

## A NEW GENUS AND SPECIES OF PLATYCNEMIDID DRAGONFLY FROM THE ARABIAN PENINSULA (ZYGOPTERA)

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*Arabicnemis caerulea* gen. n., sp. n. is described from the Sultanate of Oman and the Republic of South Yemen. The new genus differs from others in the Platycnemididae in wing venation and appears to be related to the African genera *Metacnemis* and *Mesocnemis*. Attention is drawn to alternative views on the relationship of these genera to the Old World Argiinae and the need for reassessment.

### INTRODUCTION

Collections of Odonata made recently in the Oman and South Yemen have included some small platycnemidid damselflies which presented several features particularly in wing venation as to merit a new genus. The type material is located in the Royal Scottish Museum, Edinburgh (RSM, Edinburgh) and in the British Museum (Natural History) (BMNH).

### DESCRIPTION

#### ARABICNEMIS GEN. N.

Small zygopterous dragonflies of moderately slender build. Head (Fig. 1a) small and broad, like a *Coenagrion* and not laterally expanded; antennae slender with ratios of scape : pedicel : flagellum 1 : 2 : 4 respectively; occiput simple and shallowly concave. Prothorax of female with posterior lobe raised, with lateral sulci and modified posterior margin. Legs moderately long, hind femora (Fig. 1b) with bristles on basal half about as long as intervals, those on apical half about twice as long as their intervals, tibiae not dilated and with moderately long bristles.

Wings (Fig. 2) hyaline, rounded at apices; antenodals close set and convergent towards each other on R+M; arculus arises at or slightly proximal to second Ax; petiole short; Ab long arising well proximal to level of first Ax; Ac nearer first than second Ax; quadrilateral cell elongate with costal side shorter than posterior side, distal side longer than base, lower distal angle acute; R4+5 arises proximal to subnode; 1R2 arises well towards wing apex about eighth Px in all wings only two to three cells before the pterostigma; pterostigma small, oblique diamond-shaped with costal side longer than posterior and distal side oblique, braced by a larger pentagonal subpterostigmal cell; a single row of three to five postpterostigmal cells between costa and radius; reticulation open with cells mainly quadrangular. Abdomen cylindrical about one and a half times as long as the hindwing; anal appendages in male, superiors conical, not divergent, almost as long as tenth segment, with strong ventral tooth, inferiors sloping sharply upwards towards the middle of the superiors, tapering and incurved at apex with short black point. Genitalia: prophallus or ligula simple (Fig. 3), expanded apical portion reflexed and without flagella, lamina interna present; in female the vulvar scale scarcely reaches end of abdomen.

Type-species *Arabicnemis caerulea* sp. n.

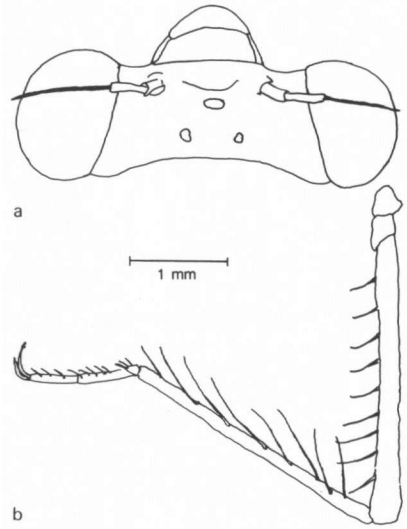


Fig. 1. *Arabicnemis caerulea* gen. n., sp. n. Sur. Oman; paratype ♂: (a) head dorsal view; — (b) left hind leg, external view. Drawn to scale, camera lucida.

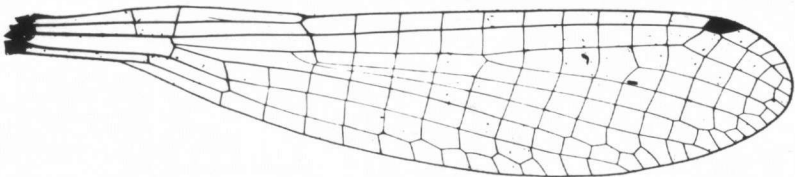


Fig. 2. *Arabicnemis caerulea* gen. n., sp. n. Sur. Oman; allotype ♀: hindwing, length 18.3 mm. Photograph.

*ARABICNEMESIS CAERULEA* SP. N.

