

## ODONATOLOGICAL ABSTRACTS

### 1973

- (6913) ASAHINA, S., 1973. Odonata. *In*: M. Ueno, [Ed.], [The late Tamiji Kawamura's] Freshwater biology of Japan, pp. 526-544, Hukuryukan, Tokyo. (Jap., with Engl. title). — (Takadanobaba 4-4-24, Shinjuku-ku, Tokyo, 169, JA).  
A concise treatment of the Order, with keys to the larvae of the Japanese genera.

### 1976

- (6914) SCHWARZWELLER, F., 1976. Die Geburt einer Libelle. *Waage* 15(4): 171-172. — (Author's address not stated).  
A general note on dragonfly biology and life history, by a medical practitioner, in a bi-monthly of the "Chemie Grüenthal", Stolberg/Rhld, FRG.

### 1979

- (6915) ASAHINA, S., 1979. [Odonata: a memoir for the 1970s]. *Gekkan Mushi* 100: 4-6. (Jap.). — (Takadanobaba 4-4-24, Shinjuku-ku, Tokyo, 169, JA).  
Highlights of odonatology in the 1970s, incl. references to the SIO, the SIO journals and the International Symposia of Odonatology (I-V).
- (6916) PARR, M.J., 1979. *The seasonal occurrence of the Odonata of the Liwonde National Park, Malawi*. 5 pp. Paper circulated at the 5th Int. Symp. Odonatol., Montreal. — (Whitegate House, Stembridge, Martock, Somerset, TA12 6BW, UK).

List of spp., with annotations on habitats and phenology.

### 1981

- (6917) GILLETT, A., 1981. *A Taupo fishing diary*. 158 pp. Hodder & Stoughton, Auckland-London-Sydney. — ISBN 0-340-26951-0.  
Angler's impressions of a year about Lake Taupo, North Island, New Zealand. It contains a passing reference to dragonflies on Lake Otamangakau nr Taupo (March 13), with a fig. of ♂ *Uropetala carovei* (p. 93).

### 1982

- (6918) MOONEY, J., 1982. Dragonfly in Cherokee lore. *In*: J. Mooney, Myths of the Cherokee and sacred formulas of the Cherokees, p. 431. Elder Booksellers & Publishers, Nashville. ISBN 0-918450-22-5. [Title of the note taken from Subject Index].  
The role of dragonfly in some versions of the Cherokee Indians (Smoky Mts, North Carolina, USA) myth on the origin of fire is stated.

### 1984

- (6919) GENTILINI, G., 1984. Limoniidae and Trichoceridae (Diptera, Nematocera) from the Upper Miocene of Monte Castelar (Pesaro, central Italy). *Boll. Mus. civ. Stor. nat. Verona* 11: 171-190. (With Ital. s.). — (Via Nazionale 78, I-47046 Misano Adriatico, Forlì).  
Contains a general description of the insect assemblage, in which the odon. constitute 12%

of the specimens recovered. For detailed treatment of the odon. fauna of this locality cf. OA 6984.

- (6920) HEINS, R., 1984. Kartierung von Libellen an den Fließgewässern im Landkreis Harburg. *MittBl. dt. Bund Vogelschutz Landersverb. Hamburg* (Sonderh.) 12: 25-30. — (Lindhorster Str. 44, D-2105 Seevetal-I, FRG). List of 21 spp., with annotations on their status in the district of Harburg, Lower Saxony, FRG.

### 1985

- (6921) AMBRUS, A., 1985. Ökofaunisztikai és állatföldrajzi vizsgálatok két Zalai gyűjtőhely nagylepkefaunáján (Macrolepidoptera). — Lepidopterological research works on the hilly country of Zala [sic!]. *Erdészeti Faipari tudomán. Közlemén.* 1985(1/2): 105-119. (Hung., with Russ., Engl. & Germ. s's). — (Jungich u.16, HU-9495 Kópháza). *Aeshna grandis* is reported from Kiscsehi, Zala district. It is new to the Hungarian fauna.
- (6922) FRÄNZEL, U., 1985. *Öko-ethologische Untersuchungen an Cordulegaster bidentatus Selys, 1843 (Insecta: Odonata) im Bonner Raum*. DiplomArb. Univ. Bonn. VI+190 pp. — (Langwartweg 101, D-5300 Bonn-I, FRG). The work was carried out during 1984-1985, at 28 localities in the area of Bonn, FRG. (In the same region, *C. boltonii* is known from 5 localities, at 2 of which it co-occurs with *bidentatus*). The sp. occurs in smaller streams, particularly in the Siebengebirge and in the Eitorf area, but it is lacking both at higher altitudes of the Eifel and in the lowlands of the Rheinische Bucht. The density of larval populations (3.28 ind./m<sup>2</sup> in spring-like streams, and 1.22 elsewhere) does not seem to influence the size of the individuals. The habitats with low O<sub>2</sub> are avoided. The imagines frequent warmer habitats, such as forest clearings and forest roads. The oviposition and male patrolling sites are selected along the stream banks and around the holokrene springs. In addition to the roosting behaviour and cleaning movements, the behaviour, habitat

selection, population structure and longevity were st. 'ied. The strength of a generally rather loose habitat binding varies individually; the population density in the preferential habitats is controlled by intraspecific aggression. While in the ultimate instar the female larvae slightly prevail, the adult sex ratio (84: 17) is greatly in favour of the male sex. The male activity is statistically significantly conditioned by air temperature; the females are largely temperature tolerant. The role of habitat selection and the principles of the population density control are discussed. It is concluded that in spite of certain rudimentary territoriality elements in its behaviour, *C. bidentatus* cannot be considered a true territorial sp. Various conservation measures are suggested and discussed.

- (6923) ZIER, L., 1985. Das Pfrunder Ried: Entstehung und Ökologie eines oberschwäbischen Feuchtgebietes. *Führer Natur- Landschafts-schutzgeb. Bad.-Württ.* 10: 9-307. — (Lerchenweg 5, D-7961 Königseggwald, FRG). The Pfrunger Ried is the second largest moor in SW Germany (9x3 km, alt. 610 m). The annotated odon. list (pp. 251-258) contains 44 spp., 18 of which appear on the German Red List.

### 1986

- (6924) GHORPADE, K.D., 1986. Dragonflies and damselflies. In: R.E. Hawkins, [Gen. Ed.], *Encyclopedia of Indian natural history*, pp. 186-188, col. pl. 26, Oxford Univ. Press, Delhi, Oxford, etc. — ISBN 0-19-561623-5. A good encyclopedia outline of the Order, with references to the Indian fauna (India, Pakistan, Bangladesh, Ceylon, Burma, Bhutan, Nepal), by a professional entomologist, in the prestigious work published in celebration of the centenary of the Bombay Nat. Hist. Soc. The information presented is not always updated, and there are a few minor factual errors.

### 1987

- (6925) CAVALLO, O. & P.A. GALLETTI, 1987. Studi di Carlo Sturani su odonati e altri insetti

fossili del Messiniano albese (Piemonte) con descrizioni di *Oryctodiplax gypсорum* n. gen. n. sp. (Odonata, Libellulidae). *Boll. Soc. paleontol. ital.* 26(1/2): 151-176, 12 pls incl. (With Engl. s.). — (First Author: Mus. Civico "F. Eusebio", I-12051 Alba).

Based on the late Sturani's manuscript notes (deceased Dec. 20, 1975), the new gen. and new sp. are described and numerous figs by Sturani are reproduced. While the present authors are responsible for the species group name, it is explicitly stated that Sturani is the authority of the genus. The sp. is known from numerous adult and larval specimens (holotype, sex not stated: Messinian deposits of Piobesi d'Alba, Piedmont, Italy; deposited in Museo Civico, Alba, specimen No. G-594) and has been for a long time associated with *Libellula doris* Heer; cf. *OA* 6783. Its affinities are here discussed, based on Sturani's correspondence with the late M.A. Liefstinck. — (*Abstracter's Note*: Upon the suggestion of Dr P.H. Ward, BMNH, Dr Sturani on Jan. 18, 1973 asked Dr Liefstinck's opinion on the status and affinities of this material. On Feb. 13, 1973 Liefstinck informed the Editor of *Odonatologica* on the subject. Copies of the correspondence and a considerable series of Sturani's original photographs of all stages are in Kiauta's archives).

## 1988

- (6926) BRISKIE, J.V., 1988. Least flycatcher lines nest with dragonfly wings. *Blue Jay* 46(3): 155-156. — (Dept Biol., Queen's Univ., Kingston, K7L 3N6, CA).

During 1984-1986 Least Flycatchers, *Empidonax minimus* (Tyrannidae), were studied in a high-density population that nests in the dune-ridge forest separating Lake Manitoba from Delta Marsh, Manitoba. Over the three summers 406 nests of this spp. were examined. — On 15 July 1986a nest was located approx. 1.5 m high in a Sandbar Willow (*Salix interior*). The nest contained 2 eggs, indicating that laying began the previous day. The nest-shell was constructed mostly of fine grasses; however, unlike every other nest examined, this nest was lined with 14-16 dragonfly wings

which formed two to three overlapping layers over the entire inside surface of the nest. On 17 July the fourth and final egg was laid. Only 3 eggs hatched on 30 July but all 3 nestlings fledged from 12-13 Aug. The lining of dragonfly wings was still intact when the nest was re-examined after fledging. — Although Zygopt. form a minor component of the diet of Least Flycatchers at Delta Marsh, Anisopt. were never taken as prey. However, numerous detached dragonfly wings were noticed on the pathways and road near this nest, presumably the result of predation by Eastern Kingbirds. It is possible that this Least Flycatcher salvaged some of these discarded wings when it was lining its nest.

- (6927) CHOU, I., 1988. *History of Chinese entomology*. 230 pp., 32 pls. Tian-ze Publ. House, Shaanxi. (Chin., with extensive Engl. & esperanto s's).

The Engl. text is identical to that of the 1980 ed., listed in *OA* 3264. The pls are added, but the captions are in Chin. only. Text fig. 10 shows 7 different (script) symbols for "dragonfly", appearing often on copper vessels, oracle bones and tortoiseshells of the Yin (= Shang) Dynasty (1500-1100 BC approx.). Pl. 29 (used also as frontispiece) represents a composition with dragonflies from a brick of the Han Dynasty (206BC-221AD). (*Abstracter's Note*: The oldest script symbols for "dragonfly" are apparently those from the Sumerian and Akkadian cuneiform tablets of Hammurabi (1792-1750BC; cf. *OA* 476), followed by those of the Chinese Yin Dynasty. The oldest hitherto known dragonfly pictures originate from the XVIIIth Dynasty of Egypt (1555-1350BC), and appear almost simultaneously (ca 1500 BC; cf. *OA* 6308) on the Late Bronze seals of Knossos, Crete).

- (6928) COLBURN, E.A., 1988. Factors influencing species diversity in saline waters of Death Valley, USA. *Hydrobiologia* 158: 215-226. — (Massachusetts Audubon Soc., Lincoln, MA 01773, USA).

Salinity is a major factor influencing the distribution and abundance of aquatic macroinvertebrates of saline waters in Death Valley, Cali-

fornia. The relative abundance and distribution relative to salinity are shown for 5 odon. spp.

