

Check-list of Odonata from the state of Bahia, Brazil: ecological information, distribution, and new state records

Cintia Ribeiro^{1,2,4}, Brunna Firme^{1,3,5}, Saulo A. Araujo^{1,6}, Acácio de Sá^{1,7},
Felipe Zander^{1,8}, Karolina Teixeira^{1,2,9}, Laís Rodrigues Santos^{1,2,10}
& Marciel Elio Rodrigues^{1,2,11}

¹Laboratório de Organismos Aquáticos, Departamento de Ciências Biológicas,
Universidade Estadual de Santa Cruz (UESC), Ilhéus, BA, Brazil

²Programa de Pós-graduação em Sistemas aquáticos tropicais, Universidade
Estadual de Santa Cruz (UESC), Ilhéus, BA, Brazil

³Programa de Pós-graduação em Zoologia, Universidade Estadual de Santa Cruz
(UESC), Ilhéus, BA, Brazil

⁴<cintiaribeirods@hotmail.com>;  <https://orcid.org/0000-0003-0309-9512>

⁵<brunnafirme@hotmail.com>;  <https://orcid.org/0000-0003-0106-1844>

⁶<saulo.araujo.saa@gmail.com>;  <https://orcid.org/0000-0003-0097-7105>

⁷<yoacacio@gmail.com>;  <https://orcid.org/0000-0002-7874-9172>

⁸<fzander.bio@gmail.com>;  <https://orcid.org/0000-0002-5254-3627>

⁹<karolina1275@gmail.com>;  <https://orcid.org/0000-0001-9944-4135>

¹⁰<laiseng.ambiental@hotmail.com>;  <https://orcid.org/0000-0002-8194-3494>

¹¹Corresponding author: <merodrigues@uesc.br>;

 <https://orcid.org/0000-0001-8161-6234>

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Abstract. A check-list of the Odonata species of the state of Bahia, Brazil, including information on their ecology and distribution in this state, was compiled. The data was collected by consulting databases and from specimens deposited in the collection of the Laboratory of Aquatic Organisms (LOA) of the State University of Santa Cruz. Altogether, 174 species from 12 families and 63 genera were recorded. Of these, two families, 15 genera, and 69 species are new records for the state. Additional information on habitats, vegetation types, and the types of land uses where the species were found is also presented. This information is considered a milestone for the state of Bahia and emphasizes the great diversity of Odonata species in poorly sampled regions in Brazil.

Further key words. Dragonfly, damselfly, South America, Northeast region, Atlantic Forest, Cerrado, Caatinga

Abundance and habitat associations of disjunct and regionally rare populations of *Leucorrhinia glacialis* and *L. hudsonica* in the Appalachian Mountains (Odonata: Libellulidae)

Bethany Liberto¹ & Jered Studinski^{2,3}

¹ Frostburg State University, Frostburg, MD, USA; <bpliberto@gmail.com>

 <https://orcid.org/0000-0002-3423-6930>

² College of Natural Resources, University of Wisconsin – Stevens Point,
Stevens Point, WI, USA

 <https://orcid.org/0000-0003-4944-2654>

³corresponding author: <Jered.Studinski@uwsp.edu>

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Abstract. *Leucorrhinia glacialis* and *L. hudsonica* are boreal anisopterans common in Canada and the north-eastern USA but are rare in central Appalachia, where they are isolated at the extreme southern edge of their range. Adult and larval anisopteran surveys were conducted at 24 wetlands in central Appalachia to determine the number of populations and habitat associations of *L. glacialis* and *L. hudsonica*. A mark-recapture study at wetlands containing either of the two target species was conducted to estimate the population size and daily survival. Cormack-Jolly-Seber (CJS) and Jolly-Seber analyses were conducted for the populations of *L. glacialis* and *L. hudsonica*, and multivariate techniques explored habitat and community associations. *Leucorrhinia hudsonica* were found in three wetlands, with the largest population estimated at 34 individuals. *Leucorrhinia glacialis* were found in two wetlands, with one population estimated at 351 and the other being too large (*i.e.*, not enough recaptures) to apply CJS methods. All wetlands containing populations of *L. glacialis* and *L. hudsonica* were permanent, acidic, and fishless, and dispersal from their natal ponds was rarely observed. Most of the wetlands containing these species were created by beaver, with some ponds rapidly shrinking due to a lack of dam maintenance. The isolation and rarity of habitats supporting *L. glacialis* and *L. hudsonica* in this region, coupled with the species' poor dispersal abilities and apparent reliance on beaver, suggests an uncertain future for these locally rare anisopterans. The protection of these rare habitats and populations, along with possible translocation efforts and beaver management, may increase these species' chances of persistence.

