Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Acari INFORMATION SHEET

Classification

Subphylum:	Chelicerata
Class:	Arachnida
Subclass:	Acari
Common name:	mite, tick Oribatid mites are also known as moss mites or beetle mites.

Distinguishing Features

- Adults have 4 pairs of walking legs.
- Appendages at the anterior (chelicerae and pedipalps) separated from the rest of the body by only a region of flexible cuticle (the cirumcapitular furrow).
- Division of primary segmentation only very faintly visible if at all.

Comments

There were 20 different species of Acari found in the freshwater samples collected during the 2010-11 Campbell Island Bicentennial Expedition. Most of these were only represented by one or two specimens and are likely to be terrestrial species that had fallen into the water. Three species were commonly found in the freshwater samples, two in streams ('Type A' and 'Type B') and one in tarns ('Type T') (Figs. 1–3). Both Type A and Type B have been identified as species that are likely to be associated with very damp soil, such as that found on stream margins. Acari has been included in the key as the lack of research on this group for Campbell Island means that it is not possible to conclusively exclude any of the species from being aquatic or semi-aquatic.

Original Description

N/A

How to Cite this Information Sheet

McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Invertebrates: Acari information sheet. EOS Ecology, Christchurch, New Zealand.

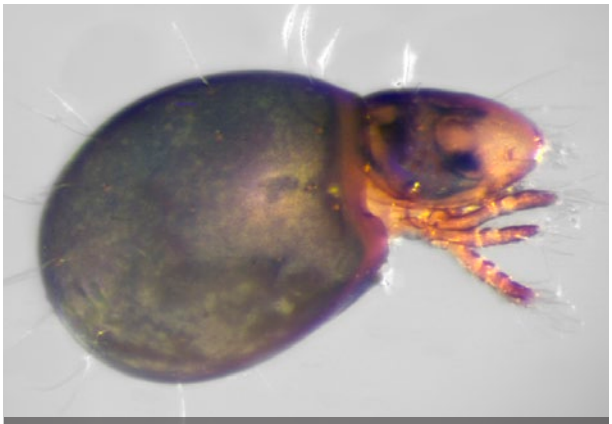


FIGURE 1. Acari 'Type A' (Ptyctimous Oribatida)

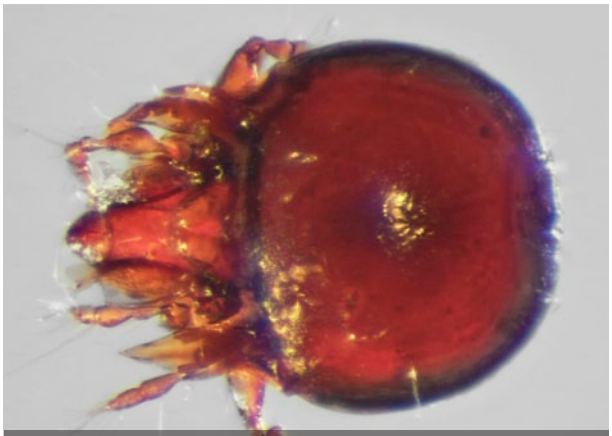


FIGURE 2. Acari 'Type B' (Oribatida)

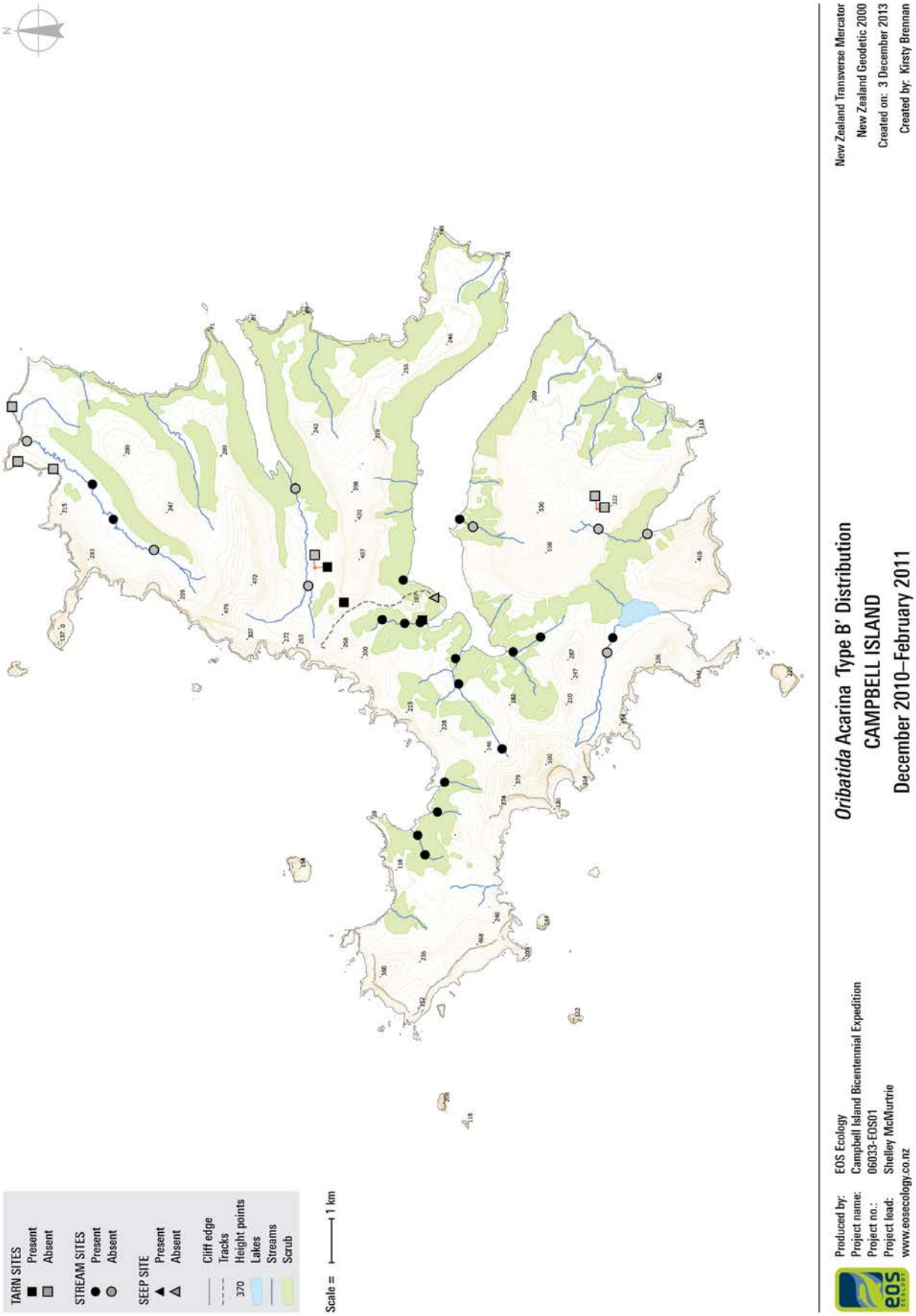
FIGURE 3. Acari 'Type T' (Oribatida)

ACKNOWLEDGEMENTS –The creation of the Lucid Key and information sheets were supported by the TFBIS (Terristrial and Freshwater Biodiversity Information System) Fund administered by the Department of Conservation (TFBIS Contract No. 278), and by EOS Ecology. Invertebrate specimens were collected by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (CIBE), made possible by the 50° South Trust. Thanks to Sergey Ermilov and Niedbała Wojciech for their assistance and contribution to this information sheet.

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

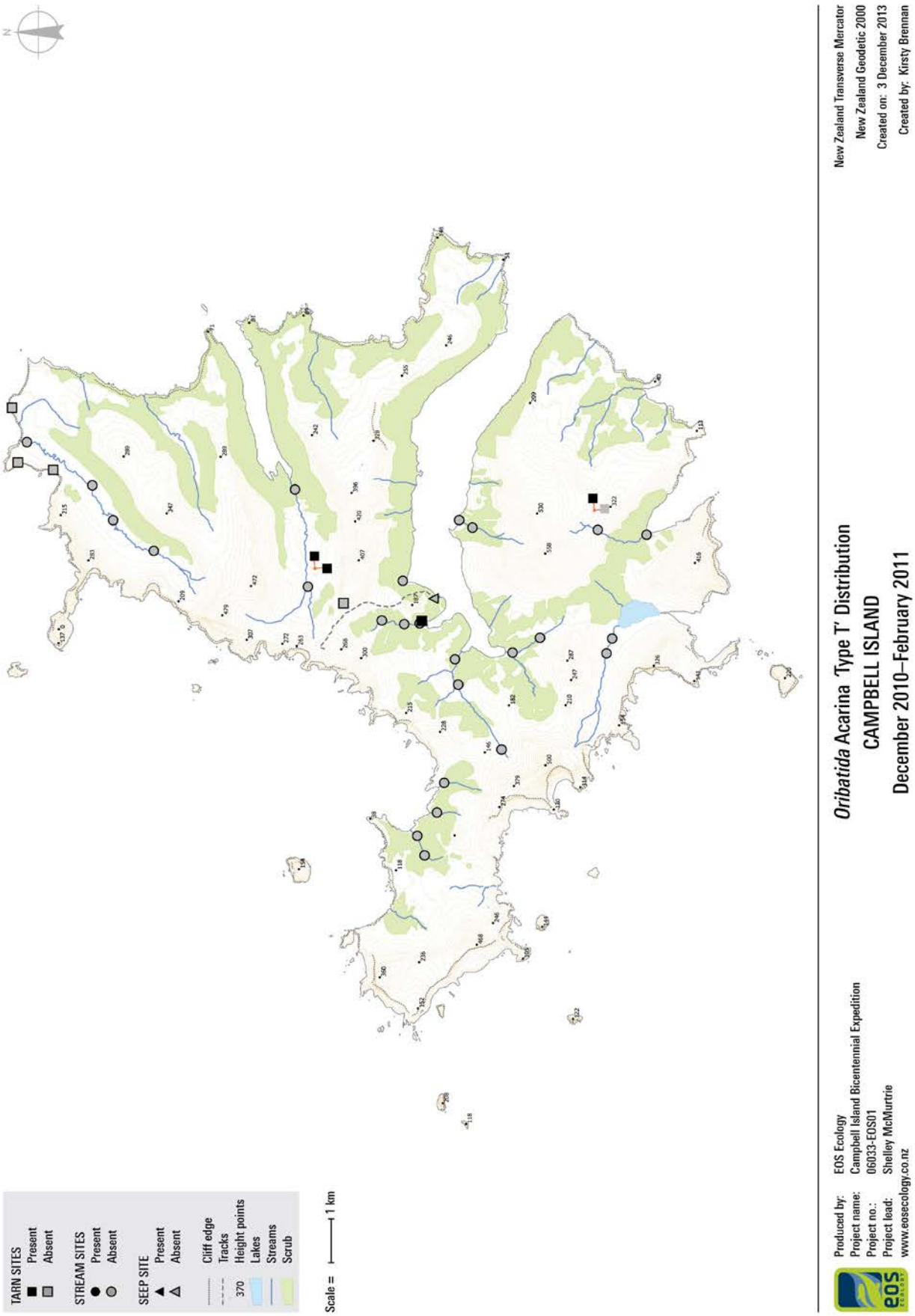
Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

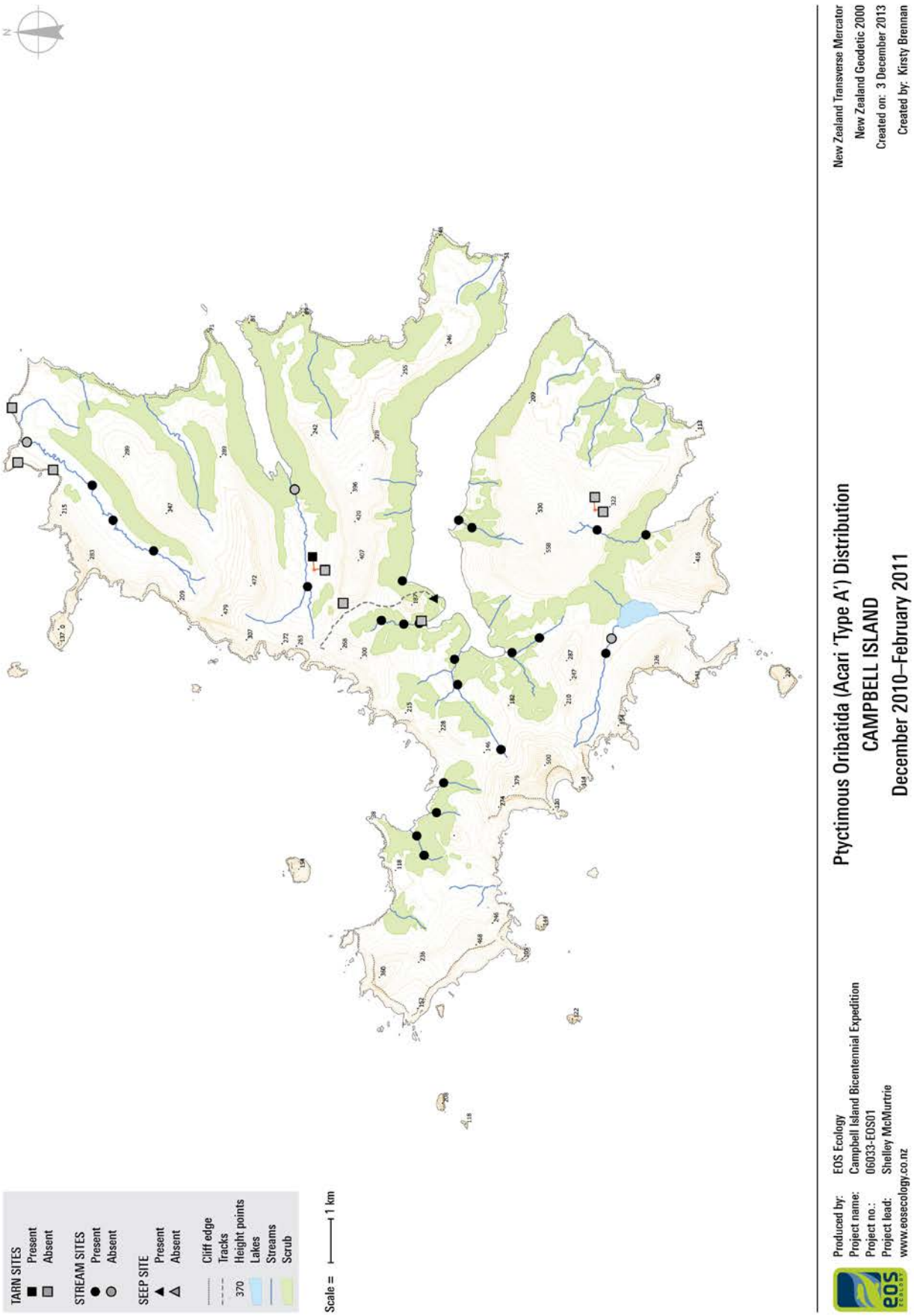
Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Alona cf. *affinis* (Leydig,1860) INFORMATION SHEET

Classification

Subphylum:	Crustacea
Class:	Branchiopoda
Order:	Diplostraca
Suborder:	Cladocera
Family:	Chydoridae
Genus:	*Alona*
Specific name:	cf. *affinis*
Common name:	water flea, chydorid cladoceran
Original combination:	*Lynceus affinis* Leydig, 1860

Distinguishing Features

Chydoridae are small cladocerans in which the cuticle of the head extends to cover the antennules and unites with the rostrum to form a beak that projects ventrally.

- *Alona* has both a compound eye and an ocellus (simple eye) that may be a similar size or smaller (Fig. 2); the head is narrower than the body when seen from above. The rostrum is more or less pointed and the antennules rod-shaped. The gut is looped.
- The postabdomen terminates in a small basal spine and a claw whose length approximates the width of the postabdomen (Fig. 3). Subtle differences in the shape and setation of the postabdomen are found between species.
- Specimens from Campbell Island resemble the widely distributed taxon *A. affinis*, which can range in length from 0.25–0.60 mm. The compound eye and ocellus are darkly pigmented and of similar size although the ocellus may be paler. The carapace is ornamented with curved, pale "dotted" lines (Fig. 1). The most obvious difference of Campbell Island specimens from others identified as *A. affinis* on the Internet is the shorter basal seta of the postabdominal claw. See for example www.cnas.missouristate.edu/zooplankton/alona_affinis.htm.

Comments

Alona affinis is likely to be a species complex (a group of closely related species) which is found throughout the world (Chapman *et al*., 2011). Further information on the group can be found in Frey (1987).

FIGURE 1. *Alona* cf. *affinis* whole animal

FIGURE 2. Close-up of head showing eyes and rostrum

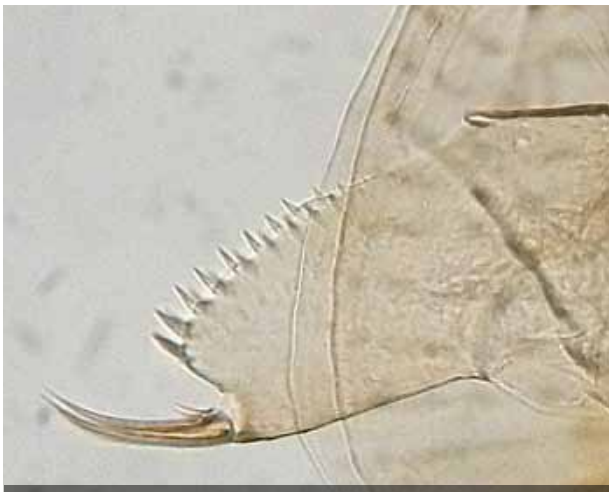
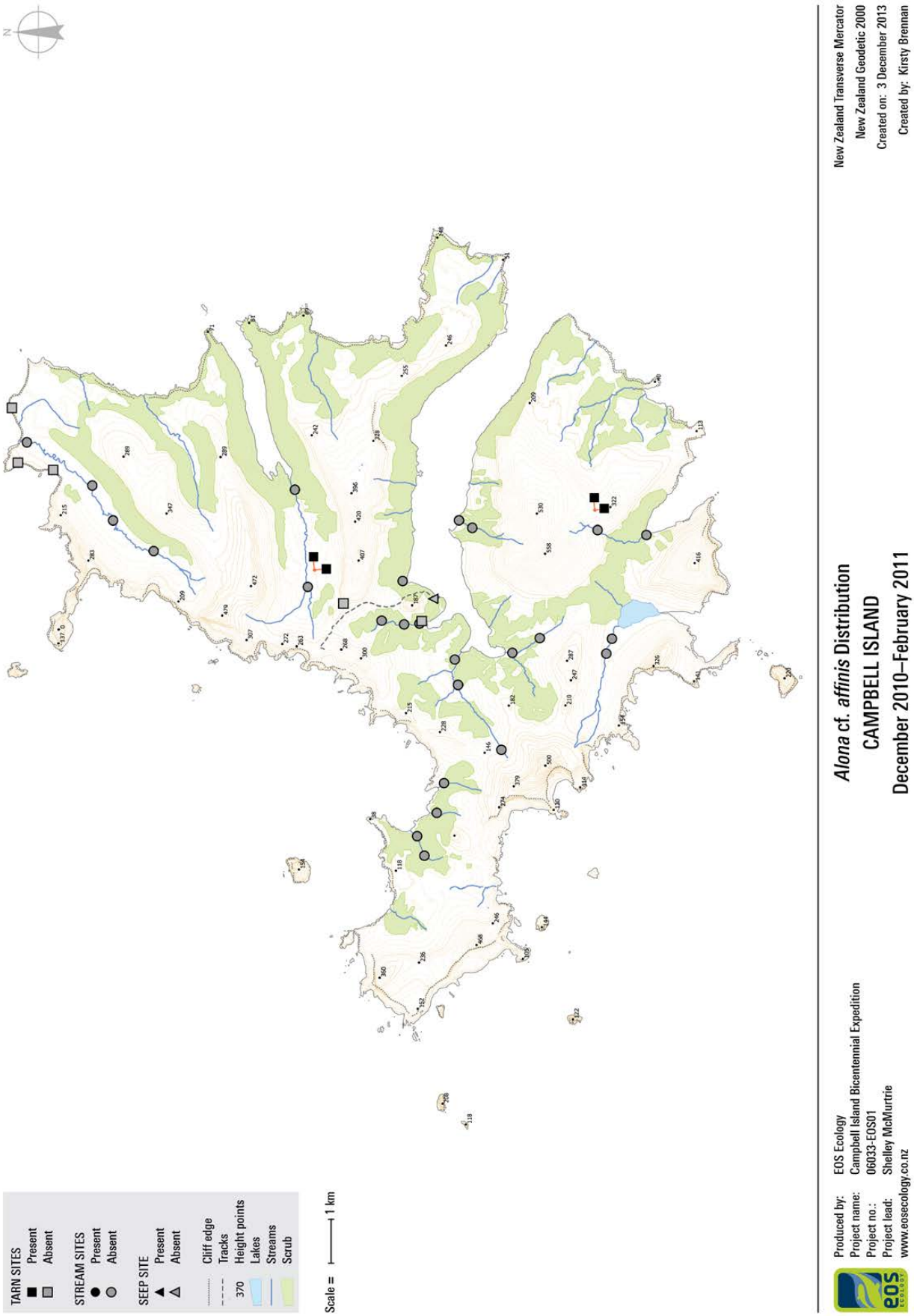


FIGURE 3. Postabdomen showing basal spine

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Original Description

The following is a direct excerpt of the original combination *Lynceus affinis* from Leydig (1860):

38. Lynceus affinis.

Hierzu Fg. 68 und 69 auf Taf. IX.

Diese dem Habitus und der Grösse nach mit ***Lynceus quadrangularis*** verwandte, aber im Einzelnen betrachtet von ihm gut unterschiedene Art habe ich bei Friedrichshafen und Langenargen in stehenden pflanzenreichen Gewässern angetroffen.

