ODONATOLOGICAL ABSTRACTS

1971

(7317) GERMER, R., 1971. Platyphlebopteron jakobyi nov. gen. et nov. spec., eine neue Libellenart und -gattung aus dem Saarkarbon. *Faun.-flor. Notiz. Saarland* 4(3/5): 32-35. — (Author's current address unknown).
The reference to a "dragonfly" in the title is erroneous. The specimen described and figured is referable to the Protorthoptera.

1980

(7318) HAAS, G., 1980. *Untersuchungen zur Populationsentwicklung von Coenagrion hastulatum Charp. (Insecta, Odonata) im Sommer 1980.* Schriftl. Hausarbeit wiss. Prüfung Lehramt Gymn. Bayern. 123 pp. Pädagog. Hochschule [?], Erlangen. — (Author's address unknown).
Comprehensive dissertation on ecology, behaviour and population biology of C. hastulatum at a sandpit nr Grossdechsendorf, Bavaria, FRG.

1982

(7319) CARCHINI, G. & E. ROTA, 1982. Il popolamento ad odonati del fiume Mignone (Lazio) e sue relazioni con la qualità dell'acqua. *Boll. Zool.* 49 (Suppl.): 34. [Abstract only]. — (Dip. Biol., Univ. Roma "Tor Vergata", Via Orazio Raimondo, I-00173 Roma).
Larvae of 19 spp. were collected and the odon. populations were analysed at different stations of the Mignone R., southern Italy, using the Sokal-Michener index and correspondence analysis. The extent of variation in odon. populations is similar to that in other Mignone aquatic insects. The importance of odon. analysis for the assessment of water quality is emphasised.

1983

(7320) GUSENLEITNER, F. & J. GUSENLEITNER, 1983. Zoologie. Wirbellose Tiere. *Jb. oberöst. MusVer.* 128(1): 431-438. — (Oberösterr. Landesmus., Museumstr. 14, A-4020 Linz).
A brief outline of the work on the odon. fauna of the Oberösterreich prov., Austria, is given on p. 434. For the regional bibliography cf. *OA* 4627 and 4628.

(7321) HUBER, C., 1983. *Kalkquellsümpfe und Wiesenbäche/ Wiesengräben als Biotop von Orthetrum coerulescens - Untersuchungen im westlichen Bodenseegebiet.* Diplomarb. Univ. Freiburg/ Br. IV+110 pp. — (Author's current address unknown).
Ecological characteristics of the breeding habitats are described, analysed and discussed, and the behaviour and population biology of O. coerulescens are described on the basis of observations at 10 habitats in the Bodensee ares, FRG.

(7322) JOGER, U., 1983. Wassergefüllte Wagenspuren auf Forstwegen — Ökosystemforschung im Kleinmasstab. *Verh. Ges. Ökol., Mainz* 10: 399-401. (With Engl. s.). — (FB Biol./Zool., Univ. Marburg, Karl-von-Frisch-Str., D-3550 Marburg, FRG)
Abridged version of the paper listed in *OA*

4483, but it does contain a brief reference to Aeshna cyanea.

1984

(7323) CRUMP, M.L., 1984. Ontogenetic changes in vulnerability to predation in tadpoles of Hyla pseudopuma. *Herpetologica* 40(3): 265-271. — (Dept Zool., Univ. Florida, Gainesville, Fl 32611, USA).
Tadpoles of the treefrog Hyla pseudopuma, ranging from stages 26-42, were offered to predatory adult dytiscid beetles (Rhantus guticollis) and odonate larvae (Aeshna sp. and Sympetrum nigrocreatum) in order to examine stage-specific vulnerability. 2 larvae predictions were tested: (1) Based on a size threshold, small tadpoles without visible legs should be more vulnerable to specific predators than should large tadpoles without legs or large tadpoles with two legs; — (2) Once the forelimbs erupt, a tadpole passes through an awkward stage, and thus four-legged individuals should be more vulnerable to specific predators than should large tadpoles with no legs or two legs. Experimental results for Rhantus guticollis and Sympetrum nigrocreatum supported both predictions. Aeshna sp. larvae, however, were able to capture and kill all stages of tadpoles offered. In all experiments, fewer four-legged individuals were killed than exspected. Most four-legged tadpoles that survived climbed out of reach of the predators. In nature, metamorphosing froglets often climb out of water and sit on vegetation while resorbing their tails.

(7324) SANTOS, N.D., 1984. Odonatos que se criam em bromélias de restingas no litoral fluminense. *In:* L.D. Lacerda, D.S.D. Araujo, R. Cerqueira & B. Turq, [Eds], Simp. sobre Restingas, pp. 351-354, Cent. Estud. Univ. Fed. Fluminense, Niterói. (With Engl. s.). — (Author deceased).
In the city sand dunes of Rio de Janeiro, Leptagrion andromache, L. elongatum and L. perlongum breed in the water contained among leaves of terrestrial bromeliads. The various spp. of these are listed and the peculiar conditions of these habitats are briefly stated.

1986

(7325) RUDIAZ, A., S. PEREIRO, A. VAZQUEZ, W. AMORES, M.A. PALERMO & B. MARCHETTI, 1986. Odonatos y efemerópteros: libélulas, caballitos del diablo, efímeras y otros. *Fauna argentina* 115: 32 pp. — (Publishers: Centro Editor de América Latina, Junín 981, Buenos Aires, Argentina). — Copies available from the SIO Central Office, Bilthoven, at Hfl. 25.- net.
This well illustrated booklet (incl. 15 col. phot., etc.) is the first and so far the sole commercially available dragonfly work in Latin America directed at the general reader. It gives a general outline of the biology (etc.) of the Order, but does not contain keys, and the spp. shown on the phot. are not identified. The circulation is apparently limited, and copies are hard to obtain from the publishers, hence the work is to be considered a considerable bibliographic "rarity".

1987

(7326) FRIDAY, L.E., 1987. The diversity of macroinvertebrate and macrophyte communities in ponds. *Freshw. Biol.* 18: 87-104. — (Dept Appl. Biol., Pembroke St., Cambridge, CB2 3DX, UK).
The range of factors that may influence the wide variation in the structure of pond communities in Britain is reviewed. Among the organisms considered are 7 odon. spp.

(7327) FRISBIE, M.P., 1987. *Investigations into the osmoregulatory physiology of the predaceous diving beetle, Dytiscus verticalis.* PhD thesis, Pennsylvania St. Univ., 87 pp. — Microfilm or xerox copy available from University Microfilms International, Dissertation Copies, P.O. Box 1764, Ann Arbor, MI 48106, USA; Order No.: ADG87-28005. 8804.
Sodium and water balance of adult and larval D. verticalis in fresh water were investigated. — Unidirectional sodium fluxes were low in comparison with most freshwater animals. Sodium influx did not show saturation kinetics over a large range of external sodium concentrations. Unfed beetles failed to arrest

net sodium loss to baths that were initially distilled water or artificial soft water, even when bath sodium concentrations surpassed levels in natural habitats. Thus beetles cannot achieve sodium balance in fresh water without dietary sodium input. — Water influx into larval D. verticalis was roughly half the influx into a dragonfly larva possessing rectal tracheal gills. Sodium balance of beetle larvae was not affected by exposure to pH 3.0. In dragonfly larvae a similar exposure significantly decreased sodium influx and increased sodium efflux. Thus, disruption in sodium balance of aquatic insects is likely to provide a useful bioassay for effects of acidic pollution only in forms using aquatic respiration. Air-breathing forms are predicted to be more tolerant to acidic and metallic pollutants that specifically inhibit sodium balance.

(7328) MARTIN, J.E.H. & S. ALLYSON, 1987. The insects, spiders and mites of Cape Breton Highlands National Park. Order Odonata (dragonflies, damselfies). *Rep. Biosyst. Res. Cent. Agric. Can.* 1: 71-76. — (Authors' addresses not stated).
Annotated list of 39 spp. (Nova Scotia, Canada).

(7329) MOSHER, B. & A. CHAPMAN, 1987. *Factors influencing reproductive success and nesting strategies in black terns.* PhD thesis, Simon Fraser Univ., Burnaby. — Not available from University Microfilms, Ann Arbor. Apply to Simon Fraser Univ., Burnaby, B.C. V5A 1S6, CA. — Abstract from *Diss. Abstr. Int.* (C) 50(4): 1222 [1987].
Factors which might influence reproductive success, coloniality and the timing of breeding in Black Terns (Chlidonias niger) were examined. The young ate 55% odon., 35% other insects, and 10% fish. Peaks in odon. emergence differed by as much as 15 weeks between years and the overall emergence rate decreased from 1981-1984. Foraging success of adults was 5.09 items/min when catching insects, 0.82 items/min for fish and 2.03 items/min for insects and fish simultaneously.

(7330) PIERCE, C.L., 1987. *Effects of fish on littoral invertebrates.* PhD thesis, Univ. Maryland, 137 pp. — Microfilm or xerox copy available from University Microfilms International, Dissertation Copies, P.O. Box 1764, Ann Arbor, MI 48106, USA; Order No.: ADG87-25551. 8802. — (Author's last known address: Dept Biol., McGill Univ., 1205 ave Dr Penfield, Montreal, Que., H3A 1B1, CA).
[Author's verbatim abstract]: Field and laboratory experiments assessed the effects of predatory fish on benthic invertebrates in the littoral zone of a small pond. Effects on demographic parameters and behaviors were considered. To test for a response to release from fish predation, I removed bluegills (Lepomis macrochirus) and largemouth bass (Micropterus salmoides) from replicated exclosure pens. Densities and biomass of most taxa were unaffected, but tabanid densities were significantly higher in fish exclosures. Total invertebrate densities did not differ between treatments, but total biomass was significantly higher in fish exclosures than controls. — Bluegill spawning activity creates benthic disturbances, and to test whether this affects invertebrate abundance, I monitored densities and biomass in spawning areas and nearby undisturbed areas before and after the onset of nest construction. Densities and biomass of most macroinvertebrates were similar before and just after nest contruction. Insects were generally more abundant in undisturbed areas six weeks after nest construction. Microinvertebrates were more abundant in undisturbed areas before spawning. Copepods and ostracods were more abundant in spawning areas after nest construction. — To test whether macroinvertebrates would respond to fish predators behaviorally, I manipulated the presence and activities of adult bluegills in patches of defaunated littoral substrate, and subsequently monitored macroinvertebrate colonization. Dragonfly larvae strongly avoided colonizing patches where fish were present. Other taxa were unaffected by bluegills, although densities of beetle larvae were reduced in patches by predation. — To further investigate the behavioral responses of dragonfly larvae to fish suggested by the field

experiment, I conducted laboratory experiments examining effects of fish and diel period on microhabitat use and foraging. The two dominant species from the field study, Tetragoneuria cynosura and Ladona deplanata, were generally found underneath cover; especially during the day or when fish were present. Fish strongly depressed foraging in last instar Tetragoneuria and Ladona. Sympetrum semicinctum, a confamilial species from a nearby fishless pond, was generally found in exposed locations, but shifted toward cover during day trials when fish were present. Foraging in Sympetrum was unaffected by either fish or diel period. Vulnerability of dragonfly larvae to bluegill predation was positively correlated with use of exposed microhabitats.

