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## A new species of *Petalura* LEACH from south-eastern Queensland (Odonata: Petaluridae)

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**Abstract:** *Petalura litorea* sp. n. (♂ holotype: Queensland, North Stradbroke Island, Brown Lake, S end) is described, illustrated and compared with *Petalura gigantea* LEACH.

**Key words:** *Petalura*, new species, Australia.

### Introduction

Because of their huge size (wing span up to 173 mm, body length up to 127 mm (A. Davies, pers. comm.)), semi-aquatic life and great antiquity (Petaluridae were common in the early Jurassic Era, 190 million years ago), the species of *Petalura* LEACH have, for many years, received more attention than other Australian dragonflies.

This resulted not only in the description of 4 species (LEACH 1815; TILLYARD 1908, 1913; WATSON 1958) and in papers on life history (TILLYARD 1909, 1911), but, more lately, also in the accumulation of considerable material, particularly in overseas collections.

Numerous specimens of north Queensland *Petalura* (*P. ingentissima* TILLYARD, *P. pulcherrima* TILLYARD), spread widely across a number of collections, are now available. In spite of, or perhaps because of this, it is now less clear than ever, whether *P. pulcherrima* can be considered specifically distinct from *P. ingentissima*, or if there are perhaps more than 2 north Queensland species of *Petalura*.

Focusing attention on northern *Petalura*, however, did not leave quite as much interest in southern *Petalura*. Only recently, *Petalura gigantea* LEACH became the subject of several Sydney newspaper articles in the context of a conservation issue (TRUEMAN 1997). As several requests for information on *P. gigantea* were also directed to me, I decided to find out more on the structure of this species. After careful study of the material made available to me by Australian institutions and private collectors, I came to the conclusion that *Petalura gigantea* of most younger authors (e. g. ARTHINGTON & WATSON 1982; HOUSTON & WATSON 1988; WATSON et al. 1991; WATSON & HOUSTON 1994; HAWKING & THEISCHINGER 1999) is a complex of 2 species.

## Material and methods

Adults of what was hitherto considered to be *Petalura gigantea* LEACH are analysed.

The more northern group of populations is described as a new species below. As this new species is very similar to *Petalura gigantea* (group of more southern populations), the description is brief and emphasises diagnostic characters. These are also presented comparatively for *P. gigantea*.

The following abbreviations are used:

### For general terms:

ft..... foot  
N.P..... National Park  
S.F..... State Forest  
c.u..... collector unknown  
Mts..... Mountains  
nr..... near  
s.l..... same locality

### For institutions and collections:

ANIC..... Australian National Insect Collection, Canberra  
DP..... Collection Dennis Paulson, Seattle, USA  
GT..... Collection Gunther Theischinger, Sydney  
QM..... Queensland Museum, Brisbane  
AM..... Australian Museum, Sydney  
BMNH..... British Museum, London  
DR..... Collection Dennis Reeves, Brisbane  
MV..... Museum of Victoria, Melbourne  
UQ..... University of Queensland, Brisbane

## Systematics

### *Petalura litorea* spec. nov. (Figs 1-8)

*Petalura gigantea*; ARTHINGTON & WATSON 1982: 84 (part); WATSON & HOUSTON, 1988: 101 (part); WATSON et al. 1991: 214 (part); WATSON & HOUSTON 1994: 28 (part); HAWKING & THEISCHINGER 1999 (part).