Figures 1-4

Material. — Holotype ♂: Sultanate of Oman, Northern Province, Sur, Wadi Rafsah, 23°33'N 59°31'E, c. 100 m, 16/17-III-1976 (Guichard) (RSM, Edinburgh). — Allotype ♀: same data and location. — Paratypes: Sultanate of Oman, Northern Province: 3 ♂, 1 ♀, same data as holotype (RSM, Edinburgh); 3 ♂, 5 km E of Al Awabi, 23°18'N 57°34'E, 7-VIII-1981 (Pittaway) (BMNH); — Republic of South Yemen: 1 ♂, Maifa, Wadi Hajr, 14°05'N 48°40'E, sea level, 23-II-1966 (Davidson) (RSM, Edinburgh); 1 ♂, 1 ♀ (teneral), Kanina, Upper Hajr, 14°10'N 48°10'E, c. 275 m, 24-II-1966 (Davidson) (RSM, Edinburgh); 1 ♂, 1 ♀, Ghail Omar, Hadhramaut, 15°44'N 48°51'E, 9-VIII-1949 (Guichard) (BMNH).

Male (holotype). — Measurements: Abdomen + apps. 28.5 mm; hindwing length 18.0 mm, pterostigma 0.7-0.85 mm.

Head: labium pale brownish white; labrum and clypeus pale greenish yellow; frons olivaceous brown, basal segments of antennae paler; occiput simple shallowly concave, back of eyes pale brown. Prothorax pale brown, posterior lobe simple and rounded. Synthorax, dorsum pale brown, median carina pale brown finely edged with black, paler greenish brown antehumeral stripe continuous broadest at base and tapering a little anteriorly; laterally paler bluish white to pruinose white ventrally, a black dot at base of both humeral and second lateral sutures which are finely black. Legs slender, moderately long; femora pale pruinose yellowish white, posterior femora not reaching apex of first abdominal segment; upper surface of femora with brownish black stripe (indistinct on forelegs), a streak of brown below the keel on the anterior surface widening distally and black internally; tibiae undilated, externally bluish, internally pitchy black, tarsi bluish white, claws yellowish brown distally and black at tips; femoral spines and tibial bristles black, moderately long and fine, 11 on hind femora, 8-11 on hind tibiae; claws with short subterminal tooth about half the length of the gently curved end hook; four or five pairs of modified spines in tibial comb of forelegs.

Wings hyaline with rounded apices; petiole short; Ab long, approximately two and a half times as long as Ac and arising well proximal to first Ax; Ac only slightly distal to first Ax to nearly midway between first and second Ax; pterostigma small diamond-shaped ochreous framed in thick black nervures and

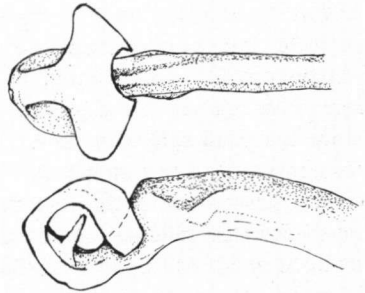


Fig. 3. *Arabienemesis caerulea* gen. n., sp. n. Sur, Oman; paratype ♂: prothorax (ligula), ventral and lateral view.

braced by a larger pentagonal subpterostigmal cell, only a single row of postpterostigmal cells; venation open with cells mostly quadrangular; eleven Px in forewing, nine in hindwing; arculus at level of or slightly proximal to second Ax; quadrilateral cell elongate trapezoidal, costal side two-thirds as long as posterior side in forewing and about three-quarters as long in hindwing, distal side about three times as long as basal side in forewing and twice as long in hindwing and oblique so that the cell is acutely pointed at lower distal angle; two postquadrilateral, antenodal cells in each wing; subdiscoidal cell with distal side broken; 1A broken about two cells beyond node; Cu2 extends two to five cells beyond end of 1A about ten cells in length; R4+5 arises just proximal to subnode; 1R3 arises at subnode; R3 arises at fifth Px in forewing and fourth in hindwing; 1R2 arises at eighth Px in forewing and seventh in hindwing only two to three cells from the pterostigma. Abdomen cylindrical, moderately slender; segment 1 olivaceous; segments 2-10 unmarked, pale blue above becoming narrowly white along ventral tergal margin; sternites brownish black; apical margin of segment 10 (Fig. 4 a-c) shallowly excavated dorsally and with a few stout marginal spines on lower half; superior anal appendages blue, conical, triangular in profile, subparallel almost as long as segment 10 with basally a strong ventral tooth directed downwards and inwards to meet in midline; inferiors paler, yellowish almost as long, directed sharply upwards and inwards towards middle of superiors, broad basally and tapering with somewhat excised inner margin to an incurved apex bearing a small tooth.

Female (allotype). — Measurements: Abdomen + apps. 28.0 mm; hindwing length 18.3 mm, pterostigma 0.8 mm.

