

## First record of *Pantala flavescens* from the Azores (Odonata: Libellulidae)

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**Abstract.** A male of *Pantala flavescens* (Fabricius, 1798) was collected on São Miguel island, Azores, on 02-xi-2014. This specimen constitutes both the first record of the species in the Azores and its northernmost record in Macaronesia. The distribution of the species in the Macaronesian islands and the possible origin of the Azorean specimen is briefly discussed.

**Key words.** Dragonfly, Anisoptera, migration, island, Macaronesia

## Habitat choice of *Cordulegaster vanbrinkae* in Iran (Odonata: Cordulegastridae)

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**Abstract.** The occurrence of *Cordulegaster vanbrinkae* was studied in Gilān and Māzandarān provinces in northern Iran in July 2014. Ten localities demonstrated the occurrence of *C. vanbrinkae* at elevations from 169 to 1,424 m a.s.l. Larvae were found at seven localities and oviposition was observed at two localities. A total of 65 males, five females, 95 larvae, and 32 exuviae were found. Habitats were classified into the following types: a) narrow, shallow streams in forests at middle and higher altitudes; b) boulder-stepped shaded forest streams; c) deep cut forest streams with gravel banks, drying to intermittent pools; and d) broader sunlit rivers.

**Key words.** Dragonfly, Anisoptera, faunistics, new records, habitat preference, bionomy, Alborz Mts.

## Habitat correlates of Odonata species diversity in the northern Western Ghats, India

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**Abstract.** Sixty-two localities from Sahyadri Tiger Reserve, Maharashtra State, India, were surveyed for habitat correlates of Odonata diversity. Proximate habitat variables (canopy cover, area of water spread on transect, and altitude) and broad scale environmental variables derived from climate database were used. Seventy species were recorded during the survey. *Vestalis apicalis* was found to be the most abundant species. Multiple regression analysis failed to resolve relationship among variables. Proximate habitat variables, except altitude, showed slightly higher contribution in shaping species richness and diversity than broad-scale habitat variables. Canonical correspondence analysis based on species abundance data and multiple variables suggested that canopy cover and area of water on the transect are driving species assemblages. Almost all of the Western Ghats endemics recorded during the survey were found to be associated with high canopy forests and streams, suggesting the critical habitat requirement of these species. The study provides baseline and local habitat association data on Odonata, which can be used as evidence in the conservation of the Sahyadri Tiger Reserve corridor which is under threat of forest felling.

**Key words.** Dragonfly, Maharashtra, canopy cover, endemic, biodiversity, CCA, poisson multiple regression

**Larval community dynamics in an artificial habitat  
created for conservation of a local population  
of the endangered brackish water damselfly,  
*Mortonagrion hirosei*  
(Odonata: Coenagrionidae)**

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**Abstract.** Brackish water ecosystems in estuaries are highly threatened due to land development, the improvement of embankments, and reclamation. Several threatened species of dragonflies and damselflies inhabit these ecosystems. The brackish water damselfly, *Mortonagrion hirosei* Asahina, 1972, has been an important focus of conservation studies. Here, we describe a conservation project for *M. hirosei* begun in 2003, and review the data collected in order to quantify details of the species' life cycle, especially larvae and larval environment. An artificially established reed community was created as a habitat for this damselfly, and water depth, salinity, and water temperature in the reed bed were continuously monitored thereafter. Because this damselfly is univoltine, the number and distribution of the odonate larvae in the experimental habitat in May, or presence of last-instar larvae of *M. hirosei*, were considered suitable indices of colonisation success. Since many odonate adults, including *M. hirosei*, visited the habitat in the first year and laid eggs, high larval diversity was found in the second year. Although the salinity of water in the reed bed varied because cyclical tidal fluctuations, the saline water gradually excluded odonate larvae that inhabit freshwater only. However, *M. hirosei* survived, and the larval population increased year by year. Consequently, the odonate larval diversity in the artificial habitat decreased, while the population of *M. hirosei* was maintained.