Further key words. Dragonfly, Anisoptera, USA, Maryland, West Virginia, beaver pond, conservation

Distribution, habitat requirements, and vulnerability of *Caliaeschna microstigma* at the north-western edge of its range (Odonata: Aeshnidae)

Marina Vilenica^{1,6}, Dejan Kulijer², Bogić Gligorović³,
Aleksandra Gligorović⁴ & Geert De Knijf⁵


¹ University of Zagreb, Faculty of Teacher Education, Trg Matice Hrvatske 12, 44250 Petrinja, Croatia

² National Museum of Bosnia & Herzegovina, Zmaja od Bosne 3, 71000 Sarajevo, Bosnia & Herzegovina; <dejan.kulijer@gmail.com>

³ Primary school “Sutjeska”, Nikca od Rovina 2, 81000 Podgorica, Montenegro; <bogic1@t-com.me>

⁴ University of Montenegro, Faculty of Mathematical and Natural Sciences, Cetinjska 2, 81000 Podgorica, Montenegro

⁵ Research Institute for Nature and Forest (INBO), Havenlaan 88 bus 73, 1000 Brussels, Belgium; <geert.deknijf@inbo.be>

 <https://orcid.org/0000-0002-7958-1420>

⁶ Corresponding author: marina.vilenica@ufzg.hr

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Abstract. More than a decade of field surveys of *Caliaeschna microstigma* (Schneider, 1845), at the north-western edge of species' distribution in Bosnia & Herzegovina, Croatia, and Montenegro recorded its presence at 135 localities, of which 107 were previously unknown. Our sampling located populations north-west of the species' previously known range limit. Literature and new data showed that the species was most frequently observed in karst springs (42 % of all known localities) and streams (34 %) and, to a lesser extent, also in rivers (24 %). Although it was observed over a wide range of altitudes, from sea level to mountainous regions (865 m a.s.l.), 72 % of the localities were below 200 m a.s.l., and 43 % below 50 m a.s.l. Reproduction attempts and/or successful reproduction was recorded at approximately half the localities (53 %, n = 71), mostly in the Mediterranean but also in the Alpine biogeographical region. Most of the localities with *C. microstigma* present are suffering from various anthropogenic threats, such as domestic and constructional waste disposal, capture of spring water, and urban and agricultural impacts. This study contributes to a better understanding of the species' distribution and provides new insight into its habitat and micro-habitat preferences.

Further key words. Dragonfly, Anisoptera, Balkan Peninsula, altitudinal distribution, springs, streams, rivers, anthropogenic influence

**Refining the identification criteria for
forma typica and *brachycerca*
in exuviae of *Boyeria irene*
(Odonata: Aeshnidae)**

Luisa Nunes^{1,2}, Patricia Casanueva³, M. Ángeles Hernández⁴, Luis Fernando Sánchez-Sastre⁵, Tomás Santamaría⁶ & Francisco Campos³

¹ Instituto Politécnico de Castelo Branco – Escola Superior Agrária.
Qta Sra Mercules, 6000-900 Castelo Branco, Portugal

² Centre for Applied Ecology “Prof. Baeta Neves” (CEABN-InBIO), School of Agriculture, University of Lisbon, Tapada da Ajuda, Lisbon, 1349-017, Portugal

³ Departamento de Ciencias Experimentales, Universidad Europea Miguel de Cervantes, 47012 Valladolid, Spain

⁴ Departamento de Biología Ambiental, Facultad de Ciencias, Universidad de Navarra, 31080 Pamplona, Spain

⁵ Departamento de Ingeniería Agrícola y Forestal, Escuela Técnica Superior de Ingenierías Agrarias, Universidad de Valladolid, 34004 Palencia, Spain

⁶ Universidad Católica de Ávila, Calle Canteros s/n, 05005 Ávila, Spain

¹ Corresponding author: <lfunes@ipcb.pt>

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Abstract. In female imagines of *Boyeria irene*, two forms are known according to the length of the cerci: *forma brachycerca* (short appendages) and *f. typica* (long appendages). Both forms are also recognisable in exuviae. Hitherto, no accurate measurements have been performed to distinguish between the two forms. Hence, we measured and analysed the absolute and relative length of the cerci in both sexes of exuviae from 11 populations originating from the centre and north of the Iberian Peninsula. We show that there are specimens intermediate between the two forms and that dimorphism is also present in males. The *brachycerca* form is more frequent in the north than in the centre of the Iberian Peninsula. Correct identification of both forms should always be based on accurate measurements of the length of the cerci.

Further key words. Dragonfly, Anisoptera, rivers, Iberian Peninsula, Spain, Portugal

Upstream and downstream movements in adults of stream-dwelling Odonata

Jan J. Beukema

Linieweg 19, NL 1783 BA Den Helder, The Netherlands;
<jan.beukema@outlook.com>

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Abstract. Based on data from the literature on along-stream movements of adult stages of Odonata, comparative preference for upstream or downstream movement is evaluated. The great majority of publications reported upstream movement. Upstream migration was reported particularly in species of Calopterygidae and Gomphidae. Upstream movements are potentially functional: they compensate for downstream larval drift. The mechanism behind the net directed movements, however, is unknown and controversial. Movements in general may be largely undirected, but, in the presence of downstream drift by larvae an innate tendency either to move upstream or to stay at upstream locations is expected.

Further key words. Dragonfly, damselfly, Calopterygidae, Gomphidae, migration, dispersal, drift compensation

***Platycnemis sasakii* Asahina, 1949 – a distinct species, endemic to Japan (Odonata: Platycnemididae)**

Matti Hämäläinen

Naturalis Biodiversity Center, Leiden, The Netherlands;
<matti.hamalainen@helsinki.fi>

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Abstract. The taxonomic status of the endemic Japanese damselfly taxon, *Platycnemis foliacea sasakii* Asahina, 1949 (type locality: Tokyo), is upgraded from subspecies to species, *P. sasakii*. Several clear structural differences (including the shape of wings, density of wing venation, ratio of wing and abdomen lengths, shape of middle and hind tibiae) between males of *P. sasakii* and the continental Chinese *Platycnemis foliacea* Selys, 1886 (type locality: Beijing) are presented to support this action.

Further key words. Zygoptera, damselfly, taxonomy, China