**Primary type:** Holotype ♂: Queensland, North Stradbroke Island, Brown Lake, S end, 3.1.1976, Watson & Bensink (ANIC). Paratypes: Queensland: North Stradbroke Island: 1♂, same data as holotype (ANIC); 1♂, 1♀, Brown Lake, 10-11.1981, D.M. Reeves (DR); 1♂, Dunwich, 23.10.1960, H. Burton (UQ); 1♂, Eighteen Miles Swamp, 10-11.1.1981, D.M. Reeves (DR); 1♂, Tortoise Lagoon, 20.12.1998, D.R. Paulson and N. Smith (DP). Queensland: 1♀, Stradbroke Island, 3.12.1912, H. Hacker (QM); 1♀, Fraser Island, 10.12.1929, c.u. (ANIC); 1♀, Fraser Island, Jennys Lake, W bank, 20.12.1979, A. Georges (ANIC); 1 specimen (head and abdomen missing), Russell Island, Dec. 1921, H. Hacker (QM); 1♂, Beerwah, 21.1.1971, G. White (UQ); 1♂, 1♀, Burleigh Heads, Jan.1933, c.u. (QM), 1♂, s. l., Nov. 1942, C.P. Ledward (ANIC); 1♀ Byfield nr Yeppoon, Oct. 1924, A. Musgrave (AM); 1♂ Coolum, Feb. 1954, G. Lamberts (MV).

**Name:** Litoreus 3 = Latin for „belonging to the shore“.

**Male** (Figs 1-6)

**Dimensions:** Hindwing 52.0-55.3 mm; abdomen (including appendages) 70.5-78.7 mm.

**Head** (Fig. 1): Labium, labrum, base of mandibles, upper portion of antefrons, anterior portion of postfrons and sides of postgenae yellow; clypeus, apex of mandibles, genae, lower portion of antefrons, posterior portion of postfrons, vertex, antennae, occiput and dorsal portion of postgenae from dark brown to black. Yellow upper portion of antefrons



**Photo 1:** *Petalura litorea* sp. n. ♂: N. Stradbroke Island, Old (Foto: D.M. Reeves)



**Photo 2:** *Petalura gigantea* LEACH ♂: Burrawang, NSW (Photo: J.A.L. Watson)

markedly narrower than black lower portion (subdivision by kind of spinulate or scaly, well-developed edge).

**P r o t h o r a x :** Pronotum largely brown to black, only narrow rim of anterior lobe and medial portion of posterior lobe dull yellow. Leg black.

**S y n t h o r a x :** Dark brown, yellow stripes alongside dorsal carina, on mesepimeron and metepimeron. Legs black. Antealar sinus generally well differentiated into smaller yellow anterior portion and larger shiny black posterior portion.

**W i n g s :** Typical for the genus *Petalura*, with bases, venation and pterostigma dark brown to black and membrane hyaline. Anal loop of hindwing generally (>85%)

made up of 2, rarely of 3 cells.

**A b d o m e n (Figs 2-6):** Terga 1-7 generally uniformly black with well-defined mid-dorsal and lateral yellow longitudinal lines or patches and with rather well defined basal and subapical yellow transverse lines. Genital hamules (Fig. 2) with apical portion rather narrow and base rather wide. Terga 4-7 (Fig. 3) with mid-dorsal line triangular basally, then very thin or obscured. Tergum 8 (Fig. 4) almost black, each side with two well-defined lateral patches, the smaller irregular and anterior to, the larger subtriangular and posterior to supplementary transverse carina. Tergum 9 largely yellow; segment 10 largely black. Anal appendages (Figs 5, 6) rather uniformly brown; superiors (Fig. 6) wider than median length of distal portion; basal portion of ventral edge longer than distal portion of ventral edge.

**F e m a l e (Figs 7, 8)**

**D i m e n s i o n s :** Hindwing 48.9-58.7 mm; abdomen (including appendages) 59.2-73.9 mm.

**H e a d :** Much as in male.

**T h o r a x :** Much as in male.

**W i n g s :** Much as in male. Anal angle missing.

**A b d o m e n (Figs 7, 8):** Much as in male (apart from largely brown to black sexual organs and anal appendages). Tergum 8 (Fig. 8) largely black, with well-defined yellow posterolateral patch.

**D i s t r i b u t i o n :** South-eastern Queensland, possibly also in north-eastern New South Wales, (largely coastal, known from Byfield in the north to Burleigh Heads in the south, including nearby islands (Fraser Island, North Stradbroke Island, Russell Island).