- (6929) DONATH, H., 1988. Bestandsveränderungen in der Odonatenfauna von Ober- und Unterspreewald innerhalb von drei Jahrzehnten. *Nat. Landschaft Bez. Cottbus* 10: 59-63. — (Hauptstr. 36/37, DDR-7960 Luckau, GDR). In the past 30 yrs, 7 spp. disappeared in the Upper- and 1 in the Lower Spreewald, GDR. The decrease in the population status is apparent in resp. 13 and 6 spp. While in the Upper Spreewald the losses concern both the stream and the backwater fauna, in the Lower Spreewald the status of the rheophilous spp. remains intact.
- (6930) DONATH, H., 1988. DDR-Tagung der Libellenkundler in Schlepzig (Unterspreewald). *Nat. Landschaft Bez. Cottbus* 10: 91. — (Hauptstr. 36/37, DDR-7960 Luckau, GDR). Brief report on the Second Meeting of East German odonatologists, Schlepzig, Sept. 6-9, 1988. For the First Meeting cf. *OA* 5718; the Third Meeting will be convened in Karl-Marx-Stadt, 1990. The Symposia are organised in the "SIO-style", with research papers and field trips. At the present gathering, 34 participants represented 13 districts of the GDR.
- (6931) DONATH, H. & J. ILLIG, 1988. Ökofaunistische Untersuchungen an der Wudritz. *Nat. Landschaft Bez. Cottbus* 10: 21-35. — (First Author: Hauptstr. 36/37, DDR-7960 Luckau, GDR). The status and larval habitats of *Calopteryx splendens*, *Gomphus vulgatissimus* and *Ophigomphus serpentinus* on the Wudritz stream nr Drehna, distr. Luckau, GDR, are described.
- (6932) EDA, S., 1988 [The pre-World War II drawings of *Epiophlebia superstes*]. *Gekkan Mushi* 209: 18-24. (Jap.). — (3-4-25 Sawamura, Matsumoto, Nagano, 390, JA). Annotated review of 16 works in which drawings of *E. superstes* were published during 1889-1940. For additions cf. *OA* 6979.
- (6933) FERRERAS ROMERO, M., 1988. La fauna odonatologica de la cuenca del embalse del Rio Bembezar (Sierra Morena) en un periodo de pluviometria irregular (1982-1983). *Stud. oecol.* 5: 303-314. (With Engl. s.). — (Depto Biol. Animal, Univ. Cordoba, Avda San Alberto Magno, s/n, ES-14004 Cordoba). An account is given of the odon. fauna of 13 streams in the Bembezar R. Basin nr Cordoba, Spain, as evidenced during 1982 and 1983, which years were characterised by an unusual irregularity in rainfall. The peculiarities of the fauna are tentatively correlated with the meteorological conditions.
- (6934) FINCKE, O.M., 1988. Sources of variation in lifetime reproductive success in a nonterritorial damselfly (Odonata: Coenagrionidae). In: T.H. Clutton-Brock, [Ed.], *Reproductive success*, pp. 24-43, cumulative references pp. 487-520, Univ. Chicago Press, Chicago. ISBN 0-226-11059-1. — (Dept Zool., Univ. Oklahoma, Norman, OK 73019, USA). Although components of lifetime reproductive success (LRS) for males and females of *Enallagma hageni* varied relatively little between the 2 apparently "normal" study years, the opportunity for sexual selection on mated males increased considerably within a reproductive season. Differences among males in the rate of encounters with females and in life span were the 2 main sources of variation in male LRS. Although no phenotypic predictor of mating efficiency or survivorship per se was found, males of intermediate size had the highest number of mates and visits per lifetime. The potential opportunity for selection on mating success was realized as stabilizing selection in this population. — Its relatively small size, coupled with high density of males around concentrated oviposition areas at the pond, made mate searching a more efficient way to obtain matings for *E. hageni* than defense of an oviposition area. Considerable synchrony in female receptivity, coupled with benefits to submerging females of multiple mating, made noncontact mate guarding advantageous to mated males and simultaneously favored unmated males that switched to an alternative mate-finding tactic. Because mating opportunities were very low (28% and

- 41% of the males failed to mate in 1982 and 1980, respectively), a male's ability to maximize the number of fertilizations/female encountered was more advantageous than his ability to obtain multiple matings/visit (though the most successful males were those that did both). Although the heritability of such traits as sperm removal, guarding propensity, and the use of alternative mate-finding tactics may prove difficult to measure, it is shown that in *E. hageni* these traits function in the context of sexual selection, even though the current population may not be able to respond to selection on these traits. A comparison of *E. hageni* with odonates for which comparable data are available indicates that territorial spp. exhibit greater sexual dimorphism related to sexual displays and correspondingly higher potentials for sexual selection on males than do nonterritorial spp. — (For some general comments on the "reader" cf. *OA* 6939).
- (6935) GENGE, W., 1988. Amphibien und Libellen der Alpenweiher Adelbodens. Nachtrag über die Jahre 1984-1986. *Mitt. naturf. Ges. Bern* (N.F.) 45: 159-162. — (Chalet Media Vita, CH-3715 Adelboden).  
Additions to the paper listed in *OA* 5475. In 47 alpine ponds (alt. 1160-2027 m) in the Adelboden area, Berner Oberland, Switzerland, 12 odon. spp. were recorded.
- (6936) GORB, S.N., 1988. Morfologiya sistemy fiksatsii golovy u ravnokrylykh strekoz. — [Morphology of the head fixation system in damselflies]. *In: Problemy sovremennoi biologii* (Trudy nauch. Konf. molodykh uchjonykh biol. Fak. moskow. gosuf. Univ., Moscow, Apr. 25-29, 1988) 1: 113-117. (Russ.). Manuscript deposited in the VINITI, Moscow, under No. 6710-V 88. — (Deposition: Inst. Scient. Information, USSR Acad. Sci., VINITI, Baltiyskaya ul. 14, USSR-125219 Moscow-A-219; — Author: Ul. Darnitskaya 50, USSR-256000 Jagotin).  
Morphology of the structures described in the paper listed in *OA* 6986 was studied with SEM in 17 spp. of 14 zygopt. genera of 6 fam. The situation in *Agriocnemis femina* is figured.
- (6937) HERMANS, J.T., 1988. Libellen (Odonata) van de Turfkoelen. — [Dragonflies (Odonata) of the Turfkoelen]. *Jaarb. heemk. Vereen. Roerstreek* 20: 70-72, 1 col. pl. excl. (Dutch). — (Hertestraat 21, NL-6067 ER Linne).  
Annotated list (15 spp.), with a brief evaluation of the odon. fauna of this small nature reserve, Zuid Limburg prov., the Netherlands.
- (6938) KLOTZEK, F. & P. SCHOLZE, 1988. Zur Arbeit der Fachgruppe "Nordharz und Vorland". *Ent. Nachr. Ber.* 32(2): 90. — (Author's addresses not stated).  
Contains a reference to the odonotol. work of the Specialist Group "Northern Harz Mts and Foreland", GDR.
- (6939) McVEY, M.E., 1988. The opportunity for sexual selection in a territorial dragonfly, *Erythemis simplicicollis*. *In: T.H. Clutton-Brock, [Ed.], Reproductive success*, pp. 44-58, cumulative references pp. 487-520, Univ. Chicago Press, Chicago. — ISBN 0-226-11059-1. — (4012 South 18th St., Arlington, VA 22204, USA).  
This text can be classified neither as a proper paper, nor as a chapter in a book. It forms a part of a (very poorly edited) volume (X+538 pp.), consisting of a number of more or less ad hoc gathered texts on "the results of some of the most innovative and fruitful research" relative to reproductive success. As is often the case with this type of "readers", the commercial success is apparently the primary objective of their publication. Compared with the periodical literature, the circulation is small, the editors often inexperienced or careless, reprints either not provided or lacking proper bibliographic data, or, as in the present case, they simply cannot be made as the references appear in the voluminous cumulative bibliography only. For this reason, even the circulation of xerox copies is a difficult and costly proposition. In the present "reader" the "papers" have no abstracts, and the style of the "summaries" (if at all provided) was left entirely at the authors' discretion. The "summary" in the present paper is completely inadequate for reproduction as an autonomous informative abstract, containing references to bibli-

- ography, references to text, unexplained abbreviations and undefined terminology relative to the field situations. — The paper is apparently based on the author's Ph. D. dissertation, listed in *OA* 6068 and contains a wealth of valuable information. — (For a nonterritorial Zygoptera paper in the same "reader" cf. *OA* 6934).
- (6940) MITRA, T.R., 1988. On a collection of Odonata (Insecta) from Mirzapur district of Uttar Pradesh, India. *J. Bengal nat. Hist. Soc.* 7(1): 64-68. — (60 Shyam Nagar Rd, Calcutta-700055, India).  
List of 15 incidentally collected, mostly ubiquitous stagnicolous spp., without locality data within the district.
- (6941) MÜLLER, L., 1988. Das Eiablagehabitat von *Libellula depressa* L. (Insecta: Odonata) — einer Pionierart nasser Abbaulflächen. *Poster Verh. Ges. Ökol., Essen* 18: 89-92. (With Engl. s.). — (Zool. Inst., Techn. Univ. Braunschweig, Pockelsstr. 10a, D-3300 Braunschweig, FRG).  
*L. depressa* is very selective as to the oviposition substrata. In a gravel pit nr Braunschweig, Lower Saxony, FRG, the floating vegetation, particularly algae, was used and the water temperature was higher there than elsewhere in the habitat. The oviposition lasted  $53.9 \pm 26.4$  s. The eggs were deposited in clutches, which consisted on average of 642 eggs.
- (6942) PONOMARENKO, A.G. & O. SCHULTZ, 1988. Typen der Geologisch-Paläontologischen Abteilung: Fossile Insekten. *Kat. wiss. Samml. naturh. Mus. Wien* 6 (Paläozool. 1): 1-39, 14 pls excl. — (Second Author: Geol.-Paläontol. Abt., Naturh. Mus. Wien, Burgring 7, A-1014 Wien).  
The catalogue includes the usual data on the 21 fossil odon. types in the collections of the NHMV (Vienna, Austria). *Selenothemis liadis* Handl., *Samarura gigantea* Brauer et al., *Stelopteron deichmuelleri* Handl. and *Nannogomphus bavaricus* Handl. are also shown on the phot. plates.
- (6943) SANTOS, N.D., 1988. Catálogo bibliográfico de ninfas de odonatos neotropicais (acompanhado de relação alfabética de autores e seus trabalhos). *Acta amazon.* 18(1/2): 265-350. (Port.). — (Author deceased).  
This is a monumental catalogue covering species-wise the bibliography on the larvae of 292 neotropical spp. (i.e. 21.37% of the 1366 known regional spp.), pertaining to 114 genera. Also included are references on 49 unidentified regional spp.
- (6944) VAN BUSKIRK, J., 1988. Interactive effects of dragonfly predation in experimental pond communities. *Ecology* 69(3): 857-867. — (Dept Zool., Duke Univ., Durham, NC 27706, USA).  
In a two predator-multiple prey community, the interactions were tested by manipulating the presence or absence of the 2 predators (larval *Anax junius* and *Tamea carolina*) in replicated outdoor artificial ponds, containing identical numbers of 4 spp. of anuran tadpoles and a diverse zooplankton assemblage.  
The impact of predation on prey communities was measured by the relative abundances and larval performances (size at metamorphosis, length of larval period, and growth rate) of the anurans, and by the densities of zooplankton sampled at 10-d intervals. — Zooplankton reached high densities in the experimental ponds (up to 2700 animals/l). Dragonfly predation had a marginally significant impact on zooplankton spp. composition, and the effects on zooplankton size structure were not significant. Predation by *Anax* and *Tamea* profoundly modified the spp. composition of anurans: the relative abundance of toads (*Bufo americanus*) increased in the presence of predators, as 2 hylid spp. (*Hyla crucifer* and *Pseudacris triseriata*) decreased. The interaction between *Anax* and *Tamea* on anuran spp. composition was additive. The performance of surviving larvae of 2 anurans (*Bufo* and *Pseudacris*) was significantly improved by predation (growth rate increased and larval period shortened), whereas the performance of two others (*Hyla* and *Rana utricularia*) showed no response to dragonflies. The absence of strong interactions between the predatory odon.

implies that in some cases it may be valid to build models of complex ecological communities by additively combining results from more simple subsets of spp.

## 1989

- (6945) AGUIAR, S., 1989. As nossas libélulas. *Quercus* (II) 1989(1): 24-26. — (Rua Alfredo Cunha 225-2'E, PT-4450 Matosinhos).  
A nice presentation of the order in the Portuguese nature conservation magazine, by one of the leading Portuguese odonatologists, with emphasis on the peculiarities of the Portuguese fauna. In Sept. 1989, the charter meeting of the "Asociación Ibérica de Odonatología" is to be convened. (c/o Dr M. Ferreras Romero, Depto Biol. Animal, Univ. Córdoba, Avda San Alberto Magno s/n, ES-14004 Córdoba).
- (6946) AIDA, M., 1989. Notes on *Stylurus nagoyanus* Asahina from the Noubi Plains, central Japan. *Gekkan Mushi* 223: 8-13. (Jap., with Engl. title). — (Sakae 1-7-15, Ichinomiyashi, Aichi, 491, JA).  
Continuation of the paper listed in OA 6842; abstract not available.
- (6947) ALCOCK, J., 1989. Annual variation in the mating system of the dragonfly *Paltotheris lineatipes* (Anisoptera: Libellulidae). *J. Zool., Lond.* 218(4): 597-602. — (Dept Zool., Arizona St. Univ., Tempe, Arizona 85287, USA).  
*P. lineatipes* exhibits annual variation in male mate-locating behaviour, variation that appears to be related to changes in the number of males competing in an area. In a year when males were numerous, as reflected in a high rate of male-male interactions, individuals defended small streamside territories, regularly raided neighbouring territories in an attempt to steal females there, and often were forced off their territory after a few hours of daily ownership. In this year, temporal partitioning of a given site was common, with the same males taking it in turns to defend the location for part of each day. In a year when males were much less numerous, as seen in a very reduced rate of aggressive encounters, males defended territories more than twice as large on average than in the high-density year; they rarely took females from neighbours, and they much less frequently "shared" ownership of a site with another male on a given day. The changes between low- and high-density years were not associated with a change in average daily copulatory success of territorial males, although the variance in mating success was significantly greater in the high-density year.
- (6948) ALTMÜLLER, R., 1989. Faunistische Bestandsaufnahmen als Grundlage für die Naturschutzarbeit am Beispiel Niedersachsens: Möglichkeiten, Grenzen und Probleme. *Schr. R. Landschaftspf. Naturschutz* 29: 65-77. — (Fachbehörde Naturschutz, Niedersächsisches Landesverwaltungsamt, Postfach 107, D-3000 Hannover-1, FRG).  
Mainly based on the odon. examples from Lower Saxony, FRG, the role of faunal mapping in the nature conservation work is described and the utility of the method is discussed.
- (6949) ASAHINA, S., 1989. Naming "new species" is not the purpose of taxonomy. *Gekkan Mushi* 223: 30-31. (Jap., with Engl. title). — (Takadanobaba 4-4-24, Shinjuku-ku, Tokyo, 169, JA).  
This is almost an "autobiographic" note, relating the author's description of his first "new species", *Aeshna taiyal*, from Taiwan (1938, *Annotes zool. japon.* 17: 541-547). As it appeared later, this is conspecific with *A. petalura* Martin, known at that time from a Darjeeling (India) ♀ only. As demonstrated by Dr Asahina in his paper listed in OA 4451, the nominate ssp. of *A. petalura* occurs in the Himalaya, while *A. p. taiyal* is restricted to Taiwan. (This is a highly interesting member of Walker's cyanea-group, to which the nearctic *constricta*, *palmeta* and *umbrosa* are also referable).
- (6950) ASAHINA, S., 1989. The Odonata of Korean peninsula, a summarized review. Part. II. Anisoptera 1 (Gomphidae). *Gekkan Mushi* 222: 8-13. (Jap., with Engl. title). — (Takadanobaba 4-4-24, Shinjuku-ku, Tokyo, 169, JA).

