

A new species of *Lanthanusa* Ris from north-eastern Papua New Guinea (Odonata: Libellulidae)

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(Received 6 June 2014; accepted 19 June 2014; first published online 17 October 2014)

A new species of the endemic New Guinean genus *Lanthanusa* is described from the Trauna River Valley in Western Highlands Province, Papua New Guinea. Characters of the male are illustrated and affinities of the new species are discussed. Some characters of the type species of *Lanthanusa*, *L. cyclopica*, are reassessed and a revised key to the genus is presented.

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Keywords: Odonata; dragonfly; Libellulidae; *Lanthanusa*; new species; Papua New Guinea

Introduction

The libellulid genus *Lanthanusa* Ris, 1912 includes six species of forest-dwelling dragonflies confined to the island of New Guinea. The records for which the altitude is known range between 1260 and 2875 m asl. The type species, *L. cyclopica*, described over a century ago by Ris (1912), is only known from the holotype female, and four additional species were described by Lieftinck (1942, 1955). The genus was not studied again for more than 50 years, until Michalski & Opper (2012) described *L. bilineata* from the mountains of western Papua New Guinea. Michalski (2012) subsequently summarized the information available on this genus and presented a key to the known species. Unfortunately the key provided by Michalski (2012) contained inaccuracies in its treatment of *L. cyclopica*, implying a more isolated position of the type species within the genus than is probable. Michalski (2012) also suggested that *L. bilineata* appears to ‘bridge’ the genera *Lanthanusa* and *Huonia* Förster, 1903 and he argued that the former should be synonymised with the latter without formally doing so.

Without involving ourselves in the *Huonia/Lanthanusa* question, we first reassess several characters attributed to *L. cyclopica* that have caused confusion in the past (e.g. Michalski 2012). We then describe as new a “typical” *Lanthanusa* species that the second author recently encountered in north-eastern Papua New Guinea, and provide an updated key to the species of *Lanthanusa*.

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Material and methods

Descriptive terminology largely follows [Watson & O'Farrell \(1991\)](#). Coloration is given as assessed from the preserved material, supplemented with a photograph of the holotype of the new species taken in life. Measurements are given in millimetres (mm). All illustrations were done with the aid of a camera lucida and are not to scale. Coordinates are presented using the GPS datum WGS 84.

Abbreviations used are: RMNH for Naturalis Biodiversity Center, Leiden, Netherlands, SAMA for South Australian Museum, Adelaide, Australia; Fw for forewing; Hw for hind wing and S for segment(s).

Comments on some characters attributed to *Lanthanusa cyclopica* [Ris, 1912](#) in the literature (Figure 1)

The description of *L. cyclopica* by [Ris \(1912\)](#) was based on a single female specimen (Figure 1) and includes measurements of hind wing length (33 mm) and pterostigma length (2.5 mm). The pterostigma measurement was emphasised by [Liefstinck \(1942\)](#) and [Michalski \(2012\)](#) to support the distinctness of *L. cyclopica* from all other *Lanthanusa* species, which have a longer pterostigma (3.0–3.8 mm). Other characters used to distinguish this species from congeners are the presence of transverse cross-veins in all triangles (versus their general absence in all other species) and the position of the hind wing triangle, which is basal to the arculus (versus at the arculus in all other species).

We investigated these details by examining the original photograph of the wings of the holotype of *L. cyclopica* in [Ris \(1912\)](#). This is a mirror image of the right pair of wings that was also reprinted by [Michalski \(2012\)](#). We also examined new photographs of the holotype of *L. cyclopica* (Figure 1) and of the holotypes of several additional *Lanthanusa* species that are lodged in RMNH. The photograph of *L. cyclopica* in [Ris \(1912\)](#) shows faint, but detectable cross-veins in both the

