

**A NEW SPECIES OF *OREAESCHNA* FROM NEW CALEDONIA
(ANISOPTERA: AESHNIDAE)**

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O. dominatrix sp. n. from New Caledonia is described (holotype ♂: Plateau de Tango, I-IV-1984; allotype ♀: Plaine des Lacs, 4-XII-1981). The new sp. is compared with *O. dictatrix* Lieft. from New Guinea and its apparently close relationship to *Aeshna brevistyla* (Ramb.) is discussed.

INTRODUCTION

The odonate fauna of New Caledonia is of particular interest because the island is placed in the central west Pacific and disappeared under the ocean for a period during the Oligocene. The island measures about 250 km long and 50 km wide and has mountains over 2000 m. The fauna established over the last 40 million years or so is "intact" in the conservation sense; there has been no significant deforestation and, while open-cast mining for nickel has made bad surface scars, these only appear to have affected the fauna and flora locally. The Odonata number about 60 species; about half of these are endemic and these are mainly Syntheminae and Argiolestinae which were presumably the dominant elements in the fauna of Eastern Australia or New Guinea (or both) in Oligocene times. There are other New Guinea relationships, e.g. the corduline *Metaphya elongata* Campion is endemic to New Caledonia; the other two species of the genus are confined to New Guinea. More recent arrivals, with derived endemic taxa at species level, include an *Ischnura*, recently described (VICK & DAVIES, 1988), and the new aeshnid described in this paper. The rest of the New Caledonian species are mainly "modern" libellulines, widespread over South-East Asia and Oceania, such as species of *Tramea*, *Diplacodes*, *Orthetrum*, etc. and widespread aeshnids like *Anax guttatus* (Burm.), *A. gibbosulus* Ramb. and *Anaci-*

aeschna jaspidea (Burm.).

A review of the Odonata of this particularly interesting island is overdue and is being prepared by D.A.L.D. The most recent contributions, other than several new species descriptions, were two papers by LIEFTINCK (1975, 1976) describing some syntemids and agriolestids and a number of larvae. Awaiting description are the male of *Metaphya elongata*, females of *Synthemis ariadne* and *S. serendipita* and a very fine new species of *Synthemis*.

In this paper, we describe a new species of *Oreaeschna*, *O. dominatrix*. The genus was erected by LIEFTINCK (1937) for a species, *O. dictatrix*, found in New Guinea. The new species from New Caledonia agrees closely with the generic characters of *Oreaeschna*, but also raises interesting points about the relationship and origin of the widespread Australasian *Aeshna brevistyla*, referred to in the discussion.

OREAESCHNA DOMINATRIX SPEC. NOV.

Figures 1-2

Material — **Holotype** ♂: New Caledonia, Plateau de Tango, 1-IV-1984, A. Bauer leg. — **Allotype** ♀: New Caledonia, Plaine des Lacs, 4-XII-1981, D. Allen Davies leg. — **Paratypes**: 1 ♂, New Caledonia, Plaine des Lacs, 10-II-1983; 1 ♂, New Caledonia, Rivière Bleue, 17-II-1987, all D. Allen Davies leg.; 1 ♂ in BMNH Coll. labelled "Lifu Is." (in Loyalty Islands), without further data. — Colour preservation of holotype good (acetone); other material just adequate.

MALE (holotype) — abdomen + appendages 49 mm; hindwing 47 mm.

Head — labium reddish-brown with longitudinal yellow streak in median groove; mandibles reddish-brown, edge with yellow rim basally; maxillae dark-brown; labrum bright yellow, edge with narrow dark-brown band on apical border; anteclypeus olive; postclypeus sky-blue, the two depressions near apical border and the suture with the frons golden and the lateral margins (against the eyes) edged with dark-brown in the dorsal half; frons sky-blue shading to greenish-blue on the vertical surface, a prominent dark-brown T-shaped mark on the dorsal surface with its stem widening basally towards vertex and continuing as a dark-brown margin on the lateral surface (against the eyes), confluent with that on the post-clypeus; frontal ridge acute-angulate, hardly projecting mesially, frontal furrow shallow; vertex dark-brown, the median ocellus with narrow circular yellow border, antennae mid-brown, the cowl strongly cleft longitudinally and marked with medial yellow dorsal band which does not reach the lateral ocelli; occiput bright yellow with trace of dark-brown margins; rear of head yellowish-brown with narrow dark-brown margins against the eyes.