- Annotated checklist of 14 spp. with figs of structural features of 10 of them.
- (6951) ASAHINA, S., 1989. The Odonata of Korean peninsula, a summarized review. Part III. Anisoptera 2 (Aeschnidae and Corduliidae). *Gekkan Mushi* 224: 14-18. (Jap., with Engl. title). — (Takadanobaba 4-4-24, Shinjuku-ku, Tokyo, 169, JA).  
Annotated checklist of 18 spp. (Aeshnidae, Cordulegasteridae, Corduliidae), with figs of structural features of 14 of them.
- (6952) BAHLO, K., 1989. Rheobionte Libellen (Odonata) in Fließgewässern der Lüneburger Heide (Niedersachsen). *Braunschw. naturk. Schr.* 3(2): 407-417. (With Engl. s.). — (Schuhstr. 21, D-3110 Uelzen-1, FRG).  
The distribution of 4 rheobiontic spp. along the streams in the Lüneburger Heide, Lower Saxony, FRG was studied. Notwithstanding the overlapping sections, Cordulegaster boltonii and Calopteryx virgo penetrate into the upper reaches of the streams, while Ophiogomphus serpentinus and Calopteryx splendens inhabit the lower sections.
- (6953) BAKER, R.L., 1989. Condition and size of damselflies: a field study of food limitation. *Oecologia* 81: 111-119. — (Dept Zool., Erindale Coll., Univ. Toronto, Mississauga, Ont., L5L 1C6, CA).  
Based on evidence from field manipulations, several authors have recently suggested that interference competition among larval odonates reduces individual growth rates and biomass by reducing foraging rates. This study was designed to test the effects of food shortage on "condition" (relative mass per unit head width) of larval Ischnura verticalis under laboratory conditions and to use these results to estimate the degree of food shortage of larvae under naturally occurring field conditions. In the laboratory, there were marked differences in condition of larvae fed diets ranging from ad libitum feeding with worms to ad libitum feeding with Daphnia 1 day out of every 8. Condition of larvae collected from May through Oct. from 17 different sites in southern Ontario indicated that, for most of the year, larvae had conditions similar to those fed ad libitum with Daphnia in the laboratory. There was no evidence that larval condition was related to population density. Condition of larvae in most sites during July was similar to that of larvae fed poor diets in the laboratory. It is unlikely that the low conditions were due to competition as there were no correlations with density across sites and population densities during July were at their lowest. Adult head widths showed a seasonal decline from mid June to the end of the flight season. There was no evidence that head widths were related to population density although there was some evidence that head widths of males were positively related to larval condition. The results do not support the hypothesis that competition is important in affecting foraging rates and subsequent development of larvae. Contrasts between the results and other studies may stem from difficulties with the interpretation of field experiments, that densities in this study may have been low due to fish predation, and/or that I. verticalis larvae are slow moving relative to other larvae and thus less likely to interact.
- (6954) BELLE, J., 1989. A revision of the New World genus Neuraeschna Hagen, 1867 (Odonata: Aeshnidae). *Tijdschr. Ent.* 132(2): 259-284. — (Onder de Beumkes 35, NL-6883 HC Velp).  
A synopsis is given of the 12 representatives of the genus. The spp. are classified into groups. Separate keys to the males and females are constructed. N. inarmata is synonymized with N. dentigera Martin, and N. rostrifera Martin is considered to be a synonym of Heliaeschna simplicia (Karsch), a sp. confined to SE Asia. 5 new taxa are described and illustrated, viz. N. cornuta (holotype ♂: Surinam, Distr. Nickerie, Sipaliwini), N. maya (holotype ♂: Costa Rica, Prov. Limón, Barra de Tortuguero), N. mayoruna (holotype ♀: Peru, Dept. Loreto, Iquitos), N. maxima (holotype ♂: Brazil, State of Pará, Belem), and N. titania (holotype ♂: Ecuador, Prov. of Pichincha, Jaruqui). Lectotypes are designated for 3 spp. described by Martin, viz. N. claviforcipata, N. dentigera and N. harpya. The larval type of Neuraeschna is determined by a reared individual of N. harpya.



- (6955) BELLE, J., 1989. *Epigomphus corniculatus*, a new dragonfly from Costa Rica (Odonata: Gomphidae). *Tijdschr. Ent.* 132(1): 158-160. — (Onder de Beumkes 35, NL-6883 HC Velp). *E. corniculatus* sp. n. is described and figured (holotype ♂, allotype ♀, in copula: Prov. Limón, Suretka, 23-IX-1988). The types are deposited in FSCA, Gainesville. The new sp. appears close to *E. armatus* Ris.
- (6956) BELLE, J., 1989. *Phyllogomphoides indicatrix*, a new dragonfly from Mexico (Odonata: Gomphidae). *Tijdschr. Ent.* 132(1): 155-157. — (Onder de Beumkes 35, NL-6883 HC Velp). *P. indicatrix* sp. n. is described and figured from a single ♂ (State of Chiapas, Ixhuatan, 26-IX-1983), deposited in Natn. Mus. Nat. Hist., Washington, DC.
- (6957) BESCHOVSKI, V.L., 1989. Predstavitelite na semeystvata Epallagidae i Calopterygidae (Odonata) v B'lgariya. — Specimens of the families Epallagidae and Calopterygidae (Odonata) from Bulgaria [sic!]. *Acta zool. bulg.* 38: 3-10. (Bulg., with Russ. & Engl. s's). — (Inst. Zool., Bulg. Acad. Sci., Bd Rouski, BG-1000 Sofia).  
*Epallage f. fatime*, *Calopteryx haemorrhoidalis*, *C. virgo festiva*, *C. v. meridionalis* and *C. splendens balcanica* occur in Bulgaria. The locality data are stated, a distributional map is provided, and a detailed description of all taxa is given along with the wing photographs of the local *Calopteryx* specimens.
- (6958) BROOKS, S., 1989. New dragonflies (Odonata) from Costa Rica. *Tijdschr. Ent.* 132(2): 163-176. — (Dept Ent., Brit. Mus. (Nat. Hist.), Cromwell Rd, London, SW7 5BD, UK).  
*Palaemnema baltodanoi* sp. n., *Phlogenia peacocki* sp. n., *Phyllogomphoides burgosi* sp. n., and *Epigomphus echeverrii* sp. n., all from Guanacaste Natn. Park, are described and figured.
- (6959) BUCHWALD, R., B. HÖPPNER & W. RÖSKE, 1989. Gefährdung und Schutzmöglichkeiten grundwasserbeeinflusster Wiesenbäche und -gräben in der Oberrheinebene. Naturschutzorientierte Untersuchungen an Habitaten der Helm-Azurjungfer (*Coenagrion mercuriale*, Odonata). *Natur & Landschaft* 64(10): 398-403. — (Inst. Biol. II/Geobot., Univ. Freiburg, Schänzlestr. 1, D-7800 Freiburg/Br., FRG).  
 In the region between the western Bodensee area and SW Palatinate, S. Germany, 84 populations of *C. mercuriale* are known. 75 of these were studied systematically. The sp. occurs in grassland streams, with low current velocity and a characteristic emergent vegetation. Where under agricultural impact, the populations are small. The population dynamics and habitat ecology are described in detail, and some tentative conservation measures are outlined.
- (6960) BURMEISTER, E.-G., 1989. Spätsommeraspekt der Libellenfauna Sardiniens (Italien) (Insecta, Odonata). *NachrBl. bayer. Ent.* 38(3): 80-83. (With Engl. s.). — (Zool. Staatssammlung, Münchenhausenstr. 21, D-8000 München-60, FRG).  
 Annotated list of 18 spp. collected during late Aug.-early Sept. in Sardinia, Italy. *Ischnura graellsii* is new to the Italian fauna.
- (6961) CLAESSENS, S., 1989. *25 jaar libellenonderzoek in hoogveengebied de Peel*. — [25 years of dragonfly research in the peat bogs of the Peel]. 196 pp., pls, tabs & appendices excl. Staatsbosbeheer, Roermond. (Dutch). — Available from the SIO Central Office, Bilthoven. — (Author: Lombokstraat 84, NL-3531 RG Utrecht).  
 This is a very thorough monograph on the synecology and autecology of the odon. fauna of the large peat bog area de Peel in the southern Netherlands (surface ca 4000 ha). The relationships between the vegetation, water quality and the odon. fauna were worked out by means of the TWINSPAN computer program, resulting in the definition of 16 odon. communities related to specific environments, and which were subsequently combined into 8 landscape-related odon. associations, described in great detail. The stable oligotrophic peat bog fauna is characterized by the association of *Ceriagrion tenellum*, *Coen-*

agrior lunulatum and *Leucorrhinia dubia*. Since 1963, 43 spp. were recorded, of which 33 spp. were collected during the 1988 surveys. Their general autecology is stated and the regional autecology and status are critically analysed. 6 spp. were not recorded since 1976 (*Lestes virens*, *Sympetma fusca*, *Coenagrion hastulatum*, *Somatochlora arctica*, *Aeshna isosceles*, *A. viridis*) which is attributed to their specific habitat choice, related to the highly sensitive oligotrophic and mesotrophic environments. In addition to some incidental taxa, *Sympetrum flaveolum* and *Leucorrhinia pectoralis* appear periodically, while the status of 9 spp. has significantly increased (e.g. *Lestes dryas*, *Erythromma viridulum*, *Ceriagrion tenellum*, *Aeshna juncea*, *Libellula depressa*, *L. fulva*). This is tentatively attributed to e.g. the increase of temperature (*E. viridulum*), acidification (*A. juncea*), decrease of water table (*L. depressa*) and to the diminishing competition from the (vanished) highly oligotrophic spp. (*C. tenellum*). The drainage, eutrophication, forestation of, and the pollution from the adjacent agricultural areas are considered the main factors underlying the faunal alterations during the past decades. The biogeographic composition of the fauna is also analysed and compared to that of the peat bogs in the Drenthe province. Of more general interest are sections on the odon. composition in the acidified fens, on dragonflies as indicators of specific environmental conditions, and on the comparison between the TWINSPAN and other computer programs in odon. synecology research. — This is the best modern treatment of the odon. synecology of a European peat bog. The large time-span it covers gives it an additional value.

- (6962) COOK, C., 1989. *Philogenia reduunca*, a new damselfly from Ecuador (Odonata: Megapodagrionidae). *Fla Ent.* 72(3): 419-424. (With Span. s.). — (469 Crailhope Rd. Center, KY 42214, USA).  
It is described and illustrated from a series of 33 ♂ and 25 ♀ (holotype ♂: Yanamanaca, Napo Prov.; allotype ♀: Abitagua, Pastaza Prov.; both deposited in Mus. Zool, Ann Arbor, USA). The ♂ is distinguished by the

shape of its anal appendages. The ♀ differs from all presently known spp. of *Philogenia* by possessing a pair of lateral horns arising on the proepimeron and directed posteriorly. *P. reduunca* belongs in the *cassandra* group because the ♂ of all 6 spp. possess a peculiar meso-ventral flange-like process on the distal halves of their cerci. Within this group *reduunca* is most closely related to *buenavista* Bick & Bick and *schmidtii* Ris.