(7331) SINGER, F.D., 1987. *The behavioral and physiological ecology of dragonflies.* PhD thesis, Univ. Minnesota, 125 pp. — Microfilm or xerox copy available from University Microfilms International, Dissertation Copies, P.O. Box 1764, Ann Arbor, MI 48106, USA; Order No.: ADG88-08501. 8810. — (Author: Dept Biol., Radford Univ., Radford, VA 24142, USA).
[Author's verbatim abstract]: Dragonflies are ideal subjects for investigations of behavioral evolution, because three aspects of behavior associated with reproductive success may be studied within a brief time span. I investigated these aspects, territoriality, mating and mate-guarding, in four species of libellulid dragonflies, Leucorrhinia frigida, L. proxima, L. intacta and Sympetrum obtrusum. This dissertation begins with a comparison of the behavior and ecology of all four species. I estimate the number of adult males of each species on the major bodies of water at my study site, and describe the phenology and habitat use of males and females. — My studies of Leucorrhinia focus on interactions. Males defend mating territories from which they exclude conspecifics and heterospecifics. L. frigida and L. intacta males are equally likely to exclude conspecifics or heterospecifics, while L. proxima is more likely to defend against intrusions by conspecifics. — Defense of mating territories against heterospecifics is not predicted by evolutionary theory, because such defense incurs energetic costs and risk of injury, yet appears to convey no benefit to the territorial male. I propose that species recognition is costly to a territorial male, because while a male determines the species identity of an intruder, he may suffer a tactical cost that reduces his fighting ability. Male Leucorrhinia dragonflies attempt to mate with conspecific and heterospecific females. Heterospecific mating attempts are usually unsuccessful, as the pair disengages after assuming the mating position. Males of all three species show no evidence of species discrimination while they are guarding their ovipositing females. This lack of discrimination is costly, because 29% of the observed takeovers occurred while a male was chasing or clasping a heterospecific intruder. — I conclude with an investigation into variation in mate-guarding in S. obtrusum. Males may use noncontact guarding or tandem guarding to protect their females against takeovers. Noncontact guarding is less effective (11% takeover male), but is energetically less costly. I provide evidence that environmental factors affect flight muscle temperature to determine the type of mate-guarding used by Sympetrum males. When flight muscle temperature is low, males use the reproductively inferior but energetically less expensive noncontact guarding.

(7332) TOGASHI, I. & J-i. TAKA, 1987. Prey insects of the spider Nephila clavata L. Koch. *New Entomol.* 36(1/4): 21-25. (Jap., with Engl. s.). — (Authors' addresses are not transliterated).
Sympetrum darwinianum is the only odon sp. listed among the preys.

(7333) TSUBUKI, T., 1987. The flight activity of the libellulid dragonfly Sympetrum frequens (Odonata) in relation to the environmental factors. *New Entomol.* 36(1/4): 12-20. (Jap., with extensive Engl. s.). — (Author's address not transliterated).
There are a morning and an evening activity peak. The dragonfly is most active at air temperatures 18-24° C, radiant heat 22-26° C, light intensity 10.000-50.000 lux (morning) or

80.000-100.000 lux (during the daytime), the humidity of 50-80%, and at wind scale 1-2. Of these, the humidity is of lesser importance. Little or no activity was seen above 100.000 lux/24° C and below 10.000 lux/18° C. The morning takeoff depends on light intensity and radiant heath rather than on air temperature. The evening activity ceases without a change in light intensity, radiant heath and air temperature. A biological clock mechanism may be related to this phenomenon.

(7334) WELLBORN, G.A., 1987. *The effects of fish predation and thermal regime on an aquatic macroarthropod community.* PhD thesis, Univ. Texas, Arlington. 139 pp. — (Microfilm or xerox copy available from University Microfilms International, Dissertation Copies, P.O. Box 1764, Ann Arbor, MI 48106, USA; Order No.: ADG13-31773. 8806. — (Author: Dept Biol., Univ. Texas, Arlington, TX 76019, USA).

[Verbatim abstract]: The effects of vertebrate predation and thermal regime on a littoral macroarthropod community were evaluated during a one year study of Fairfield Reservoir, Freestone Co., Texas. Total invertebrate abundance was significantly higher in predator exclusion plots than plots accessible to fish predators. When taxa were examined individually, Hyalella azteca and Orthotrichia sp. had significantly greater abundance in the absence of fish predation. These taxa were major components of the reservoir fauna. Zygopteran abundance was significantly reduced in fish exclusion plots. In addition to species-specific predator susceptibility, macroarthropod response to predator density manipulation often exhibited significant spatial heterogeneity and temporal inconstancy. In constrast to results obtained under a natural thermal regime, predator exclusion plots in a thermally stressed area had significantly lower invertebrate abundance than predator accessible plots. Thermal regime had a major influence on invertebrate abundance and community structure. High water temperatures during summer months eliminated all macroarthropods in the thermally stressed area; this area generally supported fewer invertebrates in other months.

1988

(7335) ALIMOV, A.F., [Ed.], 1988. *Soobshchestva presnovodnyh bespozvonochnyh v zaroslyah makrofitov. — Communities of the freshwater invertebrates among macrophytes associations* [sic!]. Zool. Inst., USSR Acad. Sci., Leningrad. II+198 pp. [*Trudy Zool. Inst.*, Vol. 186]. (Russ., with Engl. title). — (c/o Dr I.M. Krezhner, Library, Zool. Inst., USSR Acad. Sci., Universitetskaya nab. 1, USSR-199034 Leningrad). — Available from the SIO, Bilthoven.

The monograph is concerned with the freshwater invertebrate communities of the Neva estuary, Gulf of Finland, USSR. Most chapters deal largely, and some entirely, with odon. larvae, covering their sociology, trophic relationships, predatory behaviour, etc. The authors of these are *A.F. Alimov, E.V. Balushkina, S.M. Golubkov, V.E. Panov, A.M. Pavlov, I.V. Telesh* and *I.M. Zubina.*

(7336) BOHANAN, R.E., 1988. *The efficacy of case construction as an antipredatory behavior for some lotic Chironomidae: costs and benefits.* PhD thesis, Univ. Wisconsin, Madison. 144 pp. — Microfilm or xerox copy available from University Microfilms International, Dissertation Copies, P.O. Box 1764, Ann Arbor, MI 48106, USA; Order No.: ADG88-10447. 8812. — (Author: Dept Zool., Univ. Wisconsin, Madison, WI 53706, USA).

Aquatic insects have evolved a variety of ways to reduce the likelihood of predation. These include morphological and behavioral defenses. However, possession of antipredatory behavior patterns and morphology can impose constraints on the life history of these organisms. Multivariate analyses suggested that the presence or absence of a common predator, Ischnura verticalis, partially determined the species composition of prey in lotic system. Gut content analyses on this predator detected preferences for particular prey species. The Author determined the effect of I. verticalis on the abundance of an assemblage of larval Chironomidae (Diptera)

with behaviorally distinct prey species using in situ predation experiments. Artificial stream experiments were conducted in the laboratory to estimate predator feeding rates for different prey spp. Observations of predator and prey behavior were used to measure relative encounter frequencies of selected prey spp. with I. verticalis.

(7337) CARCHINI, G., F. BAMBACIGNO, M. BAZZANTI, C. BELFIORE, R. FOCHETTI, P. NICOLAI & R. ROTA, 1988. Composizione e struttura del macrobenthos del fiume Mignone (Italia centrale). *Boll. Mus. Stor. nat. lunigiana* 6/7: 407-415. (With Engl. s.). — (First Author: Dipto Biol., Univ. Roma "Tor Vergata", Via Orazio Raimondo, I-00173 Roma).
The fauna, gathered at 7 stations (prov. Roma and Viterbo) is listed and analyzed. It includes 21 odon. spp. The abundance of some regionally rare taxa is amazing.

(7338) CHOVANEC, A., 1988. *Öko-ethologische Aspekte der Räuber-Beute-Beziehung zwischen Anisopteren- und Anurenlarvan.* PhD diss. Univ. Vienna. IV+98 pp. — (Radetzkystr. 2, A-1030 Wien).
Predator-prey interactions are examined between larval Aeshna cyanea and tadpoles of Bombina bombina, Bufo bufo, B. viridis, Hyla arbora, Rana dalmatina and R.viridis.

(7339) IONESCU, V. & M. APETREI, 1988. *Indrumator practic pentru cunoasterea insectelor: colectare — preparare — conservare.* Muzeul Stiintele Naturii, Pietra Neamt, 223 pp. (Rumen.) — (Authors' addresses not stated).
On pp. 24-26 of this primitively published guide for insect collecting, cabinet preparation and conservation, a number of Rumenian locality data are given for several odon. spp.

(7340) LIU, Z.-y., 1988. On a new species of the genus Paragomphus from China (Odonata: Gomphidae). *Contr. Shanghai Inst. Ent.* 8: 167-169. (Chin., with Engl. s.). — (Shanghai Inst. Ent., Acad. Sinica, Chungkin Rd (S) 225, Shanghai, P.R. China).
P. wuzhishanensis sp. n. is described and figured from a single ♀ (Wuzhishan, Hainan Isl., P.R. China, 1-X-1957; deposited in Shanghai Inst. Ent.), and compared with P. pardalinus Needham and P. hoffmanni (Needham).

(7341) POLCYN, D.M., 1988. *The thermal biology of desert dragonflies.* PhD thesis, Univ. California, Riverside. 130 pp. — Microfilm or xerox copy available from University Microfilms International, Dissertation Copies, P.O. Box 1764, Ann Arbor, MI 48106, USA; — Order No.: ADG89-09881. 8908.
[Verbatim abstract]: The thermal biology of 2 aeshnid and 6 libellulid spp. was studied during mate-seeking activity at a permanent pond in California's Mojave desert. Most spp. were active throughout the day during the hot summer months, when air temperatures (Ta) ranged from 18-45°C and operative temperature (Te) often exceeded 55°C for extended periods. The thoracic temperatures (Tth) of all spp. studied were maintained much more precisely and much higher than, and often exceeded the therminal death point (HT) of, congeners and conspecifics previously studied in cooler habitats. Accordingly, HT was much higher in desert dragonflies than in their non-desert counterparts, ranging between 51 and 53°C. — Flight metabolic rates (Mf) were determined for 7 spp. Mf ranged from 62-157 mlO/s/(g/hr), and scaled with the 0.85 power of total body mass. Morphometric analysis revealed large thoracic mass (48-63% of total body mass) and low wing loading (0.02-0.04 g/cm²) relative to other large flying insects. — Calculations based on Te and Mr suggest that (1) under certain conditions, a perching dragonfly may reduce Tth by initiating flight; (2) individuals must consume large quantities of food (20-50% of total body mass per hour) to sustain flight, hence are probably not active for long periods at the study site (where little or no feeding occurred); and (3) the nearly continuous flight behavior exhibited by both fliers and perchers at high Ta is probably thermoregulatory in nature and may preclude the establishment and defense of breeding territories by the males of most spp.

(7342) REISS, T., 1988. Die Zurlindengruben in Pratteln. Libellen (Odonata). *TatBer. naturf. Ges. Baselland* 35: 41-43, 97. — (Schillerstr. 23, CH-4053 Basel).
A list of 25 spp. from this locality nr Basel, Switzerland. Of local interest are records of Sympecma fusca, Erythromma viridulum, Crocothemis erythraea and Sympetrum depressiusculum.

(7343) ZHANG, S.-m., Y.-x. CHAO & S.-c. HU, [1987] 1988. On the geographical region of agricultural insects in Xizang [= Tibet]. *In:* S. Zhang, [Ed.], Agricultural insects, spiders, plant deseases and weeds in Xizang [= Tibet], Vol. 1, pp. 1-27, Xizang People's Publishing House. (Chin., with Engl. s.). — (Third Author: Plant Protection Stn, Shigatse, Tibet, P.R. China).
Biogeographic division of Tibet (Chin.: "*Xizang*") is outlined on the basis of extensive insect collections (over 250.000 specimens), brought together in 36 counties of Tibet by the General Investigation Team of the Plant Protection Station, Shigatse, Tibet. The following odon. spp. are mentioned from various areas. Oriental region, Dza-yul/Mon-yul/Glo-yul rice and tea district: Calicnemia eximia, Pyrrhosoma tinctipennis, Ceriagrion fallax, Rhynocypha cuneata, Nepogomphus modestus, Acisoma panorpoides, Orthetrum triangulare melania, Palpopleura sexmaculata, Pantala flavescens; — Central Himalaya district: Ischnura senegalensis, Cordulegaster b. brevistigma, Orthetrum japonicum internum, Sympetrum commixtum; — Nying-khu/sMin-gling district: Enallagma cyathigerum, Libellula quadrimaculata, Sympetrum haematoneura; — Palaearctic region, Hong-grong mountain district: Enallagma cyathigerum; — Southern Tibet farming & animal husbandry district: Enallagma cyathigerum, Sympetrum croceolum; — Western mNg'a-ris district: Cordulegaster b. brevistigma, Aeshna juncea. — Cf. also *OA* 3628 and 7068, on which evidence the present paper is said to be based.