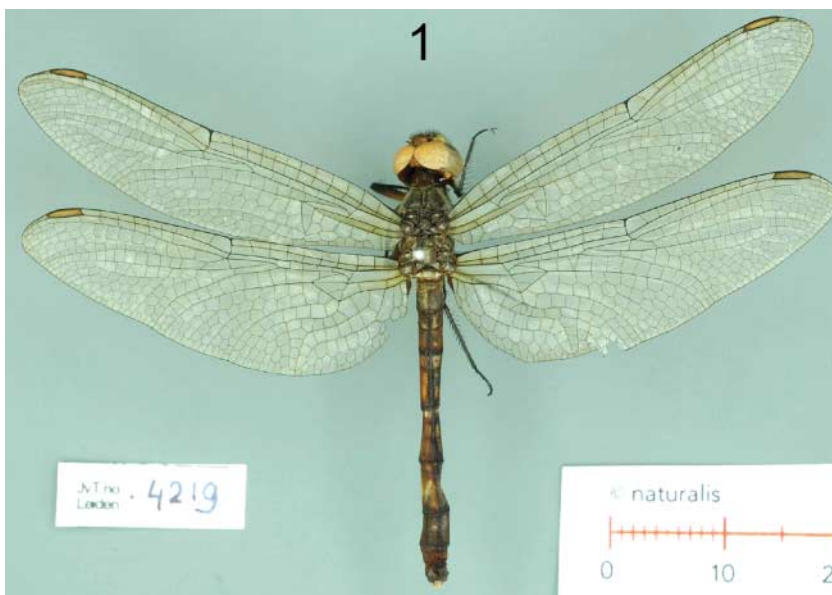


Figure 1. *Lanthanusa cyclopica*, female holotype, dorsal (photo: RMNH Naturalis).

forewing and hind wing triangle. However there is no cross-vein evident in the forewing triangle in the reproduction in Michalski (2012) even though it is mentioned in the text. Fortunately it is clearly present in the new photograph of the holotype obtained from RMNH (Figure 1). The pterostigma length, calculated from all of the available photographs of the holotype, is at least 3.0 mm, not 2.5 mm. The position of the hind wing triangle relative to the arculus is identical in *L. cyclopica* and *L. lamberti* Liefertinck, 1942 and hardly different in *L. sufficiens* Liefertinck, 1955, based on photographs of the holotypes of these species. These results indicate that the female holotype of *L. cyclopica* differs from all other *Lanthanusa* species only by the presence of crossveins in all triangles and by a small triangular fleck under each of the forewings and hind wings; it does not differ by the size of the pterostigma. However it should be noted that crossveins in one or the other triangle can also be found in some specimens of other *Lanthanusa* species (Figure 4) so this character may also be less useful than previously thought.

Description of the new species

Lanthanusa cochlear sp. nov. (Figures 2–3, 6–10)

Material examined

Holotype ♂ (SAMA 07-000987): Papua New Guinea, Western Highlands Province, Trauna River Valley, 05°29'07"S, 144°14'13"E, 1618 m asl, 17 November 2013, S.J. Richards leg.

Etymology

The specific name (cochlear = Latin for spoon) refers to the shape of the lobes of the penile hood and is used as a noun in apposition to the generic name.

Diagnosis

The smallest known *Lanthanusa* species with a short and rather wide pterostigma, pale labium, short, widely spoon-shaped penile lobes, short hamular hooks and a predominantly black anterior section of abdominal segment 3.

Description of the male holotype

Head (Figures 2, 3). Labium yellowish green, merging each side into a basal brownish black patch, lobes yellowish green, very narrowly blackened along much of inner margin but restricted to only median *c.* 1/3 of anterior margin; genae and more than basal half of mandibles yellowish green, remainder of mandibles brown to brownish black; labrum yellowish green with very narrow black anterior margin; clypeus and anterior frons largely olive-green, somewhat darker along epistomal suture; top of frons, antennae and the large vertex black; black on top of frons delimited against anterior frons medially in an almost straight line, laterally merging into olive-green; occiput and postgenae largely reddish brown to darker brown, at least ventral half of lateral edge of postgenae greenish yellow.