Prothorax — not examined.

Pterothorax — reddish-brown marked as follows: mesepisternum with a pair of yellow antehumeral stripes which are acute at the basal carina, widen medially (greatest width 1.2 mm) and narrow slightly towards the ante-alar carina before extending inwards slightly towards the dorsal carina as a pair of short

foot-shaped terminations, dorsal carina very dark-brown with prominent tooth in upper quarter; metepisternum with spiracle picked out in dark-brown; mesepimeron with straight yellow lateral stripe of uniform width (about 0.8 mm) which runs from about 1 mm above suture with mesosternum to the dorsal edge of sclerite and continues as a yellow spot on the posterior alar process; metepimeron with straight yellow lateral stripe, widening slightly at mid-length to about 1.0 mm, and running from about 1 mm above suture with metasternum to dorsal edge of sclerite; 4 sky-blue spots (on each side) on processes at base of wings and 3 blue spots in centre; pubescence pale yellow, longest on mesepisternum.

Legs — black, basal half of femora and trochanters marked with reddish-brown on outside surfaces.

Wings — normally Aeschnine; neuration dark-brown, costa paler brown as far as Pt; membrane hyaline; wing bases not coloured except for trace of dark-brown suffusion in hindwing; strengthened antenodals 1st and 7th in forewing, 1st and 6th or 7th in hindwing; nodal formula $\frac{11\ 19\ 18\ 12}{13\ 12\ 13\ 13}$; cross-veins in ht $\frac{3}{2}\ \frac{4}{2}$; triangles all 5-celled (proximal cell divided), distinctly longer and narrower in forewing; distal side of t curved, especially in hindwing where it is strongly angulate near upper end, from which point a supplementary sector arises which is continuous with Mspl; IR3 asymmetrically forked 1 cell proximal to Pt in forewing, 2 cells proximal in hindwing, upper branch of fork weaker than lower and fairly strongly zig-zagged, fork widest about 3 cells out from base and 2-3 cells in width except at wing margin (4-5 cells); R3 evenly convex at level of proximal end of Pt; bulge between MA and R4+5 commences at level of 3rd postnodal and contains 3 doubled cells; 4 rows of cells at widest point between Rspl and IR3; number of cells between MA and Mspl at widest point 3 in forewing and 4 in hindwing; number of cells between CuP and 1A where most widely separated 1 in forewing, 2 in hindwing; 1A in forewing branched forming a series of parallel supplementary sectors running to the wing margin, less regular in hindwing; Pt dark-brown 3.5 mm long, braced, subtending 3 cells in forewing, 2½ cells in hindwing; anal loop 9-celled; anal triangle 3-celled; membranule dark-brown shading to paler colour towards A1 and At and reaching to cross-vein in At; postero-anal margin of wing angulate.

Abdomen — (Figs 1-2) — segments 1 and 2 strongly inflated in both dimensions (widths 5.8, 5.6 mm); segment 3 very strongly constricted at mid-length and widening apically to form shape of an hour-glass (width 4.6 mm basally, 1.4 mm at constriction and 4.1 mm distally); segments 4 and 5 flattened dorso-ventrally (to greatest widths of 5.2 and 4.9 mm); segments 6 and 7 more or less cylindrical (widths 3.3 mm); segments 8 and 9 of increasing width and flattened dorso-ventrally (seg. 8 increasing in width from 3.5 to 4.6 mm and seg. 9 about 4.7 mm); segment 10 narrower but flattened and nearly twice as wide as long (width 3.7 mm) and bearing a small dorsal tooth and two longitudinal ridges on either side of the tooth; supplementary ridges on abdominal segments

6-10 present, those on 6 vestigial; auricles small, bearing 3 small teeth.

