



New and newly recorded micro-caddisfly species (Insecta: Trichoptera: Hydroptilidae) from Australia's north, including islands of Torres Strait

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Abstract

From the north of Australia's Northern Territory, far northeastern Queensland and Torres Strait Islands, six new species of microcaddisfly are described: *Hydroptila roperi* sp. nov., *Hellyethira khukri* sp. nov., *Oxyethira* (*Trichoglene*) *bamaga* sp. nov., *Oxyethira* (*Dampfitrichia*) *torresiana* sp. nov., *Orthotrichia pethericki* sp. nov., and *Orthotrichia becca* sp. nov. *Oxyethira torresiana* is recorded from the northwest of York Peninsula and Badu Island in the Torres Strait as well as from Papua New Guinea. Northern Australian records are given for *Orthotrichia veikaba* Wells and *Orthotrichia ensiformis* Wells, previously known only from Papua New Guinea. Northern Australian distributions are extended eastwards for *Tricholeiochiton jabilella* Wells and westwards for *Oxyethira* (*Trichoglene*) *triangulata* Wells, until now recorded only from the Northern Territory and northeastern Australia, respectively. Brief notes are given on collecting methods and sites.

Key words: Papua New Guinea, long-range dispersal, *Orthotrichia turrita*

Introduction

Although collecting of Trichoptera (Insecta) has been quite intensive in some parts of northern Australia, new species can still be discovered in the region, particularly when different collecting methods are employed. Usually adult caddisflies are collected at night by using some form of light trap fitted with a mercury vapour or ultraviolet lamp, or by day by use of a sweep net. Less commonly they are taken in intercept traps such as Malaise traps. Often, however, the very small-sized species, especially micro-caddisflies (Hydroptilidae), tend to be overlooked either in the initial collecting or when samples are sorted, especially by non-specialists.

Various Rothamsted-type light traps have proved effective for sampling of smaller caddisflies of several families. Operated on portable 6v or 12v batteries, such traps are fitted with a low intensity light, a small fan for suction and, often, a light sensor, and have been used to monitor diversity and seasonal abundance of Trichoptera in streams in the Top End (*i.e.*, far north) of the Northern Territory of Australia. Similar traps are employed in other areas in northern Australia, including Torres Strait islands that are under Australian jurisdiction, specifically for monitoring of *Culicoides* biting midges in the Australian Government's National Arbovirus Monitoring Program (NARP). These *Culicoides* traps often yield caddisflies as components of 'by-catch.' Hydroptilidae are commonly represented in samples taken in both of these programmes.

Species in the genera *Hydroptila* Dalman, *Hellyethira* Neboiss, *Oxyethira* Eaton subgenus *Trichoglene* Neboiss, and *Orthotrichia* Eaton are among the caddisflies collected recently in such traps in the north of the Northern Territory; and samples collected by the NARP include species of *Tricholeiochiton* Kloet & Hincks, *Hellyethira*, *Oxyethira* subgenera *Trichoglene* and *Dampfitrichia* Ulmer, and *Orthotrichia*. From the Northern Territory we describe one new species for each of *Hydroptila* and *Hellyethira* and two of *Orthotrichia*; from far northern Queensland we describe two new species of *Oxyethira*. One of the new species of *Oxyethira* was also collected by NARP in the Western Province of Papua New Guinea.

Another two species, described originally from New Guinea, are newly recorded for Australia: *Orthotrichia veikaba* Wells from islands in the Torres Strait and *Orthotrichia ensiformis* Wells from the north of the Northern

Territory. Furthermore, new far northern Australian records are given for several species, thereby extending significantly their known distributions: a new record of *Oxyethira triangulata* Wells extends the distribution of that species from the northeast of Australia to the north of the Northern Territory, and *Tricholeiochiton jabirella* Wells, described from the Kakadu region of the Northern Territory, is recorded from the Torres Strait for the first time.

The sampling sites in the north of the Northern Territory differ in habitat and flow regime. The sites at Radon Springs and Petherick's Rainforest Reserve are both on permanent spring-fed streams draining a sandstone escarpment and surrounded by monsoon rainforest; Peel Creek is an intermittent stream in the Darwin area; Roper River at Mt McMinn Station is a large perennial 7th order stream with baseflow from the Tindall-Mataranka aquifer; and the Edith River is an intermittent stream that contracts to a series of pools in the late dry season. Several of these stream systems in the north of the Northern Territory appear to have quite rich hydroptilid faunas. Further collecting at these and other isolated streams and springs is likely to be rewarding for all aquatic groups.

In selecting the northern Queensland sites, the NARP samplers chose localities such as the Torres Strait Islands and the tip of Cape York for their proximity to Papua New Guinea (e.g., sites such as Boigu, Badu and Saibai Islands, and Bamaga and Sesia on mainland Cape York) and therefore likelihood of wind dispersal or local boat traffic bringing unwanted insects to Australia, or in the case of several sites from Cape York sites, proximity to stockyards or airports. None of these sites was chosen particularly for its proximity to any water bodies. Boigu Island has no naturally occurring permanent freshwater wetlands—according to Burrows' (2010) report, a 'few small springs ... exist that supported villagers before the construction of modern water supplies. Several artificial waterbodies near the island village contain permanent water year round, though of brackish quality.' Earlier, Burrows and Perna (2009) reported that on Saibai '[f]reshwater habitats ... appeared limited to just the two small artificial water reservoirs located side by side'; otherwise, other than mangroves, they noted only '... brackish water wetlands.' Of Badu Island, Waltham *et al.* (2014) reported '... more obvious freshwater habitats,' and illustrated their report with a photograph of a substantial water hole.

