ODONATOLOGICAL ABSTRACTS

1975

(8452) RUSSEV, B. & I. JENEVA, 1975. Hidrofaunistichni prouchvaniya na nyakoi rodopski vodoemi. – Hydrofaunistische Erforschungen einiger rhodopischer Gewässer. *In*: La faune des Rhodopes. Matériaux, pp. 11-39, Acad. Bulg. Sci., Sofia. (Bulg., with Russ. & Germ.s's). – (Author's addresses not stated).
Lists 6 identified odon. spp. from 9 localities in the Rhodope Mts area, Bulgaria.

1978

(8453) DEUTLER, R., 1978. *Libellen (Odonata). Beitrag zur Kenntnis der Odonatenfauna von Oberbayern unter Berücksichtigung ihrer Biotopbindung*. DiplArb. Landwirt. & Gartenbau, Techn. Univ. München-Weihenstephan, Freising. iv+149 pp. – (Current author's address unknown).
38 spp. are reported from 7 aquatic habitats in the Bernried-Seeshaupt area, Upper Bavaria, FRG, where 4 odon. associations could be identified. 8 spp. occur in all habitats studied. Various aspects of the composition of local assemblages are analysed, and it is advocated that the odon. fauna should be considered in all wetland conservation projects.

1979

(8454) BROCKHAUS, T., 1979. *Ökofaunistische Untersuchungen an Libellen (Odonata) ausgewählter Biotope der Dübener Heide unter besonderer Berücksichtigung anthropogener Einflüsse*. DiplArb. Zool., Martin-Luther-Univ., Halle-Wittenberg. iii+82 pp. – (Markt 20/21, D(O)-9001 Chemnitz, FRG).
The Dübener Heide (= Heath) is situated between the Elbe and Mulde R., in the general area between the towns of Oranienbaum and Torgau, E Germany. In the present work 38 spp. were evidenced. The fauna is habitatwise described and, in addition, each sp. is treated separately, in considerable detail, and with extensive references to the local ecological conditions. The work contains a wealth of previously unknown information on autecology of various spp. For example, it was noticed that the individuals of adult Enallagma cyathigerum are on average larger in populations far from the pollution sources as compared with those in the vicinity of the latter. Platycnemis pennipes is able to breed solely in habitats whose pH became neutral or alcaline either by aeolic ash deposition, or through the impact of agricultural fertilisers.

(8455) KRISHNAMOORTHI, K.P. & R. SARKAR, 1979. Macroinvertebrates as indicators of water quality. *Proc. Symp. environ. Biol., India*, pp. 133-138. – (Natn. Environ. Eng. Res. Inst., Nagpur-440020, India).
In a table on macroinvertebrate communities associated with lotic habitats of varying quality, a general reference is made to the odon. larvae (no species names) in the mesosaprobic Pili R.

1984

(8456) BANSE, W., 1984. *Ermittlung schützenswerter Libellen-Laichgewässer und Vorschläge zur Optimierung von Libellenbiotopen – abgeleitet aus einer umfangreichen Bestandsaufnahme*

von Stillgewässern um Freising/Obb. DiplArb. Forstwirtschaft, Fachhochsch. Weihenstephan, Freising. iv+208 pp. – (c/o Dr G. Mühle, Fachber. Forstwirtschaft, Fachhochsch. Weihenstephan, D(W)-8050 Freising, FRG).
The occurrence of 31 spp. in 60 stagnant water habitats in the area of Freising, Upper Bavaria, FRG, was studied. Of these, 4 spp. have a constancy higher than 60%, and 14 spp. hardly reach 10%. Protective measures are considered for 25 (42%) of the water bodies examined. On the basis of regression analyses of various parameters suggestions are made re the artificial construction of adequate odon. habitats.

(8457) HAUPT, J., 1984. [Grundlagen für das Artenschutzprogramm Berlin]. *LandschaftsEntw. UmweltFor.* 23: 815-818. – (Author's address not stated).
Considerations on the odon. fauna (51 spp.) of the Westberlin area up to 1984. For a monographic treatment cf. *OA* 8304.

1985

(8458) ANWAR, S. & M.S. SIDDIQUI, 1985. On the distribution and dynamics of macro-invertebrate fauna of the river Kali in northern India. *J. environ. Biol., Muzaffarnagar* (Suppl.) 9(3): 333-341. – (Dept Zool., Aligarh Muslim Univ., Aligarh-202002, India).
Monthly qualitative and quantitative samples from 2 stations are analysed, with emphasis on the Mollusca. The maximal occurrence of the odon. larvae took place in March (10 and 12.8%, resp.). No species names are stated.

(8459) BECK, P., 1985. Libellen in der Hohen Rhön. *Erhebung bot. faun. Daten NSG "Lange Rhön"* 1984/1985, 55 pp. – (CIO Aulonia, Scharoldstr. 2, D(W)-8700 Würzburg, FRG).
Detailed treatment of the odon. fauna (28 spp.) of nature reserve "Lange Rhön", Hessen/Bavaria, FRG, with emphasis on management and conservation.

(8460) HEITKAMP, U., J. GOTTWALD & K. KLAPP, 1985. Untersuchungen zur Erstbesiedlung der Fauna in neu angelegten Tümpeln im Vergleich mit restaurierten Gewässern. *Mitt. Fauna Flora S-Nieders.* 7: 95-130. (With Engl.s.). – (II. Zool. Inst., Univ. Göttingen, Berliner Str. 28, D(W)-3400 Göttingen, FRG).
In 1980 the fauna of 12 permanent ponds in Lower Saxony, FRG, which had been renewed or freshly made during 1978-1980, was examined. The odon. distribution (13 spp.) is stated per pond, but the actual succession of faunal development has not been studied.

(8461) MÖCKEL, R. & W. MÖCKEL, 1985. Die Tierwelt des Filzteichgebietes. *Schneeberg. Heimat-Blein* 18: 44-54. – (Authors' address unknown).
Contains an annotated list of 13 odon. spp.; Erzgebirge, Saxonia, E Germany.

1986

(8462) BILLE, R.-P. & P. WERNER, 1986. *Natur entdecken im Pfynwald.* SVHS, Holstein. 144 pp. – (Available from the SIO, at Hfl. 70,- net).
A nicely produced and richly illustrated commercial "monograph" on the natural history of the famous Pfynwald area on the Rhône R., nr Sierre, Valais, Switzerland. The odon. fauna is described in considerable detail. Of particular interest are Leucorrhinia albifrons (perhaps the last still existing Swiss population) and the peculiar local form of Calopteryx virgo meridionalis, discussed by R. Hoess in the paper listed in *OA* 6540, which might well represent one of the last Central European infraspecific odon. taxa that are still to be named. – For obvious reasons, this is an important odonatological publication which, due to its general title, is likely to escape the notice of most workers.

(8463) MARTIN, T.H., 1986. *The diets of bluegill and redear sunfish in Bay's Mountain Lake.* M. Sc. thesis, East Tennessee St. Univ., Johnson City. 60 pp. – (c/o Dr D.M. Johnson, Dept Biol. Sci., East Tennessee St. Univ., Johnson City, TN 37614, USA).
[Verbatim abstract]: The goals of this study were to identify those dragonfly larvae that might experience significant predatory mortality from the larger sunfish of Bay's Mountain Lake, Sullivan Co., Tennessee. Interest was focused on whether the fish were size-selective predators on the larval odon., and if so, whether this led to differential mortality among species. – Sam-

ples of bluegill and redear sunfish were taken monthly from Aug. 1981 to Sept. 1982. The contents of the entire intestinal tracts of 58 bluegill and 78 redear sunfish were analyzed and the contained prey items identified and enumerated. Odon. found in the diets were measured (head width) and their size frequency compared to that of odon. collected from the lake during the same time periode. – Redear sunfish were found to be the major odonate predator, with the majority of odonate predation occurring during mid-July on odon. (Corduliidae, most often Tetragoneuria cynosura). The redear were found to be size selective predators on odon., however within, not among species. This size-selective predation could have great consequences for the T. cynosura as redear were feeding on the larger larvae (possibly the univoltine complement of each cohort).

1987

(8464) WEBER, R.G., 1987. An underwater light trap for collecting bottom-dwelling aquatic insects. *Ent. News* 98(5): 246-252. – (Delaware Agric. Exp. Stn, Dept Ent. & Appl. Ecol., Coll. Agric. Sci., Univ. Delaware, Newark, DE 19717, USA).
A small, submerged light trap, mainly for collecting Trichoptera and Ephemeroptera, is described and documented by technical drawings. The paper also includes a comprehensive bibliography on the subject, incl. 3 titles describing traps for odon. – For another light trap for odon. larvae cf. *OA* 8355.

1988

(8465) CARIUS, W., 1988. *Verwandschaftsanalyse der europäischen Vertreter der Gattung Sympetrum (Newmann 1833) (Libellulidae, Odonata).* DiplArb. Biol./Chem. Univ., Bremen. v+122 pp. – (Abt. Mossakowski, Fachber. II, Univ. Bremen, Postfach 330440, D(W)-2800 Bremen-33, FRG).
Based on "classical" adult morphology and on the electrophoresis of 10 enzymes, this is a highly significant work on phylogenetic systematics within Sympetrum, though it is unfortunate that only 9 European spp. (from Austria, France and Germany) were examined. The following are the main conclusions: (1) The species pairs vulgatum/striolatum, sanguineum/meridionale, and pedemontanum/depressiusculum are shown to represent adelphotaxa; – (2) A close affinity of danae with the vulgatum/striolatum group is indicated; – (3) No affinities could be established between fonscolombei and flaveolum; – and (4) the allocation of fonscolombei to the New World genus Tarnetum is for the time being rejected. – Also included are genealogical trees and phaenograms, based on different features and evaluation methods.

(8466) CAVIEZEL, G.A., 1988. Libella, mustgacavagl, mazzacavals. *Radioscola, Chur* 34(3): 10--22. (Raeto-Roman). – (c/o Radioscola, Radio rumantsch, Via dil teater 1, CH-7000 Chur).
This is the first odonatol. publication ever written in Raeto-Roman language (the Surselva dialect as spoken in large parts of canton Grisons, Switzerland). It is largely based on the work listed in *OA* 3336, and gives an excellent, didactically presented general outline of dragonfly biology for the pupils of Raeto-Roman schools. It was to serve as "background information" for the dragonfly talk broadcasts by the Raeto--Roman radio, Chur, on Apr. 28, 1988 and May 2, 1988. It also contains the Surselva vernacular names for the 2 Swiss suborders, 9 families, and for 17 of the more common local spp., all of which, however, are merely translations from German. On the other hand, the 3 words used for the title are true folk expressions for dragonflies in the said dialect.

(8467) DAVIES, D.A.L., 1988. *Consequences of destruction of natural predators by methods of vector suppression for parasite control.* Medical Research Council, London. v+60 pp. – (Xerox available from the SIO Central Office, Bilthoven, at Hfl. 56.-, surface postage incl.; remittance to be enclosed with the order).
This is an unpublished report for the files of the Medical Research Council. It deals almost entirely with the odon., and represents basically a carefully annotated bibliography on the subject, organised under the following headings: "Vector control by insecticides", "Vector control by odonate predation", "Toxicity of agents on non-targets (Emphasis on Odonata)", "Predation by Odonata on non-vector arthropods",

"Odonata predatory on non-arthropods", "Natural predators on Odonata", "Assays, models, methods and sampling", "Conservation", and "Reviews". – The work is a useful tool for anyone working on any aspect of the general topic covered. Professor Davies is one of the foremost odon. taxonomists, and this is his sole work combining his medical profession and odonatology.

(8468) FRIDY, L.E., 1988. The conservation and amenity value of ball-clay ponds in the Isle of Purbeck, Dorset, UK. *Biol. Conserv.* 43: 165-180. – (Dept Appl. Biol., Univ. Cambridge, Pembroke St., Cambridge, CB2 3DX, UK).
Opencast mining is the principal method by which ball-clays are extracted from heathland in the Isle of Purbeck. An understanding of the substitute habitats so created is required if the environmental impact of this mode of extraction is to be assessed. This paper investigates the conservation and amenity value of the water bodies arising from 18th and 19th century workings. The odon. are considered in some detail, and a list of 17 spp., organised according to the pH values of the ponds, is also included.

(8469) GOLDAMMER, L., 1988. *Konzeption eines Biotopverbundsystems für das "Nördliche Mandelbachtal" anhand der kartierten Vegetation, Libellen (Odonata), Heuschrecken (Saltatoria) und Vögel (Aves)* DiplArb. Biogeogr., Univ. Saarland, Saarbrücken. vii+146 pp. – (Brückenstr. 1, D(W)-6697 Nohfelden-Bosen, FRG).
The work is based on an area of ca 14.5 km^2 SW from Saarbrücken, FRG (alt. 235-380 m), and contains information on 22 odon. spp., most of which are autochthonous in the region.

(8470) HOUSE, N.L., 1988. *The ecology of Leucorrhinia hudsonica (Selys) (Odonata: Libellulidae) in Newfoundland bog pools.* B. Sci. thesis, Memorial Univ. Newfoundland, St. John's [Canada], vi+110 pp. – (Dept Biol., Carleton Univ., Ottawa, Ont., K1S 5B6, CA).
The principal study or control site was a bog, containing over 100 small, isolated pools, located 20 km S of St. John's. The experimental pools were 2 km further SSW from the control site. The pools were classified into four size classes based on surface area: (A> 100 m^2, B 10-100 m^2, C 1-10 m^2, D<1 m2). The relative abundance of 8 spp. across the pool size classes suggests that 3 dragonfly communities exist. The dominant spp. in the bog pools studied are Enallagma cyathigerum, Leucorrhinia hudsonica, Cordulia shurtleffi and Somatochlora septentrionalis in class A pools; L. hudsonica, E. cyathigerum, C. shurtleffi and A. eremita in class B pools; and Libellula quadrimaculata, Aeshna sitchensis and L. hudsonica in class C and D pools. Oviposition preferences of the adults appear to separate the species distribution in the pools. – Larvae showed seasonal trends in density which corresponded to adult emergence and egg hatching. Diet was varied and characteristic of an opportunistic feeder, but reflected the relative abundance of different prey in the pools. Larvae passed through 11 instars and the growth of the larvae throughout the summer suggests that larvae require two years before maturing into the adult. Adult emergence was synchronized over a short period of time in June and is typical of the spring species classification of Corbet. More females than males emerged from the pools. Males were territorial and the behaviour of both sexes was similar to species of Leucorrhinia studied in Europe. – Spacing behaviour of L. hudsonica and C. shurtleffi larvae in laboratory experiments showed individuals were randomly distributed and showed no tendency to clump together. – Diflubenzuron applied to pools at a concentration of 0.007 g/m^2 had an effect on L. hudsonica larvae. Small and medium L. hudsonica larvae, in the experimental pools after the diflubenzuron spray, were most affected in terms of decreases in density and changes in diet. However, by the end of the study period, larval densities were similar to densities in the control pools.

