

ODONATOLOGICAL ABSTRACTS

1998

- (14931) CHE SALMAH, M.R., S.T.S. HASSAN, A. ABU HASSAN & A.B. ALI, 1998. Influence of physical and chemical factors on the larval abundance of *Neurothemis tullia* (Drury) (Odonata: Libellulidae) in a rain fed rice field. *Hydrobiologia* 389: 193-202. — (First Author: Sch. Biol. Sci., Univ. Sains Malaysia, 11800 Kinden, Penang, Malaysia).

The influence of pH, temperature, conductivity, dissolved oxygen, nitrate, phosphate and chlorophyll a on a larval population in Bandar Baru distr., Peninsular Malaysia was studied. Water availability was the main factor determining the presence or absence of larvae in the rice field. Pesticides and fertilizer applications resulted in low population densities. None of the physical and chemical factors measured in this study affected the abundance of *N. tullia*. Rapid larval population build-ups were observed soon after chemical applications or spells of dry periods, reflecting continual oviposition and hatching of eggs.

- (14932) GONZALEZ SORIANO, E. & R. NOVELO GUTIÉRREZ, 1998. *Oplonaeschna magna* sp. nov. (Odonata: Aeshnidae) from Mexico with a description of its larva. *Revta Biol. trop.* 46(3): 705-715. — (First Author: Depto Zool., Inst. Biol., UNAM, Apdo Postal 70-153, MX-04510 Mexico, D.F.).

Both sexes and final instar larvae are described and illustrated. Holotype ♂: Morelos state, Tepoztlán, 4-XI-1990; deposited in CNIN (UNAM, Mexico). A description of *O. armata* larva is also provided, and the features separating the 2 spp. are outlined. Notes on the biology of the new sp. are included.

- (14933) WITTEN, J.L. & J.W. TRUMAN, 1998. Distribution of GABA-like immunoreactive neurons in insects

suggests lineage homology. *J. comp. Neurol.* 398(4): 515-528. — (First Author: Dept Biol. Sci., Univ. Wisconsin, Milwaukee, WI 53201, USA).

γ -Aminobutyric acid (GABA) is an important inhibitory neurotransmitter in invertebrates and vertebrates. The GABA phenotype is lineally determined in postembryonic neurons in the moth, *Manduca sexta*, and is restricted to 6 identifiable postembryonic lineages in its thoracic hemiganglia. A comparative approach was used to determine whether this distinct clustering of GABAergic neurons is conserved in insects. In the 9 orders surveyed, viz. Thysanura, Odon. (*Libellula quadrimaculata*), Orthoptera, Isoptera, Hemiptera, Coleoptera, Diptera, Lepidoptera and Hymenoptera, GABA-like immunoreactive neurons within a thoracic hemiganglion were clustered into 6 distinct groups that occupied positions similar to the 6 postembryonic lineages in *Menduca*. The largest GABA-immunoreactive neurons in Thysanura and Odon. are in positions similar to those of the common inhibitory motoneurons of grasshoppers. It is suggested that these are indeed homologous lineage groups, and that the lineal origins of the GABAergic cells have been very conservative through insect evolution. The distinctive clustering of GABA-positive cells is shared with crustaceans, but is not found in the centipede *Lithobius furciculatus*. There is a 2- to 3-fold increase in numbers of thoracic neurons between the flightless Thysanura and the most advanced orders.

1999

- (14934) GORB, S.N., 1999. Evolution of the dragonfly head-arresting system. *Proc. R. Soc. Lond. (B)* 266: 525-535. — (Inst. Spez. Zool. u. Evolutionsbiol., Friedrich-Schiller-Univ., Erbertstr. 1, D-07743 Jena). The arrester or fixation system of the head in adult Odon.

is unique among arthropods. This system involves the organs of 2 body segments: the head and the neck. It consists of a skeleton-muscle apparatus that sets the arreser parts in motion. The parts comprise formations covered with complicated microstructures, fields of microtrichia on the rear surface of the head and post-cervical sclerites of the neck. The arreser immobilizes the head during feeding or when the dragonfly is in tandem flight. Thus, it may serve as an adaptation to save the head from violent mechanical disturbance and to stabilize gaze in a variety of behavioural situations. This study shows the evolutionary trend of the arreser in the Odon. by using scanning electron microscopy and measurements of arreser structures in 227 spp. from 26 fam. The arreser design occurring in the Epiophlebiidae, Gomphidae, Neopetaliidae, Petaluridae and Chlorogomphinae is suggested to be the basic one. 2 convergent pathways of head-arreser evolution among Zygopt. and Anisopt. are proposed. The possible functional significance of the arreser system is discussed.

- (14935) NEL, A., G. GAND, J. GARRIC & J. LAPEYRIE, 1999. The first recorded protozgypteran insects from the Upper Permian of France. *Palaeontology* 42(1): 83-97, pl. 1 incl. — (First Author: Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris).

Epilestes gallica sp. n. (Permolestidae) and *Lodevia longialata* gen. n., sp. n. (Permapallagidae) are described from the Kazanian of Lodève. The holotypes are deposited in Mus. Fleury, Lodève, France. The 2 families were previously known from the Kazanian of Russia, suggesting a similar age for the formation of Lodève.

- (14936) NEL, A. & E.A. JARZEMBOWSKI, 1999. Fossil damselflies and dragonflies (Insecta: Odonata) from the late Upper Eocene of southern England. *Proc. Geol. Ass.* 110: 193-201. — (Second Author: Maidstone Mus. & Art Gallery, St Faith's St, Maidstone, Kent, ME14 1LH, UK).

Fossil dragonflies from Bembridge Marls are discussed and 5 additional spp. are (re)described, viz. *Lestes* aff. *regina* Théobald, 2 new coenagrionoids, a corduliid and an enigmatic form of uncertain affinity. The palaeoenvironmental implications are considered.

- (14937) PETRULEVIČIUS, J.F., A. NEL & J. MUZÓN, 1999. A new libelluloid family from the Upper Paleocene of Argentina. *Palaeontology* 42(4): 677-682. — (Second Author: Lab. Ent., Mus. Natn. Hist. Nat., 45 rue Buffon, 75005 Paris).
Palaeomacromiidae fam. n., based on *Palaeomacromia multicellulata* gen. n., sp. n., is described from the Maiz

Gordo Formation of La Medieta, NW Argentina. The holotype is in Museo de La Plata (specimen 28157).

- (14938) ZORINA, O.V., P.Yu. IVANOV, S.Yu. STOROZHENKO & S.K. KHOLIN, 1999. K poznaniyu entomofauny ostrova Putyatina (Yuzhnoe Primorye). — To the knowledge of insect fauna of Putyatina island (South Primorye). *N. Pacif. biol. Res.* 3: 1-10. (Russ., with Engl. s). — (Inst. Biol. & Soil Sci., Far East Br. Russ. Acad. Sci., RUS-690022 Vladivostok-22).
19 odon. spp. are listed along with locality and capture data.

2000

- (14939) BAL, B., 2000. *Odonates de Haute-Savoie, synthèse cartographique*. Agence pour l'Etude et la Gestion de l'Environnement, APEGE, [?] Paris. 16 pp. — (BP 66, F-74963 Cran-Gevrier Cedex).
[Not available for abstracting] See also OA 13389.

- (14940) FISCHER, S., M.C. MARINONE & M.S. FONTANARROSA, 2000. Urban rain pools: seasonal dynamics and entomofauna in a park of Buenos Aires. *Hydrobiologia* 441: 45-53. — (Depto Cien. Biol., Univ. Buenos Aires, Pabellón II, Ciudad Universitaria, AR-C1428 EHA Buenos Aires).
The seasonal variations during a 1-yr period are described. Non-identified Zygopt. and Anisopt. larvae occurred during Jan.-March.

- (14941) GERKEN, B. & K. STERNBERG, 2000. Odonata-Libellen (Exuvien). In: H.-J. Hannemann et al., *Exkursionsfauna von Deutschland*, Vol. 2 [9th revised edn], pp. 63-73, Quelle & Meyer, Wiebelsheim. — (Second Author: Schillerstr. 15, D-76297 Stutensee).
An illustrated key for odon. exuviae of the German fauna.

- (14942) HARITONOV, A.Yu., 2000. [Odonata]. In: M.G. Sergeev, [Ed.], *Krashnaya kniga Novosibirskoy oblasti (Zhivotnye)*, pp. 224-229, Goskomekologiya Novosibirskoy oblasti, Novosibirsk. ISBN none. (Russ.). — (Inst. Anim. Syst. & Ecol., Siber. Br., Russ. Acad. Sci., ul. Frunze 11, RUS-630091 Novosibirsk).
Gomphus epophthalmus, *Macromia amphigena fraenata*, and *Sympetrum croceolum* are red-listed for the Novosibirsk district, Russia. Their descriptions and information on general range, regional distribution, habitat, biology, and status in the district, as well as statements on the required conservation measures are provided.

- (14943) KESEL, A.B., 2000. Aerodynamic characteristics of dragonfly wing sections compared with technical aerofoils. *J. exp. Biol.* 203(20): 3125-3135. — (Dept Zool., Univ. Saarland, D-66041 Saarbrücken). During gliding, dragonfly wings can be interpreted as acting as ultra-light aerofoils which, for static reasons, have a well-defined cross-sectional corrugation. This corrugation forms profile valleys in which rotating vortices develop. The cross-sectional configuration varies greatly along the longitudinal axis of the wing. This produces different local aerodynamic characteristics. Analyses of the C_l/C_d characteristics, where C_l and C_d are the lift and drag coefficients, respectively (at Reynolds numbers Re of 7880 and 10000), using a force balance system, have shown that all cross-sectional geometries have very low drag coefficients ($C_{d,min} < 0.06$) closely resembling those of flat plates. However, the wing profiles, depending upon their position along the span length, attain much higher lift values than flat plates. The orientation of the leading edge does not play an important role. The detectable lift forces can be compared with those of technical wing profiles for low Re numbers. Pressure measurements (at $Re=9300$) show that, because of rotating vortices along the chord length, not only is the effective profile form changed, but the pressure relationship on the profile is also changed. Irrespective of the side of the profile, negative pressure is produced in the profile valleys and net negative pressure on the upper side of the profile is reached only at angles of attack greater than 0° . These results demonstrate the importance of careful geometrical synchronisation as an answer to the static and aerodynamic demands placed upon the ultra-light aerofoils of a dragonfly. — The studies were conducted on *Aeshna cyanea* and on some other, non-identified spp.
- (14944) MADDALENA, T., M. ROESLI, N. PATOCCHI & R. PERALLINI, 2000. *Inventario odonatologico del Ticino. Basi per un programma d'azione cantonale. Rapporto finale*. Mus. Canton. Stor. Nat., Lugano. 88 pp. — (First Author: CH-6672 Gordevio). [Not available for abstracting]; — canton Ticino, Switzerland.
- (14945) PITHER, J. & P.D. TAYLOR, 2000. Directional and fluctuating asymmetry in the black-winged damselfly *Calopteryx maculata* (Beauvois) (Odonata: Calopterygidae). *Can. J. Zool.* 78(10): 1740-1748. (With Fr. s.). — (First Author: Dept Biol., Queen's Univ., Kingston, ON, K7L 3N6, CA). Directional asymmetry (DA) has received considerably less attention than fluctuating asymmetry (FA) in the literature. Evidence for DA, however, is building among insect taxa. Asymmetries were examined in 2 wing traits within both sexes of *C. maculata*, sampled from 3 sites in SE Ontario. After accounting for measurement error, it is shown that proximal segments within right fore- and hindwings are consistently longer than those in the left in all but one sample group. Full wing lengths, however, exhibited FA rather than DA. Mean asymmetry values for both traits (segment and length) occurred in the direction of right-wingedness significantly more often than expected by chance. Patterns of asymmetry were generally consistent among the sexes and sites, although δ δ tended to exhibit more pronounced DA. It is suggested that the wings of *C. maculata* may undergo compensatory development, so that full lengths are more bilaterally symmetrical than their component parts.
- (14946) PROKOP, J. & A. NEL, 2000. *Merlax bohemicus* gen. n., sp. n., a new fossil dragonfly from the Lower Miocene of northern Bohemia (Odonata: Aeshnidae). *Eur. J. Ent.* 97(3): 427-431. — (First Author: Dept Palaeontol., Charles Univ., Albertov 6, CZ-12843 Praha-2). The new gen. and sp. are described from well preserved both pairs of wings, from the Eggenburgian/Ottnganlan of the Bilina mine. Holotype in NMP, Prague. The new taxon is assigned to the Anactini. Also provided is the description of an *Aeshna* (?) sp. from the same locality.
- (14947) SOUPIR, C.A., M.L. BROWN & L.W. KALLEMEYN, 2000. Trophic ecology of largemouth bass and northern pike in allopatric and sympatric assemblages in northern boreal lakes. *Can. J. Zool.* 78(10): 1759-1766. (With Fr. s.). — (First Author: Dept Wildl. & Fish. Sci., South Dakota St. Univ., Brookings, SD 57007, USA). The Calopterygidae and Libellulidae are among the major food items of *Micropterus salmoides* and *Esox lucius* in 6 interior lakes, Voyageurs Natn. Park, Minnesota. Quantitative data are presented order-wise for each lake.
- (14948) STEGLICH, R. & J. MÜLLER, 2000. Libellen (Odonata), Heuschrecken und einige andere Taxa. In: EVSA, Bestandshebungen bei Insekten im Norden Sachsen-Anhalt: Ergebnisse faunistischer Untersuchungen während der Exkursionstagung EVSA e.V. vom 23.-25.06.00 im Gebiet zwischen Arendsee, Seehausen und Wittenberge. *Ent. Mitt. Sachsen-Anhalt* 8(2): 75. — (First Author: Quittenweg 53, D-39118 Magdeburg). An annotated list of 11 odon. spp., from 5 localities in N Sachsen-Anhalt, E Germany.