Epidemiological studies on viral outbreaks in northern Australia use backtrack simulations of wind trajectories across New Guinea and northern Australia to invoke disease vectoring resulting from windborne incursions of small flying insects such as mosquitoes (*Culex* species) and biting midges (*Culicoides* species) from New Guinea (Eagles *et al.* 2014; Finlay *et al.* 2014). Furthermore, the cyclonic winds tracking across northern Australia could be responsible for movement of small insects between the east and west. Only regular monitoring of freshwater systems would indicate if populations of any of these newly reported insects are established permanently.

Material and methods

Specimens were prepared for study as slide mounts in Canada Balsam following the methods described by Wells (1990) or by slide-mounting of specimens directly in Hoyer's medium (Upton & Mantle 2010).

Even from slide preparations, identification of *Orthotrichia* species sometimes is confused simply by slight skewing of specimens on slides. One such example, illustrated here, we encountered when identifying specimens of *Orthotrichia turrita* Wells from the 'Top End.' This commonly collected species occurs across northern Australia and is usually identified by the slightly sinuous form of the phallic apparatus (Fig. 19), and when observed in ventral view, symmetrical gonopods and their superficially symmetrical dorsal process. But the dorsal process is actually not symmetrical, and with slight skewing of the specimen on a slide can appear to be highly asymmetrical as in Figure 20. We mention this, as similar problems may arise with other members of this genus.

Illustrations were prepared using Adobe Illustrator (CS5). Terminology applied to genitalic structures follows Oláh and Johanson (2008).

Type specimens are deposited in the Northern Territory Museum and Art Gallery, Darwin (NTM) and the Australian National Insect Collection, CSIRO (ANIC), Canberra.

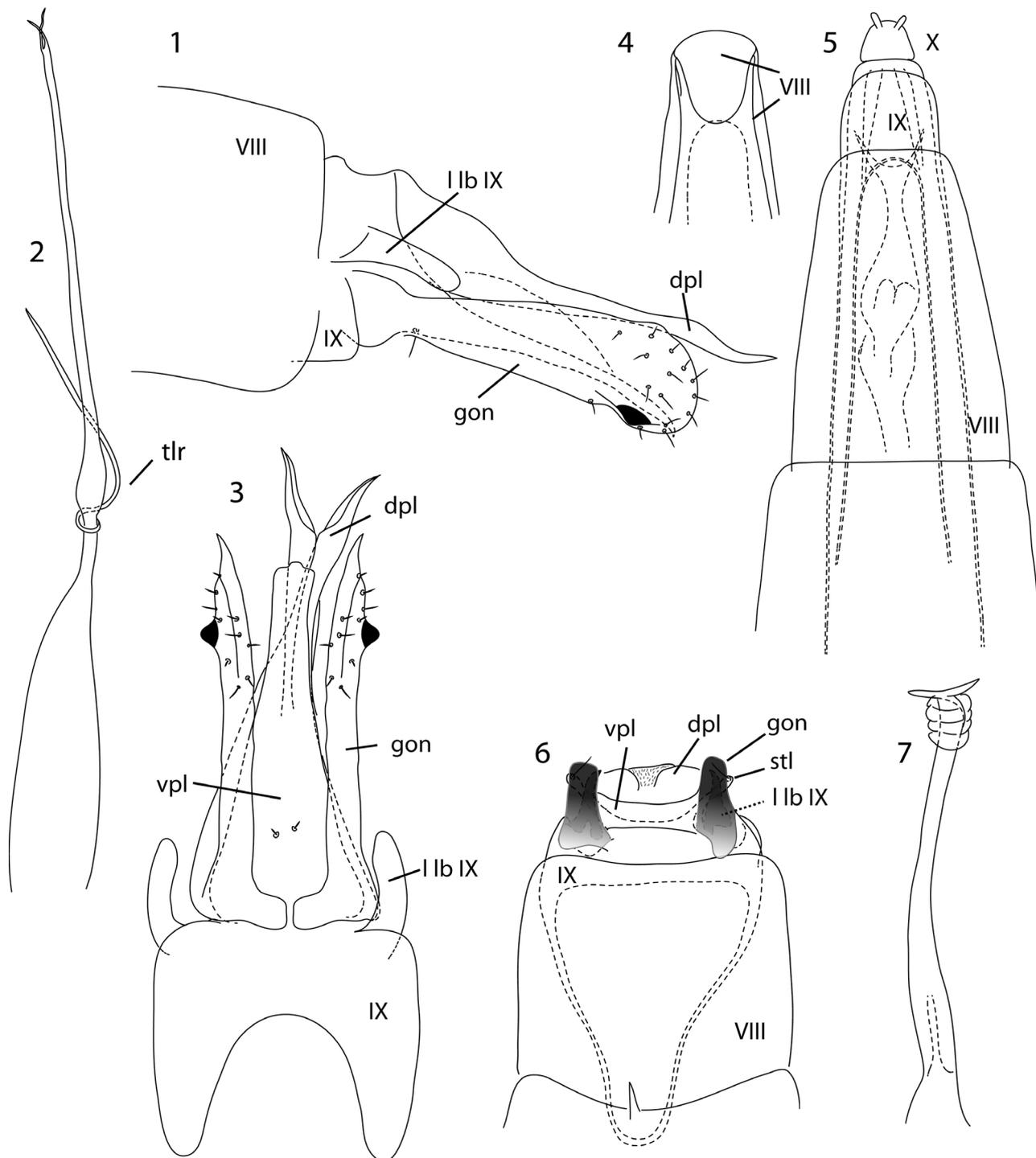
Taxonomy

Hydroptila roperi sp. nov.

