ODONATOLOGICAL ABSTRACTS

1991

(17312) FORBES, M.R.L., 1991. Ectoparasites and mating success of male Enallagma ebrium damselflies (Odonata: Coenagrionidae). *Oikos* 60(3): 336-342. – (Dept Biol., Carleton Univ., Colonel By Dr., Ottawa, ON, K1S 5B6, CA).
Several researchers have found inverse relationships between mating success of ♂♂ and degree of parasitism. Whether such mating biases result from ♀ choice of parasite-resistant ♂♂ as mates, or from parasite-mediated reductions in ♂ competitiveness for access to ♀♀, has stimulated considerable discussion. Here it was found that single ♂ E. ebrium were significantly and consistently parasitized by more larval water mites (Arrenurus spp. and Limnochares americana) than were ♂♂ caught either in tandem or copula with ♀♀. In contrast, ♂ size was inconsistently related to short-term mating success, although there was a consistent negative correlation between ♂ size and mite numbers which was statistically significant on 2 of 7 sampling days. The existence of such natural covariation and its possible effect on ♂ mating success has not been widely discussed. Lastly, it was found that heavily-parasitized ♂♂ responded less often to the presence of ♂ models, and took significantly more foraging trips, than did lightly-parasitized ♂♂. Short-term mating biases with respect to ectoparasitism for E. ebrium ♂♂ appears to result from reductions in competitiveness of heavily-parasitized ♂♂, for access to ♀♀. Furthermore, the results strongly suggest that apparent reductions in competitiveness reflect decisions by heavily-parasitized ♂♂ to pursue mating tactics which are energetically inexpensive.

(17313) HAYES, L.M., 1991. Behaviour of New Zealand kingfishers feeding chicks. *Notornis* 38: 73-79. – (Author's current address unknown).
The behaviour of kingfishers, Halcyon sancta vagans, was studied at 3 nests in Canterbury, New Zealand. Odon. are listed among food items given to chicks.

(17314) LOSOS, J.B., R.M. ANDREWS, O.J. SEXTON & A.L. SCHULE, 1991. Behavior, ecology, and locomotor performance of the giant anole, Anolis frenatus. *Caribb. J. Sci.* 27(3/4): 173-179. – (First Author, last known address: Cent. Pop. Biol., Univ. California, 2320 Storer Hall, Davis, CA 95616, USA).
An anisopteran is reported in the ♂ diet of this lizard (Barro Colorado, Panama; Nov.-Feb.). Its main food are insects, particularly the Scarabeidae (Coleoptera).

1993

(17315) DE JONGH, M., 1993. *Libellen.* – [*Dragonflies*]. De Ruiter, Gorinchem. 25 pp. Hardcover (21.5 × 22.0 cm). ISBN 90-05-06375-0. (Dutch).
A Dutch translation and adaptation of B. Watt's book described in *OA* 10191.

1994

(17316) GRIEBLER, C., 1994. Beitrag zur Kenntnis der Libellenfauna des Weissensees (Kärnten) (Insecta: Odonata). *Carinthia* (II) 104: 493-498. (With Engl. s.). – (Heidlmayrweg 3, A-4540 Pfarrkirchen).
A list of 21 spp., recorded (1992-1993) at the lake Weissensee (Carinthia, Austria), with annotations on their abundance. Noteworthy are observations

on the emergence and massive occurrence of Sympetrum pedemontanum.

1995

(17317) PAULSON, D.R., 1995. Odonata de la zona reservada de Tambopata, Madre de Dios, Peru. *In*: U. Valdez, O., [Ed.], *Reporte Tambopata: Resúmos de investigaciones en los alrededores del Explorer's Inn*, pp. 46-47. Centro de datos para la conservación (Univ. Nac. Agrar. La Molina), Conservation International & Tambopata Reserve Soc., Lima. ISBN none. – (Bilingual: Span./Engl.). – (1724 NE 98 St., Seattle, WA 98115, USA).
A synopsis of the information presented in the paper listed in *OA* 16435.

1996

(17318) COIMBRA, C.N., M.A.S. GRAÇA & R.M. CORTES, 1996. The effects of a basic effluent on macroinvertebrate community structure in a temporary mediterranean river. *Environ. Pollut.* 94(3): 301-307. – (Second Author: Depto Zool., Univ. Coimbra, PT-3049 Coimbra Codex).
The effects are assessed of an industrial basic effluent on macroinvertebrate community structure of an intermittent river in S Portugal (Alentejo). Seasonal samples were taken during lentic and lotic periods. Anax spp., Crocothemis servilia [sic!], Sympetrum fonscolombei and Trithemis annulata were restricted to the lentic periods, while A. imperator, Gomphus pulchellus and Orthetrum coerulescens also occurred almost exclusively during lentic conditions. No other references are made to Odon. and a species list is not provided.

(17319) JELLYMAN, D.J., 1996. Diet of longfinned eels, Anguilla diefenbachii, in lake Rotoite, Nelson Lakes, New Zealand. *N.Z. Jl Marine Freshw. Res.* 30: 365-369. – (Natn. Inst. Water & Atmosph. Res., P.O. Box 8602, Christchurch, NZ).
The diet of 72 eels was numerically dominated by snails. Procordulia grayi larvae were extensively eaten as they migrated towards the shore for emergence. They were important to all size groups, and were present in 67% of fish stomachs, comprising up to 40% by weight of the diet of eels <700 mm. Procordulia eggs and Xanthocnemis were also found in the stomachs.

(17320) [WATERSTON, A.R.] SHAW, M.R., 1996. *Andrew Robert Waterston*. From the homepage of The Royal Society of Edinburgh (22-26 George St., Edinburgh, EH2 2PQ, Scotland, UK) http://www.royalsoced.org.uk/fellowship/obits/index.htm#W
A comprehensive biography and appreciation of ARW's work, based on a notice published in *The Scotsman* of 9 Aug. 1996. Born on 30-III-1912 and deceased on 12-VII-1996, ARW was one of the last great all-round scholar naturalists in Scotland. The last position he held before his retirement in 1973 was keeper of Natural History in the Royal Scottish Museum. He published in *Odonatologica* (13: 139-146; 1984); for his other odonatol. works, see *OA* 1484, 3095, 3096, 3200, 3235, 3467, 5176 and 9199.

1997

(17321) OLSVIK, H., 1997. "Trekkøstikker" Hemianax ephippiger i Norge, og mulige første-observasjoner av "takrør øyenstikker" Aeshna serrata. *Insekt-Nytt* 22(4): 13-14. (Norw., with Engl. s.). – (N-6598 Foldfjorden).
The sight records are presented for H. ephippiger (1 ♂, nr Moss, 11-VIII-1995) and A. serrata (1 ♂, Isesjøen, Sarpsborg, 11-VIII-1995). The 2 spp. were not previously reported from Norway.

(17322) PÉREZ GONZÁLEZ, A. & A. GARCIA-DEBRÁS, 1997. Registros nuevos de fauna para algunas cuevas cubanas. *Cocuyo* 6: 25-29. – (Grupo BioKarst, Soc. Espeleol. Cuba, Ave. 3ra, No. 3806 e/38 y 40, Miramar, Playa, Habana-11300, Cuba).
Crossreferenced checklists of animal taxa and the caves in Cuba from where they were recorded. The odon. are listed from Cueva Caja de Agua (Sancti Spiritus prov., Banao). Spp. are not stated.

1998

(17323) LAU, P., C. BOSQUE & S.D. STRAHL, 1998. Nest predation in relation to nest placement in the greater ani (Crotophaga major). *Ornitologia neotropical* 9: 87-92. – (Depto Biol. Organismos, Univ. Simon Bolivar, Apartado 89.000, Caracas-1080A, Venezuela).
C. major is a communal breeder, restricted to riparian vegetation along the borders of rivers, lakes, swamps and streams with low, partly inundated banks. At a cattle ranch in the central Llanos of

Venezuela, during 5 h of observation at 2 nests, 40 nestling feeding events were counted. 97.5% of the arthropod prey fed to the nestlings belonged to exclusively terrestrial taxa and 2.5% of prey were odon. Since, apparently, the bird does not depend on aquatic arthropods for nestling food, the close association of ani with flooded and riverine habitats may be a consequence of its preference for safer nesting sites.

(17324) SOTA, T., 1998. Microhabitat size distribution affects local difference in community structure: metazoan communities in treeholes. *Res. Popul. Ecol.* 40(2): 249-255. (Dept Biol., Fac. Sci., Shinshu Univ., Matsumoto, 390-8621, JA).
The effect of treehole (microhabitat) size distribution on geographical difference in the metazoan community structure was studied by comparing the inventories between 2 sites on the Iriomote Isl., and between the Iriomote (subtropical) and Tsushima (temperate) islands, SW Japan. At one of the 2 Iriomote localities (where the amount of litter, biomass and species number were greater), libellulid larvae were present. Species names are not stated.

1999

(17325) GUNATHILAGARAJ, K., R.P. SOUNDARARAJAN, N. CHITRA & M. SWAMIAPPAN, 1999. Odonata in the rice fields of Coimbatore. *Zoos' Print J.* 14(6): 43-44. (Dept Agric. Ent., Tamil Nadu Agric. Univ., Coimbatore, Tamil Nadu-641003, India).
A checklist of 16 spp.; – India.

(17326) KOUAMELAN , P.E., G.G. TEUGELS, G. GOURÈNE, F. OLLEVIER & D.F.E.T. VAN DEN AUDENAERDE, 1999. The effect of man-made lake on the diet of the African electric fish Mormyrus rume Valenciennes, 1846 (Osteaoglossiformes, Mormyridae). *Hydrobiologia* 380: 141-151. – (Second Author: Lab. Ichthyol., Mus. Roy. Afrique Central, B-3080 Tervuren).
Ceriagrion, Phyllogomphus and Phyllomacromia are reported to occur in the Mormyrus rume diet in the Bia river, Ivory Coast.

(17327) ZAGORODNIUK, I., [Ed.], 1999. *Invertebrate animals of Ukraine protected by the Bern Convention.* Natn. Acad. Sci. Ukraine, Kiev. 59 pp. ISBN 966-02-1380-8. (Ukr., with Engl. titles).
The odon. are treated by *V. Ermolenko* on pp. 15-24 (text), 53-54 (distribution maps) and 56-57 (cumulative references). Sympecma paedisca, Aeshna viridis, Gomphus flavipes, Ophiogomphus cecilia, Leucorrhinia albifrons, L. caudalis and L. pectoralis are dealt with.

2000

(17328) PALOT, M.J. & V.P. SONIYA, 2000. Odonata from Courtallam, Tamil Nadu, southern India. *Zoos' Print J.* 15(7): 301-303. – (Freshw. Biol. Stn, Zool. Surv. India, 1-1-300/B, Ashok Nagar, Hyderabad, Andhra Pradesh-500020, India).
Courtallam is a small town situated in the foothills of Western Ghats (alt. ca 120 m). 14 common spp. are brought on record.

(17329) PALOT, M.J. & V.P. SONIYA, 2000. Odonata of Keoladeo National Park, Bharathpur, Rajasthan, India. *Zoos' Print J.* 15(8): 317-320. – (Freshw. Biol. Stn, Zool. Surv. India, 1-1-300/B, Ashok Nagar, Hyderabad, Andhra Pradesh-500020, India).
The Park is situated in the Indo-Gangetic flood plain. The records of 16 spp. are listed, of these 5 spp. were not previously reported from Rajasthan.

(17330) TWISK, W., M.A.W. NOORDERVLIET & M.J. TER KEURS, 2000. Effects of ditch management on caddisfly, dragonfly and amphibian larvae in intensively farmed peat areas. *Aquat. Ecol.* 34: 397-411. – (Inst. Evol. & Ecol. Sci., Sect. Environ. Biol., Univ. Leiden, P.O. Box 9516, NL-2300 RA Leiden).
Conservation of natural values within farming practice is growing rapidly within the Netherlands. The focus is primarily on terrestrial flora and fauna such as the vegetation in ditch banks and meadow birds. Knowledge needed to enhance biodiversity in ditches is limited. Therefore, a field study was set up to determine the effects of dredging, ditch cleaning and nutrient supply in the adjacent fields on trichopteran, odon. and amphibian larvae in the ditches in a peat area. 240 ditches spread over 84 dairy farms in the prov. of Zuid Holland, Noord Holland and Utrecht were selected to determine the individual effect of several management aspects. Generalised linear modelling was used as a tool to detect the most relevant aspects and to obtain quantitative relations with the chance of the larvae being

present. Dredging had an impact on the presence of all larvae types. The type of dredging machine, the dredging period, the water depth and the frequency of dredging can influence the presence of the larvae. The presence of caddisfly larvae was also affected by the cleaning machine and period and by the P supply in the adjacent field. The presence of amphibian larvae was also affected by the cleaning period. Measures that will enhance the presence of the larvae are formulated. Options for water boards and other government authorities to stimulate farmers to take these measures are given.

2001

(17331) ALVAREZ, M., I. PARDO, G. MOYA, G. RAMON & A. MARTINEZ-TABERNER, 2001. Invertebrate communities in temporary streams of the island of Majorca: a comparison of catchments with different land use. *Limnetica* 20(2): 255-266. (With Span. s.). – (First Author: Area Ecol., Univ. de Vigo, ES-36200 Vigo).
The invertebrate communities in 2 catchments are compared. The Sóller catchment is highly urbanised, with areas of intensive agriculture. The Sant Jordi catchment is largely covered by a mature Quercus ilex forest. 5 odon. fam. were recorded in the 2 systems, but no references are made to the order in the main text.

