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## Two new species of *Hylaeargia* Lieftinck from New Guinea (Zygoptera: Platycnemididae)

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### Abstract

Two species, *Hylaeargia vanmastrigti* sp. n. (holotype male from Star Mountains, Papua Province, Indonesian New Guinea) and *H. lisa* sp. n. (holotype male from Hindenburg Range, Papua New Guinea), are described as new. An illustrated key to the known species of *Hylaeargia* Lieftinck is presented.

### Introduction

The damselfly genus *Hylaeargia* Lieftinck, 1949 comprises a group of three moderately large, sombre to brightly-coloured species that are endemic to New Guinea: *H. simulatrix* Lieftinck 1949, *H. magnifica* Michalski 1995 and *H. simplex* Theischinger & Richards 2013. Previously considered to be coenagrionids, *Hylaeargia* and other closely related genera from New Guinea are all now placed in Platycnemididae (Dijkstra *et al.* 2013). Since the description of *Hylaeargia simplex* less than a year ago (Theischinger & Richards 2013) we have obtained additional material of the genus from the Hindenburg Range in western Papua New Guinea, and a single male from the nearby Star Mountains in Indonesian New Guinea was provided to us for study by V. Kalkman. Examination of this freshly acquired material confirmed that they represent two more new species. The two species are therefore described as new, illustrated, and discussed below.



### Material and methods

Descriptive terminology largely follows Chao (1953) and Watson & O'Farrell (1991). Colouration is given as detectable from the preserved material and, for one species, from photographs 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. The holotype of the new species from the Star Mountains is deposited in the National Natuurhistorisch Museum Naturalis (RMNH) in Leiden, and the type series of the new species from the Hindenburg Range is in the collections of the Museum and Art Gallery of the Northern Territory in Darwin (MAGNT) and the South Australian Museum in Adelaide (SAMA).

### *Hylaeargia vanmastrigti* sp. n.

Figures 1, 14-16



Fig.1. *Hylaeargia vanmastrigti* sp. n. Holotype male. Photo by G. Theischinger.

Material. – Holotype ♂ (RMNH): Indonesia, Papua Province, Abmisibil, Okbon, Star Mountains, 2,000 m a.s.l., 11-12-xii-1990, HJG van Mastrigt leg.

Etymology. – The specific name (Latinized family name in the genitive case) represents a dedication to the collector of the species.

Male. – Head. – Labium including lobes black; labrum lemon-yellow with black midline in basal half; mandible bases largely lemon-yellow, dark adjacent to labrum, remain-



der of mandibles black; clypeus, top of frons, antennae, vertex and postgenae black; anterior frons and genae lemon-yellow, forming light transverse bar from eye to eye.

Thorax. – Prothorax black with C-shaped blue patch on epimeron and part of episternum and with large blue patch each side of notum covering most of median lobe. Synthoracic pleura black with two substantial blue lateral patches, one somewhat complex across posterior part of mesepimeron and much of metepisternum, the other, more simple, across most of posterior half and anterodorsal corner of metepimeron; ventral tip of metepimeron also blue; the mesepimeral/metepisternal patch partially subdivided by a rather wide black wedge along interpleural suture from subalar ridge to well beyond metastigma. This forms a partial transverse subdivision, with the mesepimeral part (stripe) markedly longer than the metepisternal one; katapisterna narrowly tipped with blue. Terga vivid blue and black. Postcoxae largely blue laterally and ventrally; poststernum framed black with blue anterolateral patch connected to lateral metepimeral stripe, and with blue posteromedian patch. Legs largely black, posterior half of outer face of coxae, anterior face of trochanters and most of inner face of femora blue. Wing membrane hyaline, venation and pterostigma black; postnodals 18-19/17-18.

Abdomen. – Terga largely black; tergum 1 with large irregular blue patch each side, dorsal separation of patches wide anteriorly, narrow posteriorly; tergum 2 with approximately trapezoidal blue median patch in anterior half and small bluish lateral patch dorsal to secondary genitalia; terga 3-7 with only extreme ventral margin pale greyish yellow; terga 8 and 9 with extensive bright blue dorsal patch across posterior two thirds in 8, entire length in 9; segment 10 with extensive bright blue dorsal patch across entire length. Sterna black. Anal appendages black; superiors strongly curving mediad, bilobed, with dorsal and ventral lobe of the superior anal appendages subequal in size, dorsal lobe slightly conical with rounded tip and ventral lobe parallel sided and apically rounded; inferiors with wide base and apex obscured in the unique specimen.

Measurements (in mm). – Hindwing 25.0; abdomen plus appendages 33.5.

Female. – Unknown.

Habitat. – Unknown but the label accompanying the specimen states 'Okbon'. Ok is the word for river or stream in the Star Mountains and it is likely that the specimen was found adjacent to this mountain stream at 2,000 m a.s.l.