Figures 1–5

Diagnosis. This species is most closely similar to *Hydroptila explicata* Wells, a widespread species in northern

Australia and the Oriental Region, from which males of *H. roperi* are distinguished by the more regularly club-shaped gonopods each with a jet black spur subapically, compared to the abruptly swollen gonopods of *H. explicata* and presence subapically only of a swelling bearing several setae; the more sharply, but widely V-shaped apical cleft on the dorsal plate of *H. roperi*; and the slender, finely divided apex of the phallic apparatus. Females are distinct from those of *H. explicata*, having the abdominal segment VIII distal margin smoothly convex ventrally and smoothly and deeply concave dorsally, not produced dorso- or ventro-medially.



FIGURES 1–7. *Hydroptila* and *Oxyethira* spp. 1–5, *Hydroptila roperi* sp. nov.: 1–3, male genitalia: 1, left lateral; 2, phallic apparatus; 3, ventral; 4, 5, female terminalia: 4, abdominal segment VIII, dorsal; 5, abdominal segments VIII–X, ventral. 6, 7, *Oxyethira bamaga* sp. nov., male genitalia: 6, ventral; 7, phallic apparatus. Abbreviations: VIII, IX = abdominal segments VIII and IX; dpl = dorsal plate; dpr = dorsal process of gonopods; gon = gonopod; 1 lb IX = lateral lobe of segment IX; tlr = titillator; vpl = ventral plate.

Description. *Male* (Figs 1–3). Length of each forewing 1.5–1.7 mm (n = 5). Head without postoccipital scent glands. Antennae each with 23 flagellomeres, bearing dense sensilla placodea. Genitalia as in Figs 1–3. Lateral lobes of abdominal segment IX elongate, length about 4x width; Dorsal plate (segment X) triangular in dorsal view, produced beyond other genitalic structures, apically bifurcate, lobes tapered sharply. Gonopods slender, in ventral view rod-shaped in basal 3/4, each sharply tapered distally with sclerotised lateral tooth subapically, in lateral view gradually expanded to broadly rounded apex. Ventral plate triangular in ventral view. Phallic apparatus elongate, slender, finely bifurcate apically, titillator thread-like, sinuous.

Female (Figs 4, 5). Length of each forewing 1.6–1.9 mm (n = 6). Antennae each with 18 flagellomeres. Terminalia forming tapered oviscapt, with abdominal segment IX broadly rounded apico-ventrally, and deep U-shaped concavity dorsally.

Types. Holotype, male, NORTHERN TERRITORY, Roper River, McMinn Station, 16.x.2014, P. Dostine, It tr. (NTM, slide).

Paratypes. 5 males (one headless), 6 females, data as for holotype (NTM, ANIC, slides).

Etymology. Named for the Roper River where the specimens were collected.

Remarks. The 10 species of *Hydroptila* now known to occur in Australia are all very uniform in general genitalic morphology in comparison with many described from New Guinea and parts of SE Asia to the north, possibly representing a single evolutionary lineage (but see Bennik *et al.* 2016 who, in a molecular phylogenetic study on genus of moths, demonstrated repeated evolution of some complex genitalic structures).

Oxyethira (Trichoglene) bamaga sp. nov.

Figures 6, 7

Diagnosis. This species is a member of subgenus *Trichoglene*, and similar to *O. columba* (Neboiss) from southeastern Australia to mid Queensland, and *O. triangulata* Wells, from far northeastern Australia (but see below), in having short, sclerotised gonopods. However, in ventral view these are pillar-like, with length almost 3x width, compared with the much shorter, tapered structures in those two species.

Description. *Male.* Length of each forewing 1.6–1.9 mm (n = 2). Antennae each with 24–25 flagellomeres. Abdominal segment VII with small acute apico-medial spine on ventral surface. Genitalia as in Figs 6, 7. Segment VIII quadrate in ventral view. Segment IX triangular, deeply retracted into segment VIII, pair of triangular sclerotised processes laterally. Dorsal plate short, broad, with area of minute spinules apico-medially. Gonopods stout, sclerotised, in ventral view, length close to 3x width; dorsal process slender, positioned almost at right angle to length of body. Phallic apparatus about 1.5x length of abdominal segment VIII, without titillator; short membranous sheath subapically; apex bearing slender, twisted spine.

Female. Unknown.

Types. Holotype, male, NORTH EAST QUEENSLAND, Bamaga, 3–6.v.2011, J. Bond, ex *Culicoides* trap (ANIC, slide).