- (6963) CORDERO RIVERA, A. [text] & F. DE LA PENA [phot.], 1989. *Libélulas acróbatas del aire*. *Periplo* 15(88): 8-17. — (First Author: Area Ecol., Fac. Biol., Univ. Santiago, ES-15071 Santiago).  
A good, concise account on the biology of the Order, organised into 9 small chapters, and illustrated with 12 high-quality photographs, some of which certainly rank among the best odon. phot. published (e.g. emergence of *Cordulegaster boltonii*, larval head of the same sp., etc.).
- (6964) CROWLEY, P.H. & E.K. MARTIN, 1989. Functional responses and interference within and between year classes of a dragonfly population. *Jl N. Am. benthol. Soc.* 8(3): 211-221. — (First Author: Morgan Sch. Biol. Sci., Univ. Kentucky, Lexington, KY 40506, USA).  
In a laboratory study of *Tetragoneuria cynosura*, the feeding rates of second-year-class larvae (Tc2) were measured as a function of Tc2 density and of the density of their first-year-class conspecific prey (Tc1). The experiments were conducted for 24 hr in small, structurally simple, cylindrical plastic aquaria within a controlled environment chamber under a 14L: 10D photoperiod. The resulting functional response to prey density followed the decelerated curve (type 2) typical of many predators. Strong feeding interference among Tc2 larvae was indicated by an inverse relationship between feeding rate and predator density. Since we detected no effects of Tc1 or Tc2 densities on movement by larvae within aquaria, density-specific differences in movement probably cannot account for the observed interference. Both a distraction model (in which prey and predators "compete" for the

predator's attention) and a pre-emption model (in which interference takes precedence over feeding) fit the data reasonably well. The laboratory results suggest that the structural complexity and alternative prey present in a previous field study greatly reduced the rate of predation by Tc2 on Tc1 larvae but did not reduce the intensity of interference among Tc2 predators.

- (6965) DE MARMELS, J., 1989. Hallazgo de Odonata nuevos para Venezuela o poco conocidos. 5. *Boln Ent. venezol.* (N.S.) 5(7): 54-57. (With Engl. s.). — (Depto & Inst. Zool. Agric., Fac. Agron., Univ. Central Venezuela, Apdo 4579, Maracay-2101-A, Venezuela). Annotated list of 12 spp., 10 of which are new to Venezuela, while the other 2 were known previously from doubtful records.
- (6966) DE MARMELS, J., 1989. Odonata da Venezuela: clave para las nayades del ultimo instar, hasta familia. *Resum. 2 Jornadas Invest., Inst. Zool. agric. Maracay*, p. 22. (Span. & Engl.). — (Depto & Inst. Zool. Agric., Fac. Agron., Univ. Central Venezuela, Apdo 4579, Maracay-2101-A, Venezuela). Indicative abstract of a poster.
- (6967) DE MARMELS, J., 1989. Un híbrido entre *Dythemis multipunctata* Kirby y *Dythemis sterilis* Hagen (Odonata, Libellulidae). *Boln Ent. venezol.* (N.S.) 5(7): 74-76. (With Engl. s.). — (Depto & Inst. Zool. Agric., Fac. Agron., Univ. Central Venezuela, Apdo 4579, Maracay-2101-A, Venezuela). A natural male hybrid between *Dythemis multipunctata* and *D. sterilis* is described and figured, and compared with the males of the 2 parental spp.
- (6968) DESAULNIERS, L., 1989. Deuxième mention de *Nasiaeschna pentacantha* (Rambur) (Odonata: Aeshnidae) au Québec. *Fabriques* 14(2): 42-43. — (7230 de Musset, Montréal, Que. H2A 2W7, CA). A ♀ taken 19-VI-1988 at Masham, Lake Duncan, Ottawa area, Canada.
- (6969) DOLMEN, D., 1989. *Libellula depressa* L. (Odonata) rediscovered in Norway. *Fauna norv.* (B)36: 105-106. — (Mus., Univ. Trondheim, N-7004 Trondheim). *L. depressa* has not been recorded from Norway since 1896. In July 1977 a ♂ was recorded at Rade, Øsfold Co. Between July and Sept. 1985, the spp. was recorded at 3 further localities in the same general area, incl. the larvae at 2 of them. — (*Abstracter's Note*: This is another of the rapidly increasing number of cases of northward expansion of dragonflies in the Northern Hemisphere, such as e.g. the expansion of ranges to southern Europe by some African spp., the rapid range expansion of *Enallagma basidens* in N. America, etc.)
- (6970) DOMBROWSKI, A., 1989. *Ökologische Untersuchungen an Cordulegaster bidentatus Selys, 1843*. Diplom Arb. Univ. Göttingen. VI+139 pp. +Appendix 22 pp. — (Ihmer Landstr. 1, D-3003 Ronnenberg, FRG). The work mainly deals with larval biology in the Oberweser hills, southern Lower Saxony, FRG. Habitat structure is analysed for various instars, and life history is described under field and laboratory conditions (prolarva + 14 instars; total duration estimated at 5-6 yrs), and temperature and day length parameters influencing the duration of specified instars are pointed out. The diet was studied in great detail, in different instars and seasons. Larval and adult behaviour are outlined, and habitat selection is discussed.
- (6971) DONATH, H., 1989. Die Libellen der nordwestlichen Niederlausitz (Teil 3). *Biol. Stud. Luckau* 18: 50-57. — (Hauptstr. 36/37, DDR-7960 Luckau, GDR). Continuation (Aeshnidae) of the series listed in OA 6121, 6478.
- (6972) DONATH, H., 1989. Ein aktueller Nachweis der Blauflügel-Prachtlibelle (*Calopteryx virgo* L.) im Kreis Luckau. *Biol. Stud. Luckau* 18: 91-93. — (Hauptstr. 36/37, DDR-7960 Luckau, GDR). The local status is stated and a locality nr Görldorf is brought on record.
- (6973) DONATH, H., 1989. Verbreitung und

Ökologie der Zweigestreiften Quelljungfer, *Cordulegaster boltoni* (Donovan, 1807), in der DDR (Insecta, Odonata: Cordulegasteridae). *Faun. Abh. Dresden* 16(6): 97-106. (With Engl. s.). — (Hauptstr. 36/37, DDR-7960 Luckau, GDR).

In the GDR, *C. boltonii* mainly occurs along spring brooks at terminal moraines and at borders of the urstromtal areas, and at valley borders in the German Uplands. The habitat choice is defined by small temperature fluctuations, small water depth, low velocity, and by the morphologically diversified bed, rich in detritus sedimentation. As a stenoeicous sp., it has an important indicator value in the water quality assessment within the upper reaches of the brooks.

- (6974) DONNELLY, T.W., 1989. A new species of *Philogenia* from Honduras (Odonata: Megapodagrionidae). *Fla Ent.* 72(3): 425-428. (With Span. s.). (2091 Partridge Lane, Binghamton, NY 13903, USA).  
*P. strigilis* sp. n. is described and figured from NW Honduras (holotype ♂, allotype ♀: Cortés, Rio Piedras at Sao Pedro Sula, 16-VII-1971, deposited in FSCA, Gainesville; 9 paratypes). It extends the range of the genus more than 600 km N. The new sp. is compared with *P. boliviana* and *P. augusti*.
- (6975) DONNELLY, T.W., 1989. *Protoneura sulfurata*, a new species of damselfly from Costa Rica, with notes on the circum-caribbean species of the genus (Odonata: Protoneuridae). *Fla Ent.* 72(3): 436-441. (With Span. s.). — (2091 Partridge Lane, Binghamton, NY 13901, USA).  
The new sp. is described and figured from 10 ♂ and 3 ♀ (holotype ♂, allotype ♀: Limón Prov., Rio Pacuarito, 3 km E of Siquirres, 9/12-VI-1986, deposited in FSCA, Gainesville; 11 paratypes). It differs from *P. aurantiaca* in its bright sulfur-yellow color of the ♂ and in several minor structural details. The 2 spp. belong to a series (incl. *P. amatoria* and *cupida*) that originated in S. America and has reached Mexico. A second group (*P. tenuis*, *calverti*, *ailsa*, *viridis*, *capillaris*, and probably *cara*) originated in S. America, occupied the Antilles,

and has reached northern Central America, Mexico, and the U.S. A third group (which includes the 3 somewhat aberrant spp. (*P. peramans*, *corculum*, and *sanguinipes*) probably originated in S. America and has reached Central America and the Greater Antilles. The most derived spp. are found at the extreme geographic limits of each group.

- (6976) DONNELLY, T.W., 1989. Three new species of *Epigomphus* from Belize and Mexico (Odonata: Gomphidae). *Fla Ent.* 72(3): 428-435. (With Span. s.). — (2091 Partridge Lane, Binghamton, NY 13903, USA).  
*E. maya* sp. n. (holotype ♂: Belize: Cayo Distr., Mountain Pine Ridge, Little Vaqueros Cr., Chiquibul Rd, 22/25-VII-1983), *E. flinti* sp. n. (holotype ♂: Mexico: Oaxaca, 8 km S of Valle Nacional, 25-V-1981) and *E. sulcatistyla* sp. n. (holotype ♂: Mexico: Veracruz, Coyame, 1-VII-1965) are described and figured. The holotypes are deposited in FSCA, Gainesville, the paratypes of the first 2 spp. in author's coll., and the other in that of Dr D.R. Paulson.
- (6977) DUDGEON, D., 1989. The influence of riparian vegetation on the functional organization of four Hong Kong stream communities. *Hydrobiologia* 179: 183-194. — (Dept Zool., Hui Oi Chow Sci. Bldg, Univ. Hong Kong, Hong Kong).  
In the Appendix, a list of 8 odon. spp. is given.
- (6978) D[UNN], T.C., 1989. Records: *Calopteryx splendens* Harris, Banded Damselfly. *Vasculum* 74(2): 14-15. — (The Poplars, Chester-le-Street, Co. Durham, UK).  
A single specimen emerged (11-VI-1989) by the bank of the R. Wear, Rainton Park Woods, UK. The locality is situated near the northern range limit of this sp. in the UK.
- (6979) EDA, S., 1989. [The pre-World War II drawings of *Epiophlebia superstes*, part 2]. *Gekkan Mushi* 221: 18-20. (Jap.). — (3-4-25 Sawamura, Matsumoto, Nagano, 390, JA).  
Additions to the paper listed in *OA* 6932, listing 5 works, published during 1928-1943.

- (6980) ENNOS, A.R. & R.J. WOOTTON, 1989. Functional wing morphology and aerodynamics of *Panorpa germanica* (Insecta: Mecoptera). *J. exp. Biol.* 143: 267-284. — (Second Author: Dept Biol. Sci., Univ. Exeter, Prince of Wales Rd, Exeter, EX4 4PS, UK). Contains a passing reference to the aerodynamic mechanisms in the Odon.
- (6981) FOX, A., 1989. Oviposition behaviour in *Somatochlora metallica* Van der Linden (Odonata). *Ent. mon. Mag.* 125(1500-1503): 151-152. — (Wildfowl Trust, Slimbridge, Gloucester, GL2 7BT, UK). The highly disjunctive distribution of this sp. in Britain may indicate 2 separate colonisations: an early colonisation into northern Scotland and a more recent advance into the wooded areas of SE England. The ecological characteristics of the habitats in Scotland and SE England are broadly similar, but there appear to be differences in oviposition behaviour between the N and S populations. In SE England eggs are usually dropped on the surface of water about the sheltered periphery of lakes, where they sink to the bottom or settle on plant debris. At a number of Scottish sites, the eggs are inserted into the loose *Sphagnum recursum* mat rather than passively dropped on the surface. The behavioural details are described.
- (6982) FRAIN, I., 1989. Bibliothèque nationale: les trésors sauvés de l'autodafé en 1789. *Paris Match* 2085: 80-90. — (Author's address not stated). Article on the exhibit at the Bibliothèque nationale, Paris, of objects of art, incl. medieval manuscripts, that have been in the library collections since the French Revolution. On pp. 88-89, a detail is given of an illustration from the *Livre d'Heures d'Anne de Bretagne*, by Jean Bourdichon (1457-1521), representing a composition of peaches with a dragonfly, a fly and a ladybird beetle. — (*Abstracter's Note*: The breviary originates from ca. 1500, but the precise date of its origin is unknown).
- (6983) GEENE, R., 1989. Biotoopvoorkeur van de groene glazenmaker (*Aeshna viridis*). -- [Habitat preference of *Aeshna viridis*]. *Wet Meded. K. ned. natuurh. Veren.* 192: 55-63. (Dutch). — (Roomtuintjes 91, NL-1093 SV Amsterdam). The condition of the Stratiotes vegetation and the water quality features were examined systematically at 23 potential breeding sites of *A. viridis* in the Netherlands (mostly in the Giethoorn area, NW Overijssel prov.). The environmental requirements are outlined in detail.
- (6984) GENTILINI, G., 1989. The Upper-Miocene dragonflies of Monte Castellaro (Marche, central Italy) (Odonata Libellulidae). *Mem. Soc. ent. ital.* 67(2): 251-271. (With Ital. s.). — (Via Nazionale 78, I-47046 Misano Adriatico, Forli). The following taxa, deposited in the Museo del Territorio di Riccione (Emilia Romagna, Italy) and recovered from the Lower Messinian of Monte Castellaro, are described and figured: *Sympetrum italicum* sp. n., *S. krzeminiskii* sp. n., *S. elongatum* sp. n., *Libellula mediterranea* sp. n., *Tramea miocenica* sp. n., and *Pisaurum coloratum* gen. n., sp. n.
- (6985) GOMPHUS. Mededelingsblad van de Belgische libellenonderzoekers — Bulletin de liaison des odonatologues belges, Vol. 5, No. 3 (Sept., 1989). (Dutch & Fr.). — (c/o A. Anselin & P. Goffart, Inst. Roy. Sci. Nat. Belg., 29 rue Vautier, B-1040 Bruxelles). *Anselin, A. & P. Goffart*: Editorial (pp. 2-3); — *P. Goffart, A. Anselin & R.-M. Lafontaine*: Nouvelles fraîches du programme de surveillance de l'environnement (pp. 4-5); — Quelques observations intéressantes réalisées en Wallonie, principalement dans le cadre de la surveillance (pp. 5-7); — *Anselin, A.*: [News on the dragonfly monitoring project in Wallonia] (p. 8); — *P. Goffart*: Compte-rendu de l'excursion à Virelles (pp. 9-11); — *Hoste, I.*: [The Wielewaal field trip to the Antwerp Kempen] (pp. 11-12); — Summaries of recent Belgian literature (pp. 13-23, by *P. Goffart, A. Anselin & R.-M. Lafontaine*); — Book reviews (pp. 24-28, by *M. Van Mierlo & P. Goffart*).
- (6986) GORB, S.N., 1989. Funkcional'naya morfo-