2001

- (14949) ANDJUS, L., 2001. Pregled istraživanja Odonata u Srbiji sa ček-listom na njih vrsta. — [A review of the Odonata research in Serbia, with a checklist of species]. *Zborn. Rezim. Simp. Ent. Srb., Goč*, p. 10 [Abstract only]. (Serbian). — (Nat. Hist. Belgrade, P.O. Box 401, Njegoševa 51, SM-11000 Belgrade, Serbia).

The history of odon. exploration of Serbia is briefly traced from 1891 to present. At the time of publication, 60 spp. were known from Serbia; a checklist is here omitted. See OA 14886.

- (14950) ANHOLT, B.R., C. VORBURGER & P. KNAUS, 2001. Mark-recapture estimates of daily survival rates of two damselflies (*Coenagrion puella* and *Ischnura elegans*). *Can. J. Zool.* 79(5): 895-899. (With Fr. s.). — (First Author: Dept Biol., Univ. Victoria, BC, V8W 3N5, CA).

♂-biased operational sex ratios are very common in sexually mature dragonflies. These may be due to differential survival or differences in time spent at the breeding site by the sexes. Because most studies are carried out at the breeding site, these 2 processes can be measured as survival rates or recapture rates using modern capture-mark-recapture methods. 66 ♀ and 233 ♂ *C. puella* and 137 ♀ and 347 ♂ *I. elegans* were marked during 3 capture periods spread over 18 days. Each time an animal was recaptured it was remarked so that the capture history of any captured animal could be readily identified. 131 *C. puella* and 55 *I. elegans* were recaptured at least once. The Cormack-Jolly-Seber model was used to estimate the daily probability of survival and recapture. The probability of recapture was, on average, more than 3 times higher for ♂ *C. puella* (0.489) than ♀ (0.133) with significant day to day variation. The daily probability of survival did not differ significantly between the sexes (0.860), with no significant variation among days. In contrast, in *I. elegans* the probability of recapture did not differ between the sexes (0.139 for the first 5 days; between 0.032 and 0.287 for the final 3 days), but the daily probability of surviving was much higher for ♂ (0.812) than for ♀ (0.579). Assuming that the sex ratio was unity at sexual maturity, the recapture and survival rates predicted well the sex ratio of the sample of *C. puella* but predicted more ♂ than were observed in the sample of *I. elegans*. This suggests that ♂ *I. elegans* may suffer higher mortality than ♀ in the immature stage.

- (14951) ARTISS, T., T.R. SCHULTZ, A. POLHEMUS & C. SIMON, 2001. Molecular phylogenetic analysis of the

dragonfly genera *Libellula*, *Ladona*, and *Plathemis* (Odonata: Libellulidae) based on mitochondrial cytochrome oxidase I and 16S rRNA sequence data. *Molec. Phylogen. Evol.* 18(3): 348-361. — (First Author: Lakeside Sch., 14050 1st Ave NE, Seattle, WA 98125, USA).

Molecular phylogenetic relationships among members of the genus *Libellula* were examined using 735 bp of mitochondrial COI and 416 bp of 16S ribosomal RNA gene sequences. Considerable debate exists over several relationships within *Libellula*, as well over the status of 2 putative genera often placed as subgenera within *Libellula*: *Ladona* and *Plathemis*. Parsimony and maximum-likelihood analyses of the separate and combined data sets indicate that *Plathemis* is basal and monophyletic and that *Ladona* is the sister clade to the remainder of *Libellula* s.s. (all spp. within the genus *Libellula*, excluding *Plathemis* and *Ladona*). Moreover, *Libellula fulva* and *L. depressa*, were found to occupy a sister group relationship within the *Ladona* clade. Relationships within *Libellula* s.s. are less well resolved. However, monophyletic lineages within the genus are largely consistent with morphologically based subgeneric classifications. Although tree topologies from each analysis differed in some details, the differences were in no case statistically significant. The analysis of the combined COI and 16S data yielded trees with overall stronger support than analyses of either gene alone. Several analyses failed to support the monophyly of *Libellula* s. l. due to the inclusion of one or more outgroup species. However, statistical comparisons of topologies produced by unconstrained analyses and analyses in which the monophyly of *Libellula* was constrained indicate that any differences are nonsignificant. Based on morphological data, therefore, the paraphyly of *Libellula* is rejected and the outgroup status of *Orthemis ferruginea* and *Pachydiplax longipennis* is accepted.

- (14952) COOK, T.J.P., J. JANOVIY Jr & R.E. CLOPTON, 2001. Epimerite-host epithelium relationships among eugregarines parasitizing the damselflies *Enallagma civile* and *Ischnura verticalis*. *J. Parasitol.* 87(5): 988-996. — (Second Author: Sch. Biol. Sci., Univ. Nebraska, Lincoln, NE 68588-0118, USA).

The host-parasite interface between 2 odon. spp. and 4 eugregarine spp. was examined at the ultrastructural level. *Nubenocephalus nebraskensis* attached to the host midgut epithelium by means of a sucker-like protomerite; the space between the epicytic folds and host epithelium was filled with electron-dense material interpreted to be adhesive in nature. *Actinocephalus carilynnae* attached by means of the epimerite, which had no epicytic folds, and by the fluted stalk with characteristic epicytic folds;

host cell and parasite membranes appeared fused at some places on the epimerite. *Hoplorhynchus acanthatholius* attached by means of an ovoid epimerite with backward-pointing digitations; the entire epimerite was embedded in a host cell, and host cell microvilli surrounded the stalk. *Steganorhynchus dunwoodyi* attached by means of an ovoid stalk papilla enclosed in a retractable globular sheath; the papilla was covered with epicytic folds, but the sheath was not, and the sheath had a single membrane, whereas the epicytic folds had 2 or 3 membranes. The entire apparatus was inserted between epithelial cells, and the sheath was highly folded at its surface. The ultrastructural observations suggest that actinocephalid gregarines have evolved 2 general strategies for attaching to the host epithelium, that is, suckerlike protomerites, as in the case of *N. nebraskensis*, and deeply embedded epimerites inserted within or between host cells, as in the other spp. studied.

- (14953) HEDSTROM, I. & G. SAHLEN, 2001. A key to the adult Costa Rican „helicopter” damselflies (Odonata: Pseudostigmatidae) with notes on their phenology and life zone preferences. *Revta Biol. trop.* 49(3/4): 1037-1056. — (First Author: Dept Appl. Sci., Mid Sweden Univ., S-87188 Härnösand).
Megaloprepus caeruleatus, *Mecistogaster linearis*, *M. modesta*, *M. ornata* and *Pseudostigma aberrans* are described, illustrated and keyed. All known Costa Rican records are listed, and the information on their biology is provided.

- (14954) HERREN, B. & K. HERREN, 2001. Die Libellen der Gemeinde Burgdorf und angrenzender Gebiete. *Burgdorf. Jb.* 69[2002]: 65-76. — (Oberfeldstr. 46, CH-3550 Langnau i. E.).

A review of 30 spp., sighted since 1990 in the area of Burgdorf, canton Bern, Switzerland, with notes on their local status.

- (14955) KETELAAR, R. & C. PLATE, 2001. *Handleiding landelijk meetnet libellen*. — [Manual for national dragonfly monitoring]. De Vlinderstichting, Wageningen & Centraal Bureau voor de Statistiek, Voorburg. 40 pp. Softcover (14.7×20.8 cm). ISBN none. (Dutch). — (De Vlinderstichting, P.O. Box 506, NL-6700 AM Wageningen).

A revised, typographically much „polished up” new edn of the work listed in OA 12583, with new and additional illustrations.

- (14956) KETELAAR, R. & J. REINHOLD, 2001. *Kijken naar dagvlinders en libellen in Flevoland*. — [Butterfly

and dragonfly watching in Flevoland]. Landschapsbeheer Flevoland, Lelystad & De Vlinderstichting, Wageningen. 24 pp. Fold. brochure (10.5×19.0 cm). ISBN none. (Dutch). — (De Vlinderstichting, P.O. Box 506, NL-6700 AM Wageningen).

Beautiful col. portraits of 16 local odon. spp., with information on habitats and flight periods. A brief introductory chapter on dragonflies, and another on „Dragonflies and management” are added.

- (14957) LEUNG, B., M.R. FORBES & R.L. BAKER, 2001. Nutritional stress and behavioural immunity of damselflies. *Anim. Behav.* 61(6): 1093-1099. — (First Author: Dept Zool., Cambridge Univ., Downing St., Cambridge, CB2 3EJ, UK).

Increased mortality on the presence of stress may result from stress-reduced availability of energy for immune function, coupled with the presence of pathogens or parasites. The hypothesis that stress reduces antiparasite responses of *Ischnura verticalis* to their ectoparasitic mites, *Arrenurus pseudosuperior*, was tested. Numbers of colonizing mites did not differ between nutritionally stressed and unstressed damselflies. However, unstressed damselflies successfully removed more attached mites than nutritionally stressed host larvae. Furthermore, certain damselfly behaviours increased in the presence of nonfeeding mite larvae. Some of these behaviours were effective in defending against mites, but were reduced by nutritional stress. These results are sufficient to explain inverse relations found between damselfly condition and intensity of mite parasitism seen in nature, and are likely to be applicable to other host-ectoparasite associations.

- (14958) MALIKOVA, E.I. & P.Yu. IVANOV, 2001. Fauna strekoz (Insecta, Odonata) Primorskogo kraja. — [Dragonfly (Odonata) fauna of the Primorye region]. *Cheniya V.L. Levanidov bienn. mem. Meetings* 1: 131-143. (Russ.). — (First Author: Studencheskaya 25/1-5, RUS-675027 Blagoveshchensk, Amur Region).

The fauna (80 spp.) of the region is critically reviewed and a checklist is provided. The regional occurrence of *Enallagma cyathigerum*, *Aeshna viridis*, *Trigomphus anormolobatus*, and *Neurothemis fluctuans* requires confirmation; — Far East, Russia.

- (14959) MARIANI, S., 2001. Preliminary survey of the biological quality of Mount Amiata Faunistic Park's waterbodies (Monte Labbro, Tuscany). *Atti Mus. Stor. nat. Maremma* 19: 3-10. (With Ital. s.). — (Dept Anim. & Human Biol., Univ. Roma „La Sapienza”, Viale dell'Università 32, I-00185 Roma).

'Aeshna sp.' and 'Somatochlora' sp. are listed from the ponds (7/14-V-1998).

- (14960) MISOF, B., A.M. RICKERT, T.R. BUCKLEY, G. FLECK & K.P. SAUER, 2001. Phylogenetic signal and its decay in mitochondrial SSU and LSU rRNA gene fragments of Anisoptera. *Molec. Biol. Evol.* 18(1): 27-37. — (First Author: Inst. Evol. Biol. & Ecol., Univ. Bonn, An der Immenburg 1, D-53121 Bonn).

The phylogeny of Anisoptera has proven to be notoriously difficult to resolve. Based on morphological characters, several recent publications dealing with the phylogeny of dragonflies proposed contradicting inter- and intrafamily relationships. Phylogenetic information content of mitochondrial large-subunit (LSU) and small-subunit (SSU) ribosomal gene fragments was explored for these systematic problems. Starting at published universal primers, primer sets suitable for amplifying large parts of the LSU and SSU rRNA genes within dragonflies were developed. These fragments turned out to harbor sufficient phylogenetic information to satisfyingly resolve intrafamily relationships, but they contain insufficient phylogenetic structure to permit reliable conclusions about several interfamily relationships. It is demonstrated that decay of phylogenetic signal progresses from intrafamily to interfamily to outgroup relationships and is correlated with an increase of genetic distances. As expected, signal decay is most pronounced in fast-changing sites. Additionally, base composition among fast-changing sites significantly deviates from the expected homogeneity. Homogeneity of base composition among all included taxa was restored only after removing fast-changing sites from the data set. The molecular data tentatively support interfamily relationships proposed by the most recent publication based on morphological characters of fossil and extant dragonflies.

