsen-Anhalt 36 (Sonderheft): 23-40. (in German). [The former brown coal mining regions in Germany developed to important regions for nature conservation purposes. In Sachsen-Anhalt (and further regions) the ecology of these habitats is surveyed intensively. The odonate fauna of 75 water bodies was studied by Jörg Huth. He traced 46 species. In this publication only the key stone species are listed according to the main habitat types. The succession of the vegetation and odonate fauna in brown coal mining water bodies is outlined in short. *Leucorrhinia pectoralis*, a species of the appendix of the FFH Directive, settles on 7 water bodies.] Address: not stated

1326. **Altmoos, M. (1999):** Netzwerke von Vorrangflächen - Ein methodischer Rahmen zur Planung und Optimierung von Gebietssystemen für den Naturschutz. Naturschutz und Landschaftsplanung 31(12): 357-367. (in German with English summary). ["Networks of Priority Areas - A Methodological Framework for Planning and Optimisation of Areal systems for Nature Conservation: A network (i.e. area system) for nature conservation includes a minimum number of priority areas which in their entity secure nature conservation aims in a larger context. This makes it necessary to integrate flexibility, different categories of areas, minimum sizes and a habitat network. A methodological framework has been worked out to implement these requirements. [...] *Ischnura pumilio*, *Orthetrum brunneum*, *O. coerulescens*, and *Sympetrum pedemontanum* are used as keystone species to assess brown coal mining regions near Leipzig, Sachsen, Germany for nature conservation needs.] Address: Altmoos, M., Umweltforschungszentrum Leipzig-Halle, Projektbereich Naturnahe Landschaften und Ländliche Räume, Permoserstr. 15, D-04318 Leipzig, Germany. E-mail: altmoos@pro.ufz.de

1327. **Anonymus (1999):** Ergebnisse der Insektenaufsammlung während der 9. Landesoffenen Entomologentagung 3.9. - 5.9.1999 in Ronney (Anhalt-Zerbst). Entomol. Mitt. Sachsen-Anhalt 7(2): 42-43. (in German). [*Aeshna mixta*, *Stylurus flavipes*, and *Sympetrum sanguineum* are recorded from the floodplains of the near River Elbe (51.92N 11.94)] Address: not stated

1328. **Ansorge, J. (1999):** *Heterophlebia buckmani* (Brodie 1845) (Odonata: "Anisozygoptera") - das erste Insekt aus dem untertoarcischen Posidonienschiefer von Holzmaden (Württemberg, SW Deutschland). Stuttgarter Beiträge zur Naturkunde Serie B (Geologie und Paläontologie). 275: 1-9. (in German with English summary). ["The first insect from the Lower Toarcian Posidonienschiefer ("Posidonia Shale") of Holzmaden (Württemberg, SW Germany), a fore wing of *Heterophlebia buckmani* (BRODIE 1845) (Odonata: "Anisozygoptera"), is described from the "Unterer Stein" ("Lower Stone"), a concretion-like carbonate layer. The holotypes of the Upper Liassic *Heterophlebia dobbertinensis* Handlirsch 1939, *Heterophlebia gracilis* Handlirsch 1939, *Systellothemis reticulata* Handlirsch 1939 from Dobbertin (Mecklenburg), and *Heterophlebia proxima* Bode 1905 from the Brunsvick area (Lower Saxony) are revised and considered younger synonyms of *H. buckmani*. Besides a collecting bias, the rarity of insects in the Posidonia Shale of Holzmaden probably

results from a larger distance of the sedimentation area to the Vindelician mainland." (Author)] Address: Ansorge, J., Institut für Geologische Wissenschaften der Ernst-Moritz-Arndt-Universität, Friedrich-Ludwig-Jahn-Straße 17a, D-17489, Greifswald Germany

1329. **Artemeyer, C. (1999):** Aktuelle Verbreitung, Habitatsprüche und Entwicklungsdauer von *Gomphus vulgatissimus* (Linnaeus) in der Ems im Kreis Steinfurt, Nordrhein-Westfalen (Anisoptera: Gomphidae). *Libellula* 18(3/4): 133-146. (in German with English summary). ["In 1997, the sp. was recorded emerging in 95 % of the one-kilometer-sections along approximately 58 km of the course of the river. In most cases the species occurred in sections with an unnatural regulated profile. Almost 50 % of the emergence sites were characterized by a high or very high cover of stones in the river bed. The question of the exact habitat of the larvae in the river Ems as well as the reason for the recent expansion of the species in this river are discussed. From regularly taken size measurements of the larvae it is suggested that larval development takes two years." (Author)] Address: Artemeyer, C., Philippstraße 16, 48149 Münster, Germany. E-mail: artmeyc@uni-muenster.de

1330. **Austin, A.D. (1999):** Use of Odonata as prey by sand wasps, *Bembix* spp. (Hymenoptera: Sphecidae). *Australian Entomologist* 26(3): 77-82. (in English). ["The sphecid wasp *Bembix minya* Evans & Matthews from southern South Australia is recorded for the first time as preying on damselflies (Odonata). Details of its nest structure and prey range are presented, as is a discussion of the evolutionary transition within the genus to utilising prey other than Diptera." (Author)] Address: Austin, A.D., Department of Applied and Molecular Ecology, Waite Campus, The University of Adelaide, PO Glen Osmond, SA 5064, Australia; E-mail: aaustin@waite.adelaide.edu.au

1331. **Bechly, G. (1999):** Epallagidae versus Euphaeidae revisited. *International Journal of Odonatology* 2(2): 137-139. (in English). ["The author's previous rejection of Selys' legions as available family-group taxa is restated and elaborated, strictly based on the provisions of the International Rules of Zoological Nomenclature (4th ed.)." (Author)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

1332. **Bedjanic, M.; Pirnat, A.; Salamun, A. (1999):** A contribution to the knowledge of dragonfly fauna of broader area along Drava River between Ptuj and Sfrdiscne ob Dravi, northeastern Slovenia (Insecta: Odonata). *Natura Sloveniae* 1(1): 45-70. (in Slovene with extensive English summary). ["The results of the work of the Odonatological group on the Student Biology Research Camp Sredisce ob Dravi '97 are presented. Between 24-31 July 1997 a total of 40 dragonfly species were recorded at 97 localities. A review of all known published and unpublished dragonfly records for the investigated area has shown that in the 1992-1998 period 128 localities were investigated and a list of 49 dragonfly species was compiled. Altogether 12 species viz. *Lestes virens vestalis* (Ramb.), *Lestes dryas* Kirb., *Sympetma fusca* (Vander Lind.), *Anaciaeschna isosceles* (Mull.), *Brachytron pratense* (Mull.), *Gomphus vulgatissimus* (L.), *Cordulia aenea* (L.), *Somatochlora flavomaculata*

(Vander Lind.), *Epitheca bimaculata* (Charp.), *Libellula fulva* Müll., *Sympetrum fonscolombii* (Sel.), and *Sympetrum depressiusculum* (Sel.) are new for the investigated area. The records of endangered species *Ophiogomphus cecilia* (Fourc.) in Drava R. and of *Leucorrhinia pectoralis* (Charp.) in fishponds near Ptuj deserve special interest from the nature conservation point of view. The inclusion of *Anaciaeschna isosceles* in the Red data list of endangered dragonflies (Odonata) of Slovenia as a vulnerable species is suggested." (Authors) Address: Pirnat, Alja, Vosnjakova 4/a, SI-1000 Ljubljana, Slovenia. E-mail: alja.pirnat@guest.arnes.si

1333. **Bedjanic, M. (1999):** *Aeshna subarctica elisabethae* Djakonov 1922, new for the odonate fauna of Slovenia (Anisoptera: Aeshnidae). *Exuviae* 6: 7-10. (in English with Slovenian summary). ["Several exuviae and a teneral female of the species were collected at the Sijec peat-bog (Pokljuka plateau, NW Slovenia) on 25-VI-1999 and 27-VI-1999. New record lies on the southern border of the species range in Europe and is zoogeographically interesting. The species is declared as critically endangered. Therefore, detailed population studies and its inclusion in the Red list of the dragonflies of Slovenia are proposed." (Author)] Address: Bedjanic, M., Fram 117/A, SI-2313 Fram, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

1334. **Bedjanic, M. (1999):** Dragonflies - A colorful life between the water and the sky. *Proteus* 62(1): 8-17. (in Slovene with English summary). [General account on the 73 Slovene dragonflies; some of the typical or rare species of Slovenia as *Cordulegaster heros* and *Leucorrhinia caudalis* and their habits are documented with brilliant colour pictures. In addition, information is given to the author, the Slovene Dragonfly Association, and Bastiaan Kiauta, one of the leading odonatologists in the 70th and 80th of the past century.] Address: Bedjanic, M., Fram 117/A, SI-2313 Fram, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

1335. **Bedjanic, M. (1999):** New records of *Hemianax ephippiger* (Burmeister, 1839) in Slovenia (Anisoptera: Aeshnidae). *Exuviae* 6: 14-18. (in English with Slovenian summary). ["The development of the species was confirmed at two localities in the vicinity of Maribor, northeastern Slovenia. Known records for Slovenia are mapped and a short discussion on the threat status of the species in Slovenia is added." (Author)] Address: Bedjanic, M., Fram 117/A, SI-2313 Fram, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

1336. **Bedjanic, M. (1999):** The creature of the month in September: the dragonfly *Sympetrum depressiusculum*. *Proteus* 62(1): 36-38. (in Slovene). [Presentation of *S. depressiusculum* as the Animal of the Month including three colour pictures and a determination key of the Slovene *Sympetrum*-species] Address: Bedjanic, M., Fram 117/A, SI-2313 Fram, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

1337. **Benke, A.C.; Huryn, A.D.; Smock, L.A.; Wallace, J. B.. (1999):** Length-mass relationships for freshwater macroinvertebrates in North America with particular reference to the southeastern United States. *Journal of the North American Benthological Society*. 18(3): 308-343. (in English). ["Estimation of invertebrate biomass is a critical step in addressing many ecological questions in aquatic environments. Length-dry mass regressions are the most widely used approach for

estimating benthic invertebrate biomass because they are faster and more precise than other methods. A compilation and analysis of length-mass regressions using the power model, M (mass) = $a L$ (length) b , are presented from 30 y of data collected by the authors, primarily from the southeastern USA, along with published regressions from the rest of North America. A total of 442 new and published regressions are presented, mostly for genus or species, based on total body length or other linear measurements. The regressions include 64 families of aquatic insects and 12 families of other invertebrate groups (mostly molluscs and crustaceans). Regressions were obtained for 134 insect genera (155 species) and 153 total invertebrate genera (184 species). Regressions are provided for both body length and head width for some taxa. In some cases, regressions are provided from multiple localities for single taxa. When using body length in the equations, there were no significant differences in the mean value of the exponent b among 8 insect orders or Amphipoda. The mean value of b for insects was 2.79, ranging from only 2.69 to 2.91 among orders. The mean value of b for Decapoda (3.63), however, was significantly higher than all insects orders and amphipods. Mean values of a were not significantly different among the 8 insect orders and Amphipoda, reflecting considerable variability within orders. Reasons for potential differences in b among taxa are explained with hypothetical examples showing how b responds to changes in linear dimensions and specific gravity. When using head width as the linear dimension in the power model, the mean value of b was higher (3.11) than for body length and more variable among orders (2.8-3.3). Values of b for Ephemeroptera (3.3) were significantly higher than those for Odonata, Megaloptera, and Diptera. For those equations in which ash-free dry mass was used, % ash varied considerably among functional feeding groups (3.3-12.4%). Percent ash varied from 4.0% to 8.5% among major insect orders, but was 18.9% for snails (without shells). Family-level regressions also are presented so that they can be used when generic equations are unavailable or when organisms are only identified to the family level. It is our intention that these regressions be used by others in estimating mass from linear dimensions, but potential errors must be recognized." (Authors)] Address: Benke, A., Aquatic Biology Program, Department of Biological Sciences, University of Alabama, Tuscaloosa, AL, USA

1338. **Bönsel, A. (1999):** Der Einfluss von Rothirsch (*Cervus elaphus*) und Wildschwein (*Sus scrofa*) auf die Entwicklung der Habitate von *Aeshna subarctica* Walker in wiedervernässten Regenmooren (Anisoptera: Aeshnidae). *Libellula* 18(3/4): 163-168. (in German with English summary). ["In two rewetted bogs in Mecklenburg-Vorpommern, Germany, vegetation has developed so fast that after already 4 years areas of *Sphagnum cuspidatum* have been replaced by the next stadium of succession swing grass areas. Because of this the potential breeding places of *A. subarctica* disappeared. But those are constantly being recreated by red deer and wild pig. Therefore these mammals play an important role for the survival of *A. subarctica* in these areas." (Author)] Address: Bönsel, A., Vasenbusch 15, D-18337 Gresenhorst, Germany

1339. **Bohonak, A.J. (1999):** Effect of insect-mediated dispersal on the genetic structure of postglacial

water mite populations. *Heredity* 82(4): 451-461. (in English). ["Assaying population structure in species that differ in dispersal ability can help to determine whether population differentiation is dependent on the movement of individuals between populations. Here, allozyme variation is analysed in over 1100 individuals from nine species and two species complexes of *Arrenurus* water mites collected throughout north-eastern North America. As larvae, eight taxa are obligate parasites of winged adult insects that provide the primary opportunity for dispersal. Three additional species have lost the ability to parasitize insects and do not disperse in this manner. Consistent with the glaciated history of the region, very low allozyme heterozygosity was found in these taxa ($H_o = 0.00-0.12$), near panmixia in five out of seven species for which population differentiation was calculated and no patterns of isolation by distance over spatial scales up to several hundred kilometres. Nonetheless, in two out of three comparisons between sister species with and without parasitic larvae, parasitism was significantly associated with higher heterozygosity. Population differentiation could also be contrasted for two of these sister pairs; in each case, lower estimates of F_{ST} were found in the mites able to disperse on insects. The statistical significance of these contrasts was dependent on the method used to estimate variance. At the scale of the genus, behavioural differences among insect vectors allows for broader hypothesis that relate water mite genetic diversity to dispersal ability. For the genus, rank correlations of dispersal ability with direct count heterozygosity ($n = 11$) and population differentiation ($n = 7$) were not significantly different from zero. These results are consistent with the hypothesis that allozyme population structure is primarily the result of historical patterns in these regions. However, comparisons between sister species suggest a limited role for dispersal in homogenizing populations genetically, even when drift-gene flow equilibrium has not been achieved." (Author)] Address: Bohonak, A., Center for Conservation Research and Training, University of Hawaii, Honolulu, HI, 96822, USA

1340. **Brockhaus, T. (1999):** 2. Sächsische Libellentagung in Bad Schandau. *Mitt. Sächsischer Entomol.* 48: 28-29. (in German). [Report on the meeting held on 5/6 November 1999; main topic was the present status of the survey of the Saxonian odonate fauna and the scheduled distribution atlas] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

1341. **Brockhaus, T. (1999):** Die Libellenfauna des unteren Zschopautals. *Mitt. Sächs. Entomologen* 47: 26-28. (in German). [The odonate fauna before and after the closing of a system of ditches used by a drinking water plant is analysed. The drying out of the ditches caused a large decline of the fauna from 17 reproductive species to 6 species. The loss of habitats for ditch specialists as *Sympetrum pedemontanum* is of serious importance for nature conservation.] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

1342. **Brockhaus, T. (1999):** Ein Nachweis von *Aeshna subarctica elisabethae* Djakonov, 1922 und *Somatochlora alpestris* (Selys, 1840) im Hochmoor Sijec auf der Pokljuka, NW Slowenien (Anisoptera:

Aeshnidae, Corduliidae). *Exuviae* 6: 11-13. (in German with English and Slovenian summaries). ["Single males of both species were found at the locality on 30-VII-1999. For *A. subarctica elisabethae*, which has only recently been discovered as new for the odonate fauna of Slovenia, the Sijec peat-bog represents the only known locality in the country. During last years *S. alpestris* was thought to be extinct in Slovenia, however with present record it has been rediscovered after more than 35 years." (Author)] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

1343. **Brunelle, P. (1999):** Distribution of damselflies and dragonflies of Maine, United States. *Northeastern Naturalist* 6(2): 95-118. ["This paper provides details of the distribution and study of Odonata in the state of Maine, based on a comprehensive review of literature, public collections, private holdings, and the results of recent surveys. It is the first summary of the subject in over fifty years, and its data provide the baseline for the planned 5-year volunteer field survey of odonates in Maine. As a result of the review 11 species are added to the state list: the damselfly *Enallagma recurvatum*, and the dragonflies *Aeshna mutata*, *Nasiaesha pentacantha*, *Arigomphus furcifer*, *Gomphus descriptus*, *G. quadricolor*, *G. vastus*, *Stylurus amnicola*, *S. notatus*, *Neurocordulia* sp. nov. (= *N. michaeli* Brunelle, 2000; see OAS 1478) and *Perithemis tenera*, bringing that list up to 155 species. Distribution to township level and flight periods for all species, and geographical and seasonal distribution of past survey effort in the state are reviewed. Illustrations and notes on 26 currently state-listed species are appended." (Author)] Address: Brunelle, P.-M., 2460 John Street, Halifax, Nova Scotia, B3K 4K7, Canada

1344. **Brunelle, P.-M. (1999):** Additions to the lists of dragonflies (Odonata: Anisoptera) of the Atlantic Provinces, Canada. *Northeastern Naturalist* 6(1): 35-38. (in English). ["*Somatochlora brevicincta* is added to the Atlantic Provinces list; *Aeshna juncea* and *S. brevicincta* to the Maritime Provinces; *A. juncea*, *A. subarctica*, *S. brevicincta* and *S. septentrionalis* to New Brunswick; *S. albicincta*, *S. brevicincta* and *Pantala flavescens* to Nova Scotia; *A. subarctica*, *Epithea spinigera*, *S. cingulata*, *S. franklini*, *Leucorrhinia frigida* and *P. flavescens* to Prince Edward Island." (Author)] Address: Brunelle, P.-M., 2460 John Street, Halifax, Nova Scotia, B3K 4K7, Canada

1345. **Buczynski, P. (1999):** The checklist and the "Red list" of the dragonflies (Insecta: Odonata) of the Lublin Province. In: *Instytut Ochrony Przyrody Polskiej Akademii Nauk (Ed.): Chrony Przyrode Ojczysta. Dwumiesięcznik. R. LV (55) - 1999 - Zeszyt 6 (Listopad-Grudzien)*. Kraków: 23-39. (in Polish with extensive English summary). [Checklist of the Odonata of the southeastern part of Poland including vernacular and Latin names and an assessment of the threat of the species according to the IUCN categories] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PO-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

1346. **Buczynski, P. (1999):** Dragonflies (Odonata) of spring areas in Poland - state of research and proposes of further study. *Zródła Polski. Stan badan, monitoring i ochrona. Wyższa Szkoła Pedagogiczna. Olsztyn:* 31-36. (in Polish with English summary). [List of odonate

species known to develop in Polish mountain regions (n=5) and lowland regions (n=3) spring habitats; additional information is given on the species of flush systems (natural drainage systems) of the peat bogs (*Somatochlora arctica*, *Leucorrhina albifrons*); the author stresses the lack of data on the odonate fauna of springs in Poland] Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PO-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

1347. **Buttstedt, L.; Zimmermann, W. (1999):** Die Vogel-Azurjungfer (*Coenagrion ornatum*) im Grenzraum von Sachsen-Anhalt und Thüringen. *Pedemontanum* 3: 6-9. (in German). [In 1995 *C. ornatum* was recorded at some ditches near Wallhausen, Sachsen-Anhalt, Germany. In 1998 in subsequent ditches of the Helme floodplain (Thüringen) some more local, in most cases small, populations of the species could be detected. 10 populations are known now. In all cases *C. mercuriale* co-occurs.] Address: Zimmermann, W., von-Hoff-Str. 31, D-99867 Gotha, Germany

1348. **Calil, E.R.; Carvalho, A.L. do (1999):** Descriptions of the last instar larvae and the adult of *Triacanthagyna septima* (Selys, 1857) (Odonata, Aeshnidae) with notes about the biology of the species. *Revista Brasileira de Entomologia* 43(1-2): 73-83. (in Portuguese). [The last instar larva and the adult of *T. septima* are described and illustrated. The rarely being collected larvae develop occasionally in temporary and unstable ponds, and marshes. A key to the larvae of the four hitherto described larvae of the genus is provided. The last instar larva of *T. septima* can be distinguished by the length of the cerci, distinctly shorter than the epiproct. The adults of *T. septima* occur during all the year in the southeastern Brazil, being more common in the winter. They are crepuscular in activity and sometimes assemble in collective flights adopting migratory behaviour.] Address: Calil, E.R., Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ Brazil

1349. **Chalmel, R.; Dommange, J.-L. (1999):** Rubrique bibliographique. *Martinia* 15(4): 131-135. (in French). [Additions to the French odontological bibliography] Address: Dommange, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

1350. **Clausen, W. (1999):** *Gomphus flavipes* (Charpentier) in der Aller, Niedersachsen (Anisoptera: Gomphidae). *Libellula* 18(3/4): 187-188. (in German with English summary). ["On 14-VII-1999, one exuvia was recorded at the Aller near Eilte 12 km SSW Walsrode, Germany" (Author).] Address: Clausen, W., Zur Bockwindmühle 60, D-32351 Stemwede-Oppenwehe, Germany

1351. **Clausnitzer, V. (1999):** A checklist of the dragonflies (Odonata) of Kenya. *African Journal of Ecology* 37: 400-418. (in English). ["A checklist of Odonata has been compiled for Kenya. It is based on an inventory of museum material, publications and personal observations made between 1978 and 1997. Changes of scientific names and synonyms are documented. The list contains 194 valid dragonfly species recorded for Kenya." (Author)] Address: Clausnitzer, Viola, Zum Lahnvergr 14, D-35032 Marburg, Germany

1352. **Conrad, K.F.; Willson, K.H.; Harvey, I.F.; Thomas, C.J.; Sherratt, T.N. (1999):** Dispersal characteristics of seven odonate species in an agricultural landscape. *Ecography* 22(5): 524-531. (in English). ["Dispersal is an ecological phenomenon which is of fundamental importance to population biology. While dispersal behaviour of many orders of winged insects has received a great deal of attention, the dispersal characteristics of odonates have been poorly documented. We used capture-mark-recapture techniques to study dispersal behaviour of seven species of odonates breeding on a network of 11 small ponds in Cheshire, U.K. The ponds ranged in size from 615 to 1300 m² and varied from 30 to 860 m apart. We found surprisingly high rates of dispersal between ponds with 10-47% per species of recaptured individuals moving from their natal pond. The mean probability of dispersal differed significantly among species but the relationship between the probability of dispersal and distance moved consistently followed a simple negative exponential curve for all species. Most individuals stayed at their natal pond, but a few moved long distances. Neither the age at which an individual was marked (teneral vs sexually mature) nor its sex significantly affected its tendency to disperse. The negative exponential relationship suggests that dispersal should be relatively easy to incorporate in more complex models of odonate spatio-temporal dynamics. To our knowledge, this is the first large-scale, multi-species study to assess dispersal behaviour of odonates by direct observation." (Authors) The following species were surveyed: *Ischnura elegans*, *Coenagrion puella*, *C. pulchellum*, *Lestes sponsa*, *Enallagma cyathigerum*, *Pyrrosoma nymphula*, and *Sympetrum sanguineum*] Address: Thomas, C.J., Dept of Biological Sciences, Durham University, Durham, DH1 3LE, UK

1353. **Czachorowski, S.; Buczynski, P. (1999):** Biocenosis naturalness index - a prospective instrument in the evaluation of the ecological state of Polish peat-bogs, as exemplified by Odonata and Trichoptera. In: Radwana, S. & R. Kornijowa (Eds.): *Problemy aktywnej ochrony ekosystemów wodnych i torfowiskowych w Polskich Parkach Narodowych*. Wydawnictwo Uniwersytetu Marii Curie-Sklodowskiej. Lublin: 153-158. (in Polish with English summary. A German translation of the paper is available from the author or IDF). [Fischer's (1996) "biocenosis naturalness indexes" (Fischer, J.: *Bewertungsverfahren zur Quellfauna*. *Crunoecia* 5: 227-240), in the modification of Czachorowski (1998), are proposed for assessing and biomonitoring peat-bogs. Index values for 26 Polish peat-bogs and fens in mountain and lowland ranges are calculated, analysed and discussed. In Tab. 1 the indices are developed on a cline of typical to a-typical species for each peat bogs and fens. Some sphagnum peat-bog indexes calculated for dragonfly species are higher for fen species than for sphagnum peat-bog species. In the case of caddisflies some fens are characterised by a sphagnophilous fauna. These results are interpreted as follows: (1) The biotops are impacted by factors not yet visible. (2) Fen-fauna is very dispersive and able to settle in peat-bogs too, which may be suboptimal habitats (3) The classification of species based on their known habitat requirements is not precise yet. The "biocenosis naturalness indexes" are considered to be a good tool for assessment conservation priorities for the specific fauna of bogs.]

Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PO-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

1354. **Czeczuga, B.; Godlewska, A.; Mrozek, E. (1999):** Zoosporic fungi growing on dead dragonflies (Odonata). *International Journal of Odonatology* 2(2): 187-197. (in English). ["The mycoflora developing on dead specimens of 11 species of dragonfly, collected while floating on the water surface, was investigated under laboratory conditions. Sixty-six zoosporic fungus species were found to grow on the fragments of dragonfly investigated, including 15 Chytridiomycetes and 51 Oomycetes. Of these 66 species, 18 are known as parasites or necrotrophs of fish. Three fungus species were recorded for the first time from Poland." (Authors)] Address: Bazyli Czeczuga, Anna Godlewska & Edyta Mrozek, Department of General Biology, Medical University, Kilinskiego 1, 15-230 Białystok 8, Poland. E-mail: Dzia/Nau@AMB.AC.Białystok.PL

1355. **Czerniawska-Kusza, I. (1999):** Macroinvertebrate communities of streams in the Glubczycki plateau. *Zródła Polski. Stan badan, monitoring i ochrona. Wyzsza Szkola Pedagogiczna. Olsztyn:* 73-80. (in Polish with English summary). [In 1997, the fauna of seven rivers in the Odra catchment SW of Opole was surveyed. 37 taxa were recorded including "Corduliidae" in the river Psina.] Address: Czerniawska-Kusza, Izabela, Instytut Biologii i Ochrony Srodowiska, Uniwersytet Opolski, ul. Oleska 48, 45-052 Opole, Poland

1356. **Dantart, J.; Martín, R. (1999):** *Somatochlora metallica* (Vander Linden, 1825) (Odonata: Corduliidae) y *Leucorrhinia pectoralis* (Charpentier, 1825) (Odonata: Libellulidae), dos nuevas especies de libélulas para la Península Ibérica. *Boln asoc. esp. ent.* 23(1-2): 147. (in Spanish). [*Somatochlora metallica*: Pleta de Saboredo, Valle del Ruda (Valle de Arán, Lérida), UTM 31TCH3221, 2.100 m; 1 male, 2 female; 19-VII-86. (J. Dantart leg., det) and Lago Carlit (Pirineo francés), UTM 31TDH11, 2.200 m; 1 male; 8-IX-84. (J. Dantart leg., det.). *Leucorrhinia pectoralis*: Lago Bassiver, macizo de Beret (Lérida), UTM 31TCH3429, 2.120 m; 1 female; 10-VII-92. (J. Dantart leg., det.).] Address: Martín, R., Avda. Martí Pijol, 250, 3º, 4a, E-08911 Badalona (Barcelona), Spain

1357. **D'Antonio, C. (1999):** *Lindenia*. *Lindenia* 31: 133-134. (in Italian). [Announcements of the WDA meetings in Darmstadt, Germany (7-9 July 2000) and Gällivare, Sweden (22-27 Juli, 2001), and the SIO meeting in Novosibirsk, Russia (10-14 July, 2001); addition of 3 titles to the bibliography of Italian odonatological literature] Address: D'Antonio, C., Via A. Falcone 386/b, I-80127 Napoli, Italy. E-mail: lindenial@freemail.it

1358. **Donath, H. (1999):** Die Kleine Königslibelle (*Anax parthenope* (Selys 1839)) in der Schlabendorfer Bergfolgelandschaft. *Biologische Studien, Luckau* 28: 100-104. [Detailed documentation of records of *A. parthenope* after 1995 in the Schlabendorf brown coal mining restoration region (51.81N 13.82E). On 26/6/1999 for the first time exuviae of the species could be detected; the habitat and the succession of the odonate fauna of the habitat (lake Stoßendorf) is described] Address: Donath, H., Caule Nr. 1, D-15926 Zieckau, Germany

1359. **Duscoulier, F.; Paillisson, J.-M.; Bernier, C. (1999):** Étude faunistique des odonates du lac de Grand-Lieu (Département de Loire-Atlantique). *Martinia* 15(4): 107-120. (in French with English summary). [Detailed account (1985-1998) on the dragonfly fauna of the Grand-Lieu lake with commented list of 42 species.] Address: Duscoulier, F., Club C.P.N. des Sittelles, 8, rue des Martins, F-44230 Saint-Sébastien-sur-Loire, France

1360. **Eigenhuis, K.J.; Groenendijk, D. (1999):** De betekenis van de insectennaam Rombout. *Brachytron* 3(2): 28-30. (in Dutch). [The Dutch name of the genus *Gomphus* "Rombout" is analysed. The authors suppose that the element "rom" of the name came from ronken (snoring). The element "bout" is explained as an expression of a metall pole or stick.] Address: Eigenhuis, K.J., Rietgorsstraat 1, NL 1431 VT Aalsmeer, The Netherlands

1361. **Englund, R.A. (1999):** The impacts of introduced poeciliid fish and Odonata on the endemic *Megalagrion* (Odonata) damselflies of Oahu Island, Hawaii. *Journal of Insect Conservation* 3(3): 225-243. (in English). ["Since the beginning of this century there have been substantial declines in the distribution and abundance of native *Megalagrion* damselies on the Hawaiian Island of Oahu. Native damselies have also vanished from most low elevation areas on other Hawaiian Islands, although historically, lotic and wetland dwelling damselfly species were once common throughout the archipelago. It is hypothesized that poeciliid fish introduced for biological control have caused the decline of four stream-breeding damselfly species on Oahu, and the extinction or near-extinction of two other species in Hawaii. This study documents the presence of remnant *Megalagrion* populations in Oahu streams, wetlands and estuaries, and records the elevational distributions of introduced sh in each waterbody surveyed. The distributions of introduced Odonata are also recorded, because the seven species of damselflies and dragonflies introduced to Oahu since 1936 present another potential threat to native Hawaiian damselies. Native damselfly and introduced poeciliid fish distributions were mutually exclusive on Oahu, and it is concluded that this is probably due to predation by the introduced fish. By contrast, even the rarest native *Megalagrion* damselflies were found in areas containing introduced damselflies and dragonflies." (Author)] Address: Englund, R.A., Natural Sciences Department, Bishop Museum, 1525 Bernice Street, Honolulu, HI, 96817 USA.

1362. **Ezenwaji, H. (1999):** The abundance and trophic biology of *Clarias albopunctatus* Nichols & LaMonte, 1953 (Osteichthyes: Clariidae) in a tropical floodriver basin. *Hydrobiologia* 392: 159-168. (in English). [The abundance, food and feeding biology of *Clarias albopunctatus* was studied over a period of 17 months in the lower River Anambra, Nigeria. Insects were the predominant food, followed by crustaceans. Of primary importance were Chironomidae (mainly *Chironomus* spp. and *Tanytus* sp.), Odonata nymphs, *Dytiscus* sp., mosquito larvae and pupae, *Gyrinus* sp., *Daphnia* sp., Ostracoda and *Tilapia fry*.] Address: Ezenwaji, H., Fisheries and Hydrobiology Research Unit, Department of Zoology, University of Nigeria, Nsukka Nigeria

1363. **Fromhage, L. (1999):** Erstnachweis der Arktischen Smaragdlibelle *Somatochlora arctica* (Zetterstedt, 1840) im Regierungsbezirk Koblenz. Fauna Flora Rheinland-Pfalz 9: 341-345. (in German with short English summary). [First record of *S. arctica* in the Hunsrück mountains in Rheinland-Pfalz, Germany; the larva was collected (1997 and 1998) in a hollow of a Sphagnum layer developend on a swampy trail.] Address: Fromhage, L., St. Sebastiansstr. 6, D-55128 Mainz, Germany

1364. **Gaino, E.; Rebor, M. (1999):** Larval antennal sensilla in water-living insects. Microscopy research and technique 47: 440-457. (in English). ["An overview of larval antennal sensilla in hemimetabolous and holometabolous water-living insects is given by updating current knowledge on the fine structure of these, sensory systems. In the absence of successful electrophysiological studies, the possible function of sensilla is deduced from their architecture. Various kinds of sensilla are described in hemimetabolous insects such as" *Odonata* (*Libellula depressa*) and "holometabolous insects [...]. Their possible function in responding to stimuli from the freshwater environment is illustrated and discussed. The importance of sensilla as taxonomic and phylogenetic traits is reported in *Baetidae* (Ephemeroptera) and in *Diptera Nematocera*. [...]. Particular features, such as cuticle without pores in chemosensory sensilla and naked perikarya, are so far found exclusively in some water-living arthropods, thus reflecting a possible adaptation to the aquatic habitat. The structure of sensilla and chloride cells, which have a similar external morphology, is presented and discussed in various insect groups, considering the possible derivation of the chloride cells from sensilla." (Authors)] Address: Gaino, Elda & Manuela Rebor, University of Perugia, Dipartimento di Biologia Animata ed Ecologia, Via Elce di Sotto, I-06123 Perugia, Italy. E-mail: gaino@unipg.it

1365. **Göcking, C. (1999):** Lebenszyklus von *Platycnemis pennipes* (Pallas) und *Calopteryx splendens* (Harris) in zwei Fließgewässern Brandenburgs (Zygoptera: Platycnemididae, Calopterygidae). *Libellula* 18 (3/4): 147-162. (in German with English summary). ["The larval development of both spp. was monitored in two different running waters in Brandenburg, Germany from Mai to September 1995. For *C. splendens* a two-year life cycle is suggested, *P. pennipes* seems to be univoltine." (Author)] Address: Christian Göcking, Zum Hiltruper See 9, D-48165 Münster, E-mail: gockinc@uni-muenster.de

1366. **Grandstaff, E.D.; Bulow, F.J (1999):** The claw sampler - A macroinvertebrate sampler for scuba divers. *North American Journal of Fisheries Management* 19(1): 219-220. (in English). ["A device is described that can be used by scuba divers to obtain quantitative macroinvertebrate samples from flat surfaces. Called the "claw sampler," it was designed to collect macroinvertebrates colonizing spawning benches in Tennessee reservoirs. The spawning benches, 3.0-m X 25-cm wood slabs attached to 30-cm concrete blocks, were used to simulate logs under which smallmouth bass *Micropterus dolomieu* spawn. The claw sampler effectively collected quantitative samples of coleopterans, dipterans, ephemeropterans, odonates, trichopterans, cladocerans, and gastropods that colonized the spawning benches and provided a

readily available food supply for age-0 smallmouth bass other fishes." (Authors)] Address: not available

1367. **Groot, T. de; Wasscher, M. (1999):** Has *Leucorrhinia pectoralis* shifted its habitat in The Netherlands? *Brachytron* 3(2): 18-25. (in Dutch with English summary). ["At the moment *L. pectoralis* is a rare and declining species in the Netherlands. The species is listed as "threatened" in the Dutch Red List. During the first half of the century large numbers were found in several kinds of habitats, such as marshland near rivers, and also coastal dune lakes. Usually these habitats were mesotrophic with a well-developed riparian vegetation. Nowadays there are two main habitats: small mesotrophic waters on sandy soils and peat marshes. Numbers on sandy soils have decreased dramatically and the species is now only recorded sporadically there. On the other hand, large numbers (up to 40 individuals on a 150 m stretch of ditch) have been found in De Wieden and Weerribben, two peat marsh areas in the northwestern part of the province of Overijssel, in the last few years. It is not clear whether these populations had been overlooked in the past, or whether this species has only recently developed higher numbers here. Currently, the region supports one of the largest populations in northwestern Europe." (Authors)] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: m.wasscher@broekhuis.nl

1368. **Groot, T. de (1999):** The dragonflies of five peat mires. *Levende Natuur* 100(4): 112-117. (in Dutch). ["In The Netherlands the presence of dragonflies in five large peat mires of Natuurmonumenten has been studied. The study is focussed on characteristic peat mire species and one peat mire specialist and includes five species of the Red List. This paper deals with differences and similarities between the dragonfly populations in these five areas. All known peat mire dragonflies can be found in two of the areas (De Wieden and De Vechtplassen). Moreover large numbers of *Aeshna viridis* and *Leucorrhinia pectoralis* have been found in De Wieden. In great parts of Western-Europe six out of seven peat mire dragonflies are being threatened. This paper stresses the importance of the Dutch populations of these dragonflies and also their habitats in peat mires. Protection of habitats is needed, specifically for the threatened dragonflies which are dependant on certain stages of succession in peat mires. In order to start new succession of the vegetation new peat holes are being dugged the last few years. This can be of great importance for the dragonflies." (Author)] Address: Groot, T. de, Simon Bolivarstraat 89, NL 3573 ZK Utrecht, The Netherlands

1369. **Haden, G.A.; Blinn, D.W.; Shannon, J.P.; Wilson, K.P. (1999):** Driftwood: An alternative habitat for macroinvertebrates in a large desert river. *Hydrobiologia* 397: 179-186. (in English). ["*Argia* sp." was represented in the July sampling period, and "*Odonata*" in the October sampling period.] Address: Haden, G.A., Northern Arizona University, Dept Biology, P.P. Box 5640, Flagstaff, AZ 86011, USA

1370. **Heidemann, H. (1999):** Analyse d'ouvrages. *Martinia* 15(4): 136-144. (in French). [extensive review of the books abstracted in OAS 623 and 1149] Address: Heidemann, H., Au in den Buchen 66, D-76646 Bruchsal, Germany

1371. **Heijden, A. van der (1999):** Donkere waterjuffer herontdekt tijdens Weerribbenexcursie. Mededelingen van de Nederlandse Vereniging voor Libellenstudie 3(4): 4-5. (in Dutch). [A trip (8 May 1999) of some Dutch odonatologists to the Weerribbe region (The Netherlands) resulted in the rediscovery of *Coenagrion armatum* which for the last time was seen in 1956 in the Netherlands; additional interesting species in the region are *Coenagrion pulchellum*, *Sympecma paedisca*, *Cordulia aenea*, *Leucorrhinia rubicunda*, and *L. pectoralis*] Address: Heijden, Antoine van der. io335601@student.io.tudelft.nl

1372. **Hennig, R. (1999):** Zur Odonatenfauna des Landkreises Wittenberg. *Pedemontanum* 3: 1-6. (in German). [51 odonate species are known from the Landkreis Wittenberg, Sachsen-Anhalt, Germany in 1998; the records are listed in a tab; characteristic species of different habitat types are outlined. The listing of *Aeshna viridis* remains a little bit obscure.] Address: Hennig, R., Neustr. 10a, D-06886 Wittenberg-Lutherstadt, Germany

1373. **Hilfert-Rüppel, D.; Rüppel, G.; Suhling, F. (1999):** *Onychogomphus uncatatus* (Charp.) and *Oxygastra curtisii* (Dale) in southern Morocco in April (Anisoptera: Gomphidae, Corduliidae). *Notul. odonatol.* 5(4): 50. (in English). [Observations from the stream Tamrhakht, 50 km NE of Agadir situated in the western foothills of the Haut Atlas on 8 April 1999; additional information on *Gomphus simillimus maroccanus* is given] Address: Suhling, F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1374. **Hilfert-Rüppel, D. (1999):** To stay or not to stay: decision-making during territorial behaviour of *Calopteryx haemorrhoidalis* and *Calopteryx splendens splendens* (Zygoptera: Calopterygidae). *International Journal of Odonatology* 2(2): 167-175. (in English). ["The effect of copulation and presence of predators on territorial behaviour of male *Calopteryx haemorrhoidalis* (in southern France) and of male *C. splendens splendens* (in northern Germany) was studied in nature. A male obtaining a copulation early in the day often secured more copulations later that day than did males not obtaining an early copulation. Predators such as Green frogs, *Rana esculenta*, and water spiders, *Dolomedes* sp., affected subsequent behaviour of male *Calopteryx* that they attacked but failed to catch. A male *C. haemorrhoidalis* that had only recently occupied a territory when attacked by a spider, vacated the territory immediately, whereas a male first attacked after having occupied a territory for more than three hours and that had already courted females there remained, while avoiding the predator's immediate location. Results are discussed in the context of the value of the territory as a resource." (Author)] Address: Hilfert-Rüppel D., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: d.hilfert@tu-bs.de

1375. **Holusa, O. (1999):** The first record of *Orthetrum coerulescens anceps* (Schneider, 1845) in Slovenia (Anisoptera: Libellulidae). *Exuviae* 5(1): 13-16. (in English with Slovene summary). [On 16-VII-1997 a tandem of the taxa was caught near the village of Boreci, NE Slovenia] Address: Holusa, O., Muzeum Beskyd, prirodovedné oddeleni, Zámecké náměstí 1264, CZ-738 01 Frydek-Místek. E-mail: holusao@post.cz

1376. **Hong Sung-Jong; Woo Ho-Chun; Lee Soo-Ung; Huh Sun (1999):** Infection status of dragonflies with *Plagiatorchis muris* metacercariae in Korea. *Korean Journal of Parasitology* 37(2): 65-70. (in English). ["*Plagiatorchis muris* has been found in both house and field rats as well as in humans. The infection status of the second intermediate hosts of *P. muris* is prerequisite in understanding their biological features in an ecosystem. Six species of dragonflies were caught in a wide range of areas in Korea; and they were *Sympetrum darwinianum*, *S. eroticum*, *S. pedomontanum*, *S. infuscatum*, *Pantala flavescens*, *Calopteryx atrata*, and *Orthetrum albistylum speciosum*. The occurrence of *P. muris* metacercariae in dragonflies was nationwide with various infection rates. The metacercarial burden of *P. muris* in the surveyed areas was the highest in *S. eroticum* followed by *S. darwinianum*, *S. pedomontanum*, and *C. atrata*. The highest infection rate by *P. muris* metacercariae was found in *S. darwinianum* followed by *S. eroticum*. The metacercarial burden was particularly heavy in the dragonflies found in Hamyang-gun and Kosong-gun, Kyongsangnam-do. It is, therefore, likely that dragonflies play a significant role as the second intermediate host in the life cycle of *P. muris* in Korea." (Authors)] Address: not available

1377. **Hooper, R.E.; Tsubaki, Y.; Siva-Jothy, M.T. (1999):** Expression of a costly, plastic secondary sexual trait is correlated with age and condition in a damselfly with two male morphs. *Physiological Entomology* 24(4): 364-369. (in English). ["Males of the damselfly *Mnais costalis* Selys [...] are morphologically and behaviourally polymorphic, typically existing as clear-winged non-territorial 'sneaks' and orange-winged territorial 'fighters'. The amount of orange pigment in the wing, as measured with a chromameter, varied between individuals, and decreased as the reproductive season progressed. Young individuals maintained in the laboratory on high or low nutrient diets differed in the amount of pigment that developed in the wing. Males in the high nutrient group developed darker wings faster than those in the low nutrient group. Young adults of both sexes and morphs were fed ¹⁴C-radiolabelled tryptophan or tyrosine (precursors of the pigments ommochrome and melanin, respectively). Ommochrome was restricted to the pseudoptero stigma of the males of both morphs and was not present in females. The presence of tyrosine in the wing cells of orange males, but not of clear males, indicated that the orange pigment is at least partly constituted from melanin. These data show that at least some pigment levels must be maintained continuously in the wings of orange males, and that maintenance is costly as it is compromised at low nutrient levels." (Authors)] Address: Hooper, R.E., Laboratory for Wildlife Conservation, National Institute for Environmental Studies, Tsukuba, 305-0053 Japan

1378. **Hornig, U. (1999):** Bericht über die Tagung Sächsischer Entomologen am 18. September 1999 in Königswartha/OL. *Mitt. Sächsischer Entomol.* 48: 25-26. (in German). [Report on a meeting of Saxonian entomologists including a short notice on a lecture of Thomas Brockhaus on dispersal in Odonata] Address: Hornig, U., Lindenberger Str. 24, D-02736 Oppach/OL, Germany

1379. **Hunger, H.; Schiel, F.-J. (1999):** Massenentwicklung von *Sympetrum fonscolombii*

(Selys) und Entwicklungsnachweis von *Anax ephippiger* (Burmeister) in Überschwemmungsflächen am südlichen Oberrhein (Anisoptera: Libellulidae, Aeshnidae). *Libellula* 18(3/4): 189-195. (in German with English summary). ["In 1999, *Sympetrum fonscolombii* emerged in four and *Anax ephippiger* in two gravel pits. In one area that was inundated for 10 to 12 weeks between middle of May and end of July 1999, a mass reproduction with several 100,000 individuals of *S. fonscolombii* occurred. In years without exceptionally high and prolonged ground water level, this area is completely dry. It was observed that larvae of *S. fonscolombii* are able to survive for at least two weeks after their larval habitat has dried up. In the same area, a summer generation of *Ischnura pumilio* developed successfully." (Authors)] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INULA), Am Pfahlgraben 8, D-79276 Reute, Germany

1380. **Jacquemin, G.; Boudot, J.-P. (1999):** Les libellules (Odonates) du Maroc. Société Française d'Odonatologie. ISBN 2-9507291-3-4: 150 pp. (in French with English summary). ["This work synthesise all the available faunistic data already published, dealing with Moroccan Damselflies and Dragonflies, and adds a lot of new unpublished data. It can be used within the limits of Morocco, Algeria and Tunisia, and is the first modern book dealing with the Odonata of the Maghreb. A general part gives the most useful informations about the past faunistic research in Morocco and on the biology and ecology of the Dragonflies in the Maghreb. A detailed and illustrated key allows the identification of all species of Odonata known from Morocco, Algeria and Tunisia. A commented list provides for each Moroccan Dragonfly: its local status, the previously and newly known localities where it has been observed, the most useful information on its distribution (including a map), as well as biological and ecological notes (particularly the flight period), and, when necessary, a taxonomic discussion. Chorological considerations and a discussion on nature preservation are also approached. A detailed bibliographic section with more than 150 references ends the text part of this book. A number of high quality colour photographic plates illustrate the most representative habitats and all species of dragonflies living in Morocco (males and many of the females). The plates are complemented by pterographies showing the precise wing venation of each species." (taken from the announcing leaflet)] Address: Jacquemin, G., Biologie des Insectes, Université H. Poincaré, Nancy 1, BP 239, F-54506 Vandoeuvre-lès-Nancy, France

1381. **Jödicke, R. (1999):** Nachweis einjähriger Entwicklung bei *Aeshna cyanea* (Müller) (Anisoptera: Aeshnidae). *Libellula* 18(3/4): 169-174. (in German with English summary). ["At a newly setup garden pond near Cloppenburg, NW Germany, a part of the larval population emerged in the year after oviposition. Another part started a hibernation dormancy in the last four stages. Next year the emergence started in late May." (Author)] Address: Jödicke, R., Großenging 14, D-49699 Lindern, Germany. E-mail: r.joedicke@t-online.de

1382. **Jong, T.H. de (1999):** Aantal vleugelcellen tegenover het pterostigma bij de Houtpantserjuffer (*Lestes viridis*). *Brachytron* 3(2): 26-27. (in Dutch). [In June 1998 near Beziers, France, specimens of *Chalcolestes viridis* were traced with more than two

cells behind the pterostigma. To avoid confusion with *Lestes macrostigma*, which has 3-4 cells behind the pterostigma, the frequency distribution of cells behind the pterostigma of *C. viridis* was studied: In more than 30% at least one of the wings of *C. viridis* has more than 2 cells behind the pterostigma.] Address: Jong, T.H. de, Rijnlaan 25, NL-4105 GS Culemborg, The Netherlands. E-mail: theo.marijke@wxs.nl

1383. **Jong, T.H. de (1999):** *Aeshna viridis* in the province of Utrecht (NL). *Brachytron* 3(2): 11-17. (in Dutch with English summary). ["In 1998 localities with *Stratiotes aloides* (mostly ditches in agricultural land) in the province of Utrecht were surveyed for *A. viridis*. The species was found at 29 of the 56 visited sites. Oviposition was recorded at nineteen locations. The total number of individuals seen was 75. The maximum number of specimens found at a single locality was eleven. Vegetations with *A. viridis* were on average more extensive, the water was deeper and the cover of *Azolla filiculoides*, *Elodea nuttallii* and green algae was less. Homogeneous *Stratiotes* vegetations with a surface of 400 m² or more and only a slight cover of *Lemna spec.*, *Azolla filiculoides* and *Etoda nuttallii*, were preferred for oviposition. At such sites, the density of *Stratiotes* is about 20 plants per m² with leaves protruding at least 15 cm above the water surface. It was observed that females oviposit in all accessible leaves of a single plant before moving on to another plant. They seemed to prefer plants with withered, brown leaf tips. It is suggested that such plants have narrower leaves, which makes them easier to grasp for the female. Besides *A. viridis* twelve other species of Odonata were seen at the *Stratiotes* vegetations. *Lestes sponsa* and *Coenagrion pulchellum* appear to show a similar habitat preference to *A. viridis*. In contrast however *Erythromma viridulum* and *Orthetrum cancellatum* seem to avoid such localities. Although the leaves of *Stratiotes* are thought to protect the larvae against predators, fish larger than 10 cm were often found in open spots in the vegetations and fish smaller than 10 cm were even seen between the plants." (Author)] Address: Jong, T.H. de, Rijnlaan 25, NL-4105 GS Culemborg, The Netherlands. E-mail: theo.marijke@wxs.nl

1384. **Julka, J.M.; Vasisht, H.S.; Bala, B. (1999):** Distribution of aquatic insects in a small stream in northwest Himalaya, India. *Journal of the Bombay Natural History Society* 96(1): 55-63. (in English). [species composition, annual variability, microhabitat preference and species diversity index of aquatic insects in a perennial stream in northwest Himalaya, during 1989-91. A total of 62 morphospecies belonging to Ephemeroptera, Odonata, Plecoptera, Hemiptera, Megaloptera, Coleoptera, Trichoptera, and Diptera were caught in the samples] Address: Julka, J.M., Zoological Survey of India, Solan, HP, 173212, India

1385. **Kalkman, V. (1999):** Recensies: De danske guldsmede. Apollo books. 280 pp. ISBN: 87-88757-21-8. *Brachytron* 3(2): 30. (in Dutch). [Review of the book of Ole Fogh Nielsen; see OAS 399] Address: Kalkman, V.J., Oude Rijnsburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands

1386. **Kern, D. (1999):** Langzeituntersuchungen zur Populationsentwicklung und zum Lebenszyklus von *Gomphus vulgatissimus* (Linnaeus) an einem nordwestdeutschen Fließgewässer (Anisoptera: Gomphidae).

