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THREE NEW SPECIES OF MACROTHEMIS FROM NORTHERN SOUTH AMERICA (ODONATA: LIBELLULIDAE)

by

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Belle, J.: Three new species of *Macrothemis* from northern South America (Odonata: Libellulidae).

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Macrothemis belliata spec. nov. (male holotype: Suriname, District Marowijne, Lawa/Litani, Gransoela), *M. ludia* spec. nov. (male holotype: Venezuela, State of Bolivar, Santa Lucía) and *M. proterva* spec. nov. (male holotype: Venezuela, State of Bolivar, Luepa) are described and illustrated, and their affinities are discussed.

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INTRODUCTION

In the State of Bolivar, Venezuela, Mr. Jorge de Marmels of Caracas has collected a number of specimens of *Macrothemis*, which belong to two new species. He placed this material at my disposal for description. For this privilege and his generous offer to retain some duplicate specimens for my private collection, I wish to thank him very much. The two species are here introduced under the names *M. ludia* and *M. proterva*. A third new species of *Macrothemis*, in this paper described under the name *M. belliata*, is from Suriname. It was collected long ago by the late Dr. D.C. Geijskes. The three new taxa bring the total number of *Macrothemis* species up to 37. The type of *M. belliata* is in the collection of the Rijksmuseum van Natuurlijke Historie, Leiden (RMNH). The types of *M. ludia* and *M. proterva* are in the Instituto de Zoología Agrícola, Universidad Central de Venezuela, Maracay (UCV). Some paratypes are deposited in the author's collection (AC).

All illustrations are original camera lucida drawings (details completed by free hand), while the figures representing wings have been made from photographs.

Macrothemis belliata spec. nov.

(figs. 1-5)

Material. — Suriname: District Marowijne, at junction of the rivers Lawa and Litani, Gransoela, 9.VII.1939, 1♂, D.G. Geijskes leg., RMNH.

Description of male holotype (head partly crushed). — Total length 25 mm; abdomen 17 mm (incl. apps 1 mm); hind wing 19 mm; costal edge of pterostigma in fore wing 1 mm.

Labium brown. Vertex, frons, postclypeus and labrum glossy black-brown. Anteclypeus brown. Compound eyes in contact for a distance about middorsal length of occiput, which is brown.

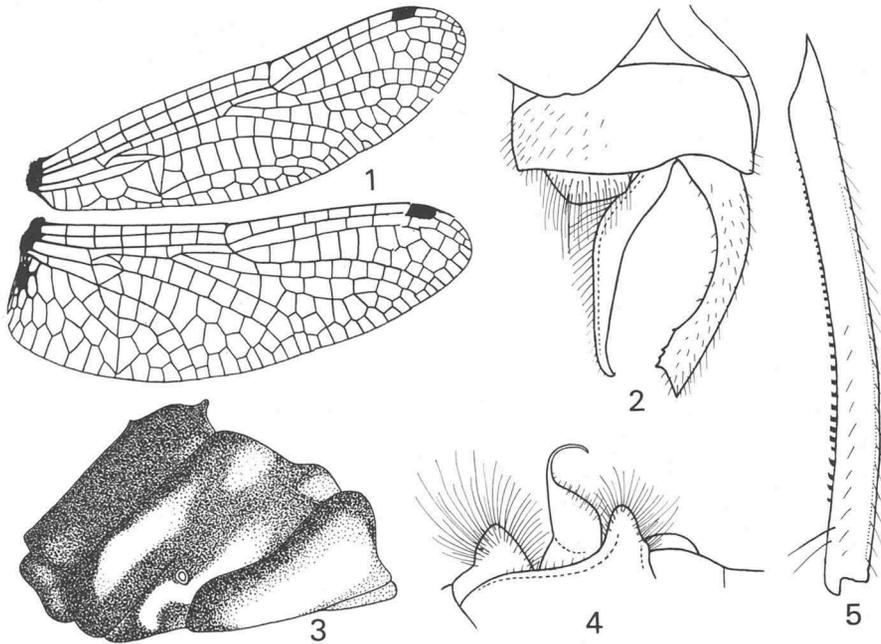
Prothorax brown. Pterothorax dark brown with greenish white markings shaped as shown in fig. 3. No pale antehumeral stripes. Black-brown femoral stripes confluent with the black-brown "comma mark" on each side of venter.

