

**A PHYLOGENY OF *CELITHEMIS* INFERRED FROM
MITOCHONDRIAL AND NUCLEAR DNA SEQUENCE DATA
AND MORPHOLOGY
(ANISOPTERA: LIBELLULIDAE)**

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Received November 9, 2007 / Reviewed and Accepted December 14, 2007

The dragonfly genus *Celithemis* consists of 8 spp., some of them common and brightly colored, that are confined largely to eastern North America. Several spp. have been used in behavioral, ecological, and morphological studies, but their intrageneric phylogeny is unclear. In this paper is provided a phylogeny based on morphology and on data from mitochondrial and nuclear DNA sequences of multiple individuals of each species. The genus appears to be monophyletic, with one nested species pair (*C. amanda* + *C. martha*) receiving strong bootstrap support by both parsimony or maximum-likelihood criteria as well as high Bayesian posterior probability. A second group (*C. bertha*, *C. elisa*, *C. ornata* and *C. fasciata*) is well-supported in Bayesian analysis but only weakly by parsimony and maximum-likelihood bootstrap values. *C. verna* and *C. eponina* are probably basal to both these groups, but their relationship to each other is unclear. All individuals assigned to a species recognized on morphological grounds were recovered as monophyletic. The problematic taxa, *C. monomalaena* and *C. bertha leonora*, are shown definitively to be synonyms of *C. fasciata* and *C. bertha*, respectively.

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DIFFERENCES IN IMMUNE ABILITY DO NOT CORRELATE WITH PARASITIC BURDEN IN TWO ZYGOPTERA SPECIES (CALOPTERYGIDAE, COENAGRIONIDAE)

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Received June 27, 2007 / Revised and Accepted October 4, 2007

Differences in phenoloxidase (PO) and hydrolytic enzymes (HE) activity, two key components in insect immune ability, were investigated in *Hetaerina americana* and *Argia tezpi*, to see if they are correlated with patterns of gregarine and mite infection. The prediction was that the sp. with the more robust immune responses would show a less intense parasitic burden. Fully mature adults of both sexes were used. No clear pattern was found: *H. americana* had higher PO activity while *A. tezpi* had higher HE activity but the latter sp. had a higher parasitic load for both parasites. Several possible explanations are discussed. However, it seems most likely that either the immune responses measured may be traded-off with other non-immune functions in which both spp. differ in investment or that both immune components may be traded-off with each other.

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**IMMUNOCYTOCHEMICAL LOCALIZATION OF SOME
AMINERGIC AND PEPTIDERGIC NEUROSUBSTANCES
IN THE CEPHALIC NEUROSECRETORY SYSTEM OF THE
DRAGONFLY, *TRAMEA VIRGINIA* (RAMBUR)
(ANISOPTERA: LIBELLULIDAE)**

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Received November 6, 2006 / Revised and Accepted October 15, 2007

An immunocytochemical study showed the presence of 7 neurosubstance-like materials: FMRFamide, neuropeptide-Y (NPY), substance-P, serotonin, gastrin, cholecystokinin (CCK) and vasoactive intestinal peptide (VIP) in the median, lateral, ventral and optic neurosecretory cells groups (MNC, LNC, VNC and ONC, respectively) in the brain and in the corpora cardiaca (CC) of the adult, *T. virginia*. In the MNC cell type A showed NPY- and serotonin- while B and C cell types showed NPY-, serotonin-, substance P- and CCK-like positive immunoreaction. The B cell type in LNC showed FMRFamide-, NPY- and serotonin- and the C cell type showed only NPY and serotonin-like positive immunoreaction. In VNC group, the B cell type showed substance P- and gastrin-, while the C cell type showed substance P- and gastrin- and VIP- like positive immunoreaction. B and C cell types of ONC group showed substance P- and serotonin-like positive immunoreaction. The CC showed only NPY-like positive immunoreactive intrinsic neurosecretory cells. The functional significance of these myotropic and vertebrate gastrointestinal hormone-like substances in the cephalic neurosecretory system of *T. virginia* is discussed.