Libellula 18(3/4): 107-132. (in German with English summary). ["From 1989 to 1999 larvae were collected in a draining ditch in the Kreis Diepholz (Germany) and quantitative investigations of emergence were made. Based on biometric data of more than 8000 larvae, a three to four years development is suggested. The annual collections of exuviae featured an average emergence periode of 21 days and an EM50 of 6-7 days. A mean of 467 exuviae per year was collected in a 800 m section. Generally, the females were predominant with a mean of 52.7 %. The time of emergence seemed to be dependent on the actual lowest and highest daily water temperature. Some aspects of the larval development and the emergence are discussed in comparison to the results on *G. vulgatissimus* from the large river Oder." (Author)] Address: Kern, D., Taxusweg 2, D-27232 Sulingen, Germany

1387. **Kido, M.H.; Heacock, D.E.; Asquith, A. (1999):** Alien rainbow trout (*Oncorhynchus mykiss*) (Salmoniformes: Salmonidae) diet in Hawaiian streams. *Pacific Science* 53(3): 242-251. (in English). ["Diet of rainbow trout, *Oncorhynchus mykiss* (Walbaum), introduced by the State of Hawai'i into tropical headwater streams of the Waimea River in the Koke'e area of the Hawaiian island of Kaua'i, was examined in this study through gut content analysis. In Wai'alaie Stream, rainbow trout were found to be opportunistic general predators efficient at feeding on invertebrate drift. Foods eaten ranged from juvenile trout, to terrestrial and aquatic arthropods, to algae and aquatic mosses. Native aquatic species, particularly dragonfly (*Anax strennus*) and damselfly (*Megalagrion heterogamias*) naiads, lymnaeid snails (*Erinna aulacospira*), and atyid shrimp (*Atyoida bisulcata*), were determined to be major foods for alien trout. Terrestrial invertebrates (primarily arthropods), however, provided a substantial (albeit unpredictable) additional food supply. Based on results of the study, it is cautioned that large numbers of rainbow trout indiscriminantly released into lower- to middle-elevation reaches of Hawaiian streams could do substantial damage to populations of native aquatic species through predation, competition, and/or habitat alteration." (Authors)] Address: Kido, M.H., Hawai'i Stream Research Center, University of Hawai'i, 7370A Kuamo'o Road, Kapa'a, HI, 96746, USA

1388. **Kotarac, M. (1999):** Additional note about androchrome females in *Crocothemis erythraea* (Brulle, 1832). *Exuviae* 6: 19-20. (in English with Slovenian summary). [Kotarac (1996) reported bright red coloured females of *C. erythraea*. "Since then additional information on the subject has been collected and is presented here. On 31-VII-1996 three red females were observed [...] S of the village Skofije near port of Koper at the Slovenian Littoral (UTM VL04, alt. 5m). All individuals were mature, but in no way old. The red colour was nearly as bright as in males. [...] Mr U. Cervek (Maribor, Slovenia; pers. comm.) reported sightings of red *C. erythraea* females at a gravelpit near Sredisce ob Dravi (NE Slovenia) in August 1996. Additionally Dr M. Pavesi (Milano, Italy; pers. comm.) provided information about red coloured females observed in SE Italy (Puglia, Gallipoli) and E Turkey (area of Diyarbakir). He stated, however, that in his opinion they were older individuals and that red coloration was a sign of maturation. [...] In July and

August 1997 a good population of *C. erythraea* with red coloured females was discovered at Blato, 3 kilometers S of town Korcula on the island Korcula, S Croatia. [...]"] (Author)] Address: Kotarac, M., Centre for Cartography of Fauna and Flora, Antoliceva 1, SI-2204 Miklavz na Dravskem polju, Slovenia. E-mail: mladen.kotarac@ckff.si

1389. **Krno, I.; Sporka, F.; Matis, D.; Tirjakova, E.; Halgos, J.; Kosel, V.; Bulankova, E.; Illesova, D. (1999):** Development of zoobenthos in the Slovak Danube inundation area after the Gabčíkovo hydropower structures began operating. Gabčíkovo part of the Hydroelectric Power Projekt - Environmental impact review. Faculty of natural Sciences, Comenius University, Bratislava, Slovakia: 175-200. (in English). [Tab. 4 documents the odonate fauna of the Slovakian part of the River Danube.] 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@nic.fns.uniba.sk

1390. **Küttner, R.; Brockhaus, T.; Lässig, A. (1999):** Spezialistenlager Insektenkunde 1999 in der Naturschutzstation Weidnitz bei Rochlitz. *Mitt. Sächsischer Entomol.* 48: 29-30. (in German). [*Aeshna cyanea*, and *A. mixta* were observed in the framework of the meeting; the publication of the complete species lists is in preparation] Address: Küttner, R., Dorfstr. 26a, 09326 Schweikershain, Germany

1391. **Laurent, S. (1999):** Discussion sur la variabilité morphométrique de *Cercion lindenii* (Odonata, Coenagrionidae). *Martinia* 15(4): 125-130. (in French with English summary). [The emergence patterns of *Cercion lindenii* were monitored at a pond near Barbentane (Bouches du Rhône, France) and on the banks of the Rhône river at Aramon (Gard, France). Size and color patterns of abdomen, thorax, and wings of the emerging population depend on temperature factors and bivoltinism phenomena.] Address: Laurent, S., 14, Rue Edmond Michelet, F-84000 Avignon, France

1392. **Laurila, A.; Kujasalo, J. (1999):** Habitat duration, predation risk and phenotypic plasticity in common frog (*Rana temporaria*) tadpoles. *Journal of Animal Ecology* 68(6): 1123-1132. (in English). ["1. Common frogs (*Rana temporaria*) breed readily in small pools and thus expose their offspring to catastrophic mortality by desiccation. Amphibian larvae exhibit considerable phenotypic plasticity in metamorphic traits, and some species respond to environmental uncertainty by metamorphosing earlier and at smaller size. In a factorial laboratory experiment, we studied whether common frog tadpoles possess this ability. 2. We also studied the interaction between pool drying and predation risk, because in a previous study the presence of a predatory dragonfly larva delayed metamorphosis of the tadpoles. 3. We gradually removed water from half the experimental containers, while in the other half the water volume was kept constant. In the laboratory it was possible to remove the effect of increased water temperature in the decreasing volume treatment by using fluorescent lights. Tadpoles responded to decreasing volume by metamorphosing earlier and at smaller size. A greater proportion of the tadpoles metamorphosed in the decreasing volume treatment. 4. Tadpoles were less active at decreasing

water level and there were significant positive correlations between activity late in the experiment and metamorphic size. This suggests that the metamorphic response to habitat drying is behaviourally mediated. 6. Early in the experiment, tadpoles developed slower in the presence of predators. At metamorphosis presence of a dragonfly larva had no effect in the whole data set, but when the constant volume treatment was analysed separately, larval period was longer in the presence of a predator. 7. Our results indicate that common frog larvae are able to respond to pond-drying adaptively by speeding up their development, and that temperature advantage is not needed to induce this adaptive plasticity. Furthermore, pond-drying seems to be a more important determinant of development rate than the presence of odonate predators." (Authors)] Address: Laurila, A., Department of Population Biology, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18d, S-752 36, Uppsala, Sweden

1393. **Logan, J.A. (1999):** Extraction, polymerase chain reaction, and sequencing of a 440 base pair region of the mitochondrial cytochrome oxidase I gene from two species of acetone-preserved damselflies (Odonata: Coenagrionidae, Agrionidae). *Environmental Entomology* 28(2): 143-147. (in English). ["Preserved insects are an important data for many molecular systematics projects. This study investigates the use of acetone-preserved specimens in molecular DNA research. Two species of damselflies, *Enallagma civile* (Hagen) and *Hetaerina americana* (F.), were soaked in acetone before drying. Total genomic DNA was successfully extracted, amplified, and sequenced from the acetone-preserved damselflies with no noticeable effect from either the acetone or preservation time. Nucleotide sequences of a 440 bp region of the mitochondrial cytochrome oxidase I gene are presented for *E. civile* and *H. americana*. These 2 species have reached a saturated divergence level and it seems that the COI gene will not be useful for developing phylogenies at this taxonomic level." (Author)] Address: not available

1394. **Manneville, O. et al. (1999):** Le monde des tourbières et des marais - France, Suisse, Belgique et Luxembourg. Delachaux et Niestlé. Lausanne. Paris: 320 pp-Odonata: 152-154. (in French). [A general outline to the dragonflies of peat-bogs, fens and marshes can be found on pages 152-154. Some remarks to the biology and ecology of Odonata are exemplified with characteristic species of bogs and marshes. The geographic and altitudinal distribution of some species is shortly mentioned. 29 species are listed in Appendix 6 with information on their status and the preferred habitat. (We are very grateful to Werner Clausen who provided a German translation of the Chapter with information on Odonata. Persons interested in this translation may contact W. Clausen, Zur Bockwindmühle 60, Oppenwehe, D-32351 Stemwede, Germany)]

1395. **Martens, A. (1999):** Buchbesprechungen: Corbet, P.S. (1999): *Dragonflies: Behaviour and Ecology of Odonata*. *Lauterbornia* 37: 247. (in German). [Review of P.S. Corbet's book, see OAS 1566] Address: Martens, A., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1396. **Martín, R. (1999):** La Odonatofauna (Insecta: Odonata) del Parque Natural del Montseny (Cataluna,

NE Peninsula Ibérica). *Boln asoc. esp. ent.* 23(1-2): 171-193. (in Spanish with English summary). [Based on published data and own records taken from 1993 to 1998, 42 odonate species are known to occur in the Nature Reserve of Montseny, Spain. 12 species are only known from prior 1930. 7 species including *Oxygastra curtisii* were traced as new after 1987.] Address: Martín, R., Avda Martí Pujol 250, 3' 4a, E-08911 Badalona, Barcelona, Spain

1397. **Martins-Neto, R.G. (1999):** Present knowledge of the Brazilian paleontological fauna. *Revista de la Sociedad Entomologica Argentina* 58(1-2): 71-85. (in Spanish). ["[...] The first mention about fossil insects was made by the Brazilian researcher Eusebio Oliveira, in the beginning of the century. Later, was described the first Brazilian form, *Phylloblatta oliveirai* Carpenter, a paleozoic Blattoptera from Parana Basin, named in honour to E. Oliveira. The insect record is well documented in Paleozoic Era, being the Parana Basin the responsible by the greater number of references, principally of Blattoptera, but including the orders Neuroptera, Coleoptera, Ensifera, Grylloblattida, Plecoptera, Auchenorrhyncha, Hemiptera, Megasecoptera and Mecoptera. In the Triassic Period the record is poor: just the orders Auchenorrhyncha and Blattoptera are represented until now. In the Cenozoic Era, Blattoptera, Hemiptera, Auchenorrhyncha, Coleoptera, Trichoptera, Lepidoptera, Diptera, Isoptera and Hymenoptera are represented. The greater diversification, however, are present in the Ararape Basin (Lower Cretaceous, Northeast Brazilian) with the following orders: Ephemeroptera, Odonata, Ensifera, Caelifera, Phasmatoptera, Blattoptera, Isoptera, Dermaptera, Hemiptera, Auchenorrhyncha, Neuroptera, Megaloptera, Raphidioptera, Coleoptera, Trichoptera, Lepidoptera, Mecoptera, Diptera and Hymenoptera." (Author)] Address: not available

1398. **Mauersberger, R. (1999):** Wiederrunde von *Anax parthenope* Selys und *Leucorrhinia caudalis* (Charpentier) in Mecklenburg-Vorpommern (Anisoptera: Aeshnidae, Libellulidae). *Libellula* 18(3/4): 197-199. (in German with English summary). ["In 1999, single adults of *A. parthenope* were observed at 2 clear-water lakes in the Müritzer National Park. A number of *L. caudalis* was recorded at a small shallow lake near Feldberg. Both species are well established in adjacent regions of Brandenburg." (Author)] Address: Mauersberger, R., Waldstraße 4, D-16278 Steinhofel

1399. **Mochizuki, H.; Morita, M.; Masuda, K.; Kusamichi, I. (1999):** Flow mechanism around a dragonfly. *Memoirs of the Faculty of Agriculture Kagoshima University*. 35(43): 17-24. ["The flapping of the wing of the dragonfly and the flow generated by the flapping at full speed were observed by the high-speed video camera and the film camera. As the result, the relation between the movement of the wing and the flow was analyzed and clarified. The wings of the dragonfly move one cycle drawing a letter of "8" from the beginning of the downstroke to the end of the upstroke. Moreover, the gradient of the downstroke becomes larger than that of the upstroke, fetching larger velocity of the wing tip for the downstroke in comparison with the upstroke. The wakes generated by such flappings let their flow states the horizontal-, downward- and upward downstream directions depending on the horizontal-, upward- and downward flights. Almost all the amount of the air which enters into the region

around the body and the wing is sucked from the upper side of the wing to compensate the air which has been exhausted by flapping. The edge of the wake generated by the flapping proceeds more downstream at faster velocity than that of the uniform flow. In this way, it can be confirmed that the thrust and the lift are generated by the flappings of the wings." (Authors)] Address: Masuda, K., Lab. Agric. Phys., Fac. Agric., Kagoshima Univ., Kagoshima, Japan

1400. **Mogi, M.; Sunahara, T.; Selomo, M. (1999):** Mosquito and aquatic predator communities in ground pools on lands deforested for rice field development in Central Sulawesi, Indonesia. *Journal of the American Mosquito Control Association*. 15(2): 92-97. (in English). [study area: Toili, Kabupaten Luwuk-Banggai, eastern peninsula of Central Sulawesi; "Aquatic habitats, mosquitoes, and larvivorous predators were studied on deforested lands in Central Sulawesi, Indonesia. Open ground pools, mainly in depressions made by the treads of bulldozers and other heavy equipment, were numerous but because of their small size, comprised ca. 1% or less of the total area of the deforested lands studied. The dominant mosquitoes in these pools were *Anopheles vagus*, *Culex vishnui*, *Culex tritaeniorhynchus*, and *Culex gelidus*. The 1st 2 species were dominant in clear pools, whereas the latter 2 species were dominant in turbid pools. The dominant metazoans other than mosquitoes were Crustacea, Ephemeroptera, and Chironomidae. Both aquatic and surface predators were abundant. Dominant among aquatic predators were Anisoptera and Zygoptera nymphs, Dytiscidae, and Notonectidae. These results are discussed in relation to mosquito control on deforested lands that transitionally but inevitably appear during the course of rice field development projects in Indonesia." (Authors)] Address: Mogi, M., Division of Parasitology, Department of Microbiology, Saga Medical School, Nabeshima 5-1-1, Saga 849-8501, Japan

1401. **Müller, J. (1999):** Editorial: *Pedemontanum* 3. *Pedemontanum* 3: 1. (in German). [Some critical remarks on the validity of odonatological research resulting from expertises of persons not specialized in Odonata and the regional odonate fauna; readers of *Pedemontanum* are urged to use the nomenclatorially updated checklist of Odonata occurring in Germany prepared by R. Jödicke (1992)] Address: Müller, J., Frankefelde 3, D-39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1402. **Müller, J. (1999):** Literatur. *Pedemontanum* 3: 10-12. (in German). [Compilation of the titles No. 51 - 81 of odonatological publications with relevance to the Federal State Sachsen-Anhalt, Germany] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1403. **Müller, J.; Steglich, R. (1999):** Neues von der Elbe bzw. aus dem Elbetal 1998. 1. UNESCO-Biosphärenreservat Flußlandschaft Elbe anerkannt. 2. *Aeshna affinis*-Reproduktionsgewässer fast ausgetrocknet. 3. Weitere Gomphidenfunde in der Elbe. *Pedemontanum* 3: 10. (in German). [22 April 1998 the Floodplain of River Elbe was recognized as Biosphere-reserve by UNESCO. 2 September 1998 *A. affinis* was recorded north of Magdeburg; new records of *Stylurus flavipes*, *Ophiogomphus cecilia*, and *Gomphus vulgatissimus* along the River Elbe] Address: Müller, J.,

Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1404. **Müller, J.; Steglich, R. (1999):** Weitere Gompiden-Nachweise in großen mitteleuropäischen Flüssen. *Pedemontanum* 3: 9. (in German). [Records of *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, and *Stylurus flavipes* from Germany (Sachsen-Anhalt, Bayern), Hungaria, and Slovakia] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1405. **Müller, J. (1999):** Zur Naturschutz-Bedeutung der Elbe und ihrer Retentionsflächen auf der Grundlage stenöker lebensraumtypischer Libellenarten (Insecta, Odonata). *Abhandlungen und Berichte für Naturkunde, Magdeburg* 21: 3-24. (in German with English summary). [Based on detailed surveys of the author and a comprehensive study of literature and unpublished expertises, 52 odonate species are recognized as indigenous for the flood plain of River Elbe, Sachsen-Anhalt, Germany. This represents 65 % of the German Odonata fauna and 82,5 % of that of Sachsen-Anhalt. 31 of this species are of Mediterranean origin. This is caused by the specific climatic conditions in the Elbe valley with higher summer-temperatures than in the surrounding area. The occurrences of *Gomphus vulgatissimus*, *Stylurus flavipes* and *Ophiogomphus cecilia* in the river and of *Lestes barbarus*, *Erythromma viridulum*, *Aeshna affinis*, *A. viridis*, *Anax parthenope*, and *Epithea bimaculata* in the oxbow lakes and the temporary waters of the flood plain are of superregional importance. The responsibility of Sachsen-Anhalt for the protection of these species in Germany is stressed.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1406. **Murphy, D.H. (1999):** Odonata biodiversity in the Nature Reserves of Singapore. *Gardens' Bulletin (Singapore)* 49(2) (1997): 333-352. (in English). ["An account is given of Odonata collected during the survey of the Nature Reserves. Most of the species described from Singapore material in A.R. Wallace's collection in 1856 still occur. A total of 79 species have been recorded within the Nature Reserves, including an endemic damselfly, *Drepanosticta quadrata*. Eight species are known only from Nee Soon Swamp Forest." (Author)] Address: Murphy, D.H., Department of Biological Sciences, National University of Singapore, Kent Ridge, Singapore, 119260, Singapore

1407. **Muzon, J.; Ellenrieder, N. von (1999):** Status and distribution of Odonata (Insecta) within natural protected areas in Argentina. *Biogeographica* 75(3): 119-128. (in English). ["This paper is an initial study of Odonata occurring in protected areas of Argentina. Of the 264 species reported in the country 189 (71.59%) have been recorded from at least one natural protected area in the last three years. Information gathered from surveys of 16 protected areas is presented in relation to biogeography and taxonomy (to family level). Species recorded only from Argentina are indicated." (Authors)] Address: von Ellenrieder, Natalia, Instituto de Limnologia "Dr. Raul A. Ringuelet", 1900, La Plata, Argentina

1408. **Nelson, B. (1999):** The status and habitat of the Irish damselfly *Coenagrion lunulatum* (Charpentier) (Odonata) in Northern Ireland. *Entomologist's Monthly Magazine* 135: 59-68. (in English). ["The N. Ireland

population of *Coenagrion lunulatum* was surveyed in 1996. The main findings were: 1, the species was thought to be present at 23 sites in N. Ireland. Of these only 17 can now be regarded as definite. Albeit that 6 colonies were presumed on insubstantial evidence, 6 have disappeared. In other words a quarter of the known UK colonies have disappeared. 2, the size of individual colonies is smaller than previously suggested; only two colonies support large numbers. 3, the colonies are found on mesotrophic lakes and large bog pools. Habitat change caused by eutrophication is seen as the major threat to the species." (Author)] Address: Nelson, B.; Zoology Department, Ulster Museum, Botanic Gardens, Belfast, BT9 5AB, UK

1409. **Nessimian, J.L.; Sanseverino, A.M.; Oliveira, A.L.H. de (1999):** Trophic relationships of Chironomidae larvae (Diptera) and its importance on the foodwebs in a sand dune marsh on the littoral of Rio de Janeiro State. *Revista Brasileira de Entomologia* 43(1-2): 47-53. (in Portuguese). ["A Food web study was carried out, based on direct observations and gut content analysis of macroinvertebrates sampled from Jan. 1987 to Feb. 1988, in Brejo-canal de Itaipuacu marsh, Marica, whose structure and composition have changed seasonally. Chironomid larvae and microcrustaceans were the main taxa among the macroinvertebrates, being keystone prey groups in the trophic system. [...] The whole group showed an approximated mean of 14 trophic links per species against the medium value of 9 links per species for all macroinvertebrates sampled. The main alimentary items observed for chironomid larvae were chlorophytes, desmids diatoms, cladocerans, copepods, oligochaetes and chironomid larvae, besides poriferans, mites and vegetal fibers. On the other hand, chironomid larvae were constant items in Odonata, Hemiptera and Coleoptera diets. The variation in the number of interactions was due to the water column, the macrophyte and algae life cycles. Spring and summer observations showed the biggest number of links. The consequent changes in the availability of alimentary items was reflected, at least relatively, on the diversity of chironomid diet." (Authors)] Address: Nessimian, J. L. , Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil

1410. **Palmer, M.A. (1999):** The application of biogeographical zonation and biodiversity assessment to the conservation of freshwater habitats in Great Britain. *Aquatic Conservation: Marine and freshwater ecosystems* 9(2): 179-208. (in English). ["1. Twelve biogeographical zones for freshwater habitats in Great Britain were derived, using detrended canonical correspondence analysis of data on climate, relief, geology, soils and land use, in conjunction with occurrence data for more than 300 native freshwater species. 2. The taxonomic groups used were aquatic macrophytes, dragonflies (Tab. 6), freshwater molluscs, amphibians and selected leeches, water beetles and crustaceans. The computer database of the Institute of Terrestrial Ecology's Biological Records Centre was used as the principal of species data. 3. Within each of the 12 biogeographical zones, 10 X 10 km square 'hotspots' for species richness and rarity were identified. 4. The significance of this work for the conservation of freshwater habitats and species in Great Britain is discussed." (Author)] Address: Palmer, Margaret, Apple

Barn Cottage, Fotheringhay, Peterborough, PE8 5JB, UK.

