Memoirs of Museum Victoria 58(1): 77–88 (2000)

NEW AUSTRALIAN SPECIES OF *OECETIS* ALLIED TO *O. COMPLEXA* KIMMINS (TRICHOPTERA: LEPTOCERIDAE)

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Abstract

Well, A., 2000. New Australian species of *Oecetis* allied to *O. complexa* Kimmins (Trichoptera: Leptoceridae). *Memoirs of Museum Victoria* 58(1): 77–88.

Seven new species of long-horned caddisfly together with *Oecetis complexa* Kimmins form a discrete set in the Australian *Oecetis* fauna, here called the *complexa*-group, based on wings with a long footstalk on Fork 1, male inferior appendages four-lobed, and phallus with paired spiny parameres. Characteristics of this group appear to conflict with the placement of *Oecetis complexa* in the most recent subgeneric and species group classification of world *Oecetis*.

Introduction

Long-horned caddisflies of the cosmopolitan genus, *Oecetis* McLachlan, 1877 (Trichoptera: Leptoceridae: Leptocerinae), are diverse and often abundant in lotic and lentic waters throughout Australia. Neboiss (1986) listed 19 Australian species in the *Atlas of Trichoptera of the SW Pacific — Australian Region* and, in another work, described a further six (Neboiss, 1989). These last species, with several species from New Guinea and Indonesia, he placed in a '*reticulata*-group', distinguished by males having a dorsal 'shield' (usually with reticulate cuticular sculpture) overhanging the terminal abdominal segments. Many additional undescribed Australian species have been represented in museum collections for several years. The present work, the first part in a review of the genus in Australia, deals with *Oecetis complexa* Kimmins and seven new closely allied species, here called the *complexa*-group. The remaining 18 described species and around 40 new species are to be reviewed in subsequent works.

Treatment of the Australian *Oecetis* fauna in isolation from the world fauna is insular. A classification of world *Oecetis* in an unpublished thesis by Chen (1992), based on a phylogenetic analysis, divided the genus into four subgenera, all further divided into species groups. According to Chen, three of the four subgenera are represented in Australia, each by one species group. Neboiss' (1989) '*reticulata*'-group species share the derived features of the larger worldwide group to which Chen assigned them, as do also a large group of Australian species, among them the very common and widespread *O. pechana* Mosely, which has wings with hair short and Fork 1 sessile, and in the male, forewing bearing patches of androconia (scales), and phallus with a single internal spiny paramere. Chen's assignment of the remaining Australian species to one subgenus is questionable. *Oecetis complexa*, which has males with paired spiny parameres, he grouped on the basis of putative sharing of the derived condition in which the male paramere spines are absent (and, plesiomorphically, the phallus symmetrical), with 12 other Australian species (all lacking parameres) and an assortment of Oriental, Palaearctic and Neotropical species. Within this subgenus, *O. complexa* was assigned to a species group sharing the feature RP_{1+2} divided at about one-tenth the length of the forewing (i.e., Fork 1 very short), and within the group, clustered with *O. parka* Mosely and *O. inscripta* Kimmins, on the basis of sharing the derived feature of 'inferior appendages with basodorsal arms prominent.' Since the basis of subgeneric placement is rejected here, for the present a new *complexa*-group is recognised in the Australian fauna, defined by wings with short hair on veins, the forewing (Fig. 25) with Fork 1 short, its the footstalk about as long as the fork; in males, the inferior appendages comprising four lobes, and the phallus with paired spiny, often complex and asymmetrical, parameres (Figs 26–33).

Material and methods. Specimens were prepared for study following methods used by Wells (1990) for micro-caddis flies (Hydroptilidae).

Although females have been sorted into vials with males of some species, many are so similar that until verified by breeding or rearing, the associations are considered only tentative. Thus, females are not described here.

Depositories are abbreviated as follows: ANIC, the Australian National Insect Collection, Canberra, Australian Capital Territory; BMNH, the Natural History Museum, London, England; OSS, Office of the Supervising Scientist (now ERISS, Environmental Research Institute of the Supervising Scientist), Northern Territory; NMV, Museum Victoria, Melbourne, Victoria; NTM, Northern Territory Museum and Art Galleries, Darwin, Northern Territory; and QM, Queensland Museum, Brisbane, Queensland. 'ARR' and 'ARRS' are used for Alligator Rivers Region, Northern Territory and Alligator Rivers Region Survey (conducted by the OSS), respectively. 'WTH' numbers are Wet Tropics Heritage numbers from the study by Walker et al. (1993).