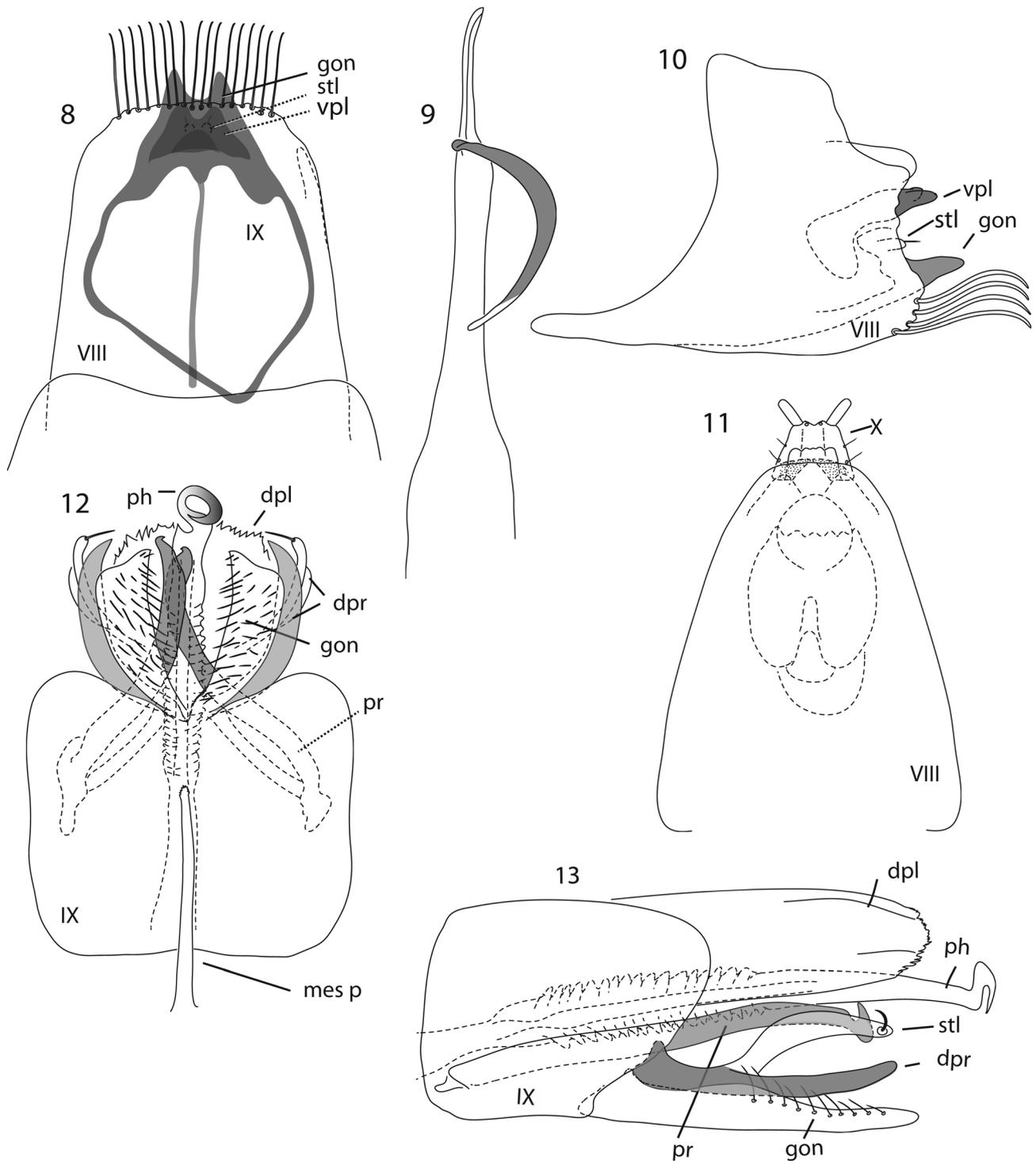
Paratypes. 1 male, NEQ, Bamaga, airport road, 19.iv.2010, J. Bond, ex *Culicoides* trap, (ANIC, alcohol); 1 male, NEQ, Bamaga, old farm, 21–24.vii.2009, J. Bond, ex *Culicoides* trap (ANIC, damaged, slide).

Etymology. Named for Bamaga, type locality of the species.

Oxyethira (Dampftrichia) torresiana sp. nov.

Figures 8–11

Diagnosis. Superficially this species is easily confused with *Oxyethira (Dampftrichia) incana* Ulmer, which is widespread from Indonesia to New Guinea, northern Australia and New Caledonia. However, it is distinguished by the broader apical margin of abdominal segment VIII; absence of elongate spines apico-laterally on the deep apical concavity in the dorsal margin of abdominal segment VIII; phallic apparatus straight, with an elongate, anteriorly directed and free strap-like process arising subapically (compared with the phallic apparatus with a bend at mid length in *O. incana*); and by the very different female terminalia that are stouter and without the darkly sclerotised quadrate area apico-ventrally on segment IX.



FIGURES 8–13. *Oxyethira* and *Hellyethira* spp. 8–11, *Oxyethira torresiana* sp. nov., male genitalia: 8, ventral; 9, phallic apparatus; 10, lateral. 11. *O. torresiana* sp. nov., female terminalia, ventral. 12, 13, *Hellyethira khukri* sp. nov., male genitalia: 11, ventral; 12, left lateral. Abbreviations: VIII, IX = abdominal segments VIII and IX; dpl = dorsal plate; dpr = dorsal process of gonopods; gon = gonopod; mes p = mesal process of abdominal segment VII; ph = phallic apparatus; pr = paramere; stl = setose lobes of gonopods; vpl = ventral plate.

