ODONATOLOGICAL ABSTRACTS

1993

(13030) LUTZ, H., 1993. The Middle-Eocene "Fossillagerstätte Eckfelder Maar" (Eifel, Germany). *Kaupia* 2: 21-25. (With Germ. s.). – (Naturhist. Mus. Mainz, Reichklarastr. 10, D-55116 Mainz).
The "Eckfelder Maar" nr Manderscheid, Eifel, is one of the most important fossillagerstattes of the European Middle Eocene. So far ca 20.000 fossils were collected from bituminous laminites and turbidites, but the odon. are scarce. A general outline of the inventory is here presented.

1994

(13031) GEENE, R., 1994. Notes on dragonflies in Egypt, spring 1990. *In*: P.L. Meininger & G.A.M. Atta, [Eds], Ornithological studies in Egyptian wetlands, 1989/90, pp. 391-395, Found. Ornithol. Res. Egypt (FORE), Vlissingen. [FORE-Rep. 94-01]. – (Publishers: Lisztlaan 5, NL-4384 KM Vlissingen).
Records for 19 spp., with field notes.

(13032) MURPHY, D.H., 1994. Risiophlebia dohrni (Libellulidae, Odonata). *In*: P.K.L. Ng & Y.C. Wee, [Eds], The Singapore red data book: threatened plants and animals of Singapore, p. 107, Nature Soc., Singapore, ISBN 981-00-3475-X. – (Dept Biol. Sci., Natn Univ. Singapore, Kent Ridge, Singapore-119260).
Habitat and ecology, distribution, threats, scientific interest and potential value are outlined. The sp. is considered "Endangered", and habitat protection is required.

(13033) VAN HALM, H., 1994. Nieuwe plekken voor libellen? – [New sites for dragonflies?]. *Trouw*, issue of 23 Apr., p. 6. (Dutch). – (Author's address unknown).
A slightly modified text of the paper listed in *OA* 9922, published in a Netherlands national daily.

1995

(13034) VIZSLÁN, T., L. VIZSLÁN, B. PINGITZER & K. KATRICS, 1995. Adatok Magyarország szitakötö-faunájához (Odonata), 1 – Data to the Odonata fauna of Hungary, 1. *Folia hist. nat. Mus. matraensis* 20: 85-89. (Hung., with Engl. s.). – (First Author: Madarász ut. 12, HU-3525 Miskolc).
The 1994 records for 36 spp., from various localities in Hungary. – For pts 2 & 3 see *OA* 13044, 13155.

1996

(13035) LUTZ, H., 1996. Die fossile Insektenfauna von Rott: Zusammensetzung und Bedeutung für die Rekonstruktion des ehemaligen Lebensraums. *In*: W. von Koenigswald, [Ed.], Fossillagerstätte Rott bei Hennef im Siebengebirge [2nd enlarged edn], pp. 41-56, Rheinlandia, Siegburg. – (Naturhist. Mus. Mainz, Reichklarastr. 10, D-55116 Mainz).
The history of investigations of the Upper Oligocene insect fauna of Rott is outlined, and the thanatocoenosis is described, in which the odon. (mostly larvae) represent 11.37% of the assemblage so far recovered.

(13036) SMILJKOV, S., 1996. Dominantna bentalna invertebratna fauna vo akumulacijta Matka – The dominant benthal invertebrate fauna of the Matka Accumulation. *Godišen Zb. Biol., Skopje* 49: 95-105. (Maced., with Engl. s.). – (Inst. Biol., Fac. Nat. Sci. & Math., P.O. Box 162, MK-91001 Skopje).
Gomphus vulgatissimus is listed from Matka,

Macedonia.

(13037) ZESSIN, W., 1996. Die älteste Libelle der Welt: Zessinella siope Brauckmann, 1988. *FamilienBr. int. Ver. Erforsch. Zessin-FamGesch.* 4: 41-43, fig. on cover p. 4 excl. – (Lange Str. 9, D-19230 Jasnitz).
A narrative on the discovery of the new sp., as described in the paper listed in *OA* 6579, with autobiographic notes and an artistic reconstruction of the sp. in its habitat. Recently, additional specimens were recovered.

1997

(13038) GESKE, C., E. ENGEL & H. PLACHTER, 1997. *Typologisierung und Bewertung kleiner Fliessgewässer: ein Methodenvergleich.* Hess. Landesanst. f. Umwelt, Wiesbaden. 133 pp. + 23 pp. appendix. ISBN 3-89026-261-9. – (Publishers: Rheingaustr. 186, D-65203 Wiesbaden).
The odon. are briefly considered under the heading, "Zooecological assessment of running water" (pp. 11-14).

(13039) HAWKING, J.H. & F.J. SMITH, 1997. *Colour guide to invertebrates of Australian inland waters.* Co-operative Res. Cent. Freshw. Ecol., Albury [Ident. Guide No. 8]. 213 pp. ISBN 1-876144-09-2. – Price: AU$ 50.- net. – (Orders to: Murray Darling Freshw. Res. Cent., P.O. Box 921, Albury, NSW 2640, AU).
Includes brief descriptions and col. phot. of larvae of 20 odon. spp. – For a pocket-size book the price is rather high.

(13040) LUTZ, H., 1997. Taphozönosen terrestrischer Insekten in aquatischen Sedimenten: ein Beitrag zur Rekonstruktion des Paläoenvironments. *Neues Jb. Geol. Paläont. Abh.* 203(2): 173-210. (With Engl. s.). – (Naturhist. Mus. Mainz, Reichklarastr. 10, D-55116 Mainz).
Both selectivity during post-mortem surface drifting and the effects of water density decide on the composition of fossil insect assemblages (incl. odon.) from aquatic lagerstattes. For horizons of similar age at the same locality it is possible to differentiate between nearshore and offshore sites. In addition, one can determine for each lagerstatte the average "salinity", i.e. the electrolyte concentration, and the salinity during deposition of different facies. This allows for the recognition of ancient normal (non-saline) lakes on the one hand and meromictic (salinity stratified) lakes on the other. The latter may be distinguished from brackish-marine environments either by their usually smaller area, or their overall structure.

(13041) MURPHY, D.H., 1997. Odonata biodiversity in the nature reserves of Singapore. *Gardens' Bull. Singapore* 49: 333-352, col. pls 1-3 incl. – (Dept Biol. Sci., Natn Univ. Singapore, Kent Ridge, Singapore-119260).
The history of odonatol. research in Singapore is traced from 1854 (A.R. Wallace) and a commented list of 79 spp. recorded within the nature reserves, incl. the endemic Drepanosticta quadrata, is given. 8 spp. are known from Nee Soon Swamp Forest only.

(13042) SIEBENEICHER, H.-W., 1997. *Labor- und Freilanduntersuchungen zur Biologie von Libellula fulva (Odonata: Libellulidae).* DiplArb. FB Biol., Heinrich-Heine-Univ., Düsseldorf. 62 pp. – (c/o Dr W. Piper, Kollenhof 31, D-22527 Hamburg).
In central Europe the sp. has a patchy distribution and it is characterised by a locally synchronous emergence. In the Lower Rhine region it is on the wings from mid May to Mid July. It is a non-territorial percher, not confined to the emergence site. Copulation commences in the air and it is completed on the ground, lasting up to 35 min or longer, whereby it differs sharply from L. depressa and L. quadrimaculata. The unguarded oviposition takes place in shady sections along the bank immediately upon copulation: 10-15 eggs are released free into the water at each stroke. Functional morphology of the genitalia is described, illustrated and discussed.

(13043) SKALE, A. & A. WEIGEL, 1997. Zur Insektenfauna (Coleoptera, Lepidoptera, Saltatoria, Odonata, Trichoptera et Heteroptera) des NSG "Tannbach-Klingefelsen" (Saale-Orla-Kreis, Thüringen). *Thür. faun. Abh.* 4: 139-172. (With Engl. s.). – (First Author: Blücher-Str. 38, D-95030 Hof).
A commented list of 11 odon. spp.; Saale-Orla distr., Thuringia, Germany.

(13044) VIZSLÁN, T. & B. PINGITZER, 1997. Adatok Magyarország szitakötö-faunájához (Odonata), 2 – Contribution to the knowledge of the dragonfly fauna of Hungary, [2]. *Folia hist. nat. Mus. matraensis* 22: 99-108. (Hung., with Engl. s.). – (First Author: Madarász ut. 12, HU-3525 Miskolc).

The 1995-1997 records for 43 spp., from 94 localities in Hungary. – For pts 1 & 3 see *OA* 13034, 13155.

1998

(13045) CZECH, T., U. IRMLER, C. KASSEBEER & V. PICHINOT, 1998. Libellen (Odonata),Heuschrecken (Saltatoria), Schnabelkerfen (Rhynchota) und Schmetterlinge (Lepidoptera). *In*: U. Irmler et al., [Eds], Das Dosenmoor: Ökologie eines regenerierenden Hochmoores, pp. 210-223, Faun.-ökol. ArbGem., Kiel, ISBN 3-00-003517-6. – (Available from: Faun.-ökol. Arbeitsgemeinschaft, Biologiezentrum Univ. Kiel, Olshausenstr. 40, D-24098 Kiel).
15 odon. spp. are listed and the fauna of the peat bog is briefly discussed; – Schleswig-Holstein, Germany.

(13046) HARDERSEN, S. & S.D. WRATTEN, 1998. The effects of carbaryl exposure of the penultimate larval instars of Xanthocnemis zealandica on emergence and fluctuating asymmetry. *Ecotoxicology* 7(5): 297-304. – (Ecol. & Ent. Group, Div. Plant Soil & Ecol. Sci., Lincoln Univ., P.O. Box 84, Canterbury, NZ).
In a laboratory experiment larvae were exposed to 3 concentrations of carbaryl (100 ppb, 10 ppb, 1 ppb) plus controls until the adult damselflies emerged. Carbaryl at 100 ppb reduced emergence by more than 90%. The lower carbaryl concentrations did not affect emergence success but increased the developmental speed slightly. The adult damselflies from the highest concentration which did not affect emergence success (10 ppb) were analyzed for their level of fluctuating asymmetry (FA) and deviation from bilateral symmetry, and compared with those from controls. The level of FA in cell patterns in wings was increased whereas the level of FA for wing length did not show any differences.

(13047) HOLUSA, O., 1998. K výskytu vážky Leucorrhinia pectoralis (Charpentier, 1825) (Odonata: Libellulidae) v České a Slovenské republice – On the occurrence of dragonfly Leucorrhinia pectoralis (Charpentier, 1825) (Odonata: Libellulidae) in the Czech and Slovac Republics. *Sb. přír. Klubu Uh. Hradišti* 3: 45-53. (Czech, with Engl. s.). – (Bruzovská 420, CZ-73801 Frýdek-Mistek).
The sp. is known from 12 localities, mostly in the hills. All records are listed, the distribution is mapped, and habitat selection in the region is outlined and discussed.

(13048) HOLUŠA, O. & P. JEZIORSKI, 1998. Faunistické správy zo Slovenska – Faunistic records from the Slovak Republic: Odonata, Corduliidae. *Entomofauna carpathica* 10: 126. (bilingual: Czech & Engl.). – (First Author: Bruzovská 420, CZ-73801 Frýdek-Mistek).
Somatochlora alpestris is recorded from Suchá Hora, and the bibliography on its occurrence in Slovakia is presented.

(13049) LUTZ, H., 1998. Die unteroligozäne Insekten-Taphozönose von Sieblos/Rhön: ein Schlüssel für die Rekonstruktion des aquatischen Paläoenvironments. *Geol. Abh. Hessen* 104: 101--114. (With Engl. s.). – (Naturhist. Mus. Mainz, Reichklarastr. 10, D-55116 Mainz).
This is an up-to-date summary of the insect taphocoenosis from Sieblos. The specimens belong to 2 different facies types, viz. dysodils (no Odon.) and laminated carbonates (57.14% specimens referable to Odon.). On the basis of taphonomical information, a dynamic model is given for the Sieblos lake that takes into account hydrological and palaeoclimatic changes during the sedimentation of the fossil-bearing facies.

(13050) O'BRIEN, M.F. & P.D. PRATT, 1998. Enallagma anna, a damselfly new to the Great Lakes region (Odonata: Coenagrionidae). *Great Lakes Ent.* 31(3/4): 211-213. – (First Author: Insect Div., Mus. Zool., Univ. Michigan, Ann Arbor, MI 48109-1079, USA).
This, a predominantly western North America sp., is recorded from SW Michigan (USA) and SW Ontario (Canada) for the first time.

(13051) PRATT, P.D. & P.M. CATLING, 1998. Distribution of Hetaerina titia (Odonata: Calopterygidae) in the eastern Great Lakes region. *Great Lakes Ent.* 31(3/4): 205-208. – (First Author: 7100 Matchelle Rd, LaSalle, ON, N9J 2S3, CA).
The Lower Thames and Sydenham Rivers in SW Ontario, Canada have well established populations of this sp. that represent its northern range limit. Although first discovered in 1985, these populations are not necessarily recently established. Adults appear from mid-Aug. to early Sept. and are most often seen around trees and shrubs overhanging moving water.

– (*Abstractor's Note*: For cytotaxonomic examination the sp. was collected on the Thames at London, Ontario, in Aug. 1978 by Dr B. & Mrs M. Kiauta).

(13052) RUDOLPH, R., 1998. Südliche Libellenarten in Westfalen. *Nat. Landschaftsk.* 34: 114-116. – (Zum Emstal 12 b, D-48231 Warendorf).
The "mediterranean" character of Lestes barbarus is considered questionable. The increased occurrence of Coenagrion lindeni, Erythromma viridulum, Aeshna affinis, Anax parthenope, Gomphus pulchellus and Crocothemis erythraea in Westphalia, Germany is outlined and discussed. Single records are known for Coenagrion mercuriale, S. scitulum, Orthetrum brunneum, O. coerulescens and Sympetrum meridionale, but no increase in sightings of these has so far been noticed.