Key to males of the *Oecetis complexa*-group

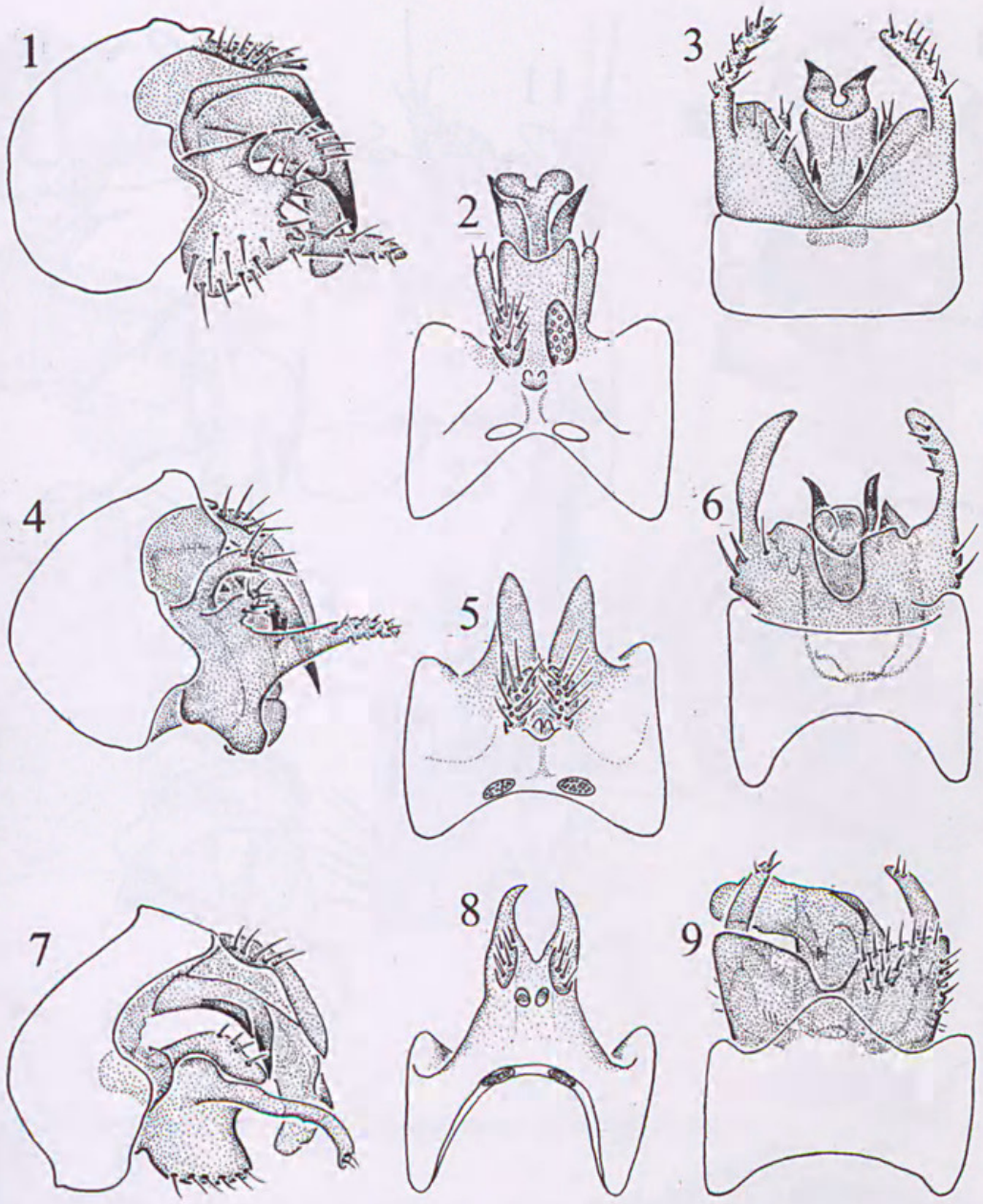
1. Preanal appendages fused with tergum IX (e.g. Figs 7, 8).....2
— Preanal appendages free (Figs 17, 20, 23).....6
2. Tergum X produced distally to form paired horn-like sclerotised spines twisted ventrally around the phallus (Figs 14, 15).....*O. uptoni* sp. nov.
— Tergum X not greatly produced.....3
3. Tergum X, in dorsal view, shallowly concave apically; in ventral view, mesal margins of inferior appendages obliquely slanted to form deep V (Fig. 3).....*O. complexa*
— Tergum X with a more or less V–shaped excision (Figs 5, 8), although apices of lobes may be convergent.....4
4. Apices of distal lobes of tergum X convergent in dorsal view (Fig. 8); in ventral view, basodorsal lobe of inferior appendages distally obliquely angled to shallow U–shaped mesal concavity (Fig. 9).....*O. obliqua* sp. nov.
— Apices of distal lobes of tergum X divergent in dorsal view (Figs 5, 11); in ventral view, basodorsal lobes of inferior appendages separated by a deep U–shaped concavity (Figs 6, 12).....5
5. Parameres terminating in a pair of equal length darkly sclerotised spines (Figs 10–12, 28); lobes formed by bisection of tergum X obliquely truncate apically (Fig. 11).....*O. adelaidica* sp. nov.
— Parameres with the second distal spine subapical (Figs 4, 27); lobes formed by bisection of tergum X tapered to apices (Fig. 5)..O. paracomplexa sp. nov.
6. Inferior appendages in ventral view with basoventral lobe forming a pair of parallel 'pillars' (Fig. 24); in lateral view, main body and basodorsal lobe about equal length and thickness (Fig. 22).....*O. parallela* sp. nov.
— Inferior appendages in ventral view with basoventral lobe not pillar-like (Figs 18, 21); in lateral view, main body far broader than the finger-like basodorsal lobe (Figs 16, 19).....7
7. In lateral view, main body of inferior appendages about equal width throughout length, truncate apically, somewhat clasper-like in ventral view (Figs 16, 18).....*O. blythi* sp. nov.
— In lateral view, main body of inferior appendages broad and irregular in shape, forming stout lobes in ventral view (Figs 19, 21)....*O. glebula* sp. nov.

Oecetis complexa Kimmins

Figures 1–3, 26, 34

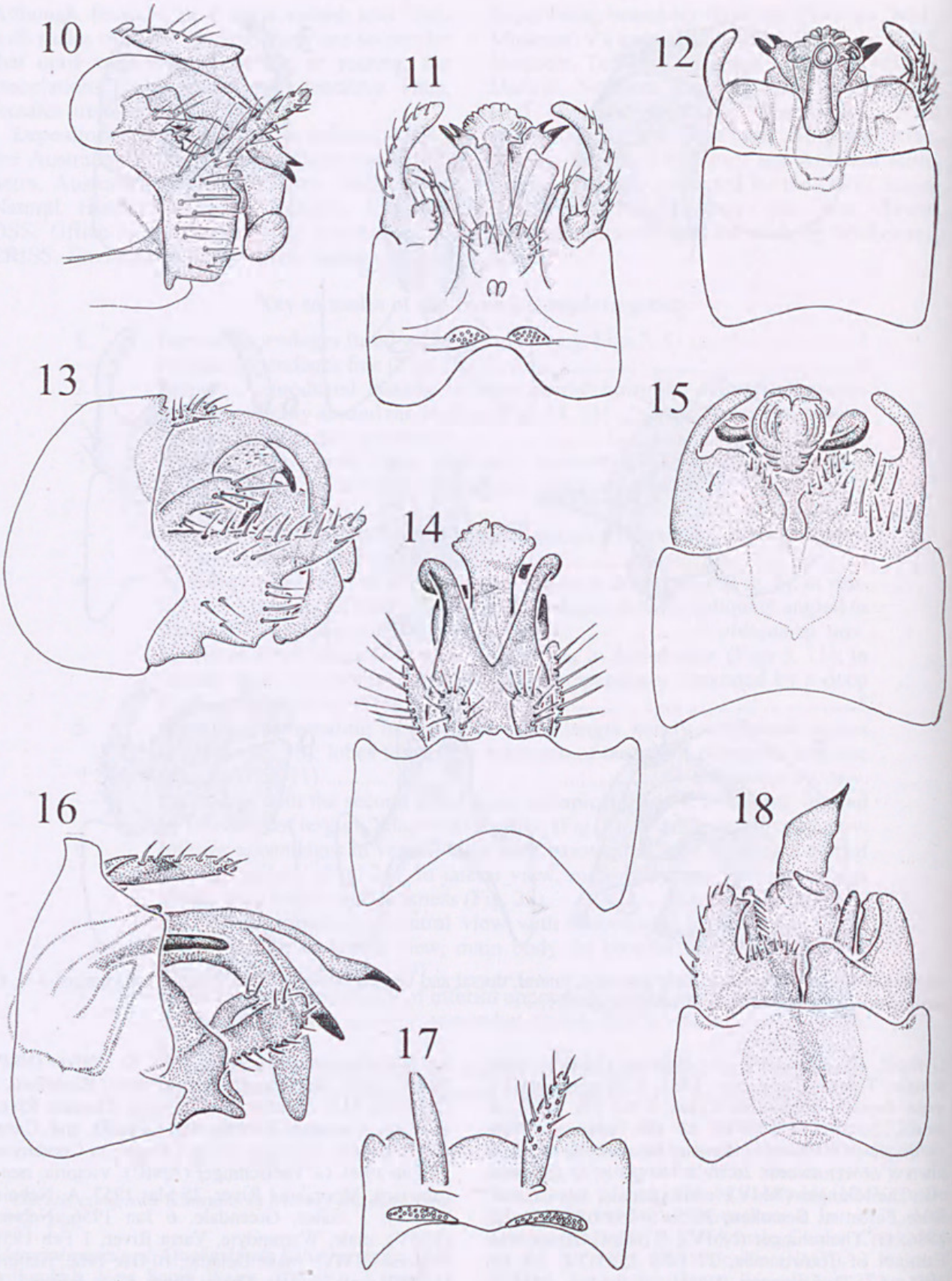
Oecetis complexa Kimmins *in* Mosely and Kimmins, 1953: 284.