2002

(17332) BOOKER, J.S., 2002 *Enallagma civile (Odonata, Coenagrionidae) life history and production in a West Texas playa*. MSc thesis, Univ. N Texas. iv+46 pp. – (Author's current address unknown).
Playas are ephemeral water bodies, filled by rainfall and surface runoff. Water is lost by evaporation and by some percolation into the ground water. They are formed from precipitation puddles, where carbonic acid is formed from decaying matter, thus dissolving carbonates and causing enlargement of the puddle. Some 19.000 playas occur in the Texas High Plains (Llano Estacado). In this setting, E. civile has a low secondary production estimate of 66.8 mg/m^2, and the Cohort Production Interval of 21 d. In an 8-week period, the average population estimate per m^2 increased in size from 2 to approx. 670 larvae.

(17333) CHITRA, N., K. GUNATHILAGARAJ & R.P. SOUNDARARAJAN, 2002. Habitat selection for oviposition by Pantala flavescens (Fab.) (Libellulidae: Odonata). *Zoos' Print J.* 17(12): 957-958. – (First Author: Agric. Res. Stn, Kennikarai, Ramanathapuram, Tamil Nadu-623501, India).
The oviposition site selection was observed in wetland-simulating conditions and in the wetlands of the Tamil Nadu Agric. Univ. at Coimbatore, India. P. flavescens preferred paddy fields with water surface exposed to the fields with crop cover. The oviposition usually took place between 09:00 and 10:30 h, and occurred in tandem. The times of daily activity at various habitats are stated.

(17334) EMILIYAMMA, K.G. & C. RADHAKRISHNAN, 2002. Additions to the Odonata (Insecta) of Thiruvananthapuram district, Kerala. *Zoos' Print J.* 17(1): 914-917. – (Western Ghats Fld Stn, Zool. Surv. India, Kozhikode, Kerala-673002, India).
27 spp. are brought on record, of these 17 spp. are new for the fauna of the district. A checklist of the fauna of the district (43 spp.) is provided. – For other papers on Kerala, see *OA* 3546 and 7017.

(17335) JANECEK, B., O. MOOG & J. WARINGER, 2002. Odonata. *In*: O. Moog, [Ed.], *Fauna aquatica austriaca* [revised edn] 3: 14 pp. Wasserwirtschaftskataster, Bundesminist. Land- u. Forstwirt., Umwelt u. Wasserwirt., Wien. – (Third Author: Abt. Limnologie, Inst. Ökol. & NatSchutz, Univ. Wien, Althanstr. 14, A-1090 Wien).
A revised edn of the work listed in *OA* 11356. The occurrence of Ceriagrion tenellum, Gomphus simillimus, Onychogomphus uncatus and Cordulegaster picta in Austria could not be confirmed, therefore these spp. are deleted in this edn.

(17336) JENKINS, R.K.B. & S.J. ORMEROD, 2002. Habitat preferences of breeding water rail, Rallus aquaticus. *Bird Study* 49: 2-10. – (Second Author: Sch. Biosci., Cardiff Uiv., P.O. Box 915, Cardiff, CF10 3TL, UK).
A minimum of 43-49 breeding pairs were counted during a survey (1996-1997) at 77 wetland sites across Wales, UK. The bird's abundance was positively and significantly correlated with the abundance of Odon. larvae, but lack of data on actual dietary composition prohibits concluding a causal relationship.

(17337) MOROZ, M.D., S. CHAHOROVSKI, K. LEVANDOVSKI & P. BUCHYNSKI, 2002.

Aquatic insects (Insecta: Collembola, Ephemeroptera, Odonata, Heteroptera, Trichoptera) of the Landscape Reserve 'Zvanec'. *Vesci nac. Akad. Navuk Belarusi* 2002(1): 88-92. (Russ., with Engl. s.). – (First Author: Inst. Zool., Natn. Akad. Sci., Akademicheskaya 27, BY-220072 Minsk).
The reserve is located within the territory of the Byelorusskoye Poles'ye (Belarus). A commented list of 18 odon. spp. is provided.

2003

(17338) CROSS, W.F., J.P. BENSTEAD, A.D. ROSEMOND & J.B. WALLACE, 2003. Consumer-resource stoichiometry in detritus-based streams. *Ecol. Lett.* 2003(6): 721-732. – (First Author: Inst. Ecol., Univ. Georgia, Athens, GA 30602, USA).
Ecological stoichiometry is a conceptual framework that considers the relative balance of key elements in trophic interactions. Within this framework, food items consumed are essentially packages of elements that may or may not be in balance with a consumer's elemental requirements. Here, carbon (C), nitrogen (N) and phosphorus (P) content of invertebrate consumers, and based food resources in 2 adjacent forested headwater streams in North Carolina (one reference, the other nutrient-enriched) is analysed. There were large elemental imbalances between consumers and food resources, particularly in regard to P, which were reduced with enrichment. Odon. (and Plecoptera and Diptera) were generally higher in %P and %N than Ephemeroptera and Trichoptera.

(17339) EMILIYAMMA, K.G. & C. RADHAKRISHNAN, 2003. Odonata (Insecta) of Indira Gandhi Wildlife Sanctuary and National Park, Tamil Nadu. *Zoos' Print J.* 18(11): 1264-1266. – (Western Ghats Fld Res. Stn, Zool. Surv. India, Kozhikode, Kerala-672002, India).
The records of 22 spp. are listed, of which 10 spp. were not previously reported from the area. In an appended tab., a checklist is provided of the 60 spp. and sspp. currently known from the Park, India.

(17340) ENGLUND, R.A., C. IMADA, D.J. PRESTON & K. ARAKAKI, 2003. *Final report Kāne'Ohe bay, O'ahu stream estuary studies.* Contrib. No. 2003-013 Hawaii Biol. Survey. ii+42 pp. – (Hawaii Biol. Surv., Bish Mus., 1525 Bernice ST., Honolulu, HA 96817, USA).
Lists 5 introduced and indigenous odon. spp. from the bay.

(17341) FOTHERGILL, K., 2003. The delicate balance of dragonflies. *Watersheds Messenger* 10(1): 8. – (c/o Ed.: Western Watersheds Project, P.O. Box 1770, Hailey, ID 83333, USA).
A general article on the Anisoptera.

(17342) KANDIBANE, M., N.R. MAHADEVAN & K. GUNATHILAGARAJ, 2003. Odonata in irrigated rice ecosystem of Madurai, Tamil Nadu. *Zoos' Print J.* 18(7): 1155-1156. – (Agric. Coll. & Res. Stn, Madurai, Tamil Nadu-625104, India).
A commented list of 12 spp., of which Trapezostigma limbata was rare; – India.

(17343) PINHEIRO, C.E.G., M.A. BAGNO & R.A. BRANDLAÕ, 2003. Diet and foraging behavior of the rufous-tailed jacamar (Galbula ruficauda, Galbulidae) in central Brazil. *Ararajuba* 11(2): 241-243. (With Port. s.). – (Depto Zool., Univ. Brasilia, BR-70910-900 Brasilia, DF).
G. ruficauda is a neotropical insectivorous bird. In a gallery forest N of Brasilia, the odon. represent a minor part in its diet.

(17344) POULTON, B.C., 2003. Aquatic invertebrates of Lisbon Bottom wetlands. *In*: C. Duane et al., *Ecological dynamics of wetlands at Lisbon Bottom, Big Muddy National Fish and Wildlife Refuge, Missouri*, pp. 83-112. U.S. Geol. Surv. – (U.S. Geol. Surv., 4200 New Haven Rd, Columbia, MO 65201, USA).
Richness of Odon. was high in vegetated areas of most of the studied wetlands; 25 identified spp. are listed and their respective localities are noted.

(17345) SIROT, L.K., M.J. BROCKMANN, C. MARINIS & G. MUSCHETT, 2003. Maintenance of a female-limited polymorphism in Ischnura ramburi (Zygoptera: Coenagrionidae). *Anim. Behav.* 66: 763-775. – (First Author: Dept Zool., Univ. Florida, 223 Bartram Hall, Gainesville, FL 32611-8525, USA).
Colour polymorphisms can be maintained in a population if all morphs have equal fitness on average, if fitness is frequency dependent or if fitness functions cross for some environmental or social variable. Female-limited colour polymorphism was studied in I. ramburi, in which one ♀ morph looks

like the ♂. The most commonly cited hypotheses to explain this polymorphism involve an advantage to andromorphs of avoiding costly matings through ♂ mimicry. An alternative hypothesis argues that ♂♂ learn the most common morph and that the polymorphism is maintained by a rare-morph advantage of mating avoidance, irrespective of ♂ mimicry. Predictions of the ♂ mimicry hypothesis, learned mate recognition hypothesis (LMR) and 2 new hypotheses were tested. Censuses and a mark-resight study were used to estimate density, sex ratio, morph frequency and mating frequencies. Interactions were observed to test for ♂ mimicry and ♀ competition and to evaluate the frequency of mating attempts. Andromorphs were less likely than gynomorphs to receive mating attempts in encounters with ♂♂, but did not mate less frequently, or attack ♂♂ or interrupt oviposition by other ♀♀ more frequently. Contrary to the LMR hypothesis, the rarer morph was more likely to receive mating attempts. Andromorph frequency was greater in older ♀♀ than in yunger ♀♀, suggesting higher mortality or dispersal of gynomorphs. The results support a modification of the ♂ mimicry hypothesis, the signal detection hypothesis. Together with past studies, the present result suggest that the ♀ morphs may be alternative mating avoidance strategies.

2004

(17346) CONZE, K.-J., 2004. Der Arbeitskreis Libellen NRW. *LOBF-Mitt.* 2004(2): 50. – (Listerstr. 13, D-45147 Essen).
A description of projects and services of the Arbeitskreis Libellen in Nordrhein-Westfalen (NW Germany).

(17347) DELIRY, C., 2004. Demoiselles et libellules: nouvelle introduction à la préservation des milieux humides savoyards. *La Feuille et la Plume* 40: 3-6. – (Groupe Sympetrum, 20 rue de la Manine, F-38510 Morestel).
Includes a concise outline of the work of the "Groupe Sympetrum" on odon. conservation in Savoy (France), considerations on the status of the regional fauna (65 spp., of which 4 extinct and 4 legally protected), and a map of localities of particular odonatological interest.

(17348) DIJKSTRA, K.-D.B., 2004. Dragonflies (Odonata) of Mulanje mountain, Malawi. *Nyala* 22: 3-8. – (Naturalis, P.O. Box 9517, NL-2300 RA Leiden).
Mulanje, at ca 3000 m the highest peak between Kilimanjaro and Drakensberg, is an isolated massif in S Malawi. In Nov. 2001 and Jan. 2002, the odon. fauna was systematically surveyed, resulting in a list of 65 spp., 21 of which were found above 1500 m. For all sp., the altitutde gradients and the types of habitat are stated, and the noteworthy taxa are emphasized. Oreocnemis phoenix is among the most remarkable taxa. Notes on its biology are provided.

(17349) KADOYA, T., S. SUDA & I. WASHITANI, 2004. Dragonfly species richness on man-made ponds: effects of pond size and pond age on newly established assemblages. *Ecol. Res.* 19: 461-467. – (Dept Ecosyst. Stud., Inst. Agric. & Life Sci., Univ. Tokyo, 1-1-1 Yayoi, Bukyo-ku, Tokyo, 113-8657, JA).
The abundance and species richness of adult odon. were studied in 11 artificial, 2-yr old ponds in the Lake Kasumigaura area, Ibaraki pref., Japan. The assemblage patterns were influenced by size and age of the ponds. The species richness was positively correlated with pond size and highly correlated with pond age, in association with the vegetation cover within ponds. It is suggested that species richness is enhanced by the increasing immigration rate, triggered by the increased vegetation as the ponds grow older.

(17350) KEATS, R.A., L.J. OSHER & H.A. NECKLES, 2004. The effect of nitrogen loading on a brackish estuarine faunal community: a stable isotope approach. *Estuaries* 27(3): 460-471. – (Second Author: Dept Plant, Soil & Envir. Sci., Univ. Maine, 5722 Deering Hall, Orono, ME 04469 USA).
The response of the faunal community of a small microtidal estuary of the Northeast Creek (Acadia National Park, Mount Desert Island, Maine, USA), dominated by Ruppia maritima, to increased nitrogen loading was investigated using an in situ mesocosm enrichment experiment Experimental nutrient additions resulted in significantly lower densities of herbivorous chironomids and on these dependant predatory Enallagma. The latter primarily consumed grazing chironomids under all but the highest loading conditions.

(17351) McPEEK, M.A., 2004. The growth/preda-

tion risk trade-off: so what is the mechanism? *Am. Nat.* 163(5): E88-E111. – (Dept Biol. Sci., Dartmouth Coll., Hanover, NH 03755, USA).
Among Zygoptera in natural lakes, Ischnura spp. grow faster than coexisting Enallagma spp., but Enallagma spp. have higher survival under predation than Ischnura spp. This growth/predation risk trade-off apparently allows these taxa to coexist in ponds and lakes across the Holarctic. However, laboratory studies presented here show that the mechanism assumed by most theoretical and empirical studies to mediate this trade-off, namely activity simultaneously modulating foraging returns and predation risk, does not operate in this system. I. verticalis larvae were more active than Enallagma larvae in a short-term behavioural experiment, which explains why Ischnura experiences greater mortality from predation. However, this greater activity did not translate into higher feeding rates. I. verticalis and Enallagma ate comparable amounts of food in both the short-term behavioural experiment and a longer feeding and digestion experiment. In spite of no difference in the amount of food ingested or assimilated, I verticalis larvae grew faster than Enallagma larvae because they were better able to physiologically convert assimilated food into their own biomass in the presence of mortality threats. From these studies the phenotypic mechanisms determining the antagonistic patterns of relative growth and survival between these genera are understood, but why these patterns exist remains unclear.