**Key words.** Dragonfly, Zygoptera, salinity, Common reed, *Phragmites australis*, Japan

# Can the use of more selective insecticides promote the conservation of *Sympetrum frequens* in Japanese rice paddy fields (Odonata: Libellulidae)?

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**Abstract.** The effect of two relatively selective nursery-box-applied insecticides on *Sympetrum frequens* larvae and adults as substitutes for the commonly used insecticides, imidacloprid and fipronil, was examined using an experimental micro-paddy lysimeter (MPL) system. Fifty hatched larvae were placed on the soil surface of separate MPLs that had been treated with imidacloprid, fipronil, dinotefuran, and cartap hydrochloride, as well as an untreated control MPL. At 30 days after transplantation, the complete absence of *S. frequens* larvae and exuviae in the imidacloprid and fipronil-treated MPLs was remarkable. In the control, cartap- and dinotefuran-treated MPLs, the mean number of larvae was  $31.0 \pm 6.0$ ,  $27.0 \pm 6.0$ , and  $6.3 \pm 1.5$ , respectively. No *S. frequens* adults were observed later in the imidacloprid- and fipronil-treated MPLs. The rate of emergence did not differ significantly among the control, cartap- and dinotefuran-treated MPLs. However, the mean head width of *S. frequens* in the dinotefuran-treated MPL was significantly narrower than that of *S. frequens* in the control and cartap-treated MPLs. The mean  $EM_{50}$  in the cartap-treated MPL was significantly longer than that in the control- and dinotefuran-treated MPLs. The findings showed that the ecological impact of cartap on *S. frequens* was slightly less than the application of fipronil, imidacloprid and dinotefuran to rice paddy fields.

**Key words.** Dragonfly, Anisoptera, microcosm, cartap, imidacloprid, fipronil

***Aeshna vercanica* sp. nov. from Iran  
with a new insight into the *Aeshna cyanea*-group  
(Odonata: Aeshnidae)**

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**Abstract.** *Aeshna vercanica* sp. nov. is described and illustrated. The male holotype and four male paratypes were collected on 15-vii-2013 in the Hyrcanian forest of the Alborz Mountains, Māzandarān province, northwestern Iran. A specimen collected on 29-vi-2002 in the Talysh Hills, Lankoran area, Azerbaijan, also belongs to the new species. In July 2014 the species, including females, was recorded again at the type locality and additionally ca 400 km further east in Golestān province. Males are similar to *Aeshna cyanea* in the structure of genitalia and terminalia but differ in head morphology, pterostigma length, colour pattern, and behaviour. Females have small abdominal blue or turquoise postero-median dorsal spots which are absent on S9 and S10, thin green antehumeral stripes, a less robust appearance than females of *A. cyanea*, and are more slender and longer. The range of *A. vercanica* sp. nov. covers the Hyrcanian forest along the southern margin of the Caspian Sea. Analysis of the barcoding COI sequence of DNA confirmed that *A. vercanica* sp. nov. is separated from *A. cyanea* by a genetic distance of ca 4%. The ITS gave a similar result. A haplotype map could not derive *A. vercanica* sp. nov. directly from *A. cyanea*. They are thus related but different species, and we suggest the common ancestor lived in pre-Pleistocene times. Analysis of *A. cyanea* specimens from across its range also revealed a western clade from the Maghreb to Central Europe. Populations from the Caucasus to Eastern Europe were polytomous, a common scenario for post-glacial invaders. A molecular comparison of the species pair *A. juncea* and *A. subarctica* showed these to be even more closely related than *A. cyanea* and *A. vercanica* sp. nov.

**Key words.** Dragonfly, Anisoptera, new species, Alborz Mountains, Caspian Sea, Hyrcanian forest

**Description of *Echo candens* sp. nov.  
from western Yunnan, China  
(Odonata: Calopterygidae)**

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**Abstract.** A new calopterygid damselfly species *Echo candens* sp. nov. (holotype ♂ from Dehong, Yunnan, China) is described and illustrated for the male sex. The supposed female of this species is shown in a field photograph, taken in Kachin State in Burma. The new species is compared with known species in genus *Echo* and a key to males of all species is provided.