Material examined. **Queensland:** holotype male, Murwillumbah, New South Wales (BMNH); 2 males, 4 females, Camp Mtn, 31 Mar 1967, N. Dobrotworsky (NMV); male, 6 females, Bullimba Creek, nr Brisbane, Site R, Kinmax St, riffle, 23 Oct 1971 (NMV); male, Girraween Natl Pk, nr Wyberba, 10 Oct 1973, A. Neboiss (NMV); male, female, Middle Claudie River, Iron Ra., 2–9 Oct 1974, M.S. Moulds (NMV); male, Iron Range, 16 Oct 1974, M.S. Moulds (NMV); male, female, 16 km W of Ravenshoe, 2 Jan 1975, M.S. Moulds (NMV WTH-1360); male, Gordon Creek, Iron Ra.,16 Oct 1975, M.S. Moulds (NMV); 2 males, 4 females, Alice River, Hervey Range River, 25 km W of Townsville, 9 May 1979, A. Wells (NMV WTH-1361); male, Jamboree Heights, Brisbane, 6 Oct 1979, G. Daniels (NMV); 2 males, Mothar Mtn, 12 km SE of

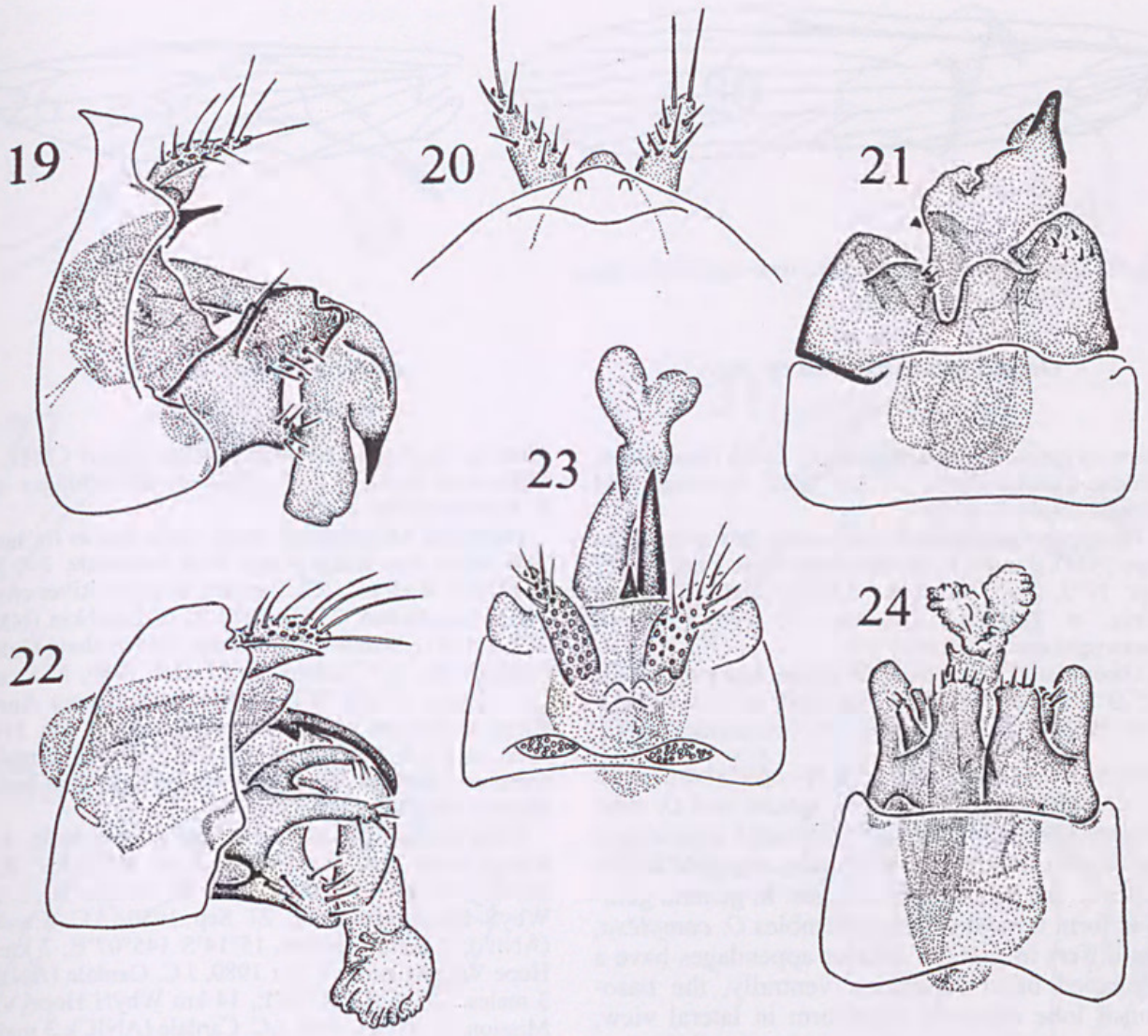


Figures 1–9, *Oecetis* species, male genitalia, lateral, dorsal and ventral views: 1–3, *O. complexa* Kimmins; 4–6, *O. paracomplexa* sp. nov.; 7–9, *O. obliqua* sp. nov.