Description. *Male.* Length of each forewing 1.6–2.2 mm (n = 7). Antennae banded, each with 27 flagellomeres. Genitalia as in Figs 8–10. Abdominal segment VIII almost quadrate in ventral view, with apical margin slightly convex, bordered by palisade of stout, distally down-turned setae, concave dorsally in lateral view; segment IX subtriangular in lateral view, antero-ventral margin tapered narrowly; gonopods fused basally, separate

in distal quarter; subgenital plate similar to gonopods in shape, setose, reduced to small, fused median structure; dorsal process even smaller, fused; mid ventral apodeme elongate slender; phallic apparatus straight, stout basally, tapered distally, with strap-like sclerotised spine arising at 3/4 length, directed proximally.

Female (Fig. 11). Length of each forewing 1.6–2.3 mm (n = 12). Antennae each with 19 flagellomeres, basal 7 dark, followed by 4 lighter, 4 dark, terminal 4 pale. Abdominal segment VII bearing small short, sharp midventral spine. Abdominal segment VIII length about 2x basal width, tapered distally. Segment IX with triangular sclerotised areas disto-laterally, apical margin coarsely crenulate.

Etymology. Named for Torres Strait, the origin of the types.

Types. Holotype. 1 male, NORTH EAST QUEENSLAND, Sesia via Bamaga, 20–23.iii.2012, W. Stevens, ex *Culicoides* trap (ANIC, slide).

Paratypes. NORTH EAST QUEENSLAND: 3 males, 3 females, data as for holotype (ANIC); 27 males, 11 females, Sesia, via Weipa, Sesia yards, 3.iv.2014, E. Cottis, ex *Culicoides* trap, (ANIC); 7 males, Bamaga, airport road, 19.iv.2010, J. Bond, ex *Culicoides* trap (ANIC); 2 males, 3 females, Sesia, 23.ii.2012, W. Namai, ex *Culicoides* trap (ANIC); 1 male, 4 females, Badu Island, Torres Strait, 26.iii.2012, T. Nona, ex *Culicoides* trap (ANIC).

Other material examined. NORTH EAST QUEENSLAND: 1 male, Badu Island, Torres Strait, 4.iv.2011, T. Nona, ex *Culicoides* trap (ANIC); 2 males, NEQ, Bamaga, 31.v–3.vi.2011, J. Bond, ex *Culicoides* trap (ANIC); 1 male, 3 females, Bamaga, 26.iii.2008, J. Bond, ex *Culicoides* trap (ANIC).

PAPUA NEW GUINEA: 4 males, Western Province, Kautru, 8°03.267'S, 141°11.038'E, 1.vi.2009, Lt, B. Cookson & N. Harris, ex *Culicoides* trap (ANIC, 1 slide, 3 alcohol).

Remarks. This new species has been collected from Badu Island and the far north of Cape York and also from Papua New Guinea. Given the large number of specimens collected from Cape York, it is probably established there, as well as in New Guinea (from whence available Trichoptera samples are so few). The closely similar *O. incana* has been collected from northern Australia to New Caledonia to the east, and westward through the Oriental Region to Sri Lanka.

***Hellyethira khukri* sp. nov.**

Figures 12, 13

Diagnosis. This species is closely similar to the northern Australian species *Hellyethira forficata* Wells, *H. radonensis* Wells, and *H. veruta* Wells, but is recognised by the tightly twisted apical spine on the phallic apparatus; the stout, sclerotised, undivided dorsal lobe on the gonopods compared with the more slender structures in *H. radonensis*, and the apically divided structures in *H. forficata*.

Description. *Male.* Length of each forewing 2.1 mm (n = 2). Antennae each with 33–34 flagellomeres, flagellomeres rectangular in profile, bearing large sensilla placodea. Meso-ventral process on abdominal segment VII slender, elongate. Genitalia as in Figs 11, 12. Abdominal segment IX quadrate in ventral view; dorsal plate broad, membranous, fimbriate apically; gonopods multilobed, ventralmost lobe broad throughout length, setose, dorsal process in form of pair of stout, sclerotised forceps-like lobes, with pair of slender membranous lobes farther above them, each bearing slender apical seta; parameres curved, convergent in ventral view almost to slightly hooked apices, basally each with stout parallel apodeme; phallic apparatus terminating in a tightly twisted spine, membranous collar subapically.

Female. Unknown.

Types. *Holotype.* male, NORTHERN TERRITORY, Petherick's Rainforest Reserve, 6–7.vi.2015, J. Schult, light trap (NTM).

Paratype. 1 male, data as for holotype (ANIC).

Etymology. "Khukri," the term for a Gurkha knife, being descriptive of the blade-like twist terminally on the phallic apparatus.

***Orthotrichia pethericki* sp. nov.**

Figures 14, 15

Diagnosis. A member of the *Orthotrichia gracilis* Group of species, having a pair of stout black setae apico-dorsally on abdominal segment VIII, this species most closely resembles *O. exigua* Wells described from the northwest of Western Australia and distributed across northern Australia to Cape York. It is distinguished from that species by the strongly asymmetrical dorsal process being more elaborately exaggerated, and on the right side produced dorsad into a stout, twisted and hooked sharp spine.