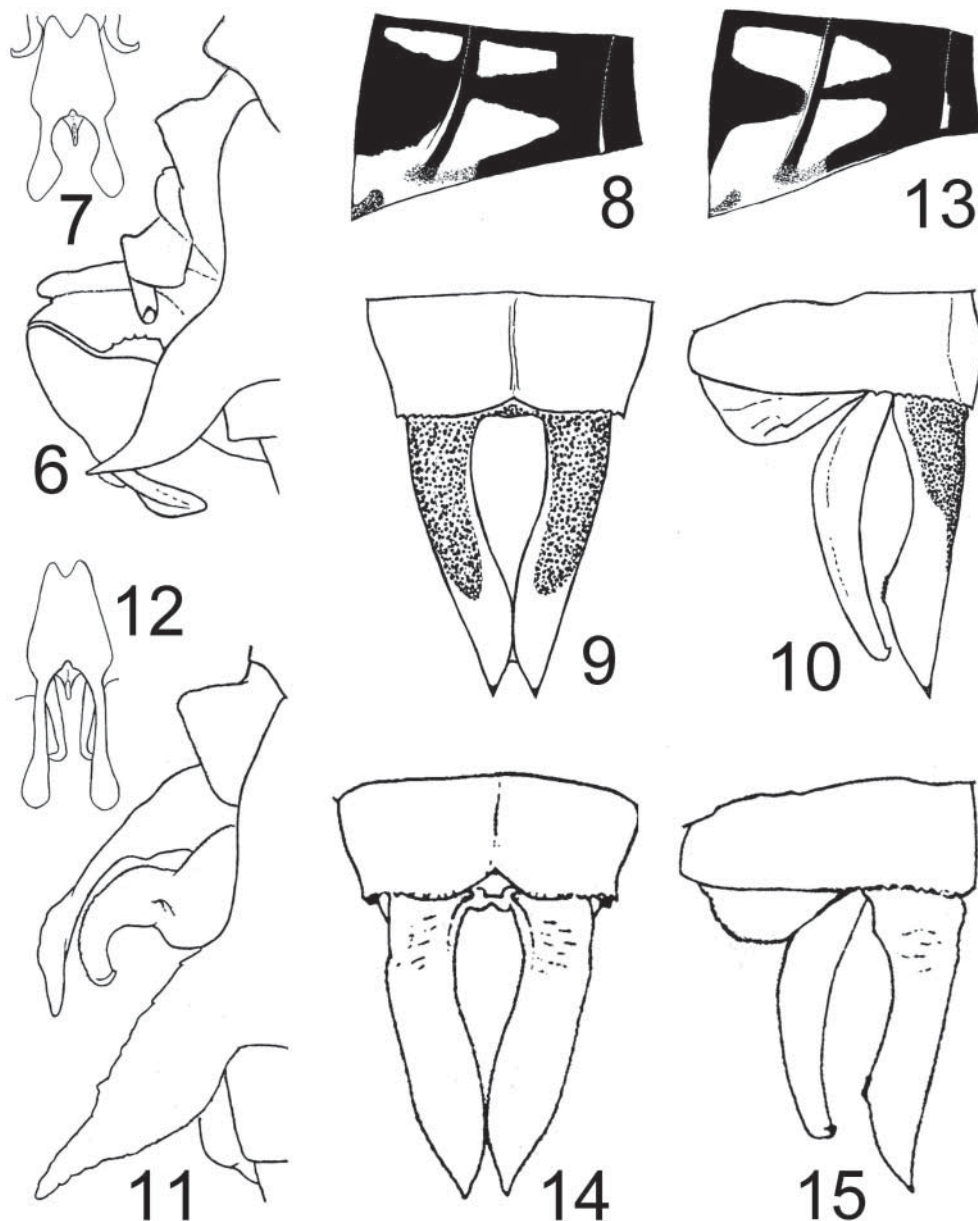
Thorax (Figures 2, 3). Prothorax largely black with a few indistinct greenish or brownish yellow spots on notum and pleura. Front of synthorax largely black with mid-dorsal carina, median section of mesostigmatic lamina and with a complex, bottle-necked antehumeral pale