**Key words.** Dragonfly, damselfly, Zygoptera, new species, key

**Taxonomic and faunal notes on  
*Macromia* Rambur, 1842 from Cambodia  
(Odonata: Macromiidae)**

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**Abstract.** Five species of *Macromia* were recently collected in Cambodia. For *Macromia aculeata*, this is the second finding of the species since its description in 1927. This species is very close to *Macromia arachnomima*, described from Borneo, but comparison of the respective holotypes proved them as different species. Records of *M. arachnomima* from Thailand, Laos, and the Malay Peninsula need to be reconsidered. The closely related species *Macromis cincta* and *Macromia cupricincta* have both been found in Cambodia; their diagnostic characters are discussed. *Macromia berlandi* is supposed to be a northern subspecies of *M. cupricincta*. Variation in *Macromia chaiyaphumensis* and *Macromia septima* is considered, and a female of the former is described. Controversies in grouping of Asian *Macromia* species are discussed. Notes on habitats and behaviour of the species considered are briefly provided.

**Key words.** Dragonfly, Anisoptera, synonymy, *Macromia aculeata*, *Macromia arachnomima*, *Macromia cincta*

**The genus *Nososticta* Hagen  
(Odonata: Platycnemididae)  
from the Papuan region  
with descriptions of ten new species group taxa**

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**Abstract.** The males and, when available, females of ten new species and subspecies of *Nososticta* are described from the Papuan region. They are: *Nososticta caerulea* sp. nov. (♂ holotype: Papua New Guinea, Upper Sepik Basin, 09-vi-2010, ♀ described), *Nososticta finisterrae satisbona* ssp. nov. (♂ holotype: Papua New Guinea, Goodenough Island, 26-x-1953), *Nososticta interrupta* sp. nov. (♂ holotype: Indonesia, Papua Province, Kabupaten Asmat, Vriendschap R., 21–25-vii-2009), *Nososticta kaizeii* sp. nov. (♂ holotype: Indonesia, Papua Province, Yapen Island, Ambaidiru village, 15-vii-2006, ♀ described), *Nososticta azurosignata* sp. nov. (♂ holotype: Papua New Guinea, Survey Site 2, Sepik Basin, 25-ii-2010), *Nososticta longicauda* (♂ holotype: Papua New Guinea, Darai Plateau, 24-vii-2003), *Nososticta manuscola* sp. nov. (♂ holotype: Papua New Guinea, Manus Island, 23-ix-2011, ♀ described), *Nososticta parafonticola* sp. nov. (♂ holotype: Papua New Guinea, Upper Sepik Basin, 10–11-xii-2009, ♀ described), *Nososticta tricolorata* sp. nov. (♂ holotype: Papua New Guinea, Upper Sepik Basin, 01-xii-2009) and *N. truncata* sp. nov. (♂ holotype: Papua New Guinea, Ivimka camp, Lakekamu, 15-xi-1996). In addition females of *N. africana* Schmidt, 1944, *N. aurantiaca* (Lieftinck, 1938) and *N. hiroakii* Sasamoto, 2007 are described and the morphology and variability of a number of additional species is discussed. Diagnostic characters of the available genders are illustrated, habitat conditions are given and their affinities are discussed. Live photos of selected species are presented. Keys to the males of all *Nososticta* species known from New Guinea and the Solomon Islands, and to the described females from this region are included. *Nososticta lorentzii* Lieftinck, 1938 is considered a synonym of *N. nigrifrons* (Ris, 1913) (syn. nov.).

**Key words.** Dragonfly, damselfly, Zygoptera, new species, Papua New Guinea, Indonesia, New Guinea, Solomon Islands, Aru Islands, Raja Ampat Islands