Head: labium yellowish white, bluish white in middle; labrum brown; anteclypeus, postclypeus, frons and vertex brown; antennal scape and pedicel ivory; flagellum pitchy black; back of head paler yellowish white. Pronotum (Fig. 4 d-g) brownish yellow; anterior margin slightly thickened and raised; anterior lobe low rounded transverse, shallowly concave in middle and laterally with a pair of small elongate pits at its base, separated from the notum by a triangular depression in the posterior angle of which is a minute striated pit surrounding an open papillule; the notum is rounded, deeply cleft, raised above the level of the anterior lobe and excavated laterally by oblique rising sulci; the posterior lobe is flat bearing an open V-shaped ridge flanked by a pair of curved expansions which terminate as triangular lappets which appear to be invaginated on their inner side over the hind margin. Synthorax brownish white with lighter brown median carina and sutures finely edged with black; laminae mesostigmales yellowish, narrow triangular, thickened basally and raised on external angle. Legs yellowish white; femora with brown moniliform stripe on upper surface; tibiae yellowish white.

Wings (Fig. 2) hyaline, neuration brownish with some crossveins black; forewing with eleven Px; hindwing with nine or ten Px; R3 arises at fifth Px in

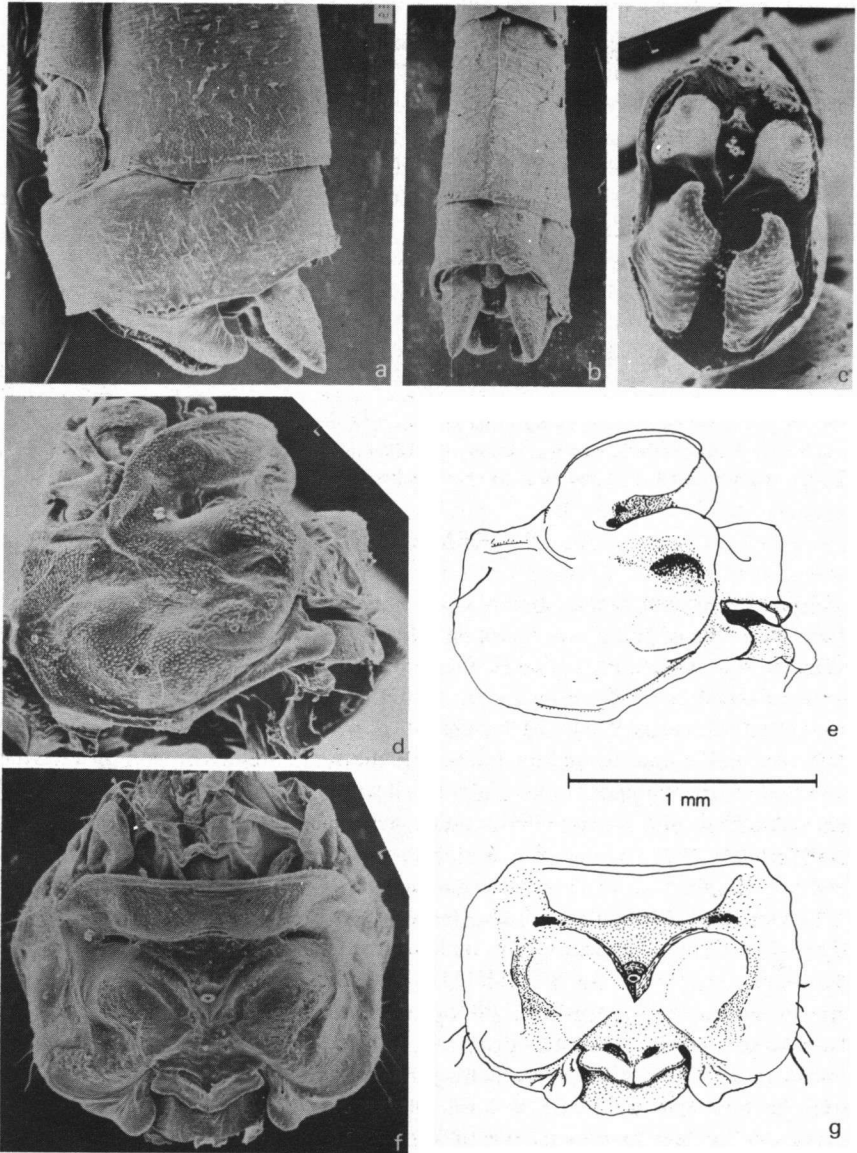


Fig. 4. *Arabicnemis caerulea* gen. n., sp. n. Sur, Oman; (a-c) paratype ♂. left lateral, dorsal and terminal views of abdominal segments 9-10 and appendages, SEM photographs; (d-g) allotype ♀. prothorax, left lateral, and dorsal views, SEM photographs and outlines with cervical sclerites omitted. All to same scale.

forewing and fourth in hindwing; IR2 arises at ninth Px in forewing and eighth in hindwing only two cells before pterostigma; arculus at or slightly proximal to oblique second Ax; quadrilateral cell elongate, costal side three-quarters as long as posterior side in forewing and about two-thirds as long in hindwing, distal side one and a half times as long as basal side and oblique, lower distal angle acute; two postquadrilateral antenodal cells; R4+5 arises proximal to subnode. Abdomen, segment 1 brownish, rest pale blue without markings, cerci short conical about one third of the length of segment 10, ovipositor sheath barely reaches apex of segment 10.