Gympie, 29 Oct 1980, A. Neboiss (NMV); male, female, Tinaroo Dam, Nov 1982, T. Hinger (NMV); male, female, Booloumba Creek, 8 km SW of Kenilworth, 26°39'S 152°39'E, 12 Dec 1984, G. Theischinger (NMV); male, female, Booloumba Creek, 8 km SW of Kenilworth, 26°39'S 152°39'E, 12 Jan 1986, G. Theischinger (NMV); male, female, Emu Creek, State Forest nr Benarken, 26°53'S 152°08'E, 15 Jan 1986, G. Theischinger (NMV); 2 males, Crows Nest Falls, N of Toowoomba, 27°14'S 152°07'E, 18 Jan 1986, G. Theischinger (NMV); 3 males, 12°44'S 145°16'E, Claudie River, Iron Range Natl Pk, 25 km NW Lockhart River, 10 Nov 1988, K. Walker (NMV); males, females, 17°08'S 145°44'E, Mulgrave River, 8 km NW Gordonvale, 15 Nov 1988, K. Walker (NMV WTH–1359). **New South Wales:** male, Blandford, 8 Oct 1976, M.S. Moulds (NMV); male, Clarence River, at Yates Crossing, 26 Oct 1981, Wells and Carter (NMV); male, 3 females, Swan Crossing nr Comboyne, 13 Feb 1999, G. Theischinger (ANIC). Victoria: male, Morrison, Moorabool River, 25 Mar 1953, A. Neboiss (NMV); 3 males, Greendale, 6 Jan 1956, Neboiss (NMV); male, Warrandyte, Yarra River, 1 Feb 1959, Neboiss (NMV); male, Delatite, 10 Dec 1962, Neboiss (NMV); male, female, Thurra River, Cape Everard, 22 Mar 1970, A. Neboiss (NMV); male, Tyers River, Site 22, 24 Feb 1974 (L.R.E.S.) (NMV); males, females, Otway Ra., East Branch Barwon River outflow from



Figures 10–18, *Oecetis* species, male genitalia, lateral, dorsal and ventral views: 10–12, *O. adelaidica* sp. nov.; 13–15, *O. uptoni* sp. nov.; 16–18, *O. blythi* sp. nov.



Figures 19–24, *Oecetis* species, male genitalia, lateral, dorsal and ventral views: 19–21, *O. glebula* sp. nov.; 22–24, *O. parallela* sp. nov.

Lake Elizabeth, nr forest, 1 Apr 1975, J. Aldenhoven (NMV); males, females, Gellibrand River, E of Gellibrand, 26 Jan 1982, A. Neboiss and R. StClair (NMV); males, females, Gellibrand River, at Lower Gellibrand, 22 Feb 1982, K. Walker (NMV). **South Australia:** 2 males, 2 females, Spring Creek, Wilmington, 22 Oct 1975, A. Wells (NMV). **Western Australia:** male, King Edward River, 14°04'S 126°12'E, 3 Sep 1996, I. Edwards (NMV).

Diagnosis. The male genitalia of *O. complexa* share with *O. paracomplexa* sp. nov., *O. obliqua* sp. nov., *O. uptoni* sp. nov. and *O. adelaidica* sp. nov., the derived states of preanal appendages fused with tergum X, and slender elongate lateral lobes on the inferior appendages. *O. complexa* is distinguished from these other species by other features of the male genitalia: the inferior appendages are separated ventrally by a deep, V-shaped cleft (Fig. 3) in contrast to the U-shaped separation of the other species and the basodorsal lobe is broad when viewed laterally (Fig. 1); on tergum X, the proximal part is somewhat rectangular, the distal lobes separated by a broad concavity (Fig. 2) and extended distally to form a pair of spiny structures; on the phallus, the parameres have a laterobasal spine and, more distally, a small black dorsal spine proximal to the darkly sclerotised acute apical spine.

Distribution (Fig. 34). Widespread in eastern Australia, with an anomalous record from each of South Australia and northern Western Australia.

Remarks. New figures of the male genitalia (Figs 1–3, 26) are supplied to aid comparisons.

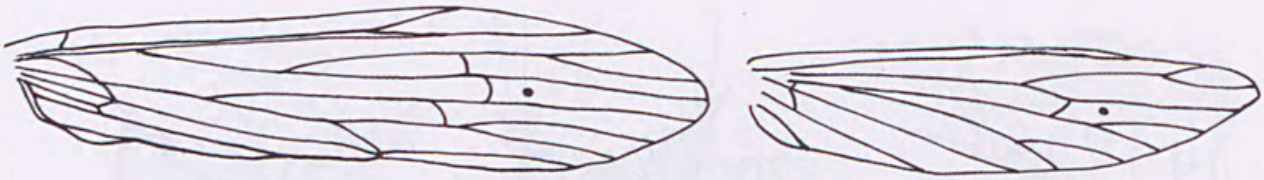


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Fig. 25, *Oecetis parallela* sp. nov., fore- and hind wings.

Oecetis paracomplexa sp. nov.

Figures 4–6, 27, 35

Material examined. Holotype. Male, North Queensland, Middle Claudie River, 29 Jun 1982, Schneider and Daniels (NMV T–17393).

Paratypes. **Queensland:** male, same data as for holotype (NMV); male, Lockerbie area, Cape York, 13–27 Apr 1973, S.R. Monteith (ANIC); male, Dulhunty River, at Telegraph Crossing, 10 Feb 1992, D. Cartwright and A. Wells (QM).

Other material examined. **Western Australia:** male, 22°23'S 117°56'E GPS, 37 km NNE of Tom Price, 6 Oct 1995, D.C.F. Rentz and P.J.M. Greenslade (ANIC).

Diagnosis. O. paracomplexa sp. nov. shares with *O. complexa, O. obliqua, O. uptoni* and *O. adelaidica*, the derived states of preanal appendages fused with tergum X, and slender elongate lateral lobes on the inferior appendages. In general genitalic form it most closely resembles *O. complexa*, but differs in that the inferior appendages have a U-shaped basal separation ventrally, the basodorsal lobe narrowly digitiform in lateral view, and tergum X in dorsal view deeply divided to form 2 divergent triangular lobes.