Figures 2–5. *Lanthanusa* species. (2, 3) *L. cochlear* sp. nov., male: (2) live, photograph by S.J. Richards; (3) holotype, lateral with head dorsal, and head (enlarged inset), ventral. (4, 5) *L. richardi* male: (4) holotype, dorsal; (5) lateral with head dorsal, and head (enlarged inset), ventral.

green patch (reaching from the ventrally pale green mesokatepisternum to antealar ridge); lateral pleura pale green with large complex black patch covering most of mesepimeron and slightly less than middle 1/3 of metepisternum dorsal to metastigma, and with narrow black patch along metapleural suture and extending into central half of metepimeron. Legs with coxae pale to greyish green, trochanters greyish brown, femora largely blackish brown, inner face of pro and metafemora pale green, tibiae, tarsi and claws black. Postcoxae and poststernum pale to greyish green. Wings (Figure 3) with venation black and membrane hyaline; 10/7 antenodals, 7/7–8 postnodals; pterostigma only 2.5 mm long; second Cu₂ in hind wing removed from triangle by only 1/4 of length of basal side of triangle; anal loop composed of 15 cells; membranula very small, grey.

Abdomen (Figures 2, 3). Largely black with rich pale green pattern as follows. S1 largely pale green; S2 (Figures 6, 7) with large dorsal patch subdivided by dark line along supplementary carina, smaller lateral and larger ventral patch above black sinuous pointed genital lobe with apex pointing ventrally; S3 each side with smaller dorsal patch anterior to, and larger dorsal patch posterior to, transverse carina; and a small ventral patch anterior to, and a larger lateroventral patch posterior to, transverse carina, the anterior patches very widely separated, making the anterior section of the segment appear in lateral view predominantly black; S4 each side with large dorsal anterior patch and much smaller dorsal posterior patch, and an elongate ventral patch; S5 with



Figures 6–15. *Lanthanusa* species. (6–10) *L. cochlear* sp. nov., male: (6) secondary genitalia, lateral; (7) penile hood and hamular hooks, ventral; (8) S3 lateral; (9, 10) anal appendages: (9) dorsal; (10) lateral. (11–15) *L. richardi* male: (11) secondary genitalia, lateral; (12) penile hood and hamular hooks, ventral; (13) S3 lateral; (14, 15) anal appendages: (14) dorsal; (15) lateral. 11, 14, 15 modified from Liefstinck (1942).

ventral patch only; S6 with very wide ring over at least 2/3 of segment length; S7–10 almost entirely black, S8 near base with very small pale dorsal spot each side of, and close to, midline; sterna largely brown to black. Penile hood with short, medially significantly widened lateral lobes; hamular hooks short and widely curved. Anal appendages (Figures 8, 9): superiors barely twice as long as S10, with base rather slender, basal 2/3 black, apical 1/3 yellow; inferiors 7/8 as long as superiors, yellow.

Measurements

Hind wing 28.2 mm; abdomen including anal appendages 28.0 mm.

Female

Unknown.

Habitat

The holotype was found along a small, very steep and clear rocky stream that intersects the road from Baiyer River to Jimi Valley in close proximity to Trauna Gap in the Trauna River Valley. The lower montane rainforest on adjacent slopes was reasonably intact, but many trees along the stream had been cleared so the canopy was fairly open. The holotype descended from the canopy during a short period of sunshine to perch on rocks and low vegetation about 15 m upstream of a large, rocky waterfall. The species appeared to be uncommon; no additional specimens were observed despite more than 6 hours of sampling over two days at this site. The new species co-occurred with a number of other interesting odonate species including the recently described *Palaiargia traunae* Orr and Richards, 2014; the odonate community at the site is summarized in Richards and Theischinger (2014).