Comparison with other species. – In having the dorsal and ventral lobe of the superior anal appendages subequal in size, the unique male specimen of the new species is most similar to *H. simulatrix*. However the synthoracic pattern of *H. vanmastrigti* sp. n., in which there is a distinct subdivision of the blue anterior lateral patch, is unique for the genus. The new species further differs from *H. simulatrix* in having the supe-



rior anal appendages strongly curved mediad (vs almost straight). *Hylaeargia magnifica*, *H. simplex* and *H. lisae* sp. n. can be readily distinguished from the new species by the colour pattern described above and by having the dorsal lobe of the rather straight male superior anal appendages much larger than the ventral lobe.

***Hylaeargia lisae* sp. n.**

Figures 2-5, 21-24



Figs 2, 3. *Hylaeargia lisae* sp. n. male in life: (2) mature; (3) subadult. Photos by S.J. Richards.





Figs 4, 5. *Hylaeargia lisae* sp. n. paratype female: (4) in life; (5) preserved. Photo 4 by S.J. Richards; photo 5 by G. Theischinger.

Material. – Holotype ♂ (MAGNT): Papua New Guinea, Hindenburg Range, Western Province, Tupnonbil area (5.12017°S, 141.25821°E, 1,817 m a.s.l.), 19-ii-2013, M. Hammer leg. Paratypes (SAMA): Papua New Guinea: 1 ♂, same data as holotype; 1 ♀,



same locality, 17-ii-2013, A. Gambia leg.; 1 ♂, same locality, 18-ii-2013, S. Richards leg.

Etymology. – The specific name (Latinized family name in the genitive case) represents a dedication to the wife of the second author.

Male (mature). – Head. – Labium black, only laterally near base with some greyish white, labial lobes black; labrum bright yellow with basal  $\frac{1}{2}$  of midline very narrowly lined black; mandible bases laterally bright yellow, ventrally including remainder of mandibles black; clypeus, top of frons, antennae, vertex and postgenae black, anterior frons and genae bright yellow, forming bright transverse bar from eye to eye.

Thorax. – Prothorax black with large boomerang-shaped blue patch on epimeron and part of episternum, and similar size blue patch each side of notum covering most of third  $\frac{1}{4}$  of median lobe. Synthoracic pleura black with two substantial blue lateral patches, one across posterior part of mesepimeron and much of metepisternum, the other across most of posterior half and anterodorsal corner of metepimeron; ventral tip of metepimeron also blue; the mesepimeral/metepisternal patch partly subdivided by a moderately wide stripe along interpleural suture from subalar ridge halfway to metastigma, the thus-formed mesepimeral part (stripe) slightly shorter than the metepisternal one; mesokatepisternum narrowly, metakatepisternum substantially, tipped with blue. Terga vivid blue and black. Mesopostcoxa laterally blue, ventrally black, metapostcoxa black and blue laterally and ventrally; poststernum framed black with blue anterolateral patch connected to lateral metepimeral stripe and with large blue posteromedian patch. Legs largely black, posterior and approximately distal half of outer face of coxae, much of anterior face of trochanters and most of inner face of femora blue. Wing membrane hyaline, venation and pterostigma black; postnodals 19-21/16-20.

Abdomen. – Tergum 1 largely black, with large irregular blue patch each side; dorsal separation of patches wide anteriorly, narrow posteriorly; tergum 2 black with approximately trapezoid shaped blue median patch over anterior half and small rhombic bluish lateral patch dorsal to secondary genitalia; terga 3-7 black with only extreme ventral margin yellowish white; terga 8 and 9 with extensive bright blue patch across apical  $\frac{1}{2}$  in 8, almost the entire length in 9; segment 10 with extensive bright blue patch across entire length. Sterna black. Anal appendages black; superiors seen in profile bilobed with dorsal lobe large, almost circular, and ventral lobe small, keel-shaped and somewhat projecting below the horizontal; inferior appendages with base wide, remainder obscured.

Measurements (in mm). – Hindwing 25.7-26.5; abdomen plus appendages 32.7-34.0. Female. – Head. Labium pale brownish blue, lobes greyish blue; labrum pale greyish blue with base and lateral margins partly and more or less distinctly darkened and





anterior margin and basal 2/3 of midline narrowly lined black; mandible bases pale greyish blue, darkened adjacent to labrum, remainder black; clypeus, top of frons, antennae, vertex, postocular lobes and postgenae largely brownish black, only occipital edge medium brown to dull orange; anterior frons and genae pale blue.

Thorax. – Prothorax: pronotum with anterior lobe pale brown, median lobe largely black, steeply rising, and posterior lobe largely dark brown, high, upright, medially engulfed and with prominent lateral lobes; propleura largely greyish to pale blue.