Legs dark brown. Third femur with an outer row of 35-40 small squarish spines for almost entire length of femur, the distal spines directed proximad (fig. 5). Inner tooth of tarsal claw a trifle larger than tip of claw itself.

Abdomen predominantly black. Segment 2 with a large greenish white spot bordering the black ventral tergal margin, and a brown-yellow spot more dorsally. Segment 3 greenish white along ventral tergal margin. Segments 4 to 8 brown-yellow along ventral tergal margin. Segments 3 to 5 with a brown-yellow, elongated, basal spot which is interrupted by the black submedian vertical carina. Posterior margin of segment 10 without denticles. Anal appendages black and shaped as shown in fig. 2; the superiors with a subapical inferior row of four (left) or five (right) denticles. Accessory genitalia shaped as shown in fig. 4.

Wings with a faint brown tinge. Venation dark brown including frontal margin of costae. Pterostigma brown. Discoidal index 0.9 (vide Donnelly, 1984: 172). Trigonal interspace in fore and hind wings starting with two cells against triangle followed by a single row of cells. Internal triangle in fore wings one-celled. Nodal index $5 : 8\frac{1}{2} - 8\frac{1}{2} : 5 / 6 : 6 - 6 : 6$. Hind wing with one cubito-anal cross-vein. Membranule pale brown.

Remarks. — The male of *Macrothemis belliata*, though similar in stature and general coloration to *M. pumila* Karsch, is readily distinguished by the entire lack of pale antehumeral stripes, by the well-developed differentiated spines on the distal part of the third femora, by the single row of cells in the trigonal interspace of the fore wings, and in having the internal triangle of the fore wings one-celled.



Figs. 1-5. *Macrothemis belliata* spec. nov., ♂ holotype. — 1, right pair of wings; 2, tenth abdominal segment and anal appendages, left profile view; 3, left side of pterothorax to show colour pattern; 4, accessory genitalia, right profile view; 5, left third femur, left profile view.

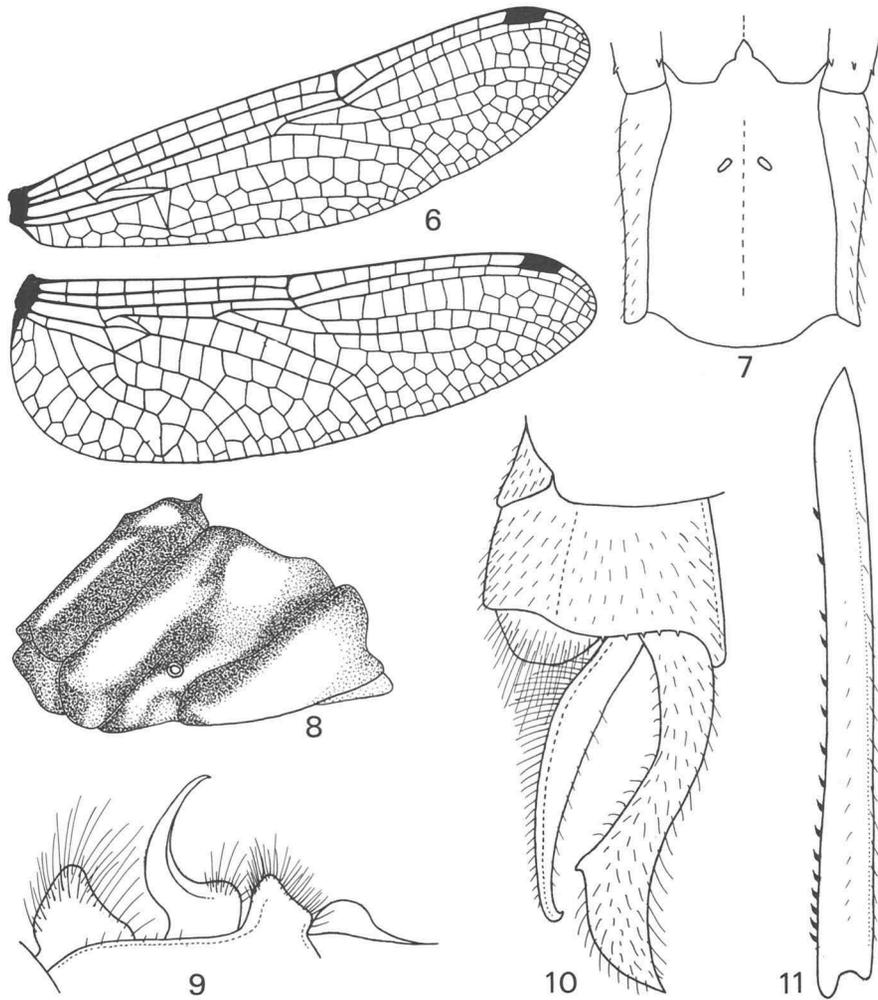
Dr. Geijskes provided the triangular envelope, in which the specimen was originally stored, with the field note that the male was collected in the forest when it was flying above a waterfall during sunny weather.