- (14961) POPOVA, O.N., 2001. Rol' mezhdiovykh vzaimodeystviy v rasprostraneni strezok roda *Sympetrum* (Odonata: Libellulidae). — [The role of interspecific reciprocity in distribution of the dragonfly genus *Sympetrum* (Odonata: Libellulidae)]. In: A.Yu. Haritonov & L.N. Sivohina, [Eds], *Biologicheskaya nauka i obrazovanie v pedagogicheskikh vuzah*, Vol. 1, pp. 15-22, Novosibirsk St. Pedag. Univ. & Inst. Anim. Syst. Ecol., Siber. Br. Russ. Acad. Sci., Novosibirsk. ISBN 5-85921-293-3. (Russ.). — (Inst. Anim. Syst. & Ecol., Siber. Br. Russ. Acad. Sci., ul. Frunze 11, RUS-630091 Novosibirsk). Within a "complex" (sensu Haritonov, 1990), i.e. a non-incident species assemblage in nature, 4-5, rarely up to 7 *Sympetrum* spp. co-occur, but as one gets closer to the

northern range border, the number of spp. gets lower. Likewise, in the harsh continental climate the number of spp. is lower than in e.g. the climatically mild W European (Atlantic) regions. In different areas different spp. are associated and dominant; some variation is conditioned also by the respective season. The patterns and trends of these intrageneric associations were systematically examined across the entire Eurasian range of the genus, and are here briefly outlined.

- (14962) SCHMIDT, E.G., 2001. Strittige systematische Fragen auf Gattungsniveau bei mitteleuropäischen Libellen (Odonata). *Abh. Ber. NaturkMus. Görlitz* 73(1): 69-77. (With Engl. s.). — (Coesfelder Str. 230, D-48249 Dülmen).

Based on autapomorphies, the following generic affiliations are suggested: *Chalcolestes viridis* vs *Lestes*, *Stylurus flavipes* vs *Gomphus*, *Platetrum depressum* and *Ladona fulva* vs *Libellula*. It is advocated that *Aeshna isosceles* "should not yet be transferred" into *Anaciaeschna*, and that the genera *Cercion*, *Erythromma*, *Anax* and *Hemianax* "should still remain separated for the European spp."

- (14963) SCHULTZ, J.K. & P.V. SWITZER, 2001. Pursuit of heterospecific targets by territorial Amberwing dragonflies (*Perithemis tenera* Say): a case of mistaken identity. *J. Insect Behav.* 14(5): 607-620. — (Dept Biol. Sci., Eastern Illinois Univ., Charleston, IL 61920, USA).

5 alternative hypotheses for the function of heterospecific pursuits in *P. tenera* were tested, viz. competition for resources, prevention of interference while mating, predator deterrence, foraging, and mistaken identity. Resident ♂ pursued both ♂ and ♀ conspecifics, as well as a horsefly (*Tabanus* sp.) and butterfly (*Ancyloxypha numitor*). Other intruding odon., including *Epitheca princeps*, *Erythemis simplicicollis*, *Libellula luctuosa*, *Pachydiplax longipennis* and *Plathemis lydia*, were relatively ignored. Because the horsefly and butterfly were similar to *Perithemis* in body size, colour, and flight height, and because they are not predators or prey of amberwings, it is concluded that the pursuit of these heterospecifics was due to mistaken identity. The characteristics of the horsefly and butterfly likely correspond to the cues that the ♂ *Perithemis* use to identify conspecifics, and the relative rarity of intrusions by these 2 spp. (as well as by ♀ *Perithemis*) probably made it more costly to discriminate and pursue only conspecifics than to make some mistaken pursuits.

- (14964) SIROT, L.K. & H.J. BROCKMANN, 2001. Costs of sexual interactions to females in Rambur's

forktail damselfly, *Ischnura ramburi* (Zygoptera: Coenagrionidae). *Amin. Behav.* 61(2): 415-424. — (Dept Zool., Univ. Florida, 223 Bartram Hall, Gainesville, FL 32611-8525, USA).

Several odon. spp. are characterized by ♀-limited polymorphism in which the andromorphs look and behave like ♂♂, whereas the gynomorphs look and behave differently. Sexual conflict has been hypothesized to play a role in the maintenance of this polymorphism in that andromorphs may have an advantage over gynomorphs by avoiding costly sexual interactions through ♂ mimicry. Here, it was tested for costs of sexual interactions to ♀ *I. ramburi* by comparing the success of singly mated ♀♀ maintained with no ♂♂ to the success of ♀♀ maintained continuously with ♂♂ at a 3:1 (♂:♀) operational sex ratio (OSR) and a 1:1 OSR. The results suggest that sexual interactions affect the 2 morphs differently. The time spent feeding, number of eggs laid and egg-laying rate of andromorphs were lower in the 3:1 OSR treatment than in the treatment with no ♂♂. Time spent feeding and number and rate of eggs laid by gynomorphs did not differ among treatments. Sexual contact may be occurring between ♂♂ and mated andromorphs because sexual interactions are associated with net costs to mated andromorphs whereas sexual interactions with mated andromorphs are beneficial to ♂♂ because there is high last-♂ sperm precedence. Based on this experiment, andromorphs cannot be said to have an advantage over gynomorphs by avoiding costly sexual interactions because these were not associated with net costs to gynomorphs.

(14965) SPRANDEL, G.L., 2001. Fall dragonfly (Odonata) and butterfly (Lepidoptera) migration at St Joseph Peninsula, Gulf county, Florida. *Fla Ent.* 84(2): 234-238. (With Span. s.). — (Florida Fish & Wildl. Conserv. Commn, 620 Meridian St., Tallahassee, FL 32399-1600, USA).

The autumnal 1999 migration of 5 Lepidoptera spp. and *Anax junius*, *Pantala flavescens*, *Tramea lacerata* and *T. carolina* along St Joseph Peninsula, Florida Panhandle is described. The nymphalid, *Agraulis vanillae*, accounted for 58% of the insects counted, *Anax junius* was the next most common, with a maximum rate of 3297/h. The median and peak period for these 2 spp. was the first week of Oct. The observed flight pattern may demonstrate a reluctance to cross open water.

(14966) STOKS, R., 2001. Food stress and predator-induced stress shape developmental performance in a damselfly. *Oecologia* 127(2): 222-229. — (Dept Aquat. Ecol., Univ. Leuven, De Bérotstraat 32, B-3000 Leuven).

The effects of stress factors, such as food shortage, non-lethal predator presence and autotomy on survival and larval performance (growth and development rates, developmental stability) of *Lestes sponsa* larvae were studied. In a laboratory experiment, larvae were raised during their last 2 instars at 2 food levels (high or low) crossed with 2 levels of autotomy (caudal lamellae present or absent). These treatments were nested within 3 levels of predation risk (*Aeshna cyanea* absent, Chironomus-fed caged *Aeshna* or *Lestes*-fed caged *Aeshna*). The diet of the predator had no effects. The low food level and the presence of *Aeshna* independently increased mortality rates of *L. sponsa* larvae. The low food level, presence of a caged *Aeshna* and autotomy all independently reduced growth rate (mass and body size at day 40) and wing size at emergence, and the first 2 stress factors also reduced development rate. Regardless of predator presence and autotomy, all damselfly larvae consumed the food available. This indicated that the predator-induced stress effects were not due to reduced food uptake, but probably reflected lowered assimilation efficiency and/or a higher metabolic rate. Besides a low food level, the presence of caged *Aeshna* predator larvae and autotomy also increased hindwing asymmetry. This result demonstrated that predator-induced stress may reduce developmental stability in the prey.

(14967) SUH, A.N. & M.J. SAMWAYS, 2001. Development of a dragonfly awareness trail in an African botanical garden. *Biol. Conserv.* 100(3): 345-353. — (Second Author: Dept Conserv. Ecol. & Ent., Univ. Stellenbosch, Private Bag X1, Matieland-7602, SA).

The *IUCN/SSC Status survey and Conservation action plan: Dragonflies* calls for an increase in educating the public and increasing awareness of dragonflies. They are conspicuous and attractive, and can 'stand in' for other invertebrates in raising awareness of the necessity to conserve invertebrates. While reserves have been set aside for dragonfly awareness and conservation in the northern hemisphere, no such reserves appear to exist in the southern hemisphere, despite its rich dragonfly fauna. This paper describes the development of a dragonfly-awareness trail in the well-visited National Botanical Gardens, Pietermaritzburg, South Africa. Correlations between spp. and environmental variables were significantly high for 6 measured environmental variables: pH, percentage shade, vegetation (structural and compositional), ambient and water temperature, and water depth. Multivariate analyses of data, classified *a priori* selected sampling units into 4 ecologically meaningful biotope types, each with a characteristic dragonfly assemblage. The 4 biotopes

provided potential viewing points. To these were added a further 3 duplicate biotopes so as to link the trail into a circuit. Questionnaires assessed public awareness of dragonflies, and helped design a preliminary leaflet. A final trail design was drawn up along with an expanded booklet. The trail has now been implemented. Recommendations are made on the minimal scientific underpinning required for future trail design.

- (14968) VAN GOSSUM, H., R. STOKS & L. DE BRUYN, 2001. Frequency-dependent male mate harassment and intra-specific variation in its avoidance by females of the damselfly *Ischnura elegans*. *Behav. Ecol. Sociobiol.* 51(1): 69-75. — (First Author: *Evol. Biol. Gr.*, RUCA, Univ. Antwerp, Groenenborgerlaan 171, B-2020 Antwerp).

It was focused on ♂ harassment on andromorphic and gynomorphic ♀♀, and on variation in morph-specific mating avoidance tactics by ♀♀. The first goal was to quantify morph-specific ♂ mating attempts, hence ♂ harassment, in populations with manipulated parameters (densities, sex ratios, proportion of andromorphs). Second, the ♀ perspective was examined by looking for potential differences in morph-specific mating avoidance tactics and success of these in a natural population. Differences in population conditions did influence the number of ♂ mating attempts per morph. The less frequent ♀ morph was always subject to fewer mating attempts, which contradicts earlier hypotheses on mimicry, but supports those that assume that ♂♂ learn to recognize ♀ morphs. Gynomorphs occupy less open habitat and often fly away when a ♂ approaches, while andromorphs use more open habitat, do not fly large distances, and directly face approaching ♂♂. ♀ morphs did not differ in the proportion of successful mating-avoidance attempts. The results suggest that the maintenance of colour polymorphism is most probably the result of interactive selective forces, depending on variation in all population conditions rather than of solely density- or frequency-dependent selection within populations.

- (14969) YOURTH, C.P., M.R. FORBES & B.P. SMITH, 2001. On understanding variation in immune expression of the damselflies *Lestes* spp. *Can. J. Zool.* 79(5): 815-821. (With Fr. s.). — (Second Author: Dept Biol., Carleton Univ., 1125 Colonel By Dr., Ottawa, ON, K1S 5B6, CA).

Immune ability and immune expression have been viewed as life-history traits that are influenced by such factors as the likelihood of being parasitized, intensity and cost of parasitism, and trade-offs associated with immune expres-

sion. Here it is shown that different patterns of infestation by a generalist ectoparasite, *Arrenurus planus* (Hydrachnida) do not fully explain the variation in immune expression across the sympatric *L. congener*, *L. dryas*, *L. forcipatus* and *L. unguiculatus*. Within sp. no gender biases in immune expression were evident. Whereas both ♂♂ and ♀♀ of one oft-exploited sp. did not mount immune responses against attending larval mites, ♂♂ and ♀♀ of 3 other spp. showed similar immune responses, with variable expression. The immune response was melanotic encapsulation of mite feeding tubes, and was associated with dead mites. Of the 3 spp. showing immune expression, the sp. with the highest prevalence and intensity of infestation had a significantly higher proportion of individuals responding immunologically to mites. In conclusion, current infestation levels only partially predict immune investment: consideration of the timing of emergence of different spp. suggests that season may be an important predictor of immune investment.