1989

(7344) (Anonymous), 1989. Libellen-Plage in Norditalien. *Hamburger Morgenpost,* issue of July 28.
Refers to the same enormous dragonfly migration of July 26, 1989, in Torino, Italy as mentioned in *OA* 6839.

(7345) ANDRIÈS, J.C., G. BELEMTOUGRI, D. CROIX & G. TRAMU, 1989. Gastrin/cholecystokinin-like immunoreactivity in the nervous system of Aeschna cyanea (Insecta, Odonata). *Cell Tissue Res.* 257(1): 105-113. — (First Author: Lab. biol. anim., Univ. Sci. & Techn. Lille, F-59655 Villeneuve d'Ascq).
Gastrin/cholecystokinin (gastrin/CCK)-like immunoreactivity has been detected in the brain, suboesophageal ganglion and corpora cardiaca of the larva of Aeshna cyanea by radioimmunoassay and immunohistochemistry, by use of two antisera raised against the sulfated (CCK-8S) and the unsulfated form (CCK-8NS) of the carboxyl terminal octapeptide. Numerous immunoreactive neurons were demonstrated in the protocerebrum (exclusive of optic lobes) and suboesophageal ganglion where 20 and 15 symmetrical clusters of reactive cells, respectively, were observed. Immunoreactive cells also occurred in the tritocerebrum, the optic lobes and the frontal ganglion. In the corpora cardiaca, gastrin/CCK-like material was found both within intrinsic cells and axon terminals. RIA measurements support the immunohistochemical results in so far as large amounts of gastrin/CCK-like material were detected in the brain, corpora cardiaca and suboesophageal ganglion complex. Both boiling water-acetic acid- and methanol-extraction procedures were performed. Comparisons of the results lead to the conclusion that a large part of the gastrin-CCK-like material occurs as small molecules. Immunohistochemical procedures performed on material fixed in a solution of picric acid-paraformaldehyde demonstrated differences in the immunoreactivity of the tested antisera. First, the immunohistochemical reaction was always more pronounced when the CCK-8NS antiserum was used instead of the CCK-8S antiserum, which may be interpreted by a lower affinity of the latter. In the second place, some neurons

strongly stained by the CCK-8NS antiserum were only very faintly if at all stained by the CCK-8S antiserum, which may mean that different peptides or at least distinct forms of the same precursor are detected.

(7346) BAKER, R.L. & B.W. FELTMATE, 1989. Depth selection by larval Ischnura verticalis (Odonata: Coenagrionidae): effects of temperature and food. *Freshw. Biol.* 22: 169-175. — (First Author: Dept Zool., Erindale Coll., Univ. Toronto. Mississauga, Ont., L5L 1C6, CA).
Water temperatures in a shallow, weedy bay of a reservoir in southern Ontario were related to depth; mid-day temperatures in summer were approximately 30° C at the water surface and 20° C below 25 cm. — In the laboratory, larval I. verticalis released in a thermal gradient (warmest water near the surface) did not remain near the surface any more than larvae in isothermal conditions. However, larvae in both isothermal and gradient conditions tended to spend more time close to the surface than expected by chance. — Larvae provided with food at all depths spent more time near the surface than did larvae with no food. Larvae provided with one feeding site in the coldest water remained near the food as much as did larvae provided with a single feeding site in the warmest water. — Results suggest that selection of microhabitats is based primarily on food availability and secondarily on proximity to the surface.

(7347) BASTERO MONSERRAT, J.J., 1989. *Longinos Navás científico jesuita.* IV+229 pp., 16 pls (mostly col., incl. portrait), another portrait on cover. Univ. Zaragoza, Zaragoza. — ISBN 84-7733-114-6. — Available from the SIO Central Office, Bilthoven.
This is a long needed monograph on the well known Spanish entomologist (born: March 7, 1858, deceased: Dec. 31, 1938). It contains a detailed biography, evaluation of his work, his (incomplete) bibliography (640 titles, of which 620 on entomology), and the crossrefe.enced list of taxa he described (2684 spp. & "varieties", 244 genera). The latter includes 93 spp. and 6 genera of Odon. — Though the bibliographic part still remains incomplete (and it is most questionable whether a complete bibliography of this worker could ever be compiled!) the book is absolutely indispensable in an odonatological library.

(7348) BEN AZZOUZ, B., R. GUEMMOUH & P. AGUESSE, 1989. Position systématique et description de la larve de Coenagrion castellanii Roberts (1948) du Maroc (Odonata, Coenagriidae). *Nouv. Revue Ent.* 6(4): 375-381. (With Engl. s.). — (Third Author: Lab. Zool. & Biol. Gén., Fac. Sci., B.P. 1014, Rabat, Morocco).
C. castellanii from Morocco is reinstalled to the specific rank. Its larva and that of C. mercuriale hermeticum are described.

(7349) BEUTLER, H., 1989. Libellen (Odonata) an Tagebaugewässern der Niederlausitz. *Verh. SIEEC* (Gotha 1986) 9: 353-356. — (Frankfurter Str. 23/63-13, DDR-1230 Beeskow, GDR).
In the abandoned open cast brown coal mining areas of Niederlausitz, GDR, a peculiar type of acid oligotrophic ponds has developed. The odon. communities of these are described and discussed.

(7350) BLINN, D.W. & M.W. SANDERSON, 1989. Aquatic insects in Montezuma Well, Arizona, USA: a travertine spring mound with high alcalinity and dissolved carbon dioxide. *Great Basin Nat.* 49(1): 85-88. — (Dept Biol. Sci., Northern Arizona Univ., Flagstaff, AZ 86011, USA).
Enallagma civile and Telebasis salva are reported. The absence of (a.o.) Anisoptera is attributed to high concentrations of dissolved CO_2 (550 mg l^{-1}) and/or alkalinity (600 mg l^{-1} $CaCO_3$), which are suggested to restrict larval development and/or hatching.

(7351) BRECHTEL, F. & U. RIEDL, 1989. Beiträge zur entomofaunistischen Bedeutung der Westwälder Seenplatte (Kreis Westerwald) unter besonderer Berücksichtigung der Laufkäfer (Coleoptera, Carabidae). *Beitr. Landespfl. Rheinland-Pfalz* 12: 305-348. — (First Author: Schubertring 26, D-6729

Rülzheim, FRG).
On pp. 309-310, a list is given of 24 odon. spp., and the regional odon. fauna is briefly discussed.

(7352) CARCHINI, G., M. BAZZANTI, P. NICOLAI, C. BELFIORE, R. FOCHETTI, E. ROTA & F. BAMBACIGNO, 1989. Popolamento macrobentonico e valutazione biologica della qualità dell'acqua del fiume Mignone. *In:* Valutazione sulle state dell'ambiente nel bacino idrografica del fiume Mignone, pp. 137-152, Assessorato Ambiente (Prov. di Roma) — Univ. di Roma "La Sapienza" — Ist. Naz. Urbanistica — Assessorato Ambiente & Ecol. Prov. di Viterbo). — (First Author: Dip. Biol., Univ. Roma "Tor Vergata", Via Orazio Raimondo, I-00173 Roma).
Mainly based on the work stated in *OA* 7337.

(7353) COSTA, J.M., 1989. Breve histórico sobre Newton Dias dos Santos. *Revta brasil. Ent.* 33(2): 404-411. — (Depto Ent., Mus. Nac., Quinta da Boa Vista, São Cristóvão, BR-20960 Rio de Janeiro).
Comprehensive biography (with a portrait), evaluation of work and a fairly complete bibliography (1939-1988) of the late Professor Santos (Sept. 14, 1916 — March 3, 1989). — For the odonatol. aspects of his work and his complete odonatol. bibliography cf. *Odonatologica* 19(1990): 297-308 (Engl.).

(7354) DAVID, S., 1989. Vážky (Odonata) Borské nížiny. — [Dragonflies (Odonata) of the Borská Lowlands]. *Prehl. odbor. Výsl. XXIV Tabora Ochrancov Prir.* pp. 115-129. (Slovak). — Tekovské Muz., P.O. Box 69, CZ-934 69 Levice).
24 spp. are listed from 4 localities, western Slovakia, Czechoslovakia. Somatochlora flavomaculata and Sympetrum pedemontanum are of particular interest.

(7355) DAVID, S., 1989. Vážky (Odonata) nádrže Buková, rudavy a rašeliniska u Plaveckého Petra a trnavských rybníkú. — [Dragonflies (Odonata) of the Bukova reservoir, the Rošelinsko moor in the Plavocký Peter area and of the Trnava fishpond]. *Zbor. odbor. Prac VI zapadnoslov. Tabora Ochrancov Prir.* 5: 63-71. (Slovak). — (Tekovské Muz., P.O. Box 69, CZ-934 69 Levice).
22 spp. are listed from these localities, Záhorská Lowlands, western Slovakia, Czechoslovakia. Somatochlora flavomaculata represents the first documented record of this sp. in Slovakia.

(7356) FABER, V. & H. KOMNICK, 1989. Peroxisomes of the midgut epithelium, Malpighian tubules and fat body of larvae of the dragonfly, Aeshna cyanea. *Tissue & Cell* 21(6): 917-923. — (Inst. Cytol., Univ. Bonn, Ulrich-Haberland-Str. 61a, D-5300 Bonn-1, FRG).
The enterocytes of the midgut epithelium of A. cyanea larvae are rich in peroxisomes while the nidal regenerative and endocrine cells contain only a few. Most of the enterocytic peroxisomes are microperoxisomes lacking a crystalloid, but peroxisomes with well developed nucleoid are also present. The peroxisomes are usually concentrated in the basal region of the cells but may also spread into the apical region and closely intermingle with absorptive lipid droplets. They significantly increase in number, when the larvae are regularly fed lipid-rich natural food or long-chain monounsaturated fatty acids that are unusual dietary components of these animals. This observation seems to indicate that the enterocytic peroxisomes are involved in chain shortening and degradation of fatty acids absorbed from the gut lumen. Numerous microperoxisomes are also present in the lipid-storing cells of the Malpighian tubules and fat body.

(7357) FRANKOVIĆ, M., 1989. Vretenca. I. Prošlost i sadašnjost. — [Dragonflies. I. Past and present]. *Priroda, Zagreb* 77(9): 18-19. Croatian). — (Dept Anim. Physiol., Univ. Zagreb, P.O. Box 933, YU-41001 Zagreb, Croatia).
General introduction in a series of papers on dragonflies, directed at the general readership. — For continuation cf. *OA* 7358, 7399.

(7358) FRANKOVIĆ, M., 1989. Vretenca. II. Izvanska grada tela. — [Dragonflies. II.

External morphology]. *Priroda, Zagreb* 77(10): 12-14. (Croatian). — (Dept Anim. Physiol., Univ. Zagreb, P.O. Box 933, YU-41001 Zagreb, Croatia).
Continuation of the series commenced with the paper listed in *OA* 7357. — For continuation cf. *OA* 7399.

(7359) FÜLLEMANN, F., 1989. *Bestandsaufnahmen der Libellen im Spitzmäder 1989.* Stencil, privately circulated by the author. II+19 pp. — (Güetlistr. 17, CH-9403 Goldach).
Contains information on 17 spp., recorded during Feb.-Aug., 1989, in the Spitzmäder Nature Reserve (Oberriet, canton St. Gallen), Switzerland. Of local interest are Coenagrion hastulatum and Sympetrum depressiusculum. — Cf. also *OA* 7418.