(17352) MOTTA, R.L. & V.S. UIEDA, 2004. Diet and trophic groups of an aquatic insect community in a tropical stream. *Braz. J. Biol.* 64(4): 809-817 (With Port. s.). – (Second Author: Depto Zool., Inst. Biociênc., Univ. Estadual Paulista, C.P. 510, BR-18618-000 Botucatu, SP).
The study was carried out in the Rebeirão do Atalho (Itatinga distr., São Paulo state, Brazil). The odon. diet was similar in the 6 gen. studied, based mainly on aquatic insects and annelids, but different gen. consumed different insect orders, reducing the feeding overlap between the genera. As apparent from a graph, Hetaerina and Castoraeschna fed exclusively on aquatic insects (and Enallagma almost so), the annelids prevailed in the diets of Progomphus and Dasythemis. In addition, Dasythemis fed also on microcrustaceans. In Neocordulia and Erythrodiplax the ratio between annelids and aquatic insects was (almost) 50:50, though Erythrodiplax (like also Enallagma) consumed also some terrestrial insects.

(17353) STROBBE, F. & R. STOKS, 2004. Life history reaction norms to time constraints in a damselfly: differential effects on size and mass. *Biol. J. Linn. Soc.* 83: 187-196. – (Lab. Aquat. Ecol., Univ. Leuven, Bériotstraat 32, B-3000 Leuven).
Optimality models predict that, under a time constraint, organisms should accelerate development, and preferably so by increasing growth rate, to keep size at emergence constant. Unfortunately, most tests did neglect genetic constraints and interchanged mass with body size which may explain mixed support for some of the models' predictions. Here, time constraints were imposed on full sibling Enallagma cyathigerum larvae by manipulating day length regimes. Under a time constraint, larval development and growth rate based on size indeed were faster. This made it possible to keep size at emergence constant, despite the shorter development time. Interestingly, under a time constraint, growth rate based on mass was not increased and larvae had a lower mass at emergence. Two reasons for this difference between body mass and size seem apparent: First, size is fixed at emergence, while mass can still increase in many insects. Secondly, genetic constraints may have contributed to different responses for size and mass. In general, these results strongly suggest discriminating between size and mass when testing life history responses.

(17354) SUHLING, F., K. SCHENK, T. PADEFFKE & A. MARTENS, 2004. A field study of larval development in a dragonfly assemblage in African desert ponds (Odonata). *Hydrobiologia* 528: 75-85. – (First Author: Inst. Geoökol., Techn. Univ. Braunschweig, Langer Kamp 19c, D-38106 Braunschweig).
Aquatic animals distributed along a 'habitat-permanence' gradient (HPG), differ in life history. Odon. that occur in hot arid regions often occur in temporary waters and consequently perform direct and rapid development. Odon. spp. of the Namibian desert do differ in their selection of habitats along the HPG and therefore may also differ in life cycle. Here, an attempt is made to monitor colonisation, larval growth and emergence in a temporary pond of known history. The development of spp. that laid eggs in artificial ponds constructed by the authors

in March 2001 was studied. The assemblage consisted of spp. that originate from different habitats along the HPG. To obtain data on larval development, samples were taken from the ponds at 10-day intervals. Most spp. showed rapid development. By regressing the maximum sizes attained by larvae on each sampling date against time, growth rates for 5 spp. were estimated and it was possible to estimate that total duration of development from oviposition to emergence ranged between 38 and 70 days. Observation of first oviposition and first emergence for 3 of these spp. corroborated estimates based on growth rate. Of few spp., which laid eggs in the ponds, no larvae or adults were found. For some this may have been the result of predation, whereas others may not have grown fast enough to emerge before the ponds dried up. The results indicate that odon. cannot recognise whether a pond will retain water long enough for full larval development and oviposit in waters that will not allow larval development.

2005

(17355) ELDREDGE, N., J.N. THOMPSON, P.M. BRAKEFIELD, S. CAVRILETS, D. JABLONSKI, J.B.C. JACKSON, R.E. LENSKI, B.C. LIEBERMAN, M.A. McPEEK & W. MILLER, 2005. The dynamics of evolutionary stasis. *Paleobiology* 31(2): 133-145. – (First Author: Div. Paleontol., Am. Mus. Nat. Hist., Central Park West, 79th Str., New York, NY 10024, USA).

Stasis is generally defined as little or no net accrued species-wide morhological change during a species-lineage's existence up to millions of years. Based on the works listed in *OA* 11597, 12432, 13303 and 13706, the N American Enallagma is given as an example of invasion of a novel environment leading to the breakdown of stasis and the generation of evolutionary novelty correlated with speciation.

(17356) JESCHKE, J.M. & R. TOLLRIAN, 2005. Effects of predator confusion on functional responses. *Oikos* 111(3): 547-555. – (First Author: Inst. Ecosystem Stud., P.O. Box AB, Millbrook, NY 12545-0129, USA).

When confronted with a swarm of their prey, many predators become confused and are less successful in their attacks. To shed light on the ecological, ethological and evolutionary consequences of predator confusion, its effects on predator functional responses are here investigated and a functional response model that considers confusion and compares it qualitatively as well as quantitatively to empirical data from 2 predator-prey systems, Aeshna cyanea – Daphnia magna (Crustacea) and Chaoborus obscuripes (Diptera) – Daphnia obtusa is developed. The qualitative comparisons show that, contrary to common belief, confusion does not necessarily lead to a dome-shaped functional response. The response can alternatively remain qualitatively unchanged and be affected only quantitatively. A non-dome-shaped response is thus no indication for the absence of predator confusion. The same is true for other swarming effects reducing foraging success, such as early warning of approaching predators. The results hence question studies that have equated the absence of a dome-shaped response with the absence of a swarming effect, and also resolve the apparent paradox that swarming effects are quite common while dome-shaped functional responses are rather uncommon.

(17357) SOCIETY FOR CONSERVATION BIOLOGY, 2005. *Book of abstracts* [of papers presented at the] *19th Annual Meeting of the Society for Conservation Biology*. Univ. de Brasilia, Brasilia, 15-19th July 2005.

[Presentations dealing with/containing references to Odon.]: *Alonso-Eguia, L.P., P. Gutiérrez-Yurrita & A. Escofet*: Odonata community as assessor of the impact on integrity of the ecological processes produced by the hydroelectric dams (pp. 4-5; Mexico); – *De Marco, P., Jr, J.L. Nessimian, N. Hamada & N. Ferreira, Jr*: Aquatic insects in Várzea lakes: are there concordant biogeographic patterns among ecologically different groups? (p. 53); – *Deegan, L.A., C. Neill, A.V. Krusche, M.V.R. Ballester, A. Gessner, R.L. Victoria & C.L. Haupert*: The conservation implications of habitat and biogeochemical alterations in small lowland Amazonian streams caused by deforestation (p. 54); – *Oertly, B., H. Hinden & A. Stoll*: Monitoring species poor communities: macroinvertebrate assemblages from alpine ponds (Swiss National Park) (p. 151; Macun high alpine cirque); – *Rebelo, C., P. Kahumba, D.J. Martins & S. Baer*: Restoration: a fully artificial process? (p. 172); – *Santos, A.N. & R.D. Stevenson*: A comparison of macroinvertebrate diversity in small streams of varying flow permanence in eastern Massachusetts (p. 188).

2006

(17358) CARVALHO, E.M. & V.S. UIEDA, 2006. Colonization routes of benthic macroinvertebrates in a stream in southeast Brazil. *Acta limnol. bras.* 18(4): 367-376. (With Port. s.). – (Depto Zool., Univ. Estad. Paulista, BR-18618-000 Botucatu, SP).
The colonization of the benthic substrate by macroinvertebrates in the tropical stream Ribeirão da Quinta, located at Itatinga (São Paulo state), was investigated through 4 routes: downstream movement, upstream movement, movement from the surface, and colonization from the aerial source. The taxa are considered familywise, including the Coenagrionidae, Calopterygidae, Gomphidae and Libellulidae).

(17359) CATLING, P.M., 2006. Dragonflies and damselflies. *In*: Working Group on General Status of NWT species, *NWT species 2006-2010: general status ranks of wild species in the Northwest Territories*, pp. 56-59, Dept Environ. & General Resour., Govt Nwest Terr., Yellowknife. – (Biodiversity, Agriculture Canada, Saunders Bldg, Central Exp. Farm, Ottawa, ON, K1A 0C6, CA).
A commented list of 41 spp. known from the Northwest Territories (Canada), with status ranks marked. Stylurus notatus, Somatochlora forcipata and S. sahlberghi "may be at risk". – See also *OA* 16977.

(17360) JAKAB, T., 2006. *A Tisza-tó és Közép-Tisza szitakötö-fajegyütteseinek (Insecta: Odonata) összehasonlitó elemzése*. Debredeni Egyetem, Debrecen. 131 pp. ISBN 963-472-971-1. (Hung., with Engl. s., but without translation of the title).
Deals with the odon. fauna of the shallow, lake-type reservoir (Tisza-tó) and with that of the Tisza river between Tiszafüred and Tiszacsege; Hungary. This is a PhD dissertation presented at the Univ. of Debrecen and includes also Author's complete bibliography (1996-2004, 38 titles; pp. 126-131).

(17361) KALNINŠ, M., 2006. An investigation of dragonfly (Odonata) ecology at the Titmanu oxbow, Gauja National Park, Latvia. *Acta biol. Univ. Daugavp.* 6(1/2): 103-108. – (Nature Prot. Bd, Exporta iela 5, LV-1010 Riga).
Information is presented on the odon. fauna (29 spp.) and phenology in the Park. Coexistence and segregation analyses of the related Libellulidae and Coenagrion spp. are provided.

(17362) MIRANDA, T., M. EBNER, M. SOLE & A. KWET, 2006. Spatial, seasonal and intrapopulational variation in the diet of Pseudis cardosoi (Anura, Hylidae) from the Araucaria plateau of Rio Grande do Sul, Brazil. *Sth Am. J. Herpetol.* 1(2): 121-130. (With Port. s.). – (First Author: Lab. Pesquisas Biol., Fac. Biociênc., PUCRS, Av. Ipiranga 6681, BR-90619-900 Porto Alegro, RS).
By stomach contents analysis of 119 P. cardosoi individuals, its diet was studied in the Araucaria forest and the adjacent grassland ecosystems of S Brazilian highlands. Odon., particularly their larvae, were among the dominant prey categories. Diet composition of ♂, ♀ and juvenile frogs was significantly different, the highest number of odon. was consumed by juvenils. There was also a difference among habitats: the highest number of odon. was consumed by frogs in shrublands. As to the seasonal variation, odon. were found in the highest proportions in the Dec. and April diets. A cyclical pattern, reflecting odon. life history, was also depicted in the stomach contents: the peaks of larvae preceding those of adults by ca 1 month. Interestingly, since odon. larvae represent an important part of the P. cardosoi diet, the frogs are apparently capable of feeding underwater.

(17363) NEDBALOVÁ, L., J. VRBA, J. FOTT, L. KOHOUT, J. KOPÁČEK, M. MACEK & T. SOLDÁN, 2006. Biological recovery of the Bohemian Forest lakes from acidification. *Biologia, Bratislava* (Zool.) 61 (Suppl. 20): 453-465. – (First Author: Dept Ecol., Fac. Sci., Charles Univ., Vinična 7, CZ-12844 Prague-2).
A limnological survey of 8 small, atmospherically acidified, forested glacial lakes in the Bohemian Forest (Czech Republic) was conducted in Sept. 2003. Its results are compared with those of the 1999 survey and with acidification data available for the period since the early 1990s. While 1 mesotrophic and 3 oligotrophic lakes are still chronically acidified, 4 other oligotrophic lakes have recovered their carbonate buffering system. Some invertebrate top predators, such as Odon., currently present in the lakes because of the absence of fish, may prevent full recovery of zooplankton.

(17364) RABOSKY, D.L., 2006. LASER: a maximum likelihood toolkit for detecting temporal shifts

in diversification rates from molecular phylogenies. *Evol. Bioinformatics Online* 2006: 257-260. – (Dept Ecol. & Evol. Biol., Cornell Univ., Corson Hall, Ithaca, NY 14853-2701, USA).
Rates of species origination and extinction can vary over time during evolutionary radiations, and it is possible to reconstruct the history of diversification using molecular phylogenies of extant taxa only. Maximum likelihood methods provide a useful framework for inferring temporal variation in diversification rates. LASER is a package for the R programming environment that implements maximum likelihood methods based on the birth-death process to test whether diversification rates have changed over time. LASER contrasts the likelihood of phylogenetic data under models where diversification rates have changed over time to alternative models where rates have remained constant over time. Major strengths of the package include the ability to detect temporal increases in diversification rates and the inference of diversification parameters under multiple rate-variable models of diversification. The program and associated documentation are freely available from the R package archive at http://cran.r-project.org. – As an example, the Enallagma holarctic radiation, as presented in the paper described in *OA* 15754, is treated here by using the LASER program. The technical proceeding is minutely described and the result supports the original conclusions.

(17365) ZABRIC, D., 2006. *Vpliv gojenja rib v toplovodnih ribogojnicah in gramoznicah na vodni ekosistem.* – [*The impact of fish breeding on aquatic ecosystem of warm-water fishpond and gravel pit systems*]. Zavod za ribištvo Slovenije, Ljubljana. iv + 114 pp. (Slovene). – (Author & Publishers: Župančičeva 9, SI-1000 Ljubljana).
7 odon. spp. are listed from 5 pisciculture pond- and retention lake systems in Styria, Slovenia. Of some interest is the occurrence of Epitheca bimaculata at "Udje-2" fishpond, near Gornji Rogatec.