Description. Male. Length of each forewing 1.5–1.6 mm (n = 2). Antennae each with 21 antennomeres. Genitalia as in Figs 14, 15. Abdominal segment VIII bearing pair of stout, elongate black spines well-separated on postero-dorsal margin; segment IX quadrate in ventral view; dorsal plate broad, membranous, its apical margin shallowly cleft apico-mesally; paramere short, slender, spiny; gonopods heavily sclerotised, elongate, tapered towards apices, length about 2–3 times basal width, strongly divergent; dorsal process sclerotised, lobular structure on left, elaborately expanded structure on right bearing seta on left apical angle, terminating in hooked apically acute spine on right; antero-ventral apodeme about 1.2 times length of abdominal segment IX; phallic apparatus broad based, slender in distal half, titillator thread-like, twisted.

Female. Unknown.

Types. Holotype. male, NORTHERN TERRITORY, Petherick's Rainforest Reserve, 13°7.424'S, 130°39.920'E, 6–7.vi.2015, J. Schult, light trap (NTM, slide).

Paratypes. NORTHERN TERRITORY: 6 males, data as for holotype; (NTM, alcohol); 2 males, Radon Springs, 12°45.091'S, 132°54.169'E, 19–20.v.2015, J. Hanley, light trap (ANIC, 1 slide, 1 in alcohol).

Etymology. Named for Ray Petherick who, with his family, preserved the small area of rainforest that now bears his name.

***Orthotrichia becca* sp. nov.**

Figures 16, 17

Diagnosis. In having a pair of strong, stout black setae on abdominal segment VIII, this species is also a member of the *Orthotrichia gracilis* Group. In *O. becca* the bases of the 2 setae are very close together, resembling those of the northern Australian *Orthotrichia bellicosa* Wells. However, *O. becca* differs from that species in having close-pressed, distally cone-shaped gonopods with their extremities heavily sclerotised, and, distally on the dorsum of the dorsal plate, a lightly sclerotised beak-shaped structure.

Description. Male. Length of each forewing 1.3–1.5 mm (n = 2). Antennae each with 24 antennomeres. Genitalia as in Figs 15, 16. Abdominal segment VIII bearing dorso-mesally one pair of closely based stout, elongate black spines; dorsal plate with sinuous blade-like sclerotised spine on left side, with membranous beak-like structure beyond it; on right broad straight spine; paramere long, slender spine; gonopods almond-shaped, distally sclerotised, close-pressed; dorsal process short, quadrate, membranous; antero-ventral apodeme elongate; phallic apparatus as for genus, slender in distal section, with a spiral titillator.

Female. Unknown.

Types. Holotype. male, NORTHERN TERRITORY, Berry Springs, 11–12.i.2016, P. Dostine, light trap (NTM, slide). Paratype. 1 male, data as for holotype (ANIC, slide).

Etymology. From the Latin for beak — *beccus*, for the beak-like structure on the dorsal plate.

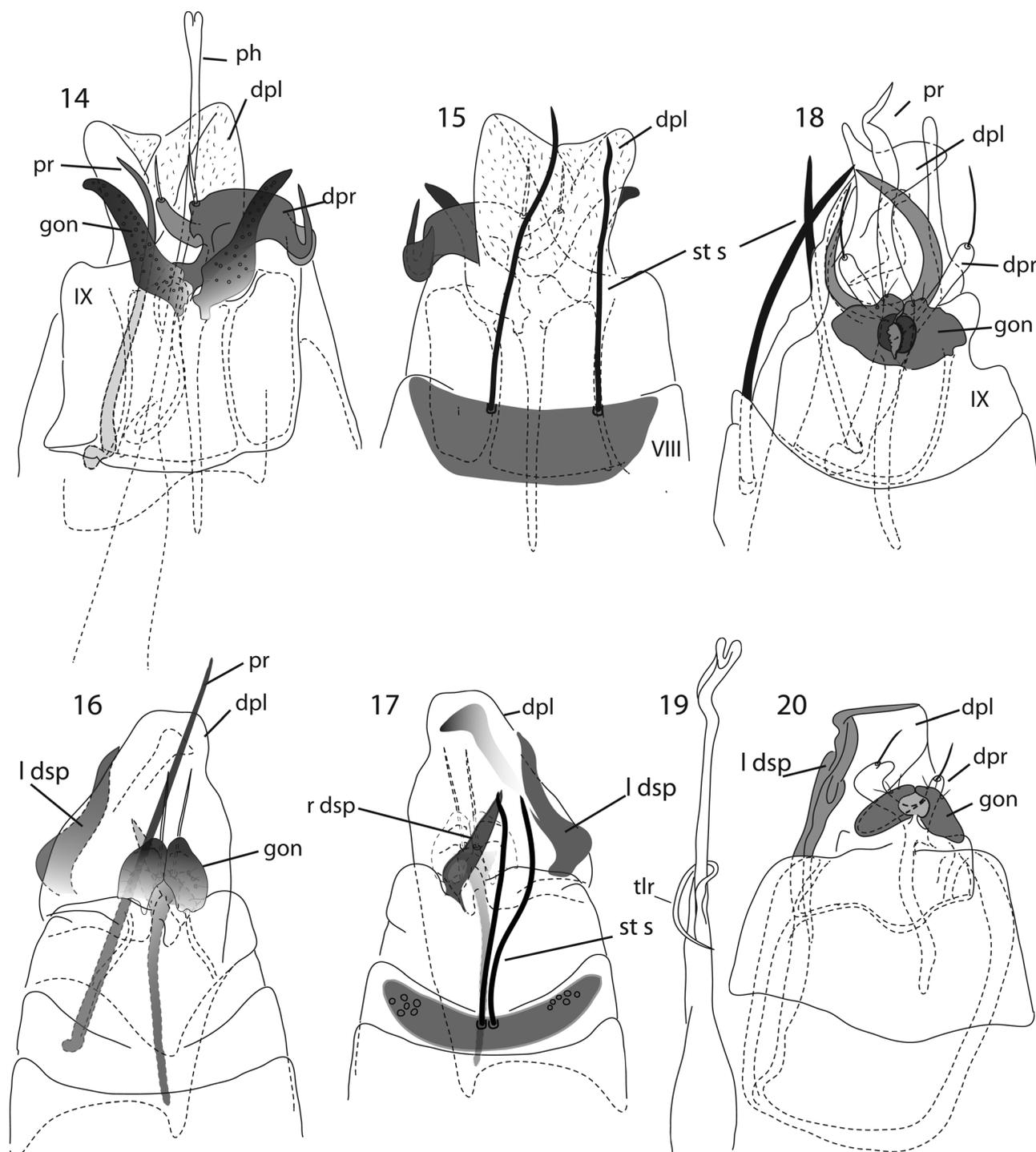
Remarks. The similarity in male genitalia of this species and *O. bellicosa*, described from NW Western Australia, possibly has led to earlier misidentifications of other Northern Territory specimens.