1411. **Paoletti, M.G.; Dunxiao, H.; Patrik, M.; Ning-xing, H.; Wenliang, W.; Chunru, H.; Jiahai, H.; Liewan, C. (1999):** Arthropods as bioindicators in agroecosystems of Jiang Han Plain, Qianjiang City, Hubei China. *Critical Reviews in Plant Sciences*. 18(3): 457-465. (in English). [Arthropods on the soil surface and on vegetation were periodically surveyed in two villages on the Jiang Han Plain from April to September 1994. Odonata are mentioned in Tab. 4 without further discussion.] Address: Hu Dunxiao, China Agricultural University, Beijing, P.R. China

1412. **Parker, A.R. (1999):** Reflected glory: the key to insect colours. *Biologist* 46(5): 206-210. (in English). ["There are basically three categories of structures that cause colour in insects: (i) elements which cause scattering, (ii) diffraction gratings and (iii) single- and multi-layer reflectors. The last two mechanisms cause specular (directional) reflections, and therefore often appear relatively bright and 'metallic', whereas the first provides on omnidirectional reflectance. Generally within all of the categories, only transparent materials are involved in producing colour. [...] Scattering - blue: [...] A gradation from blue to white scattering ('small' to 'large' particles) occurs on the wings of the dragonfly *Libellula pulchella* (Mason, 1926). Blues resulting from this 'Rayleigh' scattering can also be found in other dragonflies and damselflies [...] In some, the epidermal cells contain minute colourless granules, which scatter the short wavelengths, and a dark base. These granules are absent in the females of the species. The males of some other species produce a waxy secretion that scatters light over their dark cuticle. The green of the female *Aeshna cyanea* is the combined result of Rayleigh scattering and a yellow pigment, both within the epidermal cells (degradation of the yellow pigment turns a dead dragonfly blue) [...] (Fox and Vevers, 1960)." (Author)] Address: Parker, A., Dept Zoology, University of Oxford, South Parks Road, Oxford OX1 3PS, UK

1413. **Petrulevicius, J.F. (1999):** Cenozoic insects from Argentina. *Revista de la Sociedad Entomologica Argentina* 58(1-2): 95-103. (in Spanish with English summary). ["A review of the information about cenozoic insects is presented. Paleogene insects are mentioned from different regions and formations. The *Siricinae Urocerus patagonicus* Fidalgo & Smith, 1987 is the unique nominated species from Laguna del Hunco Formation (Paleocene-Eocene; Chubut Province). This subfamily has at present a North Hemisphere distribution. The *Formicidae Polanskiella smekali* Rossi de Garcia, 1983 and the *Myrmeciinae Ameghinoia piatnitzkyi* Viana & Haedo Rossi, 1957 are the two nominated species from Ventana Formation (Eocene-early Oligocene; Chubut Province), together with other (aquatic and terrestrial) insects. The *Myrmeciinae* have at present an Australian distribution. Insects (*Curculionioidea*, *Elateroidea* and *Formicidae*) are cited for the first time from Canadon Hondo Formation (Eocene; Chubut Province), as well as isolated elitra of *Coleoptera* from Olmedo Formation (lower Paleocene; Jujuy Province). Maiz Gordo Formation (upper Paleocene; northwestern Argentina) provided 37 species of *Orthoptera*, *Dermaptera*, *Hemiptera* (*Homoptera* and *Heteroptera*), *Trichoptera* and *Coleoptera*. Since 1993, new findings were carried out

by the author in these insect layers. Thus far, representatives of six orders and several families have been found, including Blattaria, Odonata, Mecoptera, Neuroptera, Diptera, Hymenoptera, Tettigoniidae and Lygaeidae. Isolated tegmina of Grylloidea and elitra of Coleoptera (Curculionoidea) are known from Lumbra Formation (lower Eocene; northwestern Argentina). Pleistocene insects are cited from two outcrops in Buenos Aires Province: puparia moulds of Calliphoridae in association with an articulated skeleton of Carnivora from the "Ensenadense", and an insect assemblage from Santa Clara Formation. The migratory subspecies *Schistocerca cancellata paranensis* (Burmeister, 1861) was found in an archaeological Holocene site in Tucuman Province." (Author)] Address: Petrulevicius, JF; Museo La Plata; Dept Cient Paleozool Invertebrados; Paseo Bosque S-N; RA-1900 La Plata; Argentina. E-mail: levicius@netverk.com.ar

1414. **Pirnat, A. (1999):** Study of emergence in *Pyrrhosoma nymphula* (Sulzer) (Zygoptera: Coenagrionidae). *Exuviae* 5(1): 6-12. (in English with Slovene summary). ["From 21-IV to 12-V-1994 the emergence of *Pyrrhosoma nymphula* was studied at a small forest pond in Ljubljana, central Slovenia. A total of 798 exuviae were collected and the daily emergence rate, synchronization of emergence and sex ratio were studied. A short note on mortality and predation [by Spiders, ants, lizards, and birds] during emergence is also appended." (Author)] Address: Pirnat, Alja, Biological Institute ZRC SAZU, Novi trg 5, SI-1000 Ljubljana, Slovenia. E-mail: alja.pirnat@guest.arnes.si

1415. **Polyanovskii, A.D. (1999):** Phototransduction in insects: Two strategies for calcium homeostasis? *Sensory Systems* 12(3): 181-187. (in English). [This is the English version of the paper abstracted as OAS 1306] Address: Polyanovskii, A.D., I. M. Sechenov Institute of Evolutionary Physiology and Biochemistry, Russian Academy of Sciences, 44 M Torez Prospekt, 194223 St. Petersburg

1416. **Reinhardt, K. (1999):** The reproductive activity of two Pseudagrion species in the same habitat (Odonata: Coenagrionidae). *African Entomology* 7(2): 225-232. (in English). ["The reproductive activity of two closely related species, *Pseudagrion massaicum* Sjöstedt and *P. salisburyense* Ris was examined relative to environmental factors. The abundance of both species was positively correlated, suggesting a weak influence of interspecific competition. The most important abiotic factor influencing the activity of the two species was cloud cover. Males of the two species showed a strong spatial separation in perching position relative to vegetation type, perch height and distance to the banks. The proportion of males actively engaged in reproduction rose significantly with time of day but was independent of total male density and the relative importance of either patrolling or perching behaviour. Males of both species were found to be non-territorial, which is exceptional for the genus *Pseudagrion*. This is discussed relative to high territory retention costs at high dragonfly densities." (Author)] Address: Reinhardt, K., Hauptstr. 38, D-09244 Oberlichtenau, Germany. E-mail: b5klre@pluto.rz.uni-jena.de

1417. **Reinhardt, K.; Kempke, D. (1999):** Thoracic temperatures in four libellulid dragonflies (Anisoptera: Libellulidae). *Notul. odonatol.* 5(4): 41-43. (in English). ["The thoracic temperatures in *Orthetrum cf. caffrum*,

Trithemis arteriosa, *T. dorsalis* and *Palpopleura lucia* were measured in the field. All spp. belong to the percher type. Their thoracic temperatures were between 0.7 and 10.5°C above ambient temperature. The pale blue *O. cf. caffrum* had a higher body temperature than the dark blue *T. dorsalis*. The thorax temperature was positively correlated to abdomen length but not forewing length between species with a similar trend within *T. dorsalis*." (Authors)] Address: Reinhardt, K., Hauptstr. 38, D-09244 Oberlichtenau, Germany. E-mail: b5klre@pluto.rz.uni-jena.de

1418. **Reinhardt, R.; Pimpl, F. (1999):** Beitrag zur Insektenfauna des Landkreises Mittweida. *Mitt. Sächs. Entomologen* 47: 8-17. (in German). [Checklist of 11 odonate species of the county Mittweida, Saxony, Germany] Address: Reinhardt, R., Burgstädter Str. 80a, D-09648 Mittweida, Germany

1419. **Rolff, J. (1999):** Parasitism increases offspring size in a damselfly: Experimental evidence for parasite-mediated maternal effects. *Animal Behaviour* 58(5): 1105-1108. (in English). ["The effects of parasites on host fitness and the fitness effects of maternal effects are widely discussed. In this study, I conducted an experiment linking both aspects. I manipulated the ectoparasite load (Acari: *Arrenurus cuspidator*) of damselflies, *Coenagrion puella*, and found that larvae from mothers with high parasite loads were larger (assessed by head width) than larvae from mothers with low parasite loads. Furthermore, there was a negative correlation between the number of eggs laid and parasite load. Parasitized mothers thus seemed to have fewer, but probably better, offspring. The ecological significance of these parasite-mediated maternal effects remains to be tested. However, size-dependent cannibalism almost certainly has important consequences for population dynamics." (Author)] Address: Rolff, J., Zoologisches Institut, AG Ökologie, Technische Universität Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1420. **Ruddek, J. (1999):** *Gomphus vulgatissimus* (Linnaeus) in der Weser bei Bremen (Anisoptera: Gomphidae). *Libellula* 18(3/4): 201-203. (in German with English summary). ["Exuviae and adults of *G. vulgatissimus* were found in May and June 1999. The number of Odonata species recorded in the federal state of Bremen increased to 47 species." (Author)] Address: Ruddek, R., Butendiek 34, D-28865 Lilienthal, Germany. E-mail: juergen.ruddek@telekom.de

1421. **Ruiter, E. (1999):** Een Aeshna'tje meer of minder Mededelingen van de Nederlandse Vereniging voor Libellenstudie 3(4): 9. (in Dutch). [In the estate of De Horte near Zwolle, The Netherlands, more than 70 exuviae of *Aeshna cyanea* and 1 of *Sympetrum vulgatum* were collected. The abundance was calculated with 5 ind./m²] Address: Ruiter, E., Cornelis Houtmanstraat 10, NL-8023 EA Zwolle, the Netherlands

1422. **Ruiter, E. (1999):** Late waarneming van een Gewone oeverlibel *Orthetrum cancellatum*. Mededelingen van de Nederlandse Vereniging voor Libellenstudie 3(4): 9. (in Dutch). [Phenological date from a late record of *O. cancellatum*, and *Sympetrum vulgatum* and *Aeshna mixta* (Zwolle, The Netherlands)] Address: Ruiter, E., Cornelis Houtmanstraat 10, NL-8023 EA Zwolle, the Netherlands

1423. **Sahlén, G. (1999):** The impact of forestry on dragonfly diversity in central Sweden. *International Journal of Odonatology* 2(2): 177-186. (in English). ["A survey of 32 lakes for dragonfly larvae, aquatic plants and forestry regime in the surrounding boreal forests was performed. The highest diversity was found in undisturbed forests. Lakes rich in aquatic plants were shown also to be rich in dragonflies. A rich plant community is proposed to provide a wider range of micro-habitats thereby increasing dragonfly biodiversity. If the forest surrounding a lake has been logged, a decrease in the species-richness of dragonflies with partivoltine life-cycles can be observed after a 5 year "lag phase." Increased fluctuations in water temperature and leakage of nutrients into the water are two possible causes. Univoltine species are not affected and appear to be less dependent on constant water conditions. The water plant community is only moderately affected, but a slight decrease in the number of species can be observed. A return to more species-rich conditions can be observed after more than 15 years, but whether the original community is restored or replaced with more "trivial" species is an open question." (Author)] Address: Sahlén, G., Systematic Zoology, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, S-752 36 Uppsala, Sweden. E-mail: goran.sahlen@zoologi.uu.se

1424. **Samraoui, B.; Menai, R. (1999):** A contribution to the study of Algerian Odonata. *International Journal of Odonatology* 2(2): 145-165. (in English). ["A survey of the dragonflies of Algeria, spanning nine years, has yielded 53 species. Past records of another 10 species are believed to be genuine, making up a total of 63 species for the country. We try to clarify the status of these supplementary species and also provide information on the current distribution and present status of all recorded species." (Authors)] Address: Boudjema Samraoui & Rachid Menai' Laboratoire de Recherche des Zones Humides, Université d'Annaba, 4 rue Hassi-Beida, Annaba, Algeria. E-mail: bsamraoui@hotmail.com

1425. **Samraoui, B.; Jödicke, R. (1999):** Mise au point concernait l'article "Les Odonates Zygoptères de l'oued de la Meskiana (Algerie). Premier bilan des observations" (*Martinia*, 15 (1): 22). *Martinia* 15(4): 121-123. (in French with English summary). ["The authors rectify the check-list reported by Bouguessa et al., in a short note (*Martinia*, 15(1): 22). Out of the nine listed species, only two, *Cercion lindenii* and *Coenagrion mercuriale*, may have been correctly identified. The present communication provides a list of the Zygoptera recorded so far, in Oued Meskiana and the surroundings."] Address: Samraoui, B., Laboratoire de Recherche des Zones Humides, 4, rue Hassi-BeTda, Annaba, Algeria; Jödicke, R., Grossenging 14, D-49699 Lindern, Germany

1426. **Sanders, M.D. (1999):** Common aquatic invertebrate taxa vary in susceptibility to capture by Black Stilt chicks. *Notornis* 46(2): 311-318. (in English). ["I tested the ability of captive Black Stilt chicks (*Himantopus novaezelandiae*) to capture and consume common aquatic invertebrates. Waterboatmen (*Sigara* sp.), segmented worms (*Oligochaeta*), and larvae of a damselfly (*Xanthocnemis zealandica*), midge (*Chironomus zealandicus*), mayfly (*Deleatidium* spp.), and caddisfly (*Aoteapsyche colonica*) were captured and consumed quickly and easily by chicks of all ages (2 - 30 days). They were also consumed in the greatest

contrast, two aquatic snails (*Physa acuta* and *Lymnaea tomentosa*), and larvae of two cased caddisflies (*Triplectides* sp. and *Hudsonema amabilis*) were captured and consumed with difficulty and in low numbers by young chicks (< 7 days). Young chicks appeared to take longer than older chicks to capture prey, to spend more time manipulating prey in their bills before swallowing, and to drop prey frequently. In contrast, 21 - 30 day old chicks appeared to capture, manipulate and swallow most types of prey efficiently and quickly. These results augment biomass as a measure of the value of aquatic invertebrate food supplies in wetlands." (Author). Most *Xanthocnemis zealandica* were consumed in most trials, and it was pecked at more rapidly than oligochaetes, molluscs and cased caddisflies. "Larvae of *X. zealandica* struggled vigorously when captured, and were sometimes able to escape from 2-3 day old chicks, by 'flicking' their abdomens while the chicks were manipulating them in their bills. [...] *X. zealandica* is likely to be easily captured and consumed in the wild, as it was in the experiment." (Author)] Address: Sanders, M., Department of Conservation, Private Bag, Twizel, New Zealand

1427. **Sandhu, R.; Walia, G.K. (1999):** Karyology of male and female *Pseudoagrion rubriceps* (Zygoptera : Coenagrionidae). *Bionature* 19(1): 1-5. (in English). ["Chromosomal analysis has been carried out on male and female individuals of *Pseudoagrion rubriceps* collected from the states of Jammu and Kashmir, Punjab, Assam and Meghalaya in India. Majority of mitotic and meiotic stages possess the diploid numbers 27 in males and 28 in females with XO - XX sex determining mechanism. The autosomes include a tiny pair of m chromosome in both sexes. Numerous plates showing autosomal fragmentations in different meiotic stages of the same individual have been observed. In these, diploid numbers vary from 27 to more than 45. Female karyotype and autosomal fragmentations have been reported for the first time in this damselfly." (Authors)] Address: Sandhu, R., Dep. Zool., Punjabi Univ., Patiala-147 002, Punjab, India

1428. **Sawada, K. (1999):** Female sexual receptivity and male copula guarding during prolonged copulations in the damselfly *Ischnura senegalensis* (Odonata: Coenagrionidae). *Journal of Ethology* 17(1): 25-31. (in English). ["Laboratory experiments were conducted to clarify the relationship between female sexual receptivity and male copula guarding in *I. senegalensis*, a species that copulates for several hours. In insectaries, most copulations were initiated early in the morning, and terminated relatively synchronously between 11 00 and 13 00. Females refused males with wing-flutter display and oviposited alone in the afternoon regardless of copulation events of that morning. Females could sexually receive males only in the morning. Males copulated for several hours until 12 00 after which females could oviposit. To determine whether copulations that last for hours function as male copula guarding or only of sperm displacement, emerged males were kept at various densities and permitted to copulate with virgin and mated females in insectaries. Both with virgin and mated females, "social" (not solitary; 2-4 males / insectary) males initiated copulations early in the morning and always terminated at around 12 00. However, both with virgin and mated females, solitary (one male / insectary) males

terminated copulations in the morning. In both cases, duration of copulations did not significantly differ for virgin females and mated females. Therefore, long (several hour) copulation is more likely to function as male copula guarding than as sperm displacement, and duration of copulations is predicted to be shortened when male density is very low." (Author)] Address: Sawada, K., Kashii High School, 2-9-1, Kashii, Higashi-ku, Fukuoka, 813-0011, Japan

1429. **Schiel, F.-J.; Rademacher, M. (1999):** Wiederrunde von *Gomphus flavipes* (Charpentier) am Oberrhein in Baden-Württemberg (Anisoptera: Gomphidae). *Libellula* 18(3/4): 181-185. (in German with English summary). ["As a result of a systematic survey between 20 and 29-VII-1999, two exuviae of *G. flavipes* were found at two sites at the Upper Rhine south of Karlsruhe and south of Kehl, respectively. The habitat is briefly described and the circumstances of the records are shortly discussed. Remarkable is the record of one exuvia of *Ophiogomphus cecilia* at the main course of the Upper Rhine north of Karlsruhe." (Authors)] Address: Schiel, F.-J., Rademacher, M., Institut für Naturschutz und Landschaftsanalyse (INULA), Friesenheimer Hauptstraße 20, D-77948 Friesenheim, Germany. E-mail: michael.rademacher@t-online.de

1430. **Schiller, R. (1999):** Der Leipziger Auwald - ein Gebiet mit besonderer Bedeutung für die Entomofauna Sachsens. *Mitt. Sächs. Entomologen* 47: 3-7. (in German). [Reference to some odonatological studies with reference to the floodplain forests of Leipzig, Saxony, Germany; the following species are listed: *Lestes barbarus*, *Anaciaeschna isosceles*, *Anax parthenope*, and *Brachytron pratense*] Address: Schiller, R., Naturkundemuseum Leipzig, Lortzingstr. 3, D-04105 Leipzig, Germany

1431. **Schmid, U. (1999):** Unser Neuzugang in Sachen Bernstein: Dr. Günter Bechly. *Museum - Naturkundemuseum Stuttgart* 6/99: without pagination. (in German). [The famous amber collection in the Naturkundemuseum Stuttgart will be managed in the future by Dr. G. Bechly, a well known German odonatologist with special interest in odonate palaeontology and phylogeny. Bechly's odonatological vitae is shortly outlined, and some annotations on highlights of the amber collection and its doyen Dr. Dieter Schlee are made.] Address: Staatliches Museum für Naturkunde Stuttgart, Rosenstein 1, D-70191 Stuttgart, Germany

1432. **Schulz, R.; Berenzen, N.; Hünken, A.; Wendt, H. (1999):** Auswirkungen von Unterhaltungsmaßnahmen an Gewässern der Uckerniederung nördlich von Prenzlau und ihre Bedeutung aus Naturschutzsicht. *Naturschutz und Landschaftspflege in Brandenburg* 8(4): 148-154. (in German). [Brandenburg, Germany; effects of ditch management patterns on fauna are studied in detail; rotational clearance of ditches allows best displays of fauna; *Ischnura elegans* is the single odonate species mentioned] Address: Schulz, R., Zool. Inst. TU Braunschweig, Fasanenstr. 3, 38092 Braunschweig, Germany. E-mail: r.schulz@tu-bs.de

1433. **Shieh, Sen-Her; Yang, Ping-Shih (1999):** Colonization patterns of aquatic insects on artificial substrates in a Taiwan stream. *Zhonghua Kunchong* 19(1): 27-50. (in English). ["Experiments on colonization patterns of artificial substrates by aquatic insects were

conducted in the upper Chingmei Stream, Taiwan. Artificial substrates were colonized by aquatic insects for periods of 3, 6, 12, 21, 30, and 42 days from 15 Dec. 1990 to 26 Jan. 1991 at 2 sites: a polluted site caused by coal mining activities (Site 1) and a recovery site further downstream of the polluted site (Site 2). Total numbers of individuals and taxa were significantly affected by exposure period of experimental substrates and sites, indicating the occurrence of succession and the detrimental effect of coal mining activities on aquatic insect communities. At Site 1, only *Caenis* sp., *Euphaea* sp., and *Chironomidae* occurred on all sampling dates and were abundant. The other taxa may have just continued to drift away from the site. The chironomid larvae were most abundant. They accounted for over 90% of the colonizing individuals from day 12 to day 42. At Site 2, *Baetis* spp. and *Chironomidae* were most abundant. They accounted for over 80% of individuals during the experiment, except on day 21. The relative abundance shifted from *Baetis* spp. to *Chironomidae* with an increase in colonization time. A large number of positive correlation was found within the functional groups of filter-feeders and predators at Site 2. Taxa within the two groups tended to overlap in their distribution among baskets. The lognormal distribution was a better fit at Site 1 than at Site 2, suggesting that it is easier for a community to attain a state of equilibrium in a stressed environment than in a less-polluted environment. Mechanisms determining the colonization patterns of aquatic insects were reflected by the susceptibility of organisms to mining activities at Site 1, and the influence of biological interactions and disturbance caused by high discharges at Site 2 during the experimental period." (Authors)] Address: Shieh, Sen-Her, department of Entomology, National Taiwan University, Taipei, 106, Taiwan

1434. **Southcott, R.V. (1999):** Larvae of *Leptus* (Acarina: Erythraeidae), free-living or ectoparasitic on arachnids and lower insects of Australia and Papua New Guinea with descriptions of reared post-larval instars. *Zoological Journal of the Linnean Society* 127(2): 113-276. (in English). [*Leptus* larvae (Acarina: Erythraeidae) of Australia and New Guinea, collected either free-living or ectoparasitic on Arachnida or lower Insecta, are comprehensively reviewed. For Australia new species are described from Scorpionida: 8, from Araneae: 1, from Insecta (Archaeognatha: 1, Blattodea: 1, Phasmatodea: 1, Orthoptera, Acridoidea: 7, Hemiptera: 5), and free-living only: 2. From Papua New Guinea new species are described parasiting on Acridoidea: 1, Orthoptera: 1, and free-living: 3. Additional host and other records are given for previously described species, originally described as ectoparasites of Insecta (from Australia) and from Papua New Guinea including *L. draco* Southcott (Odonata, Acridoidea, Tettiginoidea, Phasmatodea, Hemiptera).] Address: Southcott, R.V., 2 Taylors Road, Mitcham, SA, 5062 Australia.

1435. **Sovinc, A. (1999):** Restoration ecology. *Proteus, Ljubljana* 62(4): 152-160. (in Slovene with English summary). ["Restoration Ecology is an emerging profession within the Ecology; it is an attempt to reverse the human induced ecological changes and to stimulate the natural or semi-natural processes in habitats, ecosystems, and landscapes. The article discusses different terms in the restoration processes, such as habitat rehabilitation, reconstruction,

enhancement, re-creation, transplantation and creation, mitigation, and others, and provides a set of basic considerations when planning and implementing restoration measures. These include: a) the line up to which nature should be 'helped' has to be carefully considered; restoration should, in principle, only encourage, accelerate, allow or imitate natural processes; b) nature restoration projects should never be undertaken in indigenous areas with a high conservation or biodiversity value; c) nature restoration projects should never be used to justify environmentally damaging developments. Examples of already implemented wetland restoration projects include the creation of substitute habitats along the Ljubljana river during the construction of a new motorway, including habitat creation for amphibians, the construction of small ponds, revitalisation of oxbows and floodplains. Other examples include the creation of wetland habitats during the dredging of the Zbilje reservoir, the construction of a pond at Trzin and a restoration of a section of the Bicje river near Grosuplje." (Author). *Orthetrum brunneum* is the single odonate species mentioned in the article.] Address: Sovinc, A., Pod Kostanji 44, SI-1000 Ljubljana, Slovenia

1436. **Stav, G.; Blaustein, L.; Margalith, J. (1999):** Experimental evidence for predation risk sensitive oviposition by a mosquito, *Culiseta longiareolata*. *Ecological Entomology* 24(2): 202-207. (in English). ["1. Females should choose to oviposit in habitats where risk of predation and competition are low. The ovipositional responses of a mosquito, *Culiseta longiareolata*, to a predator and to species sharing the same trophic level as this mosquito (controphic species) were assessed experimentally in outdoor artificial pools. 2. The predator, larval *Anax imperator*, which strongly reduced larval *C. longiareolata* survival, resulted in a 52% reduction of *C. longiareolata* egg rafts. The controphic species (primarily *Daphnia magna*), which had a small but statistically significant negative effect on the survival of *C. longiareolata* larvae, did not have a statistically significant influence on the number of egg rafts. 3. Laboratory trials indicated that only a small fraction of the reduced number of egg rafts seen in predator pools may be due to consumption of the egg rafts by *A. imperator*. 4. The experimental evidence indicates that the reduced number of *C. longiareolata* egg rafts found in the presence of *A. imperator* is due largely to oviposition habitat selection, i.e. *C. longiareolata* females choose pools with low risk of predation for their offspring." (Authors)] Address: Blaustein, L., Laboratory for Community Ecology, Institute of Evolution, University of Haifa, Haifa, 31905, Israel

1437. **Steenis, W. van (1999):** Vondst Gewone bronlibel *Cordulegaster boltonii* in de stad Utrecht. *Mededelingen van de Nederlandse Vereniging voor Libellenstudie* 3(4): 7-9. (in Dutch). [On 8 August 1999 *C. boltonii* was discovered in Utrecht, the Netherlands. On the occasion of the discovery the known Dutch records are compiled, mapped and discussed] Address: Wouter van Steenis, W.vanSteenis@Natuurmonumenten.nl

1438. **Steglich, R.; Müller, J. (1999):** Artenliste der Funde von Heuschrecken (Saltatoria) und Libellen (Odonata) in ausgewählten Biotopen am Neusiedler See und Umgebung sowie der Donau-Niederung in Ungarn, Österreich und der Slowakei 1997 und 1998.