- logiya sistemy "arretira" u strekoz. — Functional morphology of the "hinge" system in dragonflies. *Vest. Zool.* 1989(3): 62-67. (Russ., with Engl. title). — (Ul. Darnitskaya 50, USSR-256000 Jagotin).
- The structure of the peculiar hinge system between the odon. head and thorax is described. It consists of movable cervical sclerites, and it is peculiar on the family and subfamily levels, hence it could be used in classification and phylogenetic systematics. 8 spp. of 7 fam. were studied.
- (6987) GROSVERNIER, P., 1989. Un plan de gestion pour les hauts-marais de Bellelay. *Mitt. naturf. Ges. Bern* (N.F.) 46: 40-47. — (Natura, CH-2722 Les Reussilles).  
Somatochlora arctica is recorded from the Bellelay peat bog, Jura Bernois, Switzerland.
- (6988) HÄMÄLÄINEN, M. & R.A. MÜLLER, 1989. Description of *Teinobasis annamaijæ* spec. nov. from the Philippines (Odonata: Coenagrionidae). *Opusc. zool. flumin.* 44: 1-4. — (Second Author: Rehetobelstr. 99, CH-9016 St. Gallen, Switzerland).  
*T. annamaijæ* sp. n. (holotype ♂: Mindanao, Zamboanga del Norte prov., Sindangan, Barili, 17-VI-1988; to be deposited at Senckenberg, Frankfurt/Main) is described, figured and compared with *T. rancee* Needham & Gyger.
- (6989) HEYNE, K.-H., 1989. Massenhafte Wanderung der Frühen Heidelibelle (*Sympetrum fonscolombei* Selys, 1840) in Portugal. *Dendrocopos* 16: 126-127. — (Salmstr. 39, D-5566 Salmtal, FRG).  
A large-scale migration of *S. fonscolombei*, that took place in Sagres (Algarve, Portugal) on Oct. 1, 1988 and the subsequent days, is described. On Oct. 1, during the day, the insects were swarming among the vegetation on the ground (2-10 individuals/m<sup>2</sup>). The migratory flight took place between 17.00 and 20.00 h, in E-NE direction, along the seashore, mainly relatively low above the ground, but at places up to 50 m high. The flight continued on the following morning and during the subsequent few days.
- (6990) HILLERMAN, T., 1989. *The boy who made dragonfly*: VI+82 pp. Univ. New Mexico Press, Albuquerque. — ISBN 0-8263-0910-0. Paperback. — Available from the SIO Central Office, Biltoven.  
This is a story from the mythology of the (Southwestern American) Indian tribe Zuni, which was probably first told in the 15th century, and was first recorded in 1883. It tells how the first dragonfly was made from dried cornstalks, and "how it is that there are dragonflies". It concerns a drought in which the Zuni crops were ruined. The hero is a little boy who, with the help of the dragonfly he made, saved his people. The story is intended to teach both the history and morality of a people, comparable to the narratives based on the Old Testament.
- (6991) HILTON, D.F.J., 1989. Incidence of androchromotypic female *Ischnura ramburi* (Odonata: Coenagrionidae) in the Hawaiian Island. *Ent. News* 100(4) 147-149. — (Dept Biol., Bishop's Univ., Lennoxville, Que., J1M 1Z7, CA).  
Of 549 female *I. ramburi* collected or observed from 17 localities on the islands of Hawaii and Oahu, only 3 individuals (all from a pond on the Monoa Campus) were androchromatic. *I. ramburi* is not native to Hawaii, and this evidence suggests more than one introduction.
- (6992) HINNEKINT, B.O.N. & H.J. DUMONT, 1989. Multi-annual cycles in populations of *Ischnura e. elegans* induced by crowding and mediated by sexual aggression (Odonata: Coenagrionidae). *Entomol. gener.* 14(3/4): 161-166. — (First Author: Merestraat 32, B-9430 Aalst/Nieuwerkerken).  
A re-analysis of published female mating frequencies in mature and immature *I. e. elegans* shows that male sexual aggression varies with crowding, young mature ♂♂ driving away immature and old ♂♂, and ♀♀ from the edges of ponds. This effect is more pronounced in ♀♀, heteromorphs and immatures, and generates a male-biased sexually active population near the water, where newly matured ♂♂ form the dominant fraction. — It is hypothesised that density dependent male aggression is one of

the driving forces beyond the existing hyperfine effect causing a pluriannual population cycle. Below a certain population density threshold, there is a constant minimum "basic" sexual aggression. Above the threshold, the sexual harassment that causes the fall of overall mating frequency causes a steep increase of the frequency of matings involving immature ♀♀. At peak population density general aggression disappears, and sexual aggression drops back to its base level.

- (6993) HOSTE, I., 1989. Libellen tussen Gent en Brugge (Odonata). — Les libellules entre Brugge et Gent (Odonata). *Phegea* 17(3): 123-135. (Dutch, with Fr. & Engl. s's). — (Museumstraat 93, B-9881 Aalter-Bellem).

A review is presented of the odon. fauna (22 spp.) of the Ghent-Brugge area, Belgium, as evidenced by the 1983-1987 study of 13 wetlands. The fauna is not much diversified; in comparison with the earlier evidence it appears to have significantly deteriorated in the past few decades. All the recorded taxa are fairly common, ecologically tolerant stagnicolous spp. *Erythromma viridulum* and *E. najas* might co-occur, but the former is more resistant to eutrophication than the latter.

- (6994) HUTCHINSON, R., 1989. Première mention de *Sympetrum corruptum* (Hagen) (Odonata: Libellula) au Québec. *Faberies* 14(2): 40-41. — (With Engl. s.). — (Centre Rech. biosyst., Agriculture Canada, Ottawa, Ont., K1A 0C6, CA).

The *S. corruptum* specimen in the Canadian National Collection, Ottawa, labelled "Breckenridge, Que." is brought on record, and the distribution of this sp. in Canada is briefly summarised.

- (6995) *JOURNAL OF THE BRITISH DRAGONFLY SOCIETY*, Vol. 5, No. 2 (Nov. 1989). — (c/o Mrs J. Silsby, 1 Haydn Ave., Purley, Surrey, CR2 4AG, UK; — where all back issues are still available at £ 2.50 net each).  
*Thompson, D.J.*: A population study of the Azure Damselfly *Coenagrion puella* (L.) (pp. 17-22); — *Prendergast, F.D.V.*: Changes in the Odonata populations between 1985 and 1989

at the Moors Valley Country Park, Dorset (pp. 22-28); — *Wistow, R.J.*: Dragonflies of the Montgomery Canal (pp. 28-35); — *Radford, A.P.*: Two examples of male dragonflies grasping the males of mating pairs (p. 36); — *Averill, M.T.*: Emergence attitudes in *Gomphus vulgatissimus* (L.) (pp. 37-38); — (Anonymous): Recent odonatological publications (pp. 39-40).

- (6996) JURZITZA, G., 1989. Versuch einer Zusammenfassung unserer Kenntnisse über die Odonatenfauna Chiles. — A tentative summary of the odonate fauna of Chile. *Soc. int. odonatol. rapid. Comm.* (Suppl.) 9: IV+32 pp. (Germ., with Engl. s.). Available at Hfl. 20-net from the SIO Central Office, Biltoven. — (Author: Réinmuthstr. 27, D-7500 Karlsruhe-21, FRG).

Literature data and the evidence from some collections are compiled, and information on flight periods, ecology and ethology of some spp. is provided. So far 45 spp. were evidenced; the occurrence of *Aeshna bonariensis* is uncertain and the records of some other spp., mostly from the northern regions, are in need of confirmation. The larval stage of only 10 spp. has been described, but in some cases the species identification is lacking. The complete regional bibliography is appended.

- (6997) KANO, K., 1989. [A note on oviposition behaviour of *Davidius moiwanus sawanoi*]. *Nature & Insects* 24(6): 35. (Jap.). — (5-19-17-601, Koishigawa, Bunkyo-ku, Tokyo, 112, JA).

Hovering above a stream, covered by grass, a ♀ was seen scattering the eggs, a few by a few. (Yawata-kogen, Geihoku-cho, Hiroshima, Pref.).

- (6998) KANO, K., 1989. [Submerged oviposition of *Ischnura a. aurora*]. *Gekkan Mushi* 220: 36-37. (Jap.). — (5-19-17-601, Koishigawa, Bunkyo-ku, Tokyo, 112, JA).  
At the Yild R., Guam Island, some of the ♀ showed submerged oviposition. A photograph is included.

- (6999) KANO, K. & F. KOBAYASHI, 1989. [A

disaster in ovipositing *Bayadera brevicauda ishigakiana*]. *Gekkan Mushi* 221: 38. (Jap.) — (First Author: 5-19-17-601, Koishigawa, Bunkyo-ku, Tokyo, 112, JA).

The ♀ of a tandem ovipositing into the moss on a rock in a mountain stream, Ishigaki Island, was attacked by a spider. The unsuccessful attempts of the pair to shake off the predator are described; finally the ♂ flew away and the ♀ was devoured.

- (7000) KANO, K. & F. KOBAYASHI, 1989. [*Anax parthenope julius* ovipositing into mud]. *Gekkan Mushi* 219: 38-39. (Jap.). — (Second Author: 1624-20, Hirakata, Koshigaya, Saitama Pref., 343, JA).

2 tandem pairs were seen ovipositing into almost dried up mud of an abandoned rice-field, though in the nearby irrigation ditches there was aquatic vegetation suitable for oviposition. A photograph is included. (Mobara, Chiba Pref.).

- (7001) KETELAAR, R., 1989. Insektenvangsten in Twente. — [Insect records from Twente]. *Stridula* 13(1): 26-34. (Dutch). — (Melis Stoke Laan 14, NL-1911 SL Uitgeest).

Contains a list of 29 odon. spp. (with localities), collected in Twente, the Netherlands, in 1985 and 1987, and annotations on *Calopteryx virgo*, *Coenagrion hastulatum* and *Ischnura pumilio*.

- (7002) KRENTZ, T., 1989. *Ökologisch-faunistische Untersuchungen an Libellen (Odonata) der Lanzer Kiesseen (Landkreis Lauenburg)*. Hausarb. 1. Staatsexamensprüf. Lehramt Gymnasien, Hamburg. IV+76 pp. — (Weidenallee 23, D-2000 Hamburg-6, FRG).

A thorough analysis is presented of the odon. fauna (26 spp.) of 4 gravelpits in the distr. of Lauenburg, Schleswig-Holstein, FRG. Its composition is compared with that of similar habitats in central Europe, the concept of odon. biotic communities is outlined and critically annotated, and the local occurrence of *Sympetrum pedemontanum* is briefly discussed.

- (7003) KRÜNER, U., 1989. Die Schlupfrate der

Späten Adonislibelle, *Ceriagrion tenellum* (De Villers, 1789) an einem Heidegewässer im Naturpark Schwalm-Nette (Odonata: Coenagrionidae). *Decheniana* 142: 74-82. (With Engl. s.). — (Gelderner Str. 39, D-4500 Mönchengladbach-4, FRG).