Comparison with other species

The large green antehumeral patches, which extend almost the full length of the mesepisternum, together with the remaining pattern of the synthoracic pleura, immediately distinguish the male holotype of *L. cochlear* sp. nov. (Figures 2, 3) from all congeners except *L. richardi* Liefstinck, 1942 (Figure 5; see key to individual species below). Although the anal appendages indicate a close affinity between these two species *L. cochlear* sp. nov. is smaller (Hw 28 mm, abdomen 28 mm versus 33–35 mm and 29–34 mm respectively), has the median lobe of the labium largely pale (versus black; Figure 5, inset), a shorter and wider pterostigma (2.5 mm versus >3.0–3.5 mm) with length along costa/greatest width index of *c.*3.1 (Figure 3 inset) versus *c.*3.9 (Figures 4, 5), and the anterior section of S3 is predominantly black (Figures 2, 3, 8) versus predominantly green (Figures 5, 13). Another key feature that distinguishes the two species is the structure of the penile hood and hamular hooks. In *L. cochlear* the lobes of the penile hood are short and wide and the hamular hooks are short (Figures 6, 7), while in *L. richardi* the lobes of the penile hood are long and narrow and the hamular hooks are long (Figures 11, 12). The differences between *L. cochlear* sp. nov. and *L. richardi* appear greater than the differences between *L. richardi* and *L. sufficiens* reported by Liefstinck (1955). The sinuous, ventrally pointing genital lobe (Figure 6) and the small distance between distal Cuq and triangle in Hw (Figure 3) of *L. cochlear* sp. nov., versus a straighter genital lobe (Figure 10) and a larger distance between Cuq and triangle in Hw may also be diagnostic but further material of the new species is required to confirm the utility of these characters.

Key to the species of *Lanthanusa*

- 1 Triangles of all wings traversed by a cross-vein (Figure 1) *L. cyclopica* (female only)
- Triangles not or rarely traversed by a crossvein (Figures 2–5) 2

- 2 Front of synthorax without pale antehumeral markings, sides with two broad pale stripes *L. bilineata*
 – Synthorax pattern more complex, including pale antehumeral markings (Figures 2–5) **3**
- 3 Antehumeral markings simple, not reaching close to, nor including a spot close to, antealar ridge *L. donaldi*
 – Antehumeral markings reaching close to, or including a spot close to, antealar ridge (Figures 2–5) **4**
- 4 Antehumeral markings sharply defined and including a simple large ventral and a well separated small dorsal mark *L. lamberti*
 – Antehumeral markings a complex, unbroken large patch covering almost the entire length of mesepisternum (Figures 2–5) or this patch separated narrowly (or at least nearly so) into a large ventral patch and a small dorsal mark **5**
- 5 Antehumeral markings wholly or almost completely divided up into a large ventral patch and a much smaller transverse mark situated just in front of antealar ridge *L. sufficiens*
 – Antehumeral mark unbroken, the whole forming a continuous patch from near mesokatepisternum to just in front of antealar ridge (Figures 2–5) **6**
- 6 Median lobe of labium largely pale (Figure 3 inset); pterostigma only 2.5 mm long (Figure 3); lobes of penile hood short and widely spoon-shaped (Figure 7); anterior section of S3 laterally predominantly black (Figure 8) *L. cochlear* sp. nov.
 – Median lobe of labium all black (Figure 5 inset); pterostigma at least 3.0 mm long (Figures 4, 5); lobes of penile hood long, narrow and not abruptly widening (Figure 12); anterior section of S3 laterally predominantly pale (green) (Figure 13) *L. richardi*

Acknowledgements

The survey during which this new species was discovered was supported by the National Government of Papua New Guinea through the Department of Environment and Conservation (DEC), with funds provided by the Prime Minister's Office. It is part of a project being undertaken by the Mul Baiyer Lumusa District Administration to redevelop the Baiyer River Sanctuary and we particularly thank the Honourable Koi Trappe, MP, Douglas Kilipi, Bevi Korua, Clem Kila and Oglu Makindi, the Mul Baiyer District Administrator, for their support. Assistance from Gunther Joku (Acting Secretary), and Barnabas Wilmott from DEC ensured the success of the biodiversity survey and SJR is most grateful to them. The communities at Baiyer River warmly welcomed the survey team to the area and their hospitality and willingness to share their extensive knowledge with the team is greatly appreciated. K.-D. Dijkstra and Vincent Kalkman (Leiden) are thanked for making available photographs of holotypes of *Lanthanusa* specimens. GT is grateful for ongoing support by the management of the NSW Office of Environment & Heritage.

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