### ***Petalura gigantea* LEACH (Figs 9-16)**

*Petalura gigantea* LEACH 1815: 96; SELYS & HAGEN 1857: 386; FRASER 1933: 231; FRASER 1960: 30; ARTHINGTON & WATSON 1982: 84 (part); WATSON & HOUSTON, 1988: 101 (part); WATSON *et al.* 1991: 214 (part); WATSON & HOUSTON 1994: 28 (part); HAWKING & THEISCHINGER 1999 (part).

**T y p e s :** Syntypes ♂♂ and ♀♀: New Holland (= New South Wales); supposedly in BMNH, but not found.

**M a l e (Figs 9-14)**

**H e a d (Fig. 9):** Yellow upper portion of antefrons markedly wider than black lower portion (subdivision by kind of spinulate or scaly, moderately well to ill developed edge).

**S y n t h o r a x :** Antealar sinus generally uniformly brown.

**W i n g s :** Anal loop of hindwing generally (>90 %) made up of 3 cells, rarely of 2 or 4 cells.

**A b d o m e n** (Figs 10-14): Terga 1-7 generally brown to black with basal portion paler than apical portion; with moderately well-defined mid-dorsal and lateral brownish yellow longitudinal lines or patches and with rather ill-defined, often obscured, basal and subapical brownish yellow transverse lines. Genital hamules (Fig. 10) with both, apical portion and base, moderately wide. Terga 4-7 (Fig. 11) generally with mid-dorsal line almost parallel sided from base to apex. Tergum 8 (Fig. 12) generally blackish brown, with single ill-defined lateral patch across the whole length of segment. Anal appendages (Figs 13, 14): Superiors (Fig. 14) with base black and rest brown, not wider than median length of distal portion; basal portion of ventral edge shorter than distal portion of ventral edge. Inferior appendage largely brownish yellow.

**F e m a l e** (Figs 15,16)

**H e a d** : Much as in male.

**S y n t h o r a x** : Much as in male.

**W i n g s** : Much as in male. Anal angle missing.

**A b d o m e n** (Figs 15, 16): Much as in male (apart from largely brown to black sexual organs and anal appendages). Tergum 8 (Fig. 16) largely black, generally with yellow mid-dorsal line and with ill-defined, often large, lateral patch.

**D i s t r i b u t i o n** : Eastern New South Wales (coastal and montane in some southern areas, possibly only montane in more northern areas).

**M a t e r i a l e x a m i n e d** : New South Wales : 1♂, Bark Hut Swamp, Boonoo Boonoo S.F., 6.1.1998, G. Reeves (DR); 1♂, nr Belmore Falls, Blue Mts, 25.1.1982, L. Müller (GT); 1♂, Blue Mts, 28.11.1908, 1♀, s.l., 5.12.1908, R.J. Tillyard (ANIC); 1♀, Burrawang, 10.1.1950, R. Dobson (ANIC); 1♂, Burrawang Swamp, 5.12.1968, J.A.L. Watson, R.A. Barrett (ANIC); 4♂♂, 2♀♀, Burrawang Swamp, E of Moss Vale, J.A.L. Watson and H. Abbey, 1♀ s.l., 22.12.1982, H.M. Abbey & J.A.L. Watson (ANIC); 1♂, Circular Quay, Sydney, 19.11.1914, R. Kelly (MV); 2♂♂, Gibraltar Range, 20.12.1966, A.F. O'Farrell & C.W. Frazier (ANIC); 6♂♂, 3♀♀, Gibraltar Range N.P., 3800 ft, 22.12.1966, C.W. Frazier & A.F. O'Farrell (ANIC); 2♂♂, Gibraltar Range S.F., 11.1.1972, C.W. Frazier (ANIC); 1♂ Ku Ring Gai Chase, Dec.1989, L. Müller (GT); 9♂♂, 2♀♀, Lawson, 6.1.1950, R. Dobson (ANIC); 8♂♂, 2♀♀, Narrabeen, 3.1.1950, R. Dobson (ANIC); 1♀, Noraville, Nov. 1980, R.H. Mulder (ANIC); 2♂♂, Wentworth Falls, 24.11.1916, R.J. Tillyard (ANIC); 1♂, Wingecarribee Swamp, 25.1.1982, G. Theischinger (GT).