(7360) GOODMAN, J.D., 1989. Langeronia brenesi n. sp. (Trematoda: Lecithodendriidae) in the Mountain Yellow-legged Frog Rana muscosa from southern California. *Trans. Am. microsc. Soc.* 108(4): 387-393. — (93 Coulter Pine Dr., Mt Home, Mentone, CA 92359, USA).
An isolated population of the amnicolid snail Fontelicella californiensis, from the mouth of Mill Creek Canyon, E of Redlands, California, was found to be host to tiny virgulate xiphidiocercariae of L. brenensi sp. n. In the same pool were plecopteran and zygopteran larvae; almost 100% of the latter (Ischnura sp.) contained metacercarial cysts in the abdomen. Snails releasing xiphidiocercariae were placed in small dishes in pond water with zygopterean larvae from the same locality. In a few hours these contained dozens of newly encysted metacercariae in the abdominal cavity and along the digestive tract. The xiphidiocercariae were observed entering and being expelled from the anal orifice. Uninfected Ischnura and Enallagma larvae collected elsewhere were easily infected experimentally. Rana muscosa and R. boylei are the final hosts.

(7361) HOGRAEFE, T., O. NIEHUS & M. UTH, [Eds], 1989. *Regionale Rote Liste Lübeck: Tagfalter, Libellen, Heuschrecken.* Umweltamt Lübeck. 56 pp. ISBN none. — (Orders to: Untere Landschaftspflegebehörde, Lingenberg 7, D-2400 Lübeck, FRG).
The 50 Lübeck odon. spp. (pp. 24-33) are all considered threatened to some degree. The status classification adopted is basically that used in the work listed in *OA* 2130.

(7362) INOUE, S., 1989. Dragonfly folklore in haiku. Rev. Res. Inquiries kinran Tankidaigaku 20: 157-187. — (5-9 Fuminosato 4-chome, Abeno-ku, Osaka, 545, JA).
The paper contains a large anthology of dragonfly haiku by ca 30 Japanese and ca 20 western authors (in original languages, accompanied by Engl. translation) and presents a comprehensive discussion on the Japanese and western "dragonfly folklore".

(7363) KASPRZAK, K., 1989. Uwagi o inwentaryzacji zbiorów zoologicznych Muzeum Wiedzy o Środowisku przy Zakladzie Biologii Rolnej i Leśnej PAN w Poznaniu. — Remarks on the inventory of zoological collection in the Museum of Environment (Agricultural and Forest Biology Department, Polish Academy of Sciences). *Przegl. zool.* 33(2): 315-331. (Pol., with Engl. s.). — (Osiedle Zwycięstwa 8, m. 109, PO-61-645 Poznań).
Contains passing references to the Odon., but a list of taxa is not given.

(7364) LUBINI-FERLIN, V., 1989. Hydrobiologisches Bachinventar der Stadt Zürich. *Vtljschr. naturf. Ges. Zürich* 134(4): 239-250. (With Engl. s.). — (Eichhalde 14, CH-8053 Zürich).
5 odon. spp. are listed from the Katzenbach, and Cordulegaster bidentatus from 3 other localities, of which records of larvae from the Wisbach and the Läufebach are new. All canton Zürich, Switzerland. — (*Abstracter's Note:* The current trend to replace the biological term "fauna" by the rather non-biological expression "inventory" seems a matter of computer-age fashion, and does not contribute anything towards a better understanding of the composition of local biotic communities. The *Abstracter* is inclined to suggest the use of latter strictly for the "inventories" of museum collections of specimens, while living organisms in the field remain

elements of the local "fauna").

(7365) ONO, T., M.T. SIVA-JOTHY & A. KATO, 1989. Removal and subsequent ingestion of rivals' semen during copulation in a tree cricket. *Physiol. Ent.* 14(2): 195-202. — (First Author: Lab. Biol., Kinjo Gakuin Univ., Moriyama, Nagoya, 463, JA).
A novel combination of adaptations resulting from sperm competition is demonstrated for Truljalia hibinonis (Orthopt.: Gryllidae), and the situation is compared with that in the Odon.

(7366) PAPAZIAN, M. & A. NEL, 1989. Découverte d'une aile de libellule fossilisée dans le travertin d'Auriol (Bouches-du-Rhône, France) (Odonata, Aeshnidae). *Bull. Mus. natn. Hist. nat., Paris* (IV)11 (C/3): 141-144. (With Engl. s.). — (First Author: 23, blvd de Roux prolongé, F-13004 Marseille).
The discovery of a subfossil wing of Aeshna isosceles in a 5000 yr old travertine deposit indicates the morphological stability of this sp.

(7367) REISEN, W.K., R.P. MEYER, J. SHIELDS & C. ARBOLANTE, 1989. Population ecology of preimaginal Culex tarsalis (Diptera: Culicidae) in Kern County, California. *J. med. Ent.* 26(1): 10-22. — (Dept Biomed. & Environ. Health Sci., Sch. Public Health, Univ. California, Berkeley, CA 94720, USA).
Based on relative abundance and correlation over time and space, zygopteran larvae were the most important predators at a stable foothill breeding, while coleopteran larvae were so at ephemeral breeding sites.

(7368) SHARMA,S., S. KAUSHIK & M.N. SAXENA, 1989. Odonatan nymphs of Pachmarhi (Anisoptera). *Geobios new Rep.* 8: 10-13. — (Sch. Stud. Zool., Jiwaji Univ., Gwalior-47011, India).
Habitat data (incl. type of water body and substrate, temperature, pH, transparency) are presented for the larvae of 18 spp., collected at 8 stations in the Pachmarhi area, Satpura Hills, Madhya Pradesh, India.

(7369) STRAKA, V., 1989. Vážky (Odonata) Oravy. — Dragon-flies (Odonata) from Orava, central Slovakia. *Stredné Slovensko* 8: 229-236. (Slovak, with Russ., Germ. & Engl. s's). — (Turčianske Muz., Engelsova 4, CZ-036 01 Martin).
Annotated list of 22 spp.

(7370) TAMARELLE, M. & J. GIRARDIE, 1989. Immunohistochemical investigation of locust neuroparsin-like substances in several insects, in some other invertebrates, and vertebrates. *Histochemistry* 91(5): 431-435. — (Lab. Neuroendocrinol., Univ. Bordeaux-I, av. des Facultés, F-33405 Talence).
Anti-neuroparsin serum was immunohistochemically tested on brain and/or neurohemal organ of 40 insect spp. of 13 orders (incl. 6 odon. spp.), and of 8 non-insect invertebrate and 5 vertebrate representatives using the peroxidase-antiperoxidase procedure. In insects, immunostaining of only the A1 type of the protocerebral median neurosecretory cells was revealed in all spp. tested of Odon., Dictyoptera, Isoptera and Orthoptera and in 2 species from the 9 other orders out of 13 orders tested. No immunostaining was detected in vertebrate and non-insect invertebrate spp. except in 2 annelid spp. out of 4 tested. The distribution of neuroparsin-like products in Coelomata appears to be restricted mainly to 4 phylogenetically close insect orders.

(7371) UNRUH, M., 1989. Ischnura pumilio (Charpentier) und Brachytron pratense (Müller) im Zeitzer Gebiet. *Ent. Nachr. Ber.* 33(6): 278. — (Mus. "Schloss Moritzburg", Schlossstr. 6, DDR-4900 Zeitz).
Local records (GDR).

(7372) WISSINGER, S.A., 1989. Predation by larvae of a migratory dragonfly on resident odonate species. *Am. Zool.* 29(4): 87A [abstract only]. — (Dept Biol. & Envir. Sci., Allegheny Coll., Meadville, PA 16335, USA).
[Verbatim]: Populations of Tramea lacerata in the central US often include both resident (emerging from overwintering larvae) and migratory (immigrating latitudinally as adults) individuals. As a result of their phenologic head-start, larvae of migratory T. lacerata

have a size, thus, a predatory advantage over resident odonates. In order to predict which species are most likely to be preyed on by Tramea, laboratory experiments were conducted to (1) quantify size thresholds that limit inter-odonate predation by Tramea, and (2) compare patterns of spatial habitat use to that of resident odonates. The results indicate that Tramea larvae readily attack many of the instars of resident species with which they co-occur. However, many of these species will rarely encounter Tramea in nature because they perch low in the vegetation or on the substrate. Zygopteran larvae should be especially vulnerable to Tramea predation because of their similar use of spatial habitats.

(7373) ZIMMERMANN, W., 1989. Zur Verbreitung und Ökologie der Helmazurjungfer Coenagrion mercuriale (Charpentier) in der DDR. *Ent. Nachr. Ber.* 33(6): 237-243. (With Engl. & Russ.s's). — (Mus. d. Natur, Postfach 217, Parkallee 15, DDR-5800 Gotha, GDR).
The occurrence in the GDR is revieved, and the ecology and conservation status are outlined.

1990

(7374) (Anonymous), 1990. New Kochi museum highlights dragonflies. *Asahi Evening News,* issue of April 2[?], page not stated. — (c/ o H. Ichii & H. Karube, Shimanto Dragonfly Museum = Shimanto Tombo Shizen-kan, 8055-5 Gudo, Nakamura, Kochi Pref., 787, JA).
A newspaper note at the inauguration (Apr. 1, 1990) of the world's first museum to focus exclusively on dragonflies; cf. the address above. The Mus. has 4 sections to let visitors "know, learn, feel and play". In the learning area, a total of 3000 odon. specimens from troughout the world are on display, and the playing section features dragonfly models and dragonfly-shaped toys. The Mus. was established inside the Dragonfly Natural Park along the Shimato R, Kochi pref., where more than 60 spp. have been sighted. Since 1986, a local environmental group is responsible for maintaining the 2.7 ha park, the largest dragonfly refuge in Japan. — For a book cf. *OA* 7424.

(7375) AIDA, M., 1990. Notes on Stylurus nagoyanus Asahina from the Noubi Plains, central Japan. (5). *Gekkan Mushi* 232: 20-25. — Ditto (6). *Gakkan Mushi* 234: 12-18. (Jap., with Engl. title). — (Sakae 1-7-15, Ichinomiya-shi, Aichi, 491, JA).
[Abstracts not available]. For the earlier parts of this series cf. *OA* 6842, 6946, 7264, 7265.

(7376) ALCOCK, J., 1990. Oviposition reources, territoriality and male reproductive tactics in the dragonfly Paltothemis lineatipes (Odonata: Libellulidae). *Behaviour* 113(3/4): 251-263. — (Dept Zool., Arizona St. Univ., Tempe, AZ 85287-1501, USA).
Males of P. lineatipes defend territories that contain potential oviposition sites for their mates. Males take females to an egg-laying spot after capturing them in flight. By covering natural sites and adding patches of fine gravel, one can manipulate the quantity of oviposition resources in male territories and thereby test a prediction from mating system theory: the quantity of resources in resource-based territories should affect male reproductive success. Counter to this prediction, male copulatory success is not affected by the quantity of oviposition material in male territories because females accept mating partners before assessing oviposition sites. Assessment does occur but only after the female has copulated and been released by her mate. Females released at large oviposition patches are more likely to oviposit in their mate's territory than females released at smaller patches of the key resource. However, males given a choice between taking mating partners to large or small experimental patches within their territories show only a moderate preference for the larger patch. Moreover, removal of experimental oviposition patches does not cause males to abandon defense of their territories. These results differ from those secured for another dragonfly with a resource-defense mating system. The differences between the species are related to the timing of female assessment of the oviposition resources and the degree to which females will accept marginal oviposition sites within a male's territory.

(7377) ANHOLT, B.R., 1990. Size-biased dispersal prior to breeding in a damselfly. *Oecologia* 83: 385-387. — (Ecol. Group, Dept Zool., Univ. British Columbia, Vancouver, B.C., V6T 2A9, CA).
Dispersal is notoriously difficult to measure, so its potential population consequences are often unknown. If dispersal is density-dependent, it can act in population regulation. Adult Enallagma boreale raised as larvae under a range of competitive regimes were individually measured and marked. Individuals that survived to reproductive maturity were either recovered at the natal pond or had dispersed to nearby water bodies. Dispersing individuals were heavier at emergence than those returning to the natal pond to breed. Therefore, an increased probability of dispersal does not appear to be a response to poor conditions in this sp. The research was carried out in the UBC Res. Forest, in the Costal Mts, 35 km E of Vancouver.