Synthorax much as in male; pleural pattern with less sharply defined light pattern elements pale to greyish blue on brown to blackish brown ground. Poststernum with frame paler and less strongly defined from lighter brownish to greyish blue areas. Legs much as in male but reddish to blackish brown instead of black, with light areas generally paler and with inside of femora largely dull bluish grey. Wings much as in male but pterostigma slightly paler; 18/17 postnodals.

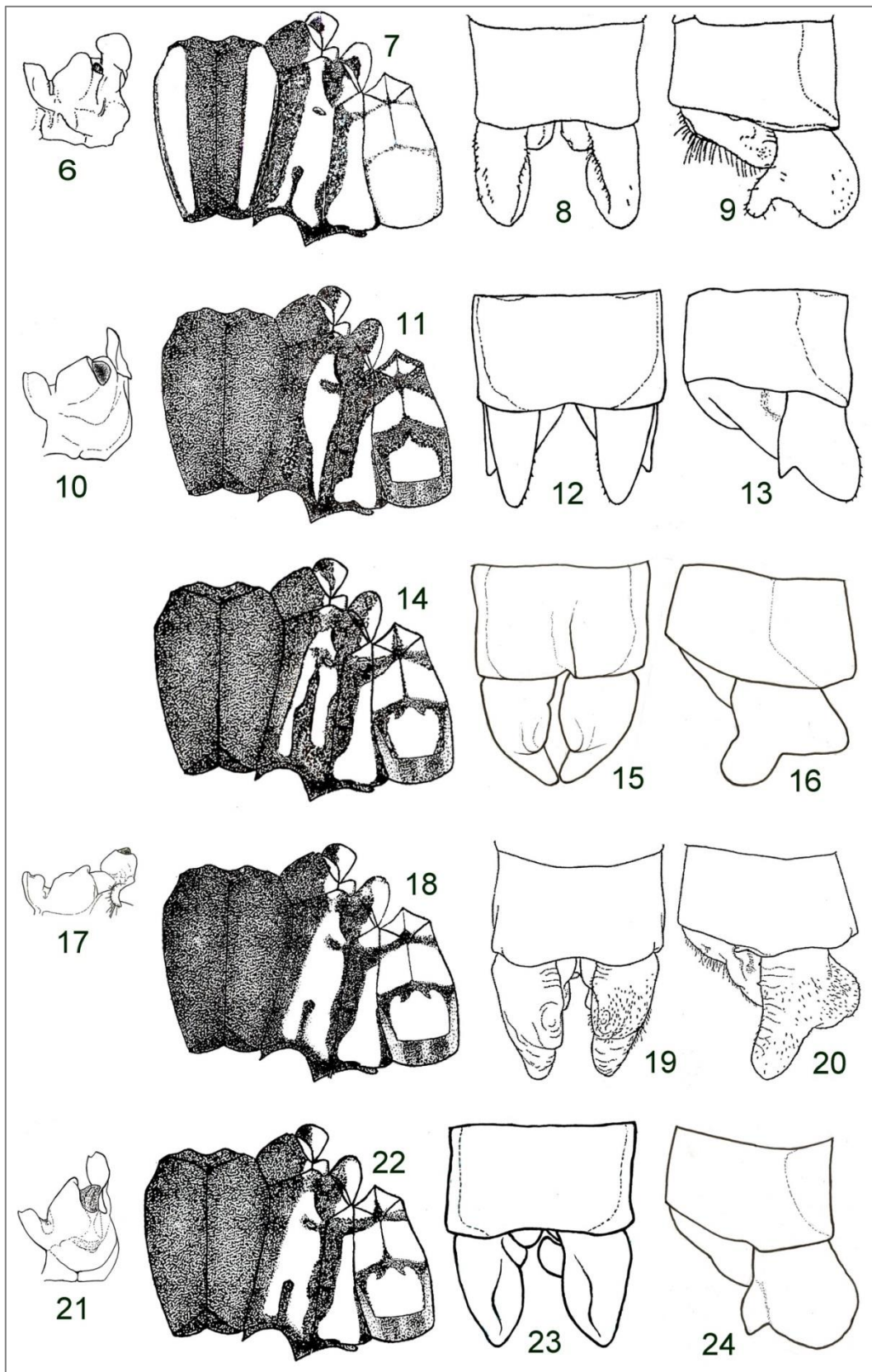
Abdomen. – Terga 1 and 2 much as in male but reddish to blackish brown instead of black and with light pattern elements paler and less clearly defined; terga 3-7 black, slightly paler at base, particularly laterally, and even paler along ventral margin, each with ill-defined reddish brown lateral streak almost as long as segment in 3, increasingly shorter towards end of abdomen, being only ¼ length of segment in 7; terga 8 and 9 and segment 10 much as in male but the dorsal blue patches duller and paler, more greyish, merging laterally into brown, on 9 only half as long as segment. Sterna black; ovipositor brown, valves black and brown with approximately 20 ventral teeth, very small in anterior portion and increasingly larger towards apex. Anal appendages black.