Halophila 38: 3-5. (in German). [Shortly commented compilation of faunistic data of Odonata from Austria, Hungaria, and Slovakia. *Thecagaster bidentata*, *Stylurus flavipes*, and *Ophiogomphus cecilia* are of some interest] Address: Steglich, Rosmarie, Quittenweg 53, 39118 Magdeburg, Germany

1439. **Stoks, R. (1999):** Autotomy shapes the trade-off between seeking cover and foraging in larval damselflies. *Behavioral Ecology and Sociobiology* 47(1/2): 70-75. (in English). ["Animals commonly choose between microhabitats that differ in foraging return and mortality hazard. I studied the influence of autotomy, the amputation of a body part, on the way larvae of the damselfly *Lestes sponsa* deal with the trade-off between foraging or seeking cover. Survival of *Lestes* larvae when confronted with the odonate predator *Aeshna cyanea* was higher in a complex than in a simple microhabitat, indicating that this more complex microhabitat was safer. Within the simple microhabitat, larvae without lamellae had a higher risk for mortality by predation than larvae with lamellae, showing a long-term cost of autotomy. When varying the foraging value (food present or absent) and predation risk (encaged predator or no predator) in the simple microhabitat, larvae with and without lamellae responded differentially to the imposed trade-off. All larvae spent more time in the simple microhabitat when food was present than when food was absent. Larvae without lamellae, however, only sporadically left the safe microhabitat, irrespective of the presence of the predator. In contrast, larvae with lamellae shifted more frequently towards the risky microhabitat than those without lamellae, and more often in the absence than in the presence of the predator. These decisions affected the foraging rates of the animals. I show for the first time that refuge use is higher after autotomy and that this is associated with the cost of reduced foraging success. The different microhabitat preferences for larvae with and without lamellae are consistent with their different vulnerabilities to predation and demonstrate the importance of intrinsic factors in establishing trade-offs." (Author)] Address: Stoks, R., Evolutionary Biology Group, Department of Biology, University of Antwerpen (RUCA), Groenenborgerlaan 171, B-2020 Antwerpen, Belgium. E-mail: stoks@ruca.ua.ac.be

1440. **Suhling, F. (1999):** Dragonfly records from El Valle, Republic of Panama. *Notul. odonatol.* 5(4): 51. (in English). [List of 13 odonate species collected in March 1998 in the surroundings of El Valle (8.35N 80.7W), Panama.] Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1441. **Suhling, F.; Schütte, C. (1999):** Sternberg, K.; Buchwald, R. (Eds.) (1999): *Die Libellen Baden-Württembergs. Band 1. Lauterbornia* 37: 248-249. (in German). [Review of the book, see OAS 1149] Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1442. **Tembhare, D.B. (1999):** The 5th South Asian Symposium of Odonatology, Nagpur, India; 20-21 December 1998: A report. *Notul. odonatol.* 5(4): 51-52. (in English). [Short report on the South Asian Sym. Odonat.] Address: Tembhare, D.B., Dept Zool., Nagpur Univ. Campus, Amravati Road, Nagpur-440010, Maharashtra, India

1443. **Terzani, F. (1999):** Odonati dell'alto Appennino Mutino-Pistoiese, Emilia-Romagna e Toscana Italia centrosettentrionale (Odonata). *Opuscula Zoologica Fluminensia* 170: 1-7. (in Italian with English summary). [11 spp. are listed from 13 localities. *Chalcolestes viridis*, *Lestes dryas*, *Platycnemis pennipes*, *Pyrrhosoma nymphula*, *Coenagrion puella*, *Enallagma cyathigerum*, *Aeshna cyanea*, *Cordulegaster b. boltonii*, *Libellula quadrimaculata*, and *Platetrum depressum* were collected for the first time in this geographic area.] (Author)] Address: Terzani, F., Museo di Storia Naturale dell'Universita di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, FI, Italy. E-mail: terzani@ www.specola.unifi.it

1444. **Terzani, F.; Carfi, S. (1999):** Ricerche odonatologiche in Toscana, Italia centrale. 6. Padule di fucecchio (Odonata). *Opuscula Zoologica Fluminensia* 170: 9-23. (in Italian with English summary). [Some 27 spp. are listed from 23 localities, Fucecchio Marsh, lower Valdarno. *Calopteryx haemorrhoidalis*, *Lestes barbarus*, *Erythromma viridulum*, *Coenagrion pulchellum mediterraneum* Schmidt, *Aeshna mixta*, *Anaciaeschna isosceles*, *Libellula quadrimaculata*, *Orthetrum b. brunneum*, *O. c. coerulescens*, *Crocothemis erythraea*, *Sympetrum sanguineum*, and *Trithemis annulata* were collected for the first time in this geographic area.] (Authors)] Address: Terzani, F., Museo di Storia Naturale dell'Universita di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, FI, Italy. E-mail: terzani@ www.specola.unifi.it

1445. **Trilar, T.; Bedjanic, M. (1999):** Contribution to the knowledge of the dragonfly fauna of Lastovo island, Dalmatia, southern Croatia. *Exuviae* 6: 1-6. (in English with Slovenian summary). [A list of 7 dragonfly species recorded on the island in June and July 1998 is given. *Cordulia aenea* (L.) is new for the odonate fauna of Dalmatia. Its distribution in southern Europe is outlined and commented.] (Authors) The rare *Coenagrion scitulum* is listed from two localities.] Address: Trilar, T., Slovenian Museum of Natural History, Presernova 20, P. O. Box 290, SI-1000 Ljubljana, Slovenia. E-mail: ttrilar@pms-lj.si

1446. **Trockur, B.; Didion, A. (1999):** Fortpflanzungsnachweise der Zierlichen Moosjungfer, *Leucorrhinia caudalis* CHARPENTIER, 1840 im Moseltal. *Abhandlungen der Delattinia* 25: 57-66. (in German with English summary). [Adult males of *L. caudalis* were recorded in gravel pits in the Mosel valley near Nennig (Saarland, Germany) and near Remich (Haff Remich, Luxembourg) between 1996 and 1999. Reproduction could be recorded in May 1999 (3 exuviae with one freshly emerged female). High transparency of the water is as typical for the localities as rich submerged or floating vegetation. All localities in the gravel pit area of Nennig and Remich with records of *L. caudalis* are described in some detail with emphasize to the vegetation and the associated odonate species. The regional status in France (Lorraine), Luxembourg and Saarland is discussed with reference to the core habitats of the regional metapopulation of *L. caudalis*.] Address: Trockur, B., Schulstr. 4, 66636 Tholey-Scheuern, Germany

1447. **Trueman, J.W.H. (1999):** The family-group names based on Selys's Légions. *International Journal of Odonatology* 2(2): 141-144. (in English). [It recently

was suggested that family-group names derived from the names of Selys' legions are not valid. I state why I believe this view is mistaken and I argue that, even if it were not, nomenclatural stability in Odonata can be better served by the preservation of these names than by their overturn.] (Author)] Address: Trueman, J., Research School of Biol. Sciences, Australian National University, Canberra, ACT 0200, Australia. E-mail: trueman@rsbs.anu.edu.au

1448. **Unruh, M. (1999):** Zum Vorkommen von *Anax parthenope* (Selys, 1839) im südlichen Sachsen-Anhalt (BRD) und Gedanken zum Schutz der Kleinen Königslibelle (Anisoptera: Aeshnidae). *Entomol. Mitt. Sachsen-Anhalt* 7(2): 29-34. (in German with English summary). [List of known habitats of the species in Sachsen-Anhalt, Germany; discussion of habitat factors necessary for establishing populations; the author assumes that only so-called "Klarwasserseen" (oligotrophic lakes with *Chara*-vegetation) in succession to dymesotrophic waterbodies with little floating plants (hydrophyts), but *Phragmites*-reed beds along the shore side are optimal habitats for the species in Sachsen-Anhalt. In addition some muddy parts on the lake bed und few fish predators are favourable.] Address: Unruh, M., Schmale Str. 29, D-06712 Großsida, Germany

1449. **Utzeri, C.; Di Giovanne, M.V.; Goretti, E.; Terzani, F.; Speziale, A.; Mei, M.; Santolamazza Carbone, S.; Cordero, A. (1999):** Updated information on the distribution of *Somatochlora meridionalis* Nielsen, 1935, in central Italy (Anisoptera: Corduliidae). *Notul. odonatol.* 5(4): 43-47. (in English). [A list and a map are given of the central Italian sites in which the presence of *S. meridionalis* has been verified in the past and recent years. Information on the 24-26 odonate spp. associated with *S. meridionalis* is provided for each site. Water parameters are also given for some Umbrian sites in which larvae were found. The latter are the first on record for the region of Umbria.] (Authors)] Address: Utzeri, C., Dipartimento di Biologia Animale e dell'Uomo, Università di Roma "La Sapienza", Viale dell'Università 32, I-00185 Roma, Italy

1450. **Vines, G. (1999):** Local heroes. *New Scientist* 161(2175): 34-39. (in English). [A more general account on the importance of ponds for biodiversity of landscapes; British Isles] Address: not stated

1451. **Wain, W.H.; Wain, C.B.; Lambert, T. (1999):** Odonata of North Island, Seychelles archipelago. *Notul. odonatol.* 5(4): 47-50. (in English). [A 6-hr visit in November 1997 established the presence of 9 spp., all of which showed some evidence of breeding. The paucity of previous Odonata records from North Island undoubtedly reflects the dearth of observers and it is probable that the present visit was the first entomological one since Vesey-Fitzgerald in November 1952.] (Authors) The following species are listed and discussed: *Ceriagrion glabrum*, *Ischnura senegalensis*, *Anax guttatus*, *Diplacodes trivialis*, *Orthetrum stemmale wrightii*, *Pantala flavescens*, *Rhyothemis semihyalina*, *Tholymis tillarga*, and *Tramea limbata*.] Address: Wain, W.H. & C.B., The Haywain, Hollywater Road, Bordon, Hants, GU35 OAD, United Kingdom

1452. **Wasscher, M. (Ed.) (1999):** NVL Nieuwsbrief. *Mededelingen van de Nederlandse Vereniging voor Libellenstudie* 3(4): 10 pp. (in Dutch). [Newsletter of the

Dutch Society of Odonatology; some technical papers as announcements of meetings, and faunistical papers (see this issue of OAS)] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: m.wasscher@broekhuis.nl

1453. **Weipert, J.; Bößneck, U. (1999):** Die Schutzgebiete der Landeshauptstadt Erfurt (Thüringen) Teil IV.: Flora und Fauna des GLB "Lohfinkensee" und dessen Umgebung. Veröffentlichungen des Naturkundemuseum Erfurt 19: 93-108. (in German). [Libellula depressa is the only dragonfly species mentioned] Address: Bößneck, U., Stadtverwaltung Erfurt, Umwelt- und Naturschutzamt, Staffenbergallee 18, D-99085 Erfurt, Germany

1454. **Werzinger, S.; Werzinger, J. (1999):** Gomphus flavipes (Charpentier) in Bayern: 1999 erstmals am Main, weitere Funde an der Regnitz (Anisoptera: Gomphidae). Libellula 18(3/4): 205-208. (in German with English summary). ["On 6-VII-1999 an exuvia of a male was collected at the river Main near Kreuzwertheim, Germany. At the river Regnitz, a tributary of the Main, five exuviae were recorded at a study section 3,000 m in length between 29-VI-1999 and 25-VH-1999." (Authors)] Address: Sabine und Joachim Werzinger, Zwernberger Weg 29, D-90449 Nürnberg, Germany

1455. **Westhus, W.; Klaus, S.; Fritzlär, F. (1999):** Schutz und Pflege Thüringer Hochmoore durch gemeinsames Handeln von Forst- und Naturschutzverwaltung. Landschaftspflege und Naturschutz in Thüringen 36(3): 98-100. (in German). [Picture of the rare Thuringian Somatochlora alpestris; some accounts on present activities of well known Thuringian odonatologist Dr. Wolfgang Zimmermann] Address: Westhus, W., Thüringer Landesanstalt für Umwelt, Abt. Ökologie und Naturschutz, Prüssingstr. 25, D-07745 Jena, Germany

1456. **Willigalla, C. (1999):** Zur Tagesaktivität von Lestes dryas Kirby (Zygoptera: Lestidae). Libellula 18 (3/4): 175-180. (in German with English summary). ["At a pond near Ostbevern in Westfalia, Germany, the flight activity of Lestes dryas was recorded on one sunny day in August 1997. The activity started at 9:00 h (summer time) with only a few individuals, had the maximum at 13:30 h (approx. solar noon) and stopped in the evening at 20:00 h. The influence of light intensity, position of the sun and temperature is discussed." (Author)] Address: Willigalla, C., Brock 45, D-48346 Ostbevern, E-mail: c.willigalla@t-online.de

1457. **Wilson, K. (1999):** Reports from Coastal Stations - 1998: Gibraltar Point, Lincolnshire. Atropos 6: 61. (in English). [Some dragonfly records including Brachytron pratense] Address: not stated

1458. **Winterholler, M.; Leinsinger, H. (1999):** Gomphus flavipes (Charpentier) bodenständig am Oberrhein in Hessen und Rheinland-Pfalz (Anisoptera: Gomphidae). Libellula 18(3/4): 209-211. (in German with English summary). ["In July 1999, exuviae were collected near Worms. These are the first breeding records for the Upper Rhine of Hessen and Rheinland-Pfalz, Germany." (Authors)] Address: Herwig Leinsinger, Oderweg 2, D-69226 Nußloch, Germany

1459. **Witte, R.H.; Groenendijk, D. (1999):** The occurrence of dragonfly larvae in the Dutch Delta in

relation to salinity. Brachytron 3(2): 3-10. (in Dutch with English summary). [(Promille-Zeichen fehlt im Lidos) "[...] At about 225 localities in the mostly brackish Dutch Delta area dragonfly larvae were caught (or exuviae were collected) and salinity values were measured simultaneously. [...] Results showed that only Ischnura elegans was found to be able to breed successfully in polyhaline waters. However, numbers decreased strongly when ion concentrations exceeded 4.5 . Aeshna mixta (larvae) was found regularly in mesohaline waters with an average ion content of 4.3 , temporarily increasing during summer to a maximum value of 6.8 . A maximum of only 2 was formerly known for this species in The Netherlands. Aeshna cyanea larvae were found in oligohaline waters, in which the salt concentration increased up to 18 during a short period in summer. This observation is highly congruent with results from Denmark, where larvae of Orthetrum cancellatum occurred in brackish waters with an ion content of 13 . It seems that larvae of several dragonfly species can survive during short periods of high salinity. However, it is highly likely that larval development will be inhibited during these temporary situations. Oviposition in mesohaline waters was recorded for Erythromma viridulum and Enallagma cyathigerum. However, no successful reproduction could be proven. In Canada E. cyathigerum larvae have been found in brackish waters, as well as Sympetrum danae larvae. Several Sympetrum species are known to be tolerant for brackish water conditions and in the Delta area egg-laying behaviour was even recorded in polyhaline waters during some occasions. In addition, exuviae of Lestes sponsa and L. barbarus were found in oligohaline waters. Larvae of several Sympetrum species and E. viridulum were recorded here also. No other dragonfly species in the Delta area could be traced in brackish waters, although some other species were found in brackish waters elsewhere in Europe." (Authors)] Address: Witte, R., Parelplein 36, NL-4337 MS Middelburg, The Netherlands. E-mail: Richard.Phoenix@planet.nl

1460. **Witte, R.H. (1999):** Voorkomen van Libellen in Zeeland, met de nadruk op de periode 1995-1998. De Zeeuwse Prikkebeen 7(2): 5-12. (in Dutch). [List of the Odonata (n=36) of the province Zeeland, The Netherlands differed for 6 areas; Lestes barbarus, Sympecma fusca, Erythromma viridulum, Aeshna affinis, Crocothemis erythraea, and Sympetrum fonscolombii are discussed in some detail] Address: Witte, R., Parelplein 36, NL-4337 MS Middelburg, The Netherlands. E-mail: Richard.Phoenix@planet.nl

1461. **Yeh, W.-C. (1999):** Description of Petalioaeschna pinratanae spec. nov. from northern Thailand (Anisoptera: Aeshnidae). Odonatologica 28(3): 283-288. (in English). ["The new species (holotype male: Doi Inthanon, Chiang Mai prov., 5-V-1988; deposited in Coll. Pinratana, St Gabriel's College, Bangkok) is described and compared with its congeners. Considering the male paddle-shaped cerci, it appears closely related to the Chinese rather than to the Himalayan congeners." (Author)] Address: Yeh, W.-C., Division of Forest Protection, Taiwan Forestry Research Institute, 53 Nanhai Road, Taipei, Taiwan, R.O.C. E-mail: wcyeh@serv.tfri.gov.tw

1462. **Zeiss, C.; Martens, A.; Rolff, J. (1999):** Male mate guarding increases females' predation risk? A case study on tandem oviposition in the damselfly

Coenagrion puella (Insecta: Odonata). Canadian Journal of Zoology 77(6): 1013-1016. (in English). ["To estimate whether male mate guarding alters the predation risk for females, we conducted experiments in field cages with the damselfly *Coenagrion puella*. We experimentally compared the risk for females ovipositing solitarily versus in tandem with the male. The backswimmer *Notonecta glauca* was used as a predator. Owing to the oviposition behaviour of the damselflies, *N. glauca* only preys on females, therefore it was possible to determine whether the presence of males decreases or increases females' predation risk. Females in tandem were more frequently touched and grasped by *N. glauca* than solitary females. In most tandem pairs, the female showed the first reaction to the attack and the male responded subsequently. After an attack, most solitary females left the oviposition site but most tandem females stayed. Once grasped by the predator, more solitary females were killed." (Authors)] Address: Zeiss, C., Zool. Institut der Technischen Universität Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1463. **Zhu, H.-q.; Zhang, X.x. (1999):** *Somatochlora shanxiensis* spec. nov., a new dragonfly from Shanxi, China (Anisoptera: Corduliidae). *Odonatologica* 28(3): 289-292. ["The new species (holotype male and allotype female: Mang-he river bank. Yangcheng Co., Shanxi, China. 27/28-VIII-1991; deposited at Shanxi University. Taiyuan, Shanxi, China) is described and illustrated. It is compared with *S. graeseri* and *S. uchidai*." (Authors)] Address: Zhu, H.-q., 42-38. Shanxi University, Taiyuan 030006. Shanxi. China Zhang, X.x., Shanxi Academy of Agricultural Science. Taiyuan 030006. Shanxi, China

1464. **Zipfel, C. (1999):** Zoogeographie und Verbreitungsmuster der Pokal-Azurjungfer *Cercion lindenii* (Odonata, Coenagrionidae). - Vergleichende Untersuchungen mit morphologischen und Isoenzym-PAGE-Methoden. Diplomarbeit. Fakultät für Biowissenschaften, Pharmazie und Psychologie, Inst. für Zoologie, Universität Leipzig: 93 pp. (in German). [*C. lindenii* occurs in Germany with at least two isolated populations that are considered to represent different subspecies. *C. lindenii* has been increasing its geographical distribution significantly since the early eighties and the isolation may be overcome within the next years. In this investigation, therefore, 117 adult specimens from five localities have been investigated regarding their wing morphometry and protein differences in electrophoresis: two each from southwestern (Giessen, Hessen; St. Leon, Baden-Württemberg) and central (Rheine, Nordrhein-Westfalen; Hameln, Niedersachsen), and one from eastern Germany (Großer Schwansee, Brandenburg). Wing morphometry showed significant differences (euklidic distance and UPGMA) between the eastern and all other populations. The males of the eastern population had larger wings whereas there was no significant difference between the females. This corresponds to earlier results (Beutler, H., 1985, Faun. Abh. Staatl. Mus. Tierk.. Dresden 49, 82) but may, however, not definitively indicate the occurrence of an eastern subspecies, whereas odonate populations from colder regions tend to have larger wings (Carius, W., 1993, Dissertation, Univ. Bremen). 5 of 21 enzymes tested were polymorphic (IDH, esterases, PGM, GPD, diaphorase); in all cases but one the less frequent

allele(s) occurred only in heterozygotes. Specimens from central Germany showed the highest heterozygosity (up to half of the population in IDH) whereas all other locations tested showed very high frequencies of one allele and low frequencies of all others or were homozygote. Also similarities between distant populations are often higher than to those from nearer locations. Regarding the isoenzyme patterns found, the German *C. lindenii* populations appear to be biochemically rather uniform and the variability is too low for postulating two subspecies. The evaluation of the total protein spectrum, however, showed that two groups can be differentiated: one group comprising all western populations investigated (Hameln, Rheine, Giessen, St. Leon) showed a homogeneous pattern of protein bands (within and between populations). The protein samples from the Schwansee population, however, differed significantly. The similarity between the Schwansee and the other populations decreased continuously from north to south. (Slightly modified from the Abstract submitted to Zoology 103, Suppl. II; Proc. of the 93 th Annual Meeting of the Deutsche Zoologische Gesellschaft, Abstract 92.1, 2000; Zipfel, A. & W.E.R. Xylander)] Address: Xylander, W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany

1465. **Zwick, P. (1999):** Historische Dokumente zur Fauna der Elbe bei Dresden vor hundert Jahren. *Lauterbornia* 37: 97-112. (in German with English summary). [35 plates with drawings and water colour paintings by Karl G. Schiller (author of the plates in Rostock & Kolbe, 1888: *Neuroptera germanica*. Die Netzflügler Deutschlands. Zwickau.) left by the late Joachim Illies show various invertebrates, including Odonata. The following species are documented on colour plates: *Lestes dryas*, *Erythromma najas*, and *Sympetrum sanguineum*. Not documented are the plates with *Ischnura elegans*, *Enallagma cyathigerum*, *Coenagrion hastulatum*, *C. puella*, *Ophiogomphus cecilia*, and *Aeshna* (cf. *mixta*). The plates provide evidence for the past occurrence of several species of water insects in the river Elbe at Dresden between 1883 and 1906, some that are today no longer found in Saxony. This refers not to Odonata. P. Zwick outlines the circumstances on the discovery of the colour plates, the evaluation of the identifications of the species, and the entomological "life history" of Karl Schiller.] Address: Zwick, P., Limnologische Fluß-Station des Max-Planck-Instituts für Limnologie, PF 260, D-36105 Schlitiz. E-mail: pzwick@mpil-schlitiz.mpg.de

2000

1466. **Åbro, A. (2000):** Sperm clusters in Zygoptera (Coenagrionidae, Lestidae, Calopterygidae). *Odonatologica* 29(1): 51-56. (in English). ["When within the testicular cyst, individual, immature sperm of *Lestes sponsa* acquire a cap of periacrosomal material. During passage through the spermiducts and vas deferens, the caps of individual sperm coalesce, producing clusters of sperm under a common cap. In *Calopteryx virgo*, entire sperm cells become embedded in an extracellular homogeneous substance. The joining substance in both species appear to be derived from decomposed surplus cytoplasm sloughed off from developing spermatids. The epithelial lining of the spermiducts adds secretions

to this. Clustering of sperm cells was not demonstrated in species of the Coenagrionidae." (Author) Species examined are: *Calopteryx virgo*, *Lestes sponsa*, *Coenagrion hastulatum*, *Enallagma cyathigerum*, and *Pyrrhosoma nymphula*.] Address: Åbro, A., Inst. Anat., Univ. Bergen, Årstadveien 19, N-5009 Bergen, Norway

1467. **Anonymus (2000)**: Gummigelenke machen Libellen zu wendigen Jägern. National Geographic, Deutschland 4/2000: 189. (in German). [Short summary on the work of S. Gorb on functional morphology of dragonfly wings] Address: NG, Deutschland, Stadthausbrücke 1-3, D-20355 Hamburg, Germany

1468. **Assis, J.C.F.; Carvalho, A.L.; Dorvillé, L.F.M. (2000)**: Aspects of larval development of *Limnethron debile* (Karsch), in a mountain stream of Rio de Janeiro State, Brazil (Anisoptera: Aeshnidae). *Odonatologica* 29(2): 151-155. (in English). ["Quantitative and qualitative samplings performed in a first order mountain stream [...] provided 121 larval specimens in the 6 last instars. The total number of larval instars estimated, using Dyar's rule, is 13, based on head width measurements. There was no significant difference between the number of males and females." (Authors)] Address: Assis, J.C.F., Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil. E-mail: juassis@aol.com.br

1469. **Beckemeyer, R. (2000)**: Kids & Dragonflies. *W.D.A.'s Agrion* 4(1): 10-11. (in English). [Narrative on the use of a high speed video camera for filming insects in flight, and the opportunity to introduce and inspire children for dragonflies] Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA

1470. **Bedê, L.C.; Piper, W. (2000)**: A new record of *Remartinia restricta* Carvalho and the southernmost record of *Gynacantha nervosa* Rambur in South America (Anisoptera: Aeshnidae). *Notul. odonatol.* 5(5): 63-64. (in English). [*G. nervosa* is recorded from 3 localities in Minas Gerais, Brazil. A male *R. restricta* was collected at Conselheiro Mata, Serra do Espinhaço, Minas Gerais, Brazil, 23/4/1998.] Address: Piper, W., Kollenhof 31, D-22527 Hamburg, Germany. E-mail: werner.piper @t-online.de

1471. **Bedjanic, M. (2000)**: Description of the last larval instar of *Epophthalmia vittata cyanocephala* Hagen, 1867 (Anisoptera: Corduliidae). *Odonatologica* 29(1): 57-61. (in English). [The specimen was collected near Anuradhapura, Sri Lanka. The present knowledge of the larval forms of the genus is briefly discussed.] Address: Bedjanic, M., Fram 117/A, SI-2313 Fram, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