Additional species newly recorded for the 'Top End' of the Northern Territory and Torres Strait and Cape York, Queensland

***Oxyethira (Trichoglene) triangulata* Wells 1981, 108, figs 11–13**

Material examined. NORTHERN TERRITORY: 1 male, Petherick's Rainforest Reserve, 6–7.vi.2015, J. Schult, light trap (NTM).

Remarks. Distributions of many microcaddisfly species extend across the north of Australia, so a westward extension to the distribution of *O. triangulata* is unsurprising. It is surprising, however, that despite quite extensive light-trapping in the Top End, this is the first record for this species. Further effort is needed to determine if it is established there.



FIGURES 14–20. *Orthotrichia* spp. 14, 15, *Orthotrichia pethericki* sp. nov., male genitalia: 14, ventral; 15, dorsal. 16, 17, *Orthotrichia becca* sp. nov., male genitalia: 16, ventral; 17, dorsal. 18, *Orthotrichia ensiformis* Wells, male genitalia, ventral. 19, 20, *Orthotrichia turrita* Wells, male genitalia: 19, phallic apparatus; 20, ventral. Abbreviations: VIII, IX = abdominal segments VIII and IX; dpl = dorsal plate; dpr = dorsal process of gonopods; gon = gonopod; l dsp = left dorsal spine on dorsal plate; ph = phallic apparatus; pr = paramere; r dsp = right dorsal spine on dorsal plate; st s = stout setae on segment VIII; tlr = titillator.

***Orthotrichia ensiformis* Wells 1984, 281, figs 43–45**

Figure 18

Material examined. NORTHERN TERRITORY: 2 males, Edith River, Pool 1, 14°10.289' 132°07.061', 31.i.2009, E. Garcia, UV It (NTM).

Remarks. *Orthotrichia ensiformis* was recorded originally from two sites in Papua New Guinea: Urimo in the Sepik Province and Keravat in eastern New Britain. This suggests that it is probably established in New Guinea, possibly native to New Guinea. The specimens taken to the south of Darwin in the Northern Territory of Australia, are not readily explained as vagrants. However, Finlay *et al.* (2014: 103) illustrated the passage of a cyclone ('Cyclone Monica') that travelled from the southeastern tip of Papua New Guinea across Cape York, made a second landfall near Maningrida in the Northern Territory, and circled the coast toward Darwin, moving south before turning inland. While this demonstrated that such an event can occur, survival of small insects such as micro-caddisflies over such a distance and time span would be unlikely. Further data are needed to determine if this species is established in the north of Australia. The species is illustrated here as Figure 18.

***Orthotrichia veikaba* Wells 1991, 516, fig. 46**

Material examined. QUEENSLAND: 14 males, 19 females, Torres Strait, Saibai Island, 23–27.i.2009, J. Babia, ex *Culicoides* trap (ANIC); 9 males, 2 females, Torres Strait, Boigu Island, 31.iii.2009, S. Bady, ex *Culicoides* trap (ANIC).

Remarks. *Orthotrichia veikaba* was recorded previously from 6 specimens collected at Veikabu, in the Central Province of Papua New Guinea. Both Torres Strait islands from which it is recorded here are situated very close to New Guinea and, given the dearth of permanent fresh water on these islands (Burrows & Perna 2009; Burrows 2010), and the fact that it has not been picked up on mainland Australia, it seems reasonable to consider this species to be a native New Guinea species, probably vagrant on the islands.