2007

(17366) BOGACKA-KAPUSTA, E., A KAPUSTA, A. DUDA, M. SZCZEPKOWSKI & R. KOLMAN, 2007. Evaluationof the suitability of samples collected in vivo for investigations of juvenile sturgeon stomach contents. *Archs pol. Fisheries* 15(2): 165-170. – (First Author: Dept Ichthyol., Inland Fisheries Inst., Oczapowskiego 10, PO-10719 Olsztyn).
The aim of the study was to determine the capabilities of artificially spawned sturgeon that had been previously fed commercial food to adapt to feeding on natural food. The gastric lavage method was also evaluated to determine its usefulness in studies of sturgeon food composition. The work was conducted in experimental ponds, where the starlet (Acipenser ruthenus) and the sturgeon (A. baerii, A. gueldenstaedtii and A. medirostris) hybrids were examined. The basic component of natural food were Chironomidae and Ephemeroptera larvae; the odon. larvae were represented in 25% of the fish examined.

(17367) BROCKHAUS, T., 2007. Bildet der Jenissei eine Pleistozän entstandene Faunengrenze? Eine Diskussion am Beispiel der paläarktischen Libellenfauna (Odonata). *Ent. rom.* 12(1): 41-95. (With Engl. s.). – (An der Morgensonne 5, D-09387 Jahnsdorf/Erzgebirge).
The current distribution of many palaearctic Odon. can be explained by a hypothetic peri-glacial fauna that existed through the entire Pleistocene. This amends the established hypotheses claiming the sole re-immigration from refugia in post-glacial times. The peri-glacial odon. fauna may be the cold-tolerant part of a pre-glacial Pliocene fauna. With the new hypothesis, the following types of distribution of palaearctic dragonflies can be explained: (1) spp. with a trans-palaearctic E to W distribution, e.g. Lestes sponsa, Sympetrum danae, – (2) spp. with a trans-palaearctic E to W distribution, centring in the boreal zone, e.g. Aeshna crenata, Somatochlora sahlbergi, – (3) western and eastern palaearctic distributions of sspp. and closely related spp., e.g. Leucorrhinia rubicunda and L. intermedia, – (4) cold-tolerant spp. with a disjunctive distribution, e.g. Coenagrion hylas, Somatochlora alpestris. – More types of distribution are presented, such as western and eastern palaearctic ranges and ranges which are the results of refugia (Coenagrion mercuriale, Somatochlora meridionale, Ischnura aralensis). During the peak of the Saale glacial period, when even western Siberia was covered by an ice-sheet, parts of the periglacial fauna were probably subdivided into eastern and western populations. This may have happened near the Jenissei river or further E around the Jenissei, Western and Eastern Sajan mountain ranges. The generic differentiation

of these populations led to their current status as ssp. or sp. The ranges of some cold-tolerant spp. disintegrated after the Pleistocene, leading to boreomontane and other disjunctions.

(17368) COTREL, N., P. ROUILLIER & A. BOISSINOT, 2007. Atlas commenté des odonates des Deux-Sèvres. *Nature Deux-Sèvres* 2007(1): 56-76, col. pls 2-4 excl. – (Authors' adresses not stated).
Distribution maps for 59 spp., with information on habitats, occurrence and regional status of each sp.; – France.

(17369) DOLNÝ, A., D. BÁRTA, M. WALDHAUSER, O. HOLUŠA, L. HANEL & R. LIZIER, 2007. *The dragonflies of the Czech Republic: ecology, conservation and distribution*. Česky svaz ochránců přírody, Vlašim. 672 pp. ISBN 978-80-86327-66-2. Hardcover (24.4 × 28.5 cm). (Czech, with chapterwise Engl. s's & bilingual fig./tab. captions).
A monographic treatment of the Czech fauna (73 spp.). The text is organized as follows: Foreword (pp. 8-9), Acknowledgements (pp. 10-11; include over 300 names!), Introduction (pp. 12-13), Basic characterization of dragonflies (pp. 14-55), Natural conditions of the Czech Republic (pp. 56-71), History of Czech and Moravian odonatology (pp. 72-91; includes a comprehensive bibliography of Czech odonatology on pp. 76-89), Methods, data collection and analyses (pp. 92-105), Essential analysis of the results (pp. 106-131), Habitats (pp. 132-178), Protection (179-203; includes the national Red List on pp. 181-186), Biomonitoring (pp. 204-209), Characterization of the species (pp. 210-658), Scientific names and synonyms of Odonata in Czech Republic (pp. 659-664), Index of photographs and photo credits (pp. 665-669), Notes (p. 670), About the authors (pp. 671-672, with portraits). Every chapter has a separate bibliographic reference list. The value of the thoroughly styled text is enhanced by the illustrations. These include distribution maps (central European grid system, 678 quadrants in Czech Rep.), graphs of vertical occurrence and phenology (emergence & adult activity) and photographs of specimens for/of all spp., numerous habitat photographs and field portraits of many spp. Among the latter, there are some of unsurpassed technical quality. – This is a monumental work of excellence in every aspect.

(17370) ENGLUND, R.A., M.G. WRIGHT & D.A. POLHEMUS, 2007. Aquatic insect taxa as indicators of aquatic species richness, habitat disturbance and invasive species impacts in Hawaiian streams. *Bishop Mus. Bull. cutl environ. Stud.* 3: 207-232. – (First Author: Hawaii Biol. Surv., Bishop Mus., 1525 Bernice Str., Honolulu, HA 96817, USA).
The primary objective of this study was to provide the first comprehensive analysis of aquatic insect populations in various urbanized and virtually pristine stream reaches on the 5 major islands, and to assess if various suites of introduced aquatic spp. may be impacting aquatic insect populations. In addition, the suitability of native aquatic insects as key indicator, flagship, or umbrella spp. regarding the overall health of Hawaiian aquatic ecosystems is assessed. 26 odon. spp. are covered and are listed in the Appendix (17 endemic, 2 indigenous and 7 introduced).

(17371) EVENHUIS, N.L., 2007. The Godeffroy Museum catalogs in relation to Fiji terrestrial arthropds. 1. Introduction and review of Myriapoda, Diptera, Odonata, and smaller hexapod orders. *Bishop Mus. occ. Paps* 91: 17-28. – (Pacific Biol. Surv., Bishop Mus., 1525 Bernice St., Honolulu, HA 96817, USA).
The odon. inventory of the Godeffroy Museum in Hamburg sale catalogues 2-8 (1865-1881) includes 9 taxa from Fiji (listed in catal. 3-7 (1866-1879), referable to Ischnura aurora, Diplacodes bipunctata, D. trivialis, Lathrecista pectoralis, Orthetrum sabina, Pantala flavescens, Rhyothemis dispar and Mesocera annulipes L. Koch (nomen nudum).

(17372) FIGUEIRA VAN DE KOKEN, A., F.A. RIBEIRO MATOS & R. LEMES MARTINS, 2007. Behavior of Pantala flavescens (Odonata, Anisoptera, Libellulidae) and waste of reproductive investment in urban areas. *Bolm Mus. Biol. Prof. Mello Leitão* (N.S.) 21: 7-18. (Port., with Engl. s.). – (Fac. Saúde e Meio Ambiente, rua Serafim Derenzi 3115, Campus II, BR-29053-250 São Pedro, ES).
Due to its migratory behaviour, P. flavescens is commonly recorded in dry areas. However, its occurrence in parking areas and the oviposition on reflective car hood surfaces are not well understood. Here, data are presented on P. flavescens behaviour in different areas, with and without vehicles, in order to evaluate its reproductive investment in parking areas. There was a correlation between its frequency and the number of parked vehicles, and

its preference for thermoregulatory activities over light-coloured cars was recorded. The observations indicate that the behaviour at parking areas is similar to that in flooded areas, but very distinctive from the behaviour in the pastureland, where only foraging behaviour was seen. Eggs collected from car hood were inseminated and viable, indicating the waste of reproductive investment. The results suggest that parking areas could trigger the occurrence of P. flavescens, but the loss in reproductive efforts could be selecting against the insects showing this behaviour.

(17373) GUNTHER, A. & J. KIPLING, 2007. Nachweise der Südlichen Heidelibelle, Sympetrum meridionalis (Selys, 1841) in Sachsen und Südostbrandenburg (Odonata: Libellulidae). *Sächs. ent. Z.* 2007(2): 9-12. (With Engl. s.). – (First Author: Nat-Schutz Inst. Freiburg, Waisenhausstr. 10, D-09599 Freiburg).
In 2006, a strong S. meridionale invasion was observed in parts of Germany. Here, 7 records from Saxony and 4 from Brandenburg are presented. Oviposition was observed at 2 localities, but so far there is no evidence of a successful breeding in these regions.

(17374) JORDAN, S., E. BARRUET, M. OLAF, B. PARSONS & C. SIMON, 2007. Blue hawaiiense and beyond: conservation genetics and comparative phylogeography of four Hawaiian Megalagrion damselfly species (Odonata: Coenagrionidae). *Bishop Mus. Bull. cult. environ. Stud.* 3: 247-260. – (First Author: Dept Biol., Bucknell Univ., Lewisburg, PA 17837, USA).
In this preliminary study of Megalagrion phylogeography and conservation genetics, about 660 base pairs (bp) of the mitochondrial COII gene were sequenced from 191 specimens of 4 spp., including 31 populations that span a gradient of endangerment. Phylogeographic analyses was applied in order to understand their biogeographic history. Unlike M. xanthomelas and M. pacificum, M. calliphya and M. hawaiiense rarely share haplotypes between populations and between islands, even within the larger Maui Nui super-island, suggesting that these latter 2 spp. do not disperse as well across land or water. Their phylogenies also better reflect the geological history of the islands. Conservation genetic analyses was applied in order to understand their genetic health. Under a conservation genetic paradigm, populations with low genetic diversity are generally considered to be at greater risk of decline and extinction than populations with high genetic diversity. Applying this principle to Megalagrion populations gave both expected and surprising results. Expected results included measurements of high diversity in most populations of M. calliphya, M. hawaiiense, and Hawai'i Island populations of M. xanthomelas. Low diversity was observed in populations known to be bottlenecked or relictual, including O'ahu and Maui M. xanthomelas, and M. pacificum. Surprising results included low genetic diversity in O'ahu Ko'olau and Hawai'i Onomea M. hawaiiense, Moloka'i M. pacificum, and West Maui M. calliphya. It is proposed that these latter 3 populations be monitored and managed to maximize their long-term genetic health.

(17375) KALLER, M.D. & W.E. KELSO, 2007. Association of macroinvertebrate assemblages with dissolved oxygen concentration and wood surface area in selected subtropical streams of the southeastern USA. *Aquat. Ecol.* 41: 95-110. – (Sch. Renewable Nat. Resour., Louisiana Agric. Exp. Stn, LSU Agric. Cent., Louisiana St. Univ., Baton Rouge, LA 70803, USA).
Argia spp. and Dromogomphus spp. were represented in greater than 1% stream samples in the Big Brushy, Mill, and Six Mile creeks, SW Louisiana, USA. No other references to odon. are made in the text.

(17376) LACERDA, C.H.F., 2007. *Influência da turbidez, macrófitas aquáticas e tamanho das ninfas na predação de larvas de Piaractus mesopotamicus e Oreochromis niloticus por odonata Pantala flavescens*. Diss. Mestrado, Univ. Estad. Maringá, Maringá, Paraná. 52 pp.
[Not available for abstracting.]

(17377) MEURGEY, F., 2007. *A contribution to the knowledge of the Odonata of Dominica (British West Indies)*. Mus. Sci. Nat., Nantes. ii+20 pp. – (Mus. Sci. Nat., 12 rue Voltaire, F-44000 Nantes).
This is a report on the results of a survey, conducted from 11 Nov. to 7 Dec. 2006, covering 23 localities, from which 22 spp. were recorded. Lestes tenuatus, Anax ephippiger, Miathyria marcella and Tramea insularis were not previously reported from Dominica. A checklist of the 25 hitherto known Dominican spp. is provided: Lestes forficula, Triacantha-

gina trifida and Brechmorhoga archboldi were not encountered during the present survey.

(17378) POLHEMUS, D.A., 2007. Biology recapitulates geology: the distribution of Megalagrion damselflies on the Ko'olau volcano of O'ahu, Hawai'i. *Bishop Mus. Bull. cult. environ. Stud.* 3: 233-246. – (Hawaii St. Dept Land & Natur. Resour., Div. Aquatic Resour., 1151 Punchbowl St., Honolulu, HA 96813, USA).

Populations of endemic Megalagrion spp. breeding in upland streams have exhibited a progressive decline in both range and numbers on O'ahu since the late 1970s, based on analysis of historical collection data and results of recent surveys. In particular, conservation status surveys conducted from 1991 onward determined that the 4 upland stream-breeding taxa on the island, 3 of which are endemic to O'ahu, have disappeared from many catchments they formerly inhabited, particularly in the Wai'anae Mountains and on the leeward side of the Ko'olau Mountains. The remaining populations on the island are now disproportionately concentrated on windward slopes of the latter range, where they are clustered around exposures of the core dike complex of the Ko'olau volcano. This geological formation traps groundwater in dike-segregated compartments, thereby producing permanent surface flow in the upper reaches of many windward Ko'olau gulches, coupled with naturally interrupted midreaches immediately blow that block the upstream migration of invasive spp. The discovery of this correlation between geology and Megalagrion distributions has allowed predictive location of additional colonies by using geological maps, permitting future surveys to be more accurately targeted, and providing an objective basis for the delimitation of habitat critical to the survival of these spp.

(17379) PRESTON, D.J., R.A. ENGLUND & M.K.K. McSHANE, 2007. Translocation and monitoring efforts to establish a second population of the rare Megapodagrion xanthomelas (Selys-Longchamps) on O'ahu, Hawai'i (Zygoptera: Coenagrionidae). *Bishop Mus. Bull. cult. environ. Stud.* 3: 261-276. – (Hawaii Biol. Surv., Bishop Mus., 1525 Bernice St., Honolulu, HA 96817, USA).