2002

- (14970) BECK, M.L. & S. PRUETT-JONES, 2002. Fluctuating asymmetry, sexual selection, and survivorship in male Dark-winged damselflies. *Ethology* 108(9): 779-791. — (First Author: 331 Funchess Hall, Dept Biol., Auburn Univ., Auburn, AL 36849-5414, USA).
Fluctuating asymmetry in *Calopteryx maculata* was not correlated with any aspect of morphology in ♂♂, but it did predict mating status in ♂♂. Mating ♂♂ showed significantly lower levels of forewing asymmetry than did non-mating ♂♂ holding adjacent territories. While fluctuating asymmetry did not relate to survivorship or resource holding ability, body size did. Larger ♂♂ were able to hold territories longer and lived longer than smaller individuals. It is suggested that size is of greater importance in this sp. with regards to fitness and that fluctuating asymmetry may play a minor role by impacting short-term mating success.
- (14971) BOTMAN, G., L. COENEN & C.A. LANCIANI, 2002. Parasitism of *Ischnura pumila* (Odonata: Coenagrionidae) in Florida by two species of water mites. *Fla Ent.* 85(1): 279-280. — (Dept Zool., Univ. Florida, Gainesville, FL 32611, USA).
Arrenurus major larvae attached to the *Ischnura* thorax and abd. segm. 1-3, *A. americanus* to abd. segm. 5-8; — Lake Alice, Gainesville, Florida.
- (14972) BUSS, D.F., D.F. BAPTISTA, M.P. SILVEIRA, J.L. NESSIMIAN & L.F.M. DORVILLÉ, 2002. Influ-

ence of water chemistry and environmental degradation on macroinvertebrate assemblages in a river basin in south-east Brazil. *Hydrobiologia* 481: 125-136. — (First Author: Lab. Avaliação e Promoção da Saúde Ambiental, Depto Biol., IOC, FIOCRUZ, Av. Brasil 4365, Manginhos, BR-21045-900 Rio de Janeiro, RJ).

7 sites in the Guapimirim R basin (Atlantic Forest region) were studied during 3 sampling periods, based on the rain regime. Relationships between macroinvertebrate assemblages, water chemistry variables and environmental degradation were examined using canonical correspondence analysis (CCA). According to CCA, concentrations of dissolved oxygen and chloride, and the environmental degradation, measured by the Riparian Channel Environment Index, exhibited the strongest impact on macroinvertebrate fauna. Odon. were among the groups tolerant to moderate levels of pollution. The genera considered were: Limnetron, Hetaerina, Argia, Cyanogomphus, Epigomphus, Gomphoides, Progomphus, Brechmorhoga, and Elasmotheris.

- (14973) CONRAD, K.F., K.H. WILLSON, K. WHITFIELD, I.F. HARVEY, C.J. THOMAS & T.N. SHERRATT, 2002. Characteristics of dispersing *Ischnura elegans* and *Coenagrion puella* (Odonata): age, sex, size, morph and ectoparasitism. *Ecography* 25(4): 439-445. — (Last Author: Dept Biol. Sci., Univ. Durham, South Rd, Durham, DH1 3LE, UK).

It is assessed whether *I. elegans* and *C. puella* individuals that moved between ponds differed in their mean characteristics from those that did not move. Overall, the sex (♀) and sp. (*C. puella*) that spent most time away from the breeding site was more likely to move between ponds, *I. elegans* ♂ that dispersed had significantly longer forewings than ♂ that did not, while ♂ *C. puella* parasitised by water mites were more likely to disperse than unparasitised ♂. There was no evidence for differences in dispersal rates among the ♀ colour forms of either *I. elegans* or *C. puella*. In general, the differences in dispersal characteristics between sexes and spp. could be explained by underlying variation in activity and mobility. The majority of dispersal between breeding sites by *C. puella* and *I. elegans* did not appear to be directed, but probably arose from chance movements occasionally taking individuals to a different pond from which they emerged.

- (14974) EBERHARD, W.G., 2002. Physical restraint or stimulation? The function(s) of the modified front legs of male *Archiseptis diversiformis* (Diptera, Sepsidae). *J. Insect Behav.* 15(6): 831-850. — (Biologia, Univ. Costa Rica, Ciudad Universitaria, Costa Rica).

There are 4 hypotheses that could explain the elaborate species-specific morphology of the clasping organs on the front legs of ♂ *A. diversiformis*. By a process of elimination, and in combination with data from a previous morphological study, the function of these organs is to stimulate ♀♀. In 2 *Ischnura* spp. (1958, E. Loibl and F. Kreiger & E. Kreiger-Loibl, *Z. Tierpsychol.* 15: 54-81 and 82-93, resp.), modification of the species-specific form of the ♂ abdominal clasping organ did not reduce the ♂ ability to grasp the ♀, but a ♀ grasped by a modified ♂ was much less likely to bend her abdomen forward to copulate.

- (14975) FENOGLIO, S., P. AGOSTA, T. BO & M. CUCCO, 2002. Field experiments on colonization and movements of stream invertebrates in an Apennine river (Visone, NW Italy). *Hydrobiologia* 474: 125-130. — (Dept Sci. & Adv. Tech., Eastern Piedmont Univ., via Cavour 84, I-15100 Alessandria).

No reference is made to the Odon. in the main text. In Appendix, 3 spp. are listed from Visone R., Alessandria distr., NW Italy.

- (14976) FORBES, M.R., K.E. MUMA & B.P. SMITH, 2002. Diffuse coevolution: constraints on a generalist parasite favor use of a dead-end host. *Ecography* 25(3): 345-351. — (First Author: Dept Biol., Carleton Univ., Colonel By Dr., Ottawa, ON, K1S 5B6, CA).

The use of closely related *Sympetrum obtusum* and *S. internum* by *Arrenurus planus* larvae is described. Adults of the former are almost wholly susceptible to *A. planus*, while adults of the latter are resistant. However, the mite attaches as often to the resistant host as it does to the susceptible host sp. Evidence is presented that mites track the susceptible host and are most active early in the season, when early-emerging unsuitable hosts are also present. Thus, use of resistant hosts appears an unavoidable outcome of constraints promoting discovery and use of susceptible host. This has implications for studies of local adaptation and host switching.

- (14977) HIGLER, L.W.G., J.W.H. ELBERSEN & P.F.M. VERDONSCHOT, 2002. Definitiestudie ecologische effecten van laagwater: een verkenning van de effecten van laagwater op de levensgemeenschappen van regionale wateren. — [Definition study on low water ecological effects: an inquire into the low water impact on biotic communities of regional water bodies]. *Alterra-Rapport* 733: 1-58. (Dutch). — (First Author: Hoogstraat 4, NL-3956 NA Leersum).

Includes several references to the Odon. In consequence

of the drying up of water bodies in the Netherlands dune regions, several spp. became extinct there. A long-lasting drought period triggers a similar local situation in bogs. If the upper courses of streams are to dry up completely, *Cordulegaster boltonii* may become extinct in the Netherlands. — The present publication is intended as a basic instrument for a forthcoming pilot study in this field.

- (14978) IVANOV, P. Yu., 2002. K faune strekoz (Odonata) ostrova Sahalin. — To the fauna of dragonflies (Odonata) of Sakhalin. *N. Pacif. biol. Res.* 7: 1-9. (Russ., with Engl. s.). — (Inst. Biol. & Soil. Sci., Far East Br. Russ. Acad. Sci., RUS-690022 Vladivostok-22).

The history of odonatol. exploration of Sahalin is outlined, and 21 spp. collected in 2001 are listed. *Aeshna caerulea* and *Leucorrhinia intermedia* were not previously recorded from the island, bringing the status of its known odon. fauna up to 31 spp.

- (14979) JOHANSSON, F. & E. WAHLSTRÖM, 2002. Induced morphological defence: evidence from whole-lake manipulation experiments. *Can. J. Zool.* 80(2): 199-206. (With Fr. s.). — (Anim. Ecol., Dept Ecol. & Envir. Sci., Umeå Univ., S-90187 Umeå).

The spine lengths of *Leucorrhinia dubia* final instar larvae were monitored in 2 experimental lakes for 7 consecutive yr. Fish were present during the first 2 yr and then removed for the remaining 5 yr. The spine lengths decreased significantly in both lakes after the removal of fish, while there was no corresponding change in the spine lengths in reference lakes, and only little change in food supply for larvae was found. This evidence suggests that the plastic response in spine length is strong and attributable to the presence of predators.

- (14980) KAUPPINEN, J., 2002. Vipinää sudenkorentomaailmassa. — [Thrilling dragonfly news from Finland]. *Suomen Luonto* 61(10): 16-17. (Finn.). — (Vehnätie 23, FIN-04400 Järvenpää).

Notes on the most remarkable dragonfly records made in Finland in 2002, incl. the first national record of *Aeshna mixta* by J. Andersson and a new population of *Nehalennia speciosa* discovered by F. Arnaboldi.

- (14981) KOEL, T.M. & K.E. STEVENSON, 2002. Effects of dredge material placement on benthic macroinvertebrates of the Illinois River. *Hydrobiologia* 474: 229-238. — (First Author: Cent. For Resources, P.O. Box 168, Yellowstone Natn. Park, WY 82190, USA). Since the 1930s, dredge material has been removed from the Illinois R. and placed along the main channel border

in shallow depths to maintain a 2.7 m deep main channel for commercial navigation. Placement of this material changes the sediment composition from primarily silt/clay to primarily sand, and it buries pre-existing benthic invertebrates. During 1997-1998, the benthos of an 125 km reach of the Middle Illinois R. was studied. For all taxa (incl. Odon.), densities were highest at sites that had never received dredge material, and for all taxa (except Chironomidae) these were lowest at sites that received dredge material during the current yr. No significant recovery by macroinvertebrates was noticed on dredge areas after 1 yr. It is concluded that strategic placement of dredge material, avoiding islands or other areas of high macroinvertebrate diversity, could improve overall system productivity and biotic integrity of large river-floodplains.

- (14982) LILJANIEMI, P., K.-M. VUORI, B. ILYASHUK & H. LUOTONEN, 2002. Habitat characteristics and macroinvertebrate assemblages in boreal forest streams: relations to catchment silvicultural activities. *Hydrobiologia* 474: 239-251. — (First Author: Dept Biol. & Envir. Sci., Univ. Jyväskylä, P.O. Box 35, FIN-40351 Jyväskylä).

No reference to the Odon. is made in the main text. In Appendix, 4 spp. are listed from the Finnish, and 3 spp. from the Russian side of the Koitajoki R.

- (14983) McGEOCH, M.A., 2002. Insect conservation in South Africa: an overview. *Afr. Ent.* 10(1): 1-10. — (Dept Conserv. Ecol., Univ. Stellenbosch, Private Bag X01, Matieland-7602, SA).

In the past decade, S Africa developed a strong insect conservation record. The odon. are covered by Prof. M.J. Samways and his collaborators. References to many of their papers are included.

- (14984) NELSON, S.M. & D.M. LIEBERMAN, 2002. The influence of flow and other environmental factors on benthic invertebrates in the Sacramento river, USA. *Hydrobiologia* 489: 117-129. — (Ecol. Res. & Invest. Gr., Tech. Serv. Cent., Bur. of Reclamation, Denver, CO-80225, USA).

It was examined how the benthic invertebrate community is related to current velocities and other environmental variables within a 187 km gradient of the Sacramento R., California. Canonical correspondence analysis revealed that current velocity was the most important variable explaining community composition. Other predictor variables that influenced community composition included periphyton biomass, altitude, and disturbances. Main

abundances at each sampling site are stated for *Argia* sp., *Erpetogomphus* sp., and *Brechmorhoga mendax*.

etc. is provided. A thorough biogeographical analysis of the fauna is presented, and Author's personal odonotol. bibliography (9 titles; 1997-2001) is appended.

- (14985) POPOVA, O.N., 2002. Materialy k biologii strekozy *Crocothemis erythraea* (Brullé, 1832). — [Materials towards the biology of *Crocothemis erythraea* (Brullé, 1832)]. In: A.Yu. Haritonov & L.N. Sivohina, [Eds], *Biologicheskaya nauka i obrazovanie v pedagogicheskikh vuzakh*, Vol. 2, pp. 90-93, Novosibirsk St. Pedagog. Univ. & Inst. Anim. Syst. Ecol., Russ. Acad. Sci., Novosibirsk. ISBN 5-85921-293-3. (Russ.). — (Inst. Anim. Syst. & Ecol., Siber. Br. Russ. Acad. Sci., ul. Frunze 11, RUS-630091 Novosibirsk).

In 2001, *C. erythraea* larvae were discovered in E Kazakhstan, close to the southern border of Siberia. In view of the recent northward expansion of many spp., the discovery of the sp. within the Siberian limits is expected, therefore it was considered opportune to present in this paper an outline of structural features that will facilitate the identification and some pending biology topics that need to be studied. The Author undertook the study of several aspects of larval biology in N Caucasus. These are enumerated and briefly annotated here, and a generic key for the adults and larvae of the Siberian libellulid genera (*Crocothemis*, *Leucorhinia*, *Libellula*, *Orthetrum*, *Pantala*, *Sympetrum*) is provided.