(7378) ASAHINA, S., 1990. The Odonata of Korean peninsula, a summarized review. Part V. Libellulidae 2. *Gekkan Mushi* 231: 15-19. (Jap. with bibl. & Engl. s. for the whole series). — (Takadanobaba 4-4-24, Shinjuku-ku, Tokyo, 169, JA).
This is the concluding part of the series as listed in *OA* 6845, 6950, 6951 and 7268. It deals with 10 spp. of Sympetrum, Leucorrhinia, Pseudothemis, Rhyothemis, Tramea and Pantala. — So far 92 spp. are known from Korea, incl. Copera tokyoensis, Coenagrion hastulatum and Sympetrum r. risi that are recorded here for the first time, while a Nihonogomphus sp. is not yet clearly understood. A common Sympetrum, believed referable to S. depressiusculum in northern Korea, becomes large and approaches the Japanese S. frequens in southern Korea. While Asiagomphus coreanus and A. melanopsoides seem to be endemic, the fauna of northern highlands is palaearctic, and that of the southern regions is strongly allied to the Japanese fauna.

(7379) BEGUM, A., M.A. BASHAR & M.U. AHMED, 1990. Biology and larval morphology of Pantala flavescens (Fabricius) (Anisoptera: Libelulidae). *Dhaka Univ. Stud.* (E) 5(1): 41-48. — (Dept Zool., Univ. Dhaka, Dhaka-1000, Bangladesh).
The life history was studied under laboratory conditions. There are 11 instars, and the development takes 72.33 days (30 ± 2° C).

(7380) BEJSAK, V.R., 1990. Methods for relaxing insect specimens. *Quart. Young Ent. Soc.* 7(3): 1-2. — (Invert. Unit, MacLeay Mus., Univ. Sydney, NSW 2006, AU).
The "Steamed water", "Carbon dioxide" and the "Canadian" (i.e. ammonia solution) methods are briefly described.

(7381) BELLE, J., 1990. Progomphus nigellus and Phyllocycla hamata, two new dragonflies from Brazil (Odonata: Gomphidae). *Tijdschr. Ent.* 133(1): 27-30. — (Onder de Beumkes 35, NL-6883 HC Velp).
The 2 new spp. are described from Fazenda Rancho Grande, Rondonia, Brazil; the ♂ holotypes are deposited in USNM, Washington DC. The ♀ are unknown.

(7382) BOUDOT, J.-P., 1990. La variété des biotopes lorrains. *Téléobjectif* 43: 6-7. — (Cent. Pédol. biol., B.P. 5, F-54501 Vandoeuvre-les-Nancy).
Aeshna subarctica, Cordulia alpestris, Epitheca bimaculata and Sympetrum pedemontanum are emphasized as odon. peculiarities of the dept. Lorraine, France. Exact localities are not stated. — For more details on the departemental odon. fauna cf. *OA* 5379, 5397, 7274.

(7383) BRADBROOK, D.A., C.Y. CLEMENT, B. COOK & L. DINAN, 1990. The occurrence of vertebrate-type steroids in insects and a comparison with ecdysteroid levels. *Comp. Biochem. Physiol.* (B) 95(2): 365-374. — (Dept Biol. Sci., Exeter Univ., Perry Rd, Exeter, EX4 4QG, UK).
Partially purified extracts from representatives of 8 insect orders (incl. adult Ischnura elegans) and arachnids were analyzed by radioimmunoassay (RIA) using antisera raised against 5 vertebrate steroids and ecdysone. RIA-positive material was detected in all the extracts with most of the antisera, implying all of these

steroids to be of wide-spread occurrence. The titres of vertebrate-like steroids were over a comparable range to the ecdysteroid titres, indicating that their potential physiological importance should not be ruled out. Further characterization of the RIA-positive material present in some of the extracts was achieved by combining chromatographic techniques with RIA.

(7384) BRUNEAU DE MIRÉ, P., 1990. Bernard Sigwalt (1928-1989). *Bull. Soc. ent. Fr.* 95(3/4): 107-110, portrait incl. — (Lab. Ent., Mus Natn. Hist. Nat., 45 rue de Buffon, F--75005 Paris).
Obituary, with a biographic outline and complete bibliography (1955-1987). The latter contains only 2 odonatol. titles, but the computerised key for identification of African Zygoptera, constructed by the late Dr Sigwalt in the 1980's and demonstrated at the 8th Inst. Symp. Odonatol. (Paris, 1987) received much attention and triggered similar projects in various parts of the world.

(7385) CLAUSEN, W., 1990. Weitere Libellenbeobachtungen aus dem nördlichen Ostwestfalen. *Natur & Heimat, Münster* 50(2): 49-53. — (Oppenwehe 459, D-4995 Stemwede-3, FRG).
Supplement to the paper listed in *OA* 5916, covering the author's 1986-1989 observations.

(7386) COPPA, G., 1990. Cordulegaster bidentatus Selys (Odonata Anisoptera: Cordulegastridae) dans les départements de la Haute-Marne et de la Côte-d'Or. *Bull. Soc. Sci. nat. Archéol. Haute-Marne* 23(9): 217-224. (With Engl. s.). — (Les Vieilles Censes, Elan, F-08160 Flize).
Ecological propensities of the sp. are reviewed and the habitats in the 2 departments (France), where it is known from more than 50 localities, are described (mean alt. 350 m, mean pH 8.4). The emergence takes place between May 16 and June 10, the adult season lasts until mid August.

(7387) COPPA, G., 1990. *Eléments cartographiques et écologiques sur les odonates (imagos) de Champagne-Ardenne.* Publs scient. Pavillon Saint-Charles, Troyes, IV+106 pp., app. incl. (With Engl. s.). — Available from the Author. Price: fFr 120.- postage incl. — (Les Vieilles Censes, Elan, F-08160 Flize).
A good monograph on the odon. fauna of the Champagne-Ardenne, France (62 spp.), based on computer-processed data gathered 1985--1989, and relative to about 10.000 observations from 580 localities visited, and supplemented by literature records. For each sp. the distribution, ecology, phenology and regional status are stated, and distribution maps and phenology graphs are provided. Of particular interest are graphs showing the abundance of each sp. at 22 ecologically different habitats.

(7388) COPPA, G., 1990. Premier inventaire des odonates de la Haute-Marne. *Bull. Soc.. Sci. nat. Archéol. Haute-Marne* 23(9): 225-230. — (Les Vieilles Censes, Elan, F-08160 Flize).
The Haute-Marne, France, is divided into 6 biogeographic regions, a region-wise checklist of the 53 spp. so far recorded from the department is presented, and the fauna of various habitat types is briefly discussed. 8 spp. are considered of particular regional interest.

(7389) CORDERO, A., 1990. The adaptive significance of the prolonged copulations of the damselfly, Ischnura graellsii (Odonata: Coenagrionidae). *Anim. Behav.* 40(1): 43-48. — (Area Ecol., Fac. Biol., Univ. Santiago de Compostela, ES-15071 Santiago, Galicia).
Copulation lasted 1-5 h, and took place in the afternoon and evening at the study site in NW Spain. Copula duration was measured in the laboratory under controlled temperature, humidity, photoperiod and density. At high density (15-20 males/insectary), copulations that started early in the day were always long, while at low density (two males/insectary) they could be short or long. At both densities, copulations with previously mated females were longer than with unmated females. The duration of stage II of copulation, when the male transfers sperm to the female, was constant and independent of density and time of day. A study of egg production in females mated only once indicated that copula duration is not correlated with the proportion

of fertile eggs laid, and that females start running out of sperm after about 15 days. These results indicate that prolonged copulations of I. graellsii have a guarding function, but the existence of more sperm displacement in long copulations cannot be rejected. Guarding takes place during stage I of copulation, before the males invest sperm in the female, which is unusual. The relation between copula duration and postcopulatory behaviour in Ischnura species so far studied is discussed.

(7390) CORDERO, A., 1990. The inheritance of female polymorphism in the damselfly Ischnura graellsii (Rambur) (Odonata: Coenagrionidae). *Heredity* 64(3): 341-346. — (Area Ecol., Fac. Biol., Univ. Santiago de Compostela, ES-15071 Santiago, Galicia).
I graellsii has 3 female coloration patterns: the male-like coloured or androchromatypic (A) females, and 2 gynochromatypic females: infuscans (olive-green to brown females, I), and aurantiaca (orange to brown females, O). The inheritance of this polymorphism was studied by rearing the offspring of 33 laboratory crosses. 14 F_1, 8 F_2 and 11 F_3 crosses produced more than 2400 adults in laboratory conditions. Results of these crosses indicate: (1) the progeny of one female can consist of one, two or all phenotypes; (2) when two phenotypes occur the ratio is 1:1 or 3:1; and (3) when all phenotypes occur the ratio is 2:1:1 for A:I:O females. The simplest hypothesis to explain these results is that 3 alleles of one autosomal locus control this polymorphism. The androchromatypic allele (p^a) is dominant over both gynochromatypic alleles, and infuscans (p^i) over aurantiaca (p^o) (Dominance: $p^a > p^i > p^o$). Males possess all 6 possible genotypes but only one phenotype (p^a). All matings were compatible with the hypothesis, and the presence of all genotypes was proved with the matings obtained. Hypotheses about the maintenance of female polymorphism in Ischnura damselflies so far studied are revised.

(7391) d'AGUILAR, J., 1990. Introduction. *Martinia* (Hors-série) 2: i-xi. — (Author's address not stated).
Contains a briet biography and evaluation of work of R.A.-F. de Réaumur (1683-1757), placing it into the perspective of the entomological achievements of his time. Cf. *OA* 7394.

(7392) d[e] C[UVELAND], J., 1990. Akrobaten in der Liebe. *Hamburger Abendblatt* 45(151): 18. — (c/ o Naturh. Mus. Lübeck, Mühlendamm 1-3, Lübeck, FRG).
Incidental note, announcing the opening (June 26, 1990) of a dragonfly photographs exhibit (by J. de Cuveland and A. Schliephalke) in the Lübeck Nat. Hist. Mus.

(7393) DE MARMELS, J., 1990. Nota sobre dos "formas" en Acanthagrion fluviatile (De Marmels, 1984) y una descripción de la náyade (Odonata: Coenagrionidae). *Boln Ent. venezol.* (N.S.) 5(15): 116-122. (Span., with Engl. s.). — (Depto & Inst. Zool. Agric., Fac: Agron., Univ. Central Venezuela, Aptdo 4579, Maracay 2101-A, Venezuela).
There are 2 "forms" in A. fluviatile. The typical one ("f. typica"), which has no trace of black stripes on head or thorax, appears to live exclusively in forested habitats. The other "form" ("f. atrodorsum") is slightly smaller and has a definite pattern of black stripes on head and thorax (here described and figured), and is exclusive of the open plains where it can be observed, in the rainy season, over the flooded savannah. Curiously enough, the same 2 "forms" with identical habitat preferences are known to occur in Leptobasis vacillans. The relations between the 2 "forms" within each sp. are unknown and the factors which produce them are open to speculation. The larva of A. fluviatile ("f. atrodorsum") fits morphologically neatly within the genus.

(7394) DE RÉAUMUR, R.-A.F., 1990. Des mouches à quatre aisles nommées demoiselles. Avec une introduction de J.d'Aguilar. *Martinia* (Hors-série) 2, pp. i-xi, followed by facsimile, with its original pagination. — Orders to: J.-L. Dommanget, 7 rue Lamartine, F-78390 Bois-d'Arcy. — Price: fFr. 100.-).
Facsimile reprint of Mémoire 11, from de Réaumur's *"Mémoires pour servir à l'histoire des insectes"*, Vol. 6, pp. xxxviii-xli 387-456,

pls 35-41 (Imprimerie royale, Paris, 1742).