1472. **Bernard, R.; Samol, J. (2000)**: An interesting record of *Crocothemis erythraea* (Brullé) in mid-western Poland (Anisoptera: Libellulidae). *Notul. odonatol.* 5(5): 64-65. (in English). [On 26/8/1999 the species was recorded in a gravel pit near Bielice (52.21N 14.58E). The habitat is characterized, and all hitherto Polish records are discussed in brief.] Address: Bernard, R., Zakład Zoologii Ogólnej, Uniwersytet im. A. Mickiewicza, ul. Fredry 10, PL-61-702 Poznań, Poland. E-mail: rbernard@main.amu.edu.pl

1473. **Bernard, R. (2000)**: On the occurrence of *Cercion lindenii* (Sélys, 1840) in Poland (Odonata: Coenagrionidae). *Opusc. zool. flumin.* 177: 1-11. (in

English). [The known Polish localities (30) - restricted to the midwestern part of the country - are listed, and the strength of the respective local populations is estimated. It is suggested that the variation in the latter is due to the weather conditions prevailing in particular years. The Polish (i.e. the northeastern-most) part of the species range is described and defined in terms of the local climatology (early spring, long summer, short and mild winter, relatively small annual air temperature amplitudes, wind sheltered - lake - biotops) and topography (larger and medium-sized rivers) and against the species situation in central Europe.] Address: Bernard, R., Zakład Zoologii Ogólnej, Uniwersytet im. A. Mickiewicza, ul. Fredry 10, PL-61-702 Poznań, Poland; E-mail: rbernard@main.amu.edu.pl

1474. **Bos, F. (2000)**: Mogelijke Nederlandse namen voor Zuid- en Oosteuropese libellen. Inclusief Rhodos en de Canarische Eilanden. *Mededelingen van de Nederlandse Vereniging voor Libellenstudie* 4(1): 13. (in Dutch). [Proposal for a Dutch name of the Odonata of South- and East-Europe including the Greek Island Rhodos and the Canarian Islands.] Address: Bos, F., Havenstraat 17, NL-6701 CK Wageningen, The Netherlands. E-mail: frank@bos.nl

1475. **Brockhaus, T. (2000)**: Aktualisierte und korrigierte Fassung des kommentierten Verzeichnisses der Libellen (Odonata) des Freistaates Sachsen. *Mitteilungen Sächsischer Entomologen* 49: 8-14. (in German). [Up dated and commented checklist of the Odonata of Saxonia, Germany incl. an extensive regional bibliography; very useful are comments on species which are in need for conservation action plans] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

1476. **Brockhaus, T. (2000)**: Zur Geschichte der sächsischen Libellenkunde. *Mitteilungen Sächsischer Entomologen* 49: 15-21. (in German). [Detailed contribution to the origins and the development of the odonatological activities in Saxonia, Germany; nice maps with information on the historical hot spots of odonatological work; interesting search for traces of *Thecagaster bidentata* in old Saxonian publications on the opportunity of the so called first record in 1994: we have to suppose that it was known to Saxonian entomologists already 140 years ago!] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

1477. **Brunelle, P.M. (2000)**: A new species of *Neurocordulia* (Odonata: Anisoptera: Corduliidae) from eastern North America. *Canadian Entomologist* 132(1): 39-48. (in English with French summary). [*Neurocordulia michaeli* sp. nov. from New Brunswick (Canada) and Maine (USA) differs from other northeastern species in the genus (*Neurocordulia molesta* (Walsh 1863), *Neurocordulia obsoleta* (Say 1839), and *Neurocordulia yamaskanensis* (Provancher, 1875)) in its short mesotibial keel and from all congeners in the great width of its abdomen. "The species is obligate crepuscular and can be locally abundant at its riverine habitat. Larvae of the the species have the lowest dorsal spines in the genus and cling to the underside of rocks in rapids."] Address: Brunelle, P.-M., 2460 John Street, Halifax, Nova Scotia, B3K 4K7, Canada

1478. **Buczynski, P. (2000):** On the occurrence of *Coenagrion armatum* (Charpentier, 1840) in Poland (Odonata: Coenagrionidae). *Opusc. zool. flumin.* 179: 1-10. (in English). ["All Polish localities (38, incl. 6 new) are listed, their grid references are stated whenever possible, and the respective habitats are briefly characterised. The distribution of the sp. in Poland is mapped, and its occurrence and habitat choice are briefly discussed and compared with those in other regions of central and eastern Europe." (Author)] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PO-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl
1479. **Cham, S. (2000):** Discovery of a 'new' population of the Scarce Chaser *Libellula fulva* Müller on the River Stour in the Dedham Vale. *J. Br. Dragonfly Society* 16(1): 17-19. (in English). [In July 1997 (near Nayland) and July 1998 (near Burnes) males of *L. fulva* were observed along the River Stour. During July 1999, further reconnaissance along much of the river revealed a sizeable population between Bures and Nayland. In addition, adult *L. fulva* were observed at Earls Colne on the nearby River Colne in North Essex during 1999. Such observations suggest that the River Stour population may have already started to colonize the River Colne. These records are discussed with emphasize to improvement of water quality in the past years. Additional notes are made to the strong increase of the populations of *Platycnemis pennipes* and *Erythromma najas* in the same area.] Address: Cham, S., 45 Weltmore Road, Luton, Bedfordshire LU3 2TN
1480. **Chovanec, A.; Schiemer, F.; Cabela, A.; Gressler, S.; Grotzer, C.; Pascher, K.; Raab, R.; Teufel, H.; Wimmer, R. (2000):** Constructed inshore zones as river corridors through urban areas - The Danube in Vienna: Preliminary results. *Regulated rivers research and management* 16(2): 175-187. (in English). ["Over the last 125 years, river regulation has considerably changed the ecological conditions of the Austrian Danube and its floodplains such that the system is now very fragmented. Within the municipal area of Vienna, these changes have been particularly severe: river embankments and a bypass channel (the 'New Danube'), separated from the main river by an artificial island ('Danube Island'), are the key elements of flood control, and river levels are controlled by the Vienna hydroelectric power plant ('Freudenau'). During construction of the hydroelectric power plant, the previously straight shoreline of the 21 km long Danube island with its steep embankments, was restructured by creating shallow water areas, gravel banks, small permanent backwaters and temporary waters. This paper describes the scheme and the results from the first year of a 4-year monitoring programme ('Danube Island Monitoring Programme', DIMP) investigating the colonization and successional processes of these areas by monitoring relevant indicator groups (vegetation, dragonflies, amphibians, reptiles, waterfowl)." (Authors)] Address: Chovanec, A.; Univ. Wien, Inst. Zool., Dept Limnologie, Althanstr 14; A-1090 Wien Austria
1481. **Clancy, S. (2000):** Reports from Coastal Stations - 1999: Dungeness area, Kent. *Atropos* 9: 65-67. (in English). [*Sympetrum fonscolombii*; *Anax parthenope*, "poor year"] Address: not stated
1482. **Corbet, P.S. (2000):** Book review: A Guide to the Dragonflies of Great Britain, Arlequin Press, Chelmsford, Essex CM1 1SW, England (1999) 21 x 15cm, 128pp.; £15.95 incl. post and packing (softback). ISBN 1 900159 01 5. Illustrated by Dan Powell; with text by Dan Powell and Colin Twist; edited by Colin. Twist. *J. Br. Dragonfly Society* 16(1): 31-32. (in English). Address: Corbet, P.S., Crean Mill, St. Buryan, Penzance, Cornwall, UK
1483. **Costa, J.M.; Irineu de Souza, L.O.; Santos, T.C. (2000):** Two new species of *Oxyagrion* Selys, 1876 with a description of five new larvae (Zygoptera: Coenagrionidae). *Odonatologica* 29(1): 1-15. (in English). ["*O. pseudocardinale* sp. n. (holotype male: Brazil. Minas Gerais, Fazenda da Cachoeira F.F. de Souza. 13-11-1990) and *O. sulmatogrossense* sp. n. (holotype male: Brazil, Mato Grosso do Sul, Campo Grande, Campus UFMS. 24-XII-1997) are described and illustrated. The larvae of *O. basale* Selys, 1876, *O. haematinum* Selys, 1876, *O. pavidum* Selys, 1876, *O. santosi* Murtins, 1967, and *O. sulinum* Costa, 1978 are described and illustrated for the first time. Keys are provided for the known *Oxyagrion* spp. and for the known larvae." (Author)] 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@unisy.com.br
1484. **Costa, J.M.; Santos, T.C. (2000):** Two new species of *Santosia* Costa & Santos, 1992 with a description of five new corduliid larvae (Anisoptera: Corduliidae). *Odonatologica* 29(2): 95-111. (in English). ["*S. machadoi* sp.n. (holotype male: Parque Nacional da Serra da Bocaina, Sao Paulo, Brazil; 25-11-1977) and *S. newtoni* sp.n. (holotype male: Brejo da Lapa, Itatiaia, Rio de Janeiro, Brazil; 19-II-1974) are described and illustrated along with their exuviae. The exuviae of *Aeschnosoma marizae* Santos, *Neocordulia androgynis* (Sel.) and *N. setifera* (Hag.) are also described and illustrated for the first time. The known *Santosia* spp. and the neotropical corduliid larvae are keyed." (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@unisy.com.br
1485. **Craine, G.D. (2000):** Reports from Coastal Stations - 1999: Isle of Man. *Atropos* 9: 77-78. (in English). [First *Libellula depressa* for the Isle of Man, *Lestes sponsa*, *Sympetrum striolatum*] Address: not stated
1486. **Daigle, J.J. (2000):** The distribution of the Odonata of Hawaii. *Bulletin of American Odonatology* 6(1): 1-5. (in English). [The distribution of 37 species is recorded by island for the 6 main islands in the State of Hawaii, USA. Each of the species is shortly commentend with reference to habitat, recent status, and in some cases to circumstances of (re)-discovery.] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: daiglej@dep.state.fl.us
1487. **De Marmels, J. (2000):** The larva of *Allopetalia pustulosa* Selys, 1873 (Anisoptera: Aeshnidae) with notes on aeshnoid evolution and biogeography. *Odonatologica* 29(2): 113-128. (in English). ["The larva is described and illustrated from four ultimate instar exuviae (2 males reared) and from a younger larva, all from Venezuela. Main characters are a pointed epiproct and spinous mesial carinae of paraprocts. There is

some general similarity with larvae of *Boyeria* McL., but the latter have angled occipital lobes, longer labium and, in some species, a bifid epiproct. Penis is strikingly similar in *Allopetalia* and *Boyeria*, the "comua" coming closer to those found in *Gomphaeschna* Sel. than to the "flagella" as found in the brachytrine *Spinaeschna* Theisch. and in the austropetaliine *Rheopetalia* Carle. - The "pryeri-group" of *Oligoaeschna* Sel. is ascribed to *Gomphaeschna* Lohmann (1996, *Enl. Z.*, Essen 106: 209-252), while the "poeciloptera-group" is considered a representative of the archaic *Gynacanthini* (*Aeshnata*). Biogeographical problems of *Anisoptera*, especially those of *Gomphaeschnini* and *Gynacanthini*, and of *Euphaeida* (*Zygoptera*) are discussed, considering the Pangaea-model and panbiogeographic criteria. Maps and a glossary of some panbiogeographic terms are added." (Author)] Address: De Marmels, J., Inst. Zool. Agricola, Fac. Agronomia, Univ. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela

1488. **Dewick, S. (2000)**: Reports from Coastal Stations - 1999: Curry Farm, Bradwell-on-Sea, Essex. *Atropos* 9: 68-70. (in English). [Assessment of the dragonfly season 1999 including records of 15 species; it was an average year for *Sympetrum striolatum* and a good season for *S. sanguineum*, but "with an interesting clustering of [19] night-time records indicating periods of migration."] Address: Dewick, S.; Curry Farm, Bradwell-on-Sea, Southminster, Essex, CM0 7NL, UK

1489. **Dewick, S.; Gerussi, R. (2000)**: Small Red-eyed Damselfly *Erythromma viridulum* (Charpentier) found breeding in Essex - The first British records. *Atropos* 9: 3-4. (in English). [On 17 July 1999 the first specimen of *E. viridulum* and a colony of the species were detected in "an area of unspoilt countryside in Essex", UK. Nearby situated a second - strong - population was discovered on 15 August.] Address: Dewick, S.; Curry Farm, Bradwell-on-Sea, Southminster, Essex, CM0 7NL, UK

1490. **Dey, D. (2000)**: County focus: The Odonata of Sussex. *Atropos* 10: 15-18. (in English). [Odonatological facts referring landscape and habitats of Sussex, UK are shortly outlined; recent records of 32 species are commented with special emphasis on the migrant species] Address: Dey, D., 26 Manor Avenue, Hassocks, West Sussex, BN9 8NG, UK

1491. **Diesel, R.; Schubart, C.D. (2000)**: Die außergewöhnliche Evolutionsgeschichte jamaikanischer Felskrabben. *Biologie in unserer Zeit* 30(3): 136-147. (in German with English summary). [The exiting evolution of the life history of Jamaican crabs: The Decapoda are among the animal groups that most recently colonised land. This important evolutionary step occurred several times independently in the tropics and subtropics and produced convergent adaptations in the life history [...] With a further advancement into terrestrial habitats, the crabs colonised habitats with small aggregations of water that became nurseries for larvae and juveniles, for example the shells of large land snails and leaf axils of bromeliad plants filled with rainwater. The larvae thereby develop in the vicinity of the mother. High predation risk, scarce food resources, and unfavourable abiotic conditions for the larvae and the young triggered in species like [...] the bromeliad crab, *Metopaulias depressus*, the evolution of an outstanding parental care. The bromeliad crab mother, for example, does

control and manipulate the acidity and calcium content of the water in the leaf axil with the brood. Bromeliad crabs live most of their life on a single bromeliad plant, and the characteristics of such a life supported a remarkable social organisation, comparable with cooperative breeding vertebrates." (Author) On page 143 a short notice on the maternal care from odonate predation is made. This refers to the results of a study published in *Animal Behaviour* 43: 803-812: Diesel, R. (1992): Maternal care in the bromeliad crab, *Metopaulias depressus*: protection of larvae from predation by damselfly nymphs: "*Metopaulias depressus* (Decapoda, Grapsidae) is a crab that breeds in water-storing leaf axils of large Jamaican bromeliads. This study examined whether and how maternal care protects crab larvae from predation by damselfly nymphs. The nymph of the bromeliad-breeding damselfly, *Diceratobasis macrogaster*, is the major predator on bromeliad crab larvae. Laboratory tests revealed that a nymph kills on average five larvae per day. Both the damselfly and the bromeliad crabs prefer the bromeliad *Aechmea paniculigera* as a breeding site. Nymphs were abundant: 87% of the *A. paniculigera* held 1-16 nymphs. Bromeliad crabs release on average 50 larvae into a prepared nursery axil where they develop for 9-10 days into young crabs. In field experiments maternal care reduced larval mortality from predation by 60%. A calculation based on predator abundance and killing potential suggests that female brood desertion would lead to 54-100% loss of their reproductive investment, depending on the female's body size and age (egg number is positively correlated with body size). Protected broods showed on average only 22% mortality during the larval period. In the bromeliad crab, predation on larvae exerts strong selection on the maintenance of maternal care for larvae."] Address: Diesel, R., Max-Planck-Institut für Verhaltensphysiologie, Abt. Winckler, D-82305 Seewiesen, Germany

1492. **Dieterich, M.; Anderson, N.H. (2000)**: The invertebrate fauna of summer-dry streams in western Oregon. *Archiv für Hydrobiologie* 147(3): 273-295. (in English). [Report on invertebrate communities and habitat associations of species in summer-dry streams of western Oregon, USA: 202 aquatic and semi-aquatic species, including at least 13 previously undescribed taxa. "Species richness in temporary forest streams (>125 species) exceeded that in a permanent headwater (100 species). Richness in ephemeral streams was 35 species or less. Duration of flow, exposure (shaded or open), riffle-pool structure and summer-drought conditions were key factors shaping community composition between and within stream types. We conclude that the potential of summer-dry streams with respect to habitat function is still widely underestimated." (Authors). In Appendix 1 *Cordulegaster dorsalis* is characterised as a species obligate - facultative for permanent streams and obligate for forest streams.] Address: Dieterich, M., Philipps-Universität-Marburg, Fachbereich Biologie, AG Tierökologie, D-35032 Marburg, Germany

1493. **Dijkstra, K.-D. (2000)**: Libellen in Wit-Rusland. *Mededelingen van de Nederlandse Vereniging voor Libellenstudie* 4(1): 11-12. (in Dutch). [In 1999 Netherlands and Belo-russian hydrobiologists surveyed the Odonata of the Svinavod region and the Hvojsk region in the southern part of the floodplains / marshes

of the river Pripjat, Belo-Russia. 43 species including species of the EU Habitat Directive as *Sympecma paedisca*, *Leucorrhinia pectoralis*, *L. albifrons*, and *Aeshna viridis* could be recorded. *Coenagrion armatum*, *C. pulchellum*, *Erythromma najas*, *Nehalennia speciosa*, *Anaciaeschna isosceles*, *Aeshna subarctica elisabethae*, *Epithea bimaculata*, *Somatochlora flavomaculata*, and *S. arctica* should be mentioned too.] Address: Dijkstra, K.D., Oude Rijnburgerweg 38, NL-2342 BC Oegstgeest, The Netherlands

1494. **Dunkle, S. (2000):** The many joys of dragonflying. *American Butterflies* 8(2): 26-32. (in English). [Sid Dunkle particularly contrasts dragonflies with butterflies. The paper contains 10 colour photos of North American odonates.] Address: American Butterfly Association, 4 Delaware Rd., Morristown, NJ, USA 07960

1495. **Èervek, U.; Sameja, M. (2000):** *Orthetrum coerulescens anceps* (Schneider) as a prey of larval Mantis *religiosa* (L.) Anisoptera: Libellulidae; Dictyoptera: Mantodea). *Notul. odonatol.* 5(5): 65. (in English). [Near Zadar, Croatia on 23 July, 1998 *M. religiosa* was observed devouring an adult *O. coerulescens anceps*.] Address: Èervek, U., Ul. Veljka Vlahovièa 35, SI-2000 Maribor, Slovenia

1496. **Ellenrieder, N. van (2000):** Additions to the description of *Gomphomacromia nodisticta* Ris, 1928 (Anisoptera: Corduliidae). *Bulletin of American Odonatology* 6(1): 7-11. (in English). [*Gomphomacromia nodisticta* Ris 1928, not found since its original description, was recorded in an Andean locality of NW Argentina. The structure of the penis is described, and some additional measurements and illustrations of diagnostic value are provided, as well as a comparison with the other species of the genus *G. paradoxa*, *G. etcheverryi*, *G. chilensis*, *G. fallax*, and *G. mexicana*.] Address: Ellenrieder, Natalie von, Instituto de Limnología "Dr. Raúl A. Ringuelet", C.C. 712, AR-1900, La Plata, Argentina. E-mail: ellenr@ilpla.edu.ar

1497. **Ellenrieder, N. von (2000):** Species composition and temporal variation of odonate assemblages in the subtropical-pampasic ecotone, Buenos Aires, Argentina. *Odonatologica* 29(1): 17-30. (in English). ["Odonate assemblages present in the ecotone between subtropical forest and pampasic grassland in Punta Lara were characterized and compared. Four pools, one in the forest, two in grassland (one within a protected area) and one at the limit of both environments, were sampled during July 1996-June 1998. For each sampling station species richness and diversity were calculated, and were compared through two similarity coefficients (Jaccard and Winer). The highest species richness and diversity were registered in the forest, and the lowest in the protected grassland. Cluster analysis showed different schemes according to the similarity coefficient considered; a greater similarity between the forest and intermediate pools (Jaccard coefficient), or a greater similarity between grassland areas (Winer coefficient). Some biogeographical implications are discussed." (Author)] Address: Ellenrieder, N. von, Instituto de Limnología "Dr. Raul A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina. E-mail: ellenr@ilpla.edu.ar

1498. **Gennard, D. (2000):** Post-symposium tour to the Adirondacks, 17-20 July 1999. *WDA's Agrion* 4(1): 7. (in English). [Personal report on the WDA Post-

symposium Tour to the famous Adirondacks, New York, USA] Address: Gennard, Dorothy, 3 West End Rd., Ulceby, N. Lincs., DN39 6TC, UK

1499. **Goudsmits, K.; Wasscher, M. (2000):** Is er voorkeur bij de eiafzetplek van de Houtpantserjuffer *Lestes viridis*? *Mededelingen van de Nederlandse Vereniging voor Libellenstudie* 4(1): 8. (in Dutch). [Is there any preference in oviposition substrat in *Lestes viridis*? *Fraxinus excelsior* and *Alnus glutinosa* are preferred oviposition substrates for *C. viridis* near the estate Rijwijk, The Netherlands. In general, trees with smooth bark seems to be preferred for oviposition.] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: m.wasscher@broekhuis.nl

1500. **Hämäläinen, M. (2000):** Ten species added to the list of Peninsular Malaysian Odonata. *Notul. odonatol.* 5(5): 53-55. (in English). [First records are the following species: *Amphicnemis ecornuta*, *A. sp.*, *A. gracilis*, *Lestes praecellens*, *Podolestes buwaldai*, *Oligoaeschna foliacea*, *Burmagomphus arthuri*, *Orchithemis pruinans*, *Tyriobapta kuekenthali*, and *Zyxomma obtusum*.] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

1501. **Hill, P.M. (2000):** Migrant Hawker *Aeshna mixta* using Buddleia Bush as a Feeding Station. *Atropos* 10: 57. (in English). [In early September 1999 *Aeshna mixta* was patrolling around a Buddleia and "periodically attempting to prey upon the various butterflies present, mainly Peacock *Inachis io* and Red Admiral *Vanessa atalanta*. Although the dragonfly was present for two or three days, I never actually saw it take a butterfly. Presumably it was successful otherwise it would have given up its vigil. Interestingly, a Robin (*Erithacus rubecula*, Aves) was also in attendance on several evenings, feeding on moths attracted to the Buddleia bush, flycatcher-fashion."] Address: Hill, P.M., 1 Clive Cottage, London Road, Allstock, Kniitsford, Cheshire WA16 9LT, UK

1502. **Jödicke, R. (2000):** Reiseberichte: Tunesien. *Libellennachrichten* 3: 18-19. (in German). [Report on the more recent activities in surveying the Odonata of Tunesia with some remarks on new additions to the checklist of the Tunesian Odonata, and voltinism of some species.] Address: Jödicke, R., Großenging 14, D-49699 Lindern, Germany. E-mail: r.joedicke@t-online.de

1503. **Johansson, F. (2000):** The slow-fast life style characteristics in a suite of six species of odonate larvae. *Freshwater Biology* 43: 149-159. (in English). ["1. The validity of the slow-fast lifestyle dichotomy proposed by Sih (1987) was tested in a suite of six odonate species from a restricted geographical area. Data on activity and microhabitat use were obtained in a laboratory study. Further necessary information on life history, macrohabitat (ephemeral-permanent) use and vulnerability to fish predation was provided by a literature survey. 2. Activity was estimated as number of moves and distance moved for the six odonate larvae. *Aeshna juncea*, *Lestes sponsa* and *Sympetrum danae* were categorised as high-active species, whereas *Coenagrion hastulatum*, *Cordulia aenea* and *Leucorrhinia dubia* were categorised as low-active species. 3. *C. hastulatum* and *L. sponsa* exploited microhabitats close to the water surface, *C. aenea* and

L. dubia close to the bottom, and A. juncea and S. danae were intermediate in their water depth utilisation. 4. A principal component analysis of the data from the laboratory experiment and the literature survey supported the slow-fast life style dichotomy since the variables activity, macrohabitat use, life cycle length and sensitivity to fish predators were highly correlated." (Author)] Address: Johansson, F., Department of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Limed, Sweden. E-mail: frank.johansson@eg.umu.se

1504. **Jones, S.P. (2000):** First proof of successful breeding by the Lesser Emperor Anax parthenope (Sélys) in Britain. J. Br. Dragonfly Society 16(1): 20-23. (in English). ["A. parthenope has been proven to breed successfully in Britain for the first time by the discovery of a male exuvia on the Lizard peninsula on 31 July 1999. Additional exuviae discovered approximately 75 km to the northeast at Bake Farm Pools shortly afterwards allow the possibility that the species may have established itself over a wide area of Cornwall, especially as adults were noted at two other sites in the county during 1999. Current knowledge of the larval development time for A. parthenope indicates that, in Europe, larval development is likely to take two years (Robert, 1958), suggesting that the original oviposition would have occurred during the summer of 1997. However it is not inconceivable that in the right conditions, such as the shallow pools of the Lizard site where there is a high degree of exposure to sunshine, A. parthenope could complete its larval development in one year (P.S. Corbet, pers. comm.). If so, it is possible that oviposition could have occurred during the summer of 1998, when there were numerous sightings of adult A. parthenope in Cornwall." (Author) Morphological characters of male exuviae of A. parthenope and A. imperator for separating the species are discussed in detail.] Address: Jones, S., Hyfield, Chapel Hill, Brea, Camborne, Cornwall TR14 9BP, UK