Measurements (in mm). – Hindwing 28.2; abdomen plus appendages 32.0.

Variability. – The description above is given from the holotype, a mature specimen. The rather immature paratype males (somewhat shrivelled by acetone preservation) differ from the holotype by having the structures of the head that are yellow in the holotype being pale blue, in having additional blue patches (irregular and ill-defined) present on top of the head close to the eyes, and the blue colouration of thorax and abdomen being paler/less bright. The blue elements are also somewhat less sharply defined and sometimes larger. The photo of the female in life shows a darker specimen with the thoracic pale pattern reduced and the brown lateral abdominal streaks apparently missing.

Habitat. – The type locality was a clearing near the base of the Hindenburg Wall, where *H. lisae* was found on low vegetation along a small (1-2 m wide) clear stream. The area had been cleared for a garden but small patches of remnant forest remained.





Figs 6-24. *Hylaeargia* spp. (6-9) *H. magnifica* Michalski; (10-13) *H. simplex* Theischinger & Richards; (14-16) *H. vanmastrigti* sp. n.; (17-20) *H. simulatrix* Lieftinck; (21-24) *H. lisae* sp. n.: (6, 10, 17, 21) female pronotum, lateral; (7-9, 11-13, 14-16, 18-20, 22-24) male: (7, 11, 14, 18, 22) synthorax, frontal, lateral, ventral; (8, 9, 12, 13, 15, 16, 19, 20, 23, 24) anal appendages: (8, 12, 15, 19, 23) dorsal; (9, 13, 16, 20, 24) lateral. Figs 6, 8, 9 from Michalski (1996); Figs 10, 12, 13 from Theischinger & Richards (2013); Figs 17-20 from Lieftinck (1949).



All specimens were perched on low plants along the stream during brief periods of sunshine. The climate at the site was extremely wet, and during the course of several days sampling at this site only 3-4 hours of sunshine in total were encountered.

Comparison with other species. – The lateral synthoracic pattern of the male of *H. lisae* sp. n. closely agrees with *H. simulatrix* and *H. magnifica*, and the female pronotum is similar to these two species and to *H. simplex*. The male superior anal appendages of the new species, with the dorsal lobe much larger than the ventral lobe, come nearest to *H. simplex* (which is considered its closest relative) and to *H. magnifica*. However the dorsal lobe of the male superior anal appendages is much plumper than it is in *H. simplex*, and the ventral lobe is much shorter and plumper than in *H. magnifica*. *H. simulatrix* and *H. vanmastrigti* can be clearly distinguished from *H. lisae* by having dorsal and ventral lobes of the male superior anal appendages that are subequal in size.

### Key to the species of *Hylaeargia*

(Colouration and pattern may vary within each species, particularly with degree of maturity.)

- 1 Front of male synthorax with broad pale (orange/blue) antehumeral stripe (Fig. 7); superior anal appendages with their dorsal lobe widely rounded, ventral lobe thumb-shaped (Fig. 9). Female pronotum as in Fig. 6  
 ..... ***H. magnifica***
  - Male with front of synthorax black (Figs 11, 14, 18, 22); superior anal appendages not as above. Female pronotum not as above  
 ..... **2**
- 2 Blue meso/metapleural patch of male dorsally undivided, narrow and almost pointed (Fig. 11); female pronotum as in Fig. 10  
 ..... ***H. simplex***
  - Blue meso/metapleural patch of male dorsally subdivided along interpleural suture (Figs 14, 18, 22). Female pronotum as in Fig. 17 or Fig. 21  
 ..... **3**
- 3 Male with black separation along interpleural suture a long wedge, reaching metastigma (Fig. 14); superior anal appendages, seen in dorsal view, strongly curved mediad (Fig. 15). Female unknown  
 ..... ***H. vanmastrigti***
  - Male with black separation along interpleural suture a short line/stripe, covering hardly half the distance between subalar ridge and metastigma (Figs 18, 22); superior anal appendages, seen in dorsal view, rather straight (Figs 19, 23). Female pronotum as in Fig. 17 or Fig. 21  
 ..... **4**



- 4 Male superior anal appendages with dorsal and ventral lobe similar in size (Fig. 20). Female pronotum as in Fig. 17  
 ..... *H. simulatrix*
- Male superior anal appendages with dorsal lobe much larger than ventral lobe (Fig. 24). Female pronotum as in Fig. 21  
 ..... *lisae*

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