- (14986) SKOBERNE, P., 2002. Slovenija, Evropska unija in varstvo narave. — [Slovenia, European Union and nature conservation]. *Proteus, Ljubljana* 64(7): 320-325. (Slovene). — (ZRSVN, Vojkova ul. 1/A, SI-1000 Ljubljana).

General: on preparations for negotiations, amendments of legislation, species and habitat type peculiarities, etc. *Cordulegaster heros*, as proposed by the Government of Slovenia for the inclusion in Annexes II and IV of the Habitat Directive (see OA 13548) is listed.

- (14987) YANIBAeva, V.A., 2002. *Fauna i ekologiya strekoz Yushnogo Urala*. — [*Fauna and ecology of dragonflies of the Southern Ural*]. Autoref. Diss. Kand. biol. Nauk, 22 pp. Sibir. Otd. Russ. Akad. Nauk, Inst. Sist. & Ekol. Zhivot., Novosibirsk. (Russ.). — (Baskirskiy gosudarstvenny prirodny zapovednik, RUS-453593 Sargaya, Burzyansk distr., Bashkortostan).

This is a published summary of the dissertation. The original of the latter (221 pp., 5 app. incl.) is not available for general distribution. — The history of odonotol. exploration of S Ural is traced from 1906 to present. 61 regional spp. are listed, and information on their ecology, range, habitat preferences, local status, phenology,

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- (14988) ARGIA. The news journal of the Dragonfly Society of the Americas (ISSN 1061-8503), Vol. 15, No. 3 (20 Oct. 2003). — (c/o Dr & Mrs T.W. Donnelly, 2091 Partridge Lane, Binghamton, NY 13903, USA). [Scientific articles:] *Mead, K.*: Findings of the 2003 Great Lakes Odonata meeting (pp. 1-3); — *Tennessen, K.*: Bolivia 5: a dry season endeavor (pp. 3-5); — *Sibley, F.*: Nicaragua without the mud (pp. 5-7); — *Aziz, K. & D.E. Bowles*: Predation of *Hagenius brevistylus* Selys on *Libellula luctuosa* Burmeister (pp. 7-8); — *Huchings, G.*: Observations on an ovipositing dragonfly frenzy in the rain (pp. 8-9); — Where do dragonflies go when they die? (p. 9); — Another dot on the map: *Aeshna tuberculifera* from North-central Saskatchewan (pp. 9-10); — *Donnelly, N.*: *Lestes disjunctus*, *forcipatus* and *australis*: a confusing complex of North American damselflies (pp. 10-13); — *Pfeiffer, B.*: Two new dragonflies from Vermont (p. 14); — *Worthen, W.B.*: A survey of odonates of Congaree Swamp National Monument, Richland Co., South Carolina (pp. 14-16); — *Donnelly, N.*: Common name for *Enallagma vernale* (p. 17); — *Paulson, D.*: Another tribute to Minter Westfall (pp. 17-18); — *Donnelly, N.*: [Book reviews]: *Dragonflies of the North Woods*, by K. Mead (pp. 18-19); — A field guide to the dragonflies and damselflies of Massachusetts, by B. Nikula, J.L. Loose & M.R. Burne (p. 19).

- (14989) ARMITAGE, P.D., K. SZOSZKIEWICZ, J.H. BLACKBURN & I. NESBITT, 2003. Ditch communities: a major contributor to floodplain biodiversity. *Aquat. Conserv. Marine Freshw. Ecosyst.* 13(2): 165-185. — (First Author: Cent. Ecol. & Hydrol., Winfrith Technol. Cent., Winfrith Newburgh, Dorchester, DT2 8ZD, UK).

The fauna and flora of the Rushton Ditch on the lower Frome R. floodplain at E Stoke (S England) were examined and compared with studies on adjacent bankside and instream habitats. Faunal abundance and richness were positively related to the diversity of aquatic plants. There are large differences in the numbers of taxa collected in ditch and in bankside samples. Of total 9 recorded odon. spp., 8 spp. were confined to the ditch. The environmental reasons for the large contribution of the Rushton Ditch to aquatic biodiversity on the floodplain are outlined and discussed. The maintenance of these conditions requires

sensitive management.

(14990) *ATROPOS* (ISSN 1478-8128), No. 20 (Oct. 2003). — (c/o M. Tunmore, 36 Tinker Lane, Meltham, Holmfirth, W Yorks, HD9 4EX, UK).

[Odon. articles:] *Peters, A.*: Dragonfly conservation from the BDS: return of the Southern Damselfly, *Coenagrion mercuriale* (Charp.), to an historic site in Dorset (pp. 16-19; pl. 7, fig. 26 excl.); — *Dudley, S.*: Digiscoping insects (pp. 35-40); — *InsectLine*: Migrant insect summary (May to August 2003) (pp. 42-45); — *Parr, A.*: Guides to Odonata from various regions of the world (pp. 48-53); — [Book review] *Dragonflies*, by Steve Brooks (p. 55); — [*Tunmore, M.*]: Britain's dragonflies, by D. Smallshire & A. Swash (p. 66; announcement of publication and a brief description of the book).

(14991) *BAAS, A.H.*, 2003. Acrobaten boven water. — [Acrobats above water]. *Eos* 9: 36-44. (Dutch). — (Author's address not stated).

General, on the Netherlands and Belgian dragonfly world.

(14992) *BAIRD, J.M. & M.L. MAY*, 2003. Fights at the dinner table: agonistic behavior in *Pachydiplax longipennis* (Odonata: Libellulidae) at feeding sites. *J. Insect Behav.* 16(2): 189-216. — (Second Author: Dept Ent., New Jersey Agric. Exp. Stn, Cook Coll., Rutgers Univ., New Brunswick, NJ 08901, USA).

Aggressive behaviour during foraging was quantified by observing focal individuals on arrays of artificial perches. *Pachydiplax* apparently aggressively defend, for up to several hours at a time, one or a few feeding perches. 17% of all behaviours included agonistic actions, e.g., chasing or physical contact. The frequency of interactions was correlated positively with ambient temperature, solar radiation, prey density and density of other dragonflies. Both sexes initiated and responded to intra- and interspecific aggression; intraspecific interactions were more intense, however. ♂♂ had significantly higher interaction rates and fighting success than ♀♀, and intraspecific ♂-♂ contests were particularly intense. When prey were visibly localized, contest winners commonly gained perches closer to the prey swarm, and aggressive behaviour was apparently correlated with feeding opportunity. Despite the frequency of aggression, these dragonflies allocated only about 19 s, on average to agonistic behaviour during 30-min observation periods. This and other costs appear small compared to foraging benefits of occupying a favourable perch, although at a very high interaction intensity high energy costs and lower intake reduce the

net energy gain.

(14993) *BEDJANIČ, M.*, 2003. Raziskave favne kačjih pastirjev (Odonata) in ravokrilcev (Orthopteroidea) na „MRT Makole 2002“. — [Inquire into the odonate and orthopteroidea fauna at the „Youth Field Research Workshop Makole 2002“]. In: S. Tajnbaher, [Ed.], *Mladinski raziskovalni tabor Makole 2002*, pp. 53-74, ZTKS, Ljubljana, ISBN 961-6243-39-X. (Slovene). — (Fram 117/A, SI-2313 Fram).

A commented list of 31 odon. spp., from 11 localities in the Makole and Poljčane areas, Slovenia; 1/6-VII-2002. *Ophiogomphus cecilia*, *Cordulegaster heros* and *Symptetrum depressiusculum* are of regional interest. — See also OA 14055, 14367 and 14591.

(14994) *BEDJANIČ, M.*, 2003. Raziskave favne ravnokrilcev (Orthopteroidea) in kačjih pastirjev (Odonata) na „MRT Mislinja 2002“. — [Inquire into the orthopteroidea and odonate fauna at the „Youth Field Research Workshop Mislinja 2002“]. In: S. Štajnbaher, [Ed.], *Mladinski raziskovalni tabor Mislinja 2002*, pp. 50, ZTKS, Ljubljana, ISBN 961-6243-38-1. (Slovene). — (Fram 117/A, SI-2313 Fram).

7 odon. spp. are recorded from 3 localities in the Mislinja R. area, Slovenia; Aug. 2002. *Cordulegaster heros* is in Carinthia rare, therefore the record is of some interest. — See also OA 14316.

(14995) *BETHOUX, O. & A. NEL*, 2003. Révision de *Protagrion audouini* Brongniart, 1893, du Carbonifère supérieur (Palaeoptera). *Bull. Soc. ent. Fr.* 108(3): 237-244. (With Engl. s.). — (Lab. Ent., Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris).

The enigmatic Upper Carboniferous „palaeopteron“ is redescribed and its phylogenetic position discussed. Even if the main currently accepted groups of the „palaeodictyopteric“ lineage are not based on clear synapomorphies, *Protagrion* has none of those of the Odonatoptera and Ephemeroptera. It shares a probable synapomorphy with the Megaseoptera, which does not occur in the other „palaeodictyopteric“ groups.

(14996) *BOSCHI, C., R. BERTILLER & T. COCH*, 2003. *Die kleinen Fließgewässer: Bedeutung, Gefährdung, Aufwertung*. Hochschulverlag a.d. ETH Zürich, Zürich. 119 pp. Hardcover (21.5x30.0 cm). ISBN 3-7281-2907-0. Price: CHF 68.- net. — (Publisher: ETH Zentrum, CH-8092 Zürich).

On the importance, endangering and revalorization of small running waters in Switzerland. The odon. are dealt

with on pp. 47, 75–82, with emphasis on *Calopteryx virgo*, *Cordulegaster bidentata* and *C. boltonii*.

relation could not be ascertained.

- (14997) BOYLE, T.P. & H.D. FRALEIGH, Jr, 2003. Natural and anthropogenic factors affecting the structure of the benthic macroinvertebrate community in an effluent-dominated reach of the Santa Cruz River, AZ. *Ecol. Indicators* 3(2): 93–117. — (First Author: US Geol. Surv., Fort Collins Sci. Cent., Colorado St. Univ., 335 Aylesworth NW, Fort Collins, CO 80523-9143, USA). 6 odon. taxa (3 identified to the gen., 3 to the sp.) of 4 fam. are listed for the upper Santa Cruz R., Arizona, USA, but no references to the order are made in the main text.
- (14998) *BULLETIN OF AMERICAN ODONATOLOGY* (ISSN 1061-3781), Vol. 7, No. 3 (20 Oct. 2003). — (c/o Dr & Mrs T.W. Donnelly, 2091 Partridge Lane, Binghamton, NY 13903, USA).
Bick, H.H.: At-risk Odonata from conterminous United States (pp. 41–56; Natural Heritage designatives); — von *Ellenrieder, N. & J. Muzón*: Description of the last larval instar of *Ichnura fluviatilis* Selys (Coenagrionidae) (pp. 57–60).
- (14999) BUTCHER, J.T., P.M. STEWART & T.P. SIMON, 2003. A Benthic Community Index for streams in the Northern Lakes and Forests Ecoregion. *Ecol. Indicators* 3(3): 181–193. — (First Author: US Geol. Surv., Lake Michigan Ecol. Res. Stn, 1100 N. Mineral Springs Rd, Porter, IN 46304, USA).
246 invertebrate taxa were collected from 94 sites that were selected randomly, using the Environmental Protection Agency's Environmental Monitoring & Assessment Program, designed to develop an index of biotic integrity for Wadeable streams. 10 of the 42 candidate metrics satisfied metric selection criteria, the odon. were rejected. Apparently so due to their variable and/or low values.
- (15000) CHOVANEC, A., C. FESL & H.P. KOLLAR, 2003. Notes on the dragonfly community of a temporary pond near Vienna, Austria (Odonata). *Opusc. zool. flumin.* 215: 1–9. — (First Author: Umweltbundesamt, Spittelauer Lände 5, A-1090 Wien).
The systematic investigations conducted (1998–2002) at a temporary pond 15 km S of Vienna (alt. 185 m, surface ca 1.5 ha, max. depth ca 1.0 m) indicate a relationship between the annual duration of water persistence and the total number of spp. They also suggest that a longer water persistence in late spring and early summer favours high abundances of the characteristic pond dwellers, *Lestes barbarus* and *L. dryas*, but a statistically significant correlation could not be ascertained.
- (15001) CLAUSNITZER, H.-J., 2003. Wie effektiv sind Naturschutzgebiete? Untersuchungen am Beispiel der Libellen (Odonata) im Landkreis Celle (Niedersachsen). *Braunschweig. naturk. Schr.* 6(4): 789–798. (With Engl. s.). — (Eichenstr. 11, D-29348 Eschede).
In the district of Celle (Lower Saxony), 53 spp. are autochthonous, incl. 28 spp. that are red-listed in Germany. Of the latter, 14 spp. mainly occur in the protected areas, 6 spp. are evenly distributed, and 6 spp. have their largest populations outside the reserves. The moorland spp. are well covered by nature reserves, but the situation of some other endangered spp. outside the reserves is less favourable. Annotated lists are provided, and the status of the respective taxa is documented.
- (15002) CRUMRINE, P.W. & P.H. CROWLEY, 2003. Partitioning components of risk reduction in a dragonfly-fish intraguild predation system. *Ecology* 84(6): 1588–1597. — (Dept Biol., Univ. Kentucky, Lexington, KY 40506-0225, USA).
Risk to prey imposed by intraguild predation (IGP) can be influenced by a number of factors, yet to date, few studies have measured the contributions of these factors to overall risk. A 3-species IGP system with *Anax junius* larvae as IG (top) predators, *Plathemis lydia* larvae as IG prey (intermediate predators), and fathead minnow hatchlings (*Pimephales promelas*) as shared prey was used to estimate the contribution of the following 3 factors to shared-prey mortality rate in combined predator treatments: (1) the trophic effect of the IG predator on IG prey density; (2) the effect of reduced shared prey consumption by the IG prey in the presence of the IG predator; and (3) the effect of alternative prey for the IG predator. These factors were integrated into a model of multiple predator effects. To quantify minnow mortality, *P. promelas* were exposed to *A. junius* only, *P. lydia* only, *A. junius* and *P. lydia*, or neither in a 2-by-2 factorial design. Additional treatments, in which one or both predators were unable to feed, were used to isolate behavioural (activity level) changes in dragonfly larvae. — When predators preyed in combination on *P. promelas* their impact was less than that of the summed effects of the 2 predators, each in the absence of the other — a result termed risk reduction. *A. junius* consumed a significant number of *P. lydia* when they were present (i.e., IGP), and behavioural interactions between *A. junius* and *P. lydia* were asymmetric. The presence of *A. junius* caused *P. lydia* to become less active, while the presence of *P. lydia* elicited a diet shift in *A. junius* to include some *P. lydia*. Interactions between predator spp., specifically

