LARVAL MORPHOLOGY OF THREE SPECIES OF THE GENUS *HADROTHEMIS* KARSCH (ANISOPTERA: LIBELLULIDAE)

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The larval morphology of *H. scabrifrons*, *H. coacta* and *H. camarensis* is described for the first time from specimens collected in East Africa, and a comparison among the species is given.
THE LARVA OF POLYTHORE SPAETERI
BURMEISTER & BÖRZSÖNY, WITH COMPARISON
TO OTHER POLYTHORID LARVAE AND MOLECULAR
SPECIES ASSIGNMENT
(ZYGOPTERA: POLYTHORIDAE)

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The larva from the area of Panguana (Huanuco prov., Peru) is described. This constitutes the first description of a Polythore. P-distance measuring of a 790 bp long fragment of the mitochondrial COI gene was used as a tool for the assignment of the larva. The low degree of sequence divergences between larval and imaginal COI sequences leaves no doubt about conspecificity. The use of scanning electron microscopy gives an impression of some morphological characters not mentioned so far concerning polythorid larvae. Comparison of the P. spaeteri larva with the few currently available descriptions of polythorid larvae shows that characterisation of the larvae at generic level is not possible until more larval specimens of the family are examined.
SEXUAL DIMORPHISM IN WING CELL PATTERNS IN XANTHOCNEMIS ZEALANDICA McLACHLAN (ZYGOPTERA: COENAGRIONIDAE)

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In many odon. spp. ♂ and ♀ differ phenotypically; the most commonly noticed characters which exhibit sexual dimorphism are size, and body- and wing colouration. Although the odon. wing venation has been studied intensively, very limited data on sexual dimorphism exist. In this study distinct cell groups in the wings of X. zealandica were compared between ♂♂ and ♀♀. Of the 6 cell groups studied two were sexually dimorphic. Reasons for the observed differences are discussed.
IMMUNOCYTOCHEMICAL DEMONSTRATION OF SOME VERTEBRATE PEPTIDE HORMONE-LIKE SUBSTANCES IN THE MIDGUT ENDOCRINE CELLS IN TRAMEA VIRGINIA (RAMBUR) (ANISOPTERA: LIBELLULIDAE)

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The present immunocytochemical study reveals the presence of well-defined endocrine cells, intermingled with the columnar cells of the epithelium in the midgut region of the alimentary canal of T. virginia. The midgut endocrine cells are of 2 types, the open-type midgut endocrine cells (OMEC) with a long tubule opening into the lumen of the midgut and close-type midgut endocrine cells (CMEC) which are spherical in shape and devoid of extending tubules. Various gastrointestinal hormone-like substances are localized in respective types of midgut endocrine cells in different regions of the midgut i.e. anterior, middle and posterior. The NPY, FMRFamide and β-endorphin were localized in the open-type while substance P, gastrin, CCK and VIP in the close-type midgut endocrine cells. The midgut endocrine cells in T. virginia differ from each other in their location, cytomorphological and immunocytochemical characteristics representing different types of endocrine cells. Functional significance of these myotropic and vertebrate gastrointestinal hormone-like substances in the midgut endocrine cells of T. virginia is discussed.

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FECUNDITY AND OVIPOSITION IN MORTONAGRION HIROSEI ASAHINA, M. SELENION (RIS), ISCHNURA ASIATICA (BRAUER) AND I. SENEGALENSIS (RAMBUR), COEXISTING IN ESTUARINE LANDSCAPES OF THE WARM TEMPERATE ZONE OF JAPAN (ZYGOPTERA: COENAGRIONIDAE)

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Adults of the 4 spp., inhabiting an estuarine landscape that includes reed communities and rice paddy fields established on water of varying saline concentration in Mie prefecture, Japan, were studied. The fecundity of Ischnura spp. was higher than that of Mortonagrion spp. I. senegalensis contained the largest number of mature, submature, and immature eggs with the smallest mature egg size, whereas M. selenion contained the smallest number of immature eggs with the largest mature egg size. During a 3-day laboratory oviposition experiment without food, all ♀♀ developed eggs, resulting in a greater number of mature eggs than was originally contained. Most of the eggs that developed to maturity were laid by M. selenion and I. asiatica, while M. hirosei laid only half of the number laid by either of these. The oviposition process of the 4 spp. is discussed from the viewpoint of their larval habitat selection.

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THE ODONATA OF SOUTH URAL, RUSSIA, WITH SPECIAL REFERENCE TO ISCHNURA ARALENSIS HARITONOV, 1979

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The odon. fauna of S. Ural (Russia), as known from literature data and new collections, is composed of 59 spp. Coenagrion ecornutum, Ischnura pumilio, Somatochlora graeseri and Selysiothemis nigra are first records for S. Ural; the presence of Ischnura aralensis Haritonov, 1979 (syn. I. haritonovi Dumont, 1997), Aeshna cyanea, Anax imperator and Libellula depressa is confirmed, but that of Pyrrhosoma nymphula, Sympecma fusca, Cordulegaster boltonii and Libellula fulva is not. Aeshna undulata Bartenev, 1909 is a probable synonym of A. junccea Linnaeus, 1758. I. aralensis, C. ecornutum, Enallagma cyathigerum risi and S. graeseri were found W as well as E of the Ural River, and thus are part of the fauna of Europe. Several western spp. reach their limit of eastward extent in S. Ural and, conversely, several eastern (Siberian) spp. reach their limit of westward extent there too. The range of I. aralensis is discussed in the light of the contractions and expansions of the Caspian-Aral lakes during the Late Pleistocene. The current disjunct positions of its colonies is understood as the result of the present phase of aridity in middle Asia.
SHORT COMMUNICATIONS

FINE-STRUCTURAL CHANGES IN THE EGG CHORION OF *BRADINOPYGA GEMINATA* (RAMBUR) INDUCED BY PAPER MILL EFFLUENT (ANISOPTERA: LIBELLULIDAE)

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The egg chorion of the dragonfly *B. geminata* undergoes major structural changes when incubated in paper mill effluent. The exochorion becomes blemished, marred and perforated. It bunches into a granular condition and looses its jelly-like original identity. The endochorion develops cracks and is pitted with holes. The hexagonal demarcations of the endochorion plates are obliterated and replaced by a network of angular surface reticulations. The micropylar stalk and the circular basal ridge dissolve and distort the micropylar apparatus.
Using a nylon filament implant inserted in the thorax, it was tested whether there were immune ability and size differences between territorial and nonterritorial \( \delta \delta \) that gather in lentic aquatic sites. It was found that territorial \( \delta \delta \) mounted a larger melanin-based immune response than nonterritorial \( \delta \delta \). This is coherent with current results in other odon. and is interpreted as territorial \( \delta \delta \) being in better condition than nonterritorial \( \delta \delta \). However, there was no size difference between the territorial and nonterritorial individuals. This suggests that size may be a poor predictor of immune ability.
TWO NEW ZYGOPTERA SPECIES FROM PAPUA NEW GUINEA (PROTONEURIDAE, COENAGRIONIDAE)

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Nososticta acudens sp. n. and Papeagrion nigripedum sp. n. from Papua New Guinea are described, both from lowland rainforest in Gulf prov. (Dark-End Lumber, 3-X-1999). Holotype \(\delta\) are deposited at SAMA, Adelaide, Australia. Diagnostic characters of the adult \(\delta\) are illustrated and the affinities of both spp. are discussed.