Neuragrion mysticum (Odonata: Megapodagrionidae) demystified

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Abstract—Based on circumstantial evidence, *Neuragrion mysticum* Karsch, 1891 is considered a junior synonym of *Heteropodagrion sanguinipes* Selys, 1885. Annotated wing scans for *H. sanguinipes* and *Mesagrion leucorrhinum* Selys, 1885, species originally compared to *N. mysticum*, are provided.

Résumé—Nous apportons l'évidence que le *Neuragrion mysticum* Karsch, 1891 n'est qu'un synonyme nouveau du *Heteropodagrion sanguinipes* Selys, 1885. Nous présentons et commentons des illustrations, prises avec l'aide d'un scanner, des ailes de l'*H. sanguinipes* et du *Mesagrion leucorhinum* Selys, 1885, espèces avec lesquelles le *N. mysticum* avait été originalement comparé.

Introduction

As its specific epithet implies, *Neuragrion mysticum* Karsch, 1891 has been a mystery ever since its original description (Karsch 1891) over 100 years ago. The species description was based on one female with the imprecise locality of "Ecuador". The description, translated from the original German, and to which we have added the modern vein nomenclature (Riek and Kukalovà-Peck 1984) in brackets, is as follows:

> *Neuragrion* nov. gen.
>
> Wings narrow, petiolated to the beginning of the quadrangle; this last one moderately long with oblique outer side; the basal postcostal crossvein [CuP crossing] is situated midway between the base of the wings and the base of the quadrangle, a little anterior to the first antecubital [antenodal] crossvein. Arculus moved away to the outside from second antecubital [antenodal]. The median sector [RP3] arises from the principalis anterior to the vein coming from the nodus, the subnodal sector [IR2] close to the first postcubital crossvein. There are two spurious sectors between the nodal [RP2] and ultranodal [IR1] sectors and between the subnodal [IR2] and median [RP3] sectors, likewise there are two short spurious sectors between the subnodal [IR2] and nodal [RP2] sectors. Most cells are four sided. Pterostigma stout forming a pointed trapezoid with outer margin straight and inner margin deeply inclined; about two cells underneath pterostigma.
>
> *Three antecubital* [antenodal] *crossveins in hindwings, middle one restricted to subcostal space*.
>
> This genus, from which I have only one female, belongs in the Legion Podagrion Selys to the Heteropodagrion group, and is intermediate between *Mesagrion* Selys and *Heteropodagrion* Selys; shares with *Heteropodagrion* the possession of two long spurious sectors between the subnodal [IR2] and median sectors [RP3] from one side, and the ultranodal [IR1] and nodal [RP2] sectors from the other, as well as two short spurious sectors between the nodal [RP2] and subnodal [IR2] sectors, and the origin of the median sector [RP3] is anterior to the veins coming from the nodus (not posterior to those as in *Mesagrion*); it differs from both of them by the wings petiolated only to the base of the quadrangle and presence of three antecubital [antenodal] crossveins in the subcostal space of the hind wing.
>
> 1. *Neuragrion mysticum* nov. spec. ♀.
>
> Abdomen ♀ 31, Hind wing 24.5 mm long.

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> Wings transparent, pterostigma over 2–3 cells, 20–21 postcubital crossveins. Head reddish brown, labrum yellow. Prothorax reddish brown, on the center black, the brown hind lobes transversely rounded. Thorax reddish brown dorsally, mediolongitudinal carina bordered with black, with a narrow continuous humeral streak on each side. Upper half of the pleurae, between the base of the fore wings and the base of the mid legs, black, and posteroinferior half yellowish brown, the thorax between the legs yellow. Abdomen quite narrow, brown, the median segments black at the base and the posterior end, the second segment with a yellow mediolongitudinal carina at its anterior two-thirds. The valves surpass the tip of the abdomen.

Munz (1919), in his key to the Zygoptera genera of the world, is the only author who subsequently treated this species. He placed *Neuragrion* in his subfamily Megapodagrioninae, separating it from *Heteropodagrion* Selys, 1885 and *Mesagrion* Selys, 1885 by the presence of more than two antenodals in the hind wing versus only two antenodals in the other two genera; this diagnostic character was taken from the descriptions of these three genera. The genus *Neuragrion* has since been carried in all subsequent catalogues (Davies and Tobin 1984; Bridges 1994; Steinmann 1997; Tsuda 2000) without comments.

Most of Karsch's types are in the Zoologisches Museum, Museum für Naturkunde der Humboldt-Universität, Berlin (Horn and Kahle 1935). Prof. Dr. Günther Peters kindly informed us that the type specimen of *N. mysticum* was not housed in that museum and that it was likely deposited in the Natural History Museum of Stettin, which was totally destroyed during the Second World War.