- IGP, influenced prey survival. Trophic and behavioural effects of IGP were similar in magnitude. These results highlight the importance of trophic and behavioural interactions in predator-prey systems and also suggest that effects of multiple predators may not be predictable based on the sum of individual effects. Determining the effects of multiple predators requires the identification of mechanisms that contribute to nonadditive prey responses.
- (15003) DE BOO, M., 2003. Slap ammoniakbeleid. — [Weak ammonia policy]. *NRC Handelsblad* 33(293): 45. (Dutch).
[Article in a leading Netherlands daily] The current Netherlands Government have the objective to relax the policies re the ammonia pollution by agriculture. This is to have a negative impact on biodiversity in ca 75% of the hitherto protected nature surface. *Leucorrhinia caudalis* is among the numerous plant and animal spp. that will be seriously affected.
- (15004) DE KNIJF, G., A. ANSELIN & P. GOFFART, 2003. Trends in dragonfly occurrence in Belgium (Odonata). *Proc. 13th int. Coll. EIS*, pp. 33-38. — (First Author: Kliniekstraat 25, B-1070 Brussels).
65,000 records of 69 spp., scattered more or less equally throughout Belgium were analysed, and trends in species occurrence were identified by comparing 3 periods: before 1950, 1950-1989, and 1990-2000. 4 spp. show a clear decline over the 3 periods, 8 spp. give evidence of a historical decline but survive on a limited number of sites, 8 spp. also display a historical decline but have been increasing during the last decade, 6 spp. show a (very) clear increase over the 3 periods, and 2 spp. have increased only during the last 10 yr.
- (15005) DE SILVA WIJEYERATNE, G., 2003. *Dragonflies of Sri Lanka*. Jetwing Research Initiative, Colombo. 8 pp. Brochure (14.7x20.7 cm). ISBN none. — (Jetwing House, 46/26 Navam Mowatha, Colombo-2, Sri Lanka).
An attractive brochure, with 88 col. field portraits of Sri Lankan spp., taxonomic and Engl. nomenclature, and a statement on the national status of each sp. The identifications were provided by M. Bedjanič and K. Coniff, most photographs were supplied by M. Bedjanič and the Author. Among these, *Aethriamanta brevipennis* is particularly notable. It has not been seen in Ceylon since 1832 — until a ♂ was photographed in the Dragonfly Sanctuary at Hunas Falls Hotel (Elkaduwa nr Kandy), in 2002. — This is a publication of the „Dragonfly Research Project“, sponsored by the Jetwing Research Initiative (Colombo), which organisation also set up 2 Dragonfly Sanctuaries, in the highlands and in the mid hills, respectively.
- (15006) DE VRIES, H., 2003. Libel met een eigen website: de groene glazenmaker. — *Aeshna viridis*, a dragonfly with its own website. *Vlinders* 18(3): 12-13. (Dutch, with Engl. s.). — (Author's address not stated).
General, on the current situation of *A. viridis* in the Netherlands, with emphasis on the management of its habitats and on the related *Stratiotes aloides* research. See www.groeneglazenmaker.nl
- (15007) DEUSSEN, M., H. VOIGT & J. ZINKE, 2003. Gomphidenfunde an der Elbe im Dresdner Stadtgebiet (Odonata). *Ent. Nachr. Ber.* 47(1): 51-52. — (First Author: Zur Wetterwarte 11, D-01109 Dresden).
A review of the 2002 records of *Gomphus vulgatissimus* and *Ophiogomphus cecilia* from the Dresden area, E Germany.
- (15008) EALES, H.T., 2003. An atlas of dragonflies of Northumberland and Durham [...]. Correction. *Vascularium* 88(2): 11-12. — (11 Ennerdale Tce, Low Westwood, Durham, NE17 7PN, UK).
The formatting errors afflicted the table in the paper listed in OA 14768; an improved version is here provided.
- (15009) ERJAVECIA. Bulletin of the Slovene Odonatological Society (ISSN 1408-8185), No. 16 (30 Oct. 2003). (Slovene). — (c/o M. Bedjanič, Fram 117/A, SI-2313 Fram).
In the feature article, by B. Kiauta (pp. 1-6), the life and work of the Carinthian (Austria) odonatologist, Dr R. Puschnig (1875-1962), are briefly outlined and his odonatol. bibliography is appended. A. Šalamun is reporting on the odonatol. work re the organisation of the Natura 2000 network in Slovenia (pp. 6-10). U. Ferletič is presenting a review of the results of the odonatol. youth workshop „Vilenica 2003“ (pp. 10-13), and of those of the international workshop, the „First Danube River Basin Ecological Youth Camp Mura 2003“ (pp. 13-17). M. Bedjanič is bringing on record the appearance of *Sympetrum depressiusculum* in the Slovenian part of Carinthia (pp. 18-19). The issue also includes 2 dragonfly texts from the Slovene literature (A. Polenec and I. Zorman), an announcement and the provisional program of the 16th Int. Symp. Odonatol. (Schwerin, Germany; 26 July-4 Aug. 2004), and additions to the Slovene odonatol. bibliography (Nos 497-526, by M. Bedjanič).
- (15010) FERNANDES, L.M., 2003. *Do hunting dragon-*

flies obey the rules? In Sympetrum sanguineum (Odonata: Libellulidae). Nuffield Science Bursary Report, CEH. Dorchester/UK. 12 pp. — (Bournemouth Sch., East Way, Bournemouth, BH8 9PY, UK).

In a heath land habitat in Dorchester, UK, the functional response of *S. sanguineum* to the abundance of prey was examined. There is no statistical association between the number of dragonflies and prey abundance. The observed mean flight duration was not sufficiently long to explain the constant flight rate of 0.73 flights per min. The lack of any variation in perching duration with prey abundance suggests the dragonfly's searching effort was not constant across varying abundance but increased as prey became scarcer. *S. sanguineum* tend to vary their 'looking' behaviour in relation to prey abundance, i.e. to look more often when prey is scarce. A possible reason for this is when there is less prey around, they will have to search more often to analyse each flying object that comes into their visual area. Whereas if prey is abundant, the dragonfly will not have to perform the act of „head cocking” to visually search and analyse for prey as often, to determine whether a particular prey is worth capturing.

- (15011) GAEDIKE, R., 2003. Bibliography of keys to European insects (1996-2000). *Nova Suppl. ent.* 16: 1-121. — (Dt. Ent. Inst., ZALF, Schicklerstr. 5, D-16225 Eberswalde).
6 odonatol. titles.

- (15012) GOGALA, A., 2003. *Kamen, voda, sonce in veter: narava Kraska in slovenske Istre.* — [Rock, water, sun and wind: the nature of Karst and the Slovene Istria]. Slovenian Mus. Nat. Hist., Ljubljana. 176 pp. Hardcover (24.5x29.5 cm). ISBN 961-6367-06-4. (Slovene). — (Publishers & Author: Slovenian Mus. Nat. Hist., Prešernova 20, P.O. Box 290, SI-1001 Ljubljana).
An impressive photographic presentation of the landscapes and flora and fauna of the classical karst of Slovenia. *Onychogomphus forcipatus* is (photographically) recorded from Pod Škocijanom, on the Reka R., Aug. 2002.

- (15013) GONSETH, Y. & C. MONNERAT, 2003. Recent changes in distribution of dragonflies in Switzerland. *Proc. 13th int. Coll. europ. Invert. Surv.*, Leiden, pp. 23-31. — (Centre Suisse Cartogr. Faune, Terreaux 14, CH-2000 Neuchâtel).
Based on the number of sites where a given sp. has been found in the periods 1970-1998 and 1999-2000, trends were calculated for each sp. The results show that since 1994 3 spp. have disappeared from Switzerland, 9 spp.

have declined, 2 spp. have increased, and 64 spp. have remained stable. *Crocothemis erythraea*, *Lestes virens*, *Nehalennia speciosa*, *Sympetrum depressiusculum* and *S. pedemontanum* are discussed as examples of the different trend categories. It is concluded that the conservation of threatened spp. should not only focus on their last remaining habitats, but also on increasing the number of favourable sites.

- (15014) HOSPERS, A., 2003. [Werkgroepen]. Libellen (Odonata: 1504). *NieuwsBr. europ. Invert. Surv. Nederland* 36: 6. (Dutch). — (Author's address not stated).
A short outline of the current odon. projects, conducted by, or in cooperation with the Europ. Invert. Surv. Netherlands.

- (15015) KAUPPINEN, J., 2003. Pirunpuntari. — [The dragonfly or „devil's balance"]. *Suomen Luonto* 62(7): 4-11 (Finn.). — (Vehnätie 23, FIN-04400 Järvenpää).
A general, cover article on the life and biology of dragonflies in the leading Finnish nature magazine. The article is furnished with several col. photographs. The full page cover photo of the issue depicts a dewy *Lestes sponsa* pair; the same photo is in S. Karjalainen's book (p. 69) on Finnish dragonflies (OA 14380).

- (15016) KAUPPINEN, J. & J. MAPPEL, 2003. Why are wasps so intimidating: field experiments on hunting dragonflies (Odonata: *Aeshna grandis*). *Anim. Behav.* 66(3): 505-511. — (Second Author: Dept Biol. & Envir. Sci., Univ. Jyväskylä, P.O. Box 35, FIN-40014 Univ. Jyväskylä).