Description. Genitalia, Figs 4–6, 27. Segment IX narrow middorsally and ventrally, broadly rounded laterally; preanal appendages slightly tapered apically, fused to tergum X. Tergum X wide at base, bifid almost throughout length, apices of lobes distally divergent. Inferior appendages in ventral view with main body slender, basoventral lobe short and obliquely truncate, in lateral view basodorsal lobe and a small median lobe digitiform. Phallus (Fig. 27) short, smoothly curved downwards, relatively simple with the fused parameres and phallobase forming a short, broad, sclerotised cover, distally divided into 2 subequal spines.

Etymology. Named for its resemblance to *O. complexa*; Latin — *para* — like.

Distribution (Fig. 35). Far northern Queensland and the Hamersley Range, Western Australia.

Oecetis obliqua sp. nov.

Figures 7–9, 28, 36

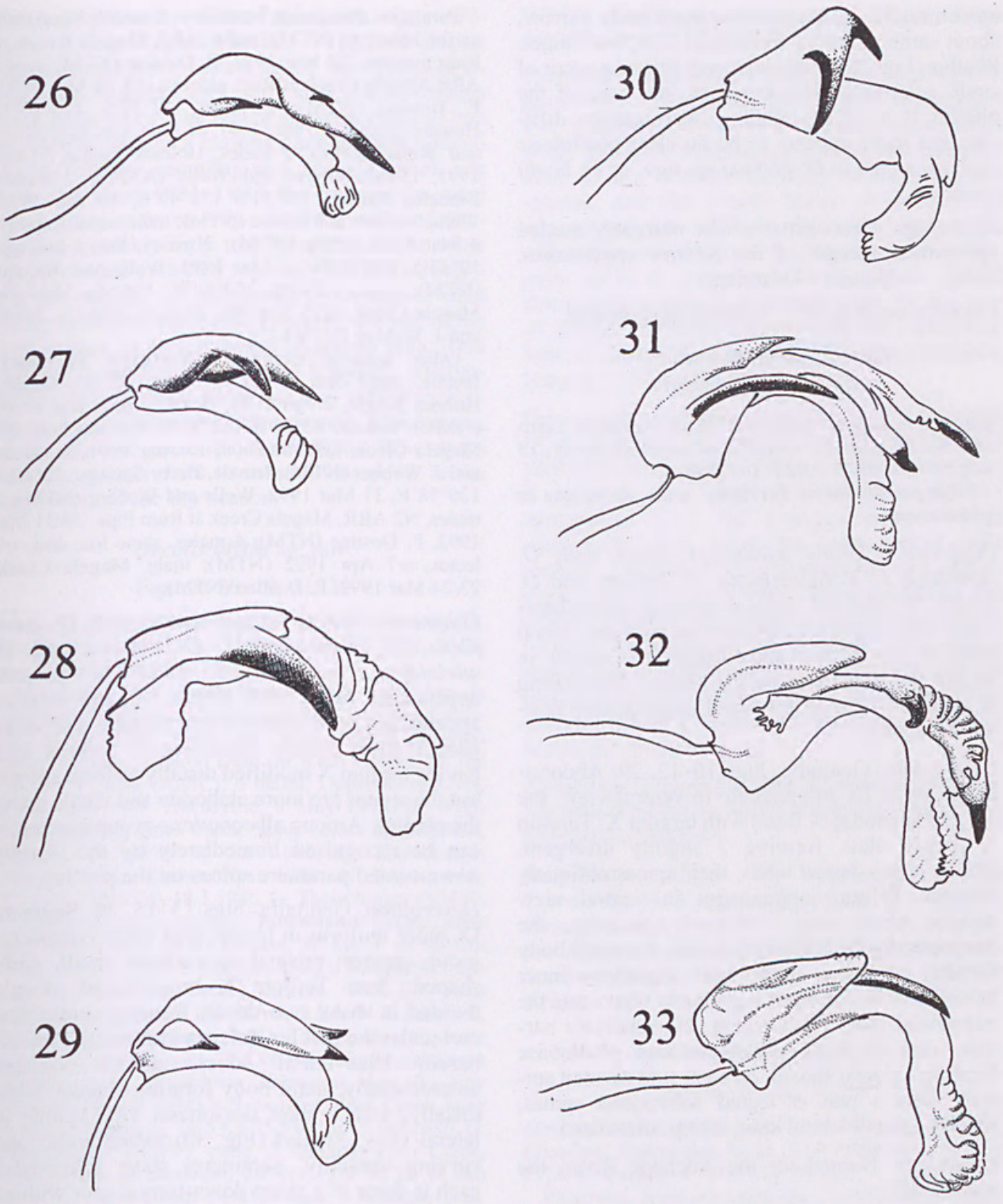
Material examined. Holotype. Male, Archer Creek, nr Millstream Falls, 5 Apr 1997, G. Theischinger and F. Mueller (ANIC).

Paratypes. **Queensland:** male, same data as for holotype; male, Iron Range, Cape York Peninsula, 2–9 Jun 1971, E.F. Riek (ANIC); 2 males, Gregory River crossing nr Goodwood, 24.viii.1977, K.L. Lambkin (NMV WTH–1393); 2 males, State Forest, 24 km along Goldsborough Rd, nr Gordonvale, 27 Dec 1980, M.S. and B.J. Moulds (NMV WTH-1391); male, Upper Annan River nr Shipton's Flat, S of Cooktown, 1 Jan 1981, M.S. and B.J. Moulds (NMV WTH-1392); 2 males, Jourama Falls, 19 Mar 1997, G. Theischinger and F. Mueller (ANIC).

Other material examined. **Queensland:** male, Iron Range, Cape York Peninsula, 2–9 Jun 1971, E.F. Riek (ANIC); male, 15°41'S 145°12'E, Annan R, 3 km WbyS Black Mountain, 27 Sep 1980, J.C. Cardale (ANIC); 2 males, female, 15°14'S 145°07'E, 7 km N Hope Vale Mission, 4 Oct 1980, J.C. Cardale (ANIC); 3 males, 15°16'S 144°59'E, 14 km WbyN Hope Vale Mission, 8–10 Oct 1980, J.C. Cardale (ANIC); 3 males, 3 females, 15°47'S 145°17'E, Moses Creek, 4 km NbyE Mt Finnigan, 14 Oct 1980, J.C. Cardale (ANIC); 8 females, State Forest, 24 km along Goldsborough Rd, nr Gordonvale, 27 Dec 1980, M.S. and B.J. Moulds (NMV WTH–1391).

Diagnosis. Oecetis obliqua shares with *O. complexa, O. paracomplexa, O. adelaidica* and *O. uptoni*, the derived states of preanal appendages fused with tergum X, and slender elongate lateral lobes on the inferior appendages, but is distinguished by the short, spiny convergent distal lobes on segment X and the broadly oblique distal margin of the basoventral lobes of the inferior appendages in ventral view.