(8471) LÖSING, U., 1988. *Auswertung faunistisch-ökologischer Bestandsaufnahmen im NSG "Achmer Grasmoor" und der geplanten Erweiterungsfläche im Hinblick auf Pflege und Entwicklung.* DiplArb. Tierökol., Univ. Paderborn, Höxter. iv+167 pp. – (c/o Prof. Dr B. Gerken, Abt. Tierökol., Univ. Paderborn-Höxter, An der Wilhelmshöhe 44, D(W)-3740 Höxter, FRG).
Contains field observations and detailed considerations on 22 odon. spp. (pp. 60-113); nature

reserve "Achmer Grasmoor", Lower Saxonia, FRG.

1989

(8472) BRÄU, E., 1989. *Libellenvorkommen an Stillgewässern: Abhängigkeit der Artenzahl von Grösse und Struktur.* DiplArb. Landwirt. & Gartenbau, Techn. Univ. München-Weihenstephan, Freising. ii+75 pp. – (Schwarzwaldstr. 101, D(W)-7630 Lahr, FRG).
The work was carried out at Dungau, in a stretch of land some 50 km along the Danube R., between the districts of Oberpfalz and Niederbayern, FRG. At 57 stagnant water bodies in this area, 36 odon. spp. were evidenced. The inventories of various types of habitats are carefully analyzed from the points of view of various ecological parameters, the importance of man-made habitats is emphasized, and the conservancy aspects are discussed.

(8473) KAUSHIK, S., M.N. SAXENA & D.N. SAKSENA, 1989. Habitat ecology of odonatan nymphs in certain water bodies of Madhya Pradesh. *Abstr. Proc. 10th a. Sess. Acad. environ. Biol. India, Muzaffarnagar,* pp. 64-65. – (First Author: Sch. Stud. Zool., Jiwaji Univ., Vidya Vihar, Gwalior-474011, India).
Preliminary abstract of the paper listed in *OA* 8339.

(8474) NONVEILLER, G., 1989. *Pioniri proučavanja insekata Dalmacije. – The pioneers of entomological research in Dalmatia.* Soc. ent. jugosl. [Editiones separatae, 2], Zagreb. viii+390 pp. – ISBN 86-81281-02-X. (Croat., with Engl.s.). – (Orders to: Slovene Ent. Soc., c/o Dr J. Carnelutti, Inst. Biol., Slovene Acad. Sci., P.O. Box 323, Novi trg 5, SLO-61001 Ljubljana, Slovenia).
This is a monumental history of ent. research in Dalmatia, Croatia, by one of the foremost Croatian entomologists. The achievements are traced from the early beginnings in 1774 to the end of World War II. The history is order-wise reviewed (Odon. pp. 302-303), and the work also contains 274 brief biographies (many with portraits and with facsimile reproductions of various authentic documents) and a comprehensive regional bibliography. – The earliest odon. material was collected in 1850 by Josef Mann (1804-1889), a technician in the Imperial Zool. Cabinet at Vienna. The first odon. records from Dalmatia were published by G. Frauenfeld (1856, *Verh. zool.-bot. Ges. Wien* 6: 431-448), and a comprehensive review was produced by D. St. Quentin (1941, *ibid.* 50/51: 66-67). – The general importance of this work goes far beyond the geographic scope stated in the title.

(8475) PLANGGER, A., 1989. *Visuelle Chromophore im Libellenauge.* DiplArb. Biol., Albert-Ludwigs-Univ. Freiburg. iv+125 pp. – (Scheffelstr. 58, D(W)-7500 Karlsruhe, FRG).
A part of the literature on the subject is reviewed, and original work is reported on Platycnemis, Calopteryx and Aeshna cyanea. The distribution of retinal and 3-hydroxyretinal, their behaviour at diverse light conditions, and the tentative role of the 2 chromophores in the dragonfly eye are described in considerable detail.

(8476) SALOWSKY, A.S., 1989. *Untersuchungen zum Larvenbiotop von Cordulegaster bidentatus in Waldbächen um Freiburg i. Br. (Ein Beitrag zur Biologie von C. bidentatus).* DiplArb. Zool., Albert-Ludwigs-Univ., Freiburg. x+101 pp. – (c/o Inst. Biol. I/Zool., Univ. Freiburg, Albertstr. 21a, D(W)-7800 Freiburg/Br., FRG).
In the Black Forest (=Schwarzwald), S Germany, 6 larval habitats (forest streams at alt. 350-520 m) were studied during June-Dec., 1988. They were characterised by temperature amplitudes 9-11°C (min. 2, max. 18°C), stream velocity 0.03-0.1 m/s (max. 0.5 m/s), sandy bottom (grain size: medium to large), high O_2 contents, and by neutral pH values (though the larvae seem to tolerate also pH 3-4). The highest larval density occurred in a spring marsh. When some sections of it dried up the insects migrated to other locations in the marsh. Based on the evidence of larval size classes encountered the sp. has a 5 yr development in this area. The complex environmental conditions exercising a negative impact on the larvae are pointed out and some habitat protective measures are suggested.

1990

(8477) BERNHARD, E. & O. MUISE, 1990. Stadtbio-

topkartierung Regensburg unter besonderer Berücksichtigung der Pflanzen- und Tierwelt auf Kalk am Beispiel des Gebietes Brandlberg und Keilberg mit Keilstein und Spitalholz. *Schr-Reihe bayer. Amt Umweltschutz* 107: 64-68. – (First Author: Amt öffentl. Ordnung u. Umweltschutz, Minoritenweg 6, D(W)-8400 Regensburg-11, FRG).
Contains a list of 5 odon. spp.; Regensburg, Bavaria, FRG.

(8478) BURBACH, K., 1990. *Libellen an Gräben und Flussgewässern im Raum Freising*. DiplArb. Landschaftsökol., Techn. Univ. München-Weihenstephan, Freising. 105 pp., Appendix excl. – Available at DM 25.- from the Author. – (Bahnweg 7, D(W)-8051 Marzling, FRG).
A good regional monograph on the odon. fauna (40 spp.) of the Freising area, Upper Bavaria, FRG, with emphasis on the impact of environmental parameters and population structure.

(8479) BUTSCHEK, S., 1990. *Zum Verhalten von Prachtlibellen gegenüber anthropogenen Raumstrukturen*, Teil 1. DiplArb. Agrarbiol., Univ. Hohenheim, Stuttgart-Hohenheim. v+209 pp. – (c/o Prof. Dr A. Kohler, Inst. Landeskultur & Pflanzenökol., Fachber. Agrarbiol., Univ. Hohenheim, Postfach 700562, D(W)-7000 Stuttgart-70, FRG).
Deals with the behaviour of Calopteryx splendens relative to man-made constructions in its habitat in the southern Pfälzerwald, FRG. These could all be mastered, though they did trigger specific behavioural modifications. Consequently, in most cases man-made constructions in the water course do not hinder essentially the gene flow between the populations of this sp. – For pt 2 cf. *OA* 8480.

(8480) FUHRMANN, G., 1990. *Zum Verhalten von Prachtlibellen gegenüber anthropogenen Raumstrukturen*, Teil 2. DiplArb. Agrarbiol., Univ. Hohenheim, Stuttgart-Hohenheim, vi+138 pp. – (c/o Prof. Dr A. Kohler, Inst. Landeskultur & Pflanzenökol., Fachber. Agrarbiol., Univ. Hohenheim, Postfach 700562, D(W)-7000 Stuttgart-70, FRG).
Deals with the effects of spruce-reafforestation on Calopteryx splendens populations in the Saarbach and Schwarzbach valleys, Palatinate, FRG. While crossing stream sections in complete and deep shadow, the dragonflies may get disoriented, therefore it is recommended to keep the forest at some distance from the stream. – Generally, this is an excellent experimental work. – For pt 1 cf. *OA* 8479.

(8481) SCHLUMPRECHT, H. & H. ZWÖLFER, 1990. Zoologische Untersuchungen im mittleren Püttlachtal. *Ber. naturw. Ges. Bayreuth* 21: 5-112. – (First Author: Sauerbruchstr. 4, D(W)-8580 Bayreuth, FRG).
12 odon. spp. are recorded from the Püttlachtal, NE Frankenalb (nr Pottenstein and Pegnitz), Bavaria, FRG. Brief comments on some of these are added.

1991

(8482) ARAI, Y., 1991. [The hatching rate in Sympecma paedisca Br. (Lestidae)]. *Gekkan-Mushi* 250: 9. (Jap.). – (1233-2 Sueno, Yorii-machi, Oosato-gun, Saitama, 369-12, JA).
It was examined in the field (Chichibu-shi, Saitama pref., Honshu, Japan), based on eggs hatched from 10 reed leaves, and the duration of the development from the egg to the adult is estimated at 70-90 days. The detailed evidence is summarized in a table.

(8483) CORKUM, L.D., 1991. Spatial patterns of macroinvertebrate distributions along rivers in eastern deciduous forest and grassland biomes. *Jl. N. Am. benthol. Soc.* 10(4): 358-371. – (Dept Biol. Sci., Univ. Windsor, Windsor, Ont., N9B 3P4, CA).
The study was designed to determine if spatial distributional patterns of lotic macroinvertebrates differed more strongly between eastern deciduous forest and grassland biomes than among sites along rivers within a biome, and it was conducted in SW Ontario and S-central Alberta, Canada. The Coenagrionidae are said to have been identified and considered, but there are no further references to the order.

(8484) DE MARMELS, J., 1991. Hallazgo de Odonata nuevos para Venezuela o poco conocidos. 7. *Boln Ent. venez.* (N.S.) 6(2): 82. – (Inst. Zool. Agric., Fac. Agron., Univ. Central Venezuela, Apdo 4579, Maracay 2101-A, Venezuela).

Records of, and annotations on Cora inca Sel., Heteragrion mitratum Wllmsn and Aeshna andresi Racenis.

(8485) DONNELLY, T., 1991. Damselflies of Fiji: radiation and evolution on an oceanic island group in the South Pacific. *Ent. News* 102(3): 129 [abstract only]. – (2091 Partridge Lane, Binghamton, NY 13903, USA).
[Verbatim]: Nearly the entire Zygopt. fauna of the Fiji Isls consists of the genus Nesobasis and 2 closely related genera, all in the Coenagrionidae, but the numerous spp. in these genera have radiated into diverse habitats; when compared with a continental biota, this range of habitats would be occupied by numerous genera and even several families! Of the 35 spp. found on the 2 main islands, Viti Levu and Vanua Levu, only 1 sp. is found on both islands even though these are separated by a relatively short distance of 50 km. The smaller islands show levels of endemicity related to the size of the island and its distance from the larger islands, constistent with the predictions of island biogeographic theory. Although Viti levu is at least 13-15 million years old, Vanua Levu is no more than 3 million years old and yet still has a well-developed endemic fauna. Rapid evolution is also demonstrated in the microgeographic differentiation of many spp., possibly related to adaptation to different microclimates. – Several characteristics are seen commonly in the Fijian damselflies which are rare or absent in damselflies occurring in the rest of the world. Some striking examples were presented, including guarding of territory by females, the development of morphological pecularities of the male genitalia and the small body size of females in some species. Larval habitats are also unusual when compared with those of a continental damselfly fauna; large streams and rivers were not utilized, but small cascades and seeps contained many species, with the larvae often living in only thin films of water concealed within small rock pockets or by leaves. – Cf. also *OA* 7395.

(8486) DUMONT, H.J., 1991. *Odonata of the Levant*. Israel Acad. Sci. Human., Jerusalem, [Fauna Palestina, Insecta 5], viii+297 pp., col. frontispiece, 1 map excl. – ISBN 965-208-013-6. Hard cover (18.5 x 27.5 cm). – Available from the SIO, Bilthoven, at Hfl. 100,- net. – (Author: Inst. Anim. Ecol., Univ. Gent, Ledeganckstraat 35, B-9000 Gent).
This is the long awaited monographic treatment of the Odon. of Israel, Jordan and Sinai (82 spp.). The work is largely organised in the style of the classical Conci & Nielsen treatment in the Fauna d'Italia, with synonymy, excellent descriptions and keys (adults & larvae), statements on general and regional distribution (incl. locality names) and phenology, and with 511 figs, illustrating the structural peculiarities of the respective taxa. The book certainly will remain for a long time the indispensable cornerstone for work on the E Mediterranean and Middle East odon. fauna.

(8487) FLOWERS, R.W., 1991. Diversity of stream-living insects in northwestern Panama. *Jl N.A. benthol. Soc.* 10(3): 322-334. – (Agric. Res. Progr., Florida A & M Univ., Tallahassee, FL 32307, USA).
189 taxa are listed for 42 streams. The list includes 24 odon. taxa, but these are identified to the fam. level only.

(8488) FORBES, M.R.L., 1991. Ectoparasites and mating success of male Enallagma ebrium damselflies (Odonata: Coenagrionidae). *Oikos* 60: 336-342. – (Dept Zool., Erindale Coll., Univ. Toronto, Mississauga, Ont., L5L 1C6, CA).
Single males were significantly and consistently parasitized by more larval water mites than those caught either in tandem or in copula. In contrast, male size was inconsistently related to short-term mating success, although there was a consistent negative correlation between male size and mite numbers which was statistically significant on 2 of 7 sampling days. The existence of such natural covariation and its possible effect on male mating success has not been widely discussed. Lastly, heavily-parasitized males responded less often to the presence of male models, and took significantly more foraging trips, than did lightly-parasitized males. Short-term mating biases with respect to ectoparasitism for E. ebrium males appears to result from reductions in competitiveness of heavily-parasitized males for access to females. These results strongly suggest that apparent reductions

in competitiveness reflect decisions by heavily-parasitized males to pursue mating tactics which are energetically inexpensive.

(8489) FORBES, M.R.L., 1991. Female morphs of the damselfly Enallagma boreale Selys (Odonata: Coenagrionidae): a benefit of androchromatypes. *Can. J. Zool.* 69(7): 1969-1970. (With Fr.s.). – (Dept Zool., Erindale Coll., Univ. Toronto, Mississauga, Ont., L5L 1C6, CA).
In E Ontario, Canada, the sp. occurs in 3 distinct ♀ colour morphs: >65% are blue (termed "androchromatypes") like the conspecific ♂, ca 30% are green, and <5% have both blue and green on their abdomen. Experimental evidence is provided suggesting that one advantage of "androchromatypism" is avoidance of harassment from heterospecific males of E. ebrium.