The emergence rate was studied (1986-1987) at a heath pond nr Mönchengladbach, FRG. The emergence period lasts about 70 days, from late May to August, but its begin is delayed if the spring is cool. Males prevailed in both years: 54.5% of 1157 exuviae in 1986, and 58.9% of 1744 exuviae in 1987.

- (7004) KUKEL, S. & H. KOMNICK, 1989. Development, cytology, lipid storage and motility of the Malpighian tubules of the nymphal dragonfly, *Aeshna cyanea* (Müller) (Odonata: Aeshnidae). *Int. J. Insect Morphol. Embryol.* 18(2/3): 119-134. — (Inst. Cytol., Univ. Bonn, Ulrich-Haberland-Str. 61a, D-5300 Bonn-I, FRG).

The Malpighian tubules of larval *A. cyanea* were examined by light and electron microscopy. The 1st instar larvae have only 3 branchless tubules. With proceeding larval stages, these lengthen and branch. Also, additional tubules bud from the gut and show the same pattern of growth and branching, until in the final instar up to 21 separate tufts of branched tubules are present. A serpentine trachea/tracheole and a cross-striated muscle are helically wound around each tubule in close apposition. Isolated tubules show twisting movements for several days. Contraction of the muscle is responsible for fast coiling movements, while the slow decoiling movements probably depend on elastic deformations of the accompanying trachea, the basal lamina and the tubule cells, the latter showing an elaborate cytoskeleton and multiple adhesive junctions. The tubular epithelium consists of 4 types of cells. The distal segment is composed of ion transporting cells and terminates with a short, solid tip segment of undifferentiated cells. The intermediate segment consists of lipid cells which are densely filled with triglyceride droplets as revealed by thin layer chromatography. Lipid cells are already present in the 1st instar before the larvae have taken up



- any food. In later instars, the renal lipid content varies to some extent with the nutritional state and is nearly depleted during metamorphosis. The proximal segment is the region of tubular branching and may be conceived as the collecting duct of each tuft. Its epithelium consists of mucocytes.
- (7005) KÜRY, D., 1989. *Hohe pH-Werte als Folge der Eutrophierung in anthropogenen Naturschutzweihern und ihre Auswirkungen auf Libellen und Amphibien*. Inaug.-Diss. Univ. Basel. XII+162 pp. — (Author: "Gammarius", Güterstr. 312, CH-4053 Basel. — Copies available from the SIO Central Office, Bilthoven.
- Attractive volume (15x21 cm), based on the work on man-made ponds in 6 nature reserves in the area of Basel, Switzerland, with emphasis on odon. succession. (A summary was published in the work listed in OA 6540). The succession shows taxa-peculiar and constant patterns. The pH impact was studied on *Sympetrum* spp. only. The length of the emergence period increases with increasing pH, but its commencement and the longevity are not influenced by the degree of alkalinity. The status of the local fauna is discussed. Of some interest is the occurrence of *Sympetrum pedemontanum*, which had not been recorded in the area by A. Portmann (1921, *Die Odonaten der Umgebung von Basel*, Inaug.-Diss. Univ. Basel).
- (7006) LANDRY, B., 1989. Rapport préliminaire du Comité de protection des espèces d'insectes menacées. *Faberies* 14(2): 46-48. — (87 Bayswater No. 2, Ottawa, Ont., K1Y 2E7, CA).
- Williamsonia fletcheri* is mentioned among the threatened insect spp. in Quebec, Canada.
- (7007) LEE, D.S., 1989. Dragonfly days. *Wildlife N. Carolina* 53(7): 4-9. — (Author's address not stated).
- A pleasantly readable, somewhat "literary-styled" presentation of dragonflies, with several col. phot. of North American Libellulidae.
- (7008) LEE, D.S. [text] & D. WILLIAMS [figs], 1989. Ancient winged warriors. *Wildlife N. Carolina* 53(7): 2-3. — (Authors' addresses not stated).
- Brief general statements on the main features of dragonfly biology, with nice pencil drawings.
- (7009) LIBELLULA, Mitteilungsblatt der Gesellschaft deutschsprachiger Odonatologen (GdO), Vol. 8, Nos 1/2 (Oct., 1989). — (c/o Prof. Dr R. Rudolph, Biol. Didaktik, Univ. Münster, Fliednerstr. 21, D-4400 Münster, FRG).
- The issue contains a single paper, and it is separately available, at DM 10.-, from Mrs U. Krüner, Geldener Str. 39, D-4050 Mönchengladbach-4, FRG. — Jödicke, R., U. Krüner, G. Sennert & J.T. Hermans: Die Libellenfauna im südwestlichen niederrheinischen Tiefland (pp. 1-106).
- (7010) LUTHI, A., 1989: Quelques observations sur la faune odonatologique de début de l'Orbe, à sa sortie du Lac des Rousses (Jura, France). *Bull. romand Ent.* (7): 69-71. — (48 chemin des Ceps, CH-1217 Meyrin).
- 10 spp. are listed from the Lac des Rousses, Dép. Jura, France, alt. 1060 m. 6 of these were not previously recorded from that Département.
- (7011) MAIBACH, A., 1989. Clé de détermination illustrée des libellules (odonates) de Suisse et des régions limitrophes. *Bull. romand Ent.* 7(1): 31-68. — (CSCF, Mus. Hist. Nat., Terreaux 14, CH-2000 Neuchâtel).
- Adult pictorial key and phenology table for the 81 regional spp.
- (7012) MALANGPO. Newsletter of the Thai National Office of the International Odonatological Society (S.I.O.), No. 6 (Nov., 1989). — (c/o Bro. A. Pinratana, St. Gabriel's Coll., 565 Samsen Rd, Bangkok-10300, Thailand).
- Pinratana, A. & M. Hämäläinen: A list of dragonflies recorded from Khao Soi Dao wildlife sanctuary (pp. 29-32); — Pinratana A.: Symposium in Tennessee (p.32); — Hämäläinen, M.: Dragonfly collecting in Thailand.

- IV. January-February 1988 (pp. 33-35); — *Pinaratana*, A.: Singapore dragonfly stamps (p. 35); — [The first series of Thai Odonata stamps] (p. 36). — (The issue is illustrated with numerous photographs. Subscription and all back issues are available from the SIO Central Office, Bilthoven; complete set, with Standing Order: hfl. 40.- net).
- (7013) MARON, A., 1989. [Biotop-/Artenschutz] Einheimische Libellen. *Dt. Aquarium-Terrarium* Z. 42(9): 548-549. — (Author's address not stated).  
An incidental note on dragonfly biology and on the status of the odon. fauna in FR Germany.
- (7014) MARTENS, A. & L. MÜLLER, 1989. Anax parthenope Selys, 1839 (Odonata: Aeshnidae) in Niedersachsen. *Braunsch. naturk. Schr.* 3(2): 399-406. (With Engl. s.). — (Zool. Inst., Techn. Univ. Braunschweig, Pockelsstr. 10a, D-3300 Braunschweig FRG).  
During 1987-1988, 14 observations of this sp. were made at 6 localities SE of Braunschweig, Lower Saxony, FRG. Details on habitat and behaviour are presented.
- (7015) MARTENS, A. & G. REHFELDT, 1989. Female aggregation in *Platycypha caligata* (Odonata: Chlorocyphidae): a tactic to evade male interference during oviposition. *Anim. Behav.* 38: 369-374. — (Zool. Inst., Techn. Univ. Braunschweig, Pockelsstr. 10a, D-3300 Braunschweig, FRG).  
Females oviposit on barkless driftwood in streams. Territorial males perform conspicuous courtship displays at these sites. Approaching males can interrupt the oviposition and force the female to fly off. In this study, receptive females landed on perches near the oviposition site where tandem formation and copulation took place. Non-receptive females showed behavioural adaptations to repulse the male's courtship and to evade further copulations. At locations with several potential oviposition sites most females aggregated at only a few. Ovipositions in groups lasted longer than those in solitary females. The presence of ovipositing females influenced other females in their choice of site. Approaching females preferred sites with already ovipositing individuals. Females forced to fly off by courting males tried to land near resident females again. Joining a group was advantageous, as solitary egg-laying individuals were intercepted more frequently by males than were females within groups. Group formation and the wing spreading display of the courted female and her neighbours are interpreted as collective defence mechanisms against male interference.
- (7016) MARTINIA. Bulletin de liaison des Odonatologues de France, No. 13 (Sept., 1989). — (c/o J.-L. Dommanget, 7 rue Lamartine, F-78390 Bois d'Arcy).  
*Partz, J.-L.*: Note sur le comportement de ponte de *Somatochlora metallica* (Vander Linden, 1825) (Odonata, Anisoptera: Corduliidae) (pp. 57-58); — *Grand, D.*: Sur les traces de *Macromia splendens* (Pictet, 1843) en France méditerranéenne (Odonata, Anisoptera: Corduliidae) (pp. 59-63); — *David, J.*: Libération des moeurs? (p. 63); — *Bence, S. & P. Bence*: A propos des récentes observations de *Lestes macrostigma* (Eversmann, 1836) dans le Vaucluse (84) et observation de l'espèce en 1988 dans les Bouches-du-Rhône (13) (Odonata, Zygoptera: Lestidae) (p. 64); — *Crochet, P.-A.*: Nouvelle observation sur le cannibalisme des odonates adultes (pp. 65-66); — *Lett, J.-M.*: Présence depuis 1983 de *Gomphus graslini* (Rambur, 1842) dans le département du Loir-et-Cher (41) (Odonata, Anisoptera: Gomphidae) (p. 66); — *Orieux, G.*: Présence d'*Epithea bimaculata* (Charpentier, 1825) dans le département de la Nièvre (58) (Odonata, Anisoptera: Corduliidae) (pp. 67-68); — *Coppa, G.*: Note sur le vol d'*Epithea bimaculata* (Charpentier, 1825) (Odonata, Anisoptera: Corduliidae) (pp. 69-73); — *Dommanget, J.-L.*: *Anax parthenope* (Selys, 1839) dans le département des Hauts-de-Seine (92) (Odonata, Anisoptera: Aeshnidae) (p. 74); — *Pierre, J. & Maurette*: Première contribution à l'inventaire des odonates du département d'Eure-et-Loir (28) (pp. 75-78); — *Juliand, C. & P. Juliand*: Il y a bien des libellules en Ardèche! (07) (pp. 79-80);

- Orieux, G. & J.-C. Laleure: Sortie odonotologique du 9 juillet dans la Nièvre (pp. 81-82); — Dommanget, J.-L.: Rubrique bibliographique (pp. 83-84); — Machel, P.: Nouvelles philatéliques (p. 84).
- (7017) MATHAVAN, S. & P.L. MILLER, avec un Avant-Propos par F. SCHALLER, 1989. *A collection of dragonflies (Odonata) made in the Periyar National Park, Kerala, South India, in January, 1988.* VI+10 pp. (Soc. int. odonatol. Rapid Comm. [Suppl.] 10). — (Requests for copies from Sth & SE Asian countries should be sent only to the SIO South Asian Regional Office, c/o Dr B.K. Tyagi, Plot No. 155, Rd No. 7, Milkman Colony, Jodhpur-342003, India).  
Commented spp. list (37 spp.), with brief field notes on habitats and behaviour of some of them. Most of the recorded spp. are common and widely distributed, but observations of *Ischnura senegalensis*, *Pseudagrion decorum* and *Hydrobasileus croceus* are of interest. — The booklet is dedicated to the memory of Professor S. Krishnaswamy, the late Vice-Chancellor of Madurai Kamaraj University, in recognition of his manyfold services to South Indian odonatology.
- (7018) MATSUKI, K. & H. KUWAHARA, 1989. Taxonomic notes on Taiwanese Polycanthagyna melanictera (Selys) (Aeshnidae, Odonata). *Gekkan Mushi* 222: 20-22. (Jap., with Engl. title). — (First Author: Hasama-cho 3-1575-14, Funabashi-shi, Chiba, 274, JA; — Second Author: Harima-cho 3-8-27, Abeno-ku, Osaka-shi, Osaka, 558, JA).  
Comparison of the Japanese and Taiwanese structural features, with figs (incl. larval labium) and distributional map of *P. melanictera* and *P. erythromelas* in Taiwan.
- (7019) MAUERSBERGER, R., 1989. Odonatenfauna des Bezirkes Rostock (DDR) und Verzeichnis der bisherigen Funde (Teil 2). *Ent. Nachr. Ber.* 33(2): 63-74. — (Köllnische Str. 35a, DDR-1190 Berlin, GDR).  
Continuation and conclusion of the work listed in OA 6885. It covers 31 Anisoptera spp. and contains the discussion and bibliography.
- (7020) MENARD, B., 1989. Captures d'odonates dans la Vallée de l'Outaouais et dans la Haute-Gatineau en 1988. *Fabriques* 14(2): 32-39. (With Engl. s.). — (58 rue Smith, Gatineau, Qué., J8T 3A1, CA).  
A follow-up to the paper listed in OA 6563. The total number of the known regional spp. is now 102.
- (7021) MERKL, O. & G. SZÉL, 1989. Zoological collectings by the Hungarian Natural History Museum in Korea. 91. A report on the collectings of the Twelfth Expedition. *Fol. ent. hung.* 50: 87-93. — (Zool. Dept., Hung. Nat. Hist. Mus., Baross u. 13, HU-1088 Budapest).  
Itinerary and an annotated list of 67 collecting sites in DPR Korea (June-July, 1988) are given. The odon. appear to have been collected very incidentally, at 2 localities only viz.: Kangwon Prov.: Kumgang-aan, Onjong-ri, and Ryanggang Prov.: Samjiyon-ho. The spp. are not mentioned.
- (7022) MONTALVERNE, G., 1989. Libélula — um insecto na história da aviação. — The dragonfly — an insect for aviation. *Atlantis* 5(1): 37-41. (Port. & Engl.). — (Author's address not stated).  
A general article on dragonflies, in the bilingual in-flight magazine of the TAP Air Portugal, on the occasion of the 40th anniversary of the corporation. (The names of most spp. shown on the col. phot. are wrong).
- (7023) MOORE, N.W., 1989. A visitor's observations on the dragonflies of New Zealand and their conservation. *N.Z. Ent.* 12: 5-13. — (The Farm House, Swavesey, Cambridge, CB4 5RA, UK).  
Field records (1988) and a study of collections extend the known distributions of 9 odon. spp. in New Zealand. — Small *Xanthocnemis* with anal appendages of the *X. sobrina* type may be commoner than is supposed. Preliminary observations on the behaviour of *X. sobrina* and *Uropetala chiltoni* suggest that these spp. are much less territorial than their respective sibling spp., *X. zealandica* and *Uropetala carovei*. Spp. in these "difficult" genera may be more easily separated by behavioural character-