The last remaining population of M. xanthomelas resides in a 100 m reach of stream located on the grounds of Tripler Army Medical Center, O'ahu. Because actions may be taken that might jeopardize this only known O'ahu population, it has been considered imperative to establish a second population to prevent M. xanthomelas from going extinct on O'ahu. An attempt to establish this sp. at a stream in the Dillingham area of O'ahu was made in 1998, but unfortunately was unsuccessful. Because the Tripler population is so small and restricted in distribution, a second effort at translocation was attempted at a new location. The population size of M. xanthomelas at the Tripler site was estimated in 1997 and again in 2003 by mark-recapture and it was concluded that the Tripler population was stable and could withstand the removal and translocation of a small number of adults and larvae. A stream site located in Makiki Valley was selected for its lack of alien predators such as crayfish, prawns, and mosquito fish, and a number of adults and immatures were translocated to the Makiki site in August 2004. Monitoring of the Tripler and the Makiki sites is ongoing and an additional translocation of M. xanthomelas to Makiki is planned. Future conservation plans should also include the assistance from the general public through avenues such as stocking of garden ponds with M. xanthomelas.

(17380) VON ELLENRIEDER, N., 2007. Composition and structure of aquatic insect assemblages of Yungas mountain cloud forest streams in NW Argentina. *Revta Soc. ent. argent.* 66(3/4): 57-76. (With Span. s.). – (Inst. Bio y Geo Cien., Mus. Cien. Nat., Univ. Nac. Salta, Mendosa 2, AR-4400 Salta).

33 lotic environments were sampled both in undisturbed forest areas and sites altered by human activities. Aquatic insects of 143 taxa (incl. 23 odon. taxa in 6 fam.) were collected. Cluster analysis suggested altitude as one of the main structuring variables of aquatic insect communities in these streams, and its importance was confirmed by non-metric multi-dimensional scaling (NMS); the environmental parameters measured that were best correlated with the ordination were altitude, water temperature, latitude and channel variables (width, percentage of large and small woody debris, of undercut banks, cobble and coarse gravel). Multi response permutation procedures (MRPP) showed streams in well preserved areas to significantly differ in their composition from streams in disturbed areas.

(17381) VON ELLENRIEDER, N. & R.W. GARRISON, 2007. Dragonflies and damselflies (Insecta:

Odonata) of the Argentine Yungas: species composition and identification. *Scient. Rep. Soc. zool. 'La Torbiera'* 7: 1-103. (Bilingual: Engl./Span.). – (First Author: Inst. Bio y Geo Cien., Mus. Cien. Nat., Univ. Nac. Salta, Mendosa 2, AR-4400 Salta).
This is a splendidly illustrated companion volume to the work described in *OA* 16846. An annotated list of 102 known spp. is followed by diagnostic keys to adults and larvae.

2008

(17382) *ABSTRACTS OF PAPERS [presented at] the 18th International Symposium of Odonatology, Nagpur, 5-9 November 2008*. Edited by R.J. Andrew. Issued by Hislop Coll., Nagpur. 80 pp. – (Available from: Dr R.J. Andrew, Dept Zool., Hislop Coll., Temple Rd., Civil Lines, Nagpur-440001, India).
Afsar, M.A., P. Vardan & S.P. Roy: Histochemistry of the respiratory surface of some damselfly larvae (p. 9); – Fine and scanning electron microscopic (SEM) study of caudal gills of some damselfly larvae (p. 10); – *Andrew, R.J., R.S. Badere & N. Doble*: Oviposition in Ceriagrion coromandelianum: 'sentinal' position of the male (p. 11); – *Andrew, R.J., S.S. Bakare & A.A. Dhamani*: Intra-male sperm translocation in Anisoptera (p. 12); – *Andrew, R.J., R.S. Badere & M.S. Bhowal*: Oviposition in Ceriagrion coromandelianum: preferential selection of leaf laminar region of Nymphaea nuchali (Nymphaeaceae). (p. 13); – *Andrew, R.J., G.P. Patil & D.R. Halwe*: Egg chorionic ultrastructure of four common dragonflies of central India (p. 14); – *Andrew, R.J., M.M. Shinkhede & A.B. Sawarkar*: Ultrastructural changes induced by paper mill affluent on the egg shell of Anax guttatus and Bradinopyga geminata (p. 15); – *Anulin, C. & M. Thomas*: Identification of inducible antimicrobial insect defensin gene from Crocothemis servilia (p. 16); – *Arulprakash, R. & K. Gunathilagaraj*: Odonata fauna of different ecosystems in Tamil Nadu, India (p. 17); – *Arunachalam, A. & M. A. Subramanian*: Impact of tannery effluent on biochemical constituents in the gonadial tissue in the larvae of female Bradinopyga geminata (p. 18); – *Babu, R.*: Study on the numerical density of different species of Odonata in Himachal Pradesh, India (p. 19); – *Bakare, S.S., R.J. Andrew & D.B. Tembhare*: Male genital ducts and seminal fluid secretion in Anax guttatus (p. 20); – *Barsagade, D.D., D.B. Tembhare, M.N. Kadwey & S.A. Gharade*: Scanning electron microscopic studies on the mouth part sensilla in Ceriagrion coromandelianum (p. 21); – *Chandanpurkar, H. & K.A. Subramanian*: Odonata of Naukuchiatal, a tectonic lake of Western Himalaya, India (p. 22); – *Chaubey, R.J., N.R. Thaokar, P.R. Verma & R.J. Andrew*: Seasonal variation in the activities of twelve anisopteran dragonflies at Sonegoan tank of Nagpur city, India (p. 23); – *Conniff, K.L., S. Gunasinghe, T. Pererat & G. Indrajith*: Preservation of Sri Lanka's dragonflies in a changing landscape: expansion without extinction (p. 24); – *David, V.R. & S.P. Narayanan*: Odonata fauna of Kanha National Park and surrounding areas, Madhya Pradesh, India (p. 25); – *Dijkstra, K.-D.B. & P. Naskrecki*: Global assessment of Odonata: problems and challenges (p. 26); – *Dijkstra, K.-D.B., V.J. Kalkman, D. Gassmann, F. Stokvis & J. van Tol*: Phylogeny of palaeo-tropical Zygoptera: long ago and far away, the history of damselflies in distant lands (p. 27); – *Dyatlova, E.S. & Y.N. Oleynik*: Morphometry analysis, ectoparasite infection and fecundity of two Ischnura elegans morphs in SW Ukraine (p. 28); – *Emiliyamma, K.G.*: The conservation of endemic Odonata of Kerala, India (p. 29); – *Günther, A.*: Reproductive behaviour of Neurobasis c. chinensis (p. 30); – *Inoue, K.*: The commonest species Sympetrum frequens critically endangered (p. 31); – *Inoue, K. & M. Sugimura*: Vivid life of dragonflies in high vision camera, including the whole life history of the living fossil, Epiophlebia superstes (p. 32); – *Jancy, K.P., M. Thomas Mathai & D.A. Mohan*: Studies on the metamorphosis of the tropical dragonfly Bradinopyga geminata (p. 33); – *Kasambe, R. & D.B. Sawarkar*: Oviposition in Brachythemis contaminata (p. 34); – *Laltanpuii* [no initials], *M. Thomas Mathai & R.M. Inbaraj*: Identification and sequencing of juvenile hormone acid and methyltransferase gene in the larva of Bradinopyga geminata (p. 35); – *Pérez-Gutiérrez, L.A.*: Standardized methodology validation for dragonfly population and community studies (p. 36); – *Marinov, M.*: Dragonflies from Poda protected area near Burgas, SE Bulgaria (p. 37); – *Mishra, S.P., D. Kumar & S.P. Roy*: Evaluation of energy expenditures (Kcal/hr) in different larval instars of Mesogomphus lineatus (p. 38); – *Mitra, A.*: Dragonfly fauna of Bhutan: an annotated and updated checklist with ten new records (p. 39); – *Mitra, A. & P. Thinley*: Odonata of Bumdeling wildlife sanctuary, Trashi Yangtse, eastern Bhutan, with the description of two new species (p. 40; Acia-

grion olympicum bumdelingensis ssp. n. and Anisopleura bella sp. n., both nomina nuda only); – *Nagarnaik, K.B. & D.B. Tembhare*: Effect of starvation on the haemolymph free amino acids in the last instar larva of Tramea virginia (p. 41); – *Nair, M.V.*: Species richness and composition of odonates in selected habitat types of Similipal Biosphere Reserve landscape, Orissa, India (p. 42); – *Nesemann, H., R.D. Tachamo, D.N. Shah & S. Sharma*: Morphological development of Epiophlebia laidlawi a relict Himalayan dragonfly (p. 43); – *Nesemann, H., R.D. Tachamo & D.N. Shah*: Records of Epiophlebiidae habitats from central Nepal (p. 44); – *Nesemann, H., R.D. Tachamo, D.N. Shah, S. Sharma, G. Sharma & R.K. Sinha*: Illustrated larvae catalogue to the common Odonata families of the Ganga river system, northern Indian subcontinent (p. 45); – *Patankar, N.V. & V.V. Ramamurthy*: Qualitative and quantitative analysis of odonate diversity in an irrigated rice field at Delhi (p. 46); – *Patankar, N.V. & D.B. Tembhare*: Hormonal control of midgut digestive enzyme activity in Tramea virginia (Rambur) (p. 47); – *Prabu, M., D. Chitra, S. Muralidharan & A. Reniprabha*: Effect of paper and pulp mill effluent on survival, moulting and emergence in the larvae of Bradinopyga geminata (p. 48); – *Prabu, M., S. Thangavel, D. Chitra, S. Muralidharan & A. Reniprabha*: Impact of composite paper and pulp mill effluent on food utilisation in the larvae of Macromia cingulata (p. 49); – *Prabu, M., S. Muralidharan & A. Reniprabha*: Influence of Panchakavya on growth, moulting and biochemical constituents in the larvae of Macromia cingulata (p. 50); – *Villanueva, R.J.T.*: Odonata of Dinagat island, Philippines: annotated list, species and site of conservation importance (p. 51); – *Roy, S.P., A.K. Prabhakar, S.P. Mishra & D. Kumar*: Interaction between the abiotic environmental factors and odonate larval population of the lacustrine environment (p. 52); – *Ryazanova, G.I., V.V. Ustinova & P. Burchits*: Dragonflies in the megapolis, Moscow (p. 53); – *Sharma, G.*: Comparative studies on the reproductive behaviour of Neurobasis c. chinensis and Orthetrum s. sabina in North India (p. 54); – *Sharma, G. & M.S. Choudhary*: Status of damselflies and dragonflies in North India, with a note on the swarms of Pantala flavescens in Rajasthan, India (p. 56); – *Sharma, B., V.V. Ramamurthy & R. Kumar*: Collection of Odonata in National Pusa Collection and species diversity of Odonata in Indian Agricultural Research Institute Campus, New Delhi, India (p. 57); – *Subramanian, K.A.*: Diversity, distribution and conservation prioritization of odonates of the Western Ghats, India (p. 58); – *Subramanian, K.A., S. Ali & T.V. Ramachandra*: Odonates as indicators of riparian ecosystem health: a case study from southwestern Karnataka, India (p. 59); – *Suri Babu, B.*: Preliminary observations on Odonata larvae as forensic indicators in human drowning cases (p. 60); – *Suri Babu, B., V.K. Srivastava & S.K. Dutta*: Man-made secondary freshwater bodies as conservation grounds of odonates (p. 61); – *Suri Babu, B., V.K. Srivastava & S.K. Dutta*: Description of the larva of Cercion malayanum (Selys, 1870) (p. 62); – *Suvorov, A.*: Comparative molecular genetics research of Nehalennia speciosa Charp. from geographically distant populations (p. 63); – *Tajima, Y. & M. Watanabe*: Spermatozoan dynamics in female sperm storage organs and genital morphology of Ischnura asiatica Brauer during copulation (p. 64); – *Tam, T.W. & V.L.F. Lee*: Report of the 17th International Symposium of Odonatology at Hong Kong Wetland Park, Hong Kong 2006 (p. 65); – *Tam, T.W., B.S.P. Kwan, K.K.Y. Wu, B.S.F. Wong, S.S.H. Tang, S.Y. Wong, J.K. Fong, S.W.O. Fong & A.H.C. Lei*: Current status of the dragonflies in Hong Kong and their representation in the protected areas (p. 66); – *Tembhare, D.B., A.B. Sawarkar & M.M. Shinkhede*: Structure of the ovary and vitellogenesis in Ceriagrion coromandelianum (p. 67); – *Thangavel, S., D. Chitra, S. Muralidharan & A. Reniprabha*: Influence of paper and pulp mill effluent on the biochemistry and inorganic constituents of haemolymph in the larvae of Bradinopyga geminata (p. 68); – Alteration in total and differential count of haemocytes under paper and pulp mill toxicity in the larvae of Bradinopyga geminata (p. 69); – *Tiple, A.D. & R.J. Andrew*: Oviposition behaviour of Rhodischnura nursei in central India (p. 70); – *Tiple, A.D., A.M. Khurad & R.J. Andrew*: Species diversity of Odonata in and around Nagpur city, central India (p. 71); – *Vardan, P., M. Asfar & S.P. Roy*: Study on the gill morphometry of some dragonfly larvae (p 72); – *Vardan, P. & S.P. Roy*: Morphological variability and ultrastructure of the rectal gills of dragonfly larvae occupying different ecological niches (p. 73); – *Walia, G.K.*: C-heterochromatin in chromosomes of Odonata (p. 74); – Heterochromatin characterization of holocentric chromosomes of dragonflies using fluorescent staining techniques (p. 75); – *Wazalwar, S.M. & D.B.*

Tembhare: Cuticular structures in the fore- and hindgut of Brachythemis contaminata (p. 76); – *Zessin, W.*: Some aspects concerning the biology of Palaeozoic dragonflies (Odonatoptera) (p. 77); – The oldest dragonflies (Odonatoptera (p. 78); – Overview of the dragonflies of the Palaeozoic (p. 79). – For other Symposium publications see *OA* 17262, 17383, 17410, 17417.