(8490) GROSSRUCK, B., 1991. Porträt der Trattnach-Altarme bei Grieskirchen als naturschutzwürdige Ökozellen. *Öko-L* 13(4): 14-18. – (Rossmarkt 13, A-4710 Grieskirchen).
Contains a few records of common odon. spp. (Grieskirchen, Upper Austria), of which Aeshna viridis is certainly erroneously identified.

(8491) GRUTTKE, H. & P. PRETSCHER, 1991. Protection des insectes en Allemagne. *Insectes, Opie* 82: 15-17. – (Authors' addresses not stated).
Contains order-wise figures of spp. (1196) that in Germany are legally "protected", and of which 159 spp. (17 odon.) are considered "threatened with extinction". Some comments are also provided. – *(Abstracter's Note:* In Germany and Switzerland documented odon. fauna research, monitoring, etc. are "criminalized" and made illegal by indiscriminate "protection" of all spp. – Cf. *OA* 3112, 8004).

(8492) HADRYS, H., 1991. Postkopulatorische Männchenkonkurrenz und RAPD-Fingerprintanalysen bei Grosslibellen. *Verh. dt. zool. Ges.* 84: 306-307 abstract only. (With Engl. title). – (Zool. Inst., Techn. Univ., Pockelsstr. 10a, D(W)-3300 Braunschweig, FRG).
A brief description is given of the RAPD-technique, as developed by J.G.K. Williams et al. (1990, *Nucl. Acid Res.* 18: 6351) for DNA-fingerprints on the individual level, which was applied here to Anax junius and A. parthenope.

(8493) HANDKE, K. & U. HANDKE, 1991. *Kurze Zusammenstellung faunistisch interessanter Daten aus dem Raum Niedervieland/Ochtumniederung/Ochtumverlegung 1990.* [Stencil]. Landschaftsökol. Forschungsstelle, Bremen, 7 pp. – (Landschaftsökol. Forschungsstelle, Am Wall 177, D(W)-2800 Bremen, FRG).
Deals with the same area as the papers listed in *OA* 8034 and 8075, and contains records of 4 odon. spp., incl. Ceriagrion tenellum and Sympetrum pedemontanum.

(8494) HARVEY, B.C. & W.R. HILL, 1991. Effects of snails and fish on benthic invertebrate assemblages in a headwater stream. *Jl N. Am. benthol. Soc.* 10(3): 263-270. – (First Author: Dept Zool., Weber St. Univ., Ogden, UT 84408, USA).
At natural densities in enclosures in an E Tennessee headwater stream, snails (Elimia clavaeformis) and juvenile creek chubs (Semotilus atromaculatus) affected benthic invertebrate assemblages and reduced the abundance of larval Lanthus sp.

(8495) HELLMUND, M. & W. HELLMUND, 1991. Eiablageverhalten fossiler Kleinlibellen (Odonata, Zygoptera) aus dem Oberoligozän von Rott im Siebengebirge. *Stuttgart. Beitr. naturk.* (B) 177:1-17. (With Engl. & Fr. s's). – (Staat. Mus. Naturk., Rosenstein 1,D(W)-7000 Stuttgart-1, FRG).
For the first time the fossil Zygoptera egg-sets from the Upper Oligocene porcellanites and "Polierschiefer" of Rott are thoroughly described, illustrated and compared with those of extant spp. The 2 different modes of egg arrangements resemble those in the extant Lestidae and Coenagrionidae, suggesting that certain behavioural features are at least about 25 million yrs old.

(8496) HODGSON, J.R., C.J. HODGSON & S.M. BROOKS, 1991. Trophic interaction and competition between largemouth bass (Micropterus salmoides) and rainbow trout (Oncorhynchus mykiss) in a manipulated lake. *Can. J. Fish. aquat. Sci.* 48(9) : 1704-1712. (With Fr. s.). –

(Div. Nat. Sci., St Norbert Coll., De Pere, WI 54115, USA).
The evidence was collected from 2 Michigan lakes, of which the control lake contained only bass, while in the experimental lake trout were introduced. With the pooled methodologies a diet composition shift with significant changes in diet diversity was demonstrated after the introduction of trout. Subsequent to the latter, bass ate fewer zooplankton (Daphnia spp.) and more odon. larvae than before trout introduction. The prey spp. are not identified.

(8497) HÖPPNER, B., 1991 *Ökologische Ansprüche dreier ausgewählter Libellenarten in der südlichen und mittleren Oberrheinebene unter besonderer Berücksichtigung der Vegetation.* DiplArb. Geobot., Albert-Ludwigs-Univ., Freiburg. vii + 189 pp., Appendix excl. – (Im Kirchenhölzle 37, D(W)-7800 Freiburg, FRG).
Deals in great detail with autecology of Brachytron pratense, Anax parthenope and Libellula fulva, in the Rhine R. valley, approximately in the area between Mulhouse and Strasbourg, on the German side.

(8498) KANOU, I., 1991. [An interspecific tandem between Orthetrum sabina Drury ♂ and Zyxomma petiolatum Rambur ♀ (Libellulidae) in the island of Guam]. *Gekkan-Mushi* 249 : 38. (Jap.). – (5-19-17-601 Koishikawa, Bunkyo-ku, Tokyo, 112, JA).
A brief description and photograph. The case was recorded in a moore along the Yild R., and both spp. are new for the island of Guam.

(8499) KOIZUMI, T., 1991. [Records of 2 odonate species from Awomori pref., Honshu, Japan]. *Nature & Insects* 26 (14): 7-8. (Jap.) – (2-2 Hamasaka Waki, Toyosaki-machi, Hachinoche City, Awomori, 039-11, JA).
Enallagma boreale circulatum and Epiophlebia superstes are recorded from Awomori pref., N Honshu.

(8500) KUMARI, T.R.R., R. MADHAVI & C.D. KUMARI, 1991. The life cycle of Mehraorchis ranarum Srivastava, 1934 (Trematoda, Licithodendriidae). *Acta parasitol. pol.* 36 (1) : 5-10. – (Dept Zool., Andhra Univ., Waltair-530003, India).
The snail Alocinma travancorica is shown to act as the first intermediate host, larval Tramea limbata and Tholymis tillarga are the second, while Rana cyanophlyctis is the final host. All stages are described in detail and illustrated.

(8501) LENZ, N., 1991. The importance of abiotic and biotic factors for the structure of odonate communities of ponds (Insecta: Odonata). *Faun.-ökol. Mitt.* 6(5/6) : 175-189. (With Germ. s. – (Schillstr. 23, D(W)-4830 Gütersloh-1, FRG).
The influence of several abiotic and biotic factors on odon. communities was studied at 12 ponds in Schleswig-Holstein, northern Germany. Neither an influence of the pond size nor of the degree of isolation (distance to a possible colonization source) could be found. A highly significant negative correlation was found between the chemical load (eutrophication) of a pond and the diversity (Shannon index) of its odon. community (r_s= -078, $P < 0.005$). Habitat heterogeneity, quantified by mapping several types of plant structures which odonates require as resources for oviposition. was positively correlated with the diversity of odon. ($r = 0.61$, $P < 0.05$). The horizontal oviposition sites (e.g. floating leaves) of Coenagrion puella and C. pulchellum and the vertical oviposition sites (e.g. reed plants) of Lestes sponsa and L. dryas could be mapped and quantified most accurately. The population density of these spp. was highly significantly correlated with the supply of their resources for oviposition ($r_s = 0,75$, $P < 0.005$). The importance of habitat hererogeneity to the understanding of odonate community structures of ponds and conclusions for conservation strategies for ponds are discussed.

(8502) MITAMURA, T. & N. YOKOI, 1991. [On a case of a group-hibernation of Sympecma paedisca Br. (Lestidae) in Fokushima pref., Honshu, Japan]. *Gekkan-Mushi* 249 : 36-37. (Jap.). – (First Author : 869-16 Sekiai, Koorimachi, Date-gun, Fukushima pref., 969-16, Ja).
Under the upper stones of the 2 garden-gate posts an assemblage of resp. 75 and 10 hibernating individuals was found. The situation is described and the details are shown in 3 photographs.

(8503) MITSUI, H., 1991. [Insect occurrence on the

grounds of two high schools in Tokyo]. *Insectarium, Tokyo* 28 (9) : 302-305. (Jap.). – (6-1-2-307 Turumaki, Tama City, Tokyo, 206, JA).
More than 800 insect spp., incl. 15 odon. spp., were evidenced during 1983-1988. The differences between the assemblages at the 2 plots are analysed using the Nomura-Simpson index. A checklist is not given.

(8504) MONNERAT, C., 1991. Étude faunistique des odonates du canton du Jura et des zones limitrophes. *In*: M. Wieland, [Ed.], Schweizer Jugend forscht, pp. 52-57, Schweiz. Jugend forscht Verlag, Winterthur, ISBN 3-908504-08-7. – (Ch. des Noisetiers 2, CH-2824 Vicques).
A summary of the monograph listed in *OA* 8139, with an autobiographic note and author's portrait, and with a checklist of the spp.

(8505) MURAKI, A., 1991. [Some observations on mating, female searching and territorial behaviours of Chlorogomphus iriomotensis Ishida (Gomphidae) in the Iriomote-jima, SW Japan]. *Nature & Insects* 26(14): 13-14. (Jap.). – (476-2-4-1312, Kano, Higashi-Osaka, 578, JA).
[Abstract not available].

(8506) OLSVIK, H., 1991. Insekter og annet småkryp. – [Insects and other small animals]. *In*: T. Faarlund, [Ed.], Naturen i Ski, Pt 1: Planter og dyr, pp. 181-200, Formatic, Ski. (Norwegian). – (Author: N-6598 Foldfjorden).
On p. 187 is given a list of 28 odon. spp. so far recorded from the Ski area, Norway, with annotations on the status of each sp.

(8507) PRITCHARD, G., 1991. Insects in thermal springs. *Mem. ent. Soc. Can.* 155: 89-106. (With Fr.s.). – (Dept Biol. Sci., Univ. Calgary, 2500 University Drive NW, Calgary, Alberta, T2N 1N4, CA).
Thermal springs are characterized by year-round high temperatures and a total-dissolved-solids concentration that is generally higher than that of surface waters. Insects appear to encounter few constraints from the water chemistry of most thermal springs, but considerable constraint from the high water temperature. Indeed, because no insect lives above 50°C and very few above 40°C, few thermal springs offer favorable conditions for insects in the actual boil itself. Thermal spring insects live in the stream at some distance from the source, and they may be defined as living in habitats having temperature regimens that are influenced by geothermy in the sense that they are warmer than they otherwise would be. An annual mean water temperature that is 5°C above the annual mean air temperature of the region can be used to define the downstream limit of geothermal influence. Thermal springs around the world have similar insect faunas; only Diptera, Coleoptera, Hemiptera and Odon. are commonly represented, and each of these only by a handful of genera. Furthermore, the fauna of any one thermal spring is characterized by very few spp., and the higher the temperature the lower the species richness. Both temperature and water chemistry may exclude certain spp., and even whole orders, from thermal springs, these factors acting either directly, alone or in concert, or indirectly through competitive interactions. Even moderately warmed systems can significantly affect insect growth rates, and seasonal regulation of adult emergence through diapause is a common strategy of temperate-zone thermal spring insects. – Thermal springs present many advantages to the ecologist, such as long-term habitat constancy, temperature stability, and taxonomic simplicity. They provide field laboratories for the study of temperature-related phenomena as well as the opportunity to explore a range of questions in biogeography and evolutionary biology. The challenge is to form the questions and select the systems critically.

(8508) RADEMACHER, U., 1991. *Folgeuntersuchungen zum Schlupferfolg von Libellen im Grabensystem des Niedervielands bei Bremen im Jahre 1990.* DiplArb. Westfälische Wilhelms-Univ., Münster. viii+97 pp., app. & fold. maps excl. – Copies available at DM 35,- net from the Author. – (Ostmarkstr. 86, D(W)-4400 Münster, FRG).
Basically, this is a continuation of the research project listed in *OA* 8088, and deals with coenology and population dynamics at the same study area. It is mainly based on exuviae research (13 spp.).

(8509) SIOJA. [Information Bulletin of the SIO National Office in Japan], Osaka, 1991, No. 1 (Dec.

1, 1991). (Jap.). – (c/o K. Inoue, 5-9, Fuminosato 4-chome, Abeno-ku. Osaka, 545, JA).
Deals mainly with the developments that led to the organization of the 12th Int. Symp. Odonatol. in Japan in 1993 rather than in 1995 as originally scheduled. – Among the various general items, there is also a call for manuscripts by Japanese workers for publication in the SIO periodicals. – (*Abstracter's Note*: In spite of the rather substantial number of members in Japan, very few papers by Japanese workers appear in the SIO periodicals, while the coverage of Japanese literature in *OA* continues absolutely inadequate and more than 2 decades of efforts to improve the collaboration with the Japanese workers rendered no appreciable results).

(8510) TAKETO, A., 1991. [Records of some dragonfly and butterfly species from Ishikawa prov., Honshu, Japan]. *Nature & Insects* 26(14): 8-9. (Jap.). – (1-1-19 Ishibaki, Kanazawa City, Ishikawa, 920, JA).
Contains some notes on ecology and distribution of Indolestes peregrinus, Aeschnophlebia longistigma, Aeshna mixta, Sympetrum konckeli, and Davidius fujiana; – central Honshu.

(8511) TOGAME, S., 1991. [Records of 3 Sympetrum species (Libellulidae) from Hyogo prov., Honshu, Japan]. *Nature & Insects* 26(14): 3. (Jap.). – (2-10-20 Takatsukasa, Takarazuka City, Hyogo, 665, JA).
S. gracile, S. maculatum and S. uniforme are recorded from Aonogahara, Ono City, Hyogo, SW Honshu.

(8512) VASCO ORTIZ, C.A., 1991. Contribución al conocimiento de los odonatos de la provincia de Huesca. *An. Biol. Univ. Murcia* (VI) 17: 89-90. (With Fr.s.). – (Avda Pirineos 9/2'B, ES-22004 Huesca).
Commented list of 5 spp., listed for the first time for the prov. of Huesca, Spain.

(8513) WALLACE, J.B., A.D. HURYN & G.J. LUGTHART, 1991. Colonization of a headwater stream during three years of seasonal insecticidal applications. *Hydrobiologia* 211: 65-76. – (Dept Ent., Univ. Georgia, Athens, GA 30602, USA).
The recolonization by insects of a small headwater stream in the southern Appalaches (Macon Co., N Carolina) that was seasonally treated during 3 yr with methoxychlor was studied by measuring the drift during each treatment. Some long-lived taxa, such as Lanthus and Cordulegaster, exhibited distinct growth through several treatment periods. Lanthus has an 18 month cohort development time in this stream; the largest individuals (cohort 1) would have survived at least 8-9 insecticide treatments.