***Macrothemis ludia* spec. nov.**
(figs. 6-11)

Material. — Venezuela: State of Bolívar, road between Santa Elena and Icabarú, east of Río Sukurúm, Santa Lucía (ca. 850 m), 20-31.I.1985, J. de Marmels leg., 1♂ holotype and 3♀ paratypes in UCV; 1♂, 1♀ paratypes in AC. Colour slide of habitat present.

Description of male holotype. — Total length 37 mm; abdomen 28 mm (incl. apps 1.7 mm); hind wing 25 mm; costal edge of pterostigma in fore wing 1.6 mm.

Labium grey, but median lobe black-brown. Face brown. Vertex and superior surface of frons glossy black. Compound eyes in contact for a distance a little shorter than middorsal length of occiput, which is black.



Figs. 6-11. *Macrothemis ludia* spec. nov. — 6, right pair of wings of ♂ paratype; 7, vulvar lamina and ninth abdominal segment of ♀ allotype, ventral view; 8, left side of pterothorax of ♂ holotype to show colour pattern; 9, accessory genitalia of ♂ holotype, right profile view; 10, tenth abdominal segment and anal appendages of ♂ holotype, left profile view; 11, left third femur of ♂ holotype, left profile view.

Prothorax brown. Pterothorax black-brown, marked with greenish white stripes and spots; its colour design shaped as shown in fig. 8. Each side of dorsum with a pale antehumeral stripe, not confluent at its upper end with an elongated pale spot in front of antealar sinus. Black-brown femoral stripes confluent with black-brown “comma mark” on each side of venter.

Legs dark brown, but innerside of first femur greenish white. Third femora each with an outer row of 16 differentiated spines (fig. 11). Inner tooth of tarsal claw longer than tip of claw itself.

Abdomen predominantly black. Sides of segments 1 and 2, and base of segment 3 with brown-yellow markings. The triangular basal spot on segment 3 interrupted by the black submedian vertical carina. Sides of segment 4 with a minute brown-yellow basal spot. Segments 1 to 8 brown-yellow along ventral tergal margins. Posterior margin of segment 10 with a few denticles on each lateral side of segment. Anal appendages black and shaped as shown in fig. 10. Accessory genitalia shaped as shown in fig. 9.

Wings with a faint brownish yellow tinge, especially on basal half. Venation black. Pterostigma dark brown. Discoidal index 0.9. Internal triangle in fore wings two-celled. Nodal index $6 : 10\frac{1}{2} - 10\frac{1}{2} : 5 / 7 : 7 - 7 : 8$. Trigonal interspace in fore wings starting with two rows of cells from triangle outwards, that in hind wings starting with a single row of four cells from triangle outwards. Hind wing with one cubito-anal cross-vein. Membranule brown, grey near wing margin.

Female allotype. — Total length 34.5 mm; abdomen 25.5 mm (incl. apps); hind wing 24.5 mm; costal edge of pterostigma in fore wing 1.5 mm.

Similar to male holotype but dark markings dark brown instead of black or black-brown. Abdominal segments 1-9 brown-yellow along ventral tergal margins.

Third femora with an outer row of 9 (left) or 8 (right) spines, which increase in length towards knee, the most proximal spine a mere denticle, the most distal spine a little longer than the diameter of femur. Vulvar lamina one-sixth the length of sternum of abdominal segment 9, deeply excised V-shaped, the lobes rounded (fig. 7). Anal appendages $1\frac{1}{4}$ times the length of abdominal segment 10.

Wings with brownish yellow tinge. Discoidal index 0.9. Nodal index $6 : 10\frac{1}{2} - 11\frac{1}{2} : 5 / 6 : 8 - 8 : 7$. Trigonal interspace in fore and hind wings starting with two rows of cells from triangle outwards. Hind wing with one cubito-anal cross-vein. Membranule brown.