1505. **Jonsen, I. D.; Taylor, P. D. (2000):** Fine-scale movement behaviors of calopterygid damselflies are influenced by landscape structure: an experimental manipulation. Oikos 88: 553-562. (in English). ["We explore the effect of differences in landscape structure, arising from habitat loss, on the fine-scale movement behaviors of two congeneric damselflies - Calopteryx aequabilis and C. maculata. Both species require streams for breeding and naiad development and both often use forest for foraging. We compare movement behaviors across three types of landscape: forested landscapes, where stream and forest habitat are adjacent; partially forested landscapes, where streams and forest habitat are disjunct, and non-forested landscapes, where little to no forest habitat is available. We employ a reciprocal transplant experiment to determine the extent to which movement along and away from streams is influenced by landscape structure and historical behavior or morphological adaptations. For both species, we show that both the propensity to move away from streams and rates of net displacement differ among landscape types. Both species move away from streams on landscapes with high or moderate levels of forest cover but neither moves away from streams on landscapes with little or no forest. Furthermore, C. maculata native to predominantly forested landscapes are more likely to move away from streams, regardless of the landscape structure they

encounter, than are individuals native to moderately forested or non-forested landscapes. There was no effect of natal landscape on C. aequabilis. Comparisons with microlandscape studies suggest that there may be some general similarities among the different systems but these are clouded by uncertainty regarding the similarity of the underlying processes responsible for observed behavioral responses to landscape structure. Despite this uncertainty, animal movement behaviors are contingent upon the structure of the broader landscape, regardless of the absolute scale of the landscape." (Authors)] Address: Jonsen, D.I., Lethbridge Research Centre, Agriculture & Agri-Food Canada, P.O. Box 3000, Lethbridge, AB, Canada T1J 4B1. E-mail: jonseni@em.agr.ca

1506. **Jurzitza, G. (2000):** Obituary: Dr. Paul Münchberg (1905-1999). Notul. odonatol. 5(5): 66. (in German). [P. Münchberg born on 16 September 1905 in Trebisch near Landsberg (Warthe), Poland departed on 23 July 1999. His odonatological vita is credited in Odonatologica 4(3): 125-128.] Address: Jurzitza, G., Reimuthstr. 27, D-76187 Karlsruhe, Germany

1507. **Karube, H. (2000):** Microgomphus jurzitzae spec. nov., a new dragonfly from southern Vietnam (Anisoptera: Gomphidae). Odonatologica 29(1): 63-65. (in English). ["The new sp. is described and illustrated from 2 males. Holotype male: Lamdong prov., Bao Lok to Ho-Chi-minh Rd, 15-VI-1996; deposited in Author's institution. It is similar to M. loogali Fraser, from northern Burma, from which it is easily distinguished by the longer inner superior appendages, and by strongly bent, bifid inferior appendages. This is the first member of the genus recorded from Vietnam." (Author)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan

1508. **Ketelaar, R. (2000):** European Reports 1999: The Netherlands: Odonata. Atropos 10: 47-49. (in English). [Compilation of new records from the Netherlands and recent range extension of Coenagrion lunulatum, Erythromma viridulum, Lestes barbarus, L. virens, Sympecma fusca, Stylurus flavipes, Aeshna affinis, A. mixta, Anax parthenope, Sympetrum fonsolombii, S. flaveolum, and S. danae] Address: Ketelaar, P., p/a De Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands

1509. **Klärner, D. (2000):** Technische Biologie: Kopffixierung bei Libellen. Naturwissenschaftliche Rundschau 53(1): 35-36. (in German). [Review of the paper abstracted as OAS 723] Address: not stated

1510. **Knill-Jones, S. (2000):** Reports from Coastal Station - 1999: Isle of Wight. Atropos 9: 62. (in English). [First record of Cordulia aenea on the Island, Anax parthenope on 4 September] Address: not stated

1511. **Kosterin, O. E. (2000):** Observation on an intergeneric copulation between a male Cordulia aenea (L.) and a female Epithea bimaculata (Charp.) (Anisoptera: Corduliidae). Notul. odonatol. 5(5): 55-56. (in English). [The copula is briefly described and documented by a photograph. It took place on 13-VI-1994, at an oxbow in Berd' River, near Legostaevo, Iskitim distr., Novosibirsk prov., Russia. A statement on the prezygotic mating barriers in dragonflies is made.] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of

Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

1512. **Kuhn, J. (2000):** Libellen (Odonata) im Murnauer Moos, Oberbayern: Fauna und Naturschutzprobleme. Verh. Westd. Entom. Tag 1998: 141-146. (in German with English summary). ["Murnauer Moos" is a large bog and fen complex in southern Bavaria, Germany. In this paper the dragonfly fauna (55 species) is listed and its conservation problems are summarized."] Address: Kuhn, J., Max-Planck-Institut für Verhaltensphysiologie, Abt. Winckler, D-82319 Seewiesen. E-mail: kuhn@mpi-seewiesen.mpg.d

1513. **Littlewood, N. (2000):** Reports from Coastal Stations - 1999: South Walney Nature Reserve, Cumbria. Atropos 9: 76-77. (in English). [Odonata are rare in general on the reserve, *Sympetrum striolatum*, *Aeshna mixta* c.f.] Address: not stated

1514. **Long, R.; Long, M. (2000):** Non-British Damselflies in Jersey. Atropos 9: 95-96. (in English). [The current status of *Sympecma fusca*, *Chalcolestes viridis*, *Lestes barbarus*, and *Crocothemis erythraea* on Jersey is briefly commented] Address: Long, R., Ozard, St. John, Jersey, Channel Islands JE3 4FP, UK

1515. **Long, R. (2000):** Southern Migrant Hawker *Aeshna affinis* in Jersey, Channel Islands. Atropos 9: 81. (in English). [Second British record from 17 July 1998 at Rosel Manor, St. Martin, Jersey] Address: Long, R., Ozard, St. John, Jersey, Channel Islands JE3 4FP, UK

1516. **Marsh, P. (2000):** Odonata at Heysham Industrial Estate, Lancashire. Atropos 9: 81-82. (in English). ["site in an old industrial area in desperate need of bio-remediation due to unpleasant chemicals lingering underground or in the substrate in the wetland area"; 13 odonate species could be recorded including freshly emerged *Sympetrum flaveolum*] Address: Marsh, P., 17 Albion Street, Lancaster, Lancashire LA1 1DY, UK

1517. **Mauersberger, R. (2000):** *Coenagrion johanssoni* (Wallengren), *Aeshna crenata* Hagen and *A. subarctica elisabethae* Djakonov found in Belarus (Zygoptera: Coenagrionidae; Anisoptera: Aeshnidae). Notul. odonatol. 5(5): 56-57. (in English). [7 spp. were recorded in a peat bog near Polozk in northern Belarus, July 1996. *Aeshna crenata* and *A. subarctica* are new additions to the fauna of the country.] Address: Mauersberger, R., Waldstr. 4, D-16278 Steinhöfel, Germany

1518. **McPeck, M.A.; Brown, J.M. (2000):** Building a regional species pool: diversification of the Enallagma damselflies in eastern North America. Ecology 81(84): 904-920. (in English). ["We use a phylogeny of the North American Enallagma damselflies, derived from molecular and morphological data, to examine how the patterns of local and regional assemblage structure developed in this taxon across eastern North America. The two primary clades in the genus have nearly identical numbers of extant species, but the centers of diversity and the diversification rates for the two clades are quite different. One clade has its center of diversity in New England and radiated very recently from three species to give the current 18. Although most of this radiation involved the creation of new species in the

ancestral fish-lake habitat, at least two independent lineages invaded and adapted to a new habitat: ponds and lakes lacking fish but supporting large numbers of large predatory dragonflies. The other clade with greatest diversity in the southeastern United States, contains species that inhabit only water bodies that support fish populations. This "south-eastern" clade diversified at a much slower and more steady pace within the fish-lake habitat than the "New England" clade, but four speciation events in this clade appear to have occurred at the same time as the northern radiation. Combined with our current understanding of local community structure in fish and fishless lakes, these results indicate that most of the species in this regional assemblage were created by speciation mechanisms other than filling empty niches, which have resulted in many locally coexisting species that are very similar in their ecological characteristics. Damselflies in eastern North American ponds and lakes appear to exemplify features of both a regulated component of the littoral food web (i.e., a functional group) and an assemblage whose local community composition is influenced by nonadaptive macroevolutionary processes that have operated on a much larger regional scale." (Authors)] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

1519. **Misof, B.; Anderson, C.L.; Hadrys, H. (2000):** A phylogeny of the damselfly genus *Calopteryx* (Odonata) using mitochondrial 16S rDNA markers. Molecular phylogenetics and evolution 15(1): 5-14. (in English). ["[...] In this study, we concentrate on establishing phylogenetic information from parts of the 16S rDNA gene, which we sequenced for nine *Calopteryx* species and five outgroup species. The mt 16S rDNA data set did not show signs of saturated variation for ingroup taxa, and phylogenetic reconstructions were insensitive to variation of outgroup taxa. Parsimony, neighbor-joining, and maximum-likelihood reconstructions agreed on parts of the tree. A consensus tree summarizes the significant results and indicates problematic nodes. The 16S rDNA sequences support monophyly of the genera *Mnais*, *Matrona*, and *Calopteryx*. However, the genus *Calopteryx* may not be monophyletic, since *Matrona basilaris* and *Calopteryx atrata* are sister taxa under every parameter setting. The North American and European taxa each appear as monophyletic clades, while the Asian *Calopteryx atrata* and *Calopteryx cornelia* are not monophyletic. Our data implies a different paleobiogeographic history of the Eurasian and North American species with extant Eurasian species complexes shaped by glacial periods, in contrast to extant North American species groups." (Authors)] Address: Misof, B., Institute for Evolutionary Biology and Ecology, Universität Bonn, An der Immenburg 1, D-53121 Bonn, Germany

1520. **Mitra, A. (2000):** Annotated Odonata inventory of the Asan reservoir, Dehra Dun, India. Notul. odonatol. 5(5): 57-60. (in English). ["44 spp. are listed, of which *Anax p. parthenope* (Sel.) is new for the Doon Valley. 13 spp. have been found to breed exclusively in the Reservoir, 8 spp. breed in the adjacent streams, while the remaining 23 spp. are common in both the habitats." (Author)] Address: Mitra, A., D/6, Government Quarters, 10 M.B. Road, Calcutta-700 083, India

1521. **Mitra, T.R. (2000):** A note on an Odonata collection from Orissa, India. Notul. odonatol. 5(5): 60-

61. (in English). [69 spp. are so far known from the state Orissa, eastern India. No locality data were published for 11 of these (Mitra, 1994, Rec. zool. Surv. India, Occ. pap., 166: 1-40); they are listed here, and the complete regional bibliography is provided. "Note on *Enallagma insula* Fraser: This enigmatic species has been described from a single female specimen, from the Chilka Lake, Ganjam district (FRASER, 1920). The type is apparently lost. Zoological Survey of India has undertaken several faunistic surveys, especially in the district of Ganjam, but no party was ever successful in collecting further specimens of this species. The authenticity and the status of *E. insula* remain uncertain."] Address: Mitra, T.R., Zoological Survey of India, M-Block, New Alipore, Calcutta-700 053, India
1522. **Müller, J.; Steglich, R. (2000):** Zur Verbreitung der Südlichen Mosaikjungfer *Aeshna affinis* (Odonata) in Sachsen-Anhalt in den Jahren 1993 bis 1999. Entomol. Mitt. Sachsen-Anhalt 8(1): 22-32. (in German). [Documentation of all known records (n = 92) of *A. affinis* in Sachsen-Anhalt, Germany; *A. affinis* prefers the floodplains of River Elbe with thermically favoured periodic water bodies with reed vegetation; in 17 cases *A. affinis* was associated with *Lestes barbarus*] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de
1523. **Naraoka, H. (2000):** Obituary: Professor Dr Kazuo Saitoh (1927-1998). Notul. odonatol. 5(5): 66-68. (in English). [10-2-1927 - 25-11-1998] Address: Naraoka, H., 36-71, Motoizumi, Fukunoda, Itayanagi, Kita-gun, Aomori, 038-3661, Japan
1524. **Neboiss, A. (2000):** Obituary for Dr. Zandis Spuris. W.D.A.'s Agrion 4(1): 11-12. (in English). [Obituary for the famous Latvian zoologist Dr. Zandis Spuris who died on 15 November 1998. The odonatological bibliography (compiled by M. Schorr) comprises nearly 40 titles.] Address: Neboiss, A., 8 Andrew St., Forest Hill, Victory Australia 3131
1525. **N.N. (2000):** Reports from Coastal Stations - 1999: Minsmere RSPB Reserve, Suffolk. Atropos 9: 71. (in English). [Late record of *Sympetrum striolatum* from 2 December] Address: not stated
1526. **Novelo-Gutiérrez, R. (2000):** Description of the larva of *Hetaerina infecta* Calvert (Odonata: Calopterygidae). Proc. ent. soc. Washington 102(1): 99-104. (in English with Spanish summary). [The larva is described and illustrated based on two exuviae of reared final instar larvae, and six F-1 instar larvae. It is compared to its close relative *H. capitalis*. Data on distribution, habitat and habits, as well as a key to larvae for the Mexican species of *Hetaerina* are provided.] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Aparatdo Postal 63, 91000 Xalapa, Veracruz, Mexico
1527. **Odin, N. (2000):** Reports from Coastal Stations - 1999: Landguard Bird Observatory, Suffolk. Atropos 9: 70-71. (in English). [Coenagrion puella] Address: not stated
1528. **Olberg, R.M.; Worthington, A.H.; Venator, K.R. (2000):** Prey pursuit and interception in dragonflies. Jour. comp. physiol. (A), Sensory, neural and behavioral physiology 186(2): 155-162. (in English). ["Perching dragonflies (Libellulidae; Odonata) are sit-and-wait predators, which take off and pursue small flying insects. To investigate their prey pursuit strategy, we videotaped 36 prey-capture flights of male dragonflies, *Erythemis simplicicollis* and *Leucorrhinia intacta*, for frame-by-frame analysis. We found that dragonflies fly directly toward the point of prey interception by steering to minimize the movement of the prey's image on the retina. This behavior could be guided by target-selective descending interneurons which show directionally selective visual responses to small object movement. We investigated how dragonflies discriminate distance of potential prey. We found a peak in angular velocity of the prey shortly before take-off which might cue the dragonfly to nearby flying targets. Parallax information from head movements was not required for successful prey pursuit." (Authors)] Address: Olberg, R.M., Union Coll, Dept Biol. Sci., Schenectady, NY 12308 USA; Siena Coll, Dept Biol, Loudonville, NY 12222 USA. E-mail: olberg@union.edu
1529. **Parr, A. (2000):** Blue Dasher *Pachydiplax longipennis* (Burmeister) on an oil rig in the north sea. Atropos 10: 3-5. (in English). [On the occasion of the first European record of *P. longipennis* in Sept. 1999 on the Sedco 706 oil rig at 60°38'N, 1°39'E in the North Sea, off the Shetland Isles, by Mr. P. Burr, the species is characterized incl. two excellent colour photos. The possibility of an accidental introduction by air or by sea direct from the Houston area, USA, and the possibility of the dragonfly being a genuine vagrant are discussed in some detail.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK
1530. **Parr, A. (2000):** Migrant dragonflies in 1999 including recent decisions and comments by The Odonata Record Committee. Atropos 9: 21-25. (in English). [The following species are treated: *Calopteryx splendens*, *Erythromma viridulum*, *Aeshna mixta*, *A. affinis*, *Anax parthenope*, *A. ephippiger*, *Sympetrum striolatum*, *S. fonscolombii*, *S. flaveolum*, *S. sanguineum*, *S. danae*, and *Pachydiplax longipennis*(!). The latter is a new addition to the European odonate fauna. The female specimen was detected dead on 6 September 1999 on the Sedco 706 oil rig in the Dunbar field on the east of Shetland.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK
1531. **Parr, A. (2000):** Odonata Records Committee News. Atropos 10: 58. (in English). [Reports on *Anax parthenope*, and *Pachydiplax longipennis*] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK
1532. **Parr, A. (2000):** Review: Dragonflies. Behaviour and Ecology of Odonata by Philip S. Corbet. 1999 Harley Books. Colchester. ISBN 0 946589 64 X. 829 pp. Atropos 9: 92. (in English). [Review of P.S. Corbet's book, see OAS 1566] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK
1533. **Parr, A. (2000):** Southern Migrant Hawker *Aeshna affinis* Vander Linden: a guide to identification. Atropos 10: 26-28. (in English). [*A. affinis* is a quite rare migrant odonate species in UK. To trace possible specimens and to separate them from *A. mixta*, the paper provides detailed information on *A. affinis*. Brilliant colour photos and information on habitat and behaviour will help to spot *A. affinis* among the *A.*

mixta.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

1534. **Parr, M.; Corbet, P.S. (2000):** The 1999 International Congress of Odonatology. WDA's Agrion 4(1): 5-6. (in English). [Report on the WDA meeting held on 11 through 16 July at Colgate University, Hamilton, New York, USA; it gives some general information on the participants and the atmosphere among participants, and short summaries of the lectures held in different sessions] Address: Parr, M., Little Island, Stembidge, Martock, Somerset TA12 6BW, UK. E-mail: mmczz@parr37.freesevice.co.uk

1535. **Pellow, K. (2000):** Lesser Emperor Dragonfly *Anax parthenope* (Selys) breeding in Cornwall. Atropos 9: 28-29. (in English). [Exuviae of the species were secured at Trerulefoot, Cornwall on 16 August 1999; male exuviae of *Anax parthenope* are compared with exuviae of *A. imperator*; the female of *A. parthenope* is described in detail] Address: Pellow, K., Mount Pleasant Bungalow, Botus Fleming, Cornwall PL12 6NQ, UK

1536. **Pellow, K. (2000):** Observations of the Red-veined Darter *Sympetrum fonscolombi* (Selys) at Bake Lakes in Cornwall during 1999. J. Br. Dragonfly Society 16(1): 29-30. (in English). [The paper presents further observations on the persistence of a population of *S. fonscolombi* that may be in the early stages of colonizing Britain.] Address: Pellow, K., Mount Pleasant Bungalow, Botus Fleming, Cornwall PL12 6NQ, UK

1537. **Piper, W.; Krüner, U. (2000):** Libellennachrichten. Libellennachrichten 3: 1-20. (in German). [Volume 3 contains a lot of information on recent activities of the Society of German speaking odonatologists, announcement of meetings, reviews of odonatological publications and CD-ROM's, new theses on Odonata, calls for cooperation ...] Address: Piper, W., Kollenhof 31, D-22527 Hamburg, Germany

1538. **Piper, W. (2000):** *Perithemis mooma* Kirby emerge in a cave (Anisoptera: Libellulidae). Notul. odonatol. 5(5): 65-66. (in English with Portuguese summary). [The cave „Gruta do Padre" is situated NE of Santa Maria de Vitoria, in the direction of Santana dos Brejos, Bahia, Brazil. A river runs through ca 10 km of the cave. On 9-11-1996, some 3 km off the cave entrance a female *P. mooma* was sitting on the helmet of the author. On the 10th, another member of the party detected another female on his helmet, at about the same section of the river. The two dragonflies were freshly emerged with very soft wings and bodies. Apparently, the larvae drifted into the cave during the rainy season.] Address: Piper, W., Kollenhof 31, D-22527 Hamburg, Germany. E-mail: werner.piper@t-online.de

1539. **Poepperl, R. (2000):** Benthic secondary production and biomass of insects emerging from a northern German temperate stream. Freshwater Biology 44(2): 199-211. (in English). ["1. Secondary production and emergence of aquatic insects were examined in the outlet of Lake Belau, Northern Germany, by means of benthic samples and emergence traps. 2. At three stream sections annual larval secondary production varied between 4.9 and 10.8 gDM (dry mass) m⁻² year⁻¹. Insects contributed with 3.4, 8.9, and 8.7% to the total macroinvertebrate production [...]. Emerged biomass was between 1.0 and 2.0 gDM m⁻² year⁻¹. At all three stream sections Diptera

dominated [...] followed by Trichoptera [...] and Ephemeroptera . 3. Average larval production amounted to 9.0 gDM n⁻² year⁻¹ and emerged biomass to 1.7 gDM m⁻² year⁻¹. Larvae of insects amounted to 7.0% of total macroinvertebrate production. 4. The ratio of annual emerged biomass to secondary production (E/P) varied among individual taxa. At the stream sections the ratio ranged from 15.9% to 20.1% with an average of 18.3% for the stream. [...]"] (Author) *Pyrrhosoma nymphula*, *Ischnura elegans*, *Aeshna cyanea*] Address: Poepperl, R., Ökologie-Zentrum, Christian-Albrechts-Universität Kiel, Schauenburgerstr. 112, D-24118 Kiel, Germany. E-mail: rainer@pz-oekosys.uni-kiel.de

1540. **Pretschner, P. (2000):** Neue Bücher: Sternberg, Klaus & Buchwald, Rainer: Die Libellen Baden-Württembergs. Band 1. Stuttgart: Eugen Ulmer Verlag, 1999. 468 S. - 98 DM. ISBN 3-8001-35098. Natur und Landschaft 75(5): 233. (in German). [book review, see OAS 1149] Address: Pretschner, P., c/o Bundesamt für Naturschutz, Konstantinstr. 110, 53179 Bonn, Germany

1541. **Reinhardt, K.; Seidenbusch, R.; Foitzik, O.; Roth, S. (2000):** A small dragonfly collection from Turkmenistan. Notul. odonatol. 5(5): 61-63. (in English). [7 spp. were recorded from southern Turkmenistan of which *Gomphus schneideri* is new to the fauna of Turkmenistan.] Address: Reinhardt, K., Hauptstr. 38, D-09244 Oberlichtenau, Germany. E-mail: b5klre@pluto.rz.uni-jena.de

1542. **Reinhardt, K. (2000):** Aspects of the dragonfly fauna of eastern Kazakstan. IDF-Report 2(2): 1-11. (in English). [Detailed report on the results of an expedition to Kazakstan in May 1999; 17 sites were surveyed, 17 species could be identified; reproductive behaviour, oviposition, and egg parasitic wasps of *Sympecma paedisca* were investigated] Address: Reinhardt, K., Hauptstr. 38, D-09244 Oberlichtenau, Germany. E-mail: b5klre@pluto.rz.uni-jena.de

1543. **Schorr, M. (2000):** Bilder aus dem Leben des Odonatologen Dr. Erich Schmidt (1890 - 1969). IDF-Report 2(2): 12-33. (in German). [Short introduction to a leaflet of W. Kanzler circulated on the opportunity of Erich Schmidt's 70th birthday; this "Festschrift" documents in black and white sketches some stations of the odonatological life of Dr. E. Schmidt, giving some intimate insight into the personality of the famous odonatologist] Address: Schorr, M., Waldfrieden 25, D-54314 Zerf. E-mail: foetrier@aol.com

1544. **Silsby, J. (2000):** A social look at the symposium. WDA's Agrion 4(1): 6-7. (in English). [report on the WDA meeting held on 11 through 16 July at Colgate University, Hamilton, New York, USA; it gives some personal impression on the warmth of atmosphere among the participants, and the things happening around the scientific part of the meeting] Address: Silsby, J., 1, Haydn Avenue, Purley, Surrey, CR8 4AG, UK. E-mail: jsilsby1@aol.com

1545. **Silsby, J. (2000):** W.D.A.'s Agrion. W.D.A.'s Agrion 4(1): 16 pp. (in English). [A large variety of information is presented in this issue, including the minutes of the first WDA Biennial General Meeting on 13 July 1999 at Colgate University, NY, USA, reports from the Colgate symposium (Mike Parr & Philip Corbet) and the post-symposium tour (Dorothy Gennard), news from members, universities, and

museums, new members, announcement of the 2nd International Symposium of W.D.A. in Sweden in 2001, etc.] Address: Silsby, J., 1, Haydn Avenue, Purley, Surrey, CR8 4AG, UK. E-mail: jsilsby1@aol.com

1546. **Slaughter, L.; Best, L. (2000):** A late Southern Hawker *Aeshna cyanea* and other observations. *Atropos* 9: 87. (in English). [*A. cyanea* was recorded on 21 November 1999 in Par Beach Dunes, south Cornwall; *Sympetrum striolatum* were also on the wing] Address: Slaughter, L., P.O. Box 16, St. Austell, Cornwall, PL25 5LY, UK

1547. **Solly, F. (2000):** Reports from Coastal Station - 1999: Isle of Thanet, Kent. *Atropos* 9: 67-68. (in English). [Good year; there are no waterbodies in the recording area, so all records are thought to refer to dispersal/migration: *Aeshna mixta*, *A. cyanea*, *Libellula quadrimaculata*, *Orthetrum cancellatum*, *Symptetrum striolatum*, *S. sanguineum*, *S. flaveolum*, and *S. danae*] Address: not stated