(7395) DONNELLY, T.W., 1990. The Fijian genus Nesobasis, part 1: species of Viti Levu, Ovalau, and Kadavu (Odonata: Coenagrionidae). *N.Z. Jl Zool.* 17: 87-117. — (2091 Partridge Lane, Binghamton, NY 13906, USA).
Damselflies of the genus Nesobasis (herein restricted) are the dominant Zygoptera on the Fijian Islands. In the southern islands that are the focus of this report the genus (divided into 3 groups) includes 20 spp., of which 10 are newly described here. The erythrops group consists of erythrops Selys, telegastrum Selys, selysi Tillyard, angulicollis Tillyard (syn. subhumeralis Tillyard), leveri Kimmins, and the new spp. rufostigma, flavifrons, ingens, recava, flavostigma, and pedata. The longistyla group contains longistyla Selys, campioni Tillyard, and the new spp. caerulecaudata, monticola, and caerulescens. The comosa group contains comosa Tillyard, heteroneura Tillyard, aurantiaca Tillyard, and the new sp. malcolmi. The genus is remarkable for the morphological and colour variations of several spp.

(7396) DUDGEON, D., 1990. Benthic community structure and the effect of rotenone piscicide on invertebrate drift and standing stocks in two Papua New Guinea streams. *Arch. Hydrobiol.* 119(1): 35-53. — (Dept Zool., Hui Oi Chow Sci. Bldg, Univ. Hong Kong, Hong Kong).
Odon. appeared among the 10 top-ranked taxa in 1 of the 2 creeks studied, but no reference is made to the specific effects of rotenone application on dragonflies, of which 3 fam. were discerned, but no spp. names are listed.

(7397) DUNN, R., 1990. Annual dragonfly (Odonata) report 1989. *Quart. J. Derbyshire ent. Soc.* 99: 6-7. — (4 Peakland View, Darley Dale, Matlock, Derby, DE4 2GF, UK).
Annotations on the 1989 records of 12 Derbyshire, UK, spp.

(7398) FORBES, M.R.L. & R.L. BAKER, 1990. Susceptibility to parasitism: experiments with the damselfly Enallagma ebrium (Odonata: Coenagrionidae) and larval water mites, Arrenurus spp. (Acari: Arrenuridae). *Oikos* 58(1): 61-66. — (Dept Zool., Erindale Coll., Univ. Toronto. Mississauga, Ont., L5L 1C6, CA).
It was found that larval Zygoptera actively defend against colonization by larval water mites and that the odon. developmental stage is related to the likelihood of being colonized. Because larval mites have a phoretic stage on Zygoptera, it is also possible to measure mass and condition of host before onset of natural parasitism. Although mass and condition of ♂ damselflies at emergence were unrelated to mite numbers, the smaller and lighter ♀ carried more mites into adulthood. The differences in mass between ♀ hosts may be both an immediate cause and an eventual consequence of different levels of parasitism. The results are likely applicable to other parasite-host associations and may help to explain the ubiquity of non-random distributions of parasites on their hosts.

(7399) FRANKOVIĆ, M., 1990. Vretenca. III, A. Srodstveni odnosi. — [Dragonflies. III, A. Phylogenetic relationships]. *Priroda, Zagreb* 79(8): 32-33. (Croatian). — (Dept Animal Physiol., Univ. Zagreb, P.O. Box 933, YU-41001 Zagreb, Croatia).
Continuation of the series listed in *OA* 7357, 7358. In the present paper the Yugoslav genera (incl. such as Epallage, Oxygastra, Trithemis) are listed and a brief (adult) key to the families is given.

(7400) GARRISON, R.W., 1990. A synopsis of the genus Hetaerina with descriptions of four new species (Odonata: Calopterygidae). *Trans. Am. ent. Soc.* 116(1): 175-259. — (1030 Fondale St., Azusa, CA 91702-0821, USA).
The synopsis includes descriptions of 4 new spp. (H. curvicauda, H. erythrokalamus, H. flavipennis, and H. indeprensa), keys to all males and most females, an annotated alphabetical account of all 37 presently recognized spp., and illustrations of taxonomic characters for all spp. The following nomenclatural changes are proposed: Hetaerina borchgravii and H. fuscibasis are transferred to Mnesarete;

H. carnifex is considered a junior synonym of H. longipes; H. donna a junior synonym of H. rosea; H. klugi and H. papavarina junior synonyms of H. laesa; H. macropus a junior synonym of H. occisa; H. sanguinolenta a junior synonym of H. hebe; H. tolteca a junior synonym of H. capitalis. The specific status of H. maxima and H. smaragdalis is questioned and they are provisionally considered the same as H. capitalis. The intersternite, a newly discovered morphological character in females, is found to vary specifically, allowing identification of most females.

(7401) *GOMPHUS.* Mededelingsblad van belgische libellenonderzoekers — Bulletin de liaison des odonatologues belges, Vol. 6, No. 2 (July 1990). (Dutch & Fr.). — (c/ o A. Anselin & P. Goffart, Inst. Roy. Sci. Nat. Belg., 29 rue Vautier, B-1040 Bruxelles).
In the style and coverage directed entirely at young people, the present issue in addition to the Editorial (*A. Anselin & P. Goffart*, pp. 2-3), contains a countrywise review of the national faunistic data retrieval addresses for the W. European countries. (*A. Anselin*, pp. 4-11) and an account on the fauna encountered at the Virelles field trip of June 16, 1990 (*P. Goffart*, pp. 12-15).

(7402) HARITONOV, A.Yu. & S.N. BORISOV, 1990. Evraziatskie vidy strekoz roda Ophiogomphus (Odonata, Gomphidae). — [The Eurasian species of the dragonfly genus Ophiogomphus (Odonata, Gomphidae)]. *In:* G.S. Zolotarenko et al., [Eds], Novye i maloizvestnye vidy fauny Sibiri, Vol. 21, pp. 43-51, Nauka, Novosibirsk. (Russ.). — (First Author: Inst. Biol., Siberian Section, USSR Acad. Sci., Ul. Frunse 11, USSR-630091 Novosibirsk).
The adult and larval stage of O. cecilia (= serpentinus), O. obscurus and O. reductus are described and figured. The larvae of the latter 2 spp. were hitherto unknown. O. caudoforcipus and O. spinicornis are not considered.

(7403) HATAKEYAMA, S., H. SHIRAISHI & N. KOBAYASHI, 1990. Effects of aerial spraying of insecticides on nontarget macrobenthos in a mountain stream. *Ecotoxicol. environ. Safety* 19: 254-270. — (First Author: Environ. Biol. Div., Natn. Inst. Environ. Stud., 16-2 Onogawa, Tsukuba, 305, Ibaraki, JA).
The effects of aerial spraying of fenitrothion were investigated at the Miano R., Tsukuba, Japan, using a drift net. The odon. (Davidius nanus, Planaeschna milnei) were insignificantly affected. A detailed analysis is presented and over 40 taxa of 6 insect orders are considered.

(7404) KOENIG, W.D., 1990. Territory size and duration in the White-tailed Skimmer Plathemis lydia (Odonata: Libellulidae). *J. Anim. Ecol.* 59(1): 317-333. — (Hastings Reservation, Star Rte Box 80, Carmel Valley, CA 93924, USA).
Adult male P. lydia defend mating territories along the edge of ponds and slow-moving streams. Territorial defence is energetically expensive. A male is territorial for an average (± S.D.) of 2.4 ± 1.4 h a day, and males times-share, or temporally partition, ownership of territories. — The Author investigated the factors determining territory size and holding time (herein called "territory duration") using focal watches of marked males and continuous observations of mating behaviour on a small stock pond near Hasting. Reservation in central coastal California. — Males varied significantly in how long each defended territories and the size of the area they defended. Territory size has significant fitness consequences: males that defended larger territories mated more times per hour spent at the pond, possibly lived longer, and may have achieved greater lifetime mating success. — A model predicting the relationship between territory size, energy budgets and mating success in species that defend time-shared mating territories is presented. The assumptions and predictions of the model are tested and generally upheld by the data on P. lydia. — Controlling for variation, both territory quality, as measured by attractiveness to ovipositing females, and conspecific density independently influenced territory size and duration. — Territory size and duration in P.

lydia result from a balance between the energy costs of defence and the reproductive benefits of increased access to females.

(7405) KUKALOVA-PECK, J. & C. BRAUCKMANN, 1990. Wing folding in pterygote insects, and the oldest Diaphanopterodea from the early Late Carboniferous of West Germany. *Can. J. Zool.* 68(6): 1104-1111. (With Fr. s.). — (First Author: Dept Earth Sci., Carleton Univ., Ont., K1S 5B6, CA).
All Palaeoptera share the presence of a derived, fused medial stem M by apomorphy. In orders with secondarily permanently outstretched wings (Palaeodictyoptera, Megasecoptera, Permothemistida, Protodonata, Odon. and Ephemeroptera), this stem of M is preserved apart from R (primitive). In the Diaphanopterodea, which preserved the ultraprimitive pterygote wing articulation and are able to fold the wing backwards while resting, M became adjacent to R as in other wing-folding insects (Neoptera), namely the plecopteroid and orthopteroid lineages, through convergence. This pattern shows clearly that Palaeoptera and Neoptera are valid taxa and sistergroups.

(7406) *LINDENIA*. Notiziario dell'Ufficio Nazionale Italiano della Società Odonatologica Internazionale, Roma, No. 14 (July 1, 1990). — (c/o Prof. Dr C. Utzeri, Dipto Biol. Anim. & Uomo, Univ. Roma "La Sapienza", Viale dell'Università 32, I-00185 Roma).
All notes by the Editor: "L'XI Simposio internazionale di odonatologica: notizie ufficiali" (p. 59; Trevi nr Perugia, Aug. 18-25, 1991; Symp. Fees: Lit 120.000.-; hotel boarding & lodging (all incl.): Lit 125.000.- per person/day; Symp. Dinner: Lit 35.000.-; Post Symp. Tour Lit 120.000; registration with Prof. C. Utzeri); — "Gli Opuscula zoologica fluminensia" (pp. 59-60); — "Kimminsia, il notiziario dell Ufficio nazionale inglese della S.I.O." (p. 60); — "Straordinaria libellula cinese giunta in volo all'Ufficio italiano" (p. 60; description of a Chinese dragonfly figure); — "Censimento odonatologi italiani, VI" (p. 60); — "Distribuzione regionale odonati italiani: aggriornamento (pp. 60-61); — "Libri di odonatologia presenti nella biblioteca del Dipartimento di Biologia Animale e dell'Uomo, Univesità "La Sapienza", Roma "(pp. 61-62); — "Libri di odonatologia presenti nella biblioteca del Dipartimento di Zoologia, Università di Napoli" (p. 62).

(7407) MARDEN, J.H. & J.K. WAAGE, 1990. Escalated damselfly territorial contests are energetic wars of attrition. *Anim. Behav.* 39: 954-959. — (Second Author: Ecol. & Evol. Biol., Brown Univ., Providence, RI 02912, USA).
13 pairs of neighbouring Calopteryx maculata males were manipulated such that members of each pair became residents in the same territory, thereby removing the normal resident--intruder asymmetry and permitting direct analysis of the physical and energetic factors affecting the outcomes of the prolonged, escalated contests that resulted. Energy reserves (fat remaining at the end of contests) were more often correlated with winning these constests than size or physical attributes related to flight ability. This pattern was also true for 11 natural contests in which persistent intruders displaced residents. Fat content varied with age, being lowest in immature (teneral) and older males, and highest in young males first appearing at the water. Our results indicate that escalated territorial contests in C. maculata favour males with the greatest energy reserves. High fat content in some males, especially young ones, may allow them to overcome the normal resident-intruder asymmetry and displace established territory residents. Since males rarely feed while at their territories and since territories are important for obtaining and protecting mates, energy reserves may be crucial to reproductive success and escalated fights may be especially costly.