Description. Genitalia, Figs 7–9, 28. Segment IX broadest ventrolaterally; preanal appendages fused with tergum X. Tergum X bifid, the short acute distal lobes being separated basally by a V-shaped cleft, their apices converging. Inferior appendages in ventral view with basoventral lobes broad-based and obliquely truncate



Figures 26–33, *Oecetis* species, phallus: 26, *O. complexa* Kimmins; 27, *O. paracomplexa* sp. nov.; 28, *O. obliqua* sp. nov.; 29, *O. adelaidica* sp. nov.; 30, *O. uptoni* sp. nov.; 31, *O. blythi* sp. nov.; 32, *O. glebula* sp. nov.; 33, *O. parallela* sp. nov.

apicomesally, in lateral view main body narrow, about same width as dorsobasal lobe, but longer. Phallus (Fig. 28) with parameres forming a pair of stout, sclerotised lateral spines, the base of the phallus is irregular, making interpretation difficult, but there appears to be no clear phallobase such as occurs in *O. glebula* sp. nov. or *O. blythi* sp. nov.

Etymology. Descriptive of the obliquely angled apicomesal margin of the inferior appendages; Latin — *obliquus* — slanting.

Distribution (Fig. 38). Northern Queensland.

Oecetis adelaidica sp. nov.

Figures 10–12, 29, 37

Material examined. Holotype. Male, Northern Territory, Adelaide River, 15 km E of Stuart Highway, 15 Aug 1979, J. Blyth (NMV T–17394).

Paratype: **Northern Territory:** male, same data as for holotype.

Diagnosis. Oecetis adelaidica shares with *O. complexa, O. paracomplexa, O. obliqua* and *O. uptoni*, the derived states of preanal appendages fused with tergum X, and slender elongate lateral lobes on the inferior appendages. It is unique in having the parameres on the phallus terminating in a pair of more or less equal length darkly sclerotised spines.

Description. Genitalia, Figs 10–12, 29. Abdominal segment IX subquadrate in ventral view, the preanal appendages fused with tergum X. Tergum X deeply cleft, forming 2 slightly divergent, almost pillar-shaped lobes, their apices obliquely truncate. Inferior appendages in ventral view divided by a deep U-shaped concavity, the basoventral lobe apically truncate, the main body slender, curved; a small setate digitiform inner lobe visible in dorsal view probably represents the basodorsal lobe. Phallus (Fig. 29) relatively narrow, curved, fused parameres and phallobase forming a dorsal sheath, on each side divided apically into a pair of equal sclerotised spines, basally a small lateral spur, its tip sclerotised.

Etymology. Named for the Adelaide River, the type locality.

Distribution (Fig. 37). Adelaide River, Northern Territory.

Oecetis uptoni sp. nov.

Figures 13–15, 30, 38

Material examined. Holotype. Male, Northern Territory, 12°42'S 130°58'E, Berry Springs, 31 Mar 1992, A. Wells and J. Webber (NTM).

Paratypes. **Northern Territory:** 2 males, same data as for holotype (NTM); male, ARR Magela Creek at Rum pipeline, 12 Mar 1991, P. Dostine (NTM); male, ARR Magela Creek at Rum pipeline, 18/19 Mar 1991, P. Dostine (NTM); 2 males, 12°27'S 131°03'E, Howard Springs, 25 Mar 1991, de Jong, van Achterberg and Wells (NMV); 2 males, Holmes Jungle, 7 Apr 1991, Horak, Upton and Wells (ANIC); 2 males, Baroalba Springs, 12°48'S 132°49'E, 16 Jan 1992, Wells, Webber and Bickle (NTM); male, same locality, 4 Mar 1992, Wells (NTM); 2 males, Berry Springs, 12°42'S 130°58'E, 31 Mar 1992, Wells and Webber (NTM); male, 12°42'S 132°57'E, Kakadu Natl Pk, Magela Creek, OSS Site/009, 24 Apr 1992, A. Wells and J. Webber (NTM).

Other material examined. **Northern Territory:** female, same data as for holotype (NTM); female, Holmes Jungle, 7 Apr 1991, Horak, Upton and Wells (ANIC); female, 12°42'S 132°57'E, Kakadu Natl Pk, Magela Creek, OSS Site/009, 15 Aug 1991, A. Wells and J. Webber (NTM); female, Berry Springs, 12°42'S 130°58'E, 31 Mar 1992, Wells and Webber (NTM); 2 males, N2 ARR, Magela Creek at Rum Pipe, 30/31 Mar 1992, P. Dostine (NTM); 4 males, same loc. and collector, 6/7 Apr 1992 (NTM); male, Magela Creek, 23/24 Mar 1992, P. Dostine (NTM).

Diagnosis. Oecetis uptoni shares with *O. complexa, O. paracomplexa, O. obliqua* and *O. adelaidica*, the derived states of preanal appendages fused with tergum X, and inferior appendages with lateral lobes slender and elongate. It most closely resembles *O. complexa* in having tergum X modified distally to form spines, but the spines are more elaborate and curve under the phallus. Among all *complexa*-group species, it can be recognised immediately by the sharply down-turned paramere spines on the phallus.

Description. Genitalia, Figs 13–15, 30. Segment IX more uniform in length than other *complexa*-group species; preanal appendages small, club-shaped, free. Tergum X broad-based, deeply divided in distal two-thirds, forming spines that curl under the phallus. Inferior appendages broad-based, basoventral lobes almost rounded anteromesally, main body forming slender lobes distally, with a short dorsobasal lobe visible in lateral view. Phallus (Fig. 30) membranous and curving ventrally, parameres short sclerotised, each in form of a sharp down-turned spur with an acute dorsal spine.

Etymology. Named for Murray Upton, in appreciation of his support during my several years in the Northern Territory.

Distribution (Fig. 38). Northern Northern Territory.

Remarks. Oecetis uptoni was not among the numerous species of *Oecetis* collected in a

1988–1989 survey of the Trichoptera of the Alligator Rivers Region (Wells, 1991), and despite much subsequent collecting in the ARR, especially on Magela Creek, only very few specimens have been taken. The real or apparent rarity of this species illustrates a curious phenomenon noticed during regular sampling at a Magela Creek site over the years 1991–1993. Several species were taken once or twice only over 14 months of standardised weekly light trap-sampling, while other species were collected regularly almost throughout the period. All specimens of *O. uptoni* were taken in March and April, generally the end of the wet season in this seasonal monsoon area. This species itself may be strongly seasonal. Alternatively, our sampling successes may reflect recruitment from upstream (?escarpment) populations, and failure to establish as the water flow drops and the stream dries to intermittent pools at the beginning of the dry season.