## Discussion

The major differences between *P. litorea* sp. n. and *P. gigantea* LEACH were pointed out above, in the diagnostic descriptions. It is also worth mentioning that *P. litorea* is the markedly more slender species which has the better defined and more strongly contrasting colour pattern. Probable allopatric existence and close similarity in size, and overall morphology indicate that *P. litorea* and *P. gigantea* are sister species. The differences between the two species in head structure, however, go beyond the magnitude of differences usually encountered between species of one and the same genus. It also appears possible that the colour pattern of head, terminal abdominal segments and particularly of the male anal appendages have specific signal functions. Recent, but hitherto unconfirmed, or past, sympatric existence in places of *P. litorea* and *P. gigantea* appear possible. In head structure *P. litorea* is much more similar to the northern *Petalura*-species than to *P. gigantea*.

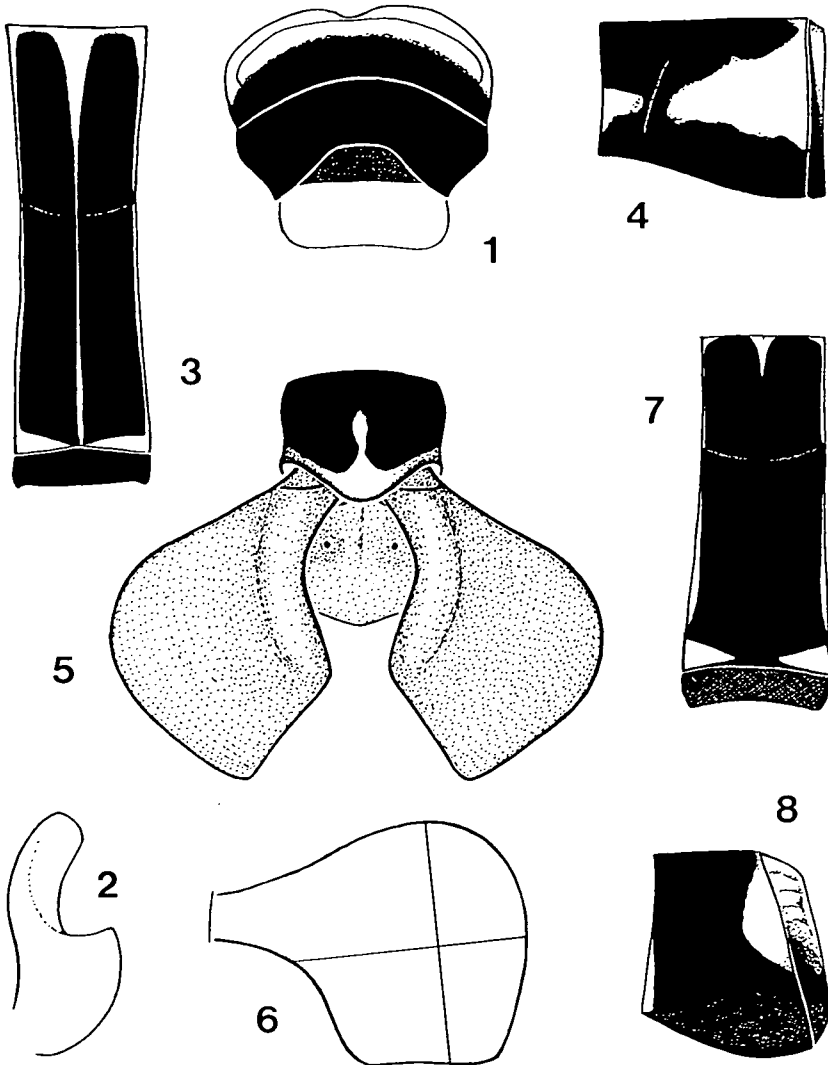
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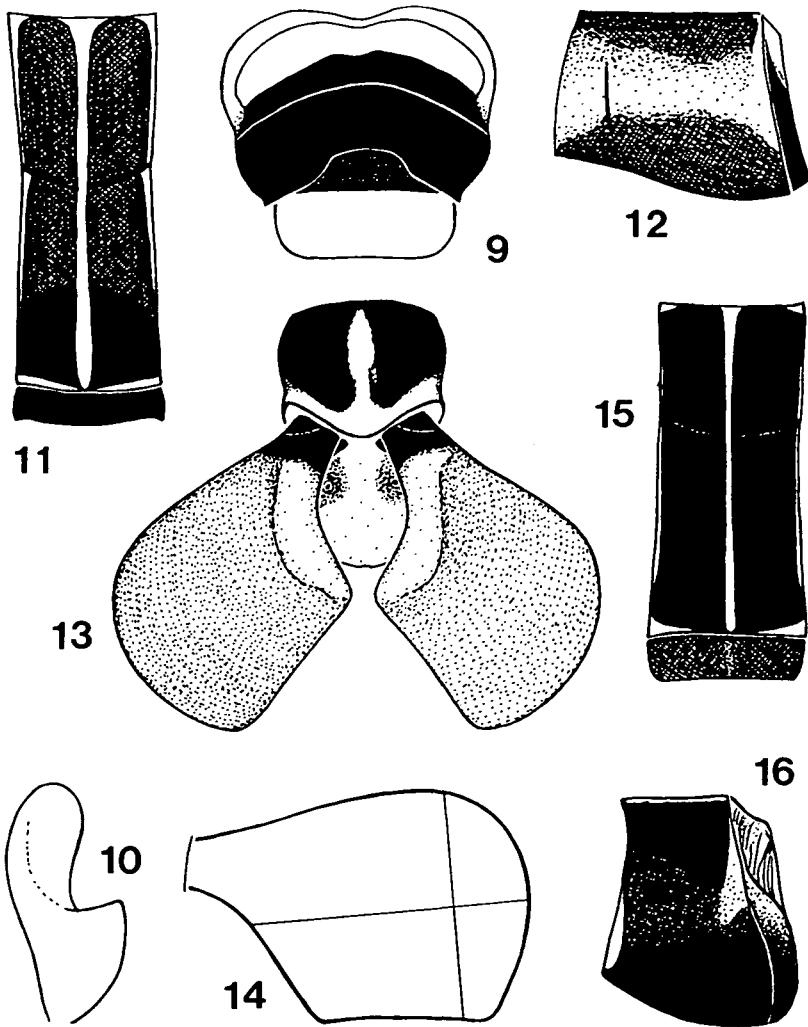
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Figs 1-8. *Petalura litorea* sp. n.: 1-6 male: 1 – head without eyes, frontal aspect; 2 – genital hamule, ventral aspect; 3 – tergum 5, dorsal aspect; 4 – tergum 8, lateral aspect; 5 – anal appendages, dorsal aspect; 6 – superior anal appendage, outline; (7, 8 female: 7 – tergum 7, dorsal aspect; 8 – tergum 8, lateral aspect.



**Figs 9-16: *Petalura gigantea* LEACH: 9-14 male: 9 – head without eyes, frontal aspect; 10 – genital hamule, ventral aspect; 11 – tergum 5, dorsal aspect; 12 – tergum 8, lateral aspect; 13 – anal appendages, dorsal aspect; 14 – superior anal appendage, outline; 15, 16 female: 15 – tergum 7, dorsal aspect; 16 – tergum 8, lateral aspect.**