(8514) YANG, E.-c, & D. OSORIO, 1991. Spectral sensitivities of photoreceptors and lamina monopolar cells in the dragonfly, Hemicordulia tau. *J. comp. Physiol.* (A) 169(6): 663-669. – (Centre Visual Sci., Res. Sch. Biol. Sci., Austral. natn. Univ., P.O. Box 475, Canberra, A.C.T. 2601, AU).
5 spectral types of photoreceptors with peak sensitivities at 330 nm, 410 nm, 460 nm, 525 nm and 630 nm were recorded from the ventral eye. Often the 525 nm photoreceptors presented broader, the 630 nm photoreceptors narrower, spectral sensitivities than would be excepted of a photopigment with the same peak sensitivity. Four types of lamina monopolar cells (cell types 1-4) were recognised from their dark-adapted spectral sensitivities and their anatomy. The anatomical identification allows tentative assignment to the monopolar cell classification from Sympetrum rubicundulum obtained using Golgi staining (cf. *OA* 3777). When dark-adapted, monopolar cells had peak spectral sensitivities that were similar to single photoreceptors or appeared to pool receptor outputs, but in some cases spectral sensitivity changed markedly upon adaptation to white and to chromatic light, in one case (cell type 2) apparently 'switching off' a UV-sensitive input.

1992

(8515) ANHOLT, B., 1992. Growth rate-mortality tradeoffs mediated by activity: consequences of sex-specific differences in Lestes disjunctus. *Bull. N. Am. benthol. Soc.* 9(1): 112 [abstract only]. – (Dept Biol., Queen's Univ., Kingston, Ont., K7L 3N6, CA).
[Verbatim]: Female odon. typically gain more mass after emergence than males. The differ-

ence in mass gain is larger in non-territorial spp. Large mass gain is associated with high mortality rates both between and within sexes. Recent theory suggests that the link between mass gain and mortality is activity. I have been investigating these links in detail in adults of the non-territorial L. disjunctus. Females gain more mass and have higher mortality rates than males. Females are also more active than males. The agents of mortality appear to be frogs and large dragonflies, especially Erythemis simplicicollis. The resulting changes in population sex-ratios have profound implications for the organization of odonate mating systems.

(8516) ARAI, Y., 1992. Ecological observations of Sympetrum frequens in Chichibu city, central Japan. *Gekkan-Mushi* 255: 16-19. (Jap., with Engl. title). – (Sueno 1233-2, Yorii-machi, Oshato-gun, Saitama, 369-12, JA).
[Abstract not available].

(8517) *ARGIA*. The new journal of the Dragonfly Society of America, Vol. 4, No. 2 (July 15, 1992). – (c/o Dr C. Cock, 469 Crailhope Rd, Center, KY 42214, USA).
Donnelly, T.W.: Carl Cook convalescing, (p. 1); – [*Anonymous*]: What happened to spring? (p. 1); – [*Valley, S.*] 1993 Meeting to be in Oregon (p. 1); – *Tennessen, K.*: D.S.A. meets in Hohenwald, Tennessee (pp. 2-3); – [*Anonymous*]: Northeast dragonfly group visits Maryland (p. 3); – *Borkin, S./C.E. Brown*: Plants strike back! (p. 3); – *May, M.L.*: Migrating dragonflies in North America (pp. 4-8); – *Tennessen, K.*: Guidelines for rearing and preservation of reared specimens (pp. 8-9); – *Donnelly, N.*: Further comments on rearing (pp. 9-10); – *Orr, R.L.*: Is entomological collecting overregulated? (pp. 10-11); – [*Cashatt, E.D.*]: Some curatorial notes (p. 11); – *Daigle, J.*: Florida collecting (pp. 11-12); – [*Vogt, T. & T. Cashatt*]: Status of Somatochlora hineana in Illinois and Wisconsin (p. 12); – *Donnelly, N.*: A second Williamsonia fletcheri record from New York (p. 13); – *Vogt, T.*: Wisconsin, Michigan, Quebec collecting (p. 13); – *Donnelly, N.*: Lanthus - a puzzling problem (pp. 13-14); – *Jordan, B.*: Dragonfly reserve [poem] (p. 14).

(8518) BARKHAUSEN, A., 1992. Prachtlibellen: Luftkämpfe und Liebesspiele. *Schweiz. Nat-Schutz* 92(4): 22-23. – (Author's address not stated).
A general note on the biology of Calopteryx, with a brief reference to the occurrence in the cantons of Luzern and Vaud, Switzerland.

(8519) BASSET, A., D. FOURNIER & C. KERHOAS, 1992. Notes entomologiques. *Annls Soc. Sci. nat. Charente-marit.* 8(2): 39-49. – (Authors' addresses not stated).
A southward libellulid migration is reported along the bank of La Rochelle, France, 4-X--1991. There was a weak SSE wind. The name of the sp./spp. involved is not stated.

(8520) BAUERFEIND, R. & H. KOMNICK, 1992. Immunocytochemical localization of lipophorin in the fat body of dragonfly larvae (Aeshna cyanea). *J. Insect Physiol.* 38(3): 185-198. – (Inst. Cell Biol., Univ. Bonn, Ulrich-Haberland--Str. 61a, D(W)-5300 Bonn-1, FRG).
Immunocytochemistry using affinity-purified polyclonal antilipophorin revealed extracellular and intracellular locations of lipophorin in the fat body of dragonfly larvae. Lipophorin was associated with the external surface of the superficial and lateral plasma membranes which are directly exposed to the haemolymph. This location probably plays a role in the extracellular lipid-loading and unloading of lipophorin. Lipophorin was detected in the endoplasmic reticulum, Golgi apparatus and small vesicles located in the trans Golgi network region. These locations were interpreted as the secretory pathway of nascent lipophorin. Lipohorin was localized in various membrane-bound compartments which were identified as endosomes using biotinyl lipophorin and horseradish peroxidase as endocytotic markers. These results clearly suggested that circulating lipophorin was endocytosed by the adipocytes. Lipophorin endocytosis might serve the removal and lysosomal degradation of old lipophorin and/or provide an additional or alternative intracellular recycling mechanism of lipid-loading and unloading.

(8521) BELLE, J., 1992. A revision of the South American species of Aphylla Selys, 1854 (Odonata: Gomphidae). *Zool. Meded. Leiden* 66(12): 239-

264. – (Onder de Beumkes 35, NL-6883 HC Velp).
The 16 recognized spp. are (re)described, figured, keyed and revised. 3 new spp are described, viz. A. scapula (♂ holotype; Brazil, Territorio de Rondonia, Fazenda Rancho Grande), A. silvatica (♂ holotype: Ecuador, Provincia Napo, Limoncocha) and A. spinula (♂ holotype: Perú, Departamento de Cuzco, Rio Urubamba). A. obscura (Kirby, 1899) and A. albinensis Belle, 1970, are considered junior synonyms of A. tenuis Selys, 1859, and A. brevipes Selys, 1854, respectively, while A. simulata Belle, 1964, is considered a synonym of A. dentata Selys, 1859.

(8522) BELLE, J. & D. QUINTERO ARIAS, 1992. Clubtail dragonflies of Panama (Odonata: Anisoptera: Gomphidae). *In*: D. Quintero & A. Aiello, [Eds], Insects of Panama and Mesoamerica: selected studies, pp. 91-101, 648, 657 (Engl. & Span.s's, resp.), Oxford Univ. Press, Oxford-New York-Tokyo, ISBN 0-19-854018--3. – (First Author: Onder de Beumkes 35, NL-6883 HC Velp).
17 spp., referable to 4 subfam., are reviewed, described and keyed. The fauna shows close affinities to S. America. The "endemics" are probably poorly collected spp. with elusive habitats, but with wider ranges than known at present.

(8523) BELOUSOV, E.M. & S.M. KOSSENKO, 1992. Vzaimootnosheniya zolotistoy (Merops apiaster) i zelenoy (M. superciliosus persicus) shchurok (Aves, Meropidae) v nizov'yah r. Atrek (yugo-vostochnyy Prikaspyy). 1. Razedelenie resursov pri sovmestnom obitanii. – Interrelations of bee-eaters Merops apiaster and M. superciliosus persicus in the lower reaches of the Atrek River (south-eastern Caspian coast). 1. Resource parting when two species live together. *Zool. Zh.* 71(3): 66-74. (Russ., with Engl.s.). – (Dept. Biol., Kharkov St. Univ., Kharkov, Russia).
In the study area the 2 bird spp. nest together and their diets differ in most of the taxonomic groups of prey. As far as the odon. are concerned, quantitative data are given cumulatively for the order, and separately for Aeshnidae and Libellulidae. Species lists are not presented.

(8524) BOULTON, A.J. & P.S. LAKE, 1992. The macroinvertebrate assemblages in pools and riffles in two intermittent streams (Werribee and Lerderderg Rivers, southern central Victoria). *Occ. Pap. Mus. Victoria* 5: 55-71. – (First Author: Dept Zool., Univ. Adelaide, G.P.O. Box 498, Adelaide, 5001, AU).
Lists 5 odon. spp.

(8525) BRITISH DRAGONFLY SOCIETY, 1992. *Dig a pond for dragonflies*. Purley, 8 pp. – (c/o Mrs R.I. Silsby, 1 Haydn Ave., Purley, Surrey, CR2 4AG, UK).
A modified and nicely illustrated version of the pamphlet listed in *OA* 6581. The publication date is not stated, but it was apparently printed in June 1992.

(8526) BROCKHAUS, T., 1992. Die Odonatenfauna einer sächsischen Industriestadt – ökologische Analyse aquatischer Lebensräume im urbanen Bereich aus der Sicht der Libellen. *Verh. westdt. EntTag Düsseldorf* 1990: 321-340. – (Markt 20/21, D(O)-9001 Chemnitz, FRG).
Deals with the fauna (32 spp.) of 33 water bodies in the city area of Chemnitz, eastern Germany. – Cf. also *OA* 7622, 8323, 8334, 8395.

(8527) BRODSKIY, A.K., 1992. Structure, functioning, and evolution of tergum in alate insects, 1. Generalized model of structure. *Ent. Rev.* 70(9): 64-83. – (Dept Ent., St Petersburg St. Univ., Universitetskaya nab. 7/9, RUS-199164 St. Petersburg, Russia).
The paper initiates a series of works dedicated to the study of structure, functioning and evolution of a wing-bearing tergal plate in insects. A generalized wing-bearing plate model includes two kinds of tergal sutures and furrows: those inherited from a Thysanura-like ancestor, and those developed after acquisition of wings. The latter class may be divided into those providing a special type of modification of the tergum in the stroke-cycle, and those providing points of insertion of indirect muscles on the inner surface of the notum. The role of different flight muscles in the formation of tergal sutures is suggested. The scutellum is treated as a posteromedial portion of the notum situated between the scutoscutellar and recurrent scutoscutellar sutures and supplied with paired scutellar muscles (t 13).

Ephemeroptera and Plecoptera primitively lack the scutellum. Investigation of the tergal sutures throughout the insect orders makes it necessary to change the names of some tergal structures. For each insect order a common structural pattern of tergal plates may be derived, differing in some combination of features. The main features of tergal plate patterns for Ephemeroptera, Odonata, Meganeurida (= Protodonata + Odonata p.p.), Plecoptera, Blattoptera, and Orthoptera are described and discussed.

(8528) *BULLETIN OF THE HOKKAIDO ODONATOLOGICAL SOCIETY.* Vol. 5 (March 30, 1992). – (c/o Dr H. Ubukata, Dept Sci. Educ., Kushiro Coll., Hokkaido Univ. Educ., Shiroyama 1, Kushiro, 085, JA).
Ubukata, H.: Variation of the dorsal black stripe in Libellula quadrimaculata Linnaeus in eastern Hokkaido, Sakhalin and Kurile Islands (pp. 1-6); – *Asahina, S.*: A record of the Odonata taken in 1990 from northern and eastern Hokkaido (pp. 7-8); – *Hiratsuka, K.*: The bank protection works of the river Tsukisamu (pp. 9-12); – *Sato, M.*: The distance of the position of emergence from water's edge and ground in Somatochlora graeseri aureola (pp. 13-14); – *Ubukata, H., T. Komatsu & S. Hiruta*: Some dragonflies collected from Sakhalin in July and September, 1990 (pp. 15-16); – *Ubukata, H. & K. Haga*: Some dragonflies collected from Mt Nipesotsu, the Hidaka Mountains (p. 17); – *Ubukata, H.*: Some dragonflies collected by Mr T. Kobayashi from Yakutsk and Khabarovsk in 1989 (p. 18); – *Koyama, T.*: Some observations about dragonflies in Rumoi district (p. 19); – *Ubukata, H.*: Dragonflies collected from the Kanayama dam (p. 20); – [*Hiratsuka, K.*]: New records of dragonflies at district level in Hokkaido (p. 21); – *Sato, M.*: Pantala flavescens was collected from Hidaka district (p. 21); – [*Hiratsuka, K.*]: Some records of Odonata in Hokkaido (pp. 22-23); – Distribution table of dragonflies in each district of Hokkaido, 7 (pp. 25-27); – Distribution table of dragonflies in the neighbouring islets of Hokkaido, 5 (pp. 28-30); – *Ubukata, H.*: Review of odonatological literature (p. 31). – Where Engl. titles do not appear in the journal, these are listed as circulated separately by the Society. The issue also contains various management notes, letters from the membership, etc.

(8529) BURNSIDE, C.A. & J.V. ROBINSON, 1992. The role of caudal lamellae in zygopteran (Odonata) larvae: contribution to swimming speed and an allometric analysis. *Bull. N. Am. benthol. Soc.* 9(1): 110-111 [abstract only]. – (Dept Biol., Univ. Texas, Arlington, TX 76019, USA). [Verbatim]: Damselfly larvae are often found missing or regenerating some of their 3 caudal lamellae. These lamellae have 3 major functions. They: (1) greatly increase swimming speed, (2) break off if grasped by a predator, (3) act as auxiliary gas exchange organs during times of respiratory stress. Lamella morphology differs interspecifically and perhaps intraspecifically throughout ontogeny. Late instars of several spp. were collected in N. central Texas. The collection includes spp. which occupy either lentic or lotic environments and some are found primarily in fish free environments. – The relative investment in lamellae was determined for all individuals. Although there are interspecific differences in investment, in all instances relative investment significantly and systematically decreases in later instars. Surface area was determined for each lamella as an index for possible respiratory function. Lamella growth was compared allometrically to other body parameters. Swimming speeds were determined for each individual with 3, 2, 1 and 0 lamellae. Relationships between lamella weight and: (1) breaking joint size, (2) lamellae surface area, and (3) swimming speed are developed and compared for this spp. collection.