Wishing to determine the identity of the genus, we examined the original descriptions for all three genera and species (Selys 1885; Karsch 1891; Ris 1918), photographs of a syntype male of *Heteropodagrion sanguinipes* Selys, 1885, and subsequent published information on *Heteropodagrion* and *Mesagrion* (Selys 1886; Donnelly 1992), and compared the original description of *Neuragrion* with specimens listed below. Characters were illustrated with the aid of a camera lucida and drawings are not to scale. To facilitate comparisons between these taxa, we provide annotated wing scans for *H. sanguinipes* and *Mesagrion leucorrhinum* Selys, 1885. Acronyms of collections are as follows:

DRP	Personal collection of D.R. Paulson, Tacoma, Washington, United States of America
RWG	Personal collection of R.W. Garrison, Azusa, California, United States of America
UMMZ	Museum of Zoology, University of Michigan, Ann Arbor, Michigan, United States of America

Material and methods

Material examined

Heteropodagrion sanguinipes

Ecuador. Cotapaxi Province, 75 km E of Quevedo, 0°56′S, 79°13′W, elevation approximately 900 m, spring seep, 12.v.1975, coll. P.J. Spangler *et al*., 2 ♂ (RWG); Pichincha Province, stream 3.5 km W of Manuel Cornejo Astorga, 0°25′S, 78°48′W, elevation approximately 1520 m, 16.vii.1977, coll. D.R. Paulson, 1 ♀ (DRP).

Heteropodagrion superbum

Colombia. Valle del Cauca Department, Río Anchicaya, Carretera al Mar, approximately 3°39′S, 76°56′W, elevation approximately 320 m, 19.v–vi.1969, coll. G. Wolffhugel, 1 ♂ (RWG); 2 km W of Pichindé, approximately 3°26′S, 76°37′W, elevation approximately 1800 m, 4.viii.1972, coll. E. Stiles, 1 ♂, 1 ♀ (DRP); 20 km W of Cali, crest of western Andes, approximately 3°31′S, 76°36′W, elevation approximately 1800 m, 5.viii.1975, coll. E. Stiles, 1 ♀ (DRP).

Mesagrion leucorrhinum

Colombia. Antioquía Department, Cristalina, approximately 6°29′S, 74°50′W, elevation approximately 320 m, 17.ii.1917, coll. J.H. and E.B. Williamson (UMMZ).

Results

Karsch's original description of *N. mysticum* makes clear that his new species combined characters of *Heteropodagrion*, a genus of two relatively large species distributed from Panama (Donnelly 1992) south through Ecuador (Selys 1885, 1886), and *Mesagrion*, a monotypic genus recorded only from Colombia (Selys 1885, 1886; Ris 1918). According to the original

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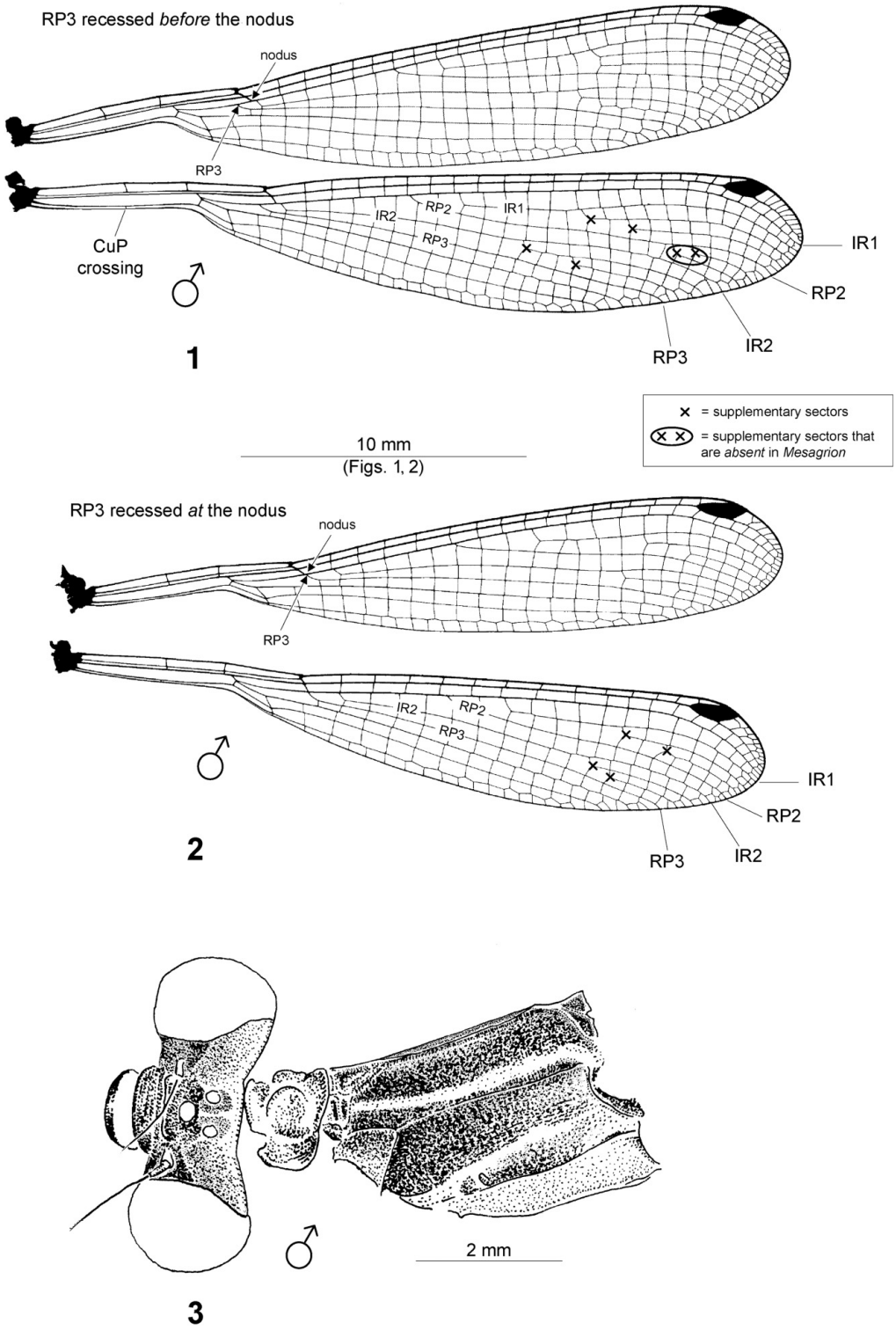
Figs. 1–3. 1, *Heteropodagrion sanguinipes*, male wings (Ecuador, Cotapaxi Province, 75 km E of Quevedo). 2, *Mesagrion leucorrhinum*, male wings (Colombia, Antioquía Department, Cristalina). 3, *Heteropodagrion sanguinipes*, male head and thorax (same data as Fig. 1).