Abdominal colour pattern — dark reddish-brown, marked with sky-blue unless otherwise stated; seg. 1 with a pair of well-separated postero-dorsal spots and a trace of an antero-lateral spot; seg. 2 with a pair of wedge-shaped mid-dorsal spots and a very wide postero-dorsal band which is confluent with the almost-complete band formed by the lateral spots (this lateral band partly enclosing the auricle and narrowly broken at mid-segmental suture); a

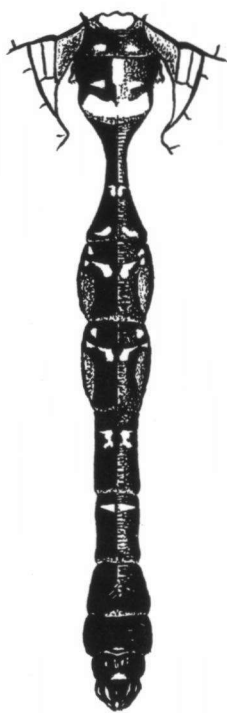


Fig. 1. *Oreaeschna domiatrix* sp. n. holotype male: abdomen, dorsal view.

wide longitudinal streak along the mid-dorsal carina of seg. 2, abruptly narrowed just before suture and confluent with postero-dorsal band; seg. 3 with a pair of mid-dorsal tear-shaped spots and a pair of postero-dorsal streaks, laterally the anterior half of the segment is yellow and there is a small green mid-lateral spot; segs 4-7 (all markings appear on dorsum owing to flattening) with, on either side of the dorsal carina, an antero-lateral spot, a mid-lateral spot (increasing in size towards seg. 7) and a pair of mid-dorsal L-shaped spots (reduced on seg. 7 to streaks); segs 8-9 immaculate; seg. 10 with a small yellow dorsal spot near posterior margin.

Appendages — (Fig. 2) — superiors curved and convergent, just greater than length of seg. 9, apically pointed; in lateral aspect a strong angulation in basal quarter and constriction at mid-length is visible; inferiors about 9/10 length of superiors, triangular in dorsal aspect, the apex minutely bifurcated and bearing two dorsally-directed teeth.

Accessory genitalia — as seen without dissection — resembling those of *Aeshna brevistyla* Ramb. very closely.

FEMALE (allotype) — abdomen + appendages 51 mm, hindwing 49 mm; head and thorax similar to male, except spots on wing processes are yellow rather than blue.

Wings — venation similar to male (allowing for sexual differences); nodal index $\frac{12}{16} \frac{20}{12} \frac{19}{13} \frac{13}{14}$; triangle 5-celled (6 in one wing); anal loop 9-10 cells; IR3 with upper branch of fork very weak in forewing; slight tawny suffusion at wing-bases but not extending beyond level of 1st antenodal.

Abdomen — much less strongly constricted at segment 3 than in male and dorso-ventral flattening of segments 4-5 and 8-9 present, but less pronounced; supplementary ridges present on segments 8 and 9 only; ovipositor very close to *dictatrix*, the valves not extending beyond segment 10; segment 10 of similar

proportions to male, its dorsal surface bearing a triangular groove, widening from a point just behind the anterior margin of segment to the posterior margin where it occupies nearly one-half of the width of the segment, the surface of the groove longitudinally rugose except for a smooth depression on each side near the margins of the groove (*Aeshna brevistyla* also possesses such a groove which is smaller and the features mentioned above are less pronounced); anal appendages short, $3/4$ the length of segment 9, lamellate and unremarkable in form.