(8530) CHOVANEC, A., U. GOLDSCHMID & S.E. WANZENBÖCK-ENDEL, 1992. Planungsbezogene Bioindikatoren für strukturelle Vielfalt aquatischer Lebensräume. *Ber. Ver. dt. Ingenieure* 901 [1991]: 1111-1122. – (First Author: Anzengrubergasse 8/28, A-1050 Wien).
The paper is based on a poster, presented at the symposium, "Bioindikation - ein wirksames Instrument der Umweltkontrolle", Vienna, 1991. It deals with the succession of amphibians and odon. (9 identified spp.) in a pond on the Viennese Danube Island ("Donauinsel"), Austria, and represents a partial report on a project relative to the management of the wetland habitats on the said island.

(8531) CLAUS-WALKER, D.B., 1992. Density-dependent cannibalism in larvae of the dragonfly Epitheca cynosura (Say). *Bull. N. Am. benthol. Soc.* 9(1): 142-143 [abstract only]. – (Evol. Ecol. Res. Gr., Morgan Sch. Biol. Sci., Univ. Kentucky, Lexington, KY 40506, USA).
[Verbatim]: "Semi-field" and in-lab behavioural experiments were conducted to study the importance of cannibalism on the population dynamics of larvae of E. cynosura. These larvae, like the larvae of most dragonflies, are voracious eaters and will consume conspecifics. After hatching, all instars exhibit cannibalism in the presence or absence of prey. Cannibalism was most prevalent when larvae were of different sizes, but can occur when larvae are of the same size. In the "semi-field" experiment, initial starting density had an important effect on relative survival. Larvae starting at lower densities had a higher percent survival, a lower size variance, and were, on the average, larger than those starting at higher, yet natural, densities. When fish were added, almost all larvae were consumed. With alternative food present and the elimination of potential predators, much of the mortality detected was attributed to cannibalism. In-lab observations were conducted to validate this assumption. Cannibalism did occur more frequently in high density treatments and mortality not related to predation was found to be unimportant. The effects of adding a naturally occurring vertebrate predator (bluegill sunfish) or fish 'odor' to larval treatments were also studied. Fish and large larvae interacted in their effects on spatial distribution, movement, survival and growth of smaller larvae. – Two possible consequences of cannibalism could be population regulation and the alternation of age-class structure by splitting a cohort into univoltine and semivoltine populations.

(8532) CONRAD, K.F. & G. PRITCHARD, 1992. An ecological classification of odonate mating systems: the relative influence of natural, inter- and intra-sexual selection on males. *J. Linn. Soc.* 45: 255-269. – (Second Author: Dept Biol. Sci., Univ. Calgary, 2500 University Drive NW, Calgary, Alberta, T2N 1N4, CA).
The authors separate odon. mating systems into 2 main groups: non-resource and resource-based systems. These comprise 5 classes of mating system: encounter-limited mating, free female choice, resource-limitation, resource-control and female-control. These classes are consistent with previous classifications of odon. mating systems and with the overall classification of mating systems by S.T. Emlen & L.W. Oring (1977: *Science* 197: 215-223). Whereas Emlen & Oring's classification was concerned with differences in sexual selection between mating systems, our classification of odon. mating systems also addresses the influence of inter- and intra-sexual selection on males within a mating system. Predictions about such relationships are useful in multivariate analysis of odon. lifetime reproduction success. Among most odon. mating systems, much of the sexual selection on males results from all-male competition for access to mates. Sexual selection via male choice is relatively less important or operates indirectly throught females' choices of times or places to mate. The Authors place resource-control and resource-limitation at opposite ends of a resource-defence continuum and postulate female choice will have greater infuence in mating systems that are more like a resource-limitation system and less influence in mating systems that are more like resource-control. Sexual selection is likely to be weak in spp. that resort to encounter-limited mating where longevity is likely to contribute strongly to variation in reproductive success. Females have limited opportunity to exercise choice among males in the female-control mating system and in this system selection is most likely to operate on male characters which contribute to their efficiency in searching for and capturing mates. Predictions about the differences in the intensity of sexual selection between different odonate mating systems should be made on the basis of the variation in the number of potential fertilizations per male or even per ejaculate, rather than the number of fertilizable females per male. Very different mating systems could result in similar patterns of variation in male reproductive success.

(8533) [CORBET, P.S.] PRITCHARD, G., [Ed.], 1992. Current topics in dragonfly biology, Vol. 5: Including a discussion focusing on survival during the hot dry season. *Soc. int. odonatol. rapid Comm.* (Suppl.) 15: viii+30 pp. – (Available

at the SIO Central Office, P.O. Box 256, NL-3720 AG Bilthoven, at Hfl. 20,- net. Vols 1-5, with standing order: Hfl. 75,- net).
This is the continuation of the transcripts of the tape-recorded discussions of the traditional "Corbet Seminars", conducted since 1981 in the framework of the International Symposia of Odonatology (for the earlier pts cf. *OA* 4563, 6436, 6472, 7495). Professor Corbet continues as organizer and moderator, but the editorial responsibility for the publication has now been accepted by Professor Pritchard. The present issue is the verbatim record of the Seminar during the 11th Int. Symp. Odonatol., Trevi, Italy (1991). In addition to the longer texts by the moderator, it contains contributions by 18 discussants.

(8534) CORDERO, A. & P.L. MILLER, 1992. Sperm transfer, displacement and precedence in Ischnura graellsii (Odonata: Coenagrionidae). *Behav. Ecol. Sociobiol.* 30(3/4): 261-267. – (First Author: Area Ecol., Fac. Biol., Univ. Santiago de Compostela, ES-15071 Santiago de Compostela, Galicia).
Copulation in I. graellsii may be divided into 3 stages, according to the movements and position of the male's abdomen. Sperm volumes in males and females, interrupted at different phases of copulation in laboratory-reared and field specimens were measured. The results showed that males remove sperm from the female during stage I, and do not transfer sperm until stage II of the copulation. In the field females interrupted during stage I of copulation had less sperm than postcopula females, and the volume of sperm in laboratory females mated once or twice was similar. These results suggest that males can remove most of the sperm during stage I of copulation. Preparations of in-copula specimens showed the horns of the penis (used to remove sperm) inside the bursa copulatrix and the spermatheca. Therefore males can remove sperm from both organs, in contrast to the other Ischnura spp. so far studied, where males can empty only the bursa. The length of these horns is positively correlated with male body length and there are significant differences in length between the left and right horns of individual males. This suggests great variability in the male's ability to remove sperm. On the other hand, ejaculate volume is positively related to male and female size, and negatively to male age. Males are likely to be able to detect the presence of sperm in females: if the effects of population density and time of start of copulation are taken into account, copulations are longer with mated than with virgin females. Using genetic markers, sperm precedence was studied by rearing the female offspring of 6 females mated with two males of different genotype. In 5 out of 6 crosses, the second male fertilized all the eggs laid by the female in her first clutch. On average, the following clutches were progressively more fertilized by the first male, but there were striking differences between crosses. These differences are probably due to the variability in the amount of sperm transferred and/or removed.

(8535) DE MARMELS, J., 1992. Odonata del Cerro Guaiquinima (edo. Bolivar) y zonas aledanas. *Boln Ent. venez.* (N.S.) 7(1): 37-47. (With Engl.s.). – (Inst. Zool. Agric., Fac. Agron., Univ. Central Venezuela, Apdo 4579, Maracay 2101-A, Venezuela).
44 spp. are listed from Cerro Guaiquinima and the nearby Rio Carapo. An illustrated description is given of Oligoclada waikinimae sp.n. (holotype ♂: Cerro Guaiquinima, alt. 1000 m, 6/13-II-1990, deposited at MIZA). The ♀ of Heteragrion pemon De Marmels and the larva of Erythrodiplax transversa Borror are also described and figured. The presence of H. pemon and Acanthagrion tepuiense De Marmels identifies Cerro Guaiquinima as a part of E Pantepui.

(8536) Le *DEPRESSIUSCULUM*. Feuille de liaison pour l'étude des odonates dans la Crau, No. 1 (Apr., 1992), No. 2 (June, 1992). Compiled and published by C. Deliry (17 rue Diderot, F-38000 Grenoble).
This incidental and irregularly published newsletter is devoted entirely to the odon. fauna of the Crau (Bouches-du-Rhône), France. The first 2 issues contain a checklist of spp., a list of the localities visited, and a rather comprehensive (though still incomplete) regional bibliography. Copies are available from the Publisher, and cooperation in all aspects of the regional work is requested.

(8537) DEVAI, G., I. DEVAI, I. CZEGENY, B. HARMAN, I. WITTNER & K. FÜRJESI, 1992. Untersuchung der Erklärungsmöglichkeiten von Bioindikation bei verschiedenartig belasteten nordostungarischen Wasserräumen. *In*: I. Mészáros et al., [Eds], Ecological approaches of environmental chemicals, pp. 51-61, GSF-Forschungszentrum für Umwelt und Gesundheit, Neuherberg. – ISSN 0721-1694. (With Engl.s.). – (First Author: Inst. Ecol., Kossuth Univ., P.O. Box 14, HU-4010 Debrecen).
Environmental effects can be optimally revealed through monitoring to the indications (sometimes alarm signals) provided by various organisms. The present work is largely based on odon., and the results show that a given pollutant accumulates in varying quantities in different organisms.

(8538) [DOMMANGET, J.-L.], 1992. Société française d'Odonatologie (S.F.O.). *Entomologiste* 48(2): 111. – (7 rue Lamartine, F-78390 Bois-d'Arcy).
The programme and objectives of the SFO, by its founder and first President.

(8539) DOMMANGET, J.-L. & G.C. LUQUET, 1992. Données faunistiques sur une collection d'odonates recueillis en France de 1961 à 1972 (Odonata). *Ent. gall.* 3(2): 73-75. – (First Author: 7 rue Lamartine, F-78390 Bois d'Arcy).
Commented list of incidental records from 10 departments, France.

(8540) DONNELLY, T.W., 1992. The Odonata of central Panama and their position in the neotropical odonate fauna, with a checklist, and descriptions of new species. *In*: D. Quintero & A. Aiello, [Eds], Insects of Panama and Mesoamerica: Selected studies, pp. 52-90, 648, 657 (Engl. & Span.s's, resp.), Oxford Univ. Press, Oxford--New York-Tokyo, ISBN 0-19-854018-3. – (2091 Partridge Lane, Binghamton, NY 13903, USA).
Central Panama has probably the richest odon. fauna in Mesoamerica. It has been considered an especially important region because of the commonly held belief that the Canal represents an important boundary between faunas on either side. Collecting done during the last 2 decades, however, shows that this zone is not a faunal boundary. The number of spp. whose ranges terminate in this zone is relatively small, and about what one would expect from the intensity of collecting. The higher areas (Cerro Campana, on the W side of the Canal, and Cerro Azul and Cerro Jefe, nr to each other on the E side of the Canal) have faunas very similar to one another. There are 4 spp. known globally only from Cerro Campana and 1 that is restricted to Cerro Jefe and Cerro Azul. Otherwise, the odon. distribution is remarkably general through the area. Further, few of the spp. are restricted to central Panama. Most are part of an Andean-Cordilleran neotropical fauna which extends throughout western South America and Mesoamerica. – 2 genera of Zygoptera were studied in detail. Heteragrion, with 5 spp., had 3 new spp. and 1 new spp. of a Colombian sp. viz., H. valgum sp.n., H. atrolineatum sp.n., H. rubrifulvum sp.n., and H. mitratum atroterminatum ssp.n. H. erythrogastrum ranges from Costa Rica to Colombia, H. atrolineatum, H. mitratum atroterminatum occur also in eastern Costa Rica. – Palaemnema has 9 spp. of which 6 are new: P. dentata sp.n., P. collaris sp.n., P. cyclohamulata sp.n., P. spinulata sp.n., P. bilobulata sp.n. and P. melanura sp.n. The other 3 spp. occur in Venezuela (P. mutans), Mexico to Venezuela (P. nathalia), and only in central Panama (P. joaneta). The failure to find forms in common with Costa Rica (except P. nathalia) reflects the fact that this genus occupies restricted microhabitats (tiny forest streams) and has evidently speciated very recently in response to relatively recent topographic and climatic changes. – 3 other new sp. are described: viz., Cannaphila mortoni sp.n. (occurring also in eastern Costa Rica), Micrathyria caerulistyla sp.n., and Epipleoneura letitia sp.n., a disjunct northern representative of a South American genus. – The status of several problematic spp. is discussed, viz., Cora marina (Mexico to Panama), Miocora peraltica (Costa Rica to Colombia), Macrothemis nobilis (also in Venezuela), and Heteropodagrion cf. superbum (also Colombia). – The Caribbean drainage of Costa Rica has an odon. fauna that is more similar to that of central Panama than does the Pacific drainage of that country. In general the spp. that occupy relatively modified habitats are those that range the most widely in Mesoamerica.

(8541) DRY, E.F. & J.E. HAVEL, 1992. Odonate predation on littoral prey populations: an enclosure experiment and diet analysis. *Bull. N. Am. benthol. Soc.* 9(1): 142 [abstract only]. – (Dept Biol., SW Missouri St. Univ., Springfield, MO 65804, USA).
[Verbatim]: Lestes sp. and Anax sp. are the dominant larval odon. of Miller's Marsh, Beaver Island, Michigan. These opportunistic predators cling to littoral vegetation and consume aquatic insects and microcrustaceans. To monitor the effects of Lestes and Anax predation on the dynamics of littoral prey populations, a 2 x 2 factorial design (presence or absence of Lestes by presence or absence of Anax) was set up and monitored over an 8-week period. Twelve 60--liter enclosures were placed in a littoral habitat with the natural prey community. Enclosure volumes were monitored twice a week and prey populations were sampled, in duplicate, once a week. On each date, Anax were sampled from adjacent littoral habitats for diet analysis. – Data analyses on the total numbers of prey items for each combination of odon. treatment indicated no effects of individual treatments or their interaction for any of the dates sampled. Likewise, no treatment effects were observed for numbers of pooled prey items (small cladocerans, large cladocerans, ostracodes, and chironomids) for any of the dates. Preliminary results from diet analyses suggest that both ostracodes and cladocerans are commonly consumed. Further analysis focuses on determination of predator size selectivity.