***Tricholeiochiton jabirella* Wells, 1985: 99, figs 4, 6, 7**

Material examined. QUEENSLAND: 10 males, 2 females, Sesia, via Weipa, 3.iv.2014, E. Cottis, ex *Culicoides* trap, Sesia yards (ANIC); 4 males, 23 females, Torres Strait, Boigu Island, 31.iii.2009, G. Badu, ex *Culicoides* trap (ANIC); 6 males, Torres Strait, Boigu Island, 25–29.v.2010, G. Badu, ex *Culicoides* trap (ANIC); 23 males, Torres Strait, Boigu Island, 29.v.2014, G. Badu, ex *Culicoides* trap (ANIC).

Remarks. Five species of *Tricholeiochiton* are known for northern Australia, *T. fidelis* Wells, *T. tridens* Wells, *T. edmondsi* Wells, *T. bifurca* Wells, and *T. jabirella* Wells. *Tricholeiochiton fidelis* and *T. bifurca* were collected from far northern Cape York (Wells & Cartwright 1993). Significantly, we record here samples of *T. jabirella* Wells, a species described from the Jabiru area in the north of the Northern Territory, now collected in reasonably large numbers from Boigu Island and Sesia near Weipa on the west of Cape York. The species could possibly be established in both places, or alternatively, on Boigu it might be an occasional vagrant, breeding when conditions are satisfactory; it has not been reported from New Guinea.

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References

Bennik, R.M., Buckley, T.R., Hoare, R.B.J. & Howell, G.I. (2016) Molecular phylogeny reveals the repeated evolution of complex male genital traits in the New Zealand moth genus *Izatha* (Lepidoptera: Xyloryctidae). *Systematic Entomology*,

41 (2), 309–322.

<http://dx.doi.org/10.1111/syen.12155>

- Burrows, D.W. (2010) *Wetland assessment of Boigu Island, Torres Strait. Report 10/06*. Australian Centre for Tropical Freshwater Research, James Cook University, Townsville, 73 pp.
- Burrows, D. & Perna, C. (2009) *A survey for exotic freshwater fish on Saibai Island and Thursday Island, Torres Strait. Report No. 09/01*. Australian Centre for Tropical Freshwater Research, James Cook University, Townsville, 10 pp. +Appendix.
- Eagles, D., Melville, L., Weir, R., Davis, S., Bellis, G., Zalucki, M.P., Walker, P.J. & Durr, P.A. (2014) Long-distance aerial dispersal modelling of *Culicoides* biting midges: Case studies of incursions into Australia. *BMC Veterinary Research*, 10 (135), 1–10 pp.
<http://dx.doi.org/10.1186/1746-6148-10-135>
- Finlay, K.J., Weiss, J. & Vereijssen, J. (2014) CRC1031: *Understanding the significance of natural pathways into Australia and New Zealand (Final Report)*. Plant Biosecurity Cooperative Research Centre, Canberra, 9 pp.
- Oláh, J. & Johanson, K.A. (2008) Reasoning and appendicular and functional caddisfly genital terminology. *Braueria*, 35, 29–40.
- Upton, M.S. & Mantle, B.L. (2010) *Methods for Collecting, Preserving and Studying Insects and Other Terrestrial Arthropods*. Australian Entomological Society, Canberra, 81 pp.
- Waltham, N., Burrows, D. & Schaffer, J. (2014) *Freshwater Pest Fish on Boigu, Saibai, Badu and Mabuiag Islands in the Torres Straits. Report No. 14/41, June 2014 survey*. Centre for Tropical Water & Aquatic Ecosystem Research, Townsville, 108 pp.
- Wells, A. (1981) The genera *Oxyethira* Eaton, *Gnathotrichia* Ulmer and *Stenoxyethira* Kimmins (Trichoptera: Hydroptilidae) in Australia. *Australian Journal of Zoology*, 29, 103–118.
<http://dx.doi.org/10.1071/ZO9810103>
- Wells, A. (1984) *Hydroptila* Dalman and *Orthotrichia* Eaton (Trichoptera: Hydroptilidae) from the islands of New Guinea and New Britain, with observations on relationships. *Australian Journal of Zoology*, 32, 261–282.
<http://dx.doi.org/10.1071/ZO9840261>
- Wells, A. (1985) Four new species of Hydroptilidae (Trichoptera) from the Alligator Rivers region, Northern Territory. *Transactions of the Royal Society of South Australia*, 109, 97–102.
- Wells, A. (1990) New species and a new genus of micro-caddisfly from northern Australia, including the first Australian record of the tribe Stactobiini (Trichoptera: Hydroptilidae). *Transactions of the Royal Society of South Australia*, 114, 107–128.
- Wells, A. (1991) The hydroptilid tribes Hydroptilini and Orthotrichini in New Guinea (Trichoptera: Hydroptilidae: Hydroptilinae). *Invertebrate Taxonomy*, 5, 487–526.
<http://dx.doi.org/10.1071/IT9910487>
- Wells, A. & Cartwright, D.I. (1993) Trichoptera, Ephemeroptera, Plecoptera and Odonata of the Jardine River area, Cape York, northern Queensland. In: Feeney, P. (Ed.), *Cape York Peninsula Scientific Expedition Wet Season 1992. Report. Vol. 2*. The Royal Geographical Society of Queensland Inc., Brisbane, pp. 221–230.