Sie unterscheidet sich von der vorhergegangen Spezies: 1) dadurch, dass der Schnabel viel stumpfer ist; 2) durch ganz anders beschaffene Tastantennen. Die geknöpften Borsten sind von ungleicher Länge und eine, alle übrigen überragend, ist von der Länge des Stammes der Antenne. Die zugespitzte Einzelborste ist kurz und steht der Wurzel der Antenne näher, als dem freien Ende. 3) Das Postabdomen besitzt eine spezifische Bezahnung. Hinter den zwei dicken, glatten Endkrallen steht eine starke Kralle und hinter dieser einige feine Zähnchen. Der Hinterrand ist einfach mit Krallen besetzt, welche in der Mitte am längsten sind und nach beiden Seiten, doch mehr nach hinten als nach vorne, an Länge abnehmen. Etwas höher, also an der Seite des Postabdomens markiren sich noch zahnartige, gestrichelte Leisten. Eine Vergleichung der Figuren wird indess über den Unterschied rascher belehren, als die ausgedehnteste Beschreibung. 4) Am unteren Schalenrand hört die Bewimperung nicht so plötzlich und wie mit einemmale auf, sondern die langen Borsten gehen allmählig in die kürzeren über. 5) Am Nebenauge, das ungefähr ebenso gross ist, als das mit wenigen Krystallkegeln versehene Hauptauge, steht die Spitze nach unten. — Das Blut ist stark gelb.

References & Further Reading

Chapman, M.A., Lewis, M.H. & Winterbourn, M.J. 2011. *Guide to the freshwater Crustacea of New Zealand*. New Zealand Freshwater Sciences Society, Christchurch. 188pp.

Frey, D.G. 1987. The taxonomy and biogeography of the Cladocera. *Hydrobiologia* 145: 5–17.

Leydig, F. 1860. Naturgeschichte der Daphniden, (Crustacea cladocera). Tübingen, H. Laupp'sche Buchhandlung, Laupp & Siebeck, 1860. 252pp.

How to Cite this Information Sheet

McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: *Alona* cf. *affinis* information sheet. EOS Ecology, Christchurch, New Zealand.

ACKNOWLEDGEMENTS – The creation of the Lucid Key and information sheets were supported by the TFBIS (Terristrial and Freshwater Biodiversity Information System) Fund administered by the Department of Conservation (TFBIS Contract No. 278), and by EOS Ecology. Invertebrate specimens were collected by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (CIBE), made possible by the 50° South Trust. Thanks to Maureen Lewis for her assistance and contribution to this information sheet.

Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Attheyella sp. INFORMATION SHEET

Classification

Subphylum:	Crustacea
Class:	Maxillopoda
Subclass:	Copepoda
Order:	Harpacticoida
Family:	Canthocamptidae
Genus:	*Attheyella*
Specific name:	unknown species
Common name:	harpacticoid copepod

Distinguishing Features

Harpacticoid copepods have short antennae that do not extend beyond the cephalothorax (cephalosome), and the urosome is much the same width as the metasome (Fig. 1). Females have a single egg sac in most species (Fig. 2).

In the Canthocamptidae the body is slender and more-or-less cylindrical; the first thoracic segment is incorporated into the cephalothorax so the metasome has 4 free somites (segments); the distal segment of the maxilliped terminates in a moveable claw (Chapman *et al.*, 2011).

The Campbell Island harpacticoid is a species of *Attheyella* recognisable by the following features:

- posterior margins of segments serrate
- endopodite of first walking leg 3-segmented
- legs 2, 3 and 4, 2-segmented
- exopodite of 5th leg of female with 4 setae
- basal expansion of 5th leg of female with 6 long setae (Fig. 3)
- anal operculum quite large and triangular.

Comments

Attheyella occurs world-wide and includes two Gondwana-based subgenera with species in South America, New Zealand, Australia and on some subantarctic islands (Chapman *et al.* 2011). *A. capensis* Ruhe is known from Kerguelen Island and *A. trigonura* from the Falkland Islands (Pugh *et al.*, 2002). The Campbell Island species resembles the New Zealand species *A. brehmi* (Keifer) (subgenus *Delachauxiella*) in that the longest seta of the 5th leg basal expansion is the second from the inner margin (Fig. 3) (see Chapman *et al.*, 2011, p. 98). The female 5th leg exopodite with 4 setae and the shape of the anal operculum are also characters of subgenus *Delachauxiella*. A second harpacticiod species, *Antarctobiotus nicollsi* Chappuis has been found on Macquarie, Auckland and Campbell islands according to Pugh *et al.* (2002).

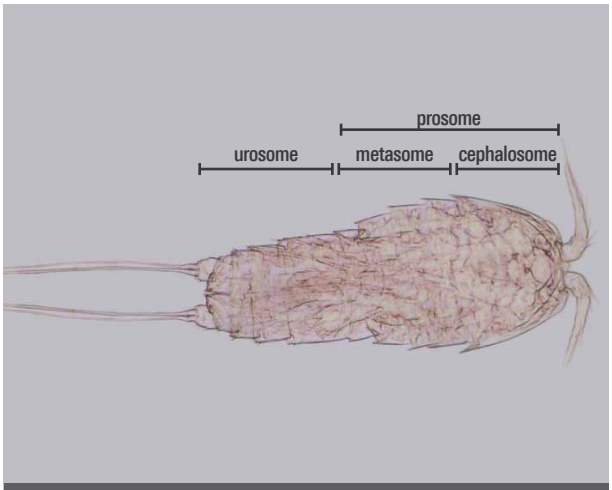


FIGURE 1. *Attheyella* whole animal

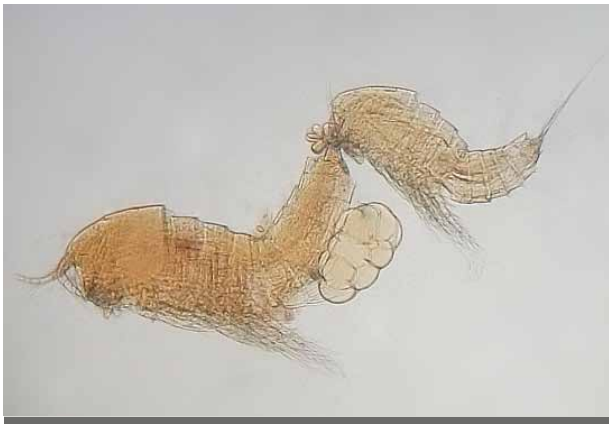


FIGURE 2. *Attheyella* in copula (female at left)

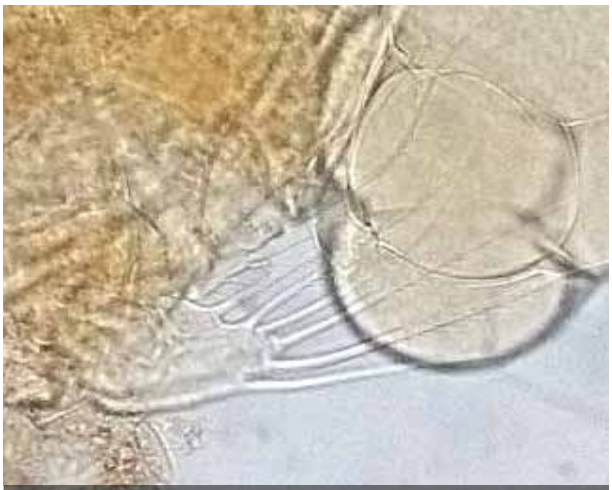
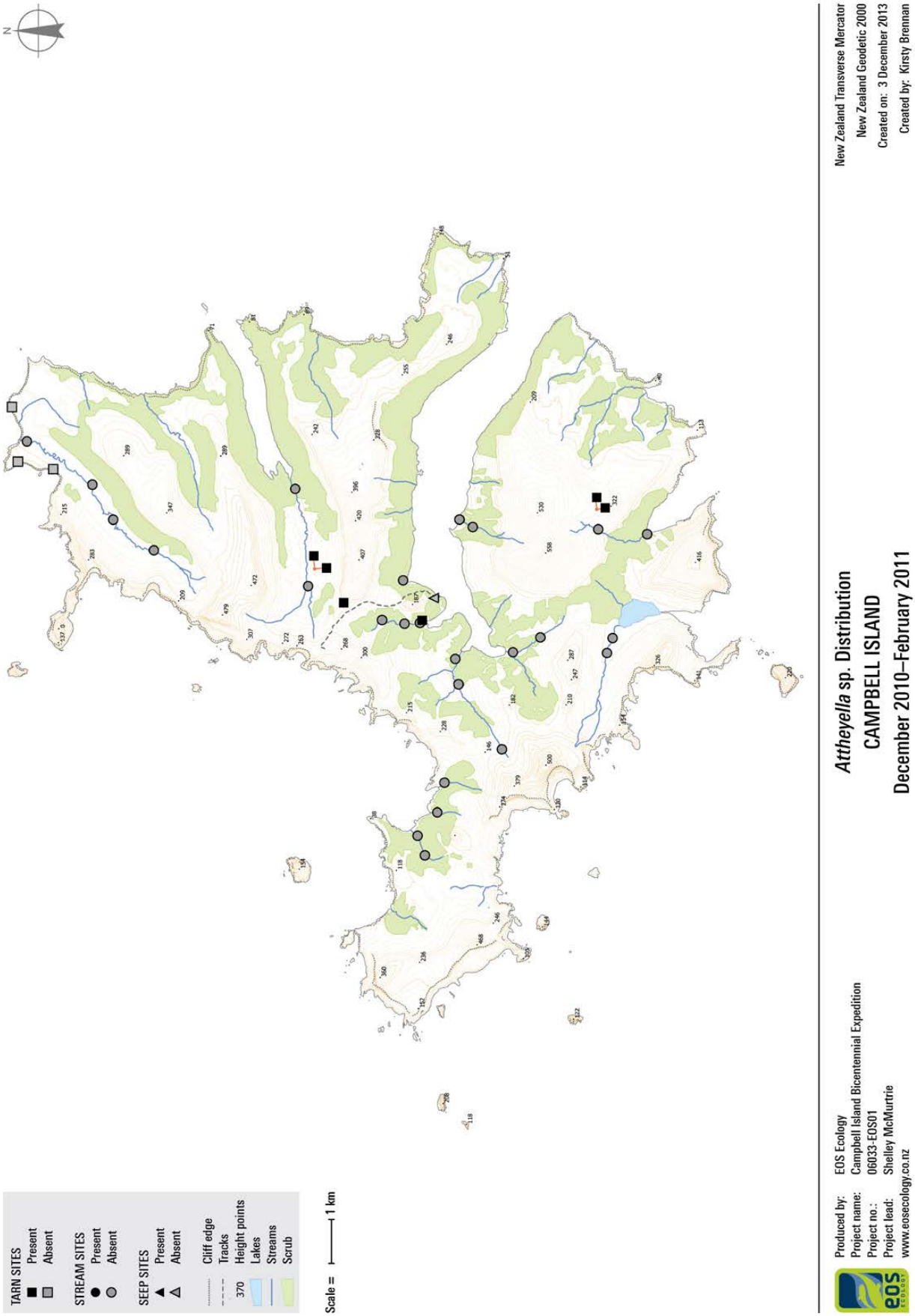


FIGURE 3. *Attheyella* female 5th leg basal expansion

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Original Description

N/A

References & Further Reading

Chapman, M.A., Lewis, M.H. & Winterbourn, M.J. 2011. *Guide to the freshwater Crustacea of New Zealand*. New Zealand Freshwater Sciences Society, Christchurch. 188pp.

Lewis, M. H. 1972. Freshwater harpacticoid copepods of New Zealand. 1. *Attheyella* and *Elaphoidella*. *New Zealand Journal of Marine and Freshwater Research* 6: 23–47.

Pugh, P. J. A., Dartnall, H. J. G. & McInnes, S. J. 2002. The non-marine Crustacea of Antarctica and the islands of the Southern Ocean: biodiversity and biogeography. *Journal of Natural History* 36: 1047–1103.

How to Cite this Information Sheet

McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: *Attheyella* sp. information sheet. EOS Ecology, Christchurch, New Zealand.

ACKNOWLEDGEMENTS – The creation of the Lucid Key and information sheets were supported by the TFBIS (Terristrial and Freshwater Biodiversity Information System) Fund administered by the Department of Conservation (TFBIS Contract No. 278), and by EOS Ecology. Invertebrate specimens were collected by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (CIBE), made possible by the 50° South Trust. Thanks to Maureen Lewis for her assistance and contribution to this information sheet.

Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Austridotea lacustris (Thomson, 1879) INFORMATION SHEET

Classification

Phylum:	Crustacea
Class:	Malacostraca
Order:	Isopoda
Family:	Idoteidae
Genus:	*Austidotea*
Specific name:	*lacustris*
Common name:	Water louse, isopod
Original combination:	*Idotea lacustris* Thomson, 1879
	Notidotea lacustris Thomson, 1879

Distinguishing Features

- Body brown, dorso-ventrally flattened (Figs. 1, 2); length up to about 15 mm.
- First antennae short, second antennae long and prominent (Fig. 1); 7 pairs of walking legs.
- Posterior margin of body (the pleotelson) rounded (Fig. 1).

Comments

The species was transferred from *Notidotea* to *Austridotea* by Poore (2001), and its relationship to the other two New Zealand species of *Austridotea* was investigated by Chadderton *et al.* (2003) and McGaughran *et al.* (2006). *A. lacustris* is found on the southern South Island of New Zealand, Stewart Island, Campbell Island and Pitt Island (Chatham Islands).

Original Description

Idotea lacustris Thomson (1879)

References & Further Reading

Chadderton, W.L., Ryan, P.A. & Winterbourn, M. J. 2003. Distribution, ecology, and conservation status of freshwater Idoteidae (Isopoda) in southern New Zealand. *Journal of the Royal Society of New Zealand* 33: 529–548.

Chapman, M.A., Lewis, M.H. & Winterbourn, M.J. 2011. *Guide to the freshwater Crustacea of New Zealand*. New Zealand Freshwater Sciences Society. 188pp.

Joy, M.K. & Death, R.G. 2000. Stream invertebrate communities of Campbell Island. *Hydrobiologia* 439: 115–124.

FIGURE 1. *Austridotea lacustris* dorsal view

FIGURE 2. *Austridotea lacustris* lateral view

McGaughran, M.C., Hogg, I.D., Stevens, M.I., Chadderton, W.L. & Winterbourn, M.J. 2006. Genetic divergence of three freshwater isopod species from southern New Zealand. *Journal of Biogeography* 33: 23–30.

Nicholls, G.E. 1937. On the freshwater Idoteidae of New Zealand (Crustacea, Isopoda). *Annals and Magazine of Natural History Series 10* 19 (109): 113-136.

Poore, G.C.B. 2001. Isopoda Valvifera: diagnoses and relationships of the families. *Journal of Crustacean Biology* 21: 205-230.

Thomson, G.M. 1879. New Zealand Crustacea, with descriptions of new species. *Transactions and Proceedings of the New Zealand Institute* 11: 230-248, Plate 10.

How to Cite this Information Sheet

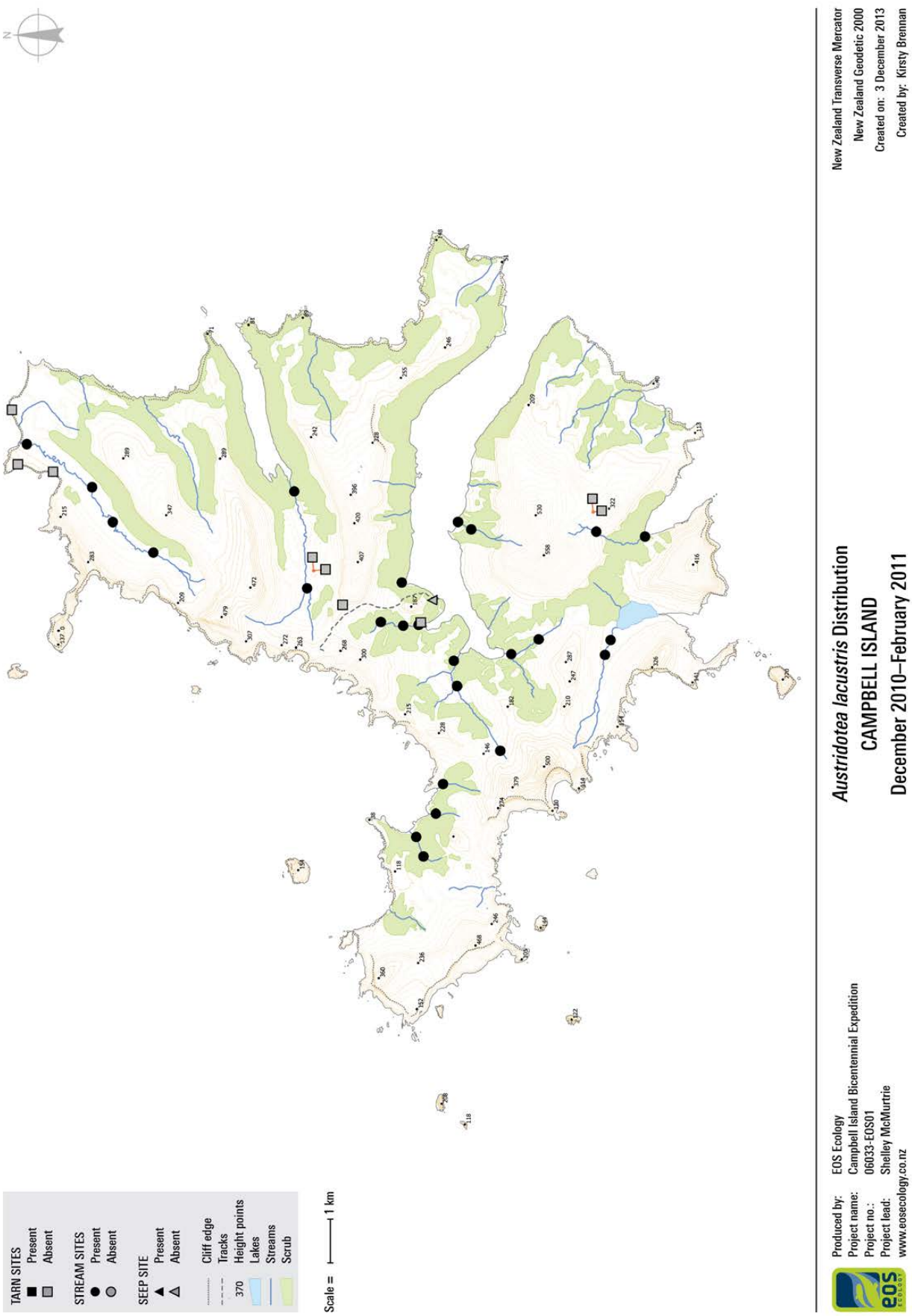
McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: *Austridotea lacustris* information sheet. EOS Ecology, Christchurch, New Zealand.

ACKNOWLEDGEMENTS – The creation of the Lucid Key and information sheets were supported by the TFBIS (Terristrial and Freshwater Biodiversity Information System) Fund administered by the Department of Conservation (TFBIS Contract No. 278), and by EOS Ecology. Invertebrate specimens were collected by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (CIBE), made possible by the 50° South Trust.

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Austrosimulium campbellense Dumbleton, 1973 (1972)

INFORMATION SHEET

Classification

Class:	Insecta
Order:	Diptera
Family:	Simuliidae
Genus:	*Austrosimulium*
Specific name:	*campbellense*
Common name:	blackfly, sandfly

Distinguishing Features

Simuliidae larvae can be distinguished from other Campbell Island Diptera larvae by the following features:

- a distinct, sclerotised head with two retactile dorsolateral fans of fine rays (Fig. 1)
- abdominal segments 5 to 8 swollen (Fig. 2), the posterior segment with a X-shaped anal sclerite and circle of minute hooks, surrounded by semicircular sclerite (Fig. 3).

Comments

The variation in size of larvae and number of gill filaments on pupae suggest the possibility of cryptic species (pers. comm. Doug Craig). Specimens recorded as *A. vexans* from Campbell Island by some earlier researchers are in fact *A. campbellense*.

According to Craig *et al.*, (2012) differentiation between *A. campbellense* larvae and those of *A. vexans* and *A. ungulatum* relates to the hypostomal teeth that protrude more distinctly beyond the lower edge of the hypostoma in the latter two species.

Bar coding molecular analysis is in progress on *A. campbellense* collected during the 2010–11 Campbell Island Bicentennial Expedition.

A number of the larvae collected during the 2010–11 Campbell Island Bicentennial Expedition were infected with a common blastocladial fungus, *Coelomycidium* sp. Infection by this fungus can be recognised by marble-like structures which pack the body of the *Austrosimulium* larvae and create a speckled appearance (Craig *et al.*, 2012) (Fig. 4). The presence of this fungus on Campbell Island is a new distribution record and the southern-most record for New Zealand.