(13053) STEFFENS, W.P., 1998. New distribution records of Somatochlora hineana (Odonata: Corduliidae). *Great Lakes Ent.* 31(1): 25-26. – (P.O. Box 16593, Duluth, MN 55816, USA).
New records in Michigan, USA are reported, extending the known distribution of the sp. by nearly 200 km to the NE. Habitats are fens with shallow creeks, springs, small pools, and marl deposits.

(13054) *TOMBO TSUSHIN* – [*DRAGONFLY COMMUNICATIONS*], No. 30 (Memorial issue; Sept. 1998). Published by the Yodo River Left Bank Regional Sewage Works Association, Osaka. ISSN none. (Jap.). – (c/o K. Inoue, 5-9, Fuminosato 4-chome, Abeno-ku, Osaka, 545-0004, JA).
The "dragonfly" was adopted as the emblem of the said sewage plant, which also manages a popular, local "Dragonfly Sanctuary". The periodical commenced publication in 1991. – On 14 pp., the present issue brings several shorter articles (*K. Tani, K. Inoue*, etc.), mostly related to the "dragonfly" educative work, conducted in the Sanctuary for general public and, above all, for children. Also included are some field photographs, showing various aspects of odon. behaviour.

(13055) VAN BUSKIRK, J. & R.A. RELYEA, 1998. Selection for phenotypic plasticity in Rana sylvatica tadpoles. *Biol. J. Linn. Soc.* 65(3): 301-328. – (Dept Biol., Univ. Michigan, Ann Arbor, MI 48109, USA).
The hypothesis that phenotypic plasticity is an adaptation to environmental variation rests on the two assumptions that plasticity improves the performance of individuals that possess it, and that it evolved in response to selection imposed in heterogeneous environments. The first assumption has been upheld by studies showing the beneficial nature of plasticity. The second assumption is difficult to test since it requires knowing about selection acting in the past. However, it can be tested in its general form by asking whether natural selection currently acts to maintain phenotypic plasticity. This approach was adopted in a study of plastic morphological traits in larvae of the wood frog, R. sylvatica. First tadpoles were reared in artificial ponds for 18 days, in either the presence or absence of Anax dragonfly larvae (confined within cages to prevent them from killing the tadpoles). These conditioning treatments produced dramatic differences in size and shape: tadpoles from ponds with predators were smaller and had relatively short bodies and deep tail fins. Selection by Anax on the two kinds of tadpoles was estimated by testing for non-random mortality in overnight predation trials. Dragonflies imposed strong selection by preferentially killing individuals with relatively shallow and short tail fins, and narrow tail muscles. The same traits that exhibited the strongest plasticity were under the strongest selection, except that tail muscle width exhibited no plasticity but experienced strong increasing selection. A laboratory competition experiment, testing for selection in the absence of predators, showed that tadpoles with deep tail fins grew relatively slowly. In the cattle tanks, where there were also no free predators, the predator-induced phenotype survived more poorly and developed slowly, but this cost was apparently not associated with particular morphological traits. These results indicate that selection is currently promoting morphological plasticity in R. sylvatica, and support the hypothesis that plasticity represents an adaptation to variable predator environments.

(13056) VARGA, I., 1998. Comparison of phytal- and förna-bound macroinvertebrate communities at Lake Fertö, Hungary. *Opusc. zool. Budapest* 31: 131-141. – (Dept Syst. Zool. & Ecol., Eötvös-Loránd Univ., Puskin u. 3, HU-1088 Budapest).
8 odon. spp. are listed, mostly from submerged macrophyton stands.

(13057) WALTZ, R.D., 1998. Gleaning on Coreidae (Heteroptera) by Tachopteryx thoreyi (Odonata: Petaluridae). *Great Lakes Ent.* 31(3/4): 209-210. – (Div. Ent. & Plant Pathol., IDNR, Room W-290, 402

West Washington, Indianapolis, IN 46204, USA).
An incidental observation of feeding on a large leaf--footed bug, probably Acanthocephala terminalis, is described. Report on this feeding behaviour in T. thoreyi is noteworthy, since neither gleaning (the taking of resting prey) has ever been reported in the Petaluridae, nor feeding on Coreidae has been previously recorded for T. thoreyi.

(13058) ZESSIN, W., 1998. Eine fossile Heuschreckenart aus der Unteren Kreide Brasiliens Cratoelcana zessini Martins-Neto, 1991. *FamilienBr. int. Ver. Erforsch. Zessin-FamGesch.* 5: 58-59, fig. on cover p. 4 excl. – (Lange Str. 9, D-19230 Jasnitz).
Includes some autobiographic notes on Author's work on odon. paleontology.

(13059) ZESSIN, W., 1998. Trigonophlebia zessini Ansorge, 1996, eine neue interessante Libellenart aus dem oberen Lias von Norddeutschland. *FamilienBr. int. Ver. Erforsch. Zessin-FamGesch.* 6: 63-64, fig. on cover p. 4 excl. – (Lange Str. 9, D--19230 Jasnitz).
An abridged redescription of the sp., described originally in *Neue paläont. Abh.* 2(1996): 1-132, 17 pls excl.), incl. a fig. of fore wing venation in the holotype.

1999

(13060) AL HUSSEIN, I.A., S. BERGMANN, T. FUNKE, J. HUTH, H.-M. OELERICH, M. REUTER, F. TIETZE & W. WITSACK, 1999. Die Tierwelt der Bergbaufolgelandschaften. *NatSchutz Sachsen-Anhalt* 36(Sonderh.): 23-40. – (Authors' addresses not stated).
The odon. are dealt with by J. Huth, pp. 26-28. Over 100 water bodies, left from the former mining operations, were surveyed and 46 spp. were evidenced, representing 73% of the Sachsen-Anhalt odon. fauna (E Germany). The characteristic spp. of various habitat types are pointed out, and the importance of the residual water bodies is emphasized.

(13061) ANDERSON, C.R., B.L. PECKARSKY & S.A. WISSINGER, 1999. Tinajas of southeastern Utah: invertebrate reproductive strategies and the habitat templet. *In*: D.P. Batzer et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and management, pp. 791-810, Wiley, New York, ISBN 0-471-29258-3. – (First Author: Dept Ent., Cornell Univ., Ithaca, NY 14853, USA).
Tinajas are small (< 30 m diameter) rain-filled wetlands that have been eroded out of sandstone bedrock. 10 odon. taxa (mostly spp.) are listed, and the zygopt. are addressed from the point of view of the relationship between life history characteristics and the maximum pool depth.

(13062) ANSORGE, J., 1999. Heterophlebia buckmani (Brodie, 1845) (Odonata: "Anisozygoptera"), das erste Insekt aus dem untertoarcischen Posidonienschiefer von Holzmaden (Württemberg, SW Deutschland). *Stuttgart. Beitr. Naturk.* (B) 275: 1-9. (With Engl. s.). – (Inst. Geol., Ernst-Moritz--Arndt-Univ., Friedrich-Ludwig-Jahn-Str. 17a, D--17489 Greifswald).
A fore wing of H. bruckmani from the Lower Toarcian Posidonia Shale of Holzmaden, Württemberg, SW Germany is described. The holotypes of the Upper Liassic H. dobbertinensis Handl., 1939, H. gracilis Handl., 1939, Systellothemis reticulata Handl., 1939 from Dobbertin (Mecklenburg) and H. proxima Bode, 1905 from the Brunsvick area (Lower Saxony) are revised and considered younger synonyms of H. buckmani. Besides a collecting bias, the rarity of insects in the Posidonia Shale of Holzmaden probably results from a larger distance of the sedimentation area to the Vindelician mainland.

(13063) *ARGIA*. The news journal of the Dragonfly Society of the Americas, Vol. 11, No. 4 (31 Dec. 1999). ISSN 1061-8503. – (c/o Dr & Mrs T.W. Donnelly, 2091 Partridge Lane, Binghamton, NY 13903, USA).
[Signed articles:] *Hutchings, G.*: Vancouver Island DSA annual meeting (with possible Okanagan side trip) (pp. 1-2); – *Laudermilk, E.*: Carl Cook receives Kentucky Biodiversity Protection Award (p. 2); – [*Anonymous*:] Juanda Bick, 1919-1999 (pp. 2-4); – *Daigle, J.J., B. Behrstock, S. Krotzer & B. Mauffray*: Arizona adventures (pp. 4-6); – *J.M. Ramos Hernandez*: New records of Odonata for some provinces of the Dominican Republic (pp. 6-7); – *Krotzer, R.S.*: Erythemis vesiculosa (Fabricius), Great Pondhawk, new for Alabama (pp. 7-8); – *Artiss, T.*: Molecular phylogenetic analyses of the odonate genera Libellula, Ladona and Plathemis (pp. 8-12); – *Donnelly, N.*: History of American Odonata: Clarence Kennedy (1879-1952) (pp. 12-14); – *Kenner, R.D.*: Request for Odonata in BC (p. 15); –

First Canadian breeding record for Tanypteryx hageni (pp. 15-16); – The issue also contains minutes of the July 1999 DSA meeting (*S. Dunkle*, p. 16), the 1999 DSA financial report (*J.J. Daigle*, pp. 16-17), and the standard web site review, "Tramea" (*R. Beckemeyer*, p. 17).

(13064) BENKE, A.C., G.M. WARD & T.D. RICHARDSON, 1999. Beaver-impounded wetlands of southeastern Coastal plain: habitat-specific composition and dynamics of invertebrates. *In*: D.P. Batzer et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and management, pp. 217-245, Wiley, New York, ISBN 0-471-29258--3. – (First Author: Aquat. Biol. Progr., Dept Biol. Sci., Univ. Alabama, Tuscaloosa, AL 35487, USA).
The study was conducted in the Talladega National Forest. Relative abundance is stated for 15 habitat--specific odon. spp. in Nymphaea and Juncus zones, based on benthic sampling or emergence.

(13065) BREWER, S.K. & G.J. ATCHISON, 1999. The effects of chlorpyrifos on cholinesterase activity and foraging behavior in the dragonfly Anax junius (Odonata). *Hydrobiologia* 394: 201-208. – (Second Author: Dept Anim. Ecol., Iowa St. Univ., 124 Sciences II, Ames, IA 50011, USA).
Head capsule cholinesterase (ChE) and foraging behaviour in Anax junius larvae, exposed for 24 h to 0.2, 0.6 and 1.0 µg l^{-1} of the organophosphorus (OP) insecticide, chlorpyrifos [O,O-diethyl O-(3,5,6-trichloro-2-pyridyl) phosphorothioate] were examined. The invertebrate community is an important component of the structure and function of wetland ecosystems, yet the potential effects of insecticides on wetland ecosystems are largely unknown. The objectives were to determine if exposure to environmentally realistic concentrations of chlorpyrifos affected foraging behaviour and ChE activity in head capsules of larvae. Larvae were exposed to different concentrations of chlorpyrifos and different prey densities in a factorial design. ChE activities and foraging behaviours of treated larvae were not statistically different ($p \geq 0.05$) from control groups. Prey density effects exerted a greater effect on dragonfly foraging than toxicant exposures. Larvae offered higher prey densities exhibited more foraging behaviours but also missed their prey more often. High variability in ChE activities within the control group and across treated groups precluded determination of relationships between ChE and foraging behaviours. It appears that A. junius is relatively tolerant of chlorpyrifos, although the concentrations here tested have been shown in other work to adversely affect the prey base; therefore the introduction of this insecticide may have indirect adverse affects on top invertebrate predators such as Odon.

(13066) CASEY, C.R., J. PARKER & M. LOTE, 1999. *Dragonflies and damselflies of Great Britain.* Video, produced by the authors. Running time: 80 min. approx. – Price: £ 15.- net. – (Orders to: Atropos Bookshop, 1 Myrtle Villas, Sussex ED, New Romney, Kent, TN28 8DY, UK).
A short introductory section provides a simplified guide to the dragonfly life cycle and a review of the morphology, as far as needed for identification of spp. The main part of the work is a review of all spp. known to breed in the United Kingdom; a coverage of several min is devoted to each sp., incl. a distribution map.

(13067) COBO, F., A. MERA & M.A. GONZALEZ, 1999. Análisis guimico y valor energético de algunas familias de insectos heterometábolos dulceacuicolas. *Boln Asoc. esp. Ent.* 23(1/2): 213-221. (With Engl. s.). – (Depto Biol. Animal, Fac. Biol., Univ. Santiago de Compostela, ES-15706 Santiago de Compostela).
Chemical analyses are presented for 6 odon. families, and calorimetric values are stated for 3 of them.

(13068) CORDERO RIVERA, A., 1999. Selección sexual y comportamiento reproductor de los insectos. *Boln Soc. ent. aragon.* 26: 693-701. (With Engl. s.). – (Depto Ecol., Univ. Vigo, E.U.E.T. Forestal, Campus Universitario, ES-36005 Pontevedra).
The evolution of insect reproductive behaviour is related to the intensity of sexual selection. Here, a review is given of the 4 proposed mechanisms for the action of sexual selection (before copulation: fights between ♂ ♂ and ♀ choice; during and after copulation: sperm competition and cryptic ♀ choice). Many examples are taken from odon. behaviour. As ♀ insects habitually store the sperm from their mates and fertilize the eggs only at the moment of oviposition, postcopulatory sexual selection has had great importance in the evolution of behaviour. It is suggested that a detailed study of the possibility of cryptic ♀ choice will be needed, especially of sperm selection. Some examples, seemingly well established in relation to sperm competition, need to be re-examined from the ♀ perspective. Because of

their great diversity re life cycle and behaviour, the odon. are considered an ideal group to test these hypotheses.

(13069) D'AGUILAR, J. & A. FRAVAL, 1999. Les mots de l'entomologie: glossaire progressif: Anax (Odonata, Anisoptera, Aeshnidae). *Insectes, OPIE* 113: 27. – (First Author: 7 rue Adrien Lejeune, F-93170 Bagnolet).
Brief descriptions of A. imperator and A. parthenope, and a brief outline of their habitat and biology.