istics than by anatomical ones. — A comparison is made between speciation of *Megalagrion* in Hawaii and *Xanthocnemis* in New Zealand. The different taxa of *Xanthocnemis* are of special interest and worthy of conservation. — New Zealand dragonflies are well conserved in national parks and reserves but need to be supported by conservation of odonate habitats on ordinary farms. Therefore organisations such as the Queen Elizabeth the Second Trust deserve special support.

— BDS now has 632 members and subscribers.

- (7024) NANAŌ, J. [text] & H. KUBO [phot.], 1989. *Lissy, die Libelle*. 24 pp., 36 col. phot. Kosmos, Stuttgart. — ISBN 3-440-05945-6. — Available also from the SIO, Bilthoven.

This is the German edition of the original Japanese book. (An Engl. edition was also published, but it is not available for abstracting). The text is directed at children, but the superb photographs of various aspects of behaviour will be of interest to professional workers as well. — This is the first Japanese dragonfly book translated into a western language.

- (7027) NIKAM, T.B. & V.V. KHOLE, 1989. *Insect spiracular systems*. 136 pp. ISBN 0-7458-0293-1. Horwood, Chichester & Wiley, New York-Chichester-Brisbane-Toronto. — Price £ 30.- net.

This is a systematic and comprehensive account of development, metamorphosis, comparative morphology and physiology of spiracular systems in insects, with considerations on functional morphology and ecophysiology. The new concept of spiracular systems in thermal adjustments is presented and their non respiratory functions are put forth to signify functional diversities of the system. The Odon. are dealt with on pp. 33-35, based mainly on the work of G.T. Tonapi and P.L. Miller.

- (7025) NARAOKA, H., 1989. Ecological observations of a Large Damselfly, *Cercion plagiopus* Needham (Coenagrionidae, Odonata). (3). Ovipositing behavior. *Gekkan Mushi* 222: 14-15. (Jap., with Engl. title). — (Fukunoda, Itayanagi-machi, Kitatsugaru-gun, Aomori, 038-36, JA).

Continuation of the series as listed in *OA* 5852 and 6291.

- (7028) PATRZICH, R., M. GRENZ, M. KORN & T. NORGALL, 1989. Was sind häufige Libellenarten? Folgerungen aus einer flächen-deckenden Kartierung. *Verh. Ges. Ökol.* 19(1): 237. (Abstract only). — (No addresses stated). On the basis of a mapping in the district of Giessen, FRG, it is concluded that the low local frequency of ubiquitous and euryoecous spp. is conditioned by the low biotope quality of the wetlands studied.

- (7026) *NEWSLETTER [OF THE] BRITISH DRAGONFLY SOCIETY*, No. 16 (Winter 1989). — (c/o Mrs J. Silsby, 1 Haydn Ave., Purley, Surrey, CR2 4AG, UK).

It contains 16 news sections, incl. brief reports on various field meetings (with the more interesting local records), and on the Indoor Meeting (Leeds, 28 Oct. 1989). The latter includes summaries of talks given by *G. Vick* (Nepal, p. 6), *P. Northcott* (Nepal, p. 6; cf. *OA* 6517), *J. Silsby* (Rockies & Great Smoky Mts, p. 7), *J. Lucas* (dragonflies in decorative art, p. 7), *T. Leach* (dragonfly photography; p. 7), *N.W. Moore* (Tasmania & New Zealand; p. 7), and *D. Chelmick* (*Macromia splendens*; p. 7).

- (7029) PETERS, G., 1989. Variabilitätsmuster der atavistischen Geäderstrukturen bei *Aeshna grandis* (Insecta, Odonata, Aeshnidae). *Ent. Abh. Mus. Tierk. Dresden* 52(4): 109-112. (With Engl. s.). — (Mus. Naturk., Humboldt-Univ., Invalidenstr. 43, DDR-1040 Berlin, GDR).

With reference to the paper listed in *OA* 6245, the atavistic venational features were restudied on a larger sample. Median space crossveins occur more frequently in ♂ than in ♀, and the frequency of individuals with one or more of these is subject to genotypic inclination of local populations, which is understood as a confirmation of the atavistic nature of crossveins in the median (basilar) space.

- (7030) POSTNER, M., 1989. Libellenbeobachtungen im Landkreis Dachau (Insecta, Odonata).

- NachrBl. bayer. Ent.* 38(3): 69-71. (With Engl. s.). — (Kreuzstr. 7, D-8046 Garching, FRG). A list of 20 spp. from the district of Dachau, Bavaria, FRG. Of some local interest are *Coenagrion mercuriale*, *Cercion lindenii* and *Onychogomphus forcipatus*. — (The statement on "2 generations" of *Sympecma fusca* is of course a lapsus and should be understood as "2 flight periods").
- (7031) RADEMACHER, M., 1989. Libellen — Flugkünstler aus der Erdgeschichte. *Globus* (Beigleith.) 6: 190-197. — (Author's address not stated).  
General article on dragonflies, with an outline of the status of the odon. fauna in the FRG.
- (7032) REINHARDT, U.J., 1989. [Book review]. G. Jurzitza, Welche Libelle ist das? *Globus* (Beigleith.) 6: 196. (Germ.). (Authors address not stated).  
Book review of the volume listed in OA 6282.
- (7033) ROCH, J.-F., 1989. Liste des odonates récoltées à Granby, division de recensement de Shefford, Québec. *Faberies* 14(2): 44-45. — (734 rue Lamartine, Mont St-Hilaire, Que. J3H 4L9, CA).  
List of 30 spp.
- (7034) RODRIGUES CAPITULO, A. & G. JURZITZA, 1989. Erstbeschreibung der Larve von *Castoraeschna decurvata* Dunkle & Cook, 1984 (Odonata: Aeshnidae). *Ent. Z. Stuttgart* 99(21): 312-317. (With Engl. & Span. s's). — (Second author: Bot. Inst., Univ. Karlsruhe, Kaiserstr. 12, D-7500 Karlsruhe-1, FRG).  
The ultimate instar is described and figured from material collected at Embalse Rio III, Cordoba prov., Argentina. The larva is compared with that of *C. castor* (Brauer).
- (7035) RÜPPELL, G., 1989. Kinematic analysis of symmetrical flight manoeuvres of Odonata. *J. exp. Biol.* 144: 13-42. — (Zool. Inst., Techn. Univ. Braunschweig, Pockelsstr. 10a, D-3300 Braunschweig, FRG).  
By analysis of slow-motion films of Anisoptera and Zygoptera in free flight, released in front of a backdrop or startled during flight, the following flight parameters have been quantified for symmetrical manoeuvres: wingbeat frequency, relative durations of up- and downstroke, phase relationship of the beats of fore- and hindwings, stroke amplitude, mean stroke velocity, flight velocity, nondimensional flight velocity, advance ratio, acceleration, angle of attack and stroke plane. — The wingbeat frequencies are higher in the smaller species and in those with relatively large wing loading. As a rule, Zygoptera have a wingbeat frequency only half that of Anisoptera. The stroke amplitude is almost always much larger in Zygoptera than in Anisoptera, which have a greater range of variation in this respect. Stroke velocity is higher in Anisoptera than in Zygoptera; it is also higher in the more elaborate flight manoeuvres than in others. The calculated stroke velocities resemble those actually measured. — Anisoptera fly more rapidly than Zygoptera. With respect to the nondimensional flight velocities, it is notable that although the values for Anisoptera are higher than those for Zygoptera, they are exceeded by the Calopterygidae; the latter can fold their wings back during rapid forward flight and shoot away, as in the "ballistic" flight of small songbirds. However, the advance ratio is higher in Anisoptera than Calopterygidae. — Anisoptera also perform better than Zygoptera with respect to acceleration. Three categories of phase relationships between the beats of the fore- and hindwings are established: counterstroking, phase-shifted stroking and parallel stroking. Counterstroking produces uniform flight, whereas the flight produced by phase-shifted and, in particular, parallel stroking is irregular. The angles of attack of the wings are shown to be associated with particular flight manoeuvres, as are the stroke planes. Flight manoeuvres are discussed without drawing detailed aerodynamic conclusions. The flight of Anisoptera is compared with that of Zygoptera.
- (7036) SAMWAYS, M.J. & P. CALDWELL, 1989. Flight behaviour and mass feeding swarms of *Pantala flavescens* (Fabricius) (Odonata: Anisoptera: Libellulidae). *J. ent. Soc. sth*

- Afr.* 52(2): 326-327. — (Dept Zool. & Ent., Univ. Natal, P.O. Box 375, Pietermaritzburg-3200, RSA).  
The Oct. 1988-Jan. 1989 swarms of *P. flavescens* (with *Tramea burmeisteri* and *T. continentalis*) are described from the area between the eastern Cape coast and northern Natal. These were denser, more frequent and more discrete towards the coast than towards the foothills of the Drakensberg. Their origin is unclear; few adults emerged from local larvae.
- (7037) SATOH, T., 1989. [A colour aberrant of *Somatochlora graeseri aureola*]. *Gekkan Mushi* 221: 40. (Jap.). — (Kashiwazaki Municipal Mus., 8-35 Midori-machi, Kashiwazaki, Niigata, 945, JA).  
A ♀ with very widely spread orange-yellow wing coloration was taken at Shimoda-mura, Minami-kanbara-gun, Niigata Pref. (27-VII-1988); a black-and-white photograph of the specimen is included.
- (7038) SCHLUMPRECHT, H. & I. STUBERT, 1989. Nutzung lokaler Vorbilder bei Artenhilfsmassnahmen — am Beispiel der Neuschaffung von Libellengewässern. *Natur Landschaft* 64(9): 393-397. — (Sauerbruchstr. 4, D-8580 Bayreuth, FRG).  
On the basis of the odon. fauna of the ponds in the city area of Bayreuth, FRG, specified suggestions are made with reference to the setting up of man-made dragonfly ponds. Though the interest in this subject is increasing, there is a certain danger that the interest in such ponds would become a matter of fashion rather than be inspired by the peculiar ecological requirements of the locally endangered spp.
- (7039) SCHLUMPRECHT, H. & I. STUBERT, 1989. Schutzmassnahmen und Entwicklungskonzepte für den Stillgewässerschutz im Stadtgebiet Bayreuth. *Landschaft+Stadt* 21(3): 93-99. (With Engl. s.). — (Büro F. Moder, Rathstr. 9, D-8580 Bayreuth, FRG).  
Dragonfly communities were investigated as a part of the urban biotope mapping of the city of Bayreuth, Bavaria, FRG. The survey resulted in spp. lists, quantitative description of biotope structure and area, assessment of the degree of human use, damages and conservation value and in management recommendations for each water body. Increasing pond area showed no significant positive influence on the numbers of spp., but these increased significantly with the increase of the structural diversity and with the decrease of the exploitation of the habitats. Most ponds are under the impact of fishfarming, eutrophication and cultivation; one third had fewer than 4 spp. and only 7% had the characteristic and complete odon. fauna.
- (7040) SCHÖLL, F., 1989. Zur näheren Kenntnis des Makrozoobenthos der Fließgewässer im Nationalpark Bayerischer Wald. *Ent. Z., Essen* 99(18): 257-267. (With Engl. s.). — (Bundesanstalt Gewässererk., Kaiserin-Augusta-Anlagen 15-17, D-5400 Koblenz, FRG).  
4 odon. spp. are recorded from the Bayrischer Wald National Park, Bavaria, FRG.
- (7041) SCHORR, M., 1989. *Leucorrhinia rubicunda* (Linnaeus, 1758) am Dürren Maar/Eifel (Insecta: Odonata). *Dendrocopos* 16: 124-125. — (Quinter Str. 112a, D-5500 Trier, FRG).  
A male of *L. rubicunda*, taken on 24-V-1989 nr Dürren in the Eifel, FRG, is brought on record and the distribution of this sp. in Germany is briefly outlined.
- (7042) SELYSIA. Newsletter of the Societas Internationalis Odonatologica and of the U.S. National Office, Vol. 18, No. 2 (Sept. 1, 1989). — (c/o D.M. Johnson, Dept. Biol. Sci., East Tennessee St. Univ., Box 23580 A, Johnson City, TN 37614-0002, USA).  
*Cook, C.*: A new odonatological association, The American Dragonfly Society, is formed (p. 5); — *Harp, G.L.*: 1990 North American odonatologists' meeting (p. 7; Jonesboro, AR; June 1-3; c/o G.L. Harp, Biol. Sci., Arkansas St. Univ., P.O. Box 599, State University, AR 72467, USA); — *Machado, A.*: Professor Santos dies in Brazil (p. 7); — *Wolberg, D.L.*: Dr R.H. Flower, paleontologist, dies (p. 7); — *Noll, B.A.*: Timetraveler dragonfly (p. 7; a poem); — *Johnson, D.M.*: The Tenth International Symposium of Odonatology (pp. 8-10); — *Pritchard, G.*: S.I.O. membership of com-