(8542) DUNHAM, M.L., 1992. Determinants of territory-holding in Pachydiplax longipennis (Odonata: Libellulidae). *Bull. N. Am. benthol. Soc.* 9(1): 112 [abstract only]. – (Div. Biol. & Med. Box G-W, Brown Univ., Providence, RI 02912, USA).
[Verbatim]: Males hold territories for a few hours each day, leaving after losing a fight with an intruder. A male must win each of a series of fights in order to hold his territory. I observed Pachydiplax in a cage to determine whether resource value or fighting ability affects length of time territories are held. Female presence was the measure of resource value, and energy level was the measure of fighting ability. I controlled the number of males and females in the cage. I recorded winners of individual contests as well as total time individuals held territories (territory tenure). When females were absent, territory tenure depended on how much food the male had recently ingested (energy level). However, when females were present and active, energy level had no effect on territory tenure. Energy level affected whether males held territories at all.

(8543) DUNKLE, S.W., 1992. Distribution of dragonflies and damselflies (Odonata) in Florida. *Bull. Am. Odonatol.* 1(2): 29-50. – (Biol. Dept, Collin Co. Commun. Coll., 2800 East Spring Creek Parkway, Plano, TX 75074, USU).
The 162 spp. known to occur in Florida, USA (and of which 6 spp. and 2 sspp. are endemic) are catalogued, their distribution is county-wise stated, and brief notes on general ecology and phenology data are provided for all of them. The comprehensive bibliography includes all publications known to the author containing regional locality data for the adults.

(8544) EDA, S., 1992. Annual review of entomology for 1991 in particular insect groups. Dragonflies. *Gekkan-Mushi* 254: 20-26. (Jap., with Engl. title). – (3-4-25 Sawamura, Matsumoto, Nagano, 390, JA).
Continuation of the series as listed in *OA* 7833.

(8545) FILZEK, J., 1992. Libellen, die Hubschrauber im Tierreich. *Mücke, Wiesbaden* 1992 (6): 14-17. – (c/o Universum Verlagsanstalt, Postfach 5720, D(W)-6200 Wiesbaden, FRG).
A general article in a children's monthly, by one of the Editors, with photographs from the (Swiss) book listed in *OA* 7722.

(8546) FINCKE, O.M. 1992. Behavioural ecology of the giant damselflies of Barro Colorado Island, Panama (Odonata: Zygoptera: Pseudostigmatidae). *In*: D. Quintero & A. Aiello, [Eds], Insects of Panama and Mesoamerica: selected studies, pp. 102-113, 648, 657-658 (Engl. & Span. s's, resp.). Oxford Univ. Press, Oxford-New York--Tokyo, ISBN 0-19-854018-3. – (Dept Zool., Univ. Oklahoma, Norman, OK 73019-0235, USA).
Whereas most odon. feed on perched or flying insect prey, pseudostigmatids have specialized

in feeding on web-building spiders. Unlike their temperate counterparts, which breed along streams or lakes, the giant damselflies of Barro Colorado Island, Panama, oviposit in water-filled treeholes scattered throughout the forest. – As a limiting resource, treehole-oviposition sites appear to have played an inordinate role in shaping the behaviour and ecology of pseudostigmatids. Interspecific larval competition seems to restrict the smaller Mecistogaster spp. to small treeholes, which support a single individual per season. Larvae of the larger Megaloprepus coerulatus dominate large treeholes, which can support at least two overlapping generations per wet season. Differences in adult seasonality affect the availability of receptive females, which in turn determines the type of mating strategy that is most effective for males. Males of M. coerulatus, whose females are receptive nearly all year around, sequester a disproportionate number of mates and increase their chances of producing multiple, high-quality offspring by defending medium to large treeholes for as long as 3 months. Mecistogaster linearis, whose males have little control over the fate of their offspring and whose females are receptive for about 6 months, defend gap areas where females forage. Female M. ornata are receptive for only a few months. Male M. ornata are not territorial but rather search for mates opportunistically. Coexistence among treehole-breeding odonates on BCI appears to be possible because the two smaller Mecistogaster spp., which are inferior competitors as larvae, are superior as adults in distributing their eggs in treeholes when they refill with wet season rains.

(8547) FINCKE, O.M., 1992. The role of interspecific competition in organizing communities of treehole-breeding odonates. *Bull. N. Am. benthol. Soc.* 9(1): 112 [abstract only]. – (Dept Zool., Univ. Oklahoma, Norman, OK 73019, USA).
[Verbatim]: Water-filled treeholes in the neotropics are the larval habitats of several pseudostigmatid and 1 aeshnid sp. The faster intrinsic growth rates of the largest spp. enable them to eventually kill the 2 smaller spp. in holes larger than 1 l. In holes ≤ 1 l, the first individual to hatch can kill any later colonizers. In Panama, the 2 largest spp. occupy larger holes on average than 2 smaller spp. A field experiment demonstrated that this distribution does not result from niche partitioning by ovipositing females. Within a month of the first treehole-filling rains in wet season, 62% of 55 natural and 54 artificial holes had been colonized. The 2 smaller spp. occupied 82% of the colonized holes, versus 25% occupied by the larger sp. In a wetter forest in Costa Rica where treeholes rarely dry out, the smaller spp. lose their colonization advantage. There, larger spp. nearly exclude a smaller one which occupied less than 1% of the holes. Water-filled fruit husks are not used as an alternative habitat but one small sp. avoids competition with larger pseudostigmatids by ovipositing in bromeliads. Within the range of tolerable habitats, species differences in competitive ability of adult females and their offspring predict the assemblage of spp.

(8548) FLECKER, A.S., 1992. Fish trophic guilds and the structure of a tropical stream: weak direct vs. strong indirect effects. *Ecology* 73(3): 927-940. – (Dept Zool., Univ. Maryland, College Park, MD 20742, USA).
The study was conducted in Rio Las Marias, Estado Portuguesa, Venezuela. The odon. are order-wise considered and statistical data on their abundance are presented.

(8549) FORSTER, S., 1992. Untersuchungen zu den Habitatansprüchen heimischer Libellen. *Junge Wissenschaft* 7(26): 38-45. – (Hinter-dem-Turm 1, D(O)-4320 Aschersleben, FRG).
Inquiry into habitat requirements of 33 spp., studied systematically at 6 localities in the Aschersleben distr., NE Harz, eastern Germany.

(8550) FUKUDA, H. & K. EHIRA, 1992. Some butterflies and dragonflies spreading their ranges in Ryûkyû Islands. *Nature & Insects* 27(7): 31-35. (Jap., with Engl. title). – (Authors' addresses not stated).
[Abstract not available; the paper contains no taxonomic names.]

(8551) GASCON, C., 1992. Aquatic predators and tadpole prey in central Amazonia: field data and experimental manipulations. *Ecology* 73(3): 971-980. – (Dept Biol. Sci., Florida St. Univ., Tallahassee, FL 32306-2043, USA).
Experimental manipulations of aquatic preda-

tors (odon. larvae and fishes) and prey (3 tadpole spp.) investigated the role of predators in the organization of a tropical larval anuran assemblage, 70 km N of Manaus, Brazil. The aeshnid and libellulid larvae are the most common predators in upland isolated pools and peccary wallows, while fish are so in the lowland, stream-associated habitats. Predators have the potential to modify the composition of tadpole species assemblages through differential predation.

(8552) GEISTER, I., 1992. Bobovek, zavarovan in znova ogrožen. – [Bobovek, protected and threatened again]. *Gea, Ljubljana* 2(2): 8-12. (Slovene). – (Pokopališka pot 13, SLO-64202 Naklo, Slovenia).
An exhaustive review of the systematic research on the flora and fauna of the Bobovek clay pits nr Kranj, Upper Carniola, Slovenia. Out of the 27 odon. spp. recorded in the area, 7 are listed here with brief annotations.

(8553) GEISTER, I., 1992. Drugotni vodni biotopi kot prebivališča kačjih pastirjev. – [Secondary aquatic biotopes as dragonfly habitats]. *Proteus, Ljubljana* 54(9): 323-329, cover phot., with caption on p. 322. (Slovene). – (Pokopališka pot 13, SLO-64202 Naklo, Slovenia).
Contains specified (prior/post 1961) distribution maps of 3 Orthetrum spp., and a good number of new records of various spp. for Slovenia. Of particular interest is the observation of Sympetrum striolatum oviposition in water covered at night by a thin ice layer (gravel pit Za Savo, nr Naklo, Upper Carniola, alt. 370 m, 8-XI-1991). – The paper is written in a very personal, highly elegant style, characteristic of this author (cf. also *OA* 8290).

(8554) *GOMPHUS*. Mededelingsblad van de belgische libellenonderzoekers – Bulletin de liaison des odonatologues belges, Vol. 8, No. 2 (June 1992). (Dutch & Fr.). – (c/o Ms A. Anselin, KBIN, 29 rue Vautier, B-1040 Bruxelles).
Goffart, P.: Prospections odonatologiques en Wallonie et à Bruxelles: où chercher et que chercher? (pp. 26-34); – *Anselin, A.*: Waar nog libellen zoeken deze zomer? (pp. 35-38); – *Goffart, P.*: Publications odonatologiques récentes (pp. 39-43). – On pp. 44 & cover p. 3 there is a list of 5 field trips scheduled for July through Sept.

(8555) HARP, P.A. & G.L. HARP, 1992. New records of Arkansas Odonata. *Bull. N. Am. benthol. Soc.* 9(1): 144 [abstract only]. – (Dept Biol. Sci., Arkansas St. Univ., State University, AR 72467, USA).
[Verbatim]: Endemism among invertebrates, including Odon. of the Interior Highlands of Arkansas and Missouri is well documented. Heterogeneity of the origins of Arkansas Odon. is indicated by recently discovered species. They include ones of northern (Lestes congener), eastern (Chromagrion conditum, Macromia alleghaniensis, Epitheca spinosa), southeastern (Telebasis beyersi, Epitheca costalis, Helocordulia selysii, Celithemis amanda) and southwestern (Dythemis fugax) affinities within North America. The addition of these 9 spp. brings the Arkansas state list for Odon. to 133.

(8556) HAVEL, J.E., J. LINK & J. NIEDZWEICKI, 1992. Selective predation by Lestes (Odonata: Lestidae) on littoral microcrustacea. *Bull. N. Am. benthol. Soc.* 9(1): 111 [abstract only]. – (First Author: Biol. Dept, SW Missouri St. Univ., Springfield, MO 65804, USA).
[Verbatim]: The current study employed 2 experimental approaches to directly examine the predation risk of 6 littoral cladoceran and ostracode spp. to 2 sizes of Lestes. Predation rate experiments showed that Lestes has a clear preference for smaller cladocerans (Polyphemus and Ceriodaphnia) over both a large cladoceran (Simocephalus) and 3 ostracodes (Cypricercus, Cyclocypris, and Cypridopsis). Most Lestes were unable to consume any of the larger-sized Cypricercus. In an experiment testing functional response to density of the small ostracode Cypridopsis, small Lestes consumed few at all densities. In contrast, large Lestes showed highly variable feeding rates, with an increase in both mean and variance at higher densities. The slope of the functional response curve did not level off, suggesting that some individual large Lestes were not satiated at 60 prey per 700 ml. Behavioral observations corroborated these data. Attack rates were highly variable among individual predators. Both attack and capture efficiencies were higher for Lestes on smaller cladoce-

rans than for any other taxa. Small Lestes showed a low success against Cypridopsis, while larger Lestes captured and ate them easily. These data suggest that damselfly naiads are size selective, consume cladocerans more readily than ostracodes, and are capable of very high individual predation rates.

(8557) HEADY, S.E. & C.E. TRISLER, 1992. Influences of the changing environment on odonates in the Bass Islands of Lake Erie. *Bull. N. Am. benthol. Soc.* 9(1): 141 [abstract only]. – (First Author: O.D.A.R.C., 1680 Madison Ave., Wooster, OH 44691-4096, USA).
[Verbatim]: A survey of Odon. occurring on the Bass Islands was conducted in 1991, 70 years after the first survey was made. Data were compiled from the Franz Theodore Stone Laboratory collection, personal collections, and the records from aquatic entomology classes of 1987, and 1989-1991. Present data were compared with data of C.H. Kennedy (1922) and the 1976 data of B. Marback (unpublished). 12 spp. present in 1921 are no longer present. 4 spp. are present now (1991) that were not recorded in 1921. 4 spp. that were not present in 1921 or 1991 were recorded at some intermediate time. Changes in the odon. environment are discussed, and spp. are listed as to date and location collected.

(8558) HIRSCHI, W., 1992. Haussperling Passer domesticus erbeutet Libellen. *Ornithol. Beobachter* 89: 138-139. – (Grund, CH-3556 Trub).
At Grosse Moossee, canton Bern, Switzerland, house sparrows were seen catching dragonflies on various dates. On the ground, huge quantities of odon. wings were found. These were referable to at least 3 freshly emerged Anax imperator, and to 22 freshly emerged Orthetrum cancellatum individuals.

(8559) HOPPER, K. & P.H. CROWLEY, 1992. How to behave around cannibals: a density-dependent dynamic game. *Bull. N. Am. benthol. Soc.* 9(1): 143 [abstract only]. – (Morgan Sch. Biol. Sci., Univ. Kentucky, Lexington, KY 40506, USA).
The study is based on the work on odon., though this is not apparent from the abstract. – [Verbatim]: In a developing cannibalistic population, conspecifics of different sizes may adopt different strategies to cope with the size-specific density-dependent tradeoffs between growth and survival commonly associated with cannibalism. When activity level is the mediating strategy, these tradeoffs depend not only on relative size and population density, but also on conspecific activity, alternative-prey availability, non-cannibalistic sources of mortality, etc. – We present a dynamic programming model that realistically simulates the above interactions and mathematically solves the density-dependent dynamic game between sizes within a developing cannibalistic cohort. An innovative convergence method that should prove useful for modelling many other ecological phenomena finds fitness maximizing optimal activity levels and produces density and size distributions over a theoretical season. – The results support the general perception of cannibalism as a density-dependent regulator of population dynamics. Intraspecific predation tends to synchronize the cohort except when cannibalism is particularly intense overall or increases in intensity with the absolute size of the potential cannibal. Stock recruitment curves derived from the results imply stable generation-to-generation dynamics, though low alternative prey availabilities and high fecundities can generate oscillatory behavior consistent with published observations.