1548. **Spence, B. (2000):** Reports from Coastal Stations - 1999: Spurn Bird Observatory, East Yorkshire. *Atropos* 9: 73-74. (in English). ["very disappointing year", few records of *Sympetrum fonscolombii* and *S. danae*] Address: not stated

1549. **Steglich, R. (2000):** Zum Vorkommen der "FFH-Libellen" *Ophiogomphus cecilia* und *Gomphus (Stylurus) flavipes* sowie von *Gomphus vulgatissimus* (Odonata, Gomphidae) in der "Magdeburger Strom-Elbe". *Entomol. Mitt. Sachsen-Anhalt* 8(1): 3-6. (in German). [Detailed documentation of records on River Elbe in the area of the town Magdeburg, Sachsen-Anhalt, Germany] Address: Steglich, Rosmarie, Quittenweg 53, 39118 Magdeburg, Germany

1550. **Steigner, W. (2000):** Naturkundliche Wanderung im LSG Höcherberg-Westrich. *Pollichia-Kurier* 16(1): 26-27. (in German). [Report of an excursion with natural history purposes in the district of Kusel, Rheinland-Pfalz, Germany; among the traced Odonata mentioned are *Orthetrum coerulescens*, and *Ceriagrion tenellum*; the observer and odonatologist Siegmund Ohlinger corrected the record to *Pyrrhosoma nymphula*.] Address: not stated

1551. **Stevani, C.V.; Porto, J.S.; Trindade, D.J.; Bechara, E.J.H. (2000):** Automotive clearcoat damage due to oviposition of dragonflies. *Journal of applied polymer science* 75: 1632-1639. (in English). ["Automotive industries are increasingly interested in learning how to pro-long the clearcoat resin lifetime and avoid its thermal, photochemical, and chemical degradation. While chemical degradation by acid rain has been well known since the beginning of the decade and the subject of many studies, chemical degradation of the automotive clearcoat by living organisms (except by bird droppings) is a newly recognized problem. In this work, we report the chemical degradation of the automotive clearcoat caused by oviposition of dragonflies. These insects, very common in Brazil, are attracted by the reflecting surface of cars exposed in the sun and lay eggs on them. We observed that the eggs, at the high temperatures (50-92°C) of the car surface, can cause damage similar to that of acid rain. In experiments on resin-coated plates, we excluded the involvement of H₂O₂- or hydroquinone-derived radicals, of enzyme-catalyzed hydrolysis, and of photosensitizer-induced damage. The damage was very similar,

however, to that produced by the sulfur-containing amino acids, cysteine and cystine, at high temperature. Due to this similarity, and because the eggs are rich in sulfur amino acids, we propose a mechanism involving cysteine and cystine residues in the clearcoat damage." (Authors) *Miathyria* sp., *Tauriphila* sp., *Erythemis* sp.] Address: Bechara, E.J.H., Instituto de Química, Universidade de Sao Paulo, C.P. 26077, 05599-970, Sao Paulo, SP, Brazil. E-mail: ebechara@quim.iq.usp.br

1552. **Stevani, C.V.; Faria, D.L.A. de; Porto, J.S.; Trindade, D.J.; Bechara, E.J.H. (2000):** Mechanism of automotive clearcoat damage by dragonfly eggs investigated by surface enhanced Raman scattering. *Polymer Degradation and Stability* 68: 61-66. (in English). ["Dragonflies are attracted by the reflection of sunlight on car surfaces and lay their eggs on the clearcoat resin. Considering that the surface can reach up to 93°C and that during the egg hardening process (sclerotization) H₂O₂ is released, cysteine and cystine residues present in the egg protein can be oxidized to sulfinic and sulfonic acids. These are strong acids which, like acid rain, can hydrolyze the acrylic/melamine resin causing damage where the eggs were laid. Confocal Raman spectroscopy revealed that the spectra obtained from damaged and intact portions of the clearcoat were similar, in agreement with infrared absorption spectroscopy data. These data demonstrate that the attack by eggs, H₂SO₄ and cysteine/H₂O₂ only promotes solubilization of resin through acid hydrolysis of the resin ester and amide moieties. Furthermore, surface enhanced Raman scattering (SERS) spectra obtained from dragonfly eggs and cysteine/H₂O₂ reaction products treated with a silver colloid were very similar, thus confirming the presence of sulfinic and sulfonic acids. [...] Conclusion: Altogether the data support the proposition that the damage caused by dragonfly eggs to acrylic/melamine resins is due to acid hydrolysis. [...] As the sulfinic/sulfonic acids putatively formed are attached to the protein structure of the eggs, only damage in the contacted area between eggs and resin takes place. Contrarily, in the case of either acid rain or "acid solutions" tested in the laboratory, the acids are free in solution and can extend the damage to a greater surface area as well as to inner layers of the clearcoat. Once inner layers are destroyed, significant changes in the structure of the polymeric material can thereafter occur." (Authors)] Address: Bechara, E.J.H., Instituto de Química, Universidade de Sao Paulo, C.P. 26077, 05599-970, Sao Paulo, SP, Brazil. E-mail: ebechara@quim.iq.usp.br

1553. **Stoks, R.; De Block, M. (2000):** The influence of predator species and prey age on the immediate survival value of antipredator behaviours in a damselfly. *Archiv für Hydrobiologie* 147(4): 417-430. (in English). ["The efficacy of antipredator behaviours may depend on both intrinsic and extrinsic factors. We experimentally studied the effects of predator species and prey age on the immediate survival value of swimming and lamellae loss in larval damselflies. Four predators: two invertebrates (the notonectid, *Notonecta viridis* and the dragonfly larva *Aeshna cyanea*), and two vertebrates (the three-spined stickleback *Gasterosteus aculeatus* and the sunfish *Lepomis gibbosus*) were tested with all combinations of two instars of the damselfly *Lestes sponsa* (F-0 and F-2). The number of escapes by swimming away were much lower when

larvae were attacked by the two fishes than by the two invertebrates. Moreover *Lepomis* never removed lamellae and killed all larvae. The instars did not differ in the number of escapes by swimming, but F-0 instars were caught more at the lamellae than F-2 instars. All larvae that survived a capture were caught at the lamellae and the majority (90 %) did so by autotomy. The ontogenetic increase in the immediate survival value of this antipredator behaviour was dependent upon the predator species. It was highest in captures by the *Notonecta* (40 %), and lower when larvae were caught by the *Aeshna* or *Gasterosteus* (ca. 17 %). This was probably because the biological relevance of the magnitude of the speed difference between damselfly instars depends upon the predator's attack performance. We discuss the consequences of these findings for the macrohabitat distribution of the larvae and for the multicomponent antipredator behaviours prey may use." (Authors)] Address: Stoks, R., Evolutionary Biology Group, Department of Biology, University of Antwerpen (RUCA), Groenenborgerlaan 171, B-2020 Antwerpen, Belgium. E-mail: stoks@ruca.ua.ac.be

1554. **Switzer, P.V.; Schultz, J.K. (2000):** The male-male tandem: a novel form of mate guarding in *Perithemis tenera* (Say) (Anisoptera: Libellulidae). *Odonatologica* 29(2): 157-161. (in English). ["Observations on male-male tandems are reported; these tandems occur at very low frequency during mate guarding sequences. When initiating a tandem, a male territory resident grabs an intruding male behind the head and flies with him. This behavior is similar to the tandem formation more usually associated with male-female pairs. Because the male-male tandems occurred during mate-guarding and because tandems do not follow courtship of the intruder by the resident, this rare behavior is interpreted as a form of mate guarding rather than misdirected mating behavior." (Authors)] Address: Switzer, P.V. & J.K. Schultz, Department of Biological Sciences, Eastern Illinois University, Charleston, IL 61920, USA. E-mail: cfpvs@eiu.edu

1555. **Tennessen, K.J. (2000):** *Micrathyria sympriona* spec. nov., a new dragonfly from Ecuador and Peru (Anisoptera: Libellulidae). *Odonatologica* 29(1): 67-73. (in English). ["The new sp. (holotype male, allotype female: Ecuador, Zamora Chinchipe prov., grassy marsh 5.5 km SE of Zamora, ca 3000 ft, 4°10'S, 78°56'W, 5-XI-1997; deposited at FSCA, Gainesville, FL, USA) is described and compared with *M. hypodidyma* Calvert. *M. sympriona* differs in the low, laterally rounded transverse ridge on the venter of abdominal segment 1 which bears 0 to 3 widely spaced black denticles on each side of the median depression, the tips of the outer arms of the hamules surpassing the anterior laminae, and segment 9 all black. Females have abdominal segment 9 sternite convex instead of flat as in *M. hypodidyma*." (Author)] Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA. ktennessen@aol.com

1556. **Troake, P. (2000):** Reports from Coastal Station - 1999: Rye Harbour SSSI, East Sussex. *Atropos* 9: 63-64. (in English). [The usual variety of resident dragonfly species were recorded including *Brachytron pratense* and *Coenagrion pulchellum*] Address: not stated

1557. **Tunmore, M. (2000):** Reports from Coastal Station - 1999: The Lizard, Cornwall. *Atropos* 9: 58-60. (in English). [*Pyrrhosoma nymphula*, exuvia of *Anax parthenope* (first proof of breeding in UK), *Sympetrum fonscolombii*, *Orthetrum coerulescens*, late season records of *Anax imperator* and *Sympetrum striolatum*] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK

1558. **Tunmore, M. (2000):** Review: Dragonflies and Damselflies of Great Britain. - A video guide. Produced by C.R. Casey, J. Parker and M. Lote; narration by R. Campey. Otus Video. 1999. Running time approx 80 minutes. £14.99. . *Atropos* 9: 92-93. (in English). [Review of a video with British odonate species excluding the Irish *Coenagrion lunulatum*] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK

1559. **Voigt, H.; Göhlert, T. (2000):** Erstnachweis von *Gomphus flavipes* (Charpentier, 1825) in der Dresdener Elbtalweitung (Odonata). *Entomologische Nachrichten und Berichte* 44(1): 50. (in German). [Records of *Stylurus flavipes* (near Dresden-Gohlis, 8/1999) and *Ophiogomphus cecilia* (near Dresden-Loschwitz, 1997) along the River Elbe in Saxony, Germany] Address: Voigt, H., Grundstr. 152, D-01324 Dresden, Germany

1560. **Ward-Smith, A.J.; Sussex, D.J.; Cham, S.A. (2000):** Flight characteristics of the Brilliant Emerald *Somatochlora metallica* (Vander Linden) in south-east England. *J. Br. Dragonfly Society* 16(1): 24-28. (in English). [The three different forms of flight styles of male *S. metallica* observed at woodland ponds near Bracknell in South-east Berkshire, UK are described and discussed: Flight style I: This flight style is typically at a height of about 1 m above the water and close to the edge. It takes the dragonfly beneath overhanging vegetation, where it is prone to loiter with spells of hovering, and into regions of shade. The male appears to be searching for ovipositing females that use water margins for egg-laying. Flight style II: In this style the male patrols back and forth along a regular beat in the sunshine with a slow, controlled flight, occasionally punctuated by hovering. [...] Typically the flight is about 2-3 m above the water, but where the pond has steeply sloping banks the dragonfly will occupy airspace as high as 6 m above the water level. Over small ponds (up to about 20 m diameter) the dragonfly occupies an area above the centre of the pond. but in larger ponds the flight is typically within an airspace about 4-6 m from the edge. When several males are present, as happens on rare occasions, they space out, each patrolling over different parts of the pool. This flight style may represent general territorial behaviour. Flight style III: In this style the dragonfly upon visiting a site flies around it on an irregular flight path. These visits typically last 1-2 minutes, but may be as short as 20 seconds, sometimes longer than 2 minutes. During this brief period *S. metallica* maintains a sense of urgency, flying faster than in the first two flight styles. Its height above the water varies. *S. metallica* appears to be carrying out a general reconnaissance of a site. The observations are discussed with reference to the energy consumption during flight. "It is conjectured that the slow, controlled flight adopted by *S. metallica* during FS I and FS II is the equivalent of the minimum-power speed of aircraft flight" (Ward-Smith, 1984). "At this flight speed, the dragonfly is able to remain airborne whilst adopting an

energy-conservation strategy."] Address: Ward-Smith, A., The Ridgeway, Bracknell, Berkshire RG12 9QU, UK

1561. **Wasscher, M.; Hoeffnagel, W.-J. (2000):** Opmerkelijk veel vroege waarnemingen in 1999. Mededelingen van de Nederlandse Vereniging voor Libellenstudie 4(1): 9-10. (in Dutch). [In 1999 many odonate species started flying season very early in the year. The phenological data of *Orthetrum cancellatum*, *Leucorrhinia rubicunda*, *Libellula depressa*, *Ischnura elegans*, *I. pumilio*, *Coenagrion hastulatum*, *Platycnemis pennipes*, *Anax imperator*, *Ceragrion tenellum*, *Orthetrum coerulescens*, *Aeshna mixta*, and *Sympetrum flaveolum* are documented and discussed with reference to data of 1997 and 1998] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: m.wasscher@broekhuis.nl

1562. **Wasscher, M. (Ed.) (2000):** NVL Nieuwsbrief Februari 2000. Mededelingen van de Nederlandse Vereniging voor Libellenstudie 3(4): 14 pp. (in Dutch). [A lot of information on activities of the Dutch odonatologists is given, including a report on the financial year 1999 and planned activities in 2000. Some of the papers are abstracted separately in this issue of OAS.] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: m.wasscher@broekhuis.nl

1563. **Wasscher, M.T; Bos, F.G. (2000):** The European dragonflies: notes on the checklist and on species diversity. *Odonatologica* 29(1): 31-43. (in English). ["Casing natural geographical boundaries, 130 spp. can be considered as European, though when broader political borders are followed this number rises to 136. In addition 20 exotic spp. have been recorded as a result of accidental importation. The highest diversity, defined by the number of spp. per standard area of 250x250 km², is found in the Alps, while the lowest diversity occurs in the northern parts of mainland Europe and on some islands. Surprisingly, the Mediterranean region is not as rich in spp. as the central part of Europe. When compared with other continents, it is clear that Europe has the lowest number of spp. However, when compared specifically with areas at the same latitude, the odonate diversity in Europe is relatively average: somewhat higher than expected in the northern regions, somewhat lower than expected in southern regions." (Authors)] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: m.wasscher@broekhuis.nl

1564. **Westman, A.; Johansson, F.; Nilsson, A.N. (2000):** The phylogeny of the genus *Leucorrhinia* and the evolution of larval spines (Anisoptera: Libellulidae). *Odonatologica* 29(2): 129-136. (in English). ["A cladistic analysis of the genus *Leucorrhinia*, based on adult morphological characters, found one most parsimonious tree with a consistency index of 0.35. The evolution of large dorsal larval spines was mapped on the resulting tree. This mapping suggests that the presence of spines is the primitive state within *Leucorrhinia* and that they have disappeared on five different occasions, or have disappeared twice on lower branches and reappeared three times higher up in the tree." (Authors)] Address: Johansson, F., Department of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Limed, Sweden. E-mail: frank.johansson@eg.umu.se

1565. **Wildermuth, H. (2000):** Buchbesprechung: Corbet, P.S. 1999. *Dragonflies. Behaviour and Ecology of Odonata*. 829 pages, 252 figures, 16 colour plates and 189 tables. Harley Books, Colchester, U.K., ca. Fr. 160.-, ISBN 0 946589 64 X.. *Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich*: (in German). [Book review submitted in November 1999 to *Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich*. [In German]. The English translation that follows has been approved by the author of the review.

Dragonflies date from the Lower Permian. During their more than 250 million years' existence their body plan has remained remarkably conservative, although they show striking diversity of ecology and behaviour. Among the insects in the order one sees displayed a range of specializations: the aquatic larva possesses a feeding mechanism equipped with pincers that can be protracted explosively, and a multifunctional hindgut (rectum) that serves for nutrient intake, respiration, ionic regulation, energy storage and jet propulsion. Adult dragonflies are impressive as astonishingly agile and enduring flyers. Their gigantic compound eyes form a morphological and physiological mosaic, the highly developed perception encompassing a high flicker threshold and resolving power, and colour and polarization receptors with a corresponding capability for image processing in the nervous system. Unique for all dragonflies is the typical copulation wheel, and associated with this a variety of strategies for mating and egg-laying. A model organisms, dragonflies have been studied to investigate biological principles and processes. For several decades they have been among the front-runners in zoological research in the fields of behavioural ecology, ecophysiology, reproductive biology and neurobiology. The principles of territoriality and sperm displacement during copulation, widespread in many animal groups, were first described for insects in dragonflies. To an increasing extent dragonflies also feature in applied ecology, especially in land management and nature conservation: Because they exhibit many habitat specializations, dragonflies provide local species-spectra by which the quality of aquatic habitats can be assessed. In Philip S. Corbet's "Dragonflies" a monumental work on the biology of dragonflies has appeared, for which the international readership has waited impatiently for almost twenty years. From the standpoint of knowledge at the end of the 20th Century, the book treats all current fields of ecology and behaviour with reference to the global fauna, comprising some 5000 species. Information is presented throughout in an evolutionary context; yet the book is more than a compendium on behavioural ecology as this discipline is currently perceived. Besides addressing causal (proximate) and functional (ultimate) aspects of behaviour, the book gives ample attention to descriptive biology in its variety at the species level, providing an important foundation for posing questions in future. "Dragonflies" is arranged according to the dragonfly life cycle and begins with habitat selection, egg-laying and developmental biology. More chapters follow on larval biology with especial reference to respiration, feeding, biotic and abiotic factors, growth, metamorphosis and emergence, in which predation and parasitism are duly treated. About half the text is devoted to the adult stage. Such general themes as maturation, activity patterns, thermoregulation, foraging and dispersal are treated in detail. Most space is devoted to the field of odonatology that has made special progress in the last two decades:

reproductive biology. The last chapter, entitled "Dragonflies and people" focuses mainly on aspects of nature conservation. Despite the book's unassuming subtitle, Corbet does not confine himself to behaviour and ecology. Wherever an opportunity offers to improve overall understanding of ecological and behavioural principles, corresponding knowledge from the neighbouring disciplines of physiology and functional morphology is presented. For example the foraging behaviour of adult dragonflies is discussed in the context of flight performance, compound eyes and the nervous system. This approach offers a more comprehensive view than if prey capture were to be treated in isolation. Likewise, correlations are shown between reproductive behaviour and both sperm competition and microscopic anatomy, as well as between behavioural ecology of larvae and their respiration and osmoregulation. Corbet's strength lies in synthesis. He has succeeded in ordering an immense body of information, put in a clear general context and in a challenging way that leads one to a total view, provided not least by the information-rich tables in the text and the appendix. How much labour this entailed is evident from the cited references: the bibliography includes some 4,000 entries. In addition to works cited in English are those in German, Japanese and various other languages. Thus "Dragonflies" represents an extraordinarily comprehensive biology of dragonflies, the significance of which extends far beyond this animal group. The new "Corbet" will indubitably belong among the classic organism-based texts of the 20th Century, like its predecessor from 1962, "A Biology of Dragonflies" - certainly the most often cited publication in odonatology. A final remark about the illustrations: all 96 colour photographs are biologically documented, and complement the text in an excellent way. Obviously the fundamental criteria for selection and compilation were their morphological, ecological and behavioural merits rather than their technical or aesthetic quality. Thus one has to accept a certain lack of uniformity in some plates. Most diagrams and drawings derive from original publications, inevitably causing a mish-mash of styles and also resulting in places in poor resolution of detail. However, new illustrations would have resulted in a higher price and further delay in the book's appearance. The small shortcomings are therefore pardonable. It is superfluous to say that these minor blemishes hardly detract from an otherwise very carefully edited work. Thus it is that "Dragonflies" belongs in the library of every researcher and committed teacher. (Hansruedi Wildermuth)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: wildermuth@swissonline.ch

1566. **Wilson, K.; Evans, S. (2000):** Reports from Coastal Stations - 1999: Gibraltar Point NNR, Lincolnshire. *Atropos* 9: 72-73. (in English). [14 species were seen in 1999, most of them are shortly commented] Address: not stated

1567. **Wilson, K.D.P. (2000):** Distributional notes on the genus *Rhipidolestes* with descriptions of two new species from South China (Zygoptera: Megapodagrionidae). *Odonatologica* 29(1): 45-50. (in English). ["*R. alleni* sp. n. (holotype male: Da Ming Shan, Guangxi) and *R. cyanoflavus* sp. n. (holotype male: Bai Yong, Guangdong) are described from South China. A table and map is provided detailing the distribution of all known *Rhipidolestes* species and

subspecies." (Author)] Address: Wilson, K.D.P., Agriculture and Fisheries Department, 6F, 25 Borrett Rd, Mid Levels, Hong Kong, China. E-mail: wilsnkhk@hk.super.net

1568. **Wootton, R.J.; Kukulova-Peck, J. (2000):** Flight adaptations in Palaeozoic Palaeoptera (Insecta). *Biological reviews of the Cambridge philosophical society* 75(1): 129-167. (in English). ["The use of available morphological characters in the interpretation of the flight of insects known only as fossils is reviewed, and the principles are then applied to elucidating the flight performance and techniques of Palaeozoic palaeopterous insects. Wing-loadings and pterothorax mass/total mass ratios are estimated and aspect ratios and shape-descriptors are derived for a selection of species, and the functional significance of wing characters discussed. Carboniferous and Permian ephemeropteroids ('mayflies') show major differences from modern forms in morphology and presumed flight ability, whereas Palaeozoic odonatoids ('dragonflies') show early adaptation to aerial predation on a wide size-range of prey, closely paralleling modern dragonflies and damselflies in shape and wing design but lacking some performance-related structural refinements. The extensive adaptive radiation in form and flight technique in the haustellate orders Palaeodictyoptera, Megasecoptera, Diaphanopteroidea and Permothemistida is examined and discussed in the context of Palaeozoic ecology." (Authors)] Address: Wootton, R.J.; Univ. Exeter; Sch. Biol. Sci. Exeter EX4 4PS; Devon; England

1569. **Yeh, W.C.; Chen, Y.M. (2000):** Descriptions of two new species of the genus *Oligoaeschna* from northern Taiwan with notes on the status of the pryeri-group (Anisoptera: Aeshnidae). *Odonatologica* 29(2): 137-150. (in English). ["2 syntopic new sp. of the pryeri-group *Oligoaeschna*, *O. lienii* sp. n. (holotype male: Tsaopi bog, 850m, Yuanshan, Ilan county, northern Taiwan, II-V-1997) and *O. tsaopiensis* sp. n. (holotype male: Tsaopi bog, 850m, Yuanshan, Ilan county, northern Taiwan, II-V-1997) collected from northern Taiwan are named, described and diagnosed. Relationship amongst the members of eastern Asian pryeri-group is discussed and inferred mainly from their male penile structure. With regard to male penile glans structure, the pryeri-group is considered to be the extant sister-group of the nearctic genus *Gomphaeschna*." (Authors) Some additional information is given on *O. pyanan* Asahina 1951] Address: Yeh, W.C. & Y.M. Chen, Division of Forest Protection, Taiwan Forestry Research Institute (TFRI), 53 Nanhai Rd, Taipei, Taiwan, R. O. C.

1570. **Zhu, H.-q.; Han, F.-y. (2000):** *Cercion yunnanensis* spec. nov., a new damselfly from Yunnan, China (Zygoptera: Coenagrionidae). *Odonatologica* 29(2): 163-166. (in English). ["Both sexes are described, illustrated and the new sp. is compared with *Coenagrion impar* Needham. Holotype male, allotype female: China. Yunnan prov., Zong-dian, 29-VII--1998, deposited at Shanxi University; paratypes of both sexes from same locality and date, deposited at Dali Teachers Training School, Dali, Yunnan, China. This is the eighth member of the genus known from China. The transfer of *Coenagrion impar* Needham to *Cercion* is suggested." (Authors)] Address: ZHU, H.q. and F.-y. HAN, Shanxi University. Department of Life Sciences, Taiyuan 030006, Shanxi. China

1571. **Zorina, O.V.; Ivanov, P.Yu.; Storozhenko, S.Yu.; Kholin, S.K. (2000):** To the knowledge of insects of Putyatin Island (South Primorye). The North Pacific Islands Biological Researches 3: 1-11. (in Russian with English summary). [The following odonate species are shortly commented and listed for Putyatin Island (42.50N 132.29E, SE Wladiwostok): *Lestes sponsa*, *L. temporalis*, *Coenagrion johanssoni*, *C. ecornutum*, *C. lanceolatum*, *Cercion v-nigrum*), *Erythromma humeral*, *Nehalennia speciosa*, *Aeshna crenata*, *A. caerulea*, *Cordulia aenea*, *Epithea bimaculata*, *Somatochlora metallica exuberata*, *S. graeseri*, *Leucorrhinia orientalis*, *Libellula quadrimaculata*, *Orthetrum albistylum*, *Sympetrum cordulegaster*, and *S. eroticum*.] (Address: Ivanov, P.Yu., Laboratory of Hydrobiology, Institute of Biology and Soil Sciences, Far East Branch of the Russian Academy of Sciences, Vladivostok, 690022, Russia. E-mail: zoology@eastnet.febras.ru (P.Yu.Ivanov)