mittees 1989-91 (p. 10). — The issue also contains several sale announcements and requests for assistance (by *R.W. Garrison* and *C.S. Allen*).

- (7043) SOKOLOVA, V.E. & SYROECHKOVSKIY, [Eds], 1989. *Zapovedniki SSSR: Zapovedniki Probaltiki i Belorussii. — Reserves of the USSR: Baltic region and Byelorussia*. 320 pp. (hard cover). Mysl', Moscow. — ISBN 5-244-00317-8. (Russ., with Engl., Germ. & Fr. s's).

A comprehensive volume on nature reserves in the Baltic states and in Byelorussia, USSR; the "zakaznik"-type reserves are not included. A subject index is missing, but references to the Odon. appear on pp. 67 ("Viidumäe", Estonia), 93 ("Matsalu", Estonia), 126 ("Endla", Estonia), 183 ("Krustkalny", Latvia), 198 ("Teiči", Latvia) and 222 ("Žuvintas", Byelorussia). In all cases the number of recorded spp. is stated rather than a list. — (Some papers on "Žuvintas" (Spuris, 1959, 1971; Stanionyte, 1968), "Kamanos" (Spuris, 1959) and on "Moricsala" (Spuris, 1963) are apparently not considered. If the "zakaznik"-type reserves had been included, 28 spp. would have been recorded from "Puhtu", Estland (Keskpaik, 1970) and 30 spp. from "Engure", Latvia (Spuris, 1960).

- (7044) THOMPSON, D., 1989. Dragons & damselflies: an in-depth penetration of their sexual strategies. *Austral. nat. Hist.* 22(11): 506-510. — (Dept Environ. & Evol. Biol., Univ. Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK).

Directed at the general reader, the article is outlining the behavioural and physiological features of the odon. sexual strategies, with emphasis on the relative importance of sexual and natural selection in determining reproductive success.

- (7045) THORENS, P., W. GEIGER & W. MATTHEY, 1989. Les invertébrés et les études d'impact sur l'environnement: un exemple d'application. *Mitt. schweiz. ent. Ges.* 62(1/2): 209. [Abstract only]. — (Second Author: Inst. Zool., Univ. Neuchâtel, CH-2000 Neuchâtel).

In the case of certain construction works, the Swiss legislation requires a beforehand evaluation of the impact these would exercise on the environment. During 1987-1988, the Odon. were for the first time considered in this type of work, relative to the scheduled construction of the Délemont-Porrentruy highway, canton Jura, Switzerland. The details are not stated.

- (7046) VAN BUSKIRK, J., 1989. Density-dependent cannibalism in larval dragonflies. *Ecology* 70(5): 1442-1449. — (Dept Zool., Duke Univ., Durham, NC 27706, USA).

Cannibalism is a likely mechanism of population regulation in odon. that inhabit fish-free temporary ponds. In 2 short-term experiments in replicated artificial ponds, the density-dependent effects of cannibalism on survival and size structure of larval *Tramea carolina* were tested. By preventing some populations from engaging in cannibalism, it was possible to distinguish mortality due to cannibalism from mortality from other sources. The first experiment included 2 density levels and the presence or absence of cannibalism in a factorial design. The no-cannibalism treatment was achieved by removing the labial palps from all individuals to prevent them from grasping large prey. *T. carolina* survived significantly better in the no-cannibalism population at both densities, and this difference was greater at high density than low density, indicating that the proportion cannibalized was density dependent. A second experiment explored the form of the density-dependent cannibalism curve over a broad range of density. The results were adequately fit by a predator-prey model incorporating size structure, so that not all members of the population were vulnerable to cannibalism. In both experiments the survival of only the smaller instars was reduced, suggesting that cannibalism may reduce variation in the size distributions of dragonfly populations and contribute to emergence synchrony. The results demonstrated that cannibalism was strongly density dependent and may contribute to population regulation of dragonflies in temporary ponds.

- (7047) WARINGER, J.A., 1989. Gewässertypisierung anhand der Libellenfauna am Beispiel der Altenwörther Donauau (Niederösterreich). *Natur Landschaft* 64(9): 389-392. — (Limnol. Abt., Zool. Inst., Univ. Wien, Althanstr. 14, A-1090 Wien).  
4 odon. associations are defined and described from the backwaters of the Danube R. nr Altenwörth, Lower Austria, viz. Gomphus-Calopteryx splendens, Erythromma-Anax imperator, Orthetrum-Libellula depressa, and Lestes-Sympetrum.
- (7048) WASSCHER, M.T., 1989. De beekschaafterijder, Gerris najas, en de bosbeekjuffer, Calopteryx virgo, op bosbeeken: hun monitorwaarde en het beheer van hun biotoop. — [Gerris naja and Calopteryx virgo on woodland creeks: their monitoring value and the management of their habitat]. *Wet. Meded. K. ned. natuurh. Veren.* 192: 65-82. (Dutch). — (Minstraat 15 bis, NL-3582 CA Utrecht).  
In the Netherlands, *C. virgo* exclusively occurs on woodland streams (velocity often only 0.2-0.3 m/s, relatively low temperature, sparse aquatic vegetation). Some of the statements by earlier Dutch workers relative to the habitat requirements and occurrence appear erroneous. Tentative suggestions are made as to the management of the existing populations and with reference to management aiming at the increase of populations.
- (7049) WATANABE, M. & T. HIGASHI, 1989. Sexual difference of lifetime movement in adults of the Japanese skimmer, Orthetrum japonicum (Odonata: Libellulidae), in a forest-paddy field complex. *Ecol. Res.* 4(1): 85-97. — (First Author: Dept Biol., Fac. Educ., Mie Univ., Tsu-shi, Mie, 514, JA).  
By means of the mark-recapture method, the study was conducted in the warm temperate zone of Japan. The flight season was from mid April to late June. The age structure showed that the maiden flight occurred towards the forest from the emergence sites (paddy fields) for both sexes. The insects returned to the paddy fields after maturation. The total number of skimmers estimated in the whole survey area was about 1000-2000, of which about 200 males were found in the paddy fields. The average lengths of the immature and reproductive periods were about 10 and 20 days in both sexes, respectively. Most mature males tended to stay in the paddy fields and showed territorial behavior, while most mature females moved frequently between the forest and the paddy fields. The average extent of each territory was about 19 m<sup>2</sup>, being established mainly in the shady paddy fields. Few males were sneakers. The available habitat throughout the life span for the skimmers was both the paddy fields and the forest.
- (7050) WHITE, H.B., 1989. Dragonflies and damselflies (Odonata) of Acadia National Park and vicinity, Maine. *Ent. News* 100(3): 89-103. — (Dept Chem. & Biochem., Univ. Delaware, Newark, DE 19716, USA).  
An annotated list of 97 spp. now known from Mount Desert Island, Hancock Co., Maine USA is presented. Included for the first time are: *Lestes inaequalis*, *Enallagma durum*, *E. geminatum*, *E. signatum*, *Ischnura posita*, *Aeshna verticalis*, *Libellula inconsta*, *Erythemis simplicicollis*, *Pachydiplax longipennis*, *Tramea carolina*, *Pantala hymenaea* and *Tarinetrum corruptum*. These 12 were found within Acadia National Park and, with the exception of *A. verticalis*, all are at or near their northeastern limit of distribution in North America. This is the first time *E. durum*, *T. carolina*, and *T. corruptum* have been reported for Maine. Also included are the first odon. records from Isle au Haut, Knox Co., Maine.
- (7051) WILDERMUTH, H., 1989. *Biologie*. 224 pp. Lehrmittelverlag Kt. Zürich, Zürich. — ISBN none. Price: sFr 29.50. — (Author: Mythenweg 20, CH-8620 Wetzikon).  
This is a biology textbook for the Swiss lower secondary and similar schools. A teacher's commentary (316 pp.) and a set of 80 slides go with it. The Author is one of the leading Swiss odonatologists: his didactical treatment of the Order is certainly noteworthy (life history pp. 32-33; general characterization of the Order pp. 122-123).



- (7052) WILSON, J.M., 1989. An observation on a damselfly naiad and a hydra. *Quart. J. Young Entomologists' Soc.* 6(3): 39-40. — (28014 Green Willow, Farmington Hills, MI 48331, USA).

The successful defensive action of a Hydra against an approaching zygopteran larva (probably *Argia* sp.) in the aquarium is described.

- (7053) WISSINGER, S.A., 1989. Seasonal variation in the intensity of competition and predation among dragonfly larvae. *Ecology* 70(4): 1017-1027. — (Dept Biol. & Environ. Sci., Allegheny Coll., Meadville, PA 16335, USA).

In nature, both similar and disparate sizes of *Libellula lydia* and *L. luctuosa* larvae frequently co-occur in time and space. To determine if these larvae interact as competitors, and/or as predators and prey, artificial ponds to manipulate density, species composition, and size-range of co-occurring larvae were used. Detailed life history data were used to design separate fall and spring experiments. In both experiments, "competition treatments" contained only larvae similar in size, whereas "predation treatments" contained larvae disparate in size. — In fall competition treatments there where no density-dependent growth responses. However, in the spring experiment, larvae of both species grew significantly faster in low density than in high density treatments. This seasonal difference in competition was attributed to fluctuations in resource abundance. Competition did not directly affect survivorship. — In spring and fall predation treatments, mortality was significantly higher than it was in competition treatments. Inter-odonate predation accounted for 25-45% of total larval mortality in fall, but only 10-15%

in spring. In the absence of inter-odonate predation, total mortality was lower for larger larvae than smaller larvae, suggesting that the latter are more susceptible to predation by other invertebrate predators. Thus, competition, by decreasing growth rates, should indirectly affect larval survivorship. — These data provide evidence that competition and predation will simultaneously affect coexistence between these two dragonfly species. Predation early in larval development should ameliorate the intensity of subsequent competitive interactions at a time when resources are most likely to be limiting. This type of mixed competition/predation interaction is analogous to predator-mediated coexistence, and might explain how such ecologically similar species can coexist at such high densities.

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- (7054) BATTIN, T., 1990. *Anax immaculifrons* Rambur, 1842 from the island of Karpathos, Greece: an oriental representative in the European dragonfly fauna (Odonata: Aeshnidae). *Opusc. zool. flumin.* 47: 1-10. — (Leopold-Ernstgasse 17/6, A-1170 Wien).  
The oriental *A. immaculifrons* is reported from the island of Karpathos, Greece. The adult ♂ and the ♀ larva are described and illustrated, and notes are given on the Karpathos habitat and adult behaviour. The larvae were collected from rock-pools in the lower reaches of a permanent stream, where the sp. coexists with *A. imperator*. The July population consisted of early instar larvae only, therefore it is tentatively assumed that life history in Karpathos lasts more than 1 yr. The range of the sp. is outlined and mapped.