Abdominal colour pattern — owing to poor state of preservation markings, it is difficult to decide whether some markings are blue or green — very similar to those of male, including the broad blue dorsal band on segment 2 but segment 10 is immaculate.

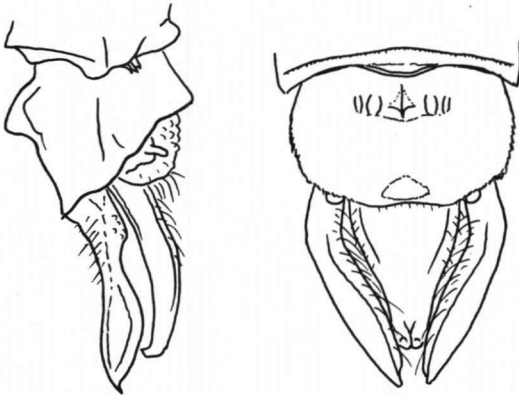


Fig. 2. *Oreaeschna dominatrix* sp. n. holotype male: abdominal segment 10 and anal appendages, in lateral and dorsal views.

DISCUSSION

Aeshnids are not well represented in New Caledonia and the species which are most commonly seen there are those which are also widespread in Australasia or South-East Asia: *Aeshna brevistyla* Ramb., *Hemianax papuensis* (Burm.), *Anax guttatus* (Burm.), *Anax gibbosulus* Ramb. and *Anaciaeschna jaspidea* (Burm.). However, eastern Australia has 8 genera and 31 species of the subfamily

Brachytroninae, e.g. *Austroaeschna* and its allies (DAVIES & TOBIN, 1985). It is curious that this group is not represented in New Caledonia; had they not arrived in eastern Australia by Oligocene times, or were they just pre-empted by synthemids? *Aeshna*-like niches have generally been occupied by synthemids on the island (*Synthemis campioni* Lieft., *S. miranda* Sel.). There are at least two species of *Gynacantha*, but there is also a brown, crepuscular *Synthemis* (*S. serendipita* Winstanley) which occupies a *Gynacantha*-like niche. The only other aeshnids are *Austrogynacantha heterogena* (Tillyard), found in 1983/4 by D.A.L.D., which is otherwise confined to eastern Australia, and *Oreaeschna dominatrix* sp. n. which has close affinities to *Oreaeschna dictatrix* from New Guinea and also to the more widespread *Aeshna brevistyla*.

LIEFTINCK (1937) described *Oreaeschna dictatrix* as a new genus and

species from material obtained in the Cycloop Mountains of Dutch New Guinea (now Irian Jaya). The main features which he used to define *Oreaeschna* were based on the abdominal morphology, i.e. the inflated basal segments, the strong constriction of segment 3, the marked flattening and lateral expansion of segments 7-9, the short but wide proportions of segment 10, the short anal appendages and the presence of supplementary lateral keels on segments 7-8 (males) or 8 (females). The wing venation of the new genus was mainly defined by "the feeble and undecided development" of IR3, in particular the weakness of the upper branch of the fork, its asymmetrical branching and the presence of only 2 cells between the branches (except near wing margins).

With respect to all of these morphological characters, *dominatatrix* can be seen to fit extremely well within Lieftinck's definition; in fact the supplementary ridges are present on 7-10 (males) and 8-9 (female) and the constriction at segment 3 and the flattening of the apical segments seems to be even more pronounced. The state of the fork of IR3 in the new material approaches that described by Lieftinck but the superior branch appears

to be rather less weak than he describes for *dictatrix*. However in the small series of the latter taxon from Dutch New Guinea in the BM Coll., we note one male (taken on Mt. Kunupi, Menoo Valley, Weyland Mountains at 6000', XII-1920