**Habitat.** — In southern Yemen the species occurred in the Wadi Kanina in cultivated land with irrigation channels adjacent to the Wadi Hajr and was associated with *Ischnura evansi* Mort.; at Maifa, in irrigation channels on the cultivated flood plain at the mouth of the Wadi Hajr adults were associated with *Ischnura senegalensis* (Ramb.), *I. evansi*, *Pseudagrion hamoni* Fraser, and *Trithemis annulata* (P. de Beauv.) (D. Davidson pers. comm.). In northern Oman, at Sur, Wadi Rafsah, associated species were *I. evansi* and *Lindenia tetraphylla* (Vander L.) (K.M. Guichard pers. comm.); at Al Awabi the habitat was at trickles of water in gullies off major wadis in company with *Trithemis arteriosa* (Burm.) and *Orthetrum chrysostigma* (Burm.) (A.R. Pittaway pers. comm.).

## REMARKS

This new dragonfly is the first platycnemidid to be recorded from the Arabian Peninsula. It appears to be most closely related to the African genera *Metacnemis* Hagen in SELYS (1863, 1886) and *Mesocnemis* KARSCH (1891) sensu PINHEY (1980) and agrees with them in the closely set antenodals converging towards R, the early separation of Ab from the wing margin well proximal to the first Ax making the petiole short, the arculus arising between the antenodals, the elongated quadrilateral cell with acute lower distal angle and the broken distal side of the subdiscoidal cell. These characters are evident in photographs of the wings of a *Metacnemis valida* Hagen in SELYS, 1863 in RIS (1921, pls 5, 7) made from a female in the Morton collection now in the Royal Scottish Museum, and for *Mesocnemis robusta* (SELYS, 1886) in RIS (1924). Additional figures of the male appendages and prophalli, and female prothorax are given by SCHMIDT (1951, figs 3-5) and PINHEY (1980). *Arabicnemis caerulea* however, differs from the species of these genera in its less robust build which recalls a *Coenagrion*, its more open venation, the more distal origin of IR2, the single large pentagonal subpterostigmal cell, the pale blue abdominal tergites unmarked with black, the male terminal appendages especially the inferiors which slope upwards not backwards, and the shape of the female prothorax. The three genera may be separated as follows:

- 1 Arculus usually well before Ax2 in forewing; mature ♂ strongly pruinosed blue, femora broadly pale-coloured, prophallus with well-developed flagella ..... *Mesocnemis* (two species, subtropical and equatorial Africa)
- 2 Arculus normally at or closely proximal to Ax2 in all wings; prophallus without flagella ..2
- 2 Larger more robust species; wing venation close; four or five postquadrilateral antenodal cells,

- 12-18 Px; mature males not pruinosed, femora mainly black ..... *Metacnemis*  
(two species, southern Africa; one species, Madagascar)  
— Smaller less robust species; wing venation open, usually two postquadriateral antenodal cells,  
9-11 Px; male lightly pruinosed on thorax, femora pale yellowish ..... *Arabicnemis*  
(one species, southern and eastern Arabia).

Although the new genus seems to be closely related to *Metacnemis* and *Mesocnemis* it is open to doubt whether these genera rest satisfactorily in the Platycnemididae. The placing of *Metacnemis* in the Selysian Léigion *Platycnemis* was first challenged by RIS (1921) who considered that the venational characters (i.e. short petiolation, long 1A, close set antenodals converging towards R, and outwardly pointed quadriateral cell), the long bristles on the legs, the *Coenagrion* not *Platycnemis*-like shape of the head, recalled New World *Argia* species and he thought that these characters might indicate real affinity and not mere convergence — a view he returned to later (RIS, 1924). SCHMIDT (1951) drew attention to the resemblance of the abdominal markings of the ♂ *Metacnemis valida* to *Enallagma cyathigerum* (Charp.) and although aware of the view of Ris kept *Metacnemis* species in the Platycnemididae. Ris was however supported by FRASER (1957) who considered that the Platycnemididae was made up of a heterogeneous collection of genera and he placed *Metacnemis* in the *Coenagrionidae*-*Argiinae*. More recently PINHEY (1980) has restored *Mesocnemis* to generic rank and places it with *Metacnemis* in the Platycnemididae. In view of the convergencies in morphology of these genera and *Arabicnemis* and some of the Old World *Argiinae* (e.g. *Onychargia* Selys) there remains a need for further studies to elucidate their affinities.

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