(17383) ANDREW, R.J. & T.R. MITRA [with a Preface by D.B. TEMBHARE], 2008. Indian odonatological bibliography. *Occ. Publ. Sth Asian Counc. Odonatol.*, Vol. 1, Nagpur. 41 pp. – (c/o Dr R.J. Andrew, Dept Zool., Hislop Coll., Temple Rd, Civil Lines, Nagpur-440001, India).
The publication has appeared in the framework of the 18th Int. Symp. Odonatol. (Nagpur, 5-13 Nov. 2008). In the introductory chapter (pp. 2-8), the history of Indian odonatology is traced from 1768 to 2006, and a reference is made also to the ancient Sangam literature of Tamil (ca 6th cent.), where dragonflies are for the first time reported from India. The history is divided into the following periods: Prehistoric (since ca 6th cent.), Pre-Selysian (1768-1840). Selysian (1840-1900), Laidlaw-Fraserian (1900-1947), and the Post-Independence era (1948–). Within the latter, the following topics are briefly outlined in separate sections: Cytology and cytotaxonomy, Taxonomy, Parasitology, Morphology, Neuroendocrinology and physiology, and Ecology. A chapter on the odonatological work of the Zoological Survey of India is added. The exhaustive (though still incomplete) Bibliography (pp. 9-41) covers the entire Indian subcontinent and the adjacent islands and includes over 800 titles of works published up to 2006.

(17384) BEDJANIČ, M., 2008. Ali si kdaj oprezal za kačjimi pastirji v Sloveniji? – [Have you ever been on the watch for dragonflies in Slovenia?]. *National geographic Junior* 48: 15. [Slovenian edn]. (Slovenian). – (Kolodvorska 21/B, SI-2310 Slovenska Bistrica).
A general note on dragonflies in Slovenia, in the Slovenian edn of the journal appended to the article of K. Wilson (see *OA* 16262 and 17296).

(17385) BUCZYNSKI, P. & M.D. MOROZ, 2008. Notes on the occurrence of some Mediterranean dragonflies (Odonata) in Belarus. *Pol. J. Ent.* 77: 67-74. – (First Author: Dept Zool., MCSU, Akademicka 19, PO-20-033 Lublin).
Sympecma fusca, Lestes viridis and Orthetrum albistylum were recorded for the first, and Erythromma viridulum and Orthetrum brunneum for the second time from Belarus. The records are analysed and discussed in the light of central and E European evidence on the expansion of Mediterranean odon. spp.

(17386) CARVALHO, A.L., L.G.V. SALGADO & G. FLECK, 2008. Description of the larva of Lauromacromia picinguaba Carvalho, Salgado & Werneck-de-Carvalho 2004, with a key to the genera of Corduliidae larvae occurring in South America (Odonata: Anisoptera). *Zootaxa* 1848: 57-65. – (First Author: Depto Ent., Mus. Nac., Univ. Fed. Rio de Janeiro, C.P. 68044, BR-21944-970 Ciudad Universitaria, Rio de Janeiro, RJ).
The ultimate instar is described and illustrated based on reared specimens from Picinguaba (Ubatuba, São Paulo, Brazil). Notes on larval biology and on the breeding habitat are provided. A generic key for S American Corduliidae larvae is appended.

(17387) CHENG, C.-H. & Y. HUANG, 2008. Construction and application of phylogenetic network. *Entomotaxonomia* 30(3): 215-221. (Chin., with Engl. s.). – (Coll. Life Sci., Shaanxi Normal Univ., Xi'an, Shaanxi-710062, China).
The phylogenetic networks, mainly applied to display complicated reticulations above species, display the relationships between intraspecific individuals, among populations, and the phylogenetic interference of contradicted data sets. Subsequent to an outline the background of phylogenetic network and reticulate evolution, several methods of phylogenetic networks' construction in widely used softwares are introduced, viz. reticulograms in T-Rex, statistical parsimony in Tcs, Median networks, Split deomposition, and Neighbour-net in Splitstrees 4.

(17388) DAUS, M., 2008. Bemerkungen zur Veränderung der Herpetofauna um Pokrent, Nordwestmecklenburg seit 1999. *Ursus/MittBl. Zoover. Zoo Schwerin* 14(1): 69-75. – (Zool. Garten Schwerin, Waldschulweg 1, D-19061 Schwerin).
The current conditions of ponds in the Pokrent area (NW Mecklenburg, E Germany) are reviewed with emphasis on the amphibian fauna. A passing reference is made to the odon., and a phot. of a ♀ Libellula depressa is included.

(17389) DE MARMELS, J., 2008 [dated Dec. 2005, actually published Jan, 2008]. La larva de Progomphus dorsopallidus Byers, 1934 (Odonata: Gomphidae), con una clave para identificar las larvas de otras e species de género del norte del Rio Orinoco, Venezuela. *Entomotropica* 20(3): 235-238. (With Engl. s.). – (Mus. Inst. Zool. Agric., Fac. Agron., Univ. Central Venezuela, Apartado 45479, Maracay 2101-A, Venezuela).
The last instar larva of P. dorsopallidus is described and illustrated based on 6 exuviae obtained from reared specimens. A key to the larvae of 6 (out of the 8) congeneric spp. known so far N of the Orinoco river is provided.

(17390) DÉVAI, G., 2008. *List of publications of G. Dévai fully or partly covering odonatological topics, 1962-2008*. Hungarian odonatol. database. 16 pp. – (Agrion 200 Bt., Zelizy Dániel u. 18, HU-4033 Debrecen).
A complete and annotated personal bibliography on the subject; 103 titles.

(17391) FINCKE, O.M., D. SANTIAGO, S. HICKNER & R. BIENEK, 2008. Susceptibility of larval dragonflis to zebra mussel colonizatin and its effect on larval movement and survivorship. *Hydrobiologia* 2008, 9 pp. – DOI 10.1007/s10750-008-9667-7. – (First Author: Dept Zool., Univ. Oklahoma, Norman, OK 73019, USA).
Colonization by the zebra mussel, Dreissena polymorpha, was quantified for 5 dragonfly spp. that differed in size and larval habits in a Michigan lake. Both larger size and a non-burrowing habit independently increased susceptibility to colonization. In 2005, over 50% of the final instars of the sprawlers Didymops transversa and Hagenius brevistylus were colonized, as well as younger instars. Rarely colonized were Progomphus obscurus and Dromogomphus spinosus, whose larvae burrow under sand, and the sprawler Epitheca princeps, whose final instars were lightly covered with sand. Hagenius larvae that had been preyed upon carried more mussels than those dying of other causes. More generally, mussel attachment decreased the probability that sprawlers left the water to emerge, the distance that some spp. traveled before emerging, and the ability of an overturned sprawler to right itself. On average, final instars of Didymops and Hagenius remaining in the water carried 3 times as many mussels as individuals known to emerge. Compared to uncolonized individuals, Epitheca and Progomphus with mussels emerged closer to the water line. Among colonized Didymops, the distance traveled on land before emerging decreased with increasing mussel load. Of the colonized Didymops that could right themselves, righting time increased with mussel load. Because the 2 common spp. of sprawlers were disproportionately colonized, and mussel attachment decreased their chances of emerging, the results suggest that D. polymorpha has the potential to affect the community structure of this guild of aquatic and terrestrial predators.

(17392) HANCOX, J., 2008. Dragonfly year. *Potteric Carr Nature Reserve Recorder* 11: 8-9. – (57 Braithwell Rd, Ravenfield, Rotherham, S65 4LH, UK).
A summery of the 2007 records and observations on 17 spp. at Potteric Carr Nature Reserve, Yorkshire, UK. – For the 2004-2006 reviews, see *OA* 16101, 16144 and 16820.

(17393) HANCOX, J., 2008. Early and late sightings 1998-2007. *Potteric Carr Nature Reserve Recorder* 11: 5. – (57 Braithwell Rd, Ravenfield, Rotherham, S65 4LH, UK).
A commented tab., showing the first and last flying period dates for 17 odon. spp. at Potteric Carr Nature Reserve, Yorkshire, UK.

(17394) [HANDLIRSCH, A., 1906-1908]. *In*: NEL, A. et al., 2008, as listed in *OA* 17404: Publication dates of A. Handlirsch, 1906-1908, *Die fossilen Insekten und die Phylogenie der rezenten Formen: ein Handbuch für Paläontologen und Zoologen*, Engelmann, Leipzig.
This work was published in parts between 1906 and 1908. On p. ix, the information is given on publication dates of the quires, while the corresponding pages and plates are not specified, which makes the exact citation difficult. The correct page publication dates are as follows: pp. i-vi, 1-160, pls 1-9 (May 1906); pp. 161-320, pls 10-18 (June 1906); pp. 321-480, pls 19-27 (Aug. 1906); pp. 481-640, pls 28-36 (Oct. 1906); pp. 641-800, pls 37-45 (Feb. 1907); pp. 801-960, pls 46-51 (June 1907); pp. 961-1120 (Nov. 1907); pp. 1121-1280 (Jan. 1908); pp. vii-ix, 1281-1430 (July 1908).

(17395) HASSALL, C., D.J. THOMPSON & I.F. HARVEY, 2008. Latitudinal variation in morpholo-

gy in two sympatric damselfly species with contrasting range dynamics (Odonata: Coenagrionidae). *Eur. J. Ent.* 105: 939-944. – (Biosci. Bldg, Univ. Liverpool, Crown St., Liverpool, L69 7ZB, UK).
Geographic range expansion is one of the best documented macroecological consequences of climate change. A concomitant change in morphology has been demonstrated in some spp. The relationship between latitudinal variation in morphology (e.g. Bergmann's rule) and the morphological consequences of microevolutionary pressures at expanding range margins have received little attention in the literature. Here, morphology of the palaearctic Coenagrion puella and Pyrrhosoma nymphula is compared. C. puella has recently expanded its range from the N of England into Scotland, P. nymphula does not exhibit a range margin in the United Kingdom and has established populations in northern Scotland. Evidence for spatially correlated variation in body size across the sampling sites between the 2 spp. and a deviation in patterns of dispersal-related morphology are demonstrated. P. nymphula exhibited very weak relationships between dispersal-related morphology (wing loading and thorax:abdomen mass ratio) and latitude. These trends appear to indicate compensatory growth patterns in cooler environments. The limits of this compensation for conditions that are close to the limits of a species' tolerance may contribute to the determination of the range margin. Greater variation in morphology towards the range margin has been observed in previous studies in Odon. As such, the location of the sampling sites relative to the range margin of each sp. (closer in C. puella than P. nymphula) is highlighted as a potential contributing factor to the variation observed.

(17396) JIANG, S.-h., Z.-y. MENG, X.-q. CHEN & G.-j. LI, 2008. Application of rDNA sequence analysis in insect systematics. *Entomotaxonomia* 30(3): 225-238. (Chin., with Engl. s.). – (First Author: Sch. Appl. Chem. & Biol. Technol., Shenzhen Polytechnic, Shenzhen, Guangdong-518055, China).
DNA analysis is used extensively in insect systematics. Here, the structure of ribosomal DNA, the significance in systematics and the application in the study of insect phylogenetic relationships among different groups and levels are described systematically. The methods of DNA sequence analysis are introduced briefly, and application prospects are forecast. The work on Odon. is represented by a reference to the paper listed in *OA* 14138.

(17397) JURA, F.G., 2008. Tadpole-odonate larvae interactions: influence of body size and diel rhythm. *Aquat. Ecol.* 2008, 7 pp. – DOI 10.1007/s10452-007-9110-6. – (Lab. Fotobiol., Cent. Reg. Bariloche, Univ. Nac. Comahue, Quintral 1250, AR-8400 San Carlos de Bariloche, Rio Negro).
Several studies have shown that prey and predator body size may affect the outcome of predator-prey interactions. However, few studies have taken in account the changes on predator-prey interactions over 24 h. In a tropical freshwater system it is evaluated how predator and prey size, and their diel rhythm in activity influenced the interaction between Physalaemus pustulosus tadpoles and Rhinoaeschna larvae. Tadpoles of different size classes were exposed to 2 size classes of the dragonfly larvae. Feeding trials were conducted during day and night. Tadpole activity showed a diel rhythm and affected size-selective predation of the smalles dragonfly larvae, but not of the larger ones. Predator and prey size had a significant effect on the prey survivorship and prey size had a significant effect on the preference of the predator. The interaction between both factors was significant, indicating that they did not operate independently. It is concluded that the predator-prey interactions between odon. larvae and anuran tadpoles were mainly affected by the size of the prey and the predator, and less by the diel activity pattern of the prey.

(17398) KROLAK, E. & M. KORYCINSKA, 2008. Taxonomic composition of macroinvertebrates in the Liwiec river and its tributaries (central and eastern Poland) on the basis of chosen physical and chemical parameters of water and season. *Pol. J. environ. Stud.* 18(1): 39-50. – (Dept Ecol. & Envir. Prot., Univ. Podlasie, Prusa 12, PO-08110 Siedlce).
The taxa are treated familywise only, incl. 8 odon. fam. Due to odon. emergence in summer, in the samples collected then their number is reduced, thus, the summer does not seem to be a good season for collecting odon. samples for biomonitoring. Odon. were more varied in the autumn samples than in the spring ones.