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description, the following characters of *Neuragrion* are shared with *Heteropodagrion*: (*i*) origin of RP3 recessed before the nodus; (*ii*) presence of two long pairs of supplementary sectors, one between IR2 and RP3, the other between IR1 and RP2, as well as a short pair of supplementary sectors between RP2 and IR2. These are the same character states (translated from the original French) given for *Heteropodagrion* by Selys (1885): "Median sector [RP3] arising a little before the nodus. Two short sectors interspersed between the sub-nodal [RP2] and the nodal [IR2]". The contrasting character states given for *Mesagrion* by Selys (1885) are: "Median sector [RP3] arising a little after the nodal vein. No sector between the sub-nodal [RP2] and the nodal [IR2]". Thus Karsch's venational characters of *Neuragrion* closely fit the wing venation of *Heteropodagrion* (Fig. 1) rather than that of *Mesagrion* (Fig. 2). Karsch (1891) described the body of *Neuragrion* as having "a predominantly reddish color"; it does not significantly differ from the head and thoracic color pattern of a male of *H. sanguinipes* (Fig. 3).

Discussion

Karsch (1891) justified the placement of his new species in a new genus based on (*i*) the presence of three antenodal crossveins in the subcostal space of the hind wing and (*ii*) wings petiolated only to the base of the quadrangle. The latter character implies that the wings in *Heteropodagrion* and *Mesagrion* are petiolated beyond the base of the quadrangle, a condition not found in the examined specimens of these genera (Figs. 1, 2). Thus the only character that would seem to justify *Neuragrion* is the presence of the extra subcostal antenodal in the hind wings. We feel that the presence of the extra subcostal crossvein is most likely the result of individual variation. Von Ellenrieder (2003) has already argued that the presence of one or even two supplementary antenodal crossveins in some megapodagrionid genera (*e.g.*, *Philogenia* Selys, 1862) is the result of intraspecific variability and does not justify a new genus. With this character removed, there is nothing to support any difference between *Neuragrion* and *Heteropodagrion*.

The differentiation between *H. sanguinipes* and *H. superbum* Ris, 1918 is unclear (Donnelly 1992), although *H. superbum*, generally a larger species, would seem to occur from Panama south through Colombia while *H. sanguinipes* is thus far known only from Ecuador. The venational statistics given by Karsch (1891) (hind wing 24.5 mm, abdomen 31 mm, 20–21 postnodal crossveins) are similar to those recorded for females of *H. sanguinipes* (hind wing 26 mm, abdomen 31–32 mm, 20–23 postnodals) by Selys (1885, 1886). Based on the comparison of the original description of *N. mysticum* with descriptions and specimens of *H. sanguinipes*, we propose that *N. mysticum* be considered a junior subjective synonym of *H. sanguinipes* as follows.

Heteropodagrion Selys

Heteropodagrion Selys, 1885: cxliv (6 separate); Selys 1886: 51.
Neuragrion Karsch, 1891: 105. **Syn. nov.**

Heteropodagrion sanguinipes Selys

sanguinipes Selys, 1885: cxliv (6 separate); Selys 1886: 53.
mysticum Karsch, 1891: 105. **Syn. nov.**

Type material

Holotype (♀): Ecuador. Lost. **Syntypes** (2 ♂, 2 ♀): Ecuador. Quito, in coll. Selys, Brussels. One of the males is labelled as lectotype, probably by N. Dias Dos Santos, but we are unaware of any published lectotype designation.

Heteropodagrion superbum Ris

superbum Ris, 1918: 89, Figs. 44 [appendages], 45 [wings].

Type material

Syntypes (2 ♂): Colombia. San Antonio, in Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt.

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