Remarks. — The paratypes are very similar to the holotype and allotype. *Macrothemis ludia* agrees with *M. tenuis* Hagen in having the male anal appendages and accessory genitalia of the same type but it differs by the presence of only one cubito-anal cross-vein in the hind wing. There are two cubito-anal cross-veins in the hind wing of *M. tenuis*.

Mr. De Marmels sent a colour slide of the habitat of *M. ludia* and wrote: "I enclose a colour slide of the exact habitat of the unidentified *Macrothemis* taken in Santa Lucía. It is a small creek which is open only at the spot shown; otherwise the creek crosses forested areas".

Macrothemis proterva spec. nov.

(figs. 12-17)

Material. — Venezuela: State of Bolivar, road between El Dorado and Santa Elena (ca. at km 130), north of Luepa (1280 m), 20-22.V.1985, J. de Marmels leg., 1♂ holotype, 1♂ 1♀ paratypes in UCV, 1♂ paratype in AC. Colour slides of living ♂ and ♀ present.

Description of male holotype. — Total length 32 mm; abdomen 24 mm (incl. apps 1.5 mm); hind wing 24.5 mm; costal edge of pterostigma in fore wing 1.6 mm.

Labium and labrum black. Clypeus and vertical part of frons brown. Vertex and superior surface of frons glossy black. Compound eyes in contact for a distance about equal to middorsal length of occiput, which is brown.

Prothorax brown. Dorsum of pterothorax brown with black marking along humeral sutures and a large, dark, subquadrangular median spot traversed by the middorsal carina, which is bright yellow. Sides of pterothorax brown with black stripes and two striking greenish white markings. Colour design of pterothorax shaped as shown in fig. 14. Black femoral stripes confluent with black “comma marks” on each side of venter.

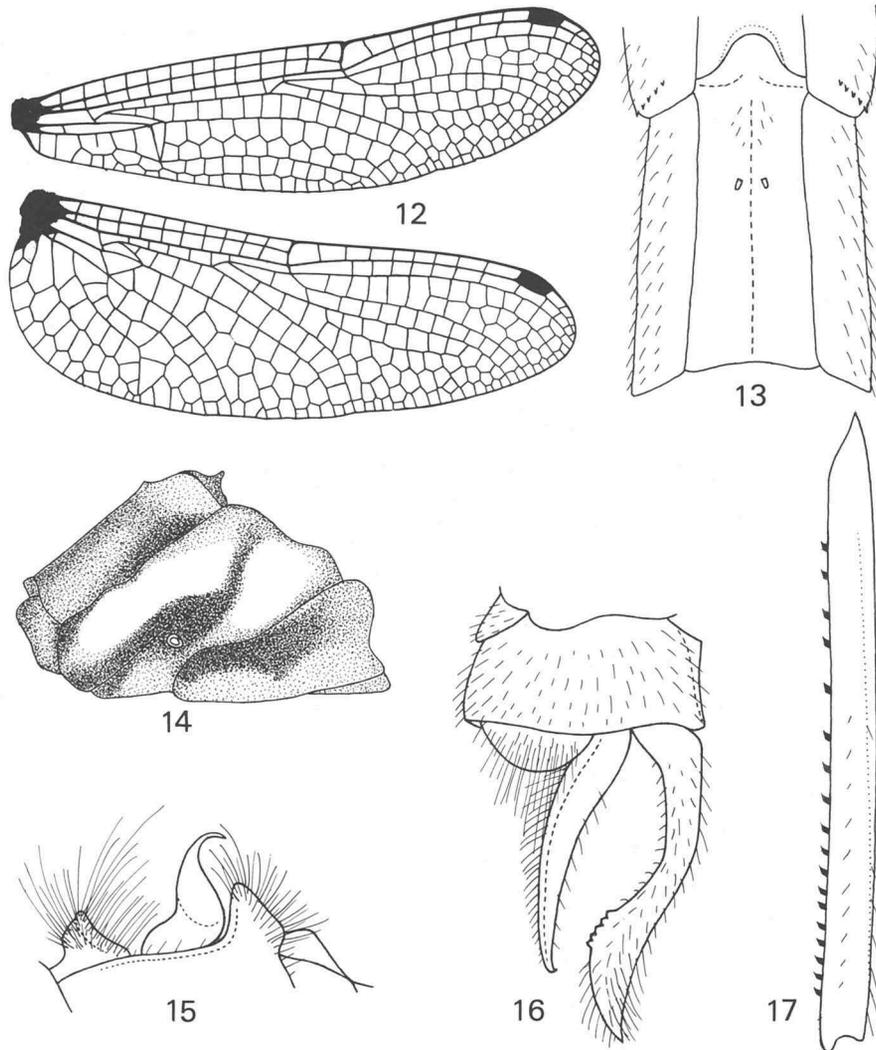
Legs brown. Third femora with an outer row of 18 (left) or 20 (right) squarish spines (fig. 17). Inner tooth of tarsal claws longer than tip of claw itself.