(17399) LOK, A.F.S.L., 2008. The biology and distribution in Singapore of Lestes praemorsus decipiens

Kirby, 1893. *Nature Singapore* 2008(1): 27-30. – (Dept Biol. Sci., Natn. Univ. Singapore, 14 Science Dr. 4, Singapore-117543, Singapore)
The ssp. was recorded in 1997 from MacRitchie Reservoir and ha since been found at several other localities in Singapore. Notes are provided on its habitats and behaviour. Structural differences from the nominate ssp. are outlined and some photographs are presented.

(17400) LYTLE, D.A., J.D. OLDEN & L.E. McMULLEN, 2008. Drought-escape behaviors of aquatic insects may be adaptations to highly variable flow regimes characteristic of desert rivers. *SWest. Nat.* 53(3): 399-402. (With Span. s.). – (First Author: Dept Zool. Oregon St. Univ., Corvallis, OR 97331, USA).
On 10-IV-2007, Progomphus borealis larvae were observed in a drying reach of the Santa Maria river (Arizona, USA), moving upstream in large numbers (690 larvae/m²). They burrowed to just underneath the surface of the substrate, so most larvae remained hidden beneath sand as they moved. However, numerous burrows left over from this movement were apparent after the water receded. Larvae were moving upstream at 0.17 cm/s. Although burrowing rate was slightly greater than the rate of stream recession of 0.16 cm/s, larvae occasionally left the substrate to swim actively in short bursts of ca 10 cm. This behaviour increased their average speed and allowed them to excape from the recession point and to arrive at perennial reaches of the river before being overtaken by drought. Larvae of Hetaerina americana were not observed moving upstream but were seen stranded in drying areas, often underneath mats of algae where they might be protected from desiccation. The proximate cues used to initiate the observed behaviour to escape drought by P. borealis are not known. Although vocalizations were not noticed during the observations, underwater vocalization in Progomphus remains a possibility.

(17401) MACAULAY, D., 2008. *Survey of the odonate fauna in Willmore Wilderness Park*. Prepared for Park Resour. Mngmt Coord. Br., Alberta Tourism, Parks & Recreation, Edmonton. ii+134 pp. – (Author's address not stated).
17 spp. are listed from the park, along with some annotations and precise data on all specimens collected; – Alberta, Canada.

(17402) MARCZAK, D., 2008. Z Kampinoskiego Parku narodowegu: ważki. – [From the Kampinoski National Park: dragonflies]. *Parki narodowe* 2008(3): 17-19. (Pol.). – (Author's address not stated).
The Park is situated W from Warsaw (Poland). Some of the interesting local spp. are highlighted (Aeshna affinis, A. viridis, Ophiogomphus cecilia, Leucorrhinia albifrons, Sympetrum pedemontanum).

(17403) NEISS, U.G., F.A.A. LENCIONI, N. HAMADA & R.L. FERREIRA-KEPPLER, 2008. Larval redescription of Microstigma maculatum Hagen in Selys, 1860 (Odonata: Pseudostigmatidae) from Manaus, Brazil. *Zootaxa* 1696: 57-62. (With Span. s.). – (Second Author: Rua dos Ferroviaros 55, Jardim Mesquita, BR-12300-000 Jacarei, SP).
The last-instar larva is redescribed and illustrated based on a reared larva, collected in a water-filled hole of a fallen tree trunk within an urban forest fragment in Manaus, Amazonas.

(17404) NEL, A., D.-Y. HUANG & G.-B. LIN, 2008. A new genus of isophlebioid damsel-dragonflies with "calopterygid"-like wing shape from the Middle Jurassic of China (Odonata: Isophlebioidea: Campterophlebiidae). *Eur. J. Ent.* 105(4): 783-787. – (First Author: Entomologie, Mus. Nat. Hist. Natur., 45 rue Buffon, F-75005 Paris).
Zygokaratawia reni gen. n., sp. n. is described and illustrated from Jiulongshan Formation of Inner Mongolia, China. Its wing shape is convergently similar to that of recent Zygoptera (Calopterygidae and several other Cenozoic clades), suggesting similar style of flight and habits, i.e. predation on small insects and flight along trees on river banks.

(17405) NORMA-RASHID, Y., L.F. CHEONG, H.K. LUA & D.H. MURPHY, 2008. *The dragonflies (Odonata) of Singapore: current status records and collections of the Raffles Museum of Biodiversity Research*. Ruffles Mus. Biodiv. Res., Singapore. 21 pp. – (First Author: Inst. Biol. Sci., Fac. Sci., Univ. Malaysia, Kuala Lumpur-50603, Malaysia; – other Authors: Raffles Mus. Biodiv. Res., Dept Biol. Sci., Natn. Univ. Singapore, Singapore-117546).
An annotated list is presented of the 117 spp. known to occur in Singapore, incl. 11 spp. that are here reported for the first time. In addition, a catalogue is provided of odon. specimens in the Raffles Mus., and historical records from museum collections are discussed.

(17406) NORONHA, C.R.S., J.F. BARBOSA & A.M. QUADROS, 2008. Dragonfly (Odonata) control in fish farming. *PUBVET, Londrina* 2(45), 6 pp. (Port., with Engl. s.). – (First Author: Cent. Fed. Educação Tecnológica, Caixa Postal 05, BR-39.800.000 Bambui , MG).
Some in Brazil used methods of mechanical, chemical and biological control of odon. in fish farming are briefly described and commented.

(17407) NOVELO-GUTIERREZ, R. & J.A. GÓMEZ-ANAYA, 2008. A comparative study of Odonata (Insecta) assemblages along an altitudinal gradient in the sierra de Coalcomán Mountains, Michoacán, Mexico. *Biodiv. Conserv.* 2008, 20 pp. – DOI 10.1007/s10531-008-9533-y. – (First Author: Depto Ent., Inst. Ecol., A.C., Apartado Postal 63, MX-91070 Xalapa, Veracruz).
Odon. diversity in the Coalcomán Mountain Range (CMR) was surveyed, and samplings were made during 2 yr in 8 streams along an altitudinal gradient. Presence-absence data were analyzed using non-parametric and parametric methods. β and γ diversities were estimated using Whittaker's and Lande's formulae, respectively. A total of 2526 adults and 489 larvae were captured, yielding 116 spp. (γ diversity), 44 gen. and 9 fam. 5 new spp. were discovered. The genus Argia was the most important contributor to Zygoptera diversity and total richness (γ diversity), yielding 40.4 and 14.7%, respectively. The non-parametric estimator Chao2 provided the closest theoretical estimate of species richness, and Clench's model fit the data well (R^2 ranged from 99.44 to 99.99) to explain a high proportion of the variance (98,8). It is concluded that β diversity is important at the landscape scale, supporting the hypothesis that Mexico is a β diverse country. The results triple the number of known Odon. spp. for Michoacán. Given the considerable richness of odon. at local and landscape scales, the results support the proposal of the CMR as a priority area for conservation and related research.

(17408) *ODONATRIX*. Bulletin of the Odonatological Section of the Polish Entomological Society (ISSN 1733-8239), Vol. 4, No. 2 (31 July 2008). (Pol., with Engl. s's). – (c/o Dr P. Buczyński, Dept Zool., UMCS, Akademicka 19, PO-20-033 Lublin).
Buczyński, P.: Dragonflies (Odonata) of the Kozlowieckie Forest (pp. 33-42); – *Bernard, R. & P. Buczyński*: Conservation status and habitat selection of Nehalennia speciosa (Charpentier, 1840) in Poland (pp. 43-60); – *Buczyński, P.*: Polish and to Poland dedicated odonatological papers, 6: 2007 and additions to 2006 (pp. 61-64); – *Buczyńska, E.*: Cartoon strip (p. 64).

(17409) OTT, J., 2008. Die Kleine Pechlibelle, Ischnura pumilio (Charpentier, 1825) (Odonata: Coenagrionidae) in der Pfalz: ein Profiteur von Regenrückhaltebecken, Naturschutzgewässern und der Klimaänderung. *Mainz. naturw. Arch.* 46: 233-261. (With Engl. s.). – (L.U.P.O., Friedhofstr. 28, D-67705 Trippstadt).
During the last decades, I. pumilio was not very common in Rhineland-Palatinate (W Germany) and it was rare in the central part of the "Pfälzerwald" Biosphere Reserve, though it was occasionally encountered in the Rhine valley and in the man-made shallow ponds at the lower altitudes at Haardtrand. In 2007, the sp. suddenly appeared at various sites in "Pfalzerwald", where it took advantage of lower water tables, caused by the climatic changes in the area. In order to settle there it had to negotiate several km of the intervening dense forest. The larvae live within a wide range of abiotic conditions: some of the waters had a pH of only 3.3, while the conductivity varied between 13 and 9109 µS/cm. They are able to survive for about 3 weeks in dried-out ponds. The possible ways of colonization are discussed in terms of larval development and voltinism, and the aspects of conservation and classification of I. pumilio in Red Lists are addressed.

(17410) *PROGRAMMES AND GENERALITIES [of] the 18th International Symposium of Odonatology, Nagpur, 5-9 November 2008*. Edited by R.J. Andrew. Issued by Hislop Coll., Nagpur. 34 pp. – (Available from: Dr R.J. Andrew, Dept Zool., Hislop Coll., Temple Rd, Civil Lines, Nagpur-440001, India).
Andrew, R.J. & D.B. Tembhare: Welcome address (p. 2); – *Inoue, K.*: Greetings of the President of the International Odonatological Foundation, S.I.O. (pp. 3-4); – *Organizing Committee* (pp. 5-6); – *General information* (pp. 7-8); – *Scientific programmes* (pp. 9-10); – *Social programmes* (pp. 11-12); – *Programme schedule* (pp. 13-24); – *List of participants* (pp. 25-34). – For the abstracts of papers, see *OA* 17382.

(17411) PRYKE, J.S. & M.J. SAMWAYS, 2008. Conservation of invertebrate biodiversity on a moun-

tain in a global biodiversity hotspot, Cape Floral Region. *Biodiv. Conserv.* 17: 3027-3043. – (Second Author: Dept Conserv. Ecol. & Ent., Cent. Agric. Biodiv., Fac. Agric., Univ. Stellenbosch, Private Bag XI, Matieland-7602, SA).
During the field work on Table Mt (Cape Peninsula, S Africa), odon. were sampled, identified and deposited in the Univ. Stellenbosch collection. A list of spp. is not provided. There was no correlation between the diversity of aerial and foliage invertebrates. In total, 216 spp. from 14 orders were recorded.

(17412) REN, D., A. NEL & J. PROKOP, 2008. New early griffenfly, Sinomeganeura huangheensis, from the Late Carboniferous of northern China (Meganisoptera: Meganeuridae). *Insect Syst. Evol.* 38: 223-229. – (Third Author: Dept Zool., Fac. Sci., Charles Univ., Vinična 7, CZ-12844 Praha-2).
Sinomeganeura huangheensis gen. n., sp. n. is described from Upper Carboniferous Namurian) of the Tupo Formation in N China (Ningxia Hui Autonomous Region). This taxon exhibits unique structure of the wing venation pattern. It is highly interesting in reference to the Namurian age known for the occurrence of 2 meganeurids until present. (Namurotypus Brauckmann & Zessin, 1989 and Shenzhousia Zhang & Hong, 2006) as well as the palaeogreographical position of the locality far from all sites in Laurussia. It is demonstrated that meganeurids with relatively small wings already coexisted with large spp. in theNamurian, as for the Stephanian and the Late Permian. Thus, Sinomeganeura demonstrates that the meganeurid diversity and wing venation disparity were comparable during the Namurian and the Stephanian, suggesting that this group already had a long history in the Early Carboniferus. Odonatoptera were probably the main, if not unique predators of the flying insects during the Late Paleozoic.

(17413) RUDOLF, V.H.W. & J. ARMSTRONG, 2008. Emergent impacts of cannibalism and size refuges in prey on intraguild predation system. *Oecologia* 157: 675-686. – (First Author: Mountain Lake Biol. St, Pembroke, VA, USA).
Many organisms undergo ontogenetic niche shifts due to considerable changes in size during their development. These ontogenetic shifts can alter the trophic position of individuals, the type and strength of ecological interactions across species, and allow for cannibalism within species. In this study it is examined if and how the interaction of a size refuge and cannibalism in the prey alters the dynamics of intraguild predation (IGP) systems. By manipulating the composition of large cannibalistic Aeshna umbrosa and predatory Anax junius larvae in mesocosms it is shown that the interaction of cannibals and predators was non-linear and increased the survival of prey. The structure of the final resource community shared by prey and predator differed between small and large dragonfly treatments but not within size classes across species. In general, the small prey stage showed similar shifts in microhabitat use and refuge use when exposed to either conspecific cannibals or predators, while large cannibals showed no clear anti-predator response. However, further behavioural experiments revealed that specific behavioural components, such as distances between individuals or number of movements, differed when individuals were exposed to either cannibals or predators. This indicates that individuals discriminated between conspecif or heterospecific predators. Furthermore, in similar experiments large cannibals and predators showed different behaviours when exposed to conspecifics rather than to each other. These changes in behaviour are consistent with the observed increase in prey survival. In general, the results indicate that cannibalism and ontogenetic niche shifts can result in behaviour-mediated indirect interactions that reduce the impact of the predator on the mortality of its prey and alter the interactions of IGP systems. However, they also indicate that size is not the sole determinant and that it is also necessary to account for the spp. identity when predicting the dynamics of communities.

(17414) SCHMIDT, E.G., 2008. Fliessgewässerlibellen am Schiffahrtskanal: das Beispiel Dortmund--Ems-Kanal im Münsterland. *Erweit. Zusammenf. Jtag. dt. Ges. Limnol.*, Münster 2007, pp. 160-166. – (Coesfelder Str. 230, D-48249 Dülmen).
17 spp. are listed. The fauna of the Dortmund-Ems Canal (W Germany) is dominated by Calopteryx splendens, Platycnemis pennipes and Gomphus vulgatissimus.