(7408) MARTIN, P.A., D.C. LASENBY & R.D. EVANS, 1990. Fate of dietary cadmium at two intake levels in the odonate nymph, Aeshna canadensis. *Bull. environ. Contam. Toxicol.* 44(1): 54-58. — (Dept Environ. Biol., Univ. Guelph, Guelph, Ont., N1G 2W1, CA).
The flux of dietary Cd in the larva was

monitored using the mass balance technique. At low and at high Cd ingestion, the faecal pellets contained more Cd than actually ingested. and at low ingestion no extra Cd was accumulated in the larval body. It is speculated that the increase of Cd in the pellets may be due to the ability of the latter to scavenge metal ions out of the water column, by means of the peritrophic, semipermeable membrane in which the pellets are wrapped, which is egested with the faeces and, therefore, is continuously being replaced.

(7409) *MARTINIA*. Bulletin de liaison des Odonatologues de France, Vol. 6, No. 2 (June, 1990). — (c/o J.-L. Dommanget, 7 rue Lamartine, F-78390 Bois d'Arcy).
Grand, D.: La collection d'odonates d'Eugène Foudras, entomologiste lyonnais (pp. 29-33); — *Orieux, G.:* Observation d'Hemianax ephippiger (Burmeister, 1839) dans le département de la Nièvre (Odonata, Anisoptera: Aeshnidae) (p. 34); — *Papazian, M.:* Brachytron pratense (Müller, 1764): Nouvelle espèce pour la Corse (Odonata, Anisoptera: Aeshnidae) (p. 35); — *Coppa, C.:* Nouveaux départements français pour Epitheca bimaculata (Charpentier, 1825) (Odonata, Anisoptera: Corduliidae) (pp. 37-39); — *Dommanget, J.-L.:* Additif à l'Etude faunistique et bibliographique des Odonates de France (pp. 41-46); Rubrique bibliographique (pp. 46-48).

(7410) *MARTINIA*. Bulletin de liaison des Odonatologues de France, Vol. 6, Suppl. 1 (June, 1990). — (c/o J.-L. Dommanget, 7 rue Lamartine, F-78390 Bois d'Arcy).
Directory of individual and institutional subscribers (20 pp.).

(7411) MOORE, A.J., 1990. The evolution of sexual dimorphism by sexual selection: the separate effects of intrasexual selection and intersexual selection. *Evolution* 44(2): 315-331. — (Dept Anat. of Neurobiol., Washington Univ. Sch. Med., Box 8108, 660 S. Euclid Ave., St. Louis, MO 63110, USA).
Libellula luctuosa is apparently sexually dimorphic. Previous studies of the mating behaviour of this sp. suggest that both male-male competition and female mate choice are important influences. Males compete for territories, where they attract females and where mating occurs. Female behavior influences both the copulation success and the fertilization success of males. Because of temporal and spatial separation of these episodes of sexual selection, multivariate and nonparametric statistical techniques could be used to investigate the influence of components of sexual selection on various sexually dimorphic traits. Sexual dimorphism in L. luctuosa was first quantified; then the direct effects and the form of selection were estimated. Sexually dimorphic wing size, body size, wing coloration, and body coloration are distributed either continuously or discontinuously between the sexes in L. luctuosa. These traits have apparently diverged between the sexes as a result of directional sexual selection. Body size is further influenced by stabilizing selection. Intrasexual selection (success in gaining access to a territory) and intersexual selection (success in copulation and fertilization) can influence the same or different sexually dimorphic characters. Body size is influenced by directional selection during the intrasexual phase of sexual selection and is also influenced by stabilizing selection during intersexual selection. The size of the brown wing patch is influenced by directional selection, primarily during the intersexual phase of sexual selection. There is directional selection on the white wing patch during both phases. Thus, the different proximate mechanisms of sexual selection may jointly or separately affect the evolution of sexually dimorphic characters. Further empirical and theoretical investigations into the differences in the effects of intrasexual selection and intrasexual selection are needed to clarify the circumstances leading to separate consequences of these two mechanisms of sexual selection.

(7412) MULHAUSER, B., 1990. Les odonates de la "Grande Cariçaie" (rive sud-est du lac de Neuchâtel). *Bull. romand Ent.* 8: 1-54. — (Groupe d'Etude et de Gestion, Grande Cariçaie, Champ-Pittet, CH-1400 Cheseaux-

-Noréaz).
A "monograph" on the odon. fauna (45 spp.) of the Neuchâtel Lake, Switzerland. Annotations on ecology and conservation are presented for each sp.

(7413) MÜLLER, O., 1990. Mitteleuropäische Anisopterenlarven (Exuvien) — einige Probleme ihrer Determination (Odonata, Anisoptera). *Dt. ent. Z.* (NF) 37(1/3): 145--187. (With Engl. s.). — (Grosse Müllroser Str. 8, DDR-1200 Frankfurt/Oder, GDR).
Some problems in identification of central European anisopt. larvae are discussed, and an excellently illustrated key is provided for 41 spp. of the GDR fauna.

(7414) NARAOKA, H., 1990. Ecological observations on the damselfly Agrion lanceolatum Selys (Coenagrionidae, Odonata). (1). Larval growth. *Gekkan Mushi* 233: 28-29. (Jap., with Engl. title). — (Fukunoda, Itayanagi-machi, Kitatsugaru-gun, Aomori, 038-36, JA).
[Abstract not available].

(7415) REISS, T., 1990. Libellen des Kantons Baselland, Schweiz (Odonata). *Opusc. zool. flumin.* 56: 1-5. (With Engl. s.). — (Schillerstr. 23, CH-4053 Basel).
A checklist of 46 spp. is given along with annotations on their status in Switzerland and in the canton; 21 of these are almost certainly autochthonous, the status of the others is unclear. Lestes dryas and Leucorrhinia rubicunda are of particular regional interest.

(7416) RETTIG, K., 1990. Neues aus der Insektenwelt Ostfrieslands (Libellen, Grossschmetterlinge). *Beitr. Vogel- Insektenwelt Ostfrieslands* 41: 19-20. — (Danziger Str. 11, D-2970 Emden, FRG).
With reference to the records given in *OA* 6890, an annotated list is given of 15 odon. spp.

(7417) RIBETTE, M., J.-P. BOUDOT, D. ABLITZER, C. POIVRE & G. JACQUEMIN, 1990. Les zones humides de Lorraine. *Téléobjectif* 43: 19-23. — (Second Author: Cent. Pédol. biol., B.P. 5, F-54501 Vandoeuvre-les-Nancy).
Some characteristic odon. spp. are listed for various types of wetlands in the dep. Lorraine, France. In the brackish water habitats of the Seille valley, Coenagrion mercuriale and Ischnura elegans occur. — Only French vernacular names are stated. Some of these differ from the standard nomenclature introduced in the works listed in *OA* 5041 and 6134, therefore the relative taxa cannot be readily identified.

(7418) SCHLEGEL, J., 1990. Naturschutzgebiet Spitzmäder: ein wertvoller Lebensraum für Libellen. *Stgaller TagBl.* (Rheintal-Werdenberg), issue of Aug. 16, Bund II, p. 2. — (Author's address not stated).
A rather comprehensive daily's article on the management of the odon. fauna (24 spp.) in the Spitzmäder Nature Reserve (Oberriet, canton St Gallen), Switzerland. The spp. are not listed; for the list of 17 of these cf. *OA* 7359.

(7419) SCHLÜTER, T., 1990. Fossil insect localities in Gondwanaland. *Entomol. gener.* 15(1): 61--76. (With Germ. s.). — (Paläont. Inst., Freie Univ. Berlin, Schwendenerstr. 8, D-1000 Berlin-33, Westberlin).
The Odon. ate considered throughout and a comprehensive bibliography is appended.

(7420) SCHNEIDER-JACOBY, M. & M. FRANKOVIĆ, 1990. Prvi nalaz jedne od najredih i najugroženijih vrsta evropskih vretenaca u Jugoslaviji Leucorrhinia caudalis (Charpentier, 1840). — [First record of Leucorrhinia caudalis (Charpentier, 1840) in Yugoslavia, one of the rarest and most threatened European dragonfly species]. *Priroda, Zagreb* 79(6): 18-19. (Croatian). — (Second Author: Dept Anim. Physiol., Univ. Zagreb, P.O. Box 933, YU-41001 Zagreb, Croatia).
L. caudalis is recorded from the Lonjsko Polje area, Posavina, Croatia. Some habitat conservation measures are suggested.

(7421) SEBASTIAN, A., M.M. SEIN, M.M. THU & P.S. CORBET, 1990. Suppression of Aedes aegypti (Diptera: Culicidae) using augmentative release of dragonfly larvae (Odonata: Libellulidae) with community participation in

Yangon, Myanmar. *Bull. ent. Res.* 80(2): 223--232. — (Last Author: Dept Zool., Univ. Edinburgh, West Mains Rd, Edinburgh, EH9 3JT, Scotland, UK).
A pilot field study, involving periodic augmentative release of predatory larvae of Crocothemis servilia, to suppress the mosquito, was conducted during the rainy season in "Yangon" (=Rangoon, Burma). More than 90% of pre--adult A. aegypti occurred in domestic water--storage containers. Evaluations of larval and adult numbers of A. aegypti were made half--monthly 3 times before, and 7 times after treatment began. 4 laboratory-reared, 3-week--old C. servilia larvae were placed in each major source of A. aegypti larvae immediately after the third evaluation and then monthly for 3 successive months. Such treatment reduced the larval population of A. aegypti to a very low level in 2-3 weeks and suppressed it progressively until the trial ended; the adult population was greatly reduced after about 6 weeks and was progressively diminished thereafter until the trial ended. The trial's success was ascribed to: the virtual confinement of pre-adult stages of the target mosquito to containers accessible to control operators; the behaviour, growth rate, survival and ready availability of the chosen species of dragonfly; and the awareness and enthusiastic participation of local householders. — (With reference to the title, the *Abstracter* cannot think of a valid reason why the well-established Engl. names of Third--World countries and places should be replaced, in an Engl. text, by newly created, often changing national language nomenclature. Like Finland and Germany, The Hague and Vienna stand for the national language names of resp. "Suomi", "Deutschland", "'s-Gravenhage" and "Wien", there is absolutely no reason to replace in an Engl. text the universally known names of Rangoon and Burma by the non-Engl. expressions "Yangon" and "Myanmar".

(7422) SEMLITSCH, R.D., 1990. Effects of body size, sibship, and tail injury on the susceptibility of tadpoles to dragonfly predation. *Can. J. Zool.* 68(5): 1027-1030. (With Fr. s.). — (Inst. Zool., Univ. Zürich, Winterthurerstr. 190, CH-8057 Zürich).
The effect of tadpole body size, sibship, and tail injury on the survival of treefrog tadpoles (Hyla chrysoscelis) in the presence of dragonfly larvae (Tramea lacerata) was examined in a three-way factorial experiment. Tadpole body size had a dramatic effect on survival; large tadpoles had higher survival than medium--sized or small tadpoles. The presence of tail injury simulating an unsuccessful predation attempt significantly reduced survival. Survival of control tadpoles without tail injury in the presence of a predator was almost twice as high as that of tadpoles with 75% tail loss. Tadpole sibship had no effect on survival and indicated that genetic differences in anti-predator behavior or production of alarm substances and allelochemicals, independent of body size, were not apparent. There were no significant interactions between tail injury and body size or tail injury and sibship. These results indicate that increasing body size is an effective mechanism for reducing predation and that injury from an unsuccessful predation attempt reduces subsequent survival by increasing the risk of future predation.

(7423) SOKOLOV, V.E. & E.E. SYROECHKOVSKIY, [Eds.], 1990, *Zapovedniki SSSR: Zapovedniki Kavkaza. — Reserves of the USSR: The Caucasian region.* 368 pp. (hard cover). Mysl', Moscow. ISBN 5-244-00432-8. (Russ., with Engl., Fr., Germ. & Span. s's).
The lay-out and organisation of the book are identitic to that listed in *OA* 7043 [please correct there the spelling of the Eds' names and add Span. s.]. For several reserves some odon. spp. are listed, but invariably only the Russian vernacular names are stated, therefore a proper identification of these is a rather time--consuming proposition, viz. Teberdinskiy Reserve (p. 26; general reference to Odon.), North-Osetinskiy R. (p. 62; general reference to Odon.), Kavkazskiy R. (p. 85; Cordulegaster mzymtae and 2 other spp.), Kintrishskiy R. (p. 152; 3 spp.), Lagodehskiy R. (p. 219, 221; 2 spp.), Hosrovskiy R. (p. 334; 17 spp.).