FIGURE 1. ***Austrosimulium campbellense*** **head and thorax, showing developing pupal gill** (photo: Douglas Craig)

FIGURE 2. ***Austrosimulium campbellense*** **whole animal**

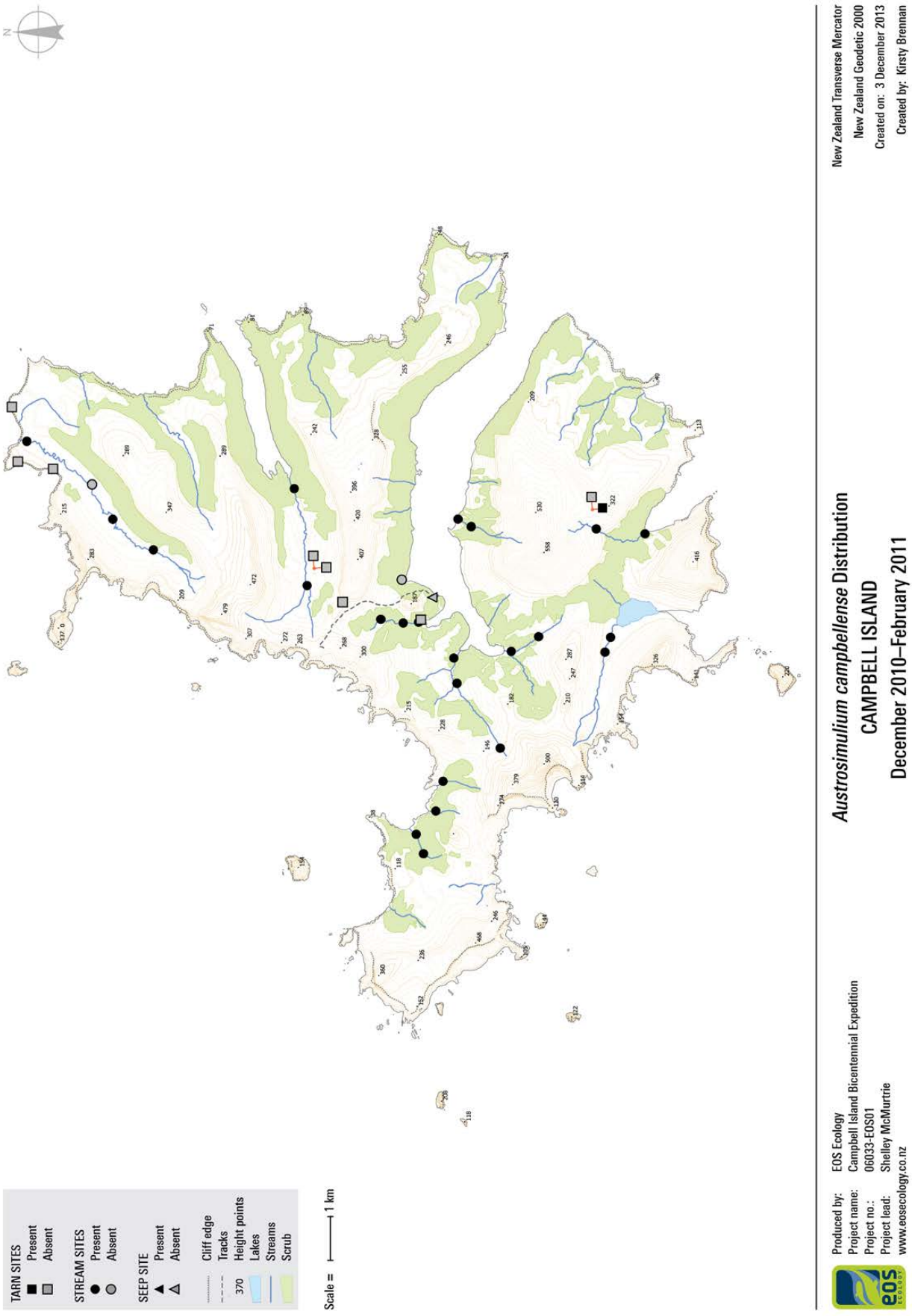
FIGURE 3. ***Austrosimulium campbellense*** **posterior anal sclerite and circlet of hooks** (photo: Douglas Craig)

FIGURE 4. ***Austrosimulium campbellense*** **infected with** ***Coelomycidium*** **fungus** (photo: Douglas Craig)

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Original Description

The following is a direct excerpt from Dumbleton (1972), including figures:

Gill spot (Fig. 196) with less than seven terminal filaments, none of these reflexed apically; mesal hypostomal tooth (Fig. 172) shorter, not as prominent as the large lateral teeth. Antenna as in Fig. 186; semicircular sclerite apices as in Fig. 211

Craig *et al.* (2012): A much more comprehensive larval description than that originally provided by Dumbleton (1972) can be found in Craig *et al.* (2012).

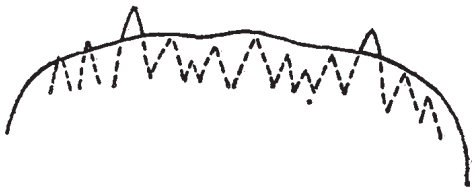


FIGURE 172. *A. campbellense* mesal hypostomal tooth

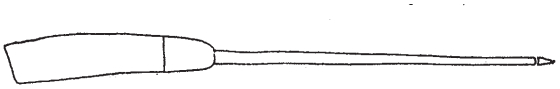


FIGURE 186. *A. campbellense* antenna

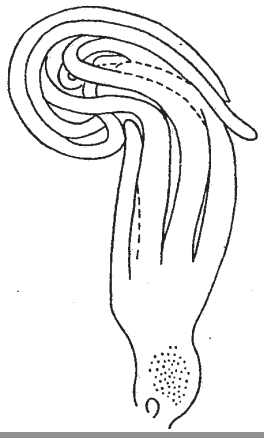


FIGURE 196. *A. campbellense* gill spot

FIGURE 211. *A. campbellense* semicircular sclerite apices

References & Further Reading

Craig, D.A., Craig, R.E.G. & Crosby, T.K. 2012. Simuliidae (Insecta: Diptera). *Fauna of New Zealand* 68: 336 pp.

Dumbleton, L.J. 1972. The genus *Austrosimulium* Tonnoir (Diptera: Simuliidae) with particular reference to the New Zealand fauna. *New Zealand Journal of Science* 15: 480-584.

How to Cite this Information Sheet

McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: *Austrosimulium campbellense* information sheet. EOS Ecology, Christchurch, New Zealand.

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Boeckella sp. INFORMATION SHEET

Classification

Subphylum:	Crustacea
Class:	Maxillopoda
Subclass:	Copepoda
Order:	Calanoida
Family:	Centropagidae
Genus:	*Boeckella*
Specific name:	unknown species
Common name:	calanoid copepod

Distinguishing Features

In calanoid copepods the antennae extend well beyond the metasome and they may be longer than the body (Fig. 1). The urosome is narrower than the metasome and there is only one egg sac.

The genus *Boeckella* has the following features (Jolly, 1957):

- Cephalothorax (cephalosome) of 6 segments, the head being the largest.
- Abdomen of the male 5-segmented; abdomen of female 3-segmented.
- Caudal lamellae short, each with 5 plumose setae.
- Exopodites of female 5th legs having the second joint produced into a stout inner spine (Fig. 2).
- Last (5th) pair of legs of males prehensile, and terminating in long moveable claws (Fig. 3).

Comments

Boeckella is a widespread genus with species in New Zealand, Australia and South America. Eight species have been reported from New Zealand (Chapman *et al*., 2011) where they are common macro-filterers of pond and lake plankton. *B. brevicaudata* (Brady) has been recorded from Macquarie Island (Pugh *et al*., 2002). The long spine-like claws of the male 5th legs provide rapid identification of the genus.

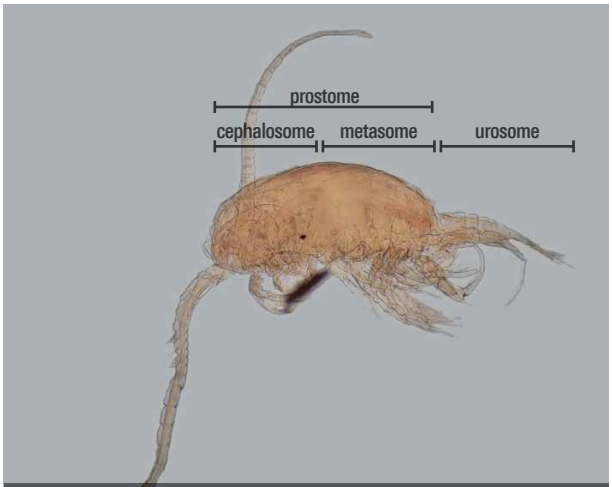


FIGURE 1. *Boeckella* whole animal

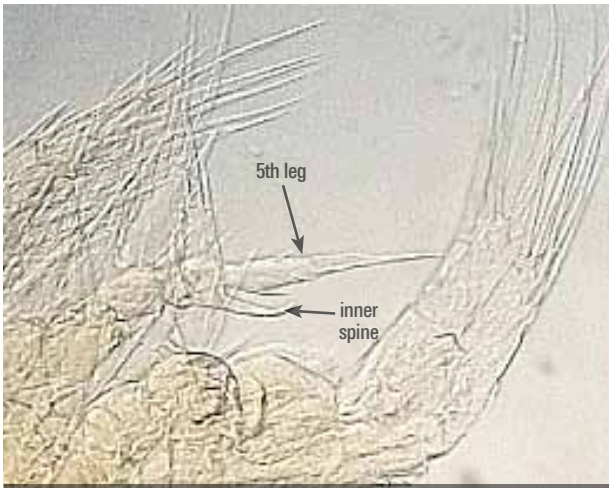


FIGURE 2. *Boeckella* female 5th leg

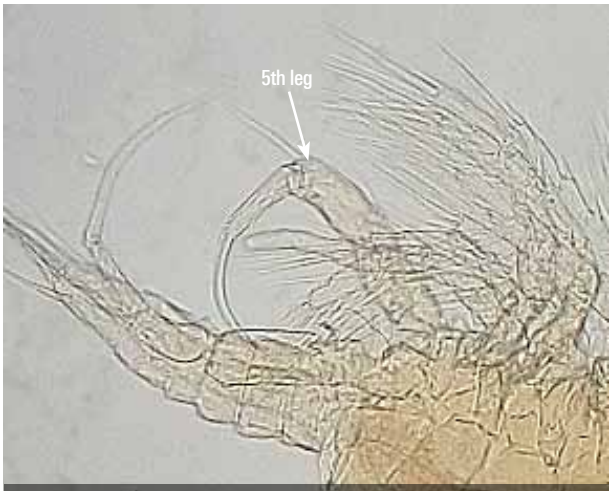
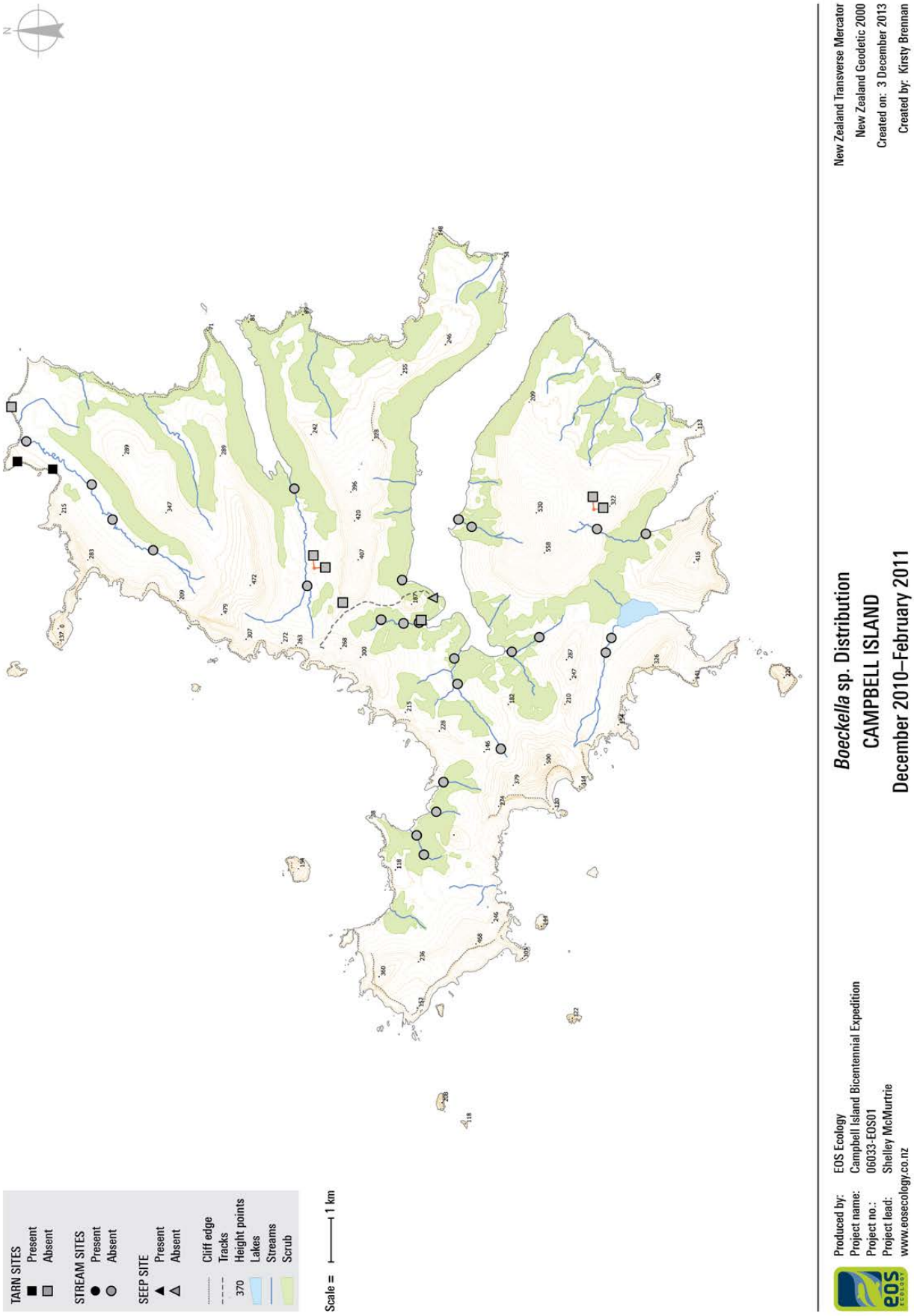


FIGURE 3. *Boeckella* male 5th leg

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Original Description

N/A

References & Further Reading

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How to Cite this Information Sheet

McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: *Boeckella* sp. information sheet. EOS Ecology, Christchurch, New Zealand.

ACKNOWLEDGEMENTS – The creation of the Lucid Key and information sheets were supported by the TFBIS (Terristrial and Freshwater Biodiversity Information System) Fund administered by the Department of Conservation (TFBIS Contract No. 278), and by EOS Ecology. Invertebrate specimens were collected by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (CIBE), made possible by the 50° South Trust. Thanks to Maureen Lewis for her assistance and contribution to this information sheet.

Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Chiltonia minuta Bousfield, 1964 INFORMATION SHEET

Classification

Subphylum:	Crustacea
Class:	Malacostraca
Order:	Amphipoda
Family:	Chiltoniidae
Genus:	*Chiltonia*
Specific name:	*minuta*
Common name:	side swimmers, scuds, freshwater shrimp

Distinguishing Features

Chiltonia minuta possess the following features typical of amphipods (see Chapman *et al.*, 2011 for futher detail):

- A laterally flattened body (Fig. 1).
- A distinct head with two pairs of antennae.
- A thorax containing 7 pereonites (segments), each with one pair of pereopods (walking legs) with the first two pairs modified and termed gnathopods.
- An abdomen comprising 6 segments, three of which are pleonites (each bearing a pair of appendages called pleopods), and three are urosomites (each bear a pair of uropods).

Other genera of amphipods could also occur in on Campbell Island. The distinguishing features of the genus *Chiltonia* provided in Chapman *et al.* (2011) are "possession of two pairs of antennae of almost equal length, palpless maxillae, modified male 1st pleopods, and 1-segmented 3rd uropods" (note that family Ceinidae is used in this publication).

Bousfield (1964) identifies the following characteristics to differentiate *Chiltonia minuta* from other species of *Chiltonia*:

"*Chiltonia minuta*, in addition to being much the smallest of all known species, is distinguished from other *Chiltonia* species by the smooth epimeral plates, the absence of marginal spines on uropod 3, the extremely broad telson, and subequal peduncular segments 4 & 5 of antenna 2."

Comments

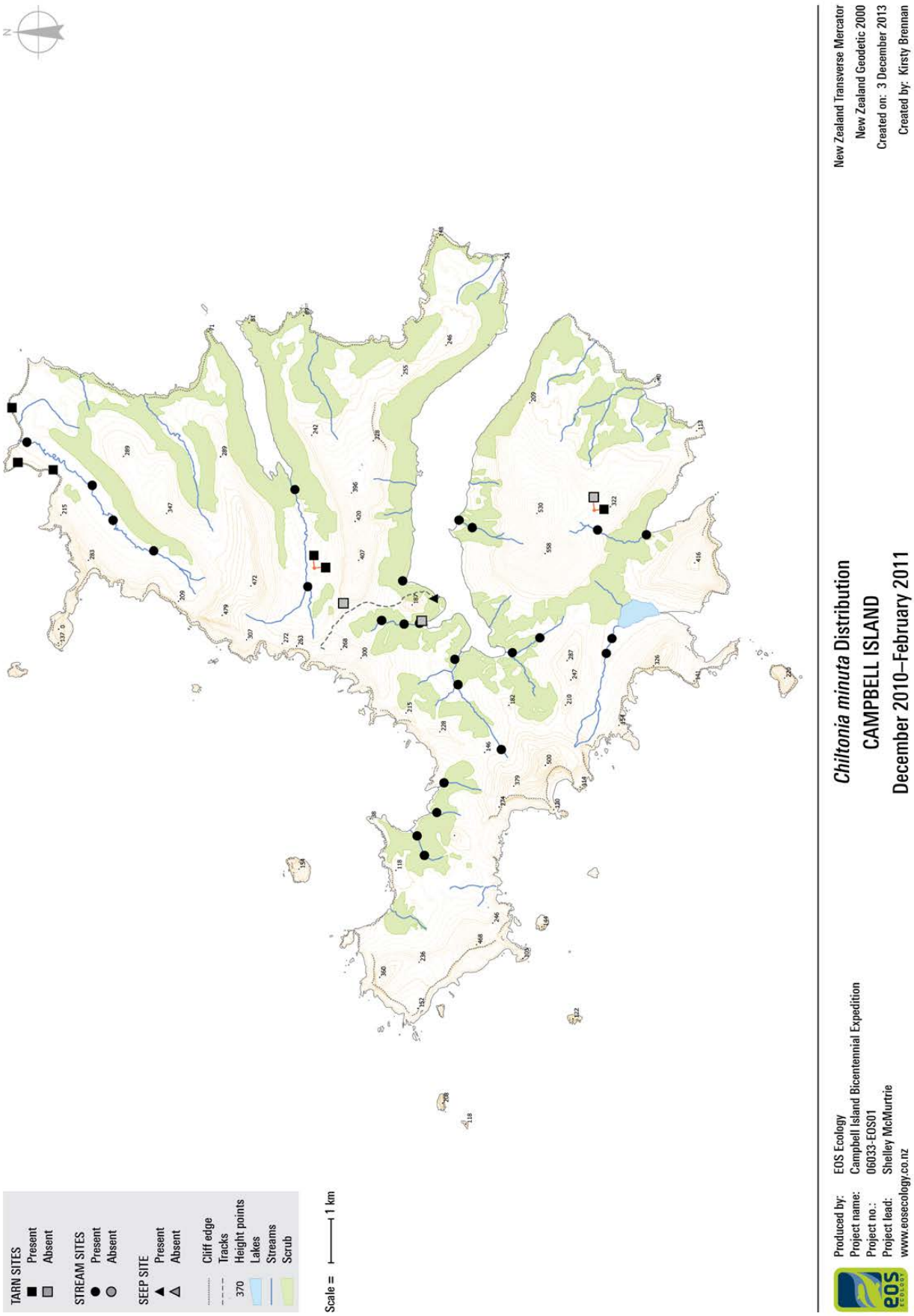
Two species of *Chiltonia* are recorded from Campbell Island – *C. enderbyensis* and *C. minuta* (Fenwick, 2001). Though the only specimen of *C. minuta* identified by Bousfield (1964) was collected from under kelp on a beach, the specimens collected as part of the 2010-11 Campbell Island Bicentennial Expedition have been identified as this species, and not *C. enderbyensis* (previously collected from freshwater pools). Amphipod specialist Graham Fenwick (NIWA, Christchurch), who identified the specimens, commented that '*Chiltonia* is a "puzzling" genus with species that appear to be variable in some characters. There is potentially a second species within the specimens that were collected in the 2010-11 expedition, but any morphological differences are very subtle, and may be phenotypic, rather than genotypic'.

FIGURE 1. *Chiltonia minuta* whole animal

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Original Description

The following is a direct excerpt of the female from Bousfield (1964), including figures:

♀ (3.5 mm) : Head shallow, interantennal lobe prominent, broad, sub-acute, inferior antennal sinus shallowly concave. Eye small, indistinct, weakly pigmented in the type. Antenna 1 a little longer than antenna 2; peduncular segments strong, successively smaller distally; flagellum 8-segmented, longer than peduncle. Antenna 2 peduncle relatively slender, segment 1 large, conspicuously bulging in front, segment 2 with prominent gland cone, segment 3 small, segments 4 & 5 subequal; flagellum 7-segmented, about equal to peduncle. Mouthparts about normal. Upper lip subquadrate, apex gently rounding, moderately pilose. Lower lip, lobes tall, broadest proximally, richly pilose along inner margin. Mandibles with slender 5-7-cuspate incisor, left lacinia long, 6-dentate, right lacinia short, trifid; 2 strong plumose accessory blades; molar process moderately strong, with about 25 facial striations. Maxilla 1, apical spine-teeth of outer plate tall, strongly pectinate, outer 3 teeth heavier, with fewer pectinations, palp " pit " about mid-way along outer margin; inner plate short, with pair of strong plumose terminal setae, innermost slightly subapical. Maxilla 2, outer plate slightly longer, inner plate with apical slender spines and 2 proximal inner marginal plumose setae, stoutest proximally. Maxilliped, inner plate slender, rectangular, apex with 3 conical spine teeth, outer strongest, inner margin distally with 4-5 plumose se- tae ; outer plate slightly exceeding inner plate, apex blunt, inner margin sinuous, richly spinose ; palp strong, segments broad, terminal (4th) segment conspicuous, sub-conical, with stiff apical spines, one much longer than the others. Gnathopod 1, coxal plate broad and deep, lower margin lined with several spinules; segment 2 moderately strong with a few posterodistal setae; segment 5, hind lobe with stiff simple setae; segment 6 broadening distally, palm oblique, gently convex, dactyl closely approximating palm, tip closing between 2 stout spines at palmar angle. Gnathopod 2, coxal plate deeper than broad, proximally excavate and with blunt posterior process; segment 2 slender, slightly sinuous; segment 5, posterior lobe with several long stiff simple setae; segment 6 slightly broadening distally, palm slightly oblique, gently convex, dactyl closely fitting, tip reaching exactly to palmar angle. Peraepods 1 & 2 very similar; coxal plates somewhat deeper than broad, that of P2 more deeply excavate and with a more deeply excavateand with a more prominent posterior process; segments 5 Sc 6 with stout posterior spines; dactyls short, strong. Peraeopods 3-5 similar, short, moderately spinose, increasing successively. Peraeopod 3, posterior coxal lobe deeper than anterior lobe, hind margin sparsely spinose; segment 2 moderately expanded, evenly convex behind. Peraeopod 4, coxal hind lobe deep, sharply rounding below; segment 2, hind margin nearly straight, weakly scallope. Peraeopod 5, coxal plate shallow, broad; segment 2 broad, posterior margin strongly convex, noticeably scalloped. Primary (coxal) gills short and sac-like, present on gnathopod 2 and peraeopods 1-4 inclusive. Slender sac-like accessory gills anteriorly on coxal bases of peraeopods 4 & 5. Brood plates very large, laminar, sub-triangular, margins lined with numerous short, strong, hooked setae (more than 100 per plate). Abdominal side plates smoothly rounded below, posterior margins smooth, with 1-3 weak setae, hind corners of 2 & 3 little produced. Pleopods somewhat reduced, 3rd strongest; peduncles short and relatively broad, with 2 coupling spines (vestigial in pleopod 1) and margins variously pilose; outer ramus (7-8 segments) a little

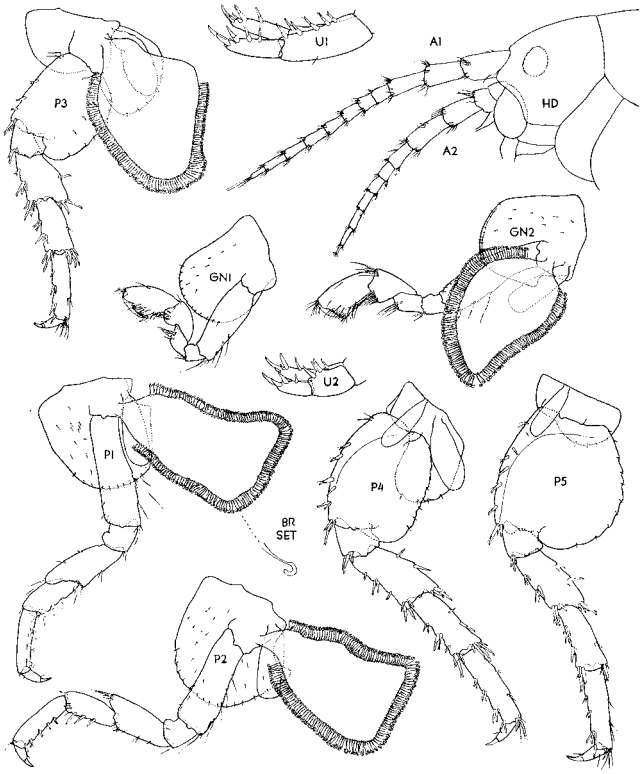


Fig. 1. *Chiltonia minuta* n. sp., holotype ♀, 3.5 mm, Perseverance Harbor, Campbell I.

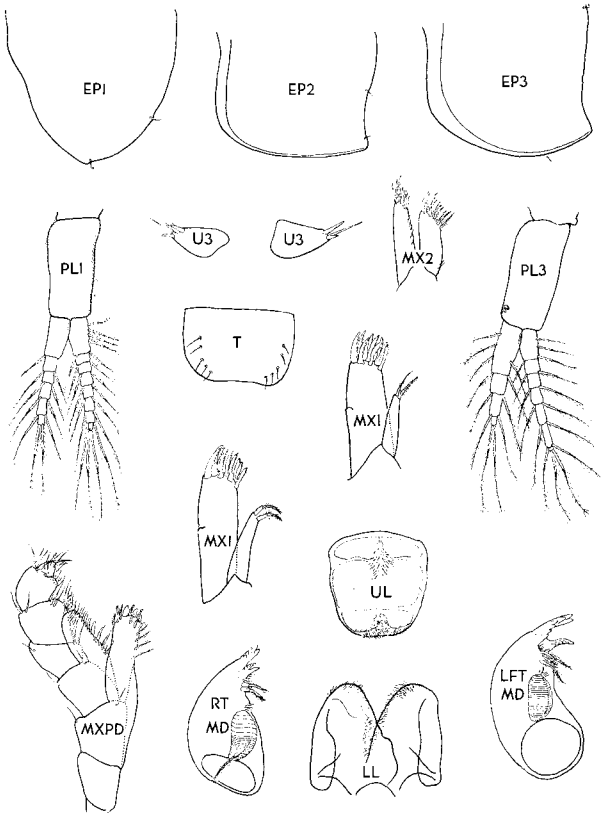


Fig. 2. *Chiltonia minuta* n. sp., holotype ♀, 3.5 mm, Perseverance Harbor, Campbell I.

longer than inner ramus (5-6 segments). Uropod 1 short and stout, subequal rami with a few heavy marginal spines, shorter than peduncle. Uropod 2 very short and stubby, rami and peduncle subequal, each with 1 or 2 stout posterior marginal spines. Uropod 3 short, subconical, apex with 3 stout spines and 1 slender seta. Telson very broad, plate-like, posterior margin gently incised and nearly straight, bearing a few minute setae dorso-laterally.

Remarks: The strongly excavate coxal plate 2, entire telson, and short uropods would ally the present species most closely with *Chiltonia enderbeyensis* Hurley 1954. This species was first recorded by Chilton (1909) from a fresh-water pool on Enderby I. and from a pool outflow on Auckland I. Stephensen (1927) noted closely similar but somewhat larger specimens from under stones and wood on Auckland I. which Hurley tentatively assigned to *C. enderbeyensis*. However, *Chiltonia minuta,* in addition to being much the smallest of all known species, is distinguished by the smooth epimeral plates, the absence of marginal spines on uropod 3, the extremely broad telson, and subequal peduncular segments 4 & 5 of antenna 2.

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How to Cite this Information Sheet

McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: *Chiltonia minuta* information sheet. EOS Ecology, Christchurch, New Zealand.

ACKNOWLEDGEMENTS – The creation of the Lucid Key and information sheets were supported by the TFBIS (Terristrial and Freshwater Biodiversity Information System) Fund administered by the Department of Conservation (TFBIS Contract No. 278), and by EOS Ecology. Invertebrate specimens were collected by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (CIBE), made possible by the 50° South Trust. Thanks to Graham Fenwick for his assistance and contribution to this information sheet.

Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Clitellata INFORMATION SHEET

Classification

Phylum:	Annelida
Class:	Clitellata
Common name:	worms

Distinguishing Features

- Segmented body (Fig. 1–2).
- First segment (prostomium) forms a smooth lobe or cone.
- Segments do not have appendages other than four bundles of chaetae on each segment.
- Mature specimens have a ring (clitellum) around the forward part of the body formed by modified segments containing secretory gland cells in the body wall.

FIGURE 1. Campbell Island freshwater worms

FIGURE 2. Anterior

Comments

The class Clitellata includes both earthworms and leeches, but this sheet refers only to earthworms as no leeches were found. These two groups have traditionally been considered to be related but separate (with a common ancestor). However, taxonomic research has shown that leeches lie within the earthworm evolutionary tree (closely related to Lumbriculidae) and so should not be considered as a separate group (Erseus, 2005).

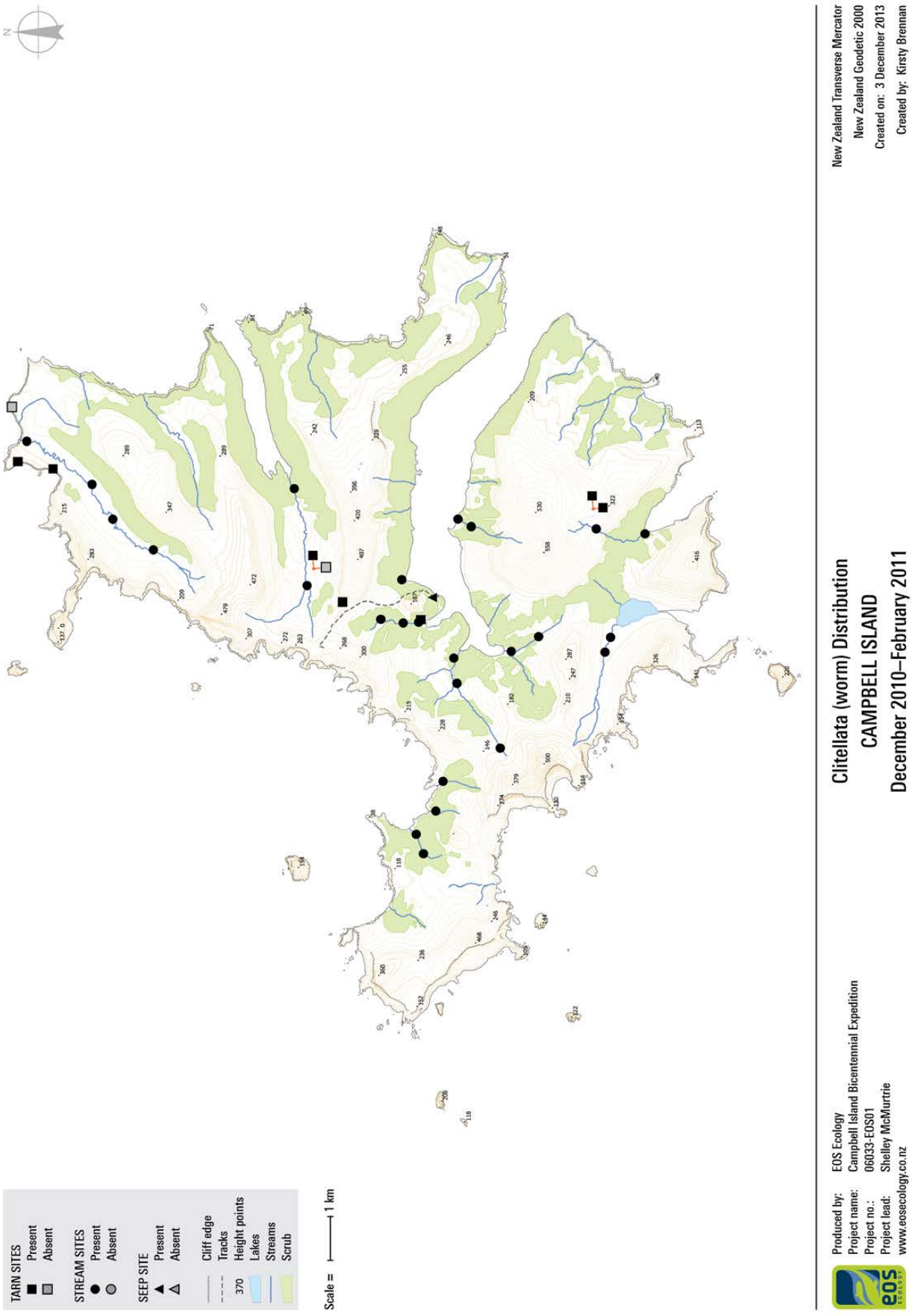
Almost 9,000 oligochaetes were found in freshwater samples collected during the 2010-11 Campbell Island Bicentennial Expedition. One of the few described species is *Antarctodrilus spinosus* Pinder & Brinkhurst, 1997. However, there are likely to be a number of other undescribed species in the orders Tubificida (Naididae and Phreodrilidae) and Enchytraeida (Enchytraeidae). One new naidid species, *Macquaridrilus mcmurtrieae* Pinder and James 2014, has recently been described (see below).

ACKNOWLEDGEMENTS – The creation of the Lucid Key and information sheets were supported by the TFBIS (Terristrial and Freshwater Biodiversity Information System) Fund administered by the Department of Conservation (TFBIS Contract No. 278), and by EOS Ecology. Invertebrate specimens were collected by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (CIBE), made possible by the 50° South Trust. Thanks to Adrian Pinder for his assistance and contribution to this information sheet.

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Macquaridrilus mcmurtrieae

Classification

Phylum:	Annelida
Class:	Clitellata
Family:	Naididae
Genus:	*Macquaridrilus*
Specific name:	*mcmurtrieae*

Distinguishing Features

In comparing *M. mcmurtrieae* with the only other member of the genus, M. bennettae Pinder & James (2014) stated that *Macquaridrius mcmurtieae* "resembles the only other species in the genus, *Macquaridrilus bennettae* Jamieson, 1968, in most aspects, but shows significant differences in the anatomy of its genitalia. In particular, the spermathecal pores are dorsal rather than lateral, the spermathecae lack diverticulae, the ejaculatory duct is more stout and muscular, the vas deferens is shorter relative to other organs and the anterior prostate is compact rather than elongate. The presence of a cuticular sperm canal appears to be a synapomorphy for the genus" (Fig. 3–4).

Comments

The related species, *M. bennettae* is found on Macquarie Island (Jamieson, 1968).

Original Description

The following is a direct excerpt from Pinder & James (2014):
All features are as observed for specimens killed in formalin or ethanol and then preserved in alcohol.

Dimensions: Length of whole worms 5.5 to 10 mm, width at VI to 0.3 to 0.35 mm, width at XI of mature worms 0.35 to 0.45 to mm, number of segments 32 to 38.

External features: Prostomium bluntly conical in dorsal/ventral view, sometimes more squarish in lateral view. Anterior chaetae bifid crotchets with upper teeth much shorter than lower, posterior chaetae with upper tooth minute or absent, all chaetae sigmoid and with indistinct nodulus approximately medial. Anterior chaetae 60 to 70 µm long (measured as a straight line between base and tip) and 3 µm wide in II (at nodulus), increasing in length in subsequent few segments, so that chaetae along most of body 85 to 105 µm long and 4 µm wide at nodulus. Number of chaetae 3 to 7 (mostly 4 or 5) per bundle. Clitellum from 10/11 to about the level of the chaetae on XII, with about three-quarters of the cells being glandular and the rest hyaline. Crescent-shaped ventro-lateral male pores (exterior opening of the bursae) on postero-lateral edges of a broad ventral depression which runs the length of XI. Opening of bursae with particularly large and protruding epithelial cells on

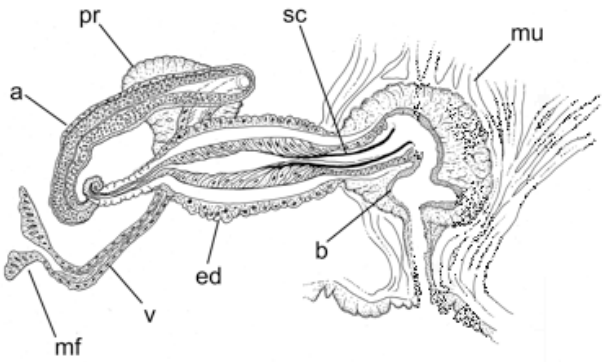
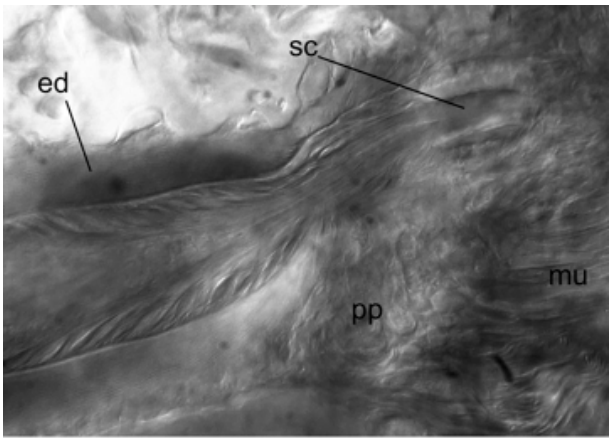


FIGURE 3. Male genitalia of *M. mcmurtrieae*, based on the holotype: a, atrium; b, bursa; ed, ejaculatory duct; mf, male funnel; mu, muscle bands covering bursa; pr, prostate gland attached to atrium; v, vas deferens. Scale 50 Sm. Illustration: Adrian Pinder



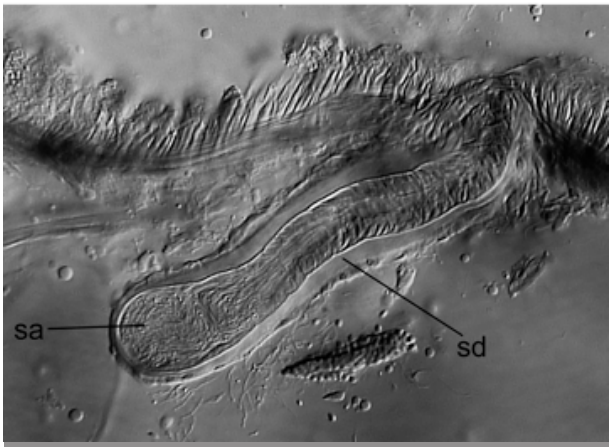


FIGURE 4. Photos of *M. mcmurtrieae* genitalia. A, ejaculatory duct (left) entering the copulatory bursa (right): ed, ejaculatory duct; mu, muscle bands covering bursa; cg, copulatory gland cells; sc, sperm canal. B, spermatheca: sd, spermathecal duct; sa, spermathecal ampulla. Scales: A, 14 Sm; B, 35 Sm. Image: Adrian Pinder

the lateral walls. Female pores within intersegmental furrow 11/12. Spermathecal pores above the line of the dorsal chaetae and about 2/3rds of the distance between 9/10 and 10/11.

Internal somatic features: Pharynx in III with numerous muscular connections to body wall in II-V. Pharyngeal gland development variable but primarily ventro-lateral to lateral in clumps from IV to posterior of septa 5/6. No coelomocytes observed. A layer of chloragogue cells covering gut from VI. Oesophagus expanded and with taller lining cells in VIII, IX and sometimes X. Post-clitellar intestine intrasegmentally constricted (at about a third of the distance from anterior to posterior of the segment), as well as at each septa. In most of the specimens examined there are parasitic ciliates partially embedded in the walls of the fore-gut, especially in segments VIII to X. Paired nephridia present in VII to IX with lateral pores anterior to ventro-lateral chaetae, then again in most segments between XV and XVIII.

Genitalia: Small antero-ventral testes anteriorly in X. Ovaries larger than testes and present anteriorly in XI. Egg sacs extending posterior as far as XIV. Sperm sacs not observed but a few sperm morulae sometimes present in coelom of IX and X.

Sperm funnels 50-65 µm across at the flare (with cilia projecting forward by up to 40 µm), narrowing to 20-30 µm behind the flare, then narrowing further to 10 µm by the time it becomes the ental vas deferens. The ciliated vas expanding to the width of the atrium as it passes (or passes through) the prostate to join the atrium. Atrium 170-190 x 20-30 µm, consisting of a thin layer of peritoneal cells around a strongly vesiculated epithelial lining with cell walls often not visible, around a narrow ill-defined lumen. A compact prostate gland appears to be broadly attached to the ental portion of the atrium, although the precise nature of the connection(s) could not be determined. Atrium joining the ental end of an ejaculatory duct. Entally, the latter is a duct of about 80 µm in length and 15-20 µm in width, with well developed circular muscle and epithelial cells around a narrow lumen. This duct then expands into a spindle-shaped organ 180-240 µm long and 55-70 µm wide with a thick (12-15 µm) layer of spiral muscle fibres between a layer of peritoneal cells and epithelial cells with cuticular walls: the basements of the latter forming a well-defined line inside of the muscle layer. Epithelial cells directed posteriad and strongly elongated and tapered at their extremity, especially from the middle to ectal part of the ejaculatory duct, so that their apical walls combine to form a cuticular tube ('sperm canal' sensu Jamieson 1968) with medial width of 13-16 µm that projects into the anterio-medial wall of the dorsal chamber of the bursae. The epithelial lining cells of the ectal-most part of the ejaculatory duct are not elongated and are continuous with the epithelial tissue of the bursa to which it connects. There are muscle fibres encircling the region on the ejaculatory duct where it enters the bursa. The nature of the ectal end of the sperm canal cannot be discerned in the type material.

The internal structure of the bursa is difficult to discern from dissected or whole-mounted worms, but it appears to be at least two-chambered (or at least with the walls strongly folded inwards to form constrictions). It has a layer of epithelial cells surrounded by multiple layers of muscle fibres differing in their orientation. Additionally, there are muscle fibres that run in parallel from the ventral to dorso-lateral body wall and anchor the entire bursa to the lateral body wall. The upper half of the bursa is covered by diffuse accessory copulatory gland cells (sensu Erséus & Jamieson 1981) underlying the muscle fibres. In some of the examined specimens the bursa are protruded from the body a distance of about half of the body width. Within this protruded bursa, the ectal part of the muscular ejaculatory duct can be seen, though it is not clear how close the cuticular sperm canal then is to the opening of the bursa.

Spermathecae short (115-155 µm x 35 µm), hardly differentiated along their length other than a constriction at the pore and thinner epithelium at its ental extremity. Each spermatheca entirely covered by a thick (5-6 µm) layer of longitudinal muscle covered by a single layer of low peritoneal cells. Glandular cells are clustered around the base of the duct at the pore. For the ectal 2/3 to 3/4 of the spermathecae (this part being equivalent to a duct) the epithelial layer is broad, leaving only a small lumen. The epithelium becomes much thinner in the ental portion (the ampulla). Sperm in the ampulla is loose and occupies the entire lumen and there are often sperm lying along the lumen of the duct. The spermathecae lack a diverticulum.

Etymology. Named for Shelley McMurtrie, from EOS Ecology, New Zealand; leader of the freshwater team on the 2010/11 Campbell Island Bicentennial Expedition.

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Pinder, A. & James, A. 2014. A new species of *Macquaridrilus* (Annelida: Clitellata: Naididae) from subantarctic Campbell Island. *New Zealand Journal of Zoology* 41 (2): 114-123.

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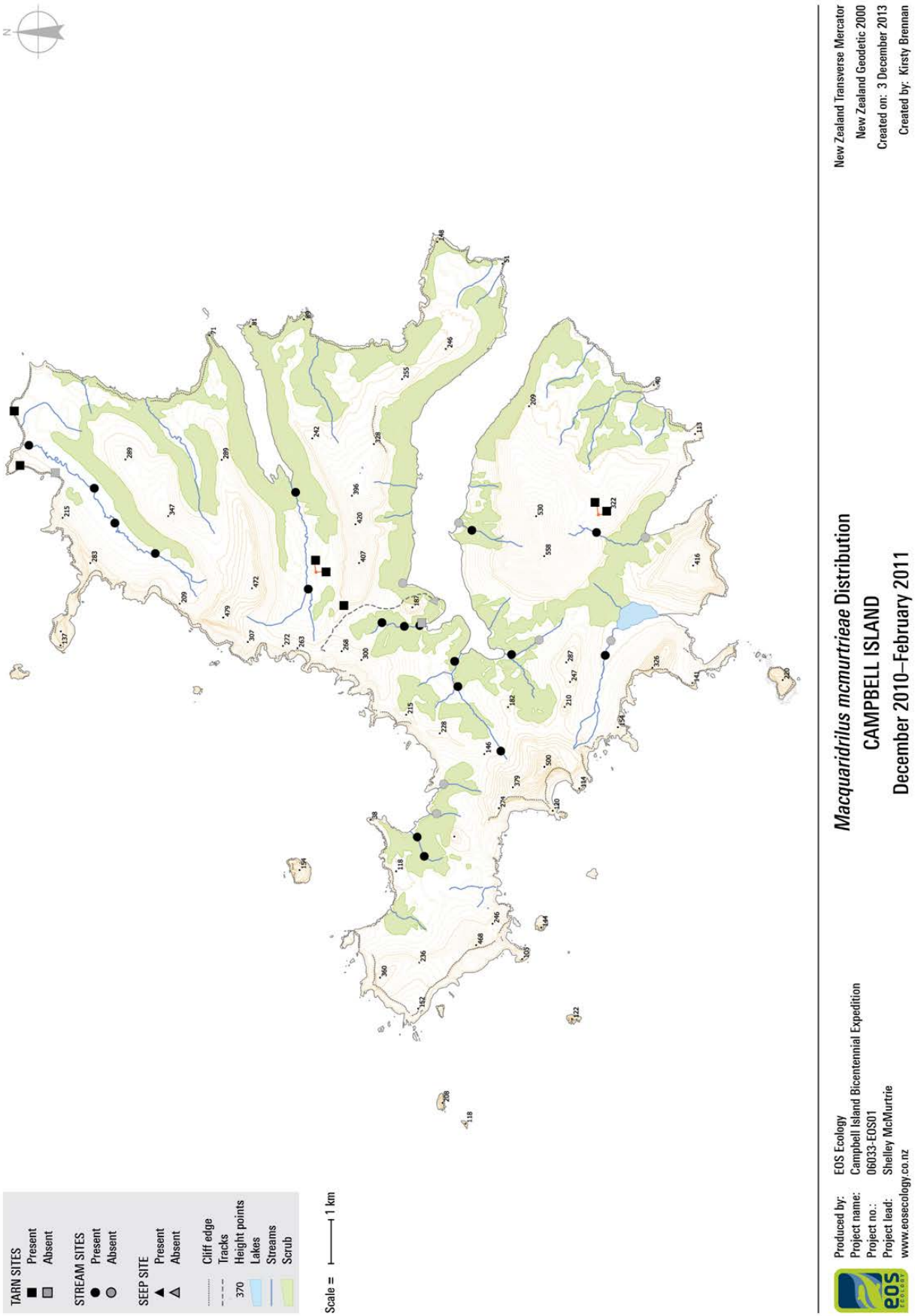
Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Empididae INFORMATION SHEET

Classification

Subphylum:	Insecta
Class:	Diptera
Order:	Empidoidea
Suborder:	Empididae
Family:	Chydoridae
Genus:	unknown
Common name:	dagger fly

Two species of adult Empididae have been recorded from the island (and were also collected in sticky traps during the 2010-11 Campbell Island Bicentennial Expedition). The larvae of two different Empididae species were found in the freshwater samples from the 2010-11 Expedition, and it is possible that these are the larvae of the two described adult species.

FIGURE 1. Empididae larvae Type A

FIGURE 2. Empididae larvae Type B

FIGURE 3. Empididae unidentified pupa

Distinguishing Features

Unidentified larva Type A (Fig. 1)

- Body golden-brown, gut visible through body wall as a dark stripe; body length up to 6.5 mm.
- Eight pairs of prolegs present; prolegs longer than broad, the posterior pair longest.

Unidentified larva Type B (Fig. 2)

- Body yellow-grey (paler than Type A); body length of only specimen 6.7 mm.
- Eight pairs of prolegs present; other than the posterior pair they are about as long as broad (and thus shorter than in Type A).

Unidentified pupa (Fig. 3)

- Body golden-brown with a prominent pair of dark, downwardly-directed caudal hooks; body length 4.3 mm.
- Dorsum of segment 8 with two strong sub-median, and two sub-lateral spines on each side.

Comments

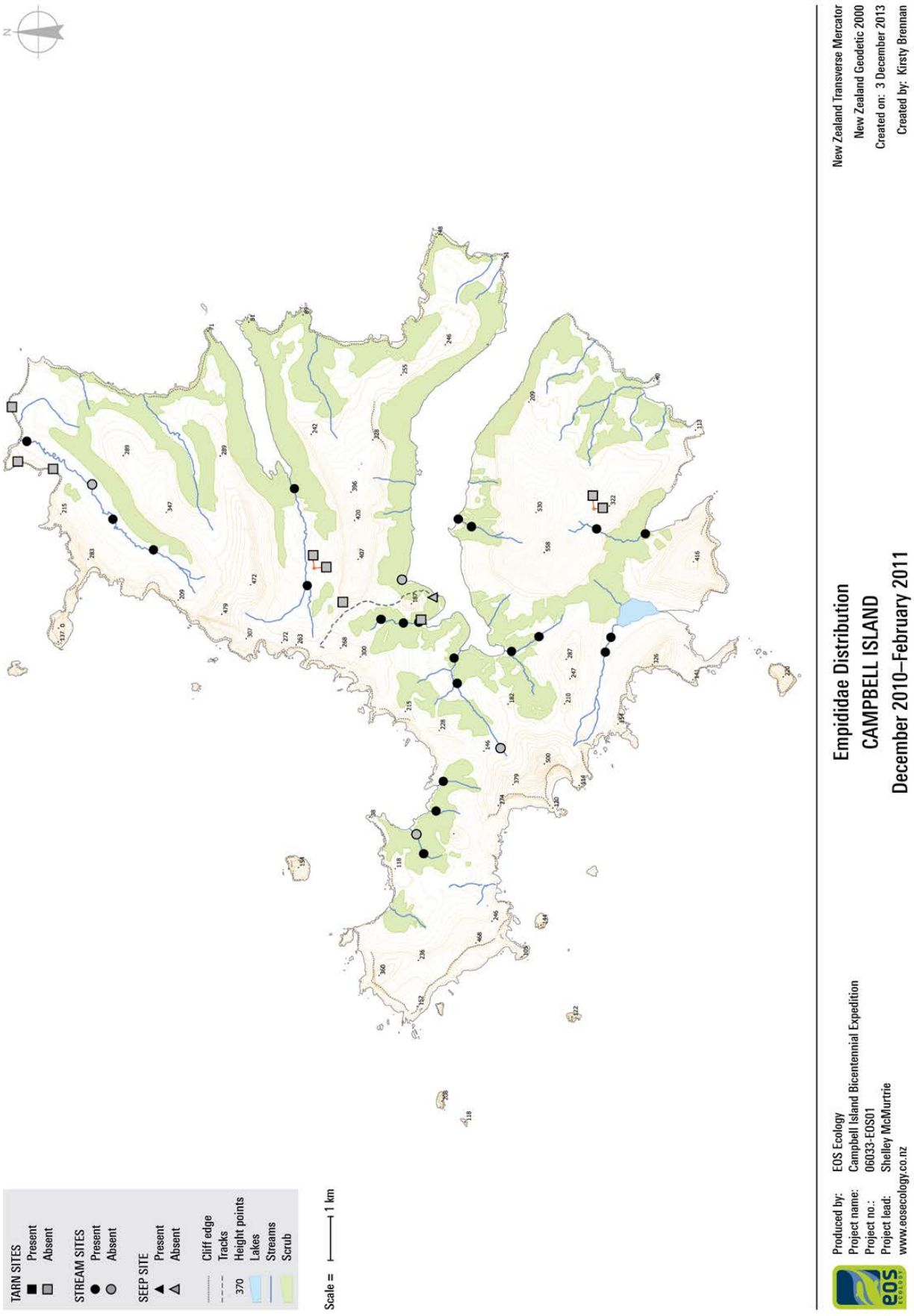
Two species of Empidoidea have been recorded (as adults) from Campbell Island and have been placed in separate families in some recent classifications (Sinclair, 2000; Sinclair, 2011). Other authors still treat one of these families (Brachystomatidae) as a subfamily (Brachystomatinae) of Empididae. The two species are: *Clinocera gressiti* Smith (Empididae: Clinocerinae) and *Adipsomyia stigmosa* (Smith) (Brachystomatidae: Trichopezinae).

Dumbleton (1966) described an aquatic larva and pupa from Campbell Island and suggested they could be those of *C. gressitti.* Both Type A and Type B larvae (above) are very similar to Dumbleton's figure of *C. gressitti* and key to *Clinocera* in Merritt *et al.* (2008). The posterior end of the Type A larva appears to be the more similar to Dumbleton's specimen, but this is difficult to confirm as his drawing is rather diagrammatic. The pupa (as in Flg. 3 above) fits Dumbleton's description but is shorter (4.3 mm cf. 6.0 mm).

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Original Description

Clinocera gressitti (subfamily: Clinoceridae)

Smith (1964): Larvae not described

The following is a direct excerpt from Dumbleton (1966) of Empididae larva and pupa description that may be *C. gressitti*:

Larva

Length 4.5-5.5 mm. Similar in colour and form to *C. tantula* but integument smooth. [*Chelifera tanula* Collin. Larva. Colour pale yellowish-white. Body elongate, widest about mid-length, cephalic end tapered, caudal end sub-truncate.] Apneustic [closed tracheal system; no open spiracles].

Thorax. Dorsum of prothorax without transverse ridge at mid-length, not strongly sclerotised, without pits. Each thoracic segment with one 4-branched seta on each side at mid-length of the venter but without dorsal or pleural setae.

Abdomen. All abdominal segments without dorsal, pleural, or ventral setae. Paired abdominal prolegs present on venter of abdominal segments 1-7. Eighth segment with a long postero-lateral dorsal process on each side, each bearing 4 long simple apical hairs; median process more ventral in position, little longer than the lateral process, shortly bifurcate apically, each lobe with 2 long simple apical hairs; anal prolegs longer than those preceding.

Pupa

Length 6.0mm. Colour light yellowish-brown. Integument smooth. Without obvious long hairs.

Head. A few very short hairs on the frons and dorsad of the base of the antennal sheaths which are dark, parallel-sided, rounded apically and widened basally.

Thorax. Prothoracic spiracles on short conical processes, anterolaterally. Mesothorax with a median sutural line, surface transversely ridged in posterior 2/3, a pair of very short paramedian setae about mid-length. Meta- thorax without setae or sculpture.

Abdomen. Spiracles small, circular, at mid-length of pleura on segments 1-7. First segment with a transverse row of spines at mid-length of dorsum. Dorsa of segments 2-7 with a continuous anterior row of very fine spinules and a posterior row of alternating larger and smaller spines. On segments 3-7 both rows are continued across the pleuron and venter. Dorsum of eighth (caudal) segment with a faint anterior row of spinules; the posterior row, behind mid-length, represented by 2 sub-median and 2 sub-lateral spines on each side; ventrally with 2 long tapering caudal hooks, directed vertically downward, each with a small dorsal spine on its base.

Described from a pupa collected with the larva described above. The moulted skin of the last-instar larva, which still adhered to the pupa, was identical with that of the mature larva.

Adipsomyia stigmosa (subfamily: Clinoceridae)

Smith (1964): Larvae not described

Empidadelpha stigmosa (subfamily: Clinoceridae)

Smith (1964): Larvae not described

References & Further Reading

Dumbleton, L.J. 1966. Immature stages of two aquatic Empididae (Dipt.). *New Zealand Journal of Science* 9: 565–568.

Merritt, R.W., Cummins, K.W. & Berg, M.B. (eds) 2008. Introduction to the Aquatic Insects of North America (4th edition). Kendall/ Hunt, Dubuque, Iowa.

Sinclair, B.J. 2000. Revision of the genus *Clinocera* Meigen from Australia and New Zealand (Diptera: Empididae: Clinocerinae). *Invertebrate Taxonomy* 14 (3): 347–361.

Sinclair, B.J. 2011. Revision of the New Zealand genus *Adipsomyia* (Diptera: Empidoidea: Brachystomatidae: Trichopezinae), with key to local empidoid family and selected genus groups. *New Zealand Entomologist* 34: 30-36.

Smith, K.G.V. 1964. Diptera : Empididae. *In* Insects of Campbell Island. *Pacific Insects Monograph* 7: 325–8.

How to Cite this Information Sheet

McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: Empididae information sheet. EOS Ecology, Christchurch, New Zealand.

ACKNOWLEDGEMENTS – The creation of the Lucid Key and information sheets were supported by the TFBIS (Terristrial and Freshwater Biodiversity Information System) Fund administered by the Department of Conservation (TFBIS Contract No. 278), and by EOS Ecology. Invertebrate specimens were collected by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (CIBE), made possible by the 50° South Trust. Thanks to Rod Macfarlane for his assistance and contribution to this information sheet.

Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Eriopterini INFORMATION SHEET

Classification

Class:	Insecta
Order:	Diptera
Family:	Tipulidae
Subfamily:	Limoniinae
Tribe:	Eriopterini
Genus:	unknown
Common name:	cranefly

Distinguishing Features

- Body golden, shiny (Fig. 1); gut shows through body wall as a dark band; length 5.8 mm.
- Spiracular disk with 5 lobes, blackened, the black patches divided by pale lines (Fig. 2).

Comments

Two species of Eriopterini were listed for Campbell Island by Harrison (1955) and Alexander (1955, 1962) – *Erioptera (Trimicra) pilipes* (Fabricius) and *E. (T.) brachyptera* (Alexander). *E. pilipes* is among the most widespread craneflies in the world. Alexander (1962) included figures of the larva and pupa, whose habitat he described as "mud and wet earth along margins of ponds and streams". The spiracular disk of the larva he figured lacks blackening and therefore is unlikely to be that of *E. pilipes*. Rather the disk resembles that of *Ormosia* figured by Merritt *et al.* (2008).

Original Description

N/A

References & Further Reading

Alexander, C.P. 1955. The crane-flies of the Subantarctic islands of New Zealand (Diptera). *Records of the Dominion Museum* 2: 233–239

Alexander, C.P. 1962. Insects of Macquarie Island. Diptera: Tipulidae. *Pacific Insects* 4 (4): 939–944.

FIGURE 1. Eriopterini whole animal

FIGURE 2. Eriopterini posterior spiracular disc

Harrison, R.A. 1955. Report on Diptera of Auckland and Campbell Islands. *Records of the Dominion Museum* 2: 205–231.

Merritt, R.W., Cummins, K.W., Berg, M.B. (eds) 2008. *Introduction to the Aquatic Insects of North America* (4th edition). Kendall/Hunt, Dubuque, Iowa.

How to Cite this Information Sheet

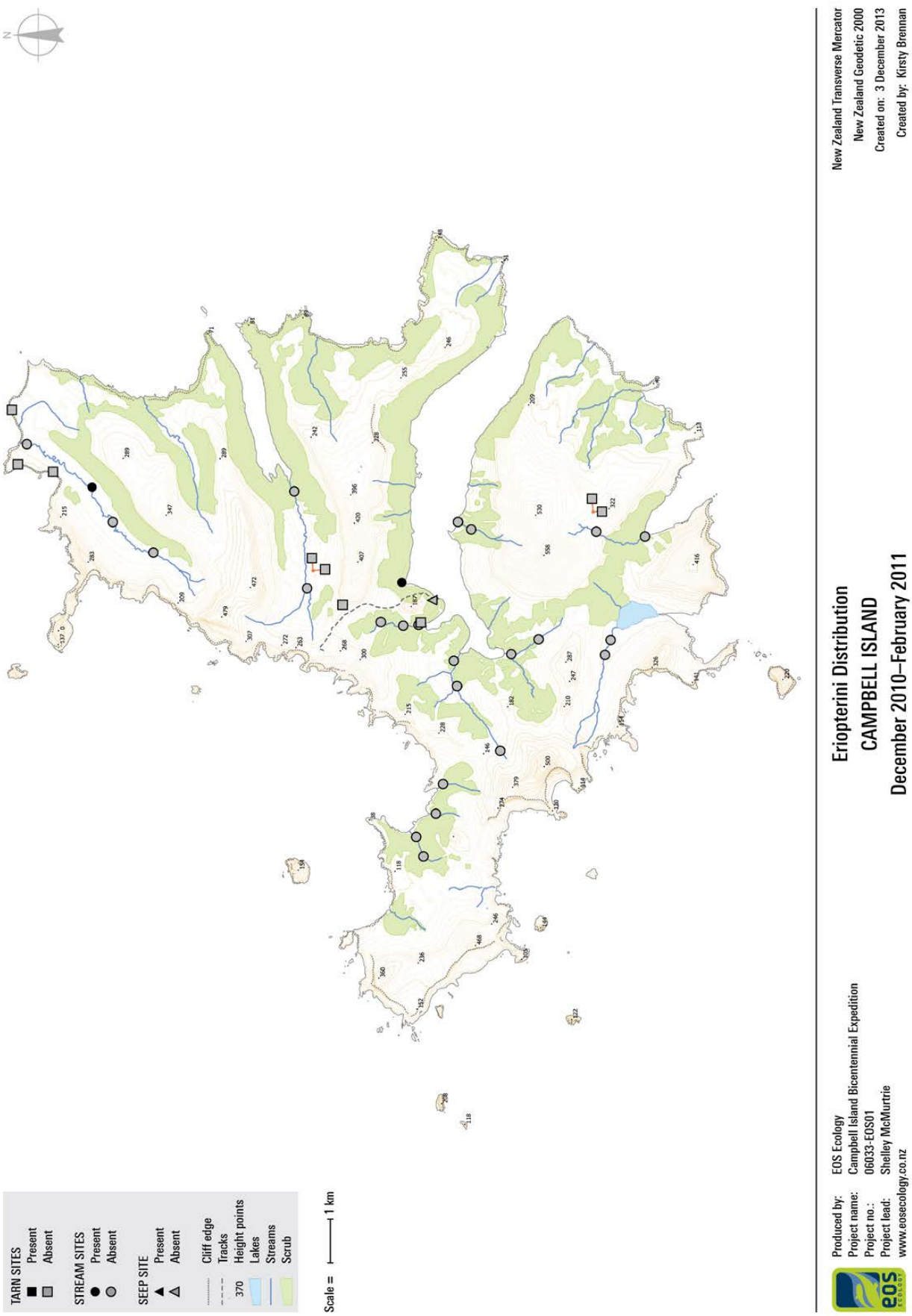
McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: Eriopterini information sheet. EOS Ecology, Christchurch, New Zealand.

ACKNOWLEDGEMENTS – The creation of the Lucid Key and information sheets were supported by the TFBIS (Terristrial and Freshwater Biodiversity Information System) Fund administered by the Department of Conservation (TFBIS Contract No. 278), and by EOS Ecology. Invertebrate specimens were collected by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (CIBE), made possible by the 50° South Trust.

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Hexatomini INFORMATION SHEET

Classification

Class:	Insecta
Order:	Diptera
Family:	Tipulidae
Subfamily:	Limoniinae
Tribe:	Hexatomini
Genus:	unknown
Common name:	cranefly

Distinguishing Features

- Body golden with a hairy surface (Fig. 1); length 3.6 mm.
- Blades of maxillae produced as elongate appendages projecting well beyond the head (Fig. 2).
- Spiracular disk with 4 lobes (Fig. 3), pale with short fringes of hairs; spiracles black.

Comments

This was one of three species of Tipulidae larvae found in the freshwater invertebrate samples during the 2010–11 Campbell Island Bicentenial Expedition (Limoniinae, Hexatomini, Eriopterini). As well as two known Eriopterini species (*Erioptera (Trimicra) brachyptera, E. (T.) pilipes*, Evenhuis, 1989), two Limoniinae species of *Molophilus* species have also been recorded from the island (Alexander, 1964). The condition shown by the maxillae is found in *Limnophila* species (Byers, 1996).

Original Description

N/A

References & Further Reading

Alexander, C.P. 1964. Insects of Campbell Island. Diptera: Trichoceridae and Tipulidae. Pacific Insects Monograph 7: 272-279.

Byers, G.W. 1996. Tipulidae. Pp 549-570 in Merritt, R. W. & Cummins, K. W. (eds) 1996. An introduction to the aquatic insects of North America (3rd edition). Kendall/Hunt, Dubuque, Iowa.

Evenhuis, N.L. ed. 1989. *Catalog of the Diptera of the Australasian and Oceanian Regions*. Bishop Museum Special Publication 86. Bishop Museum Press, Honolulu and E.J. Brill, Leiden. 1155pp.

FIGURE 1. Hexatomini whole animal

FIGURE 2. Head showing projecting maxillae blades

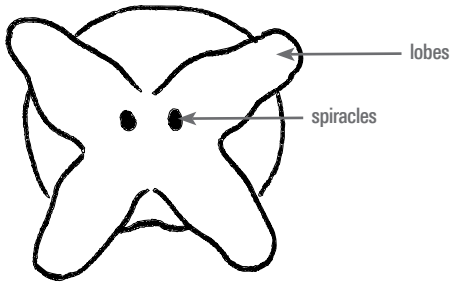


FIGURE 3. Diagram of posterior spiracular disc

How to Cite this Information Sheet

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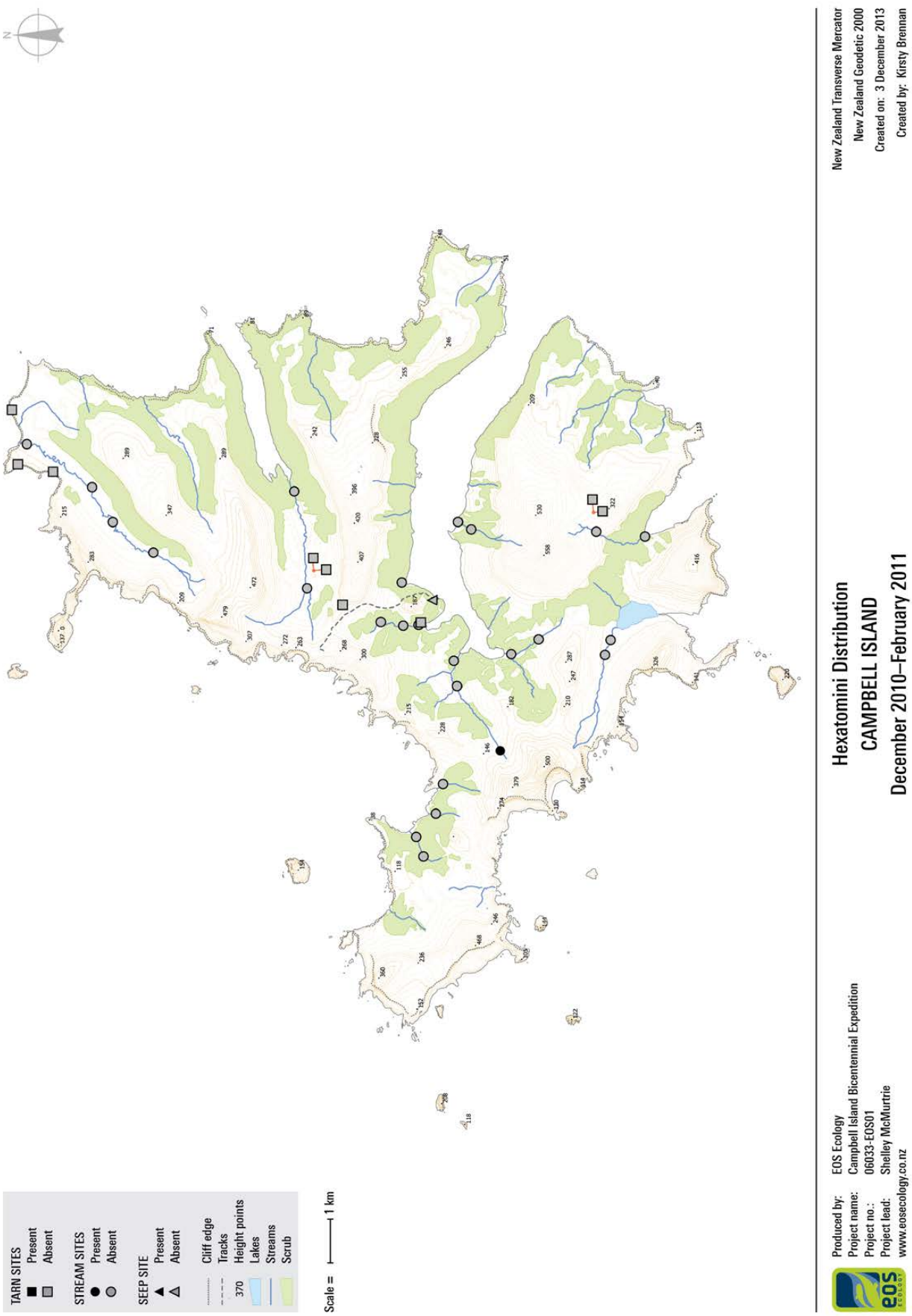
ACKNOWLEDGEMENTS – The creation of the Lucid Key and information sheets were supported by the TFBIS (Terristrial and Freshwater Biodiversity Information System) Fund administered by the Department of Conservation (TFBIS Contract No. 278), and by EOS Ecology. Invertebrate specimens were collected by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (CIBE), made possible by the 50° South Trust.

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Limoniinae INFORMATION SHEET

Classification

Class:	Insecta
Order:	Diptera
Family:	Tipulidae
Subfamily:	Limoniinae
Tribe:	unknown
Common name:	cranefly

Distinguishing Features

- Body golden with a hairy surface (Fig. 1); length 5.3 mm.
- Spiracular region elongated with long curling hairs extending posteriorly (Fig. 2); spiracles not visible.

Comments

This was one of three species of Tipulidae larvae found in the freshwater invertebrate samples during the 2010–11 Campbell Island Bicentenial Expedition (Limoniinae, Hexatomini, Eriopterini). As well as two known Eriopterini species (*Erioptera (Trimicra) brachyptera, E. (T.) pilipes*, Evenhuis, 1989), two Limoniinae species of *Molophilus* species have also been recorded from the island (Alexander, 1964)

Original Description

N/A

References & Further Reading

Alexander, C.P. 1964. Insects of Campbell Island. Diptera: Trichoceridae and Tipulidae. *Pacific Insects Monograph* 7: 272–279.

Evenhuis, N.L. ed. 1989. *Catalog of the Diptera of the Australasian and Oceanian Regions*. Bishop Museum Special Publication 86. Bishop Museum Press, Honolulu and E.J. Brill, Leiden. 1155pp.

FIGURE 1. Limoniiae whole animal

FIGURE 2. Limoniinae posterior spiracular region

How to Cite this Information Sheet

McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: Limoniiae information sheet. EOS Ecology, Christchurch, New Zealand.

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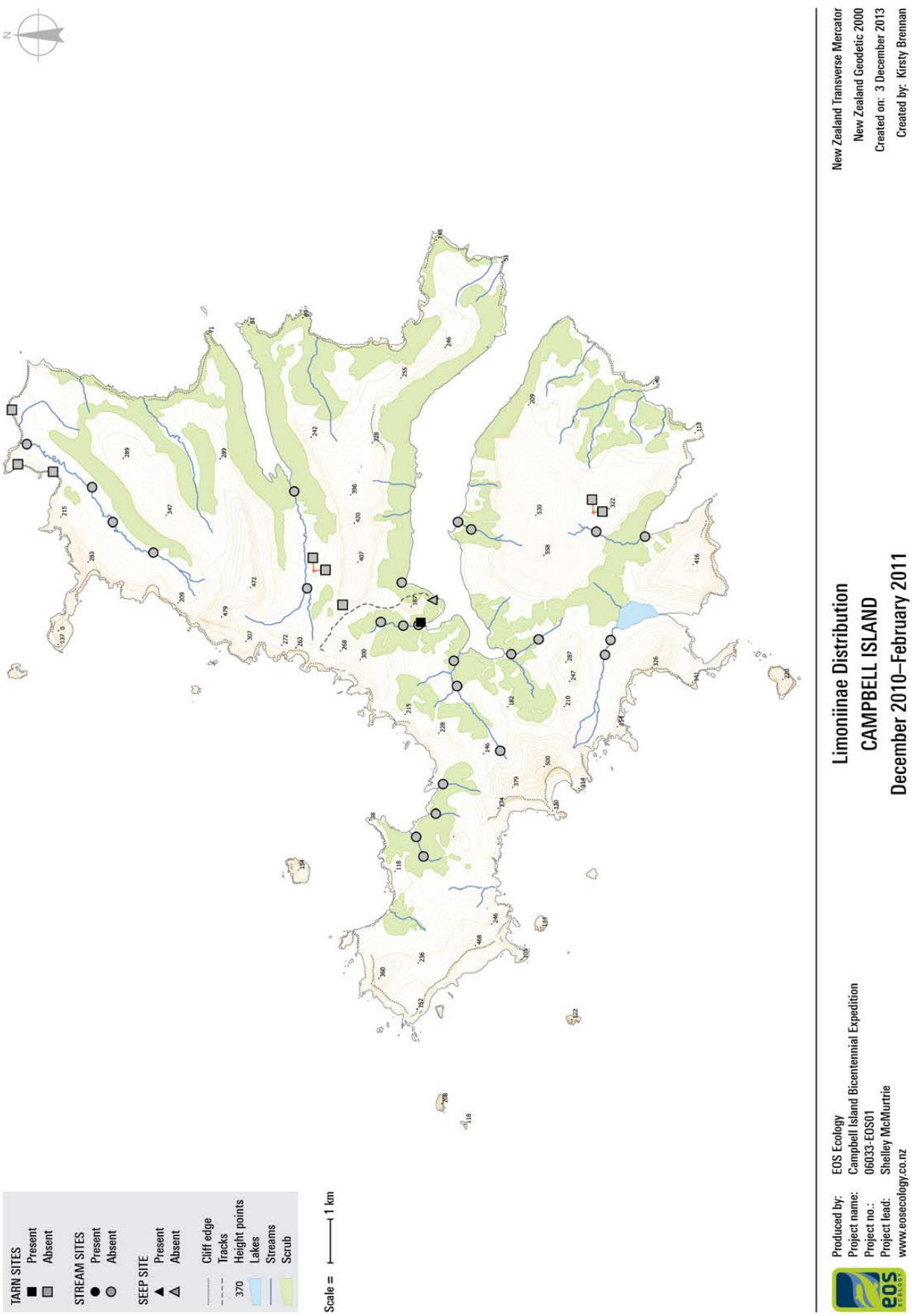
Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Muscidae INFORMATION SHEET

Classification

Class:	Insecta
Order:	Diptera
Family:	Muscidae
Genus:	unkown
Common name:	house fly

Distinguishing Features

- Body yellowish with striations on segments, laterally (Fig. 1); length up to 15 mm.
- Posterior siphons short, not joined at the base; tracheal trunks clearly visible within them (Fig. 3).
- Seven body segments have creeping welts (Fig. 1), those on the posterior segment being a complex of small welts (Fig. 3).

Comments

Eight species of Muscidae in three genera (*Paralimnophora* [2 species], *Spilogona* [5 species] and *Coenosia* [1 species]) have been recorded from Campbell Island as adults but no larvae or pupae have been described. Some of the three genera are likely to have aquatic larvae. The larva described above is of the "*Limnophora*" type (Wirth & Stone, 1968; Winterbourn *et al.*, 2006).

There are a number of descriptions of adult Muscidae but these require clarification as in some cases the same species may have been described more than once and some species complexes also probably exist.

Original Description

Limnophora, Harrison (1955): Larvae not described

Paralimnophora, Harrison (1955): Larvae not described

Spilogona, Malloch (1931): Larvae not described

References & Further Reading

Harrison, R.A. 1955. Report on Diptera of Auckland and Campbell Islands. The Diptera of Auckland and Campbell islands, part 1. *Records of the Dominion Museum* 2(4): 205–231.

Malloch, J.R. 1931. The Calyptrate Diptera of New Zealand, Part V. *Records of the Canterbury Museum* 3(6): 377–383.

FIGURE 1. Muscidae whole animal

FIGURE 2. Muscidae anterior

FIGURE 3. Muscidae posterior

Winterbourn, M.J., Gregson, K.L.D. & Dolphin, C.H. 2006. Guide to the aquatic insects of New Zealand (4th edition). Bulletin of the Entomological Society of New Zealand 14.

Wirth, W.W. & Stone, A. 1968. Aquatic Diptera. In: Usinger, R. L. (ed.) Aquatic insects of California. University of California Press, Berkeley & Los Angeles: 372–482.

How to Cite this Information Sheet

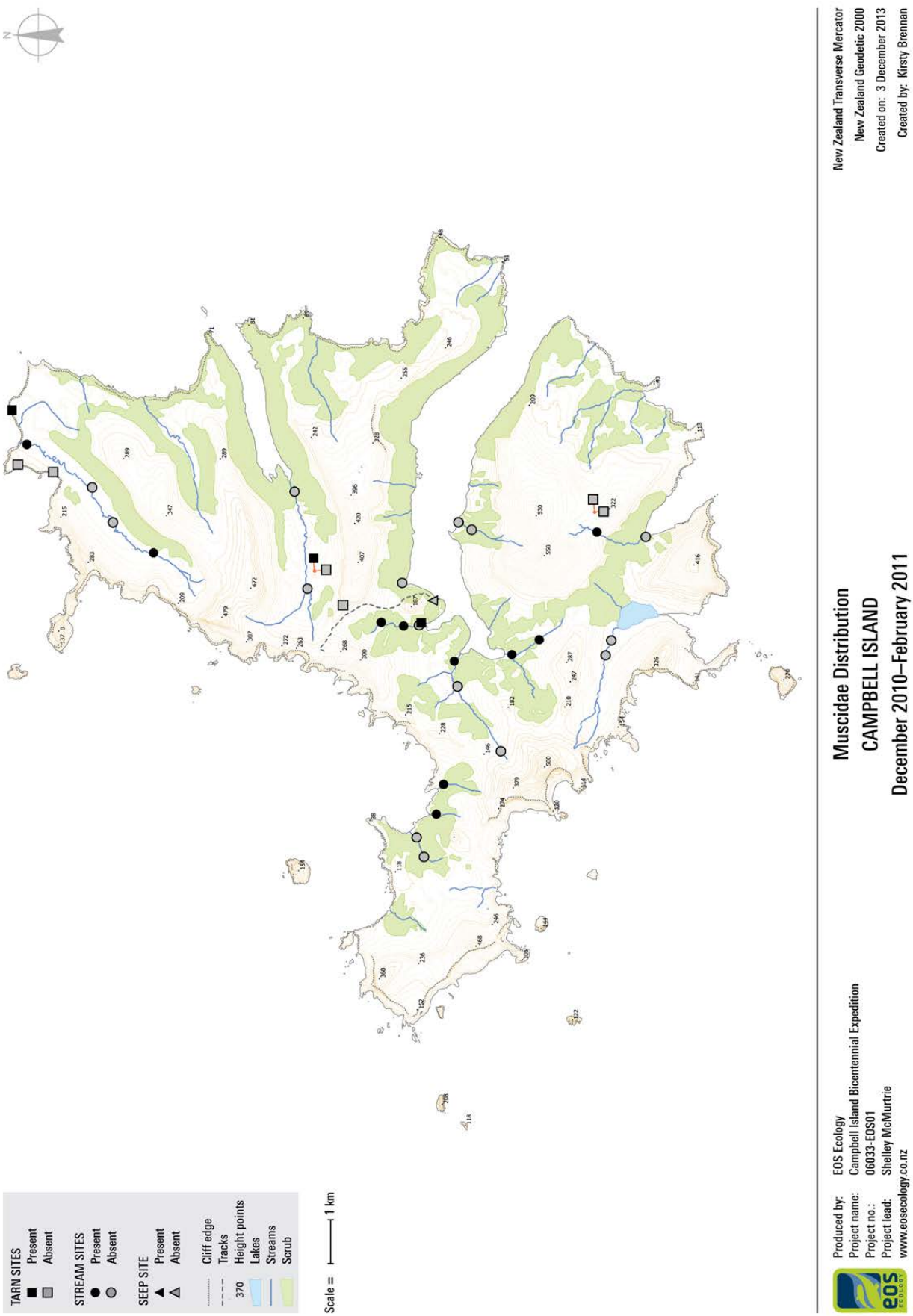
McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: Muscidae information sheet. EOS Ecology, Christchurch, New Zealand.

ACKNOWLEDGEMENTS – The creation of the Lucid Key and information sheets were supported by the TFBIS (Terristrial and Freshwater Biodiversity Information System) Fund administered by the Department of Conservation (TFBIS Contract No. 278), and by EOS Ecology. Invertebrate specimens were collected by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (CIBE), made possible by the 50° South Trust. Thanks to Rod Macfarlane for his assistance and contribution to this information sheet.

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Nematoda INFORMATION SHEET

Classification

Phylum: Nematoda
Common name: round worms

Distinguishing Features

- Generally less than 3 mm long, slender, smooth and unsegmented (Fig. 1).
- Usually white or semi-transparent.
- Body round in cross section and often with at least one sharply pointed end (Fig. 2–3).
- Tubular digestive system with openings at both ends.

FIGURE 1. Nematoda whole animals

Comments

Clark (1963) provided descriptions and habitat notes on species of Mononchidae collected from Campbell Island from terrestrial habitats including moss, soil, leaf litter, and beneath vegetation. Two nematode species have been recorded from freshwater streams on Macquarie Island (Greenslade, 2006); an unidentified species of Cyatholaimidae and *Enoploides stewarti* Nicholas (Thoracostomopsidae).

FIGURE 2. Nematoda anterior

Original Description

N/A

References & Further Reading

Clark, W.C. 1963. Notes on the Mononchidae (Nematoda) of the New Zealand region with descriptions of new species. *New Zealand Journal of Science* 6: 612–632.

Greenslade, P. 2006. *The invertebrates of Macquarie Island*. Australian Antarctic Division, Tasmania, Australia.

FIGURE 3. Nematoda posterior

How to Cite this Information Sheet

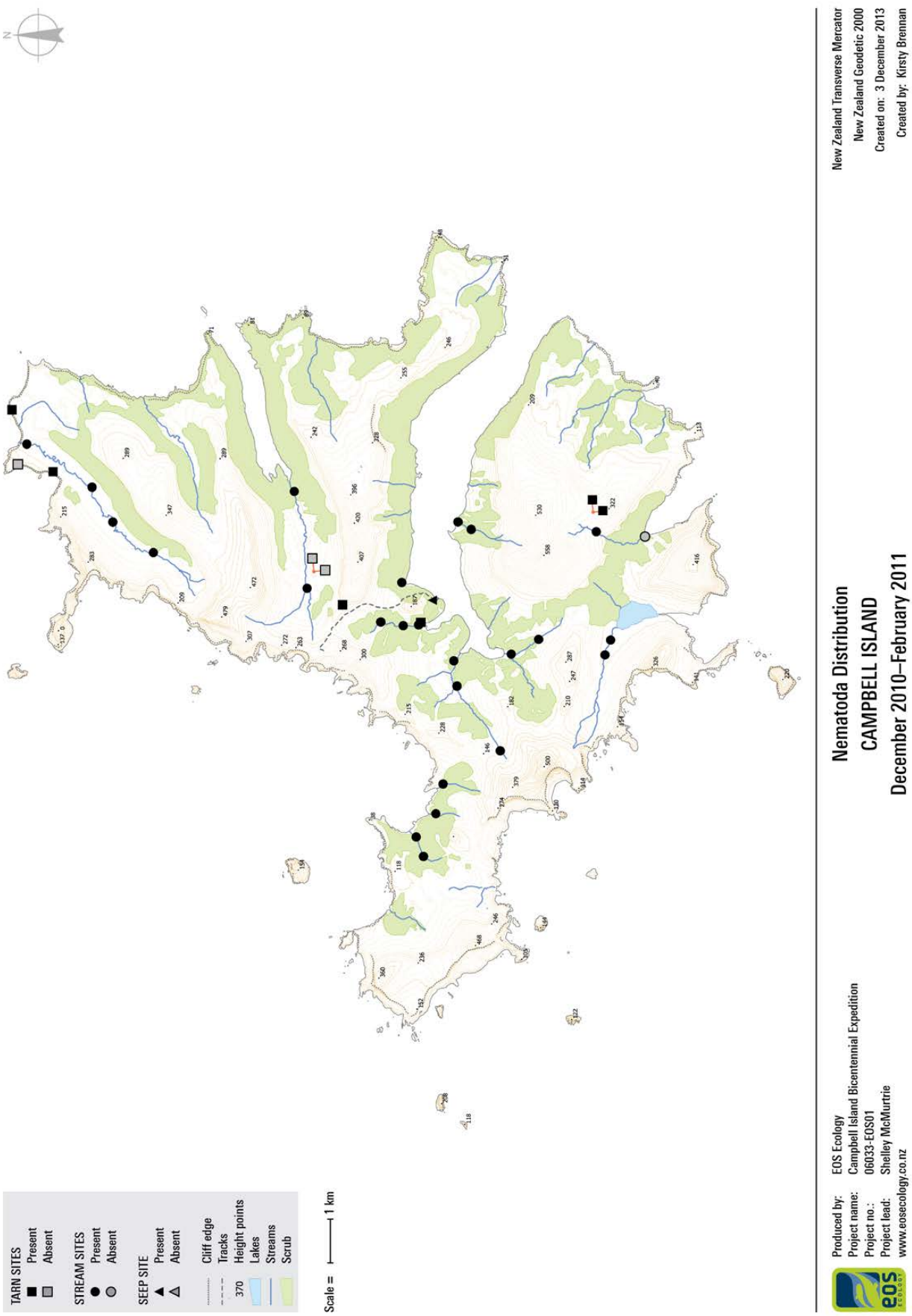
McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: Nematoda information sheet. EOS Ecology, Christchurch, New Zealand.

ACKNOWLEDGEMENTS – The creation of the Lucid Key and information sheets were supported by the TFBIS (Terristrial and Freshwater Biodiversity Information System) Fund administered by the Department of Conservation (TFBIS Contract No. 278), and by EOS Ecology. Invertebrate specimens were collected by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (CIBE), made possible by the 50° South Trust. Thanks to Zeng Zhao and Gregor Yeates for their assistance and contribution to this information sheet.

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Nemertea INFORMATION SHEET

Classification

Phylum: Nemertea

Common name: ribbon worm, proboscis worm

Distinguishing Features

- Unsegmented, elongated, smooth body, often flattened (Fig. 1).
- Eversible proboscis up to a third of the length of the body (Fig. 1).

Comments

A single Nemertean specimen was collected from a freshwater invertebrate sample during the 2010-11 Campbell Island Bicentennial Expedition. DNA work suggests that it could fit within the genus *Baseodiscus*, however species of this genus have previously only been known to live in marine environments (pers. comm. Sebastian Kvist). It is possible that due to the proximity of the collection site to the ocean and windswept nature of the island, that the salt spray that reaches the site increases the salinity of the stream enough to support brackish or marine species.

FIGURE 1. New Zealand freshwater Nemertea (no photographs of the Campbell Island species available)

Original Description

N/A

How to Cite this Information Sheet

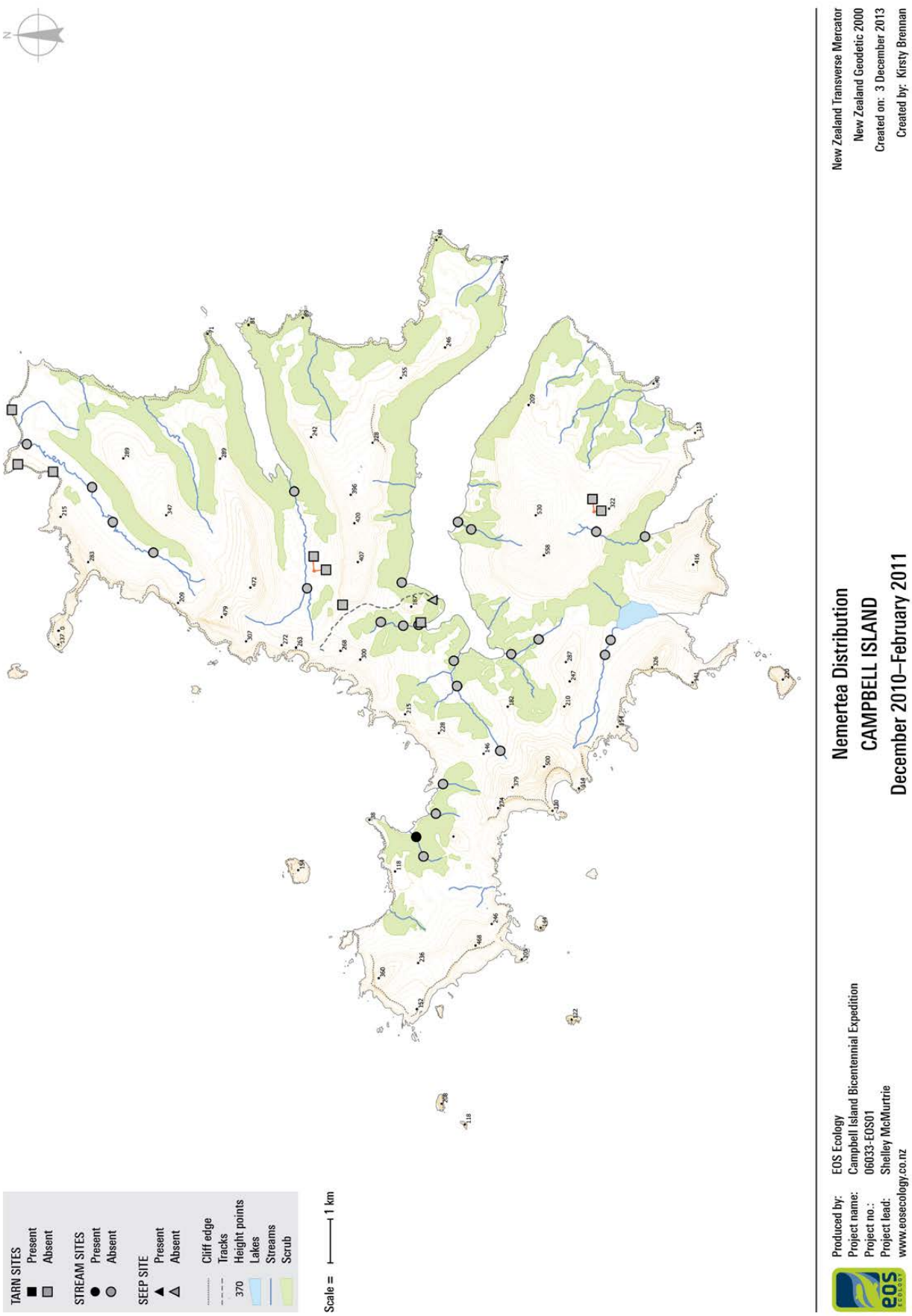
McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: Nemertea information sheet. EOS Ecology, Christchurch, New Zealand.

ACKNOWLEDGEMENTS – The creation of the Lucid Key and information sheets were supported by the TFBIS (Terristrial and Freshwater Biodiversity Information System) Fund administered by the Department of Conservation (TFBIS Contract No. 278), and by EOS Ecology. Invertebrate specimens were collected by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (CIBE), made possible by the 50° South Trust. Thanks to Sebastian Kvist and Christopher Laumer for their assistance and contribution to this information sheet.

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Neppia sp. INFORMATION SHEET

Classification

Phylum:	Platyhelminthes
Class:	Turbellaria
Order:	Tricladida
Family:	Dugesiidae
Genus:	*?Neppia*
Specific name:	unknown species
Common name:	flatworm, "planarian"

Distinguishing Features

- Body colour ranging from pale yellowish to grey-brown (Fig. 1); body length up to 6.5 mm (preserved material).
- Pharynx mid-ventral, sometimes protruded in preserved material. If not protruded the ventral mouth can be difficult to see.
- Two small eyes present anteriorly (Fig. 1); more or les triangular auricles (Fig. 2).

FIGURE 1. *?Neppia* whole animal

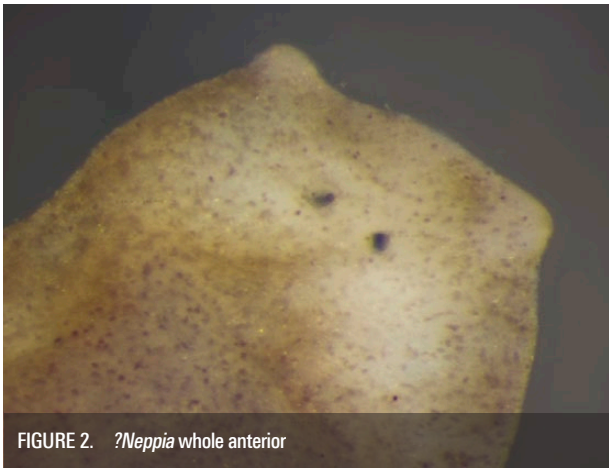


FIGURE 2. *?Neppia* whole anterior

Comments

The genus *Neppia* was originally considered to be a subgenus of *Dugesia* (De Vries & Sluys, 1991). *Neppia montana* occurs in New Zealand and other species are known from the Subantarctic region (Nurse, 1950).

Original Description

N/A

References & Further Reading

De Vries, E.J. & Sluys, R. 1991. Phylogenetic relationships of the genus *Dugesia* (Platyhelminthes, Tricladida, Paludicola). *Journal of Zoology* 223: 103–116.

Nurse, F.R. 1950. Freshwater triclads new to the fauna of New Zealand. *Transactions of the Royal Society of New Zealand* 78: 410-417.

How to Cite this Information Sheet

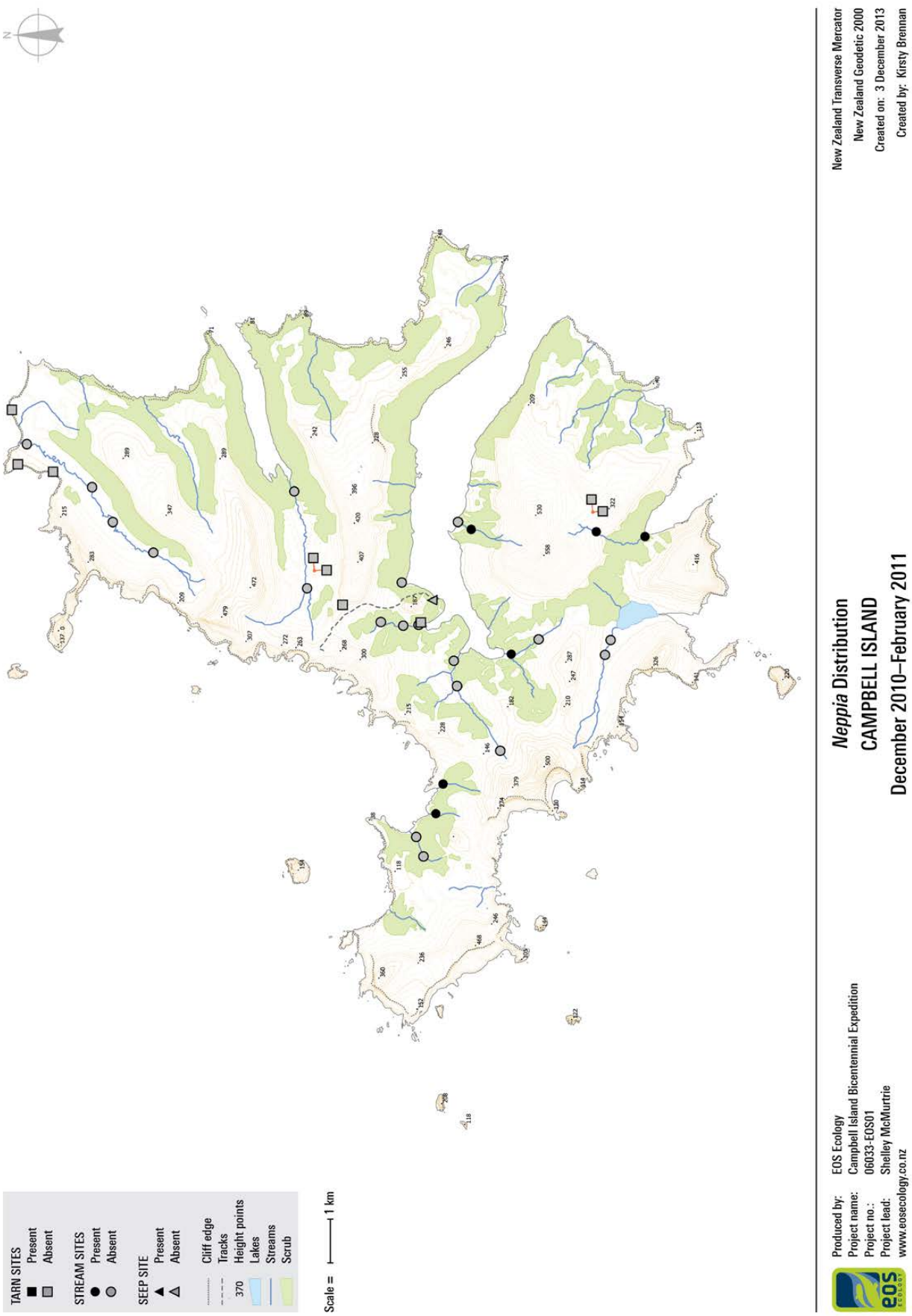
McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: *Neppia* sp. information sheet. EOS Ecology, Christchurch, New Zealand.

ACKNOWLEDGEMENTS – The creation of the Lucid Key and information sheets were supported by the TFBIS (Terristrial and Freshwater Biodiversity Information System) Fund administered by the Department of Conservation (TFBIS Contract No. 278), and by EOS Ecology. Invertebrate specimens were collected by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (CIBE), made possible by the 50° South Trust. Thanks to Miquel Vila Farré for his assistance and contribution to this information sheet.

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Ostracoda INFORMATION SHEET

Classification

Subphylum:	Crustacea
Class:	Ostracoda
Order:	Myodocopida
Family:	Cypridinidae
Common name:	seed shrimp, ostracod

Distinguishing Features

Type 1 (*?Eucypris*)

- Valves greyish-green, about 2x as long as high; dorsally rounded, the greatest height at about mid length (Fig. 1). Ventral margin shallowly concave. Prominent warts, variably distributed on different individuals present on the valves, particularly on their anterior halves (Fig. 2). The valves have the general shape of those of *Eucypris pratensis*, figured by Chapman *et al.* (2011).
- Antennae with swimming setae; legs 3-segmented, the second pair with very long claws.
- Body length 0.8 mm.

Type 2

- Valves white, speckled with black; less than 2x as long as high; dorsal surface smoothly rounded.
- Antennae without swimming hairs.
- Second walking legs with a moderately curved claw.
- Body length up to 0.8 mm.

Comments

No ostracods have been officially described from Campbell Island. However, two species of Cyprinididae have been found on Macquarie Island, including a *Eucypris* species (Greenslade 2006).

Type 1 (*?Eucypris*): The *Eucypris* species from Macquarie Island was identified as *E. virens* Jurine (Greenslade, 2006). In her brief description of the species Greenslade notes that "wart-like protuberances" were present near the anterior margins of the valves, and that *E. virens* is parthenogenetic. *E. virens* has also been recorded from Kerguelen Island. Other *Eucypris* species reported from Subantarctic islands are *E. corpulenta* (G. O. Sars) (Kerguelen Island) and *E. fontana* (Graf) (South Orkney and South Georgia islands) (Pugh *et al.*, 2002).

Type 2: Material of this small species collected during the 2010–11 Campbell Island Bicentennial Expedition was difficult to examine as specimens were not well preserved. *Candona* and *Paracypria* are genera containing small white species with antennae lacking swimming hairs and the Campbell Island species may belong in one of them. Another small, rounded species *Cypretta* cf. *seurati* Gauthier has been found on Macquarie Island (Pugh *et al.* 2002).

FIGURE 1. Ostracoda Type 1 *(?Eucypris)*

FIGURE 2. Ostracoda Type 1 *(?Eucypris)*

Original Description

N/A

References & Further Reading

Chapman, M.A., Lewis, M.H. & Winterbourn, M.J. 2011. *Guide to the freshwater Crustacea of New Zealand*. New Zealand Freshwater Sciences Society, Christchurch.

Greenslade, P. 2006. The invertebrates of Macquarie Island. Australian Antarctic Division, Tasmania, Australia.

Pugh, P.J.A., Dartnall, H.J.G. & McInnes, S.J. 2002. The non-marine Crustacea of Antarctica and the islands of the Southern Ocean: biodiversity and biogeography. *Journal of Natural History* 36: 1047–1103

How to Cite this Information Sheet

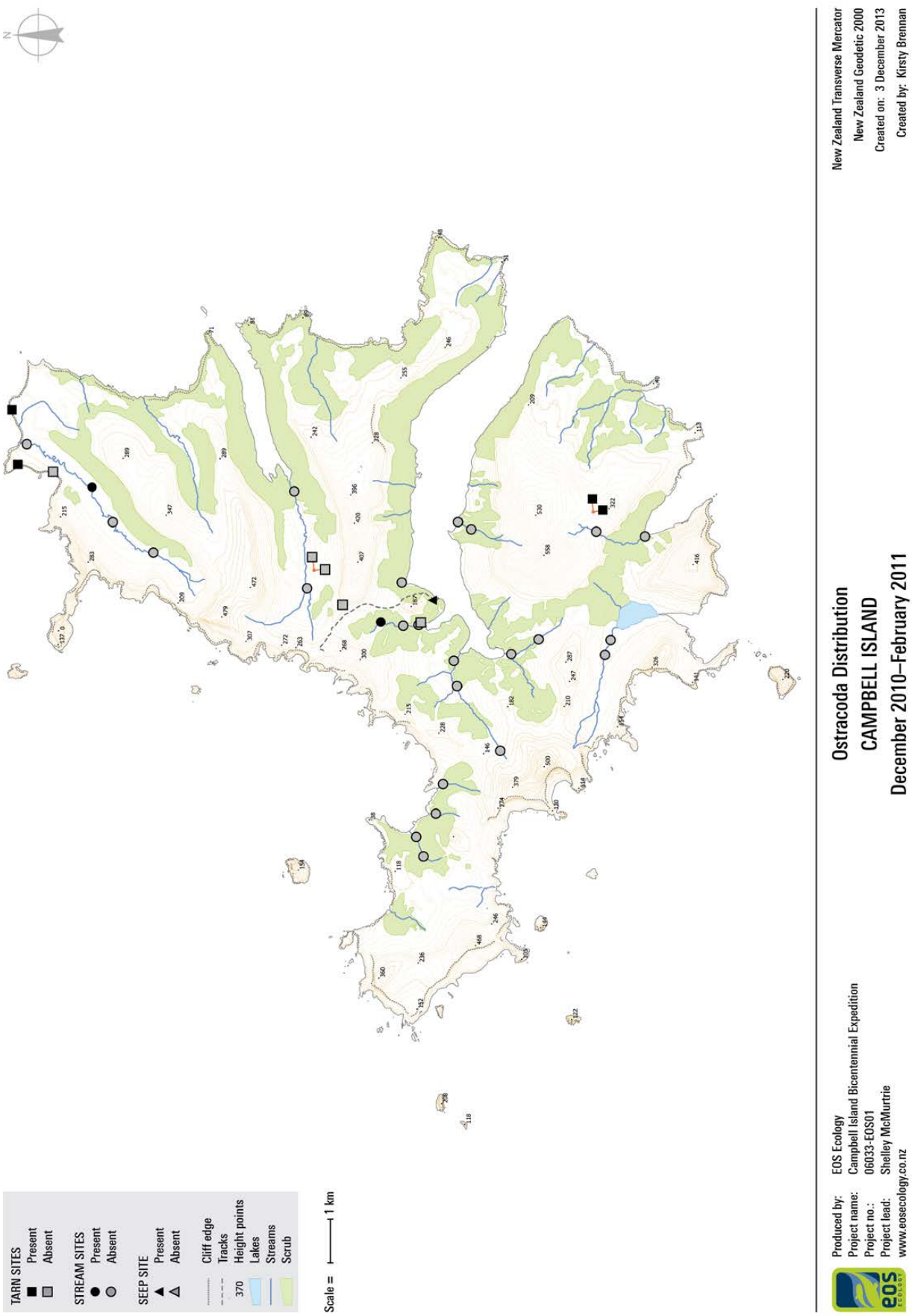
McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: Ostracoda information sheet. EOS Ecology, Christchurch, New Zealand.

ACKNOWLEDGEMENTS – The creation of the Lucid Key and information sheets were supported by the TFBIS (Terristrial and Freshwater Biodiversity Information System) Fund administered by the Department of Conservation (TFBIS Contract No. 278), and by EOS Ecology. Invertebrate specimens were collected by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (CIBE), made possible by the 50° South Trust. Thanks to Patrick De Deckker for his assistance and contribution to this information sheet.

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Oxyethira albiceps (McLachlan, 1862) INFORMATION SHEET

Classification

Phylum:	Arthropoda
Class:	Insecta
Order:	Trichoptera
Family:	Hydoptilidae
Genus:	*Oxyethira*
Specific name:	*albiceps*
Common name:	micro-caddisfly
Original combination:	*Hydroptila albiceps* McLachlan, 1862

Distinguishing Features

As in all Trichoptera larvae, *Oxyethira albiceps* have a sclerotised head. All three thoracic segments have sclerotised plates on the and the abdomen is soft. They have three pairs of segmented legs. The abdomen lacks prolegs but has a pair of posterior claws with subsidiary hooks.

Late-instar *Oxyethira albiceps* larvae occupy a transparent, roughly axe-head shaped, portable case (Fig. 1). First instar larvae have no case, however, they can be recognised by very long hairs (setae) projecting posteriorly, and on their legs (Fig. 2).

FIGURE 1. *Oxyethira albiceps* whole animal, showing lateral and dorsal view

FIGURE 2. *Oxyethira albiceps* whole animal

Comments

Oxyethira albiceps is widely distributed on the three main islands of New Zealand (North, South, Stewart), and Snares, Antipodes, Auckland, Campbell, and Chatham islands.

Original Description

Hydroptila albiceps McLachlan (1862): Larvae not described

First description of larval biology by Hudson (1904). A detailed morphological description is provided by Cowley (1978).

References & Further Reading

Cowley, D.R. 1978. Studies on the larvae of New Zealand Trichoptera. *New Zealand Journal of Zoology* 5: 639–750.

Hudson, G.V. 1904. New Zealand Neuroptera: a popular introduction to the life histories and habits of mayflies, dragonflies and allied insects inhabiting New Zealand, including notes on their relation to angling. London, West Newman & Co. 102 p.

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How to Cite this Information Sheet

McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: *Oxyethira albiceps* information sheet. EOS Ecology, Christchurch, New Zealand.

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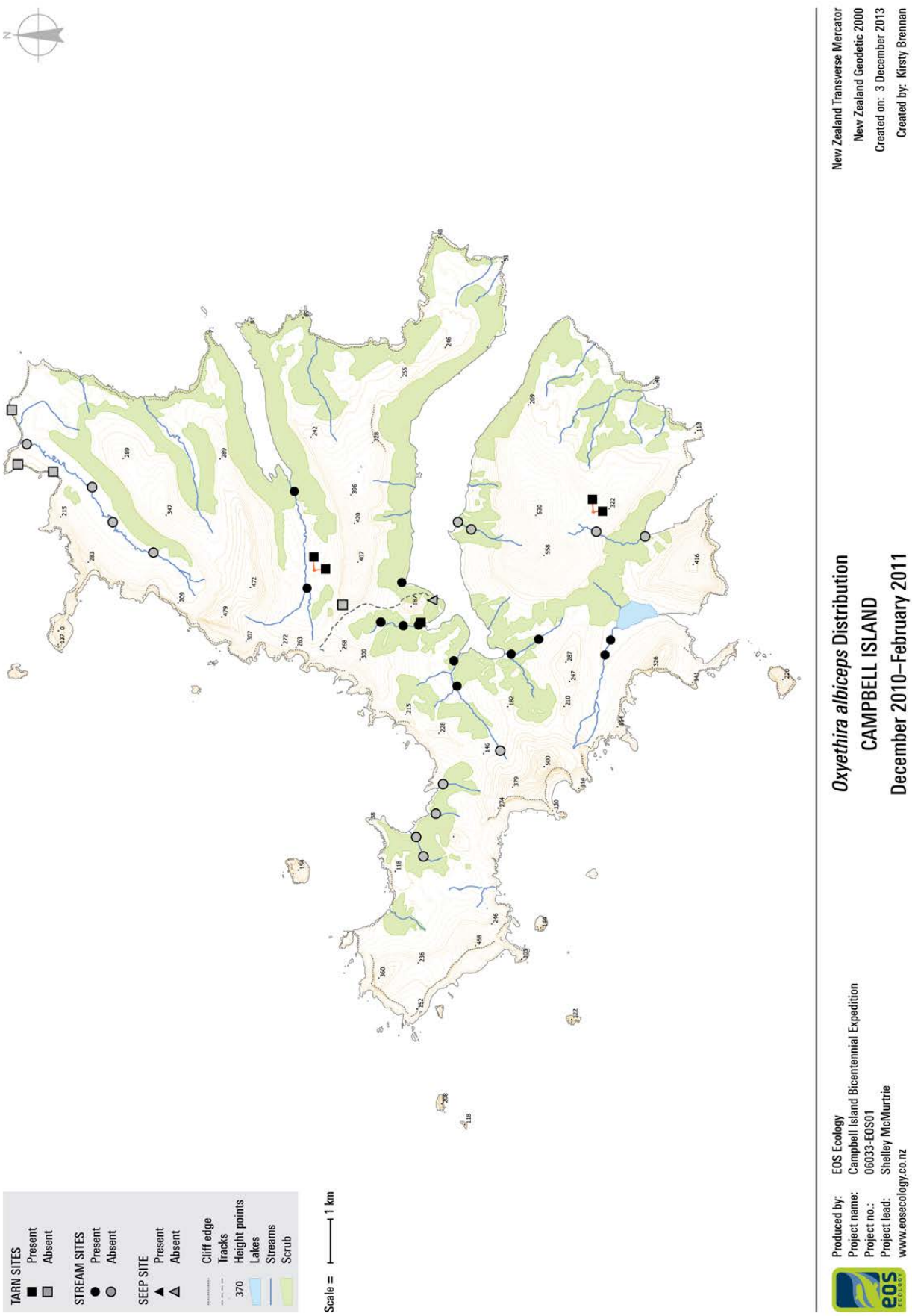
Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Prorhynchus sp. INFORMATION SHEET

Classification

Phylum:	Platyhelminthes
Class:	Turbellaria
Order:	Lecithoepitheliata
Family:	Prorhynchidae
Genus:	*Prorhynchus*
Common name:	flatworm

Distinguishing Features

- Pale, golden flatworm lacking eyes (Figs. 1, 2); body length up to about 6 mm (preserved specimens).
- Mouth anterior, prominent with a small, straight, pointed stylet in the mouth cavity anterior to the pharynx (Fig. 3).
- Pharynx tubular, muscular, visible on dissection.

Comments

This species may be a previously undescribed one, though it is very similar in some aspects (particularly the mouth, auricles, and pharynx) to the mainland species *Prorhynchus putealis* (Percival, 1945).

Original Description

N/A

References & Further Reading

Percival, E. 1945. The genus *Prorhynchus* in New Zealand (Phylum Platyhelminthes, Class Turbellaria). *Transactions of the Royal Society of New Zealand* 75: 33–41.

Timoshkin, O.A. 1991. Turbellaria, Lecithoepitheliata: morphology, systematic, phylogeny. *Hydrobiologia* 227: 323–332.

How to Cite this Information Sheet

McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: *Prorhynchus* sp. information sheet. EOS Ecology, Christchurch, New Zealand.

FIGURE 1. *Prorhynchus* whole animal

FIGURE 2. *Prorhynchus* head, dorsal view

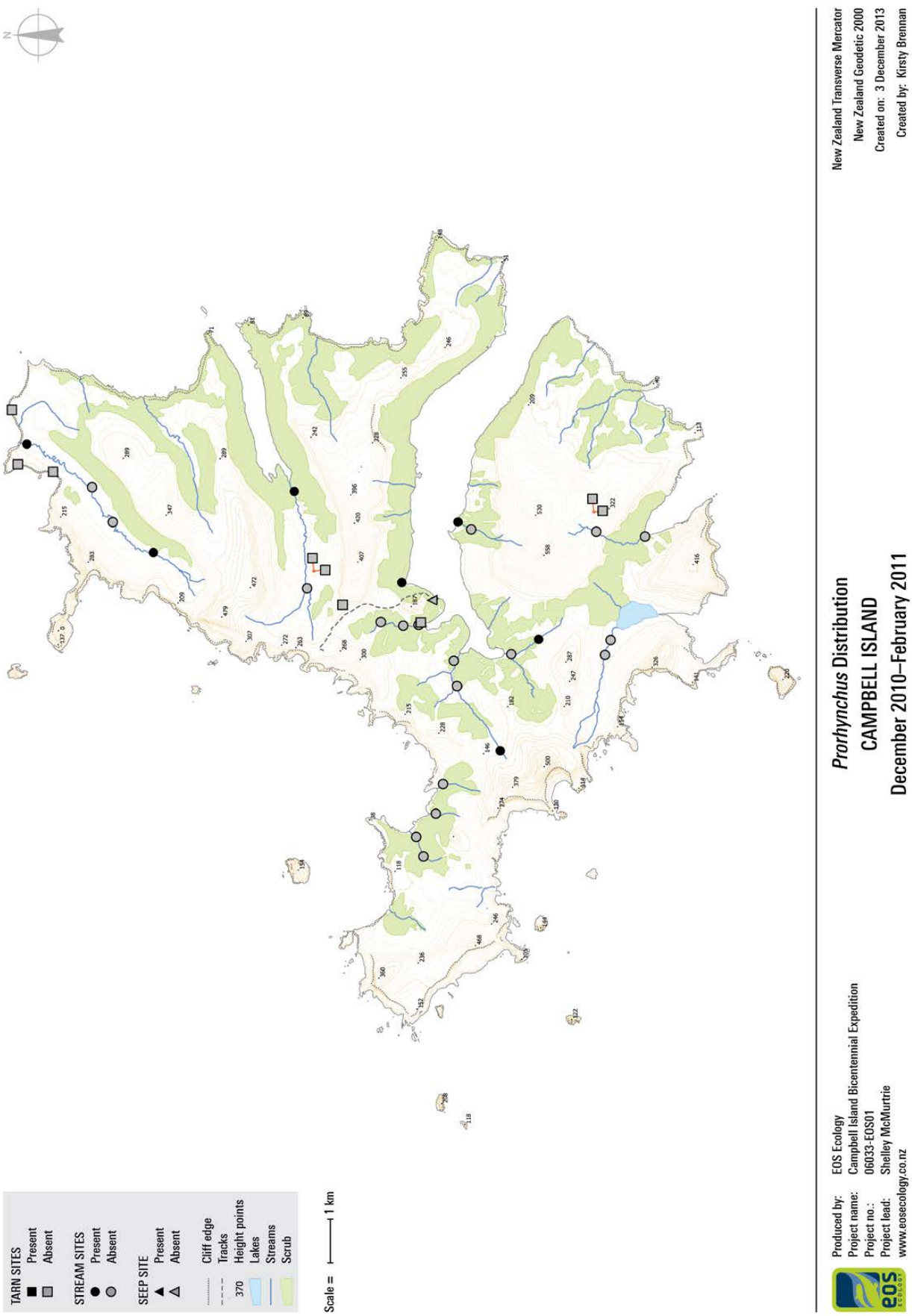
FIGURE 3. *Prorhynchus* whole animal, mouth visible

ACKNOWLEDGEMENTS – The creation of the Lucid Key and information sheets were supported by the TFBIS (Terrestrial and Freshwater Biodiversity Information System) Fund administered by the Department of Conservation (TFBIS Contract No. 278), and by EOS Ecology. Invertebrate specimens were collected by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (CIBE), made possible by the 50° South Trust. Thanks to Christopher Laumer for his assistance and contribution to this information sheet.

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Rungaperla longicauda (Illies, 1963) INFORMATION SHEET

Classification

Phylum:	Arthropoda
Class:	Insecta
Order:	Plecoptera
Family:	Griptopterygidae
Genus:	*Rungaperla*
Specific name:	*longicauda*
Common name:	stonefly
Original combination:	*Apteryoperla longicauda* Illies, 1963

FIGURE 1. *Rungaperla longicauda* whole animal

Distinguishing Features

- Larvae are moderately flattened with prominent thoracic legs (Fig. 1).
- Antennae long (Fig. 1).
- Two filamentous cerci (tails) which are about as long as the last 6 abdominal segments (Fig. 1).
- A rosette of anal gills is present between the bases of the cerci (Fig. 1).
- Larvae can be up to 24 mm long.

Comments

A second species *Rungaperla campbelli* (Illies) is semi-terrestrial, living in damp habitats but not under water (Illies, 1963). Nevertheless it was found in stream samples by Joy & Death (2000). Its cerci are much shorter than those of *R. longicauda* (i.e., about as long as the last two abdominal segments) and the gills are rudimentary. Maximum length of *R. campbelli* larvae is about 20 mm.

Original Description

The following is a direct excerpt from Illies (1963) for *Apteryoperla longicauda*, including figure:

Length of body: Male ca. 20mm; female ca. 22-24mm

Only known in larval stage. Similar to *A. campbelli* n.sp. in the colour pattern, but distinctly different in length of cerci, size of body, and other details as well as in the bionomics. Body brownish or dark grey. Colour pattern of the abdominal nota similar to those of *A. campbelli* n.sp., but the yellow stripes are smaller, shorter, and less distinct. On the tenth tergit, four black spots in a semi-circle surround a light spot on the front margin of the segment (see fig 7a).

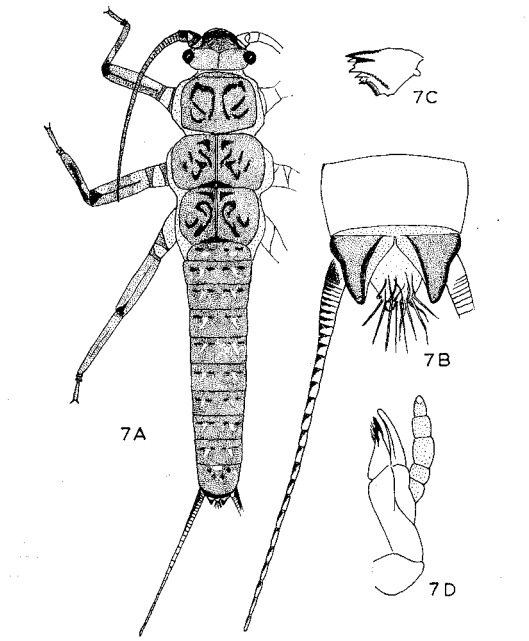


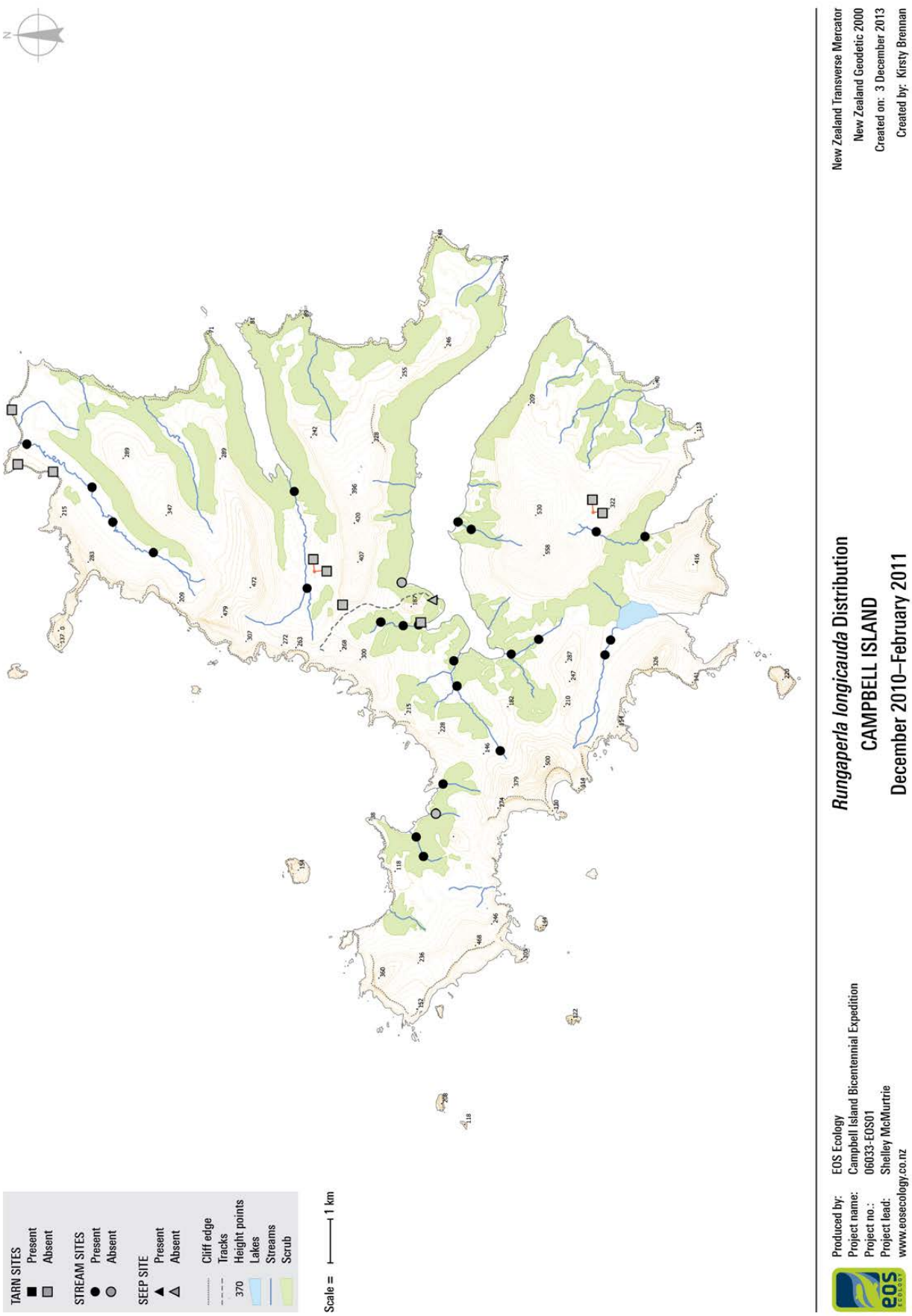
FIG. 7.—Larva of *Apteryoperla longicauda* n.sp. (a) Fully grown larva, dorsal view; (b) tip of abdomen of same specimen, ventral view; (c) left mandible, ventral view; (d) left maxilla, ventral view.

The cerci remarkably well developed, as long as the last six abdominal segments (5-6mm), consisting of about 35 segments. Gill filaments rather long and numerous (see fig 7b). mouth parts as shown in fig 7c,d. The tip of the last segment of the maxillary palp is distinctly light.

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



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How to Cite this Information Sheet

McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: *Rungaperla longicauda* information sheet. EOS Ecology, Christchurch, New Zealand. New Zealand.

ACKNOWLEDGEMENTS – The creation of the Lucid Key and information sheets were supported by the TFBIS (Terristrial and Freshwater Biodiversity Information System) Fund administered by the Department of Conservation (TFBIS Contract No. 278), and by EOS Ecology. Invertebrate specimens were collected by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (CIBE), made possible by the 50° South Trust.

Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Tricladida INFORMATION SHEET

Classification

Phylum:	Platyhelminthes
Class:	Turbellaria
Order:	Tricladida
Family:	?Dugesiidae
Genus:	unknown
Common name:	flatworm

Distinguishing Features

- Body yellowish, pale (Fig. 1); length up to 5.7 mm (preserved specimens)
- Mouth mid-ventral (Fig. 2)
- Eyes absent

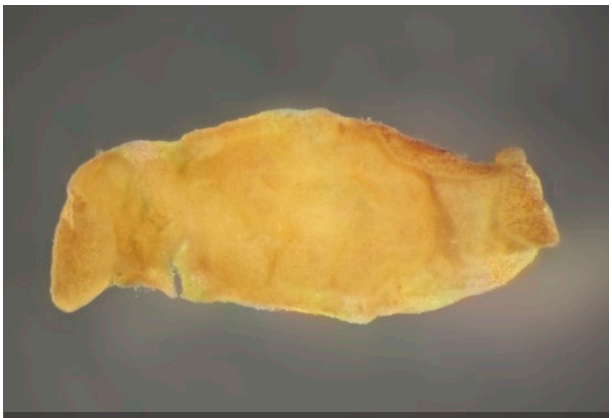

FIGURE 1. Dorsal view

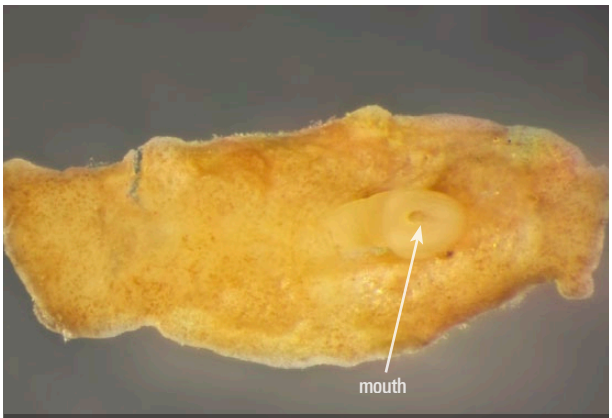

FIGURE 2. Ventral view

Comments

A number flatworms found in the freshwater invertebrate samples collected during the 2010–11 Campbell Island Bicentennial Expedition have so far not been able to be identified confidently beyond order. They may belong to the Dugesiidae family, and potential DNA barcoding for these animals may help to identify these animals further.

Original Description

N/A

How to Cite this Information Sheet

McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: Tricladida information sheet. EOS Ecology, Christchurch, New Zealand.

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Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

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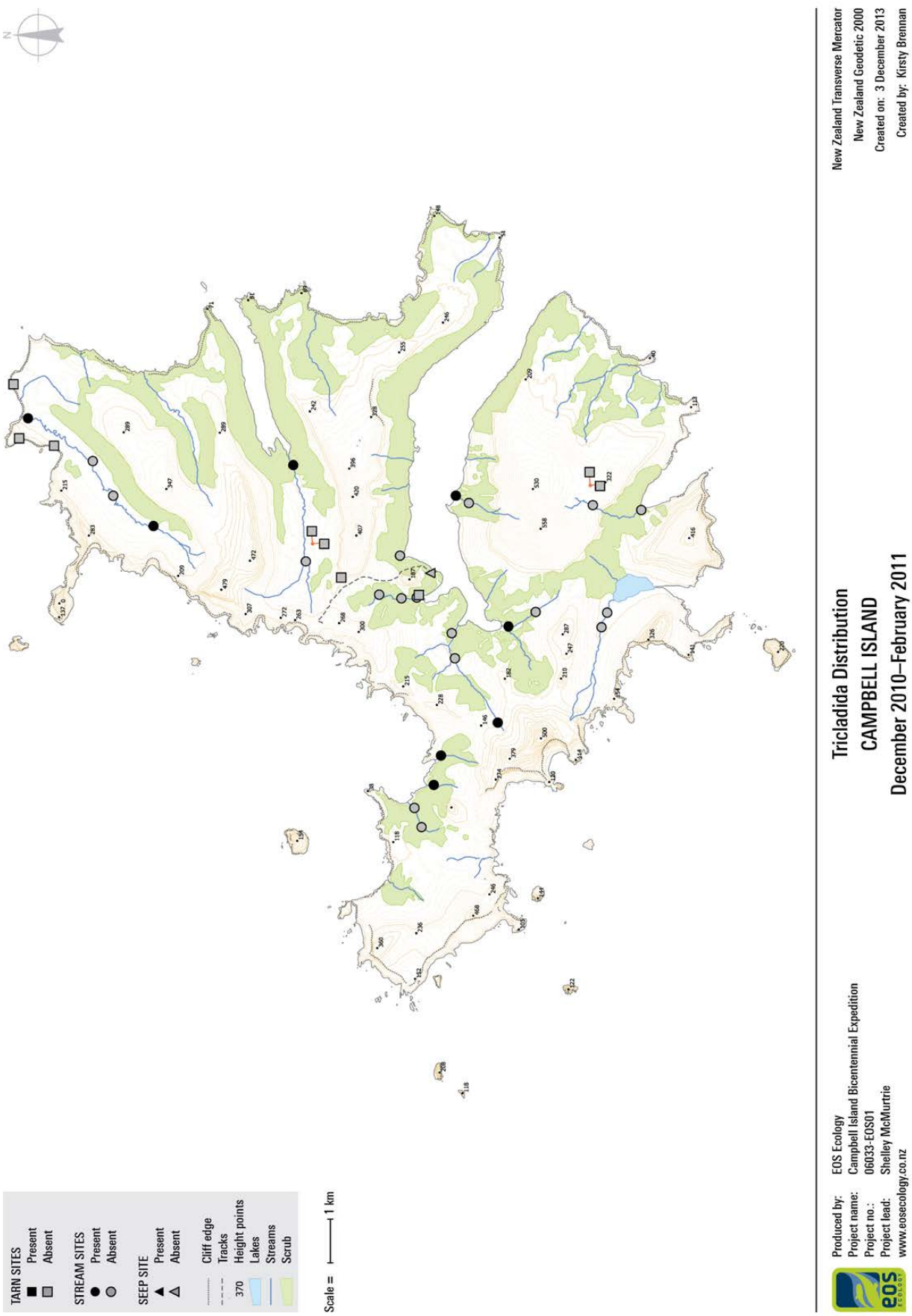


Identification Key to Campbell Island Freshwater Invertebrates

McMurtrie, Sinton & Winterbourn (2014)

Tropocyclops sp. INFORMATION SHEET

Classification

Subphylum:	Crustacea
Class:	Maxillopoda
Subclass:	Copepoda
Order:	Cyclopoida
Family:	Cyclopidae
Genus:	*Tropocyclops*
Specific name:	unknown species
Common name:	cyclopoid copepod

Distinguishing Features

Copepods belonging to the order Cyclopoida have antennae that do not extend beyond the metasome (anterior body section), the (posterior) urosome is narrower than the metasome (Fig. 1), and egg sacs are paired.

The Campbell Island cyclopoid is considered to be a species of *Tropocyclops* based on the following features:

- The 5th leg comprises a single segment roughly as long as wide with three apical setae, one of which is slightly longer and thicker than the others (Fig. 2).
- The outer edges of the furcal (caudal) rami are not serrated as in *Eucyclops*, are about twice as long as wide, and lack transverse rows of small spines, dorsally as in *Paracyclops* (Fig. 3).
- The antennae of the Campbell Island species appear to have 11 or 12 segments; the distal 6 segments are distinct but the more proximal ones are difficult to make out. As *Tropocyclops* species can have 6–12 segments this is probably not a critical factor.
- Body length of 0.8–1.0 mm.

Comments

No copepods have previously been reported from Campbell Island. *Tropocyclops prasinus* occurs in New Zealand and is typically a benthic species (Chapman *et al*. 2011).

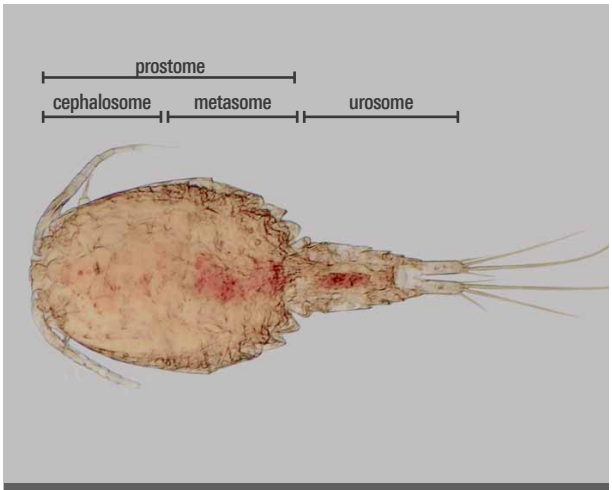


FIGURE 1. *Tropocylcops* whole animal

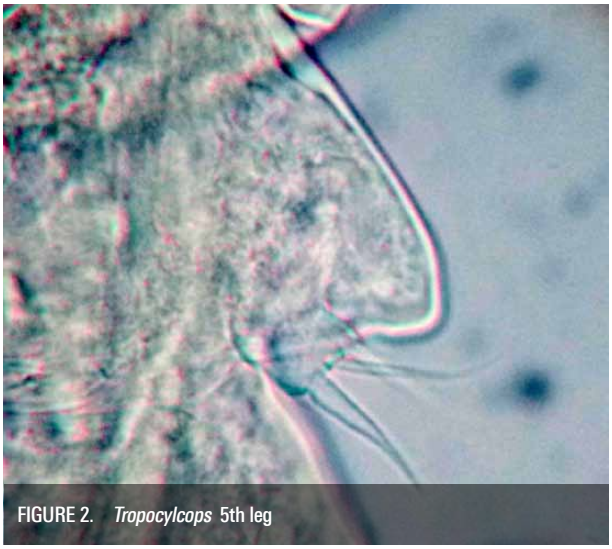


FIGURE 2. *Tropocylcops* 5th leg