(17415) SCHOUTEN, M.A., P.A. VERWEIJ, A. BARENDREGT, R.M.J.C. KLEUKERS, V.J. KALKMAN & P.C. DE RUITER, 2008. Determinants of species richness patterns in the Netherlands

across multiple taxonomic groups. *Biodiv. Conserv.* 2008, 15 pp. – DOI 10.1007/s10531-008-9467-4. – (First Author: Dept Envir. Sci., Copernicus Inst. Sustainable Develpm. & Innovation, Univ. Utrecht, P.O. Box 80115, NL-3508 TC Utrecht).

The species richness patterns of 5 different species groups (mosses, reptiles and amphibians, grasshoppers and crickets, dragonflies and hoverflies) in the Netherlands (41,500 km²) were examined using sampling units of 5×5 km. The spatial patterns of species richness of the 5 groups were compared using Spearman's rank correlation, and a stepwise multiple regression generalized linear modelling (GLM) approach was used to assess their relation with a set of 36 environmental variables, selected because they can be related to the several hypotheses on biodiversity patterns. Species richness patterns of the 5 groups were to a certain extent congruent. The data suggest that environmental heterogeneity (in particular habitat heterogeneity) is one of the major determinants of variation in species richness within these 5 groups. It was found that for taxonomic groups comprising a low number of spp., the regression model explained more of the variability in species richness than for taxonomic groups with a large number of spp.

(17416) SIMAIKA, J.P. & M.J. SAMWAYS, 2008. An easy-to-use index of ecological integrity for prioritizing freshwater sites and for assessing habitat quality. *Biodiv. Conserv.* 2008, 15 pp. – DOI 10.1007/s10531-008-0484-3. – (Dept Conserv. Ecol. & Ent., Fac. AgriSci., Univ. Stellenbosch, Private Bag X1, Matieland-7602, SA).

Prioritizing and assessing the condition of sites for conservation action requires robust and ergonomic methodological tools. The authors focus here on prioritizing freshwater sites using 2 promising biodiversity indices, the Dragonfly Biotic Index (DBI) and Average Taxonomic Distinctness (AvTD). The AvTD had no significant association with either species richness or endemism. In contrast, the DBI was highly significantly associated with species richness and endemism, although the strengths of the associations were weak. These associations are related to how the sub-indices in the DBI are weighted, and how spp. are distributed geographically. Additionally, the DBI was found to be very useful for site selection based on its ability to measure ecological integrity, combined with level of threat, at multiple spatial scales. The AvTD was found to be useful principally for regional use. As the DBI is a low-cost, easy-to-use method, it has the additional use as a method for assessing habitat quality and recovery in restoration programs. The DBI operates at the species level, and is therefore highly sensitive to habitat condition and has great potential for environmental assessment and monitoring freshwater biodiversity and quality. Practical, worked examples of river restoration are given here. In view of the ease and versatility by which the DBI can be employed, its testing and possible integration into freshwater management and conservation schemes elsewhere in the world are recommended.

(17417) *SOUVENIR [of the] 18th INTERNATIONAL SYMPOSIUM OF ODONATOLOGY*, 2008. Hislop College, Nagpur; Maharashtra State Forest Department, Mumbai & South Asian Council of Odonatology, Nagpur. 58 pp. – (c/o Dr R.J. Andrew, Dept Zool., Hislop Coll., Temple Rd, Civil Lines, Nagpur-440001, India).

In accordance with Indian tradition, this booklet was produced as an extra gift to the participants of the Symposium. – A list of the members of the Organizing Committee (p. 2; 26 persons) is followed by a Welcome word from *R.J. Andrew & D.B. Tembhare* (p. 3), Greeting addresses by *K. Inoue* (pp. 5-6) and *B. Kiauta* (p. 7-8), and by 5 Messages to the Symposium by local dignitaries (pp. 9-17), incl. *B. Pachpute*, Minister for Forests of the Maharashtra Government (p. 9). In the 3 subsequent articles, the history of the city of Nagpur, that of the Hislop College (i.e. the host of the Symp.), and an outline of the principal information on the forests and wildlife in the state of Maharashtra are of odonatological bearing, viz.: *Tembhare, D.B.*: International Odonatological Foundation, Societas internationalis odonatologica (pp. 27-29; incl. a list of the preceding Int. Symp. Odonatol., 1971-2006); – *Andrew, R.J.*: South Asian Council of Odonatology, SACO (pp. 30-31); – Odonatology, the science of dragonflies and damselflies (pp. 32-36); – *Anonymous*: Nagpur and odonatology (pp. 37-42; incl. a list of 5 odonatol. PhD dissertations and of 49 other Nagpur research papers in the field of odonatology); – *Amjad, H.*: Why is it so important to study Odonata? (pp. 43-46); – and *Subramanian, K.A.*: Checklist of dragonflies and damselflies (Odonata) of India (pp. 47-58; 473 taxa).

(17418) TAKAHARA, T., Y. KOHMATSU, A. MARUYAMA & R. YAMAOKA, 2008. Benefit

of suites of defensive behavior induced by predator chemical cues on anuran tadpoles, Hyla japonica. *Behav. Ecol. Sociobiol.* 63: 235-240. – (First Author: Med. Inst. Bioregul., Kyushu Univ., 3-1-1 Maidashi, Higashi, Fukuoka, 812-8582, JA).
In this study, it is experimentally investigated how behavioural responses of H. japonica tadpoles to predator chemical cues affect their vulnerability to Anax parthenope julius larvae. The frequency of tadpoles attacked by larvae was lower when cues were present than when they were not, and most attacks occurred when tadpoles were mobile. When tadpoles were exposed to chemical cues, their swimming speed was quicker and swimming distance was longer, and the rates of being approached by a dragonfly larva were lower than in those not exposed to the cues. It was found that the tadpoles are induced by predator chemical cues not only to generally lower activity but also to swim in bursts (as an additional behaviour) and that the set of their behavioural responses reduces the vulnerability to dragonfly larvae.

(17419) TAKAHASHI, Y. & M. WATANABE, 2008. Male mate performance depending on the mating experience in the damselfly Ischnura senegalensis (Rambur) (Odonata: Coenagrionidae). *Jap. J. Ent.* (N.S.) 11(1): 13-17. (Jap., with Engl. s.). – (Grad. Sch. Live & Environ. Sci., Univ. Tsukuba, Tsukuba, Ibaraki, 305-8572, JA).
The coenagrionid ♀ ♀ exhibit colour dimorphism, andromorph and gynomorph. ♂ ♂ seem to switch reversibly their mate choice to the morphs by prior experience of encounters with ♀ ♀. To clarify the effect of mating experience on ♂ mate preference, binary choice experiments betweent he 2 ♀ morphs in I. senegalensis were conducted in the laboratory. Unexperienced ♂ ♂ that had been reared separately from ♀ ♀ after emergence showed fair selectivity, indicating that the innate ♂ mate preference was not biased. Binary choice experiments for ♂ ♂ that had been put into a small cage with a single ♀ in the morning were also conducted both in the afternoon and in the following morning. In the former, ♂ ♂ that mated with the ♀ during the morning significantly preferred the same ♀ morph, while ♂ ♂ that did not mate due to the ♀ rejection showed fair selectivity. In the latter, ♂ ♂ that mated with a ♀ during the morning of the previous day showed fair selectivity. These results indicate that the ♂ mate preference changes depending on the prior mating experience, and the biased ♂ preference disappears by the following morning.

(17420) TSUCHIYA, K. & F. HAYASHI, 2008. Surgical examination of male genital function of calopterygid damselflies (Odonata). *Behav. Ecol. Sociobiol.* 62: 1417-1425. – (First Author: Dept Biol., Tokyo Metropol. Univ., Minamiosawa 1-1, Hachioji, Tokyo, 192-0397, JA).
♂ genitalia show rapid and divergent evolution. It is rarely determined whether variation in ♂ genital morphology influences ♂ reproductive success. ♂ Zygoptera possess a unique aedeagus with a recurved head and spiny lateral processes, and most ♀ ♀ have 2 sperm storage organs, a spherical bursa copulatrix and a tubular spermatheca. Previous studies have indicated that the recurved head may remove bursal sperm, whereas the lateral processes remove spermathecal sperm. However, more direct evidence of these functions is needed. Sperm number in ♀ sperm storage organs was compared by interrupting copulation to examine sperm removal by the ♂. In Calopteryx cornelia, ♂ ♂ removed almost all bursal sperm, but only partially removed spermathecal sperm. In contrast, Mnais pruinosa ♀ ♀ store sperm primarily in the bursa, and ♂ ♂ removed only bursal sperm. In contrast, Mnais pruinosa ♀ ♀ store sperm primarily in the bursa, and ♂ ♂ removed only bursal sperm. To examine the functions of ♂ spiny lateral processes, mating behaviour was compared between control and experimental ♂ ♂ from which the lateral processes were removed (cut). In C. cornelia, cutting of the lateral processes resulted in a decreased number of abdominal movements during copulation and no removal of spermathecal sperm. The amount of bursal sperm removed during copulation also decreased in experimental ♂ ♂ compared to the unmanipulated ♂ ♂. However, in M. pruinosa, the experimental removal of ♂ lateral processes did not decrease the abdominal movements and little affected the removal of bursal sperm. Inter-specific differences between C. cornelia and M. pruinosa may be caused by variation in the strategies of ♀ sperm storage.

(17421) UHL, A., 2008. Ergebnisse einer Nachsuche nach den Libellenarten Lestes barbarus, Sympetrum flaveolum und S. meridionale. *NatSchutz südl. Oberrhein* (Beih.) 2008(2): 33-38. – (Ritterstr. 26, D-77746 Schutterwald).

An annotated list of records (2004, 2005) of the 3 spp. from the area between Offenburg and Freiburg, SW Germany.

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(17422) *DIGEST OF JAPANESE ODONATOLOGICAL SHORT COMMUNICATIONS*, No. 22 (Jan. 2009). – Compiled, translated and produced by K. Ishizawa (1644-15, Yamaguchi, Tokorozawa, Saitama, 359-1145, JA).
Kano, K.: Locality and sexual differences in the abdominal lengths and hind-wing length in Copera tokyoensis (pp. 1-4); – *Minamide, Y.*: Curious behaviours of Calopteryx cornelia Selys larvae kept in captivity (pp. 4-10).

(17423) *ODONATOLOGICAL ABSTRACT SERVICE* (ISSN 1438-0269), No. 23 (Jan. 2009). 72 pp. – (Distributor: M. Schorr, Schulstr. 7/B, D-54314 Zerf).
Abstracts Nos 7165-7573 of works published in 1997-2009.

(17424) SMIT, J.T. & M. REEMER, 2009. De soortenlijst van het Naturalis-terrein. *Nieuwsbr. europ. invert. Surv. Nederland* 48: 16-28. (Dutch). – (Naturalis, P.O. Box 9517, NL-2300 RA Leiden).
An annotated checklist of 1569 animal, fungi and plant spp. (incl. 13 odon. spp.) recorded from the 7 ha "garden" plot of the National Nat. Hist. Mus., Leiden, the Netherlands.

(17425) *TOMBO. ACTA ODONATOLOGICA JAPONICA* (ISSN 0495-8314), Vol. 51 (13 Feb/ 2009). (Engl. & Jap., mostly with Engl. titles). – (c/o Dr S. Eda, 3-4-25 Sawamura, Matsumoto, Nagano, 390-0877, JA).
In memoriam Dr Juzo Sawano (1912-2007) (pp. 1-11); – *Eda, S., Y. Saito & A. Sasamoto*: A checklist of publications by Dr Juzo Sawano (pp. 12-15); – *Hämäläinen, M., G.T. Reels & H. Xhang*: Descriptions of Aristocypha aino sp. nov. from Hainan, with notes on the related species (Zygoptera: Chlorocyphidae) (pp. 16-22); – *Kawashima, I. & A. Sasamoto*: Description of the last instar larva of Macromia pinratani vietnamica Asahina, 1996 (Anisoptera: Corduliidae: Macromiinae) from northern Vietnam, Indochina (pp. 23-28); – *Iwata, N., N. Akieda, N. Hirai & M. Ishii*: Seasonal prevalence of the migratory dragonfly, Pantala flavescens (Anisoptera, Libellulidae), in Sakai city, Osaka prefecture, central Japan (pp. 29-37); – *Jinguji, H. & H. Tsuyuzaki*: Stadium construction and development of Sympetrum frequens (Selys), S. darwinianum (Selys) and S. infuscatum (Selys) larva (pp. 38-42); – *Taguchi, M.*: The area of woodlands to fulfill the requirements of the Odonata in urban area and the evaluation of the landscape by the odonate assemblages of woodlands (pp. 43-51); – *Naraoka, H.*: Sex ratio biased to female at the emergence time of Davidius phaon (Selys, 1838) (pp. 52-57); – *Nakahara, M. & K. Higashi*: A new record of Sympetrum fonscolombei from Saga prefecture (pp. 58-59); – *Kawashima, I. & I. Tsuji*: A heterogeneric copulation between Sympetrum infuscatum (Selys, 1883) ♂ and Orthetrum albistylum speciosum (Uhler, 1853) ♀ (pp. 60-61); – *Eda, S.*: Supplement on a recollection of Lestes temporalis Selys as a noxious to mulberry and fruit trees (p. 62); – Dr Philip S. Corbet (1929-2008) in memoriam (pp. 62-63). Brief notes on the 2007 and 2008 annual meetings of the Japanese Society for Odonatology appear on pp. 11, 15 and 51, respectively, with a group phot. of the participants. – Cover phot of "A male Anotogaster sieboldii (Selys) patrolling above a stream in Katano, Osaka pref. in Sept 2005" was provided by *A. Ozono*.