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**POPULATION GENETIC DIFFERENTIATION IN THREE
SYMPATRIC DAMSELFLY SPECIES IN A HIGHLY
FRAGMENTED URBAN LANDSCAPE
(ZYGOPTERA: COENAGRIONIDAE)**

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Received July 24, 2007 / Revised and Accepted November 12, 2007

The AFLP (Amplified Fragment Length Polymorphism) technique was used to compare the levels of genetic diversity and differentiation among *Paracercion calamorum*, *Ischnura senegalensis* and *I. asiatica* and to compare the genetic structure of populations found in highly fragmented urban habitats to populations in relatively continuous rural habitats. For all 3 spp., high genetic diversity was found in both areas. However, population genetic differentiation among urban populations was approximately twice that of rural populations, indicating that movements between habitat patches are more restricted in urban areas, probably due to human disturbances that may function as barriers. Inter-specific differences regarding genetic diversity and differentiation are further discussed in terms of habitat specificity.

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SHORT COMMUNICATIONS

**NOTES ON THE SYNONYMY, DISTRIBUTION AND THREAT
STATUS OF *ELATTONEURA OCULATA* (KIRBY, 1894),
AN ENDEMIC DAMSELFLY FROM SRI LANKA
(ZYGOPTERA: PROTONEURIDAE)**

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Received August 2, 2007 / Revised and Accepted December 19, 2007

Based on an examination of the material in the Natural History Museum in London, *Elattoneura bigemmata* Liefstinck, 1971 is a junior synonym of *E. oculata* (Kirby, 1894). A map of the currently known distribution of the sp. is provided. According to the IUCN criteria, due to its very small area of occupancy in SW Sri Lanka and pressure on its habitat, *E. oculata* is to be classified as globally endangered (EN).

***HETERAGRION ARCHON* SPEC. NOV.
FROM THE COASTAL CORDILLERA OF VENEZUELA
(ZYGOPTERA: MEGAPODAGRIONIDAE)**

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Received September 11, 2007 / Revised and Accepted December 7, 2007

The new sp. is described and illustrated from a single ♂, which is compared with the holotype ♂ of *H. palmichale* Hartung. The two differ in colour pattern of head and shape of cerci. A map showing distribution of all four species of *Heteragrion* Selys occurring north of the Orinoco River is provided.

***MACROMIDIA SHIEHAE* SPEC. NOV.,
A NEW DRAGONFLY FROM JIANGXI, CHINA
(ANISOPTERA: CORDULIIDAE)**

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Received November 18, 2007 / Revised and Accepted January 8, 2008

The new sp. is described and illustrated. Holotype ♂: China, Jiangxi: Lushan Mt (Haihui), 31-V-2004; deposited in Nanjing Forestry University, Nanjing, China. It is related to *M. ellenae* Wilson and *M. hangzhouensis* Zhou & Wei, but it is differentiated from these by having the postclypeus with yellow on anterior margins, the median lobe of the prothorax with four fine, pale yellow streaks, thorax with 5 yellow stripes, and nodal index of fore- and hindwings lower than in any of the other 4 *Macromidia* spp. described from China.

**DESCRIPTION OF THE ADULT MALE AND LARVA
OF *BRECHMORHOGA ARCHBOLDI* (DONNELLY)
FROM THE FRENCH WEST INDIES
(ANISOPTERA: LIBELLULIDAE)**

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Received May 4, 2007 | Revised and Accepted October 7, 2007

Scapanea archboldi (Donnelly), known only from the holotype ♀ from Dominica, was recently transferred to *Brechmorhoga* (R.W. Garrison & N. von Ellenrieder, 2006, *Can. Ent.* 138: 269-284). Here, its ♂ and larva are described from Guadeloupe and Martinique; some behavioural and habitat notes, and distribution for this sp. are included. *B. grenadensis* Kirby is considered to be a distinct sp. and not a ssp. of *B. praecox* (Hag.).

***ARGIOLESTES TRIGONALIS* SPEC. NOV.,
A NEW SPECIES FROM PAPUA NEW GUINEA
(ZYGOPTERA: MEGAPODAGRIONIDAE)**

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Received September 17, 2007 / Reviewed and Accepted October 2, 2007

The new sp. is described from lowland rainforest in Gulf Province. Holotype ♂: Papua New Guinea, Gulf prov., Dark-End Lumber, 2-X-1999; deposited at SAMA, Adelaide. Diagnostic characters of the adult ♂ are illustrated and the affinities of the sp. are discussed.