It was investigated whether *A. grandis* avoids attacking *Vespula norvegica*, which is an unprofitable prey for most predators. As a control were used flies that were painted either black or with yellow and black stripes. The dragonflies showed greater aversion to wasps than to flies. Black-and-yellow-striped were avoided more than black ones, suggesting that aposomatic coloration on harmless fly provides a selective advantage against predation. There was no significant difference in reaction to black-painted and black-and-yellow wasps, indicating that, in addition to coloration, some other feature in wasps may deter predators. Consequently, in further experiments dragonflies were offered artificial prey items in which the candidate warning signals (coloration, odour, shape) were tested separately. No influence was found of wasp odour on dragonfly hunting, but they were slightly (not significantly) more reluctant to attack wasp-shaped prey items than fly-shaped ones. Apparently, the typical black-and-yellow stripes of wasps, possibly combined with their peculiar

- shape, make dragonflies avoid wasps. Since black-and-yellow stripes alone significantly decreased attack rate, it is concluded that even profitable prey spp. (i. e. Bathesian mimics) are able to exploit the dragonflies' avoidance of wasps.
- (15017) KETELAAR, R., 2003. *Recente rapporten over libellen in Nederland (1994-2001)*. — [Recent reports on the dragonflies in the Netherlands (1994-2001)]. Ketelaar, Wageningen. 14 pp. (Privately circulated; Dutch). — (De Vlinderstichting, P.O. Box 506, NL-6700 AM Wageningen).
A bibliography of 220 titles of obscurely published or solely privately circulated works.
- (15018) KETELAAR, R. & B. KRANENBARG, 2003. *Overzicht recente rapporten over libellen in Nederland (periode maart 2002-april 2003)*. — [A review of the recent reports on the dragonflies in the Netherlands (March 2002-April 2003)]. De Vlinderstichting, Wageningen. 6 pp. (Privately circulated; Dutch). — (De Vlinderstichting, P.O. Box 506, NL-6700 AM Wageningen).
A bibliography of 84 titles of obscurely published or solely privately circulated works.
- (15019) LIBELLENNACHRICHTEN. Mitteilungsblatt der Gesellschaft deutschsprachiger Odonatologen (GdO) (ISSN 1437-5621), No. 10 (15 Oct. 2003). — (c/o Ms T. Schrimpf, Heimbühlstr. 32, D-72768 Reutlingen).
12 pp., incl. a report on the 22nd GdO Annual Meeting (Dessau, 2003), with the 2002 GdO balance account, and a report on the 3rd WDA Int. Symp. in Australia (2003); the 4th Symp. is scheduled to take place in July 2005 in Spain (Org. Secr. Dr A. Cordero). Notes on dragonflies in the literature and figurative arts are continued.
- (15020) MALOLETKO, A.M., 2003. *Ozero Aya i ego okrestnosti (fiziko-geograficheskiy ocherk)*. — [Lake Aya and its environs (a physical and geographical sketch)]. Tomsk Univ., Tomsk. 104 pp. ISBN 5-7511-167-X. (Russ.). — (Author's address unknown).
The lake is situated 25 km E of Gorno-Altaysk, on the left bank of the Katuna R., Altay (Siberia, Russia). 9 odon. spp. are listed (pp. 41-42). The occurrence of *Anax parthenope* is considered of particular biogeographic interest.
- (15021) MANGER, R., 2003. *De libellenfauna in de Haulerpolder (Friesland) in 2003*. — [Dragonfly fauna of the Haulerpolder (Friesland) in 2003]. Manger, Assen. 4 pp. (Dutch). — (Stoepveldsingel 55, NL-9403 SM Assen).
A commented list of 14 spp.; the Netherlands.
- (15022) MANGER, R., 2003. *Libelleninventarisatie natuurontwikkelingsgebied Breevenen (Drenthe)*. — [Dragonfly inventarisatie in the nature development area Breevenen (Drenthe)]. Manger, Assen. 5 pp. (Dutch). — (Stoepveldsingel 55, NL-9403 SM Assen).
A commented list of 28 spp., sighted V/IX-2003 in Breevenen and in De Bulten, Drenthe, the Netherlands. Vernacular nomenclature.
- (15023) MASTRANTUONO, L., 2003. Biomonitoring in the lake littoral using invertebrate fauna associated with sandy sediments: a short synthesis. *Riv. Idrobiol.* 40(2/3) [2001]: 117-128. (With Ital. s.). — (Dept Anim. & Human Biol., Univ. Roma „La Sapienza”, Viale dell'Università 32, I-00185 Roma).
Platycnemis pennipes, *Ischnura elegans* and *Orthetrum* sp. are checklist from 5 volcanic lakes in the Latio region, central Italy.
- (15024) MOLLER PILLOT, H., 2003. *Hoe waterdieren zich handhaven in een dynamische wereld: 10 jaar onderzoek in de Roodloop, een bovenloopje van de Reusel in Noord-Brabant*. — *The survival of aquatic animals in a dynamic world: a 10-year study of the Roodloop, a small tributary of the Reusel in the Dutch province of Noord-Brabant*. Noordbrabants Landschap, Haaren. 184 pp. Softcover (22.0x30.0 cm). ISBN 90-801226-4-5. (Dutch, with Engl. s.). — (Publishers: P.O. Box 80, NL-5076 ZH Haren).
Includes circumstantial evidence on 9 odon. spp.; — the Netherlands.
- (15025) NIESEN, H., 2003. Nieuwe libellen in de duinen. — [New dragonflies in the dunes]. *Duin & Dijk* 2(3): 8-11. (Dutch). — (Stierop 12, NL-1862 JL Bergen).
In the recent decades, 11 spp. have appeared or increased their populations in the dunes of Noord Holland prov., the Netherlands. Their local occurrence and status are stated.
- (15026) NIJBOER, R.C., M.W. VAN DEN HOORN & P.F.M. VERDONSCHOT, 2003. *Verkenning van de waarde van historische gegevens voor het invullen van biologische referentietoestanden voor beken en sloten*. — [Inquire into the importance of historical data for biological reference condition assignment of brooks and ditches]. Alterra-Rapport 755: 1-112. (Dutch). — (c/o Alterra Res. Inst., P.O. Box 47, NL-6700 AA Wageningen).
Among the examples, historical occurrence in various Netherlands provinces or regions is presented of *Calopteryx virgo*, *Sympecma fusca*, *S. paedisca*, *Ceriatrigon*

tenellum, *Ischnura pumilio*, *Nehalennia speciosa*, *Aeshna isosceles*, *A. juncea*, *A. subarctica*, *Brachytron pratense*, *Gomphus flavipes*, *G. pulchellus*, *Cordulia aenea*, *Soma-tochlora metallica*, *Libellula fulva* and *Orthetrum brun-neum* (all in brooks), and that of *Coenagrion hastulatum*, *Onychogomphus forcipatus* and *Crocothemis erythraea* (all in ditches). The restrictions conditioned by the techni-cal nature of historical data are emphasized, the applica-tion of those related to the rare spp. only is recommended, and the process to be followed is outlined.

- (15027) NIJBOER, R.C., P.F.M. VERDONSCHOT & M.W. VAN DEN HOORN, 2003. Macrofauna en vegetatie van de Nederlandse sloten: een aanzet tot beoordeling van de ecologische toestand. — [Macrofauna and vegetation of the Netherlands ditches: an instigation for the assessment of the ecological condition]. *Alterra-Rapport* 688: 1-255. (Dutch). — (c/o Alterra Res. Inst., P.O. Box 47, NL-6700 AA Wageningen).
The set-up and the results of a ditch ecology and typology network are described. The macrofauna analysis has led in combination with environment variables to a network of 13 ditch types in the Netherlands. The information on various odon. spp. is presented, where appropriate.
- (15028) PIETSCH, T., 2003. Nachweis der Grünen Flussjungfer, Keiljungfer (*Ophiogomphus cecilia* Fourcroy, 1785) im südlichen Sachsen-Anhalt im NSG „Forst Bibra“ (Burgenlandkreis). *Ent. Mitt. Sachsen-Anhalt* 11(1): 3-6. — (Friedrich-List-Str. 25, D-06110 Halle/Saale).
1 spec. (sex not stated), Forst Bibra, Burgenland distr., Sachsen-Anhalt (E Germany), 3-VII-2002. The locality is described.
- (15029) POBOLŠAJ, K., J. FRANCE & T. ČELHAR, 2003. Rastline in živali v kalu. — [Plant and animal life in karst ponds]. In: T. Trampuš & T. Babič, [Eds], *Obravljamo kale*, pp. 7-11, ZRSVN, Piran. (Slovene). — (First Author: CKFF, Zemljemerska 10, SI-1000 Ljubljana).
Coenagrion puella, *Aeshna cyanea* and *Anax imperator* are among the most common karst pond odon. spp. in Slovenia.
- (15030) POULTON, B.C., M.L. WILDHABER, C.S. CHARBONNEAU, J.F. FAIRCHILD, B.G. MUELLER & C.J. SCHMITT, 2003. A longitudinal assessment of the aquatic macroinvertebrate community in the channelized lower Mississippi River. *Envir. Monit. Assessment* 85: 23-53. — (First Author: US Geol. Surv., Columbia Envir. Res. Cent., Columbia, MO, USA).
Longitudinal site differences that are potentially associated with water quality related factors originating from the Kansas city metropolitan area were examined. In the assessment, statistical analyses of individual metrics and multimetric scores were used to identify community response patterns and to evaluate relative biological conditions. Along with the Ephemeroptera, Plecoptera and Trichoptera, Odon. (8 unnamed spp.) are considered the sensitive insect orders. Of interest is a comparison of the efficiency of the odon. sample collecting by various methods, viz. rock basket (5 spp.), kicknet (5 spp.) and the petite Phonar (2 spp.).
- (15031) RETTIG, K., 2003. Eine Gebänderte Prachtlibelle bei Emden. *Beitr. Vögel-Insektenwelt Ostfrieslands* 199: 13. — (Danziger Str. 11, D-26725 Emden).
Calopteryx splendens, 1 ♂: Larreter Tief nr Emden, 7-VI-2003. This is the first record for Ostfriesland, Germany. — An anonymous note on this observation has appeared also in the local daily, *Ostfriesen Ztg.*, issue of 10 June, p. 14.
- (15032) ROTHFELS, C., 2003. Royal Botanical Gardens odonate count 2003. *Ontario Insects* 9(1): 11-13. — (Author's address not stated).
A list of 28 spp. (556 individuals), sighted on 25-VII-2003; — Ontario, Canada.
- (15033) RÜPPELL, G., 2003. Wie die Tiere fliegen lernten; die Eroberung des Luftraumes. *Biol. unserer Zeit* 33(4): 231-243. — (Zool. Inst., Techn. Univ. Braunschweig, Fasanenstr. 3, D-38092 Braunschweig).
General, on the origins of animal flight, with references to, and figs of odon. Author's brief biography and a portrait are added.
- (15034) SAMWAYS, M.J., 2003. Marginality and national red-listing of species. *Biodiv. Conserv.* 12(12): 2523-2525. — (Dept Conserv. Ecol. & Ent., Fac. Agric. Univ. Stellenbosch, Private Bag X1, Matieland-7602, SA).
The marginality is defined as the state of populations at a specific location and time when environmental and landscape factors decrease the probability of population survival and persistence. S Africa has the highest proportion of globally red-listed odon. spp., but most of those that are only nationally red-listed are marginal, with some even recently nationally extinct. The nationally extinct spp. may be lost only temporarily and may return at some time in the future. This has important implications of practical red-listing, since rarity rather than threat is here concerned. The various aspects of this problem are briefly outlined

and discussed.

- (15035) SANTOVAC, S., M. JOVIĆ & L. ANDJUS, 2003. Da li je vrsta *Sympetrum depressiusculum* (Sélys, 1841) nova za faunu Odonata Srbije? – [Is *Sympetrum depressiusculum* (Sélys, 1841) new for the fauna of Serbia?] *Zborn. Plen. Ref. Rezim. Simp Ent. Srb., Ivanjica*, p. 25. [Abstract only]. (Serb.). – (First Author: Nat. Mus., Subotičeva 1, YU-23000 Zrenjanin, Serbia; – other Authors: Nat. Hist. Mus., Njegoševa 1, P.O. Box 401, YU-11000 Belgrade, Serbia).
2 recent records are listed (Vlasinsko Lake, 1990; Ludaš, 2002), and the attention is drawn to the historical record from Deliblatska peščara, by J. Frivaldszky (1877, *Mat. Természettud. Közl.* 13: 285-378), which publication escaped the notice of most workers. The census of the odon. fauna of Serbia stands at present at 61 spp.
- (15036) SCHLUPMANN, M., 2003. Zur Verbreitung, Phönologie, Ökologie und Einnischung des Plattbauches (*Libellula depressa* Linnaeus, 1758), des Vierflecks (*L. quadrimaculata* Linnaeus, 1758) und des Blaupfeils (*Orthetrum cancellatum* Linnaeus, 1758) im Raum Hagen (Insecta: Odonata: Libellulidae). *Dormund. Beitr. Landesk.* (Naturw.) 36/37: 113-162. (With Engl.s.). – (Hirseier Weg 18, D-58119 Hagen).
A detailed account on the distribution, phenology, ecology and habitat choice of the 3 spp. in the Hagen area, W Germany.
- (15037) SCHMIDT, E.G., 2003. Die Torf-Mosaikjungfer *Aeshna juncea* (L., 1758) (Odonata, Aeshnidae) an Tontümpeln und Gartenteichen im West-Münsterland und in Essen, ein ökologischer Rätsel. *Verh. westdt. EntTag.* 2001: 75-80. – (Coesfelder Str. 230, D-48249 Dülmen).
Clay- and garden ponds in West-Münsterland and in the Essen area (W Germany) are described as the unusual habitat and (in one case a documented) breeding site of *A. juncea*.
- (15038) SELLERS, C., 2003. Dragonflies and other insects of the Rouge Valley. *Ontario Insects* 9(1): 4. – (Author's address not stated).
A list of 7 odon. spp., sighted on 7-VI-2003; – Ontario, Canada.
- (15039) SUKHACHEVA, G.A., N.A. KRYUKOVA & V.V. GLUPOV, 2003. O roli morfolometricheskikh i bihimicheskikh kriteriev pri identifikacii vidov (na primere lichinok strekoz roda *Aeshna*). – On the role of morphological and biochemical criteria in species identification: an example of larval dragonflies of the genus *Aeshna*. *Izv. Akad. Nauk* (Biol.) 2003(1): 74-80. (Russ., with Engl. s.). – (Inst. Anim. Syst. & Ecol., Siber. Br. Russ. Acad. Sci., ul. Frunze 11, RUS-630081 Novosibirsk).
Distinct morphometric characters can be found only in late-instar larvae. The presence of species-specific proteins in the homogenates of thoracic muscles provides the possibility of electrophoretic identification at the sp. level. The method and the results are described in detail. The infestation by parasites has no effect on the biochemical parameters studied. Species identification of the early-instar odon. larvae is still problematical.
- (15040) SWITZER, P.V. & P.K. EASON, 2003. Space use in territorial amberwing dragonflies: are residents female maximizers or neighbor minimizers? *Behav. Ecol. Sociobiol.* 54(4): 321-328. – (First Author: Dept Biol. Sci., Eastern Illinois Univ., Charleston, IL 61930, USA).
The patterns of intrusions and space use in territorial ♂ *Perithemis tenera* were investigated to test the idea that residents will adjust their use of space to maximize their beneficial interactions with conspecifics while minimizing their costly interactions with conspecifics. Because territories were arranged linearly around the edge of a pond, each resident had 2 neighbours, one of which was often closer to the focal resident than the other. Residents experienced more intrusions by neighbours and fewer intrusions by ♀♀ on the side of their closer neighbour. Residents generally perched on the side of their territory that experienced the fewest intrusions by neighbours and the most intrusions by ♀♀, but the pattern was more strongly related to neighbour intrusions than ♀ intrusions. Subsequent to pursuits of neighbours and ♀♀, residents tended to shift their perches away from where they pursued neighbours but toward where they pursued ♀♀. Nonneighbour intrusions were not affected by neighbour proximity, nor did residents adjust their space use in response to nonneighbour intrusions. These results suggest that residents do adjust their space use in response to intrusions by conspecifics, that their adjustment depends on the type of conspecific that intruded, and that residents may be using a simple decision rule such as „move away from ♂ intrusions, move closer to ♀ intrusions” to adjust their within-territory space use.
- (15041) TERZANI, F. & A. MARCONI, 2003. Descrizione della femmina di *Agriocnemis angustirami* Pinhey, 1974 e qualche osservazione sul maschio. (Insecta, Odonata, Coenagrionidae). *Quad. Studi Notizie Stor. nat. Romagna* 17(Suppl.): 1-4. (With Engl. s.). – (Mus. Zool.