(13070) D'ANDREA, M., 1999. La fauna odonatologica della provincia di Arezzo, Italia centrale (Odonata). *Boll. Ass. romana Ent.* 54(1/4): 1-30. (With Engl. s.). – (Mus. Zool. "La Specola", Univ. Firenze, Via Romana 17, I-50125 Firenze).
A comprehensive treatment of the fauna of Arezzo, Tuscany. 106 localities were surveyed and 42 spp. are listed, incl. 10 spp. that were not previously recorded from the province. Of particular interest are the records of Calopteryx splendens caprai (= ancilla) from a stagnant pond, Enallagma cyathigerum from (for Italy) an unusually low elevation (450 m), and Boyeria irene.

(13071) DAVEY, A., 1999. Dragonflies. *Terra, Los Angeles* 36(4/5): 1 (cover phot., with editorial caption on p. 2). – (c/o Editor: Nat. Hist. Mus. Los Angeles Co., Publication Office, 900 Exposition Blvd, Los Angeles, CA 90007, USA).
When the Toronto-based artist was asked to produce a series of images representing speed, he thought first of dragonflies, because of fascination with the contrast between their small size and their speed and agility. The here reproduced digital image around a species of Aeshna, was honoured in *Applied Arts Magazine*'s 8th Annual Photography and Illustration Contest.

(13072) DE SZALAY, F.A., N.H. EULISS & D.P. BATZER, 1999. Seasonal and semipermanent wetlands of California: invertebrate community ecology and responses to management methods. *In*: D.P. Batzer et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and management, pp. 829-855, Wiley, New York, ISBN 0-471-29258-3. – (Third Author: Dept Ent., Univ. Georgia, Athens, GA 30602, USA).
Most of California's original wetlands have been drained or converted to agricultural uses (e.g. rice fields), most of those remaining are found in the Central Valley. Numbers of Coenagrionidae, Aeshnidae and Libellulidae collected (Feb.-March) in early- and late- seasonally flooded marshes of Suisun Marsh are stated, without sp. names. They were much more abundant in early-flooded sites.

(13073) DOMMANGET, J.-L., 1999. La conservation des couleurs et la préparation des libellules destinées à la collection de référence. *Insectes, OPIE* 144: 25-28. – (7 rue Lamartine, F-78390 Bois-d'Arcy).
Instructions for colour preservation (aceton) and specimen preparation of cabinet specimens.

(13074) DUDGEON, D., 1999. *Tropical Asian streams: zoobenthos, ecology and conservation.* Hong Kong Univ. Press. xii+830 pp. ISBN 962-209-469-4. – Price: UK £ 35.- net. – (Publishers: 14/F Hing Wai Centre, 7 Tin Wan Praya Rd, Aberdeen, Hong Kong).
The book deals with the ecology of rivers and streams in the Oriental Region, and describes the composition of their fauna. The Odon. are treated on pp. 291-316. A family key to the larvae is also provided.

(13075) DUFFY, W.G., 1999. Wetlands of Grand Teton and Yellowstone National Parks: aquatic invertebrate diversity and community structure. *In*: D.P. Batzer et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and managament, pp. 733-756, Wiley, New York, ISBN 0-471-29258-3. – (California Fish. Res. Unit, Humboldt St. Univ., Arcata, CA 95521, USA).
Aquatic invertebrates were sampled monthly from May to Sept. in 6 wetlands in Yellowstone and Grand Teton National Parks (1995). 6 odon. spp. are listed from wetlands in the greater Yellowstone ecosystem. Coenagrion resolutum and Sympetrum spp. are indicated in the generalized foodwebs for, resp. semipermanent and seasonal subalpine wetlands.

(13076) ENDERSBY, I.D., 1999. Dragonflies of the Organ Pipes National Park. *Victorian Ent.* 29(3): 51-52. – (56 Looker Rd, Montmorency, Vic. 3094, AU).
The Park is situated 30 km NW of Melbourne, Australia. A commented list of 12 spp., evidenced Nov. 1997-Feb. 1998, is presented. Rhadinosticta simplex is of particular regional interest. Further surveys and a more detailed investigation into seasonal development of the local spp. are warranted.

(13077) ENGLUND, R.A. & R.B. FILBERT, 1999. Flow restoration and persistence of introduced species in Waikele Stream, O'ahu. *Micronesica* 32(1): 143-154. – (Hawai'i Biol. Surv., Bishop Mus., 1525 Bernice St., Honolulu, HI 96817, USA).
Despite an increase in stream flow, introduced fish remained abundant and native spp. appear to have declined. 3 indigenous and 4 introduced odon. spp. are listed from the stream, incl. Crocothemis servilia, which has been first collected around taro fields in Waiahole Stream in 1994 (cf. *OA* 11199), and has since spread rapidly across O'ahu, Hawaii.

(13078) *ERJAVECIA*. [Newsletter of the Slovene Odonatological Society], Ljubljana, No. 8 (31 Oct. 1999). ISSN 1408-8185. (Slovene). – (c/o M. Bedjanič, Fram 117/a, SI-2313 Fram).
The feature article, by *J. Gulič & M. Bedjanič* (pp. 1-5), is devoted to the naturalist, J. Koprivnik (1849--1912). The issue introduces also a new standard section of odonate records and brief observations, with 4 notes by *D. Klenovšek* (pp. 16-17). *M. Sameja* contributed a list of 30 spp. evidenced in the Dramlje area (pp. 7-10). The rest of the 24 pp. issue is made up by various articles from the society's life and on topics of general interest, etc. Nos 281-302 are added to the Slovene odonatol. bibliography (pp. 22-24).

(13079) EULISS, N.H., D.A. WRUBLESKI & D.M. MUSHET, 1999. Wetlands of the Prairie Pothole Region: invertebrate species composition, ecology and management. *In*: D.P. Batzer et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and management, pp. 471-514, Wiley, New York, ISBN 0-471-29258-3. – (First Author: U.S. Geol. Surv., Northern Prairie Wildl. Res. Cent., Jamestown, ND 58401, USA).
The Prairie Pothole Region of the USA and Canada is a unique area where shallow depressions created by the scouring action of Pleistocene glaciations interact with midcontinental climate variations to create and maintain a variety of wetland classes. The partial odon. list includes 49 spp., listed here with bibliographic references, and with brief annotations in the text.

(13080) EZENWAJI, H.M.G., 1999. The abundance and trophic biology of Clarias albopunctatus Nichols & LaMonte, 1953 (Osteichthyes: Clariidae) in a tropical floodriver basin. *Hydrobiologia* 392(2): 159--168. – (Fish. & Hydrobiol. Res. Unit, Dept Zool., Univ. Nigeria, P.O. Box 3140, Nsukka, Nigeria).
The abundance, food and feeding biology were studied over a period of 17 months in the lower Anambra R., Nigeria. Insects were the predominant food, odon. larvae are among the groups of primary importance. Species names are not stated.

(13081) FAIRCHILD, G.W., A.M. FAULDS & L.L. SAUNDERS, 1999. Constructed marshes in southeast Pennsylvania: invertebrate foodweb structure. *In*: D.P. Batzer et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and management, pp. 423-446, Wiley, New York, ISBN 0-471-29258-3. – (First Author: Biol. Dept, West Chester Univ., West Chester, PA 19383, USA).
The taxonomic and trophic structure of aquatic invertebrate communities in 11 recently created freshwater marshes is compared to communities at 7 nearby reference sites. The odon. are family-wise considered. Wetlands with fish often had an abundance of gomphids.

(13082) FLÖSS, I., 1999. *Die Libellenfauna der Glattaltläufe von Rümlang und Oberglatt (Kt. Zürich) 1999*. Fachstelle Naturschutz, Amt f. Landschaft u. Natur, Kt. Zürich. 20 pp. – (c/o Dr H. Wildermuth, Haltbergstr. 43, CH-8630 Rüti).
In the oxbows along the Glatt R., canton Zürich, Switzerland, 28 spp. were encountered during May--Aug. 1999. An annotated list of these is presented, and the fauna is briefly discussed.

(13083) FROMHAGE, L., 1999. Erstnachweis der Arktischen Smaragdlibelle Somatochlora arctica (Zetterstedt, 1840) im Regierungsbezirk Koblenz. *Fauna Flora Rheinland-Pfalz* 9(1): 341-345. (With Engl. s.). – (St. Sebastianstr. 6, D-55128 Mainz).
In 1997 and 1998, S. arctica was found for the first time within the district of Koblenz (nr Morbach). The status of the sp. in Rhineland-Palatinate, Germany is briefly discussed.

(13084) [FRUND, J.], 1999. Libellen mitten in der Stadt. *Neue osnabrück. Ztg*, issue of 6 March. – (Pagination and address unknown).
A regional daily's article on Jochen Fründ's hydrobiological work (with emphasis on Odon.) on garden ponds in the city area of Osnabrück, Germany, conducted as a "Jugend forscht" project.

(13085) GALLEGO, O.E. & R.G. MARTINS-NETO,

1999. La entomofauna mesozoica de la Argentina: estado actual del conocimiento. *Revta Soc. ent. argent.* 58(1/2): 86-94. (With Engl. s.). – (First Author: Cátedra Paleont., FACENA-UNNE, C.C. 128, AR-3400 Corrientes).
The Triassic, Triassothemis mendozensis, is the only odon. sp. listed.

(13086) GARRISON, R.W., 1999. Aerial dragons. *Terra, Los Angeles* 36(4/5): 2-4. – (1030 Fondale St., Azusa, CA 91702-0821, USA).
A concise and skillful general presentation of the Order, with beautiful field portraits of 7 spp. from Chile, Thailand and the USA.

(13087) GASSMANN, D., 1999. Taxonomy and distribution of the inornata species-group of the Papuan genus Idiocnemis Selys (Odonata: Zygoptera: Platycnemididae). *Invert. Taxon.* 13(6): 977-1005. – (Natn. Mus. Nat. Hist., P.O. Box 9517, NL-2300 RA Leiden).
The presumably monophyletic group is revised, with special regard to phylogenetically relevant morphological characters and the distribution of its spp. Diagnosis of all 9 previously described spp. are presented, and I. adelbertensis sp. n. (NE New Guinea) and I. australis sp. n. (southern central New Guinea) are described. Both sexes are keyed. A diagnosis of the genus and a nomenclatural note on the family-group name Calicnemiinae Fraser, 1957 are included.

(13088) GATHMAN, J.F., T.M. BURTON & B.J. ARMITAGE, 1999. Coastal wetlands of the Upper Great Lakes: distribution of invertebrate communities in response to environmental variation. *In*: D.P. Batzer et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and management, pp. 949-994, Wiley, New York, ISBN 0-471-29258-3. – (First Author: Dept Zool., Michigan St. Univ., East Lansing, MI 48824, USA).
Includes short odon. lists from Lake Huron, Saginaw Bay, St Mary's R., lake St Clair, and Green Bay.

(13089) GODREAU, V., G. BORNETTE, B. FROCHOT, C. AMOROS, E. CASTELLA, B. OERTLI, F. CHAMBAUD, D. OBERTI & E. CRANEY, 1999. Biodiversity in the floodplain of Saône: a global approach. *Biodiv. Conserv.* 8: 839-864. – (First Author: Lab. Ecol.-Evol., Univ. Bourgogne, Bât. Gabriel, F-21000 Dijon).
An upstream-downstream survey of the Saône R. floodplain (France) has been carried out to identify the contribution of habitats to the floodplain biodiversity. Odon. were among the selected taxa considered. 40 spp. occurred in sampling wetlands; Coenagrion mercuriale, Cordulegaster bidentata and Oxygastra curtisii are of particular regional interest. The cut-off channels of the river have a higher odon. richness (10.2-14.5) than the other wetlands (6.1--10.6). In the former, the abundance of individuals is also higher (2.5-3.0 vs 0.5-1.5).

(13090) *GOMPHUS.* Mededelingsblad van de belgische libellenonderzoekers – Bulletin de liaison des odonatologues belges, Vol. 15, No. 3 (dated Dec. 1999; received 24 March 2000). (Dutch & Fr., with Engl., Fr. & Dutch s's). – (c/o G. de Knijf, Ploegstraat 33, B-9050 Gent).
Goffart, P./ Tailly, M.: Editorial (pp. 109-110); – *Geenen, S., K. Jordaens, M. De Block, R. Stoks, H. van Gossum & L. De Bruyn*: A new reproduction site of Sympecma fusca (Vander Linden, 1820) in Vlaanderen (pp. 111-117); – *De Knijf, G.*: Invasion of Anax parthenope (Sélys) in Belgium in 1999 (pp. 119-129); – *Stoks, R.*: [Book review] "Dragonflies: behaviour and ecology of Odonata", by P.S. Corbet (pp. 130-132; Dutch); – [Compte rendu d'excursions:] *Defoort, T.*: Eendeputten (pp 133-134); – *De Knijf, G.*: Mol-Postel (pp. 134-136); – *De Schaetzen, R.*: Ronquières et Seneffe (pp. 136-138); – *Goffart, P.*: Ourthe moyenne (pp. 139-141). – Various announcements, etc. (pp. 142-155).

(13091) GRODNITSKY, D.L., 1999. *Form and function of insect wings: the evolution of biological structures*. Johns Hopkins Univ. Press, Baltimore--London. xiv+261 pp. ISBN 0-8018-6003-2. – Price: UK £ 44.50 net. – (Publishers: 2715 North Charles St., Baltimore, MD 21218-4363, USA).
Chapter topics include general information on insect flight, vortex aerodynamics, the diversity and evolution of flapping flight, wing morphology, and general evolutionary considerations. The book also contains a novel insect taxonomy at supraordinal level (by A.P. Rasnitsyn), and throws light upon recent developments in contemporary Russian evolutionary theory.

(13092) GURLIAT, P., 1999. Les odonates de Loire Atlantique. *Bull. Soc. Sci. nat. Ouest Fr.* (N.S.) 21(2): 83-89. (With Engl. s.). – (8 imp. des Amandiers, F-

-44800 Saint-Herblain).
A commented list of 55 spp., Loire-Atlantique, France.

(13093) HALL, D.L., R.W. SITES, E.B. FISH, T.R. MOLLHAGEN, D.L. MOORHEAD & M.R. WILLIG, 1999. Playas of the southern High Plains: the macroinvertebrate fauna. *In*: D.P. Batzer et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and management, pp. 635-665, Wiley, New York, ISBN 0-471-29258-3. – (First Author: Dept Ent., Univ. Missouri, Columbia, MO 65211, USA).
The Southern High Plains (= Llano Estacado) in Texas and New Mexico is an extensive, semiarid tableland. A review of the recorded odon. taxa, and notes on biological features of some spp. are presented.

(13094) HANN, B.J., 1999. A prairie coastal wetland (Lake Manitoba's Delta Marsh): organization of the invertebrate community. *In*: D.P. Batzer et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and management, pp.1013-1039, Wiley, New York, ISBN 0-471-29258-3. – (Dept Zool., Univ. Manitoba, Winnipeg, MB, R3T 2N2, CA).
Includes a short odon. list (mostly genera only), information on mean densities (suborder-wise) and on biomass (order-wise).

(13095) HARDERSEN, S. & C.M. FRAMPTON, 1999. Effects of short term pollution on the level of fluctuating asymmetry: a case study using damselflies. *Entomologia exp. appl.* 92(1): 1-7. – (Ent. Group, Div. Plant, Soil & Ecol. Sci., Lincoln Univ., P.O. Box 84, Canterbury, NZ).
Fluctuating asymmetry (FA), a measure of developmental stability, has been suggested as a monitoring tool for environmental pollution. However, there have been few investigations into the effects of short term pollution on the level of FA. This paper explores effects of exposing late instar larvae to short term pollution on the level of FA in the wings of adult Xanthocnemis zealandica. In these insects FA in wing length and in cell patterns have different "windows of opportunity" in relation to environmental stress. If increased environmental stress is applied after the "window of opportunity" of one trait had closed, while the window of the other trait was still open then the level of FA of the first trait should not be altered whereas that of the latter should increase. If short term pollution killed part of a population, symmetrical individuals (low FA) should survive better than highly asymmetrical ones, because FA reflects the overall ability of an individual to cope with stress. If the pollution event occurred at a time when the level of FA was already fixed, the level of FA of the remaining population should be lower than that in controls. An experiment was carried out, using 10 artificial ponds, each holding a population of Xanthocnemis larvae. These were exposed to carbaryl at a nominal concentration of 100 $\mu g\ l^{-1}$, which reduced emergence success after 10-20 days by ca 50%. Based on laboratory experiments, it was assumed that despite the high mortality, the short exposure to carbaryl late in the last instar would ensure that the wing cell patterns of the damselflies were not altered by the increased stress. The level of FA in wing length increased in the damselflies surviving the exposure to carbaryl, but the level of FA in cell patterns did not differ significantly between the treatment and the control. The effects of differential mortality, as well as the effects of pollution, on the level of FA in traits with different "windows of opportunity" need further investigation.

(13096) HAWKING, J.H. & T.R. NEW, 1999. The distribution patterns of dragonflies (Insecta: Odonata) along the Kiewa River, Australia, and their relevance in conservation assessment. *Hydrobiologia* 392(2): 249-260. – (Second Author: Dept Zool., La Trobe Univ., Bundoora, Vic. 3082, AU).
Sampling of larvae and adults from 16 sites along the river, Victoria, yielded 34 spp. Patterns of larval and adult incidence are appraised, and show that most spp. are restricted in incidence to several consecutive sites along the river, and that there is a clear distinction also between the faunas of the potamon, rhithron and eucrenon regions. Different spp. of some Anisopt. genera display different zonational distributions, and patterns of incidence and relative abundance of larvae and adults confirm zonational occupancy. For larvae, these distribution patterns transcend the mode of collection, although many spp. were found most abundantly in one microhabitat or by one of several sampling methods employed at each site. Sampling of the 2 stages separately shows considerable concurrence of distributional patterns, so that either stage alone may provide data of value in faunal and conservation assessment.

(13097) HAWKING, J. & G. THEISCHINGER, 1999. *Dragonfly larvae (Odonata): A guide to the identification of larvae of Australian families and identification and ecology of larvae from New South Wales*. Co-operative Res. Cent. Freshw. Ecol., Albury. [Ident. Guide No. 24] iv+218 pp. ISBN 1--876144-25-4. – Price AU $ 20.- net. – (Orders to: Murray Darling Freshw. Res. Cent., P.O. Box 921, Albury, NSW 2640, AU).
Keys are provided for the Australian families, and larvae of the New South Wales spp. are described, keyed, and their known records are mapped. – A splendid and richly illustrated work.

(13098) HILL, M.T.R., 1999. A freeze-corer for simultaneous sampling of benthic macroinvertebrates and bed sediment from shallow stream. *Hydrobiologia* 412: 213-215. – (Envir. Sci. Dept, Univ. Bradford, W. Yorks., BD7 1DP, UK).
The paper describes a new liquid nitrogen freeze--corer for simultaneous sampling of benthic macroinvertebrates and the top 10-15 cm of bed sediment in shallow (< 0.3 m) streams. The corer weighs 12.3 kg and is operated by hand to sample a 0.03 m^2 area of the stream bed. The corer was tested by taking two samples at each of nineteen stream sites with varying bed texture in Yorkshire, UK. The high success rate (35/38) demonstrates the viability of this corer for year-round use in shallow urban and rural streams. No taxa are mentioned.

(13099) HIROSE, Y. & A. SASAKI, 1999. Notes on Somatochlora alpestris and S. graeseri graeseri in Hokkaido. *Gekkan-Mushi* 343: 9-11. (Jap., with Engl. title). – (First Author: No. 102, La Mode, 4-56-7 Katsura-machi, Abashiri, Hokkaido, 093-0041, JA).
In Japan, S. alpestris and S. graeseri have a restricted distribution; the former occurs above an elevation of 1300 m, mainly in Taisetsu Natn. Park, the latter at Taisetsu and Shiretoko Natn. Parks. The 2 spp. co--occur at the Shibinai Woodland Path (alt. 1210-1230 m). Observations on adult behaviour of S. alpestris and notes on the morphology of the 2 spp. are provided.

(13100) HOEKSTRA, J.D. & R.W. GARRISON, 1999. Range extension of Palaemnema domina Calvert (Odonata: Platystictidae) to southeastern Arizona, U.S.A.: a new odonate family for the United States. *Proc. ent. Soc. Wash.* 101(4): 756-759. – (Second Author: 1030 Fondale St., Azusa, CA 91702-0821, USA).
The occurrence of a P. domina population in SE Arizona extends the known northern range limit of this sp. from Chihuahua, Mexico. It is the first record of the Platystictidae for the USA. Notes on adult perching habits and a brief habitat description are provided.

(13101) HOLUSA, O., 1999. Vážky (Odonata) v okoli Vsetina a Valašského Meziříčí – The dragonflies (Odonata) in the surroundings of Vsetin and Valašského Meziříčí. *Sb. přír. Klubu Uh. Hradisti* 4: 82-102. (Czech, with Engl. s.). – Bruzovská 420, CZ--73801 Frýdek-Mistek).
33 spp. are recorded, and the composition of the fauna is discussed; – Czech Republic.

(13102) HUTCHINSON, R., 1999. Découverte d'Enallagma civile (Hagen) (Odonata: Coenagrionidae) dans la baie des Chaleurs en Gaspésie (Québec). *Fabreries* 24(4): 82-84. – (12 ch. de la Savane, app. 12, Gatineau, QU, J8T 1P7, CA).
Carleton-sur-Mer, Quebec, Canada, 10-IX-1999; – habitat preference and the northward expansion of the sp. are briefly discussed.

(13103) HUTCHINSON, R. & B. MÉNARD, 1999. Stylurus notatus (Rambur) (Odonata: Gomphidae) au Québec: récoltes, observations et notes biologiques. *Fabreries* 24(4): 78-80. – (Second Author: 56 rue Smith, Gatineau, QU, J8T 3A1, CA).
The 1996-1997 records of exuviae, emergences and teneral adults from Luskville, Quebec, Canada are presented, along with field notes, observations on biology and a discussion on the local status of the sp.

(13104) INOMATA, T., 1999. [Book review] [Dragonflies of the Japanese archipelago in color, by M. Sugimura et al.]. *Gekkan-Mushi* 344: 34. (Jap.). – (Author's address not stated).
A brief description of the volume, presented in *OA* 12862.

(13105) JEZIORSKI, P. & O. HOLUSA, 1999. Collection of dragonflies (Odonata) in Muzeum jihovýchodni Moravy in Zlin. *Sb. přír. Klubu Uh. Hradisti* 4: 103-106. (With Czech s.). – (First Author: Na Bělidle 1, CZ-73564 Havířov-Suchá).
A list of odon. collection (34 spp., with precise locality data) in the Museum of Southeastern Moravia. Most of the material originates from Moravia, Czech

Republic.

(13106) JOURDE, P., O. ALLENOU, M. CAUPENNE & J.-M. THIRION, 1999. Contribution à l'inventaire des odonates de Charente-Maritime. *Annls soc. Sci. nat. Charente-Maritime* 8(8): 967-972. (With Engl. s.). – (First Author: La Grande Métairie, 20 rue de Charnay, F-172300 Pont-l'Abbé-d'Arnoult).
A briefly commented checklist of 59 spp.; dept Charente-Maritime, France.

(13107) [JURZITZA, G.] HOLZER, A., S. RIETSCHEL & K. VOIGT, 1999. Prof.Dr. Gerhard Jurzitza zum 70. Geburtstag. *Carolinea* 57: 134. – (c/o Dr G. Jurzitza, Reinmuthstr. 27, D-76187 Karlsruhe).
A brief biography and appreciation of work, with a portrait.

(13108) KÄHLERT, J., 1999. *Die Libellen Europas – The dragonflies of Europe*. CD-ROM, Kählert Naturfotografie u. –reportage, Burg. (Bilingual: Germ./Engl.). *Version 1.2*. – Price in Europe: DEM 139.-; in the USA: US$ 69.-; postage excl. – (Orders to: J. Kählert, Rotkehlchenweg 4, D-25712 Burg, Germany; – *or* G. Carnevale, 1690 NE 191st St., Apt 213, Miami, FL 33179, USA).
This version consists of 3 CDs, with 300 pictures of 122 European spp., most represented by both sexes, all taken in the field, and digitally scanned from 35 mm slides, at 1:1 ratio approx. The pictures are saved in 2 different kinds of image files, viz. Bitmap (bmp, for monitor viewing and can be loaded quickly) and JPEG (jpg, for high resolution prints). The usual software can be used, but a special programme, for a very comfortable handling and developed especially for this purpose, is included. With the CD-ROMs goes a booklet (Germ. *or* Engl.), with detailed technical instructions and a complete spp. list. – For another edn see *OA* 13109.

(13109) KÄHLERT, J., 1999. *Die Libellen Europas – The dragonflies of Europe*. CD-ROM, Kählert Naturfotografie u. –reportage, Burg. (Bilingual: Germ./Engl.). *Version 1.2 LE*. – Price in Europe: DEM 98.-; in the USA: US$ 49.-; postage excl. – (Orders to: J. Kählert, Rotkehlchenweg 4, D-25712 Burg, Germany; – *or* G. Carnevale, 1690 NE 191st St., Apt 213, Miami, FL 33179, USA).
The descriptions and spp. inventory as in *OA* 13108, but this version consists of a single CD, with Bitmap images only. On the monitor, these are indistinguishable from JPEG images, but the prints would be of inferior quality.

(13110) KANO, K., 1999. [Observations on Lestes temporalis prolarva]. *Gekkan-Mushi* 343: 22-24. (Jap.). – (No. 601, 19-17, Koishikawa 5-chome, Bunkyo-ku, Tokyo, 112-0002, JA).
On 23 Nov., willow twigs containing eggs were brought home. No eggs hatched on the twig kept in a dry vessel, but during 15 Jan.-1 March (peak 8-17 Feb.) the twig kept in a vessel with water yielded 147 prolarvae. Hatching seems to have been accelerated by higher room temperatures, and took place during daytime and at night. The movements of prolarvae on their way to the water are described and photographed.

(13111) KISHI, K., 1999. [Anax guttatus recorded in Tochigi prefecture]. *Gekkan-Mushi* 344: 45. (Jap.). – (A101, Mistral Shonan, 488-1 Isahikawa, Fujisawa, Kanagawa, 22-0815, JA).
1 ♂, Takanezawa-machi, 4-X-1998.

(13112) KITAGAWA, K., T. YAGI, A. NAKANISHI, N. WAHID & M. MARYATI, 1999. Dragonflies of Tabin Wildlife Reserve, Sabah, Malaysia. *In*: M. Maryati et al., [Eds], Tabin scientific expedition, pp. 79-85, Univ. Malaysia Sabah, Kota Kinabalu, ISBN 983-2188-23-7. – (First Author: Imaichi 1-11-6, Asahi-ku, Osaka, 535-0011, JA).
In Feb.-March 1998, 25 spp. were evidenced in the Reserve (Borneo, Malaysia), 18 of which could be identified and are listed here. The fauna is discussed and col. portraits of 16 spp. are provided.

(13113) KOTARAC, M., 1999. Inventarizacija flore in vegetacije ter favne na Bloški planoti: kačji pastirji (Odonata) – [Inventarisation of flora, vegetation and fauna of Bloke Plateau: dragonflies (Odonata)]. *In*: K. Poboljšaj, Inventarizacija flore in vegetacije ter favne na Bloški planoti, pp. 46-62, Nat. Hist. Mus., Ljubljana. (Slovene). – (Author: CKFF, Zemljemerska 10, SI-1000 Ljubljana).
Deals with the same fauna as *OA* 10834. 40 spp. are reported from 50 localities. The communities are analysed and conservation measures are suggested.

(13114) KOTARAC, M., 1999. Popis kačjih pastirjev v glinokopih Rova in Mengeš – [Dragonfly inventory of the clay pits of Rova and Mengeš]. CKFF,

Miklavž-na-Dravskem-polju. 21 pp. (Slovene). – (CKFF, Zemljemerska 10, SI-1000 Ljubljana).
23 spp. are listed from Rova, and 27 from Mengeš, Ljubljana Basin, Slovenia. The assemblages are analysed and protective measures are suggested.

(13115) KOTARAC, M. & A. ŠALAMUN, 1999. Inventarizacija flore in favne na Radenskem polju: kačji pastirji (Odonata) – [Inventarisation of flora and fauna of Radensko polje: dragonflies (Odonata)]. *In*: K. Poboljšaj, Inventarizacija flore in favne na Radenskem polju, pp. 10-14, CKFF, Miklavž-na-Dravskem-polju. (Slovene). – (Second Author: Čevljarska 28, SI-6000 Koper).
9 spp. are listed and the assemblage is briefly discussed; – Slovenia.

(13116) La *LETTRE DES SOCIETAIRES*, Société française d'odonatologie, No. 19 (15 Sept. 1999), No. 20 (15 Dec. 1999). ISSN 1260-0857. – (c/o J.-L. Dommanget, 7 rue Lamartine, F-78390 Bois-d'Arcy).
[No. 19]: In addition to the Editorial (pp. 1-3; by *J.-L. Dommanget*), the issue contains 5 pp. of notes and announcements, under the traditional headings. – [No. 20]: Includes a supplement, titled "Liste de référence des odonates de France métropolitaine" (4 pp.; *Anonymous*).

(13117) LOVVORN, J.R., W.M. WOLLHEIM & E.A. HART, 1999. High Plains wetlands of southeast Wyoming: salinity, vegetation and invertebrate communities. *In*: D.P. Batzer et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and management, pp. 603-633, Wiley, New York, ISBN 0-471-29258-3. – (First Author: Dept Zool., Univ. Wyoming, Laramie, WY 82071, USA).
Salinization of wetlands is an important issue in arid western N. America. In Saskatchewan, Alberta and British Columbia, odon. (mainly Enallagma) occur commonly in both oligosaline and mesosaline lakes, and few spp. that occur at higher salinities fail to occur or are less abundant at lower salinities, but might be limited in oligosaline wetlands by Gamarus lacustris predation on early instars. Odon. sometimes eat snails or amphipods (when they are much more abundant than other foods), but in most cases, chironomid larvae are much preferred in the Laramie Basin.

(13118) MARDEN, J.H., G.H. FITZHUGH, M.R. WOLF, K.D. ARNOLD & B. ROWAN, 1999. Alternative splicing, muscle calcium sensitivity, and the modulation of dragonfly flight performance. *Proc. natn. Acad. Sci.* 96(26): 15304-15309, col. phot. on cover. – (First Author: 208 Mueller Lab., Dept Biol., Pennsylvania St. Univ., University Park, PA 16802, USA).
Calcium sensitivity of myosin cross-bridge activation in striated muscles commonly varies during ontogeny and in response to alterations in muscle usage, but the consequences for whole-organism physiology are not well known. Here it is shown that the relative abundances of alternatively spliced transcripts of the calcium regulatory protein troponin T (TnT) vary widely in flight muscle of Libellula pulchella, and that the mixture of TnT splice variants explains significant portions of the variation in muscle calcium sensitivity, wing-beat frequency, and an index of aerodynamic power output during free flight. 2 size-distinguishable morphs differ in their maturational pattern of TnT splicing, yet they show the same relationship between TnT transcript mixture and calcium sensitivity and between calcium sensitivity and aerodynamic power output. This consistency of effect in different developmental and physiological contexts strengthens the hypothesis that TnT isoform variation modulates muscle calcium sensitivity and whole organism locomotor performance. Modulating muscle power output appears to provide the ecologically important ability to operate at different points along a tradeoff between performance and energetic cost.

(13119) MARINOV, M., 1999. *Zdravei ... vodno konche! – [Hi ... dragonfly!]* Bulg.-Swiss Biodiversity Cons. Program, Sofia. 32 pp. ISBN 954-9959-05-8. (Bulg.). – (Publishers: BŠPOB, Ul. Graf Ignatiev 38B, BG-1000 Sofia; – Author P.O. Box 134, BG-1000 Sofia).
An attractive booklet on morphology and biology of Bulgarian dragonflies, directed at general readership.

(13120) MARSHALL, S.A., A.T. FINNAMORE & D.C.A. BLADES, 1999. Canadian peatlands: diversity and habitat specialization of the arthropod fauna. *In*: D.P. Batzer et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and management, pp. 383-400, Wiley, New York, ISBN 0-471-29358-3. – (First Author: Dept Envir. Biol., Univ. Guelph, Guelph, ON, N1G 2W1, CA).
A review of Canadian peatland habitats, incl. a

comprehensive chapter on the Odon. – See *OA* 6131.

(13121) MARTINS-NETO, R.G., 1999. Estado actual del conocimiento de la paleoentomofauna brasileña. *Revta Soc. ent. argent.* 58(1/2): 71-85. (With Engl. s.). – (Lab. Paleont., Depto Biol., FFCL-USP, Campus de Ribeirão Preto-SP, Av Bandeirantes 3900, BR-14040-901 Ribeirão Preto, SP).
A checklist of all hitherto known fossil taxa from Brazil, incl. 9 Cretaceous odon. spp. For descriptions of these see *OA* 8070, 10231, 10233, 11115.

(13122) McPEEK, M.A., 1999. Biochemical evolution associated with antipredator adaptation in damselflies. *Evolution* 53(6): 1835-1845. – (Dept Biol. Sci., Darthmouth Coll., Hanover, NH 03755, USA).
Previous studies have shown that at least 2 lineages of Enallagma shifted from inhabiting lakes with fish as top predators to inhabiting ponds and lakes with large dragonflies as the top predators. In adapting to living with the new predator type, these lineages evolved much greater swimming speeds to avoid attacking dragonflies. In this paper, it is tested whether biochemical adaptations to fuel swimming arose in concert with previously identified morphological changes that increase swimming speed. Assayed are the mass-specific enzyme activities of 3 enzymes involved in fueling strenuous activity: pyruvate kinase and lactate dehydrogenase (enzymes involved in glycolysis) and arginine kinase (the enzyme that recharges the ATP pool). Enzyme activities were determined for 14 Enallagma spp. from across the genus. Spp. that coexist with dragonfly predators had significantly higher mass-specific arginine kinase activities than those that coexist with fish, and the results of evolutionary contrasts analyses indicate that this difference between the 2 groups is the result of evolutionary change associated with the habitat shifts of lineages from fish lakes to dragonfly lakes. Although significant evolution was documented for lactate dehydrogenase and pyruvate kinase across the genus, evolutionary change in the activities of these enzymes was not consistent with adaptation to coexisting with dragonfly predators. Swimming bouts to avoid dragonfly predators last for only a few seconds, and the action of arginine kinase to phosphorylate ADP to make ATP will extend the duration of maximal exertion for swimming for a few seconds. However, much longer time periods (over 45 s.) are required to generate ATP via glycolysis. Therefore, selection may have favored adaptation only at the arginine kinase locus.

(13123) MERRITT, R.W., M.J. HIGGINS, K.W. CUMMINS & B. VANDENEEDEN, 1999. The Kissimmee River-riparian marsh ecosystem, Florida: seasonal differences in invertebrate functional feeding group relationships. *In*: D.P. BATZER et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and management, pp. 55-79, Wiley, New York, ISBN 0-471-29258-3. – (First Author: Dept Ent., Michigan St. Univ., East Lansing, MI 48824, USA).
Historically, the Kissimmee R. was a complex braided channel with an extensive floodplain wetland that was channelized and converted to a series of 5 impoundments during 1962-1971. Restauration of the system has begun now, and the invertebrate community succession is in its early stages, dominated by short life-cycle, rapidly moving spp. Some quantitative data are presented for Coenagrionidae, Gomphidae, Corduliidae and Libellulidae, mostly genus-wise.

(13124) MEYER, D., 1999. *Makroskopisch-biologische Feldmethoden zur Wassergütebeurteilung von Fliessgewässern.* [5th, revised edn]. Natur u. Umweltverlag, Hannover. 142 pp. ISBN 3-9800871-4-X. – (Publishers: Goebenstr. 3a, D-30161 Hannover).
Gives saprobiotic indicator values for larvae of Platycnemis pennipes (2.1), Pyrrhosoma nymphula (2.3), Calopteryx splendens (2.0), C. virgo (1.8), Aeshna cyanea (2.0) and Cordulegaster boltonii (1.5). These spp. are briefly ecologically characterised and their larval structural features are stated.

(13125) MÜLLER, J., 1999. Bestandsentwicklung der Libellen (Odonata). *In*: D. Frank & V. Neumann, [Eds], Bestandssituation der Pflanzen und Tiere Sachsen-Anhalts, pp. 442-448, Ulmer, Stuttgart, ISBN 3-8001-3368-7. – (Frankefelde 3, D-39116 Magdeburg).
An annotated and crossreferenced checklist of the odon. fauna of Sachsen-Anhalt, Germany, with comments on the recent developments in the status of some of them. During the past decade, the quality of the habitats has significantly improved, and the mean annual temperature has increased for 1-2°C

(13126) MUNGENAST, F., 1999. Aus der Nordtiroler Odonatenfauna: die Libellen der Trams bei Landeck (Insecta: Odonata). *Veröff. tirol. Mus. Ferdinandeum*

79: 317-326. (With Engl. s.). – (Stadtplatz 12, A-6460 Imst).
22 spp. are recorded from Trams (alt. 950 m), Tyrol, Austria. The abundance of Erythromma najas and Lestes viridis are notable.

(13127) MUZÓN, J., 1999. Estudios de biodiversidad en la Argentina: proyectos actuales y tendencias. *Revta Soc. ent. argent.* 58(1/2): 128-131. (With Engl. s.). – (Inst. Limnol. "Dr R.A. Ringuelet", C.C. 712, AR-1900 La Plata).
The projects and trends in the biodiversity research in Argentina are outlined and discussed. A reference to the Odon. is also made. The limited funds and the unfavourable "geographic distribution" of entomologists are among the main problems.

(13128) MUZÓN, J. & N. VON ELLENRIEDER, 1999. Status and distribution of Odonata (Insecta) within natural protected areas in Argentina. *Biogeographica* 75(3): 119-128. (With Fr. s.). – (Inst. Limnol. "Dr R.A. Ringuelet", C.C. 712, AR-1900 La Plata).
Of the 264 spp. reported in Argentina, 189 spp. (71.59%) have been recorded from at least one protected area in the past 3 yr. Information gathered from surveys of 16 protected areas is presented in relation to taxonomy (to family level) and biogeography. Spp. known only from Argentina are indicated.

(13129) NARAOKA, H., 1999. [Establishment of Pseudothemis zonata in central and southern Aomori prefecture]. *Gekkan-Mushi* 342: 45. (Jap.). – (36-71, Aza Motoizumi, Fukunoda, Itayanagi-machi, Kita-gun, Aomori pref., 038-3661, JA).
During 1960-1970, the sp. was known in the prefecture (Hokkaido, Japan) from 4 isolated records, considered to represent immigrants from the South. In 1981, the emergence was recorded at Towada City; since 1990 the sp. is known from numerous localities, and immature adults and exuviae were also evidenced. It is suggested, the recent range expansion could be due to global warming.

(13130) *NIEUWSBRIEF VAN DE NEDERLANDSE VERENIGING VOOR LIBELLENSTUDIE*, Vol. 3, No. 4 (Dec. 1999). (Dutch). – (c/o W.J. Hoeffnagel, Krekelmeent 72, NL-1218 ED Hilversum).
[Scientific notes:] *Van der Heijden, A.*: Coenagrion armatum rediscovered at the Weerribben (pp. 4-5); – *Abbingh, G.*: Report on the Appelscha field trip (pp. 5-6); – *Van Steenis, W.*: Cordulegaster boltonii recorded in the city of Utrecht (pp. 7-9); – *Ruiter, E.*: A late sighting of Orthetrum cancellatum (p. 9); – [*Dijkstra, K.-D.*]: [The American Pachydiplax longipennis (?) at an oil production platform in NE England, in September 1999] (p. 9).

(13131) OTT, G., 1999. Selamat datang! Als Aquarianer auf Bali. *Aktuell RundBr. Verb. dt. Ver. Aquarien- Terrarienk.*, 1999(4): 54-59. – (c/o ed.: W. Seuss, Waldsteinblick 21, D-95234 Sparneck).
In the hill village of Tigawasa, Bali, Indonesia, fried adult and larval dragonflies, gathered by children, are eaten by the villagers as supplementary, protein-rich food. – See also *OA* 13173, and *Notul. odonatol.* 4(1994): 60-62.

(13132) OZONO, A., 1999. [Tholymis tillarga taken in Nara prefecture]. *Gekkan-Mushi* 342: 44. (Jap.). – (Higashi 5-7-5, Myoken, Katano, Osaka, 576-0012, JA).
3 ♂, Koryo-cho & Kamimaki-cho, 18-IX-1998 & 25-X-1998. – (*Abstractor's Note*: Other Nara records were provided by B. Irikawa et al., as listed in *OA* 12399).

(13133) PALACIOS-VARGAS, J.G., G. CASTANO-MENESES & A. PESCADOR RUBIO, 1999. Phenology of conopy arthropods of a tropical deciduous forest in western Mexico. *Pan-Pac. Ent.* 75(4): 200-211. – (First Author: Lab. Ecol., Depto Biol., Fac. Cien., UNAM, MX-04510 Mexico, D.F.).
On the coast of Jalisco, the odon. were represented only in July; density: 0.10 individual/m^2.

(13134) PAPAZIAN, M., 1999. Les odonates de Guyane française. 1. Les Calopterygidae (Odonata, Zygoptera). *Entomologiste* 55(6): 235-239. (With Engl. s.). – (La Constellation Bât. A, 72 ave des Caillols, F-13012 Marseille).
5 Hetaerina spp. and 1 Mnesarete sp. occurring in French Guyana are keyed (♂♂ only) and some descriptive notes are provided.

(13135) PAŠIC, L., 1999. *Ocena vrstnega bogastva kačjih pastirjev na področju Brkinov – [An assessment of dragonfly species diversity in the Brkini region]*. Individualna naloga Anim. Ecol. Dept Biol., Univ. Ljubljana. 21 pp. (Slovene). – (c/o M. Bedjanič, Fram 117a, SI-2313 Fram).

126 localities were surveyed from 24 July to 4 Aug. 1996, and 41 spp. were evidenced. The Jackknife method was used for the assessment of spp. diversity, and a comparison is made between the odon. communities of stagnant and flowing waters. – W Slovenia.

(13136) PAULSON, D.R., 1999. Dragonflies (Odonata: Anisoptera) of South Florida. *Occ. Pap. Slater Mus. nat. Hist.* 57: 1-139. – Price US$ 12.- net. – (Orders to the Author: Slater Mus. Nat. Hist., Univ. Puget Sound, 1500 North Warner, Tacoma, WA 98416, USA).

The work is based on Author's 1966 PhD Dissertation of the same title (Univ. Miami, 605 pp.), dealing with 65 spp., 8 of which are here recorded from S Florida for the first time. – The fauna is predominantly temperate (68% of spp.), but about half of the genera are of tropical origin. – At least 19 spp., most of which are of tropical affinities, are probably present as adults throughout the yr in this area; 37 sp. were found earlier or later in the season than previously recorded in the USA. – A few taxonomic changes have resulted from the studies carried out here. Perithemis seminole is relegated to subspecific rank under P. tenera (and is recorded from North Carolina for the first time). The race Celithemis bertha leonora is considered invalid. It is suggested that Epicordulia regina may be a race of E. princeps, Celithemis monomelaena a race of C. fasciata, and Brachymesia gravida a race of B. herbida. The synonymy of Cannacria with Brachymesia and Erythemis with Lepthemis is emphasized. Both of these synonymies were proposed by earlier workers but have been ignored recently. Macrodiplax is considered not sufficiently different from other libellulids to warrant full family status, and the genera of the Sympetrini and Celithemini are rearranged in light of behavioral and larval characteristics. The following are considered sibling spp.: Libellula auripennis and L. needhami; L. axilena, incesta, and vibrans; and Tramea abdominalis, binotata, and cophysa [calverti]. Finally, the S Florida spp. of Holotania are considered more closely related to one another than to the extralimital spp. of the subgenus. – Analysis of a number of spp. indicates that aeshnids tend to acquire more intense wing pigmentation with advancing age and that this characteristic is of value in determining the maturity of specimens. The loss of terminal appendages in females of some genera is also valuable as an indicator of maturity. The larva of Triacanthagyna trifida was found to have small premental setae, a characteristic not previously reported in the Aeshnidae. The presence of palpal setae, long thought to be present in only Gynacantha and Triacanthagyna of that family, is shown in other aeshnid genera. Improvements are suggested for published keys to larvae of the following genera: Boyeria, Anax, Progomphus, Dromogomphus, Tetragoneuria, Ladona, Libellula, Brachymesia and Pantala. – Size variation in the adults of 2 spp. is analyzed. Gomphus minutus decreases in size clinally from north to south throughout its range. Both the adults and larvae of Pachydiplax longipennis vary in size seasonally, the largest individuals occurring during late winter and the smallest during late summer. – The first records of dragonfly parasitism by ceratopogonid flies in the USA are listed for Anax junius, Progomphus alachuensis, Brachymesia gravida, Lepthemis simplicicollis, and Tramea carolina. Miathyria marcella was found to be the second known exophytic dragonfly to select a single plant sp. for oviposition sites. Perithemis tenera is considered an effective wasp mimic, the only known incidence of this phenomenon other than in the Old World Tropics.

(13137) PAVLYUK, R.S. & C.V. GOLOVACHOV, 1999. The first record of Orthetrum anceps (Odonata, Libellulidae) in the fauna of Ukraine. *Vest. Zool.* 33(4/5): 44. (Ukrainian, with Engl. title). – (First Author: Zool. Mus., Fac. Biol., St. Univ. Lvov, UA--290005 Lvov).

Alupka (Crimea), 3 ♂, 1 ♀, 8-VII-1998.

(13138) PETRULEVICIUS, J.E., 1999. Insectos del Cenozoico de la Argentina. *Revta Soc. ent. argent.* 58(1/2): 95-103. (With Engl. s.). – (Depto Paleozool. Invert., Mus. La Plata, Paseo del Bosque s/n, AR--1900 La Plata).

Includes annotations on hitherto undescribed Odon. from the Maiz Gordo Formation, Upper Paleocene, NW Argentina (Aeshnidae, ?Polythoridae, a new fam.).

(13139) PLAISTOW, S. & M.T. SIVA-JOTHY, 1999. The ontogenetic switch between odonate life history stages: effects on fitness when time and food are limited. *Anim. Behav.* 58(3): 659-667. – (Second Author: Dept Anim. & Plant Sci., Univ. Sheffield, Sheffield, S1O 2UQ, UK).

During the course of ontogeny, odon. switch from

being aquatic larvae to being terrestrial adults. Ontogenetic niche shift theory proposes that such shifts are adaptive and have evolved to maximize a growth rate (size) to mortality rate ratio. Individuals should therefore switch from one niche to the other at an optimal size or state. Since the majority of odon. are seasonal breeders, the extent to which the switch is optimal will depend upon the time and the resources available during postembryonic development. A cohort of Calopteryx splendens xanthostoma larvae was collected that varied in how close they were to eclosion and reared them on either a high--nutrition or a low-nutrition diet. Then the relative influence of both time and nutritional constraints on survival and development rate, as well as the body size, size-corrected flight muscle mass and fat reserves of individuals at eclosion were determined. Damselflies in both high- and low-nutrition treatments responded to a short development period by developing faster and reducing their body size, but did not change their proportional investment in fat reserves and flight muscle. Reduced larval nutrition resulted in decreased body size, flight muscle mass and fat reserves at eclosion. However, it had no effect on survival to eclosion or development rate. These results are discussed in terms of the influence that time and nutritional constraints have on odonate development patterns and fitness.

(13140) PORTER, K.G., A. BERGSTEDT & M.C. FREEMAN, 1999. The Okefenokee Swamp: invertebrate communities and foodwebs. *In*: D.P. Batzer et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and management, pp. 121--138, Wiley, New York, ISBN 0-471-29258-3. – (First Author: Inst. Ecol., Univ. Georgia, Athens, GA 30602, USA).
This is one of the largest wetlands in N. America, 3781 km^2, in the lower Atlantic Coastal Plain, S. Georgia and N. Florida. Close to 20 odon. spp. are listed for Little Cooter Prairie, and seasonal patterns of some of them are outlined. While Erythemis simplicicollis, Libellula axilena and Pachydiplax longipennis were almost constantly abundant, E. minuscula and Ischnura spp. fluctuated interannually. These patterns may include influences of hydrology and community interactions on populations,. and further investigations are suggested.

(13141) RELYEA, R.A. & E.E. WERNER, 1999. Quantifying the relation between predator-induced behavior and growth performance in larval anurans. *Ecology* 80(6): 2117-2124. – (First Author: Dept Biol. Sci., Univ. Pittsburgh, Pittsburgh, PA 15260, USA).
To examine the relation between species traits and performance, behavioural responses of larval Rana catesbeiana and R. clamitans to 3 predator spp. were first examined in the laboratory. Subsequently, the responses were correlated with growth performance of the 2 frogs when they competed in the field. In the laboratory experiment, larval frogs exhibited no reduction in activity or spatial avoidance to bluegill sunfish (Lepomis macrochirus), the reduction of these was moderate in case of mudminnows (Umbra limi), while the response to Anax larvae was large. In the field experiment, these behavioural responses were directly related to corresponding reductions in growth of the 2 frogs.

(13142) RIFFELL, S.K., 1999. Road mortality of dragonflies (Odonata) in a Great Lakes coastal wetland. *Great Lakes Ent.* 32(1/2): 63-73. – (Dept Zool., Michigan St. Univ., East Lansing, MI 48824, USA).
Road mortality of invertebrates has rarely been studied or considered in management scenarios. Mackinac Bay is an extensive coastal wetland in northern Michigan. It is bordered by a two-lane paved highway that separates the marsh, where dragonflies defend territories and breed, from the adjacent forest, where dragonflies forage and rest. During mid-summer of 1997, daily collections of dragonfly corpses from the road and road edge were used to estimate daily mortality rates and sex ratios among casualties. Daily mortality was highly variable, ranging from 10 to 256 casualties/km. Sex ratios among casualties were generally ♂-skewed (60% or higher). Life-history differences between the sexes present a parsimonious explanation for ♂-specific mortality. Mortality was even or ♀-skewed for some spp., and impacts of road mortality may be more severe in populations where mortality is ♀-skewed. More research about the effects of roads on dragonflies is warranted because dragonfly populations are small relative to many invertebrates and are restricted to wetland habitats which are being degraded or destroyed in many regions.

(13143) ROBERTS, S.P. & J.F. HARRISON, 1999. Mechanisms of thermal stability during flight in the honeybee Apis mellifera. *J. exp. Biol.* 202(11): 1523--1533. – (First Author: Dept Organismal Biol. &

Anat., Univ. Chicago, 1027 E. 57th St., Chicago, IL 60637, USA).
With reference to the paper listed in *OA* 10582 and in support of the mechanical power hypothesis, it is emphasized that like in dragonflies, there is a negative relationship between wingbeat frequency and air temperature also in the honeybee (and some other Hymenoptera).

(13144) ROIG-JUNENT, S.A. & S. CLAVER, 1999. La entomofauna del monte y su conservación en las áreas naturales protegidas. *Revta Soc. ent. argent.* 58(1/2): 117-127. (With Engl. s.). – (Inst. Argent. Invest. de Zonas Aridas, IADIZA, C.C. 507, AR-5500 Mendoza).
The "monte" is a common denomination for the warm shrub desert, extending from the prov. of Salta to the prov. of Chubut, covering ca 60% of the Argentinian surface. Entomologically, only its northern part is reasonably well explored. 22 odon. spp. were so far recorded, but a checklist is not given here.

(13145) SCHAFFNER, A.K., 1999. Influence of predator presence and prey density on behaviour and growth of damselfly larvae (Ischnura elegans). *MittBl. ethol. Ges.* 43: 46 [abstract only]. – (c/o Zool. Inst., Univ. Zürich, Winterthurer Str. 190, CH-8057 Zürich).
Verbatim abstract, as listed in *OA* 12775.

(13146) SCHIEL, F.-J., 1999. *Torfstiche, ein Lebensraum der Grossen Moosjungfer.* Schutzgemeinschaft Libellen in Baden-Württemberg, Freiburg/Main. 15 pp. [Fold. pamphlet]. – (Friesenheimer Hauptstr. 20, D-77948 Friesenheim).
An outline of Leucorrhinia pectoralis biology in Baden-Württemberg, Germany, directed at general readership.

(13147) SIVA-JOTHY, M.T., 1999. Male wing pigmentation may affect reproductive success via female choice in a calopterygid damselfly (Zygoptera). *Behaviour* 136(10/11): 1365-1377. – (Dept Anim. & Plant Sci., Univ. Sheffield, Sheffield, S10 2UQ, UK).
♂ calopterygids show striking morphological and behavioural secondary sexual traits which are known to function in intrasexual contests. The distribution of pigment in the sexually dimorphic wing 'spot' is prominently displayed to the ♀ during courtship, yet there is little empirical evidence that this trait functions in an epigamic context. Observations of marked field populations revealed (a) there was variation in wing pigment distribution in ♂♂, (b) the pigmentation was fixed in reproductively active ♂♂, (c) resource holding ♂♂ had less heterogeneity in the distribution of the wing pigment than ♂♂ that were never observed to hold a resource and (d) that ♀♀ frequently (60.3%) rejected ♂♂ after courtship. An experiment was conducted in which the frequency of key reproductive behaviours (♀ inspection flights, courtships, copulations, and oviposition) was measured for the same ♂: utilising the same territory before and after treatment or control manipulation of wing pigment parameters. Increasing the heterogeneity (and decreasing the area) of the wing pigmentation by removing small areas of pigmented cuticle from their wings resulted in a decrease in the measured reproductive behaviours (control ♂♂ that had non-pigmented areas removed from their wings showed no decreases). Since ♀♀ cannot be coerced into these behaviours, the experimentally induced decrease suggests ♀♀ avoided ♂♂ with higher levels of wing pigment heterogeneity. The results are discussed in the context of the benefits ♀♀ might receive as a consequence of their reproductive decisions.

(13148) SMOLKA, G.E., P.M. STEWART & T.O. SWINFORD, 1999. Distribution of odonates (dragonflies and damselflies) in the Indiana Dunes, National Lakeshore and nearby lands. *Natural Areas Jl* 19(2): 132-141. – (Second Author: Lake Michigan Ecol. Res. Stn, 1100 N. Mineral Springs Rd, Porter, IN 46304, USA).
From 1993 to 1997, 60 spp. (incl. the regionally rare Enallagma cyathigerum, Aeshna clepsydra and Leucorrhinia frigida) were evidenced, in contrast to 34 spp. recorded historically from this region. On the other hand, 9 spp. listed in the historical records were missing from the present collections. Since few odon. surveys were conducted in NW Indiana, USA in the past, a poor baseline exists for comparisons of temporal trends in odon. diversity.

(13149) STOKS, R., M. DE BLOCK, H. VAN GOSSUM & L. DE BRUYN, 1999. Phenotypic shifts caused by predation: selection or life-history shifts? *Evol. Ecol.* 13(2): 115-129. – (Evol. Biol. Gr., Dept Biol., Univ. Antwerpen, Groenenborgerlaan 171, B-2020 Antwerpen).

Predators can impose both selection and life history shifts in prey populations. Since both processes may affect phenotypic distributions, the estimates of selection differentials may be biased. 2 field experiments were carried out to disentangle these separate effects. It was examined whether Aeshna cyanea predation changes the distributions in body size and lamellae morphology in Lestes sponsa. The zygopt. caudal lamellae are used in escapes by swimming. In the first experiment, the presence of the predator was manipulated (no Aeshna, encaged Aeshna, free-ranging Aeshna), and the experiment was stopped when all larvae had moulted once. In the second experiment, larvae were confronted with a free-ranging Aeshna, but collected before moulting, and survivors were compared with a control sample taken at the start of the experiment. The presence of Aeshna largely reduced the survival probabilities of the Lestes larvae at a very similar rate in both experiments. Daily survival probabilities did not differ between the 'no Aeshna' and 'encaged Aeshna' treatments. In the 'free-ranging Aeshna' treatment of the first experiment, size was reduced compared to the other 2 treatments, creating a significant apparent selection differential. This was probably mainly due to predator-induced reduced growth because in the second experiment, where growth effects were excluded, size of the survivors did not differ from the control sample. In both experiments there was a significant selection pressure for larger lamellae. Standardized directional selection differentials were similar in both experiments (0.57 and 0.28 phenotype standard deviation units). No survival selection on lamellae shape was detected. These results are in agreement with previous findings that lamellae size, but not lamellae shape, enhances swimming performance and thereby predator escape in this sp.

(13150) TANIKADO, M., 1999. [Book review] [All about dragonflies, by K. Inoue & K. Tani]. *Gekkan-Mushi* 342: 37. (Jap.). – (Author's address not stated).
A brief review of the volume described in *OA* 12676. The outstanding treatment of Mnais is emphasized.

(13151) TAYLOR, B.E., D.A. LEEPER, M.A. McCLURE & A.E. DeBIASE, 1999. Carolina bays: ecology of aquatic invertebrates and perspectives on their conservation. *In*: D.P. Batzer et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and management, pp. 167-196, Whiley, New York, ISBN 0-471-29258-3. – (First Author: Drawer E, Savannah R. Ecol. Lab., Aiken, SC 29802, USA).
The bays are shallow, isolated basins in the Atlantic Plain, mainly in N. and S. Carolina, containing palustrine habitats. 12 odon. genera are listed, but the odon. occurrence in Carolina bays may be limited by seasonal drying of aquatic habitats. Biological features of the prevailing spp. are briefly outlined, and references to the primary faunistic literature are stated.

(13152) VAN DIJK, D.E. & H. GEERTSEMA, 1999. Permian insects from the Beaufort Group of Natal, South Africa. *Ann. Natal Mus.* 40: 137-171. – (First Author: Dept Zool., Univ. Stellenbosch, Private Bag X1, Matieland-7602, SA).
From the Upper Permian (Beaufort Group of the Karoo Sequence) of Balgowan nr Lidgetton and Mt West nr Mooi R., an anisozygopteran and a protanisopteran (Permaeschnidae, cf. Polytaxineura), resp. are listed. This is the first evidence of the odon. occurrence in the Permian of Africa.

(13153) VAN GOSSUM, H., R. STOKS, E. MATTHYSEN, F. VALCK & L. DE BRUYN, 1999. Male choice for female colour morphs in Ischnura elegans (Odonata, Coenagrionidae): testing the hypotheses. *Anim. Behav.* 57(6): 1229-1232. – (Evol. Biol. Gr., Dept Biol., Univ. Antwerpen, Groenenborgerlaan 171, B-2020 Antwerpen).
The occurrence of different conspecific ♀ colour morphs, with one of the morphs resembling the ♂, is supposed to have consequences for mate choice. There are two hypotheses linking mate choice and ♀ colour polymorphism. First, ♂♂ may mate predominantly with ♀ morphs that differ from the ♂ because they do not recognize androchrome ♀♀ as ♀♀ (♂ mimic hypothesis). Second, ♂♂ may be more attracted to the most common morph in the population (habituation hypothesis). These hypotheses were tested in 5 populations of the same sp., L. elegans, with a range of androchrome frequencies. In each population binary choice experiments were performed in small cages. ♂♂ did not consistently prefer gynochrome ♀♀, but mated predominantly with the most common morph in the population. Moreover, a reanalysis of the available damselfly data in the literature also supported the habituation hypothesis.

(13154) VAN GOSSUM, H. & F. VALCK, 1999. Een juffertje tussen de soldaten? *Wielewaal* 65(4): 126-

-127. (Dutch). – (First Author: Evol. Biol. Gr., Dept Biol., Univ. Antwerpen, Groenenborgerlaan 171, B--2020 Antwerpen).
The habitat and biology of Coenagrion lunulatum at the military training area of Groot Schietveld in Brasschaat, Belgium are briefly described. In Flanders the sp. is known from 7 localities, all in the provinces of Antwerp and Limburg.

(13155) VIZSLAN, T. & B. PINGITZER, 1999. Adatok Magyarország szitakötö-faunájához (Odonata), 3 – Data on the Odonata fauna of Hungary, 3. *Folia hist. nat. Mus. matraensis* 23: 179--190. (Hung., with Engl. s.). – (Madarász ut. 12, HU--3525 Miskolc).
The 1998 records for 47 spp., from 151 localities in Hungary. – For pts 1 & 2 see *OA* 13034, 13044.

(13156) VOGRIN, N. & M. VOGRIN, 1999. Krajinski parki Slovenije: Rački ribniki – Požeg. – [Landscape parks of Slovenia: "Rački ribniki-Požeg"]. *Gea, Ljubljana* 9(12): 6-9. (Slovene). – (c/o M. Bedjanič, Fram 117/A, SI-2313 Fram).
A general description, with a brief paragraph on odon.; no species list. It is emphasized, the Park harbours ca 75% of odon. spp. known to occur in Slovenia. – (For a checklist and description of the fauna see *OA* 12796.)

(13157) WARD, J.B. et al. [21 authors], 1999. Insects and other arthropods of Hinewai Reserve, Banks peninsula, New Zealand. *Rec. Canterbury Mus.* 13: 97-121. – (Canterbury Mus., Rolleston Ave, Christchurch-8001, NZ).
Austrolestes colensonis and Uropetala ?chiltoni are listed.

(13158) WATANABE, Y., H. YOKOTA, K. KATO & M. HATAKEYAMA, 1999. Artificial parthenogenesis in the dragonfly Stylurus oculatus (Odonata). *Proc. arthropod. embryol. Soc. Jpn* 34: 31-32. (Jap., with Engl. title & tabs). Unabridged Engl. translation, by K. Inoue, is available from the Eds of *Odonatologica*. – (First Author: 4-14 Nishida-cho, Nishinomiya, Hyogo, 662-0031, JA).
In the laboratory, the normally oviposited eggs yielded normal embryos, with sex ratio (identified from the karyotypes, 2n♂ = 23, 2n♀ = 24), ♂:♀ = 8:21 (= 2.6). The eggs dissected from the anterior section of the ovary (hence considered unfertilized) were divided into 2 groups: some were macerated with sperm, the others without it. Fewer than 20% of eggs hatched, and many of the resulting larvae were malformed, missing abd. segments or legs. In both groups, all were diploid ♀♀, but in some of them some cells were haploid (n = 12). – It seems, in this case a thelytoky occurred in combination with parthenomixis. Earlier, on supposition, parthenogenesis was hypothesized in Anomalagrion hastatum in the Azores, where also only ♀♀ occur in the population (cf. *OA* 7617).

(13159) WILLIAMS, D.D. & N.E. WILLIAMS, 1999. Canadian springs: postglacial development of the invertebrate fauna. *In*: D.P. Batzer et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and management, pp. 447-467, Wiley, New York, ISBN 0-471-29258-3. – (Div. Life Sci., Univ. Toronto, Scarborough, ON, M1C 1A4, CA).
The hydrachnid mites, Trichoptera, Coleoptera and Chironomidae have been studied in some detail. Community composition has a strong E/W dichotomy, and has been influenced markedly by the recent glacial history in combination with different dispersal abilities among spp.; springs and non-glaciated regions of the US have more diverse faunas. Amphiagrion abbreviatum, Argia vivida, Cordulegaster dorsalis and Libellula quadrimacultata are recorded from Canadian thermal springs (see also *OA* 8507).

(13160) WISSINGER, S.A., A.J. BOHONAK, H.H. WHITEMAN & W.S. BROWN, 1999. Subalpine wetlands in Colorado: habitat permanence, salamander predation, and invertebrate communities. *In*: D.P. Batzer et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and management, pp. 757-790, Wiley, New York, ISBN 0-471-29258-3. – (First Author: Dept Biol., Allegheny Coll., Meadville, PA 16335, USA).
Wetlands are abundant in wet subalpine and montane valleys on the W slopes of the Rocky Mts. Here, the odon. are used in basin characterization for 41 wetlands at the Mexican Cut Nature Preserve, and 5 spp. are listed.

(13161) WISSINGER, S.A. & L.J. GALLAGHER, 1999. Beaver pond wetlands in northwestern Pennsylvania: modes of colonization and succession after drought. *In*: D.P. Batzer et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and management, pp. 333-362,

Wiley, New York, ISBN 0-471-29258-3. – (First Author: Dept Biol., Allegheny Coll., Meadville, PA 16335, USA).
Wetlands associated with beaver dams have become increasingly abundant in N. America as beaver populations have recovered during the last century. The distribution of 32 odon. spp. in 4 autumnal and permanent wetlands associated with beaver activity at the Bousson Environmental Research Reserve is outlined and discussed.

(13162) YAMAMOTO, Y., 1999. Trigomphus melampus Selys in Ayama, Mie pref. *Gekkan-Mushi* 344: 12-16. (Jap., with Engl. title). – (Nizigaoka, 2-7--6-704, Meito-ku, Nagoya, 465-0078, JA).
The present distribution of T. melampus and its kin, T. interruptus, in the Ayama Hills, is addressed from the point of view of the Middle and Late Pliocene paleogeographical development of the Iga Basin area, Japan.

(13163) YOZZO, D.J. & R.J. DIAZ, 1999. Tidal freshwater wetlands: invertebrate diversity, ecology and functional significance. *In*: D.P. Batzer et al., [Eds], Invertebrates in freshwater wetlands of North America: ecology and management, pp. 889-918, Wiley, New York, ISBN 0-471-29258-3. – (Second Author: School Marine Sci., Virginia Inst. Marine, Coll. William & Mary, Gloucester Point, VA 23062, USA).
Tidal freshwater wetlands are found in all coastal areas of N. America, they are most extensive along the Atlantic coast between Georgia and New England, along the coastal plain rivers in South Carolina, etc. Enallagma durum is among the documented predators in the study area. Anomalagrion sp., Gomphus sp. and Perithemis sp. are evidenced for tidal freshwater marshes of the James R., Virginia.

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(13164) BRASKAMP, A., 2000. Ein Naturpfad durch das Naturschutzgebiet "Wildes Moor" bei Schwabstedt. *Heimatkalender Nordfriesland* 2000 [Zwischen Eider und Wiedau]: 164-184. – (Westerstr., D-25876 Schwabstedt).
Calopteryx splendens, C. virgo and Aeshna viridis are listed from Nature Reserve "Wildes Moor" nr Schwabstedt, Northfriesland, Germany.

(13165) EKLOV, P. & E.E. WERNER, 2000. Multiple predator effects on size-dependent behavior and mortality of two species of anuran larvae. *Oikos* 88(2): 250-258. – (Second Author: Dept Biol., Univ. Michigan, Ann Arbor, MI 48109, USA).
The paper is focussed on how trait changes in predators and prey may be transmitted to other spp. in the food web. In laboratory experiments, the effects were examined of bluegill sunfish, Lepomis macrochirus, and Anax junius larva on behaviour and mortality of tadpoles of the bullfrog, Rana catesbeiana, and the green frog R. clamitans. Experiments were conducted with predators alone and together to assess effects on behaviour and mortality of the tadpoles. The experiments were replicated on 5 size classes of the tadpoles to evaluate how responses varied with body size. Predation rates by Anax were higher on bullfrogs than on green frogs, and both bullfrogs and green frogs suffered greater mortality from Anax than from bluegill. Bluegill only consumed green frogs. Predation rates by both predators decreased with increasing tadpole size and decreased in the non-lethal (caged) presence of the other predator. Both anuran larvae decreased activity when exposed to predators. Bullfrogs, however, decreased activity more in the presence of Anax than in the presence of bluegill, whereas green frogs decreased activity similarly in the presence of both predators. The largest size class of green frogs, but not of bullfrogs, exhibited spatial avoidance of bluegill. These responses were directly related to the risk posed by the different predators to each anuran sp. Anax activity (speed and move frequency) also was higher when alone than in the non-lethal presence of bluegill. Decreased predation rate of each predator in the non-lethal presence of the other, apparently caused by 2 different mechanisms was observed. Bluegill decreased Anax mortality on tadpoles by restricting the Anax activity. In contrast, Anax decreased bluegill mortality on tadpoles by reducing tadpole activity. A discussion how the activity and spatial responses of the tadpoles interact with palatability and body size to create different mortality patterns in the prey spp. and the implications of these results to direct and indirect interactions in this system is provided.

(13166) FRITZSCHE, I. & B. GITSAGA, 2000. Terrestrische Arthropoden als Nahrungs- und Genussmittel auf thailändischen Märkten. *Ent. Z., Stuttgart* 110(1): 2-4. (With Engl. s.). – (First Author: Hubertstr. 1, D-38855 Wernigerode; – Second

Author: 67/2 mu 4, Bandaima Station, Pak Chong, prov. Korat-30100, Thailand).
Notes on insects sold in Thailand as human food are provided. As consumables are used Orthoptera, Heteroptera, Coleoptera, Hymenoptera and Lepidoptera, but no reference is made to the Odon. Some information on food preparation methods are included.

(13167) GERKSIC, T., 2000. Prizadevanje za ustanovitev krajinskega parka na Ljubljanskem Barju – [Endeavour for proclamation of a Landscape Park on the Ljubljana Moor]. *Delo, Ljubljana* 42(26): 7; issue of 1 Feb. (Slovene). – (More information available from: Ms A. Pirnat, Groharjeva 18, SI-1241 Kamnik).
The survey of the odon. fauna is expected to become available in summer 2000; – Slovenia. – See *OA* 12165.

(13168) HÄMÄLÄINEN, M., 2000. Risiocnemis seideschwarzi spec. nov., an endangered damselfly from Tabunan forest in Cebu, the Philippines (Odonata: Platycnemididae). *Ent. Ber., Amst.* 60(3): 46-49. (Sunankalliontie 13, FIN-02760 Espoo).
The new sp. (holotype ♂: Tabunan, 9-II-1999; deposited in RMNH, Leiden) is described, illustrated and compared with the closely related R. rolandmuelleri. It is endemic to Cebu. As a forest stream dweller it has a very limited area left for survival. Its endangered status is emphasized and its remaining habitat in the Tabunan forest area is characterized in detail.

(13169) HOFFMANN, A. & D. HERING, 2000. Wood-associated macroinvertebrate fauna in central European streams. *Int. Revue Hydrobiol.* 85(1): 25-48. – (First Author: Inst. Freshw. Ecol., Dept Lowland Rivers & Shallow Lakes, P.O. Box 850119, D-1261 Berlin).
In a review of aquatic spp. closely associated with wood, Calopteryx splendens, C. virgo and Ophiogomphus serpentinus are listed, without further comments.

(13170) JONSEN, I.D. & P.D. TAYLOR, 2000. Fine-scale movement behaviors of calopterygid damselflies are influenced by landscape structure: an experimental manipulation. *Oikos* 88(3): 553-562. – (Second Author: Atlantic Coop. Wildl. Ecol. Res. Network, Biol. Dept, Acadia Univ., Wolfville, NS, P0B 1X0, CA).
The effect of difference in landscape structure, arising from habitat loss, was studied in Calopteryx aequabilis and C. maculata, in the Annapolis Valley region, Nova Scotia, Canada. Both spp. require streams for breeding and forests for foraging. Movement behaviours were compared across 3 types of landscape, viz. forested landscapes (where stream and forest habitat are adjacent), partially forested landscapes (where these habitats are disjunct), and non-forested landscapes (where little or no forest habitat is available). A reciprocal transplant experiment is employed, to determine the extent to which movement along and away from streams is influenced by landscape structure and historical behaviour or morphological adaptations. For both spp. it is shown that the propensity to move away from streams and the rates of net displacement differ among landscape types. Both spp. move away from streams on landscapes with high or moderate levels of forest cover but neither moves away from streams on landscapes with little or no forest. Furthermore, C. maculata native to predominantly forested landscapes are more likely to move away from streams, regardless of the landscape structure they encounter, than are individuals native to moderately forested or non-forested landscapes. There was no effect of natal landscape on C. aequabilis. Comparisons with micro-landscape studies suggest that there may be some general similarities among the different systems but these are clouded by uncertainty regarding the similarity of the underlying processes responsible for observed behavioural responses to landscape structure. Despite this uncertainty, animal movement behaviours are contingent upon the structure of the broader landscape, regardless of the absolute scale of the landscape.

(13171) KIAUTA, M., 2000. Prvi žafran – [The first crocus]. *Apokalipsa* 34/36: 245-247. (Slovene). – (P.O. Box 256, NL-3720 AG Bilthoven).
A selection of 22 haiku (incl. a dragonfly motif) from the book listed in *OA* 12882. – The book appeared mid April 2000; – 2 informative reviews were published almost simultaneously in: *Revija o Knjigi* 2000(1): 19, and *Grosupljski Odmevi* 35(4): 13.

(13172) LAURILA, A., 2000. Behavioural responses to predator chemical clues and local variation in antipredator performance in Rana temporaria tadpoles. *Oikos* 88(1): 159-168. – (Dept Pop. Biol., Evol. Biol. Cent., Uppsala Univ., Norbyvägen 18 d, S-75236 Uppsala).

Antipredator behaviour was studied in tadpoles from 3 populations that differ in predator regimes. In the first experiment, tadpoles obtained from four natural matings in each population were subjected to chemical cues from either European perch (Perca fluviatilis) or from larvae of Aeshna juncea. Tadpoles decreased their activity in response to both predators, but the spatial behaviour of tadpoles differed between the 2 predator treatments. In general, there were no differences in behaviours among the populations, but in 3 out of 4 studied behaviours there were differences between parentages within the populations suggesting that these behaviours may be genetically determined. The lack of a significant Predator x Population interaction suggests no differences in plastic antipredator behaviour among the populations, while the lack of significant Predator x Parentage interaction suggests no genetic variance within the populations for plastic antipredator behaviour. In the second experiment, tadpoles from the 3 populations were exposed to predation by a free-ranging A. juncea. In line with the first experiment, there were no differences in survival rate between the populations. R. temporaria tadpoles seem to rely heavily on plastic antipredator behaviour as their main response to predator chemical cues. There was very little indication of local behavioural differentiation and the possible reasons for the lack of divergence among populations are discussed.

(13173) OTT, G., 2000. Orthetrum pruinosum pruinosum. *Aktuell RundBr. Verb. dt. Ver. Aquarien-Terrarienk.* 2000(2): 59.
A supplementary note to the paper listed in *OA* 13131. The sp. used as human food is identified as O. p. pruinosum, and one of its habitats, a waterfall in the Batakau Hills, Bali, is described. A reference is also made to the novel by V. Baum, *Liebe und Tod auf Bali* (1997, Kiepenheuer & Witsch, Köln), where the comsumption of dragonflies by the Bali villagers is described (1st edn published in 1937).

(13174) *RUNDBRIEF ARBEITSKREIS LIBELLEN NORDRHEIN-WESTFALEN*, Essen, No. 7 (10 March 2000). – (c/o K.-J. Conze, Listerstr. 13, D-45147 Essen).
On 12 pp., it includes agenda of the meeting of the North Rhine Westphalia (Germany) dragonfly association (25 March 2000) and the updated regional grid distribution maps for 60 spp.

(13175) *TAGUNGSBAND 19. Jahrestagung der Gesellschaft Deutschsprachiger Odonatologen, Schwäbisch Hall, 17.-19. März 2000.* GdO, Mönchengladbach. 31 pp. – (c/o Mrs U. Krüner, Gelderner Str. 39, D-41189 Mönchengladbach).
[Abstracts of papers]: *Riexinger, W.-D.*: Naturschutz an Fliessgewässer-Okosystemen am Beispiel der Jagst, Baden-Württemberg (p. 9); – *Schmidt, B.*: Modelluntersuchung zur Flusslibellenfauna der Jagst, insbesondere zu Metapopulationen von Gomphiden (pp. 9-11); – *Sternberg, K.*: Die Verbreitung der Libellen Baden-Württembergs im Einfluss der geographischen Lage und Topographie des Landes (p. 12); – *Schiel, F.-J., A. Schanowski & M. Rademacher*: Aktuelle Bestandsentwicklung von und geplante Schutzmassnahmen für Leucorrhinia caudalis in Baden-Württemberg (pp. 12-13); – *Hunger, H.*: Bemerkenswerte Vorkommen von Sympetrum pedemontanum und S. fonscolombii in der Oberrheinebene (p. 13); – *Rademacher, M.*: Libellengemeinschaften von Kleingewässern im Randbereich einer Kiesgrube der Hartheimer Trockenaue (Landkreis Breisgau-Hochschwarzwald, Baden-Württemberg) (p. 14); – *Buchwald, R. & W. Röske*: Welche Bedeutung hat die Vegetation für die Wahl des Kleinhabitats bei Zygopteren (pp. 14-15); – *Bárdosi, E., Z. Müller, S. Nagy, Gy. Devai, B. Kiss, Z. Csabai, A. Móra & N. Szálassy*: Ein Vorschlag zur quantitativen Sammlung der in den verschiedenen Pflanzenbeständen lebenden Libellenlarven (p. 15; title only); – *Buczynski, P.*: Zwischen Ost und West: Sympecma paedisca in Polen (p. 16); – *Samraoui, B., S. Bouizid & P.S. Corbet*: Delayed maturation in Algerian Odonata: a response to the mediterranean climate (pp. 16-17); – *Jödicke, R.*: Saisonale Anpassung mediterraner und mitteleuropäischer Sympetrum striolatum (p. 17); – *Olberg, R.*: Neuroethology of prey pursuit, 1: neural signalling from eyes to wings (p. 18); – *Worthington, A.*: Neuroethology of prey pursuit, 2: video analysis of prey interception (p. 18); – *Schneider, W.*: Die Insel Soqotra: Galapagos des Indischen Ozeans (p. 19); – *Bedjanič, M.*: Dragonfly observations in southern Borneo, Indonesia (p. 19); – *Ott, J.*: 15 Jahre Monitoring der Libellenfauna einer Kiesgrube: wann ist endlich Schluss? (pp. 19-20); – *Kuhn, J. & J.M. Müller*: 20 Jahre Libellen am Schmiechnener See: Zwischenbilanz einer Langzeitstudie (p. 20): – *Wildermuth, H.*: Hat sich das Rotationsmodell zur Pflege kleiner Libellengewässer bewährt? Rückschau auf 20 Jahre Erfahrung (p. 21); – *Clausnitzer,*

H.-J.: Auswirkung einer Naturschutzmassnahme auf Libellen (pp. 21-22); – *Brockhaus, T.*: Grössendifferenzierungen in Libellenpopulationen und ihre mögliche Bedeutung für die Populationsdynamik (p. 22); – *Jahn, P.*: Kopfhöcker als Sonderbildungen früher Stadien von Libellenlarven (p. 23): – *Grebe, B.*: Violinen und kleine Müller: Libellen in Bulgarien (p. 23); – *Günther, A.*: Reproduktionsverhalten einer bisher unbeschriebenen Form der Gattung Disparocypha aus Zentralsulawesi (Indonesien) (p. 24); – [*Kunz, B.*]: Landschaft und Libellen um Schwäbisch Hall (pp. 25-27).

(13176) *TOMBO. ACTA ODONATOLOGICA JAPONICA*, Vol. 42, No. 1/4 (dated 1 Feb. 2000, mailed in Japan 8 March 2000). (Jap., with Engl. titles & s.'s). – (c/o Prof. Dr S. Eda, Dept Oral Pathol., Matsumoto Dental Univ., 1780 Gobara, Hirooka, Shiojiri, Nagano, 399-0781, JA).
Eda, S.: Oviposition of Deielia phaon (Selys) in the rain, at Sunahara pond in Ueda, Nagano pref. (p. 1; cover phot.).; – *Hirose, Y.*: The molecular evolutionary genetics of Japanese Odonata by mitochondrial DNA sequence (pp. 2-13); – *Kagimoto, B.*: An old male of Orthetrum poecilops miyajimaense guarded females without copulation with the male before [sic!] (p. 14); – *Aoki, T.*: An expansion of Ictinogomphus pertinax (Selys) in Japan based on past records (pp. 15-22); – *Naruse, K. & S. Eda*: An abnormally melanized male of Polycanthagyna melanictera (p. 22); – *Karube, H.*: Additional records on the genus Petaliaeschna of northern Vietnam, with description of a new species (pp. 23-25); P. tomokunii sp. n.); – Present circumstances of the habitats of Sympetrum maculatum Oguma (pp. 26-30); – *Eda, S.*: A hybrid male supposed between Sympetrum e. eroticum and S. baccha mutatinum (p. 30); – *Kurashima, H. & N. Kikuya*: A study of the female's behavior that does not lay eggs after the copulation in Libellula angelina (pp. 31-38); – *Hara, T.*: How to conserve Mortonagrion hirosei from the construction of the Bay Coast Road in Ube city, Yamaguchi pref. (pp. 39-41); – *Eda, S.*: Two records of Epiophlebia superstes in Nagano prefecture (p. 42); – *Matsuki, K. & Y. Saito*: Description of the larva of Mnais mneme (Ris, 1916) (Calopterygidae) from Hong Kong (pp. 43-45); – *Sasamoto, A. & K. Ushijima*: Notes on the larva of Anax nigrofasciatus nigrolineatus Fraser (pp. 46-48); – *Sasamoto, A.*: An endoparasite from Psolodesmus kuroiwae Oguma (p. 48); – *Yokota, H. & Y. Watanabe*: Larval breeding record of Stylurus annulatus (Djakonov) (pp. 49-53); – *Kita, H.*: Non-contact sitting-oviposition of Ictinogomphus clavatus (p. 54); – *Yokoyama, T.*: Larval growth of Leucorrhinia intermedia ijimai Asahina (pp. 55-59); – *Yokoyama T.*: A record of Boyeria maclachlani in southern Hokkaido (p. 59); – *Eda, S.*: An introduction to new odonate books (p. 60); – *Wada, S.*: Observation on a Y-shaped triple connection of Lestes temporalis Selys (pp. 61-62); – *Taketo, A.*: On Odonata of Ishikawa and Fukui prefectures in 1999 (pp. 63-64); – Transition of odonate fauna in the newly-formed ponds in Kanazawa: situation in the 7th year (pp. 65-66); – Somatochlora clavata in Tsuno, Miyazaki prefecture (p. 66); – *Futahashi, R. & Y. Araki*: Records of interspecific hybrid between Sympetrum kunckeli and S. e. eroticum (p. 67); – *Futahashi, R.*: Successive invasion and colonization of odonate species into reclaimed land Koshino-kata, Shinminata city, Toyama prefecture (Addition 2) (p. 68); – *Wada, S.*: New records of Davidius moiwanus taruii Asahina & Inoue from Fukui prefecture (pp. 69-70); – A record of a teneral female of Anax guttatus in Fukui prefecture (p. 71); – *Matsuda, I.*: Anax guttatus collected again in Sakai city, Osaka prefecture, in 1999 (p. 72); – *Eda, S.*: Annual Meeting of the Japanese Society for Odonatology (p. 75); with a group phot. of participants)