Oecetis blythi sp. nov.

Figures 16–18, 31, 39

Material examined. Holotype. Male, New South Wales, Severn River, 29°28'S 151°29'E, 23 Oct 1981, Wells and Carter (NMV T–17395).

Paratypes. **New South Wales:** male, same data as holotype (NMV); male, Clarence River at Yates Crossing, 26 Oct 1981, Wells and Carter (NMV). **Queensland:** 4 males, Tinaroo Dam (nr Kairi Creek), 22 Jun 1971, E.F. Riek (ANIC); 6 males, Upper Ross River, below weir, SW Townsville, 8 May 1979, A. Wells (NMV); male, Emu Creek State Forest nr Benarkin, 26°53'S 152°08'E, 15 Jan 1986, G. Theischinger (NMV); male, Crows Nest Falls, N Toowoomba, 27°14'S 152°07'E, 18.1.1986, G. Theischinger (NMV).

Other material examined. **Queensland:** female, same data as holotype (NMV); male, 36 km S of Miriam Vale, 25 May 1971, E.F. Riek (ANIC); 3 females, Tinaroo Dam (nr Kairi Creek), 22 Jun 1971, E.F. Riek (ANIC); male, South Pine River, 8 km W of Samford, 21 Oct 1980, A. Neboiss (NMV); 10 females, Clarence River at Yates Crossing, 26 Oct 1981, Wells and Carter (NMV); male, Blackdown Tableland Natl Pk, Nov 1982, T. Hinger (NMV); 3 females, Emu Creek State Forest nr Benarkin, 26°53'S 152°08'E, 15 Jan 1986, G. Theischinger (NMV); male, 3 females, Emu Creek, State Forest nr Benarkin, 26°53'S 152°08'E, 15 Jan 1988, G. Theischinger (NMV); male, 3 females, Tinaroo Pines Caravan Park, 10 Jun 1972, N. McFarland (NMV); 4 males, 13 females, Alice River, Hervey Range Road, 25 km W Townsville, 8 May 1979, A. Wells (NMV); males, females, Obi Obi Creek, 8 km SW Mapleton, 23 Oct 1980, A. Neboiss (NMV). **Victoria:** 3 males, Swan Lake, 30 km NW of Portland, 27 Feb 1976, P.A. Meyer (NMV); male, Wyperfeld Natl Pk, Lake Werribean, 6 Apr 1977, J. Blyth (NMV); 3 males, 4 females, Lake Albacutya, 16 Jan 1980, J. Blyth (NMV). **South Australia:** male, female, North Adelaide, 28 Nov 1975, M. Davies (NMV).

Diagnosis. In common with *O. glebula* and *O. parallela*, *O. blythi* has the preanal appendages free and lateral lobes of the inferior appendages stout. The latter structures are somewhat intermediate in size between the form of the other two species, and the ventral lobes of the inferior appendages are subtriangular in ventral view, rather than rounded as in *O. glebula* or subrectangular as in *O. parallela Oecetis blythi* can be distinguished readily in ventral view by the pair of slender processes representing the basodorsal lobe, on the inner side of the inferior appendages, lying almost parallel to the phallus.

Description. Genitalia, Figs 16–18, 31. Segment IX short middorsally, relatively long laterally and ventrally; preanal appendages elongate. Tergum X reduced to a short rounded lobe. Inferior appendages short and rounded mesoventrally; main body stout, short, the inner apical angle spur-like; in lateral view basodorsal lobe setate, digitiform, in ventral view, lying alongside the phallus. Phallus (Fig. 31) elongate with parameres forming a complicated set of spines, including 1 dorsal pair which almost equal in length and are membranous and free for most of the length of the phallus; basally a slender curved spine; dorsally a bract-like phallobase.

Etymology. Named for John Blyth whose collecting efforts added so much interesting material to the NMV collection.

Distribution (Fig. 39). Disjunct: mainly Townsville area of north-eastern Queensland, through north-eastern New South Wales to western Victoria; a single record from North Adelaide, South Australia (probably from the Torrens River).

Oecetis glebula sp. nov.

Figures 19–21, 32, 40

Material examined. Holotype. Male, Western Australia, Ellendale, Greenough River, E of Geraldton, 11 Sep 1974, K. Carnaby (NMV T–17396).

Paratypes. **Western Australia,** 2 males, same data as holotype (NMV); 3 males, Millstream Crossing Pool, 21 Oct 1970, J.C. Cardale (ANIC); 5 males, 10 females, Lockyer Gorge, Harding River, Pilbara, 19 Oct 1979, J. Blyth (NMV); male, female, Fortescue Falls, Hamersley Ra. Natl Pk, 27 Oct 1979, J. Blyth (NMV).

Other material examined. **Western Australia:** 2 females, Millstream Crossing Pool, 21 Oct 1970, J.C. Cardale (ANIC); male, N of Carnarvon, De Grey Station Road, 29 Jun 1972, N. McFarland (NMV);

male, Wittenoom Gorge, Hamersley Ra., 20 Feb 1977, M.S. and B.J. Moulds (NMV); male, Hamersley Ra., 20 Feb 1977, M.S. and B.J. Moulds (NMV); 6 males, 13 females, Millstream, Fortescue River, S of Roebourne, 17 Nov 1978, M.S. and B.J. Moulds (NMV); male, female, Wooramel River, Gascoyne Junction–Mullewa Rd, 11 Sep 1979, J. Blyth (NMV);10 females, Lockyer Gorge, Harding River, Pilbara, 19 Oct 1979, J. Blyth (NMV); female, Fortescue Falls, Hamersley Ra. Natl Pk, 27 Oct 1979, J. Blyth (NMV); 2 males, female, 21°37'S 117°06'E, Millstream Natl Pk, 24 Apr 1992, P.S. Cranston (ANIC).

Diagnosis. In common with *O. blythi* and *O. parallela*, *O. glebula* has the preanal appendages free and lateral lobes of the inferior appendages stout. It is clearly distinguished from *O. blythi* and *O. parallela* by the more rounded basoventral lobes of the inferior appendages and pair of parameres of unequal length lying dorsally along the length of the phallus.