(8560) JOHANSSON, F., 1992. Intraguild predation and cannibalism in odonate larvae – effects of foraging behaviour and zooplankton availability. *Bull. N. Am. benthol. Soc.* 9(1): 142 [abstract only]. – (Dept Anim. Ecol., Univ. Umeå, S-90187 Umeå).
[Verbatim]: The foraging behaviours and susceptibilities of 4 odon. larvae to predation by large Aeshna juncea larvae were studied in the laboratory. Predation was compared in the presence and absence of a first trophic level (zooplankton). The A. juncea predator showed a high foraging activity irrespective of odon. prey treatment. The predation by A. juncea was lowest on Coenagrion hastulatum, which had sit and wait foraging mode, and hence support the prediction that sit and wait larvae have low rates of predation. Predation on actively foraging Leucorrhinia dubia by the A. juncea preda-

tor was high, which was consistent with prediction. However both activity and predation of L. dubia were lower in the presence of zooplankton and the A. juncea predator. This could reflect a risk averse to foraging under these conditions. A. juncea prey showed the same activity and predation pattern as L. dubia. Cordulia aenea had intermediate activity levels which were lower in the presence of zooplankton. However, this low active C. aenea prey suffered from high predation by the Aeshna predator, indicating a low odonate predator escape ability. The results show that larval odonate predation on other odon. is frequent, and that differences in foraging behaviour may account for observed differences in predation rates.

(8561) JOHNSON, D.M., 1992. Identification of the year-classes among final-instar larvae of a semivoltine dragonfly. *Bull. N. Am. benthol. Soc.* 9(1): 143 [abstract only]. – (Dept Biol. Sci., East Tennessee St. Univ., Johnson City, TN 37614-0703, USA).
[Verbatim]: Larval Epitheca (Tetragoneuria) cynosura are important predators in the benthic community of Bays Mountain Lake (Tennessee). Descriptive studies suggest that the population is predominantly semivoltine (2-year life cycle); but there is 'cohort-splitting', some individuals completing univoltine development. Field experiments show the population to be predominantly univoltine in the absence of biotic interactions (exploitation and interference competition). A recent enclosure/exclosure experiment was complicated by rapid growth of the junior year-class (Ec1) such that many univoltine individuals 'caught up with' the senior year-class (Ec2). An ad hoc method for distinguishing year-classes within the final instar was based on their having different 'condition coefficients', C = (dry mass)/(headwidth). In 1991 I tested that method by marking Ec2 individuals before introducing them to field enclosures in May. One tarsus was removed, and one compound eye scarred by minute pin pricks. Ec1, hatching from eggs introduced to enclosures, were unmarked. For final-instar larvae recovered in October I found that, using $C \geq 0.195$ to define Ec2, I correctly identified 94% of marked larvae, and incorrectly identified 14% of unmarked larvae. Ec2 larvae had larger headwidths [$5.56 \pm 0.14 > 5.13 \pm 0.17$], dry masses [$52 \pm 13 > 21 \pm 12$], and condition coefficients [$0.30 \pm 0.07 > 0.15 \pm 0.07$] than Ec1.

(8562) KHARITONOV, A.Yu. & S.N. BORISOV, 1992. Eurasian species of dragonflies of the genus Ophiogomphus (Odonata, Gomphidae). *Ent. Rev.* 70(4) [1991]: 113-119. – (First Author: Inst. Biol., Siberian Sect. Russ. Acad. Sci., Ul. Frunse 11, RUS-630091, Russia).
Engl. edition of the paper listed in *OA* 7640.

(8563) KIMSEY, L.S., 1992. Biogeography of the Panamanian region, from an insect perspective. *In*: D. Quintero & A. Aiello, [Eds], Insects of Panama and Mesoamerica: selected studies, pp. 14-24, 647, 656 (Engl. & Span.s's, resp.). Oxford Univ. Press, Oxford-New York-Tokyo, ISBN 0-19-854018-3. – (Dept Ent., Bohart Mus. Ent., Univ. California, Davis, CA 95616, USA).
Contains a list of 10 odon. genera of 5 families that have originally evolved in S. America and reached the Panamanian region, and a list of 7 genera of 4 families that contain 21 spp. endemic to Panama. (For the Gomphidae, however, cf. *OA* 8522).

(8564) KOTARAC, M., 1992. Obvestilo. – [Notice]. *Proteus, Ljubljana* 54 (8): 301. (Slovene). – (Marohovih 11, SLO-62000 Maribor, Slovenia).
Announcement of the odon. mapping scheme in Slovenia, by its Organizer (UTM grid, the EIS system). All interested are requested to get in touch with the author.

(8565) LEE, P.A. & D.M. JOHNSON, 1992. Colonization of a pond following restoration of its fish-free status. *Bull. N. Am. benthol. Soc.* 9(1): 142 [abstract only]. – (Dept Biol. Sci., East Tennessee St. Univ., Johnson City, TN 37614-0703, USA).
[Verbatim]: Availability of fish-free habitats is essential for conservation of some aquatic taxa that are maladapted for coexistence with fish. Ecology Pond was established as a fish-free habitat in Bays Mountain Park (Kingsport, Tennessee) to provide opportunities for study of such organisms. Its odon. assemblage has been studied since 1977. Comparisons with the as-

semblage in Bays Mountain Lake showed that the pond included several spp. adapted to fish-free habitats, most notably: Anax longipes and A. junius, Plathemis lydia, Tramea carolina, T. lacerata, Enallagma aspersum and Lestes eurinus. Unauthorized introduction of bluegill sunfish in 1987 caused decimation of these populations within one year. In September 1990 the fish were removed by poisoning with rotenone, and we began to monitor recolonization of Ecology Pond. We also sampled an adjacent beaver pond containing fish to determine which taxa were present in the nearest source of colonists. Monthly qualitative surveys and seasonal quantitative samples were collected from both ponds. Based on partial analysis of qualitative surveys (through May 1991), the following benthic invertebrates re-colonized Ecology Pond that were not in the beaver pond: Anax spp.; Gyrinidae (Coleoptera); Corixidae, Gerridae, and Notonectidae (Hemiptera); and Leptophlebiidae (Ephemeroptera).

(8566) LEGRAND, J. & C. GIRARD, 1992. Biodiversité des odonates du Simandou, recensement des espèces de Guinée, Afrique occidentale (Odonata). *Opusc. zool. flumin.* 92: 1-23. (With Engl.s.) – (Lab. ent., Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris).
A commented account is given of 33 spp., collected during the 1984 dry season in the remote and hitherto entomologically entirely unexplored Simandou range, SE Guinea, and the causes of habitat destruction in the region are analysed. Also included are a brief outline of the history of odon. exploration in Guinea, and a checklist of the 135 spp. so far recorded from the state. The latter is based mainly on literature; ca 60% of the records originate from the Nimba Range.

(8567) LEMPERT, J., 1992. Dolichopodiden als Eiräuber bei der tropischen Libellulide Hadrothemis versuta (Karsch) (Diptera: Dolichopodidae; – Odonata: Libellulidae). *Opusc. zool. flumin.* 94: 1-4, (With Engl.s.). – (Prinz-Albert-Str. 38, D(W)-5300 Bonn-1).
H. versuta females oviposit by swinging the eggs together with waterdrops onto the banks of temporary pools. Immediately after oviposition commences, dolichopodids of the genus Paraclius Löw gather at the oviposition site. They are highly active and search the ground with the proboscis, obviously feeding on the dragonfly eggs. Dolichopodids may play a more important role as predators of exophytic odon. eggs than previously assumed.

(8568) LENZ, N., 1992. Die Libellen (Insecta: Odonata) des Kreises Gütersloh. *Natur Heimat. Münster* 52(1): 1-14. – (Schillstr. 2, D(W)-4830 Gütersloh-1, FRG).
A comprehensive account and analysis of the odon. fauna (47 spp.) of Gütersloh distr., ca 967 km^2, Ostmünsterland, FRG.

(8569) *LINDENIA*. Notiziario dell'Ufficio Nazionale Italiano della Società Odonatologica Internazionale, Roma, No. 18 (July 1, 1992). – (c/o Prof. Dr C. Utzeri, Dipto Biol. Anim. & Uomo, Univ. Roma "La Sapienza", Viale dell' Università 32, I-00185 Roma).
In addition to a few SIO management notes and request for material, the issue contains the following articles: [*Utzeri, C.*]: L'odonatologo Adolfo Cordero di nuovo in Italia (p. 78); – *Falchetti, E.*: Scuole elementari fra le libellule (pp. 78-79); – [*Utzeri, C.*]: Laurea di Andrea Rossi (p. 79; "Alcuni dati di demografia su una popolazione di Sympetrum meridionale"); – [*Utzeri, C.*] & *B. Kiauta*: Notizie bibliografiche (pp. 80-81).

(8570) MAIBACH, A., 1992. Biodiversité, sur le terrain: la plaine de l'Orbe (VD). *Protect. Nat., Bâle* 92(4): 18-20. – (Le Bourg, CH-1610 Oron-la-Ville).
Lists several odon. spp. from the marshes of Sésines nr Orny, canton Vaud, Switzerland.

(8571) MAIBACH, A., 1992. Libellules des eaux courantes: les Caloptéryx. *Protect. Nat., Bâle* 92(4): 22-23. – (Le Bourg, CH-1610 Oron-la-Ville).
A general note, with emphasis on the status of Calopteryx in Switzerland.

(8572) *MARTINIA*. Bulletin des odonatologues de France. Vol. 8, No. 2 (June, 1992). – (c/o J.-L. Dommanget, 7 rue Lamartine, F-78390 Bois d'Arcy).
Coppa, G.: Esquisse faunistique des odonates de l'étang de la Horre (départements de l'Aube et de la Haute-Marne) (pp. 33-35); – *Brugière,*

D.: Stylurus flavipes (Charpentier, 1825) dans le moyen val d'Allier (p. 36); – *Kérihuel, C.*: Observation de Sympetrum danae (Sulzer, 1776) dans la Sarthe (Odonata, Anisoptera, Libellulidae) (pp. 37-38); – *Monnerat, C.*: Coenagrion caerulescens (Fonscolombe, 1838) dans le département de l'Ardèche (Odonata, Zygoptera: Coenagrionidae) (pp. 39-40); – *Reinhardt, K.*: Observations d'odonates en Corse (pp. 41-43); – *Lecocq, S.*: Sympecma fusca (Vander Linden, 1820) en février dans le département de l'Orbe (Odonata, Zygoptera, Lestidae) (p. 44); – *Le Quellec, J.-L.*: Complément à l'inventaire des odonates du Gers (pp. 45-56); – *Ducros, R.*: Sortie odonatologique du 15 septembre 1991 (Région Centre) (pp. 46-47); – *Boudier, F.*: 4ème Symposium des odonatologues de Suisse (pp. 47-50); – *J.-L. Dommanget*: Rubrique bibliographique (pp. 50-54); – *Heidemann, H.*: Analyse d'ouvrage (pp. 54-55 as listed in *OA* 8018); – *Machet, P.*: Nouvelles philatéliques (p. 56).

(8573) McPEEK, M.A., 1992. Habitat specialists and generalists: behavioral differences between Enallagma and Ischnura causing different habitat distributions. *Bull. N. Am. benthol. Soc.* 9(1): 111 [abstract only]. – (Dept Biol. Sci., Bowling Green St. Univ., Bowling Green, CH 43403, USA).
[Verbatim]: The Coenagrionidae display striking habitat distribution patterns among ponds and lakes. One set of Enallagma spp. are found only in fishless lakes, whereas the remaining spp. are found only in lakes with fish. In contrast, Ischnura are abundant in both lake types. Previous experiments indicate that behavioral differences make the Enallagma differentially vulnerable to large dragonflies found only in fishless lakes (i.e. Anax, Aeshna, Tramea spp.) and fish, which causes them to segregate between the 2 lake types. All Enallagma reduce their activity when a predator is nearby, but spp. from fishless lakes move frequently and quickly and attempt to evade attacking predators by swimming, whereas spp. from lakes with fish move infrequently and slowly and do not attempt to evade attacking predators. These behavioral differences result from a tradeoff in the conflicting demands of feeding and avoiding predators in the 2 lake types. However, Ischnura are apparently not affected by this tradeoff. Ischnura larvae taken from lakes with fish display the same behavior as Ischnura from fishless lakes, and their behavior is quite different from that of any Enallagma. Ischnura larvae walk faster and more frequently than larvae of any Enallagma and attempt to avoid attacking predators by walking. Furthermore, Ischnura larvae do not reduce activity when predators are nearby, but rather they immediately move away from predators. These results indicate that Ischnura has settled on an antipredator adaptation that is effective against both dragonflies and fish and allows them to coexist with both, whereas the antipredator adaptations of Enallagma force them to inhabit only fishless lakes with large dragonflies or only lakes with fish. These results have important implications for both present community structure and evolution within the taxon.

(8574) MOLLER PILLOT, H., [Ed.], 1992. *De fauna van het Drongelens Kanaal: inventarisatie, natuurwaarden en betekenis hiervan voor de inrichting.* – [*The fauna of the Drongelens Canal*, ...]. Oekol. Adviesbureau Moller Pillot, Tilburg. ii+39 pp., 1 fold. map excl. (Dutch). – (Leyparkweg 37, NL-5022 AA Tilburg).
Contains annotations on several odon. spp., but does not give a complete list; – Noord Brabant prov., the Netherlands.

(8575) MORIN, A. & N. BOURASSA, 1992. Modèles empiriques de la production annuelle et du rapport P/B d'invertébrés benthiques d'eau courante. *Can. J. Fish. aquat. Sci.* 49(3): 532-539. (With Engl.s.). – (Dept Biol., Univ. Ottawa, Ottawa, Ont., K1N 6N5, CA).
Published data on secondary production of running water invertebrates (incl. odon.) are analyzed by multiple regression to quantify the relationships between productivity (P, in grams dry mass per square metre per year) and biomass (B, in grams dry mass per square metre), mean individual mass (M, in grams dry mass), and annual mean water temperature (T, in degrees Celsius) to compare productivity of major taxonomic groups and to compare to invertebrate populations from other aquatic ecosystems. The equation $P = 0.18B^{1.01} M^{-0.34} 10^{0.037T}$ explains 87% of the variability in log P in the 291 lotic

invertebrate populations analyzed. Significant differences were detected among major taxonomic groups, but these differences account for only about 4% of the variability in log P. Once the effect of biomass, mean individual mass and water temperature are taken into account, productivity of lake and stream invertebrate populations is quite similar, although productivity is a linear function of biomass in streams and not in lakes. Comparison of models for running waters, lake and marine ecosystems suggests that marine invertebrates are less productive than freshwater populations.

(8576) MURRAY, K., 1992. A note on the rearing of Austroargiolestes isabellae (Theischinger & O'-Farrell) (Odonata: Megapodagrionidae). *Aust. ent. Mag.* 19(2): 49-50. – (41 Stanley St., St Croydon Park, N.S.W., 2133, AU).
Rearing from egg to adult revealed that 21 days were required for egg development at room temperature, and approx. 37 weeks for larval development with 8-9 instars.