(7424) SUGIMURA, M. & H. ICHII, 1990. *Tombo--ôkoku y yôkoso. — [Welcome to the dragonfly*

paradise]. X+212 pp., Iwanami Shoten, Tokyo. — ISBN 4-00-500178-5. (Jap.). — (First Author: 9-7 Uyama-satsuki-cho, Nakamura, Kochi Pref., 787, JA; — Second Author: Shimato Tombo Shizen-kan, 8055-5, Gudô, Nakamura, Kochi Pref., 787, JA). — The book is *not* available from the SIO.
The pocketsize booklet is directed at everyone, and it is dealing with the "dragonfly paradise" in the lower reaches of the Shamanto R., Shikoku, the domain of the Shimanto Dragonfly Museum (cf. *OA* 7374). The chapter headings are: "Preface", — "Can you find a dragonfly in your town?", — "Dragonfly paradise along the Shimanto R.", — "Let us build a dragonfly paradise", — "Relationship between dragonflies and human culture" — "Monitoring to the environment quality through dragonflies", — "Each dragonfly species has its own peculiarities", — "Suggestions for dragonfly watching", — "Let us enjoy the dragonflies", — "A dream about dragonfly paradise", — "Main spots for dragonfly watching in Japan". — The book is a kinf of "guide" for the visitors to the Shimanto Dragonfly Mus., and also contains phot. of its view and interior. It should be emphasized that S. Sugimura was the moving spirit behind the Mus.project, H. Ichii and H. Kurabe are on the Mus. staff.

(7425) SUZUKI, K., 1990. Taxonomic treatment of "species" and "subspecies" of Japanese Odonata. *Gekkan Mushi* 233: 20-27. (Jap., with Engl. title). — (Dept Biol., Coll. Liberal Arts, Toyama Univ., 3190 Gofuku, Toyama, 930, JA).
[Abstract not available].

(7426) TRUEMAN, J.W.H., 1990. Comment. Evolution of insect wings: a limb exite plus endite model. *Can. J. Zool.* 68(6): 1333-1335. (With Fr. s). — (Dept Zool., Austral. Natn. Univ., Canberra, ACT 2601, AU).
In the paper listed in *OA* 4320 and in *Can. J. Zool.* 65(1987): 2327-2345, J. Kukalova-Peck has provided evidence that insect wings evolved from primitively moveable exite lobes of leg podomeres proximal to the coxa. Reinterpretation of previous experimental findings suggests that this hypothesis, as currently formulated, is only partly correct. The costal-subcostal field is derived from an epicoxal exite, but the radial-medial and cubital-anal fields of the wing have arisen from epicoxal endite and (or) subcoxal exite and endite lobes. Wings thus have a complex origin: limb exite plus endite.

(7427) UEDA, K., 1990. Specimens collected by P.F. von Siebold and entomology in Japan. 3. *Insectarium, Tokyo* 27(3): 84-93. (Jap., with Engl. title). — (Author's address not stated).
Shows col. phot. of the Mnais pruinosa Sel. lectotype and of the Anotogaster sieboldii holotype (?, not entirely certain), with the corresponding labels, both in RMNH, Leiden.

(7428) VAN TOL, J., 1990. *The first 1200 records of the ODOREFS database.* Rijksmus. Nat. Hist., Leiden. IX+40 pp. — (Natn. Mus. Nat. Hist., P.O. Box 9517, NL-2300 RA Leiden).
Bound in a nice volume, this is not a formal publication, but rather a preliminary document for circulation to odon. taxonomists. It cannot be xeroxed, but copies are available free from the Author. — The work lists 1200 bibliographic references of works in which new names in Odon. were introduced. It is a preliminary outprint of a database of a much larger project on a computerized catalogue of the order. The latter is scheduled for presentation at the XIth Int. Symp. Odonatol., Trevi, Italy, Aug. 1991, and represents but one of the more significant computerized odon. projects, conducted under supervision of the present author by RMNH, Leiden.

(7429) VAN TOL, J., 1990. Key to the Malesian species of Leptogomphus Selys, with the description of a new species from Sabah (Odonata, Gomphidae). *Tijdschr. Ent.* 133(1): 97-105. — (Rijksmus. Nat. Hist., P.O. Box 9517, NL-2300 RA Leiden).
L. pasia sp. n. (holotype ♀: N. Borneo, S. Sabah, Beaufort, alt. 1250 m, 3-VI-1987; deposited in RMNH, Leiden) is described, figured and its affinities are discussed. The description of a congeneric and presumably con-

specific ♂ is included. The 11 spp. known from Malaysia, the adjacent areas of Burma and Thailand, Indonesia and the Philippines are keyed.

(7430) VONWIL, G., 1990. Neue Libellenbeobachtungen an Pionierstandorten des oberen Reusstales. *Jber. Stift. Reusstal* 27: 38-41. — (Oberdorf, CH-6041 Dietwil).
With reference to the papers listed in *OA* 4202, 7141 and 7197, additional spp. are given for the fauna of the wetlands E of Still Rüss, canton Aargau (with special reference to Hemianax ephippiger), and the fauna and the management of the habitat are briefly discussed.

(7431) *WALKERIA.* Newsletter of the Canadian National Office of the International Odonatological Society, Vol. 5, No. 1 (July 1, 1990). — (c/o Dr S. Cannings, Dept Zool., Univ. British Columbia, 6270 University Blvd, Vancouver, B.C., V6T 2A9, CA).
Wu, Y.-r./Kiauta, B.: Symposium on Odonata at the XIX International Congress of Entomology, Beijing (pp. 1-2; to be held at Beijing, China; June 28-July 4, 1992; registrations as soon as possible to Dr Yu-ran Wu, XIX Int. Congr. Ent., 19 Zhonnuancun Lu, Beijing--100080, China; brief abstracts by Sept. 1, 1991 to the SIO Central Office, P.O. Box 256, 3720 AG Bilthoven, The Netherlands); — *Deacon, K.:* Dragonflies and climate change (p. 2); — [*Cannings, S.*]: Canadian odonatology news (p. 2).

(7432) WALTON, W.E., N.S. TIETZE & M.S. MULLA, 1990. Ecology of Culex tarsalis (Diptera: Culicidae): factors influencing larval abundance in mesocosms in southern California. *J. med. Ent.* 27(1): 57-67. — (Dept Ent., Univ. California Riverside, CA 92521, USA).
Contains 2 brief paragraphs on the seasonal larval population development and abundance of 7 odon. spp. in the ponds studied (Oasis, CA, USA).

(7433) WARRANT, E.J. & R.B. PINTER, 1990. Changes of acuity light and dark adaptation in the dragonfly compound eye. *Z. Naturforsch.* (C)45(1/2): 137-141. — (First Author: Centre Visual Sci., R.S.B.S., Austral. Natn. Univ., P.O. Box 475, Canberra, A.C.T. 2601, A).
Intercellular recordings of angular sensitivity from the photoreceptors of Aeshna brevistyla and Hemianax papuensis were used to determine the magnitude and time course of acuity changes following alterations of the state of light or dark adaptation. Acuity is defined on the basis of the acceptance angle. $\Delta\rho$ (the half-width of the angular-sensitivity function). The maximally light-adapted value of $\Delta\rho$ is half the dark-adapted value, indicating greater acuity during light adaptation. Following a change from light to dark adaptation, $\Delta\rho$ increases slowly, requiring at least 3 min to reach its dark-adapted value. In contrast, the reserve change (dark to light) induces a rapid reduction of $\Delta\rho$, and at maximal adapting luminances, this reduction takes place in less than 10 s.

(7434) WASSCHER, M.T., 1990. *Libellen in de provincie Utrecht, met enige aanbevelingen voor natuurbeheer, ecologische infrastructuur en beleid. — [Dragonflies of the province of Utrecht, with some suggestions for management, maintenance of ecological infrastructure and for a general conservation policy].* European Invertebrate Survey (the Netherlands), Leiden. 28 pp. (Dutch). — (Minstraat 15 bis, NL-3582 CA Utrecht).
A checklist is given of 43 spp. ever recorded with certainty from the province (the Netherlands), the occurrence of 36 of which was confirmed after 1950. The regional habitat types are described and the peculiarities of their fauna outlined. For 25 spp. of particular interest, detailed locality data and annotations are presented, based on literature, collection inventories, the EIS and Youth Federation files, and on reports by reliable informants. A complete regional bibliography is appended. — Approx. 30% of the text is concerned with management and conservation; detailed management suggestions are provided for each type of aquatic habitat, and tentative conservation policies relative to the maintenance and possible increase of populations of spp. of particular national interest are suggested.

(7435) WASSCHER, M.T., 1990. Lijst van bedreigde en uitgestorven libellensoorten in Nederland (Odonata). — List of endangered and extinct dragonfly species in the Netherlands (Odonata). *Ent. Ber., Amst.* 50(7): 77-80. (Dutch, with Engl. s.). — (Minstraat 15 bis, NL-3582 CA Utrecht).
Out of 69 spp. recorded from the Netherlands, 9 are not autochthonous. Among the remaining 60 spp., 28 (47%) are considered threatened or extinct, divided into 5 categories, viz. "extinct" (2 spp.), "probably extinct" (4), "strongly endangered" (7), "endangered" (5) and "vulnerable" (5). Aeshna viridis, an endangered sp. throughout Europe (but locally not uncommon in the Netherlands) is of particular importance. Nationally, the mesotrophic waters, brooks and rivers appear the most threatened odon. habitats.

(7436) YADWAD, V.B., V.L. KALLAPUR & S. BASALINGAPPA, 1990. Inhibition of gill Na^+K^+-ATPase activity in dragonfly larva, Pantala flavescens, by endosulfan. *Bull. environ. Contam. Toxicol.* 44(4): 585-589. — (First Author: Dept Biol., Univ. Waterloo, Waterloo, Ont., N2L 3G1, CA).
While odon. might prove practical agents of mosquito control, the increase of the use of endosulfan against insect pests and mosquitoes in India is affecting non-target organisms. — Adenosine triphoshatases (ATPases) are a group of enzymes playing an important role in intracellular functions and are considered sensitive indicators of toxicity. Na^+K^+-ATPase has a role in osmoregulation and affects the transepithelial movements of cations in gills. In the present paper it is shown that endosulfan inhibits rectal Na^+K^+-ATPase activity in larval P. flavescens. This may affect the cellular functions and osmoregulation, contributing thus to the lethal effects of this pesticide on dragonflies.

(7437) YOON, I.B. & D.S. KONG, 1990. Systematic study of the dragonfly (Odonata) larva from Korea [sic!]. (I) Superfamily Aeshnoidae. *Korean J. Ent.* 20(2): 55-81. — (With Korean s.). — (Second Author: Korean Ent. Inst., Dept Biol., Korea Univ., 1 Anam Dong, Sungbuk-ku, Seoul-132, Korea).
Ultimate larval instars are described and figured of 22 Korean spp. of Gomphidae and Aeshnidae. — (*Abstracter's Note:* Figs are adequate, descriptions would need amendments, and the poor Engl., coupled with numerous spelling and printing errors makes reading unpleasant).

(7438) YOON, I.B., T.H. RO & S.H. LEE, 1990. A study of the aquatic insects community in the Kap'yong stream. *Korean J. Ent.* 20(1): 41-51. (Korean, with Engl. s.). — (Dept Biol., Korea Univ., Seoul 136-701, Korea).
Anisogomphus maacki and Onychogomphus ringens are recorded from various sampling stations and on various dates (S. Korea).

ERRATUM

ÅBRO, A., 1990, The impact of parasites in adult populations of Zygoptera. *Odonatologica* 19(3): 223-233.

Due to an editorial error, two graphs were omitted from Figure 3, on p. 227. These are reproduced below.