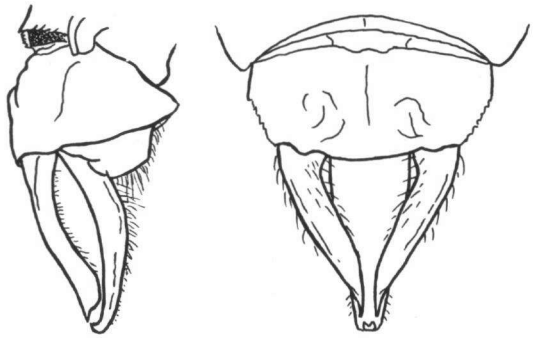


Fig. 3. *Oreaeschna dictatrix* Lieft., holotype male: abdominal segment 10 and anal appendages, in lateral and dorsal views. — [After LIEFTINCK, 1937]

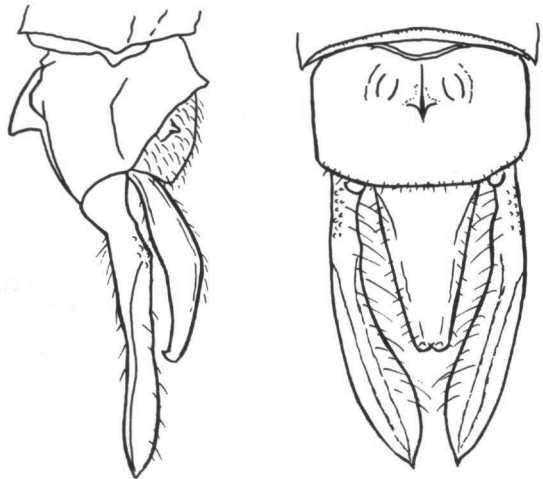


Fig. 4. *Aeshna brevistyla* Ramb.: abdominal segment 10 and anal appendages, in lateral and dorsal views — from Queensland material.

to I-1921, C.F. & J. Pratt leg.) in which the superior branch of IR3 is not obsolete but just weak and zig-zagged and very similar to the condition displayed by our material. Clearly there is some variability in this respect but both taxa seem to agree in possessing 2 rows of cells in the fork and a weak superior branch.

The new species differs from *dictatrix* as it is smaller (hindwing length 47 mm comp. with 52 mm), the colour pattern is quite different (although both species possess the broad blue band on segment 2) and there are small differences in the anal appendages and accessory genitalia (see Fig. 3 for anal appendages of *O. dictatrix*). In colour pattern, the new species closely resembles *Aeshna brevistyla* although there are distinct differences in abdominal morphology between the two species, especially that of the anal appendages (see Fig. 4 for those of *A. brevistyla*). However, the very close similarity of the accessory genitalia of the two species of *Oreaeschna* to that of *brevistyla* and the fact that the latter species possesses some of the morphological features of *Oreaeschna* in a rudimentary form (e.g. it has traces of supplementary ridges on the abdomen and its wing venation is very similar) suggest that the three species are closely related. We hesitate to place *brevistyla* with the other two species in *Oreaeschna* at this stage but we would suggest that this is an interesting avenue for further research.

The name *Oreaeschna* ("mountain *Aeshna*") was coined by Lieftinck on account of the high altitude of *O. dictatrix* localities in New Guinea. Curiously, the holotype of *O. dominatrix* was found at a small mountain stream in North-central New Caledonia, near Bopop village at an altitude of about 500 m. However, it transpired that it had already been taken elsewhere and overlooked because of its similarity to the rather common *Aeshna brevistyla*. The latter was not seen in the mountains but localities for *O. dominatrix* now include lowland areas in the South where *A. brevistyla* also occurs. It is certain that both can breed in the same stream. The flight seasons of both species are at least from early November to April. The difference between their ecological niches is not known; neither is really a forest species and they are most often seen over rather open or sparsely wooded areas. Much of the colour pattern of the two species is remarkably similar but it is an unaccountable fact that *O. dominatrix* more closely resembles the darker New Caledonia form of *A. brevistyla* than the much lighter Australian mainland form. They do not seem to breed in the larger rivers where *Anax guttatus* and *A. gibbosulus* are to be found.

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