„La Specola”, via Romana 17, I-50125 Firenze).

A ♀ (Sierra Leone; in copula) is described and illustrated for the first time. Some descriptive notes on, and figs of the ♂ are also provided.

which can be described as a fast-to-slow-water habitat gradient. *Enallagma* spp. were generally related-to-wetland dominated, depositional sites.

- (15042) THIPAKSORN, A., W. JAMNONGLUK & P. KITTAYAPONG, 2003. Molecular evidence of *Wolbachia* infection in natural populations of tropical odonates. *Curr. Microbiol.* 47: 314-318. — (First & Third Author: Dept Biol., Fac. Sci., Mahidol Univ., Rama 6 Rd, Bangkok-10400, Thailand).

Wolbachia comprise a group of endosymbiotic α -proteobacteria, causing various reproductive alterations in their arthropod hosts, such as the induction of parthenogenesis and feminization. Using the Long (P)olymerase (C)hain (R)eaction, 33 Thai rice field odon. spp. were examined. *Wolbachia* was found in *Agricoides f. femina*, *Pseudagrion pruinosum*, *Brachythemis contaminata*, and *Neurothemis t. tullia*. The *Wolbachia* strains of all of these are referable to the B-group. Based on *wsp* (protein-coding gene) nucleotide sequence data, the relationships of the strains are identified. The infection frequencies in several *A. femina* populations suggest that the replacement of uninfected populations by *Wolbachia*-infected ones has occurred only recently in this sp. — See also OA 14818.

- (15044) WILLIAMSONIA. Newsletter of the Michigan Odonata Survey. (ISSN none), Vol. 7, No. 3/4 (Oct. 2003). — (c/o Dr M.F. O'Brien, Insect Div., Mus. Zool., Univ. Michigan, Ann Arbor, MI 48109-1079, USA). *O'Brien, M.*: Editor's musings (pp. 1-2); — *Chartier, A.*: *Williamsonia lintneri* found in the Upper Peninsula (pp. 2-3); — *Mead, K.*: 2003 Great Lakes Odonata Meeting (pp. 3-6; with species lists); — *Craves, J. & D. O'Brien*: Update on two 2002 state records (pp. 6-7; *Ischnura hastata*, *Dromogomphus spoliatus*); — *Raney, H.*: Late season musings (p. 7); — *O'Brien, M.*: Sharon Miss odes (pp. 7-8; Washtenau Co.); — New books (p. 8).

- (15045) ZAWAL, A., 2003. Ważki (Odonata) dwóch niewielkich zbiorników wodnych z terenu Szczecińskiego Parku Krajobrazowego „Puszcza Bukowna”. — *Dragonflies (Odonata) of two small water bodies from Szczecin Landscape Park „Puszcza Bukowa”*. *Park narod. Rezerw. Przyr.* 22(3): 441-448. (Polish, with Engl. s.). — (Inst. Invert. Zool. & Limnol., Univ. Szczecin, ul. Waska 13, PO-71-415 Szczecin). 28 spp. were collected during 1999-2000. Most of these are eurytopic. At the dystrophic Lake Weglinek, *Erythromma viridulum* was encountered, which is a typical warm water sp.

- (15043) WEIGEL, B.M., L. WANG, P.W. RASMUSSEN, J.T. BUTCHER, P.M. STEWART, T.F. SIMON & M.J. WILEY, 2003. Relative influence of variables at multiple spatial scales on stream macroinvertebrates in the Northern Lakes and Forest ecoregion, USA. *Freshw. Biol.* 48: 1440-1461. — (First Author: Wisconsin Dept Nat. Resour., Bureau Integrated Sci. Serv., 1350 Fernside Dr., Monona, WI 53716, USA).

94 sites in Minnesota, Wisconsin and Michigan were used to identify environmental variables at the catchment, reach and riparian scales that influence stream macroinvertebrates. Redundancy analyses found significantly influential variables within each scale and compared their relative importance in structuring macroinvertebrate assemblages. *Calopteryx* sp. appeared in >50% of the sites. As to the relative abundance data set, *Ophiogomphus* sp. was associated positively with dissolved oxygen, width/depth and number of instream logs. In the presence/absence data set, *Enallagma* spp. were associated with % macrophyte, mean distance between riffles, mean depth and turbidity, while *Ophiogomphus* sp. was associated with width/depth, % erosion, mean depth and % macrophytes. As to the catchment environmental effect, the forest-to-wetland gradient appeared to largely define macroinvertebrates along an erosional-to-depositional habitat continuum,

- (15046) ZAWAL, A. & D. JANICKI, 2003. Pasożytywanie larw wodopójek z rodzaju *Arrenurus* na imagines ważek pochodzących z okolic Barlinka. — [Larval *Arrenurus* watermites as parasites of adult dragonflies in the environs of Barlinek]. *In: Zoologia na progu XXI wieku*, pp. 257-258, Pol. Tow. Zool. & Uniw. M. Kopernika, Toru. (Pol.). — (First Author: Inst. Invert. Zool. & Limnol., Univ. Szczecin, ul. Waska 13, PO-71-415 Szczecin). 557 odon. specimens of 25 spp. were examined, and 2218 mite larvae were counted. The infestation was the heaviest in *Enallagma cyathigerum* (56.5% individuals infested), *Coenagrion puella* (53.6%), *Ischnura elegans* (46.9%) and *Coenagrion pulchellum* (41.9%), but only 2 anisopt. spp. carried the parasites, viz. *Cordulia aenea* (14.4%) and *Sympetrum sanguineum* (4.0%). Usually, ♀♀ were more heavily infested than the ♂♂. As to the parasite location: 1374 were located on thorax, 371 on abd. segm. 1, 200 on abd. segm. 2, and 63 on abd. segm. 3. The infestation was most intense in May and June.

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- (15047) **ARGIA**. The news journal of the Dragonfly Society of the Americas (ISSN 1061-8503), Vol. 15, No. 4 (25 Jan. 2004). — (c/o Dr & Mrs T.W. Donnelly, 2091 Partridge Lane, Binghamton, NY 13903, USA). [Scientific articles]: *Beckemeyer, R.*: Aerobatic Anisoptera & zooming Zygoptera: Odonata flight from A to Z (pp. 6-8); — *Hämäläinen, M.*: The 150 year anniversary of Selys' Synopsis des caloptérygines (pp. 8-11); — *Donnelly, N.*: *Erythemis simplicicollis* and collocata: subspecies? (pp. 11-13); — *Tennessee, K.*: *Enallagma exulans* gleaned at the water surface (p. 13); — *Proctor, N.S.*: Color of emergent Elfin skimmers, *Nannothemis bella* (p. 13); — *Wilson, H.*: Perching orientation of Seaside dragonflies (*Erythrodiplax berenice*) in a Maine salt marsh (p. 14); — *Brown, G.*: Rhode Island Odonata Atlas season summary, 2003 (pp. 14-16); — *Barlow, A.E.*: Third report of the New Jersey Odonata Survey (pp. 16-21); — Adverse weather and its impact on Odonata flights seasons: new record late dates from New Jersey (pp. 21-22); — *Moskowitz, D.P.*: A new late flight date for *Lestes* congener in North America (pp. 22-23); — *Johnson, A.*: Iowa 2003 records (p. 23); — *Mauffray, B.*: Georgia 2003 summary (p. 23); — Louisiana 2003 summary (p. 23); — *Bocanegra, O.R.*: First record of *Tetragoneuria spinosa* for Texas (pp. 23-24); — *SaintOurs, F.*: Notes on *Somatochlora linearis* in southeastern Massachusetts (pp. 24-25); — *McShaffrey, D.*: Swarming dragonflies in Florida (pp. 25-26); — *White, H. & N. Donnelly*: George Beatty passes away (p. 26); — *Book notices* (pp. 28-29).
- (15048) **BULLETIN OF AMERICAN ODONATOLOGY** (ISSN 1061-3781), Vol. 7, No. 4 (25 Jan. 2004). — (c/o Dr & Mrs T.W. Donnelly, 2091 Partridge Lane, Binghamton, NY 13903, USA). *Donnelly, T.W.*: Distribution of North American Odonata, 1: Aeshnidae, Petaluridae, Gomphidae, Cordulegastridae) (pp. 61-90; Dot-map presentation, with additional comments, incl. sssp. information for several spp., etc.).
- (15049) **MANGER, R.**, 2004. Libellen op drift. — [Dragonflies adrift]. *Tussen Duin en Dijk* 3(1): 20-21. (Dutch). — (Stoepveldsingel 55, NL-9403 SM Assen). A preliminary account on the odon. occurrence in the Netherlands in the unusually hot summer 2003. For the first time were recorded from the country *Coenagrion scitulum* and *Trithemis annulata*. *Ischnura pumilio* has appeared for the first time on the island of Terschelling. *Sympetrum fonscolombii* dwelled "everywhere", and *Anaciaeschna isosceles* was clearly expanding. On the other hand, *Lestes barbarus* and *Coenagrion lunulatum* were on decline.
- (15050) **MITRA, T.R.**, 2004. A checklist of the Odonata of Sikkim, with some new records. *Opusc. zool. flumin.* 216: 1-8. — (208/K/8 Raja Ram Mohan Roy Rd, Netaji Sarak, Calcutta-700008, India). 74 spp. and sssp. known to occur in the Himalayan state of Sikkim (India) are listed. The locality dates are provided for 20 spp. that are new to the state. A complete regional bibliography is appended.
- (15051) **WILLIAMSONIA**. Newsletter of the Michigan Odonata Survey. (ISSN none), Vol. 8, No. 1 (Jan. 2004). — (c/o Dr M.F. O'Brien, Insect Div., Mus. Zool., Univ. Michigan, Ann Arbor, MI 48109-1079, USA). *O'Brien, M.*: What's in a name: when is an Aeshna not an Aeshna? (pp. 1-2); — *Ross, S.*: Odes in Suriname (pp. 1, 3); — *Craves, J.*: [book review] A field guide to the dragonflies and damselflies of Massachusetts, by B. Nikula et al. (pp. 2-4); — *O'Brien, M.*: [book review] Dragonflies of the North Woods, by K. Mead (pp. 3-4); — *Recent literature* (p. 5); — *Odonata resources on the Internet* (p. 6).