Abdomen dark brown on basal segments, becoming almost black on segments 3 to 10, being brown along ventral tergal margins of segments 3 to 9. Posterior margin of segment 10 without denticles. Accessory genitalia and anal appendages shaped as shown in figs. 15 and 16, respectively.

Wings hyaline but flavescent at extreme base. Venation black. Pterostigma brown. Discoidal index 0.9. Internal triangle in fore wings two-celled. Nodal index $7 : 11\frac{1}{2} - 11\frac{1}{2} : 7 / 8 : 9 - 9 : 7$. Trigonal interspace in fore wings starting with two rows of cells from triangle outwards, that in the hind wings starting with a single row of five cells from triangle outwards. Hind wing with one cubito-anal cross-vein. Membranule brown.

Female allotype. — Total length 33.5 mm; abdomen 24 mm (incl. apps); hind wing 25.5 mm; costal edge of pterostigma in fore wing 1.6 mm.

Similar to male but middorsal marking of pterothorax dark brown instead of black. Third femora with an outer row of 10 (left) or 11 (right) spines which increase in length towards knee, the most proximal spine a mere denticle, the most distal spine a little shorter than diameter of femur. Vulvar lamina very short and medially incised by a relatively deep and rounded notch (fig. 13). Anal appendages $1\frac{1}{2}$ times as long as abdominal segment 10.



Figs. 12-17. *Macrothemis proterva* spec. nov. – 12, right pair of wings of ♂ paratype; 13, vulvar lamina and ninth abdominal segment of ♀ allotype, ventral view; 14, left side of pterothorax of ♂ holotype to show colour pattern; 15, accessory genitalia of ♂ holotype, right profile view; 16, tenth abdominal segment and anal appendages of ♂ holotype, left profile view; 17, left third femur of ♂ holotype, left profile view.

Wings flavescent at base, in fore wings to second antenodal cross-vein and to arculus, in hind wings to just beyond second antenodal cross-vein and second cubito-anal cross-vein. Discoidal index 1. Nodal index $8 : 13\frac{1}{2} - 13\frac{1}{2} : 8 / 8 : 10 - 10 : 7$. Trigonal interspace in fore wings starting with two rows of cells from triangle outwards, that in hind wings starting with a single row of three (left) or four (right) cells from triangle outwards. Hind wing with two cubito-anal cross-veins.

Remarks. — The two male paratypes have one cubito-anal cross-vein in each hind wing. One male paratype has the middorsal carina of the pterothorax brown instead of bright yellow.

The male anal appendages of *Macrothemis proterva* resemble somewhat those of *M. guarauno* Racenis, but the superiors have a subapical inferior row of denticles, only two denticles in *M. guarauno*. The accessory genitalia of *M. proterva* approach more those of *M. flavescens* Kirby. The single female of *M. proterva* has two cubito-anal cross-veins in each of the hind wings, the corresponding males have only one cubito-anal cross-vein in the hind wings. Obviously caution is called for using the number of cubito-anal cross-veins in the hind wings as a character for separating species.

Mr. De Marmels sent good colour slides of a living male and a female, with the two striking, greenish white thorax markings. He wrote about this species and its locality: 'It was at a creek in the forest, with slightly black water. The *Macrothemis* flew, however, only at one site, where the creek makes a knee, at a slightly more open place, but nevertheless within forest. There are many stones, a few fallen trunks, etc. . . . This new *Macrothemis* behaved as *Progomphus*. The specimens did not fly to and fro, but settled on leaves or on the ground.'

REFERENCE

- Donnelly, T.W., 1984. A new species of *Macrothemis* from Central America with notes on the distinction between *Brechmorhoga* and *Macrothemis* (Odonata: Libellulidae). — *Fla. Ent.* 67 (1): 169-174.