Description. Genitalia, Figs 19–21, 32. Segment IX short laterally and dorsally; preanal appendages free, elongate. Tergum X reduced to a short, rounded lobe. Inferior appendages shorter than in *O. blythi*, main body and basodorsal lobe slender in lateral view; in ventral view inferior appendages have a lumpy appearance, main body and basoventral lobe stout, basodorsal lobe diverges from the phallus. Phallus (Fig. 32) slender medially, overlying it the parameres in the form of a long, loose, membranous spine on right, a shorter, hooked spine on left; phallobase a bract-like sheath.

Etymology. Descriptive of the general shape of the male genitalia; Latin — *gleba* — lumpy.

Distribution (Fig. 40). North-west Western Australia, from Geraldton, about 400 km north of Perth, to north of the Pilbara region.

Oecetis parallela sp. nov.

Figs 22–24, 32, 41

Material examined. Holotype. Male, North Queensland, Upper Freshwater Creek, Whitfield Range nr Cairns, 3 Apr 1975, M.S. Moulds (NMV WTH-1412, T-17397).

Paratypes. **Queensland:** 4 males, same data as for holotype (NMV); male, Mossman Gorge, 16 Jun 1971, E.F. Riek (ANIC: WTH-1413); 3 males, Little Mulgrave R., 28 Jun 1971, E.F. Riek (ANIC: WTH-1411); 2 males, Cap Creek, Mt Finlayson Range, S of Cooktown, 23 Nov 1974, M.S. Moulds (NMV WTH-1414); male, Kearney Falls, Goldsborough Valley, 26–27 Mar 1977, G. Theischinger and L. Mueller (ANIC); 5 males, State Forest, 24 km along Goldsborough Rd nr Gordonvale, 27 Dec 1980, M.S. and B.J. Moulds (NMV WTH–1410).

Other material examined. **Queensland:** 5 females, same data as for holotype (NMV); male, Kuranda, 15 Jun 1971, E.F. Riek (ANIC); female, Mossman Gorge, 16 Jun 1971, E.F. Riek (ANIC: WTH-1413); 10 females, Little Mulgrave R., 28 Jun 1971, E.F. Riek (ANIC: WTH-1411); 3 males, Lock-Davies Creek Rd, Lamb Ra., Mareeba District, 10 Nov 1974, M. Moulds (NMV WTH-1395); female, Cap Creek, Mt Finlayson Range, S of Cooktown, 23 Nov 1974, M.S. Moulds (NMV WTH-1414); 2 males, Cog Creek, Mt Finlayson Ra., S of Cooktown, 25 Nov 1974, M.S. Moulds (NMV WTH-1416); 3 males, 4 females, Upper Freshwater Creek, Whitfield Range nr Cairns, 15 Dec 1974, M.S. Moulds (NMV WTH-1409); male, Forty Mile Scrub, 65 km SW of Mt Garnet, 19 Dec 1974, M.S. Moulds (NMV); male, 2 females, 16 km W of Ravenshoe, 2 Jan 1975, M. Moulds (NMV WTH-1394); male, Tully Falls, S of Ravenshoe, 11 Jan 1977, M.S. and B.J. Moulds (NMV WTH-1415); 3 females, Kearney Falls, Goldsborough Valley, 26–27 Mar 1977, G. Theischinger and L. Mueller (ANIC); male, Currunda Creek, trib. of Freshwater Creek, Cairns District, 30 Apr 1979, A. Wells (NMV); male, Birthday Creek Falls, via Paluma, 11 Apr 1980, I.D. Naumann and J.C. Cardale (ANIC); male, 15°47′S 145°14′E, Shiptons Flat, 17–19 Oct 1980, J.C. Cardale (ANIC); 2 females, State Forest, 24 km along Goldsborough Rd nr Gordonvale, 27 Dec 1980, M.S. and B.J. Moulds (NMV WTH–1410); male, 17°02′S 145°37′E, 3 km NbyE Mt Tip Tree, 20 Oct 1980, J.C. Cardale (ANIC).

Diagnosis. In common with *O. blythi* and *O. glebula, O. parallela* has the preanal appendages free and lateral lobes of the inferior appendages stout. It is readily distinguished from both by the almost straight-sided more elongate basodorsal lobes of the inferior appendages in ventral view, and narrower lateral lobes in lateral view.

Description. Genitalia, Figs 22–24, 32. Segment IX short middorsally, otherwise relatively long; preanal appendages elongate, slender. Tergum X reduced to a short truncate lobe. Inferior appendages with all lobes about the same length: basoventral lobe produced more than in other species, almost straight-sided, apically truncate, main body narrower, rounded apically, basodorsal lobe slender. Phallus (Fig. 32) long and slender; parameres in form of a set of unequal sclerotised spines ventral to the sheathing phallobase.

Etymology. Descriptive of the almost parallel alignment, in ventral view, of the lobes of the inferior appendages.

Distribution (Fig. 41). Far north-eastern Queensland, particularly in the Atherton Tableland area.

Oecetis complexa

Oecetis paracomplexa

Oecetis obliqua

Oecetis adelaidica

Oecetis uptoni

Oecetis blythi

Oecetis glebula

Oecetis parallela

Figures 34–41, collecting sites for *Oecetis complexa*-group species: 34, *O. complexa* Kimmins; 35, *O. paracomplexa* sp. nov.; 36, *O. obliqua* sp. nov.; 37, *O. adelaidica* sp. nov.; 38, *O. uptoni* sp. nov.; 39, *O. blythi* sp. nov.; 40, *O. glebula* sp. nov.; 41, *O. parallela* sp. nov.

Discussion

Within the Australian *Oecetis* fauna, species of the *complexa*-group are distinct and possibly so in the world fauna too. It is apparent that these Australian taxa are not accommodated in Chen's (1992) scheme and thus further assessment of the group in the broader context is needed.

Species of the *complexa*-group are found more or less peripherally on the Australian continent (Figs 34–41), although as yet they are unknown from south-western Western Australia or from Tasmania. Several species appear to be quite widespread but most have been collected in the more northerly parts of Australia. The curiously disjunct distributions seen here in *O. complexa, O. paracomplexa* and *O. blythi* are a recurrent feature among species in the Australian *Oecetis* fauna. The veracity of the identifications has been checked carefully. Possible explanations are gaps in sampling (real, but unlikely to be the full explanation given the intensity of collecting Australia wide), high vagility, or loss of diversity in parts of the continent as a result of aridification and/or recent agricultural or pastoral practices. An alternative explanation may lie in differences in the biology of the species.

Acknowledgements

My thanks go to Arturs Neboiss who made available to me the material from Museum Victoria and checked through a first draft of the manuscript, and to the editor, for critical comments that led to improvements.

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