(8577) NARAOKA, H., 1992. Ecological observations on the damselfly Agrion lanceolatum Selys (Coenagrionidae, Odonata). 2. Sexual behaviour. *Gekkan-Mushi* 252: 22-26. (Jap., with Engl. title). – (36-71, Aza Motoizumi, Oaza Fukunoda, Itayanagi-machi, Kita-gun, Aomori, 038-36, JA).
This is a sequel to the paper listed in *OA* 7414. It is based on 1981-1989 field work at Byobusan marsh, Aomori, northern Japan, and deals in detail with the diurnal rhythm of copulation behaviour (incl. sperm translocation) and the oviposition. – (A comprehensive Engl.s., provided by the Author, is available from the Eds of *Odonatologica*).

(8578) OLSVIK, H., & D. DOLMEN, 1992. Distribution, habitat, and conservation status of threatened Odonata in Norway. *Fauna norv.* (B) 39(1): 1-21. (With Norw.s.). – (First Author: N-6598 Foldfjorden; – Second Author: Museum, N-7013 Trondheim).
New records are presented for 17 spp. Orthetrum cancellatum is considered extinct in Norway. The habitats and status of each sp. are briefly commented, and the distribution of all 44 Norwegian spp. is shown in a table.

(8579) PEDERSEN, H., 1992. Somatochlora sahlbergi Trybom, 1889 (Odonata: Corduliidae). – a new species to Norway. *Fauna norv.* (B) 39(1): 22. – (Sct. Mogens Gade 56, DK-8800 Viborg).
1 ♂, nr Bugøynes, Sør-Varanger, 7-VII-1990.

(8580) PILON, J.-G., 1992. Les odonates: leur rôle dans le milieu naturel et la possibilité de leur utilisation dans la lutte biologique. *In*: C. Vincent & D. Coderre, [Eds], La lutte biologique, pp. 221-231, Morin, Montréal. – (Dép. Sci. Biol., Univ. Montréal, C.P. 6128, Montreal, Que., H3C 3J7, CA).
The odon. biology is briefly outlined, and their role in biological control is discussed. A comprehensive bibliography on the subject enhances the value of the paper.

(8581) PILON, J.-G., 1992. Note sur la présence automnale de Sympetrum vicinum Hagen au Québec, Canada (Odonata: Libellulidae). *Opusc. zool. flumin.* 90: 1-5. (With Engl.s.). – (Dép. Sci. biol., Univ. Montréal, C.P. 6128, Qué., H3C 3J7, CA).
With reference to the paper listed in *OA* 8394, the phenology of S. vicinum in Quebec is outlined. The adults were recorded on the wing from Aug. 4 through Nov. 6, mating occurs up to the very end of Oct., and oviposition is evidenced up to mid-Oct. Since in some years a temporary ice formation along the pond edges commences towards mid-Oct., the eggs may be deposited into freezing (free) water but, unlike the situation in S. striolatum, no oviposition on ice is so far on record in this sp. As no particular attention has been hitherto paid to this behavioural feature, the need of further systematic observations is emphasized.

(8582) PRITCHARD, G., [Ed.], 1992. Current topics in dragonfly biology, Vol. 5.
Cf. *OA* 8533.

(8583) REHFELDT, G.E., 1992. Aggregation during oviposition and predation risk in Sympetrum vulgatum L. (Odonata: Libellulidae). *Behav. Ecol. Sociobiol.* 30: 317-322. – (Zool. Inst., Techn. Univ., Pockelsstr. 10a, D(W)-3300 Braunschweig, FRG).
Tandem pairs of S. vulgatum always start oviposition with contact guarding directly over the

surface of shallow water, where they are exposed to green frogs (Rana esculenta). Tandems which approached locations with other pairs already present started oviposition nearby regardless of whether or not predators were actually present. With predators present attack rates during arrival were lower on tandem pairs in groups than on pairs that oviposited alone. During oviposition the attack rate on groups was similar to that on solitary pairs, but predation risk to individual tandem pairs was lower due to dilution effects. Predation risk during tandem oviposition was similar for both sexes, but females had a higher risk of falling prey to frogs during post-tandem oviposition than males. If tandems were attacked by frogs, females left the site after tandem oviposition despite the male hovering above her, and the frequency of non-contact guarded post-tandem oviposition was reduced.

(8584) ROBINSON, B.A. & P. SILVER BOTTS, 1992. Dragonfly predation on chironomid larvae: the importance of tubes and substrate complexity. *Bull. N. Am. benthol. Soc.* 9(1): 144 [abstract only]. – (Dept Biol., Univ. South Florida, Tampa, FL 33620, USA).
[Verbatim]: We conducted a series of laboratory experiments designed to evaluate the relative importance of chironomid tubes and structurally complex substrate as refugia for chironomid larvae in the presence of odon. predators. We used factorial experiments to test for the effects of predators (0, 7,7 mm, and 13.3 mm Pachydiplax longipennis), tubes (no tubes, tubes), and substrate (no root, water hyacinth root) on survival of 10 Instar II Glyptotendipes paripes or Phaenopsectra flavipes larvae. Larvae were added to experimental arenas with detritus and/or hyacinth roots prior to the addition of one starved (24 h) odon. nymph. Trials were terminated 8 h after the addition of the nymphs, and larval survivors were counted. – When hyacinth roots were present in the arenas, at all root densitites and configurations used, larval survival in the presence of predators was not different from that in the absence of predators (4.03 larvae vs. 6.19 larvae, $p>0.05$) and larval tubes did not enhance survivorship (5 larvae vs. 6.1 larvae, $p>0.056$). In the absence of hyacinth root, larval survival was higher when larvae were able to construct tubes prior to the addition of nymphs (7.53 larvae vs. 3.93 larvae, $p<0.05$). When larvae were unable to construct tubes prior to the addition of nymphs, survival was higher with small predators than with large predators (4.6 larvae vs. 0.8 larvae, $p<0.05$). It appears that chironomid tubes are important as refugia from invertebrate predators only on relatively simple or exposed substrata.

(8585) ROBINSON, J.V. & R.L. ALLGEYER, 1992. Covariation in life history traits, demography, and behavior in ischnuran damselflies: the evolution of monandry. *Bull. N. Am. benthol. Soc.* 9(1): 143 [abstract only]. – (Dept Biol., Univ. Texas, Arlington, TX 76019, USA).
[Verbatim]: Life history patterns emerge between spp. in the genus Ischnura when they are sorted by size. Females are always larger than males, but this difference is magnified in smaller spp. With the exception of I. denticollis and I. gemina, large-size spp. consistently show different adaptation patterns than small-size spp. These 2 spp. form a third adaptation group and are the only ischnurans lacking a pair of stout erect spines on the penultimate segments of their penes. These are the only 2 ischnurans which typically employ contact guarding during oviposition. – Small ischnuran females tend to mate only once, mature quickly, pruinesce extensively at sexual maturation, copulate for short durations, and maintain a high density presence at the aquatic site. Within the small-sized spp. group there is a trend toward monochromatic females. In contrast, large-size spp. do not possess these characteristics. – Dissections of 2 small-size spp. I. posita and I. (= Anomalagrion) hastatum indcate that less sperm is accessible for removal by males than in other ischnurans studied (i.e., large sized spp.).

(8586) ROSENBERG, J., 1992. Zur Libellenfauna des Kölner Stadtgebietes (Insecta: Odonata). *Decheniana* (Beih.) 31: 107-114. (With Engl.s.). – (Sommerhaus 45, D(W)-5010 Glessen, FRG).
Commented list of 23 spp., from various wetland habitats in the Cologne city area, Germany.

(8587) ROWE, R.J., 1992. Agonistic behaviour in larval Odonata. *Bull. N. Am. benthol. Soc.* 9(1):

111 [abstract only]. Dept Zool., James Cook Univ., Townsville, Qld 4811, AU).
[Verbatim]: Agonistic behavior is now recorded from a diverse range of zygopteran larvae. The present state of knowledge is reviewed. problems in eliciting and observing agonistic behavior are described and some productive protocols suggested. The systematic development of comparative studies of larval agonistic behavior requires some form of standardized terminology. A possible notation is outlined. The pattern of occurrence of larval agonistic displays through the Order indicates that some motor patterns are highly conserved. Such displays may be useful in phylogenetic reconstructions of the Odon. In contrast the motor patterns involved in other displays appear labile. These variable elements will be important when analysing the evolution of display repertoires among more closely related forms. Potential selection pressures influencing the evolution of agonistic displays in larval Odon. are considered.

(8588) SAVARD, M. & C. GIRARD, 1992. Observations sur le comportement de Stylurus scudderi (Sélys) (Odonata: Gomphidae) et extension de sa période connue de vol dans l'Est du Canada. *Fabreries* 17(1): 1-4. (With Engl.s.). – (1665 des Engoulevents, Chicoutimi, Qué., G7H 5Y2, CA).
2 ♂ were recorded at the Du Moulin R., Chicoutimi, Quebec, 22-IX-1991, which is 2 weeks later than the latest hitherto known regional sighting. Some notes on the habitat and behaviour are added.

(8589) SCHLÜPMANN, M., 1992. Libellenvorkommen in und an stehenden Kleingewässern in Abhängigkeit von der Vegetationsstruktur. *Verh. westdt. EntTag Düsseldorf* 1990: 307-320. – (IRP Ingenieurberatung, Böhmerstr. 2, D(W)-5800 Hagen-1, FRG).
This is basically an abridged extract of the relative sections in the work listed in *OA* 8065.

(8590) SMIT, J.T., 1992. Odonata (Libellen). *In*: Inventarisatie "Stikke trui" 1990-1991, p. 9, Insektenwerkgroep KNNV, afd. Arnhem. (Dutch). – (Author's address not stated).
Contains a checklist of 4 spp., without comments; – Rheden, Veluwezoom distr., the Netherlands.

(8591) SMOCK, L.A., J.E. GLADDEN, J.L. RIEKENBERG, L.C. SMITH & C.R. BLACK, 1992. Lotic macroinvertebrate production in three dimensions: channel surface, hyporheic, and floodplain environments. *Ecology* 73(3): 876-886. – (Dept Biol., Virginia Commonwealth Univ., Richmond, VA 23284-2012, USA).
A 3-dimensional spatial perspective was used to determine annual macroinvertebrate production in 2 low-gradient stream systems on the Coastal Plain physiographic province of Virginia, USA. Annual habitat-specific dry mass production ($\mu g/m^2$) at Buzzards Branch and Colliers Creek is stated for Boyeria grafiana, B. vinosa, Calopteryx dimidiata, Cordulegaster maculata and Gomphus cavillaris.

(8592) TANAKA, M., 1992. Insect collecting and children in the Meiji era. *Insectarium, Tokyo* 29(1): 12-18. (Jap., with Engl. title). – (Author's address not stated).
Deals mainly with Lepidoptera and Coleoptera, but it is of general interest for the history of entomology of the second half of the 19th century in Japan. (Emperor Meiji's reign: 1867-1912).

(8593) VAN BUSKIRK, J., 1992. Crowding and cannibalism in the dragonfly Aeshna juncea. *Bull. N. Am. benthol. Soc.* 9(1): 112 [abstract only]. – (Dept Zool., North Carolina St. Univ., Raleigh, NC 27695-7617, USA).
[Verbatim]: Larval populations of A. juncea, inhabiting rock pools on the Lake Superior shoreline at Isle Royale, showed clear evidence of crowding when densities were experimentally manipulated. The mechanism of competition was assumed to be interference, because impacts on prey populations were negligible and larvae were aggressive toward conspecifics. Consequences of crowding were visible in unmanipulated populations as well. After 2 years of larval growth, individuals in crowded pools were developmentally delayed compared with individuals in sparse populations, and third-year larvae in the final instar were relatively small at high density. There was a strong 2-year cycle in population age-structure, suggesting that recruitment of small individuals was impaired by

larger larvae in the adjacent year class. These results illustrate the role of competition in controlling a natural odon. population.

(8594) VANE-WRIGHT, R.I., 1992. Systematics and the global biodiversity strategy. *Antenna* 16(2): 49-56. – (Biogeogr. & Conserv., Br. Mus. Nat. Hist., Cromwell Rd, London, SW7 5BD, UK).
Contains references to, and figs of Hemiphlebia mirabilis.

(8595) *WALKERIA*. Newsletter of the Canadian National Office of the International Odonatological Society, Vol. 6, No. 1 (May 1, 1992). – (c/o S. Cannings, Conserv. Data Cent., 780 Blanshard St., Victoria, B.C., V8V 1X5, CA).
Pritchard, G.: Canada in Costa Rica (pp. 1-2); – *House, N./Cannings S.*: What we're up to in Canadian odonatology (pp. 2-3); – *Kiauta, B. & M. Kiauta*: Canadian dragonfly bibliography (pp. 3-5); – *Cannings, S.*: Paper published on Somatochlora sahlbergi (p. 5; refers to that listed in *OA* 8288); – Checklist of Canadian odonatologists (p. 6; 22 addresses). – As from the forthcoming issue, the editorship will be taken over by Ms *N.L. House* (Dept Biol., Carleton Univ., Ottawa, Ont., K1S 5BD), to whom all the material intended for publication in the newsletter should be henceforth sent.

(8596) WERZINGER, S. & J. WERZINGER, 1992. *Zwischenbericht über Planbeobachtungen an der Grünen Keiljungfer (Ophiogomphus cecilia) im Bereich der Aurach (Lkr. Neustadt/Bad Winsheim, Mittelfranken)*. Abt. Okol. heim. Libellen, Naturh. Ges. Nürnberg. 15 pp. – (Zwernberger Weg 29, D(W)-8500 Nürnberg-60, FRG).
On the Aurach R., central Franconia (Bavaria, FRG), 479 O. cecilia individuals (of which 8 ♀) were marked during July 3 through Sept. 21, 1991. About 50% of these could be recaptured (max. 48 days), max. capture-recapture distance: 3900 m along the river (i.e. 3500 m as the crow flies). The ♂ territoriality, even if for a few hrs only, was an exception. The max. abundance, on an 800 m stretch, was 60 individuals (30-VII), but only 2 exuviae were recorded. The temperature-dependent daily activity is stated, and the oviposition sites and behaviour are described.

(8597) ZINKERNAGEL, C., 1992. Le Altmoos lucernois. *Protect. Nat., Bâle* 92(4): 21. – (Author's address not stated).
A brief description of the moore (canton Luzern, Switzerland), with reference to the 27 local odon. spp., but without a list.

(8598) ZINKERNAGEL, C., 1992. Riedgebiete – wo sind sie geblieben? *Schweiz. NatSchutz* 92(4): 18-21. – (Author's address not stated).
Contains references to the odon. fauna of the Sésines moore (Orny, canton Vaud) and Altmoos (canton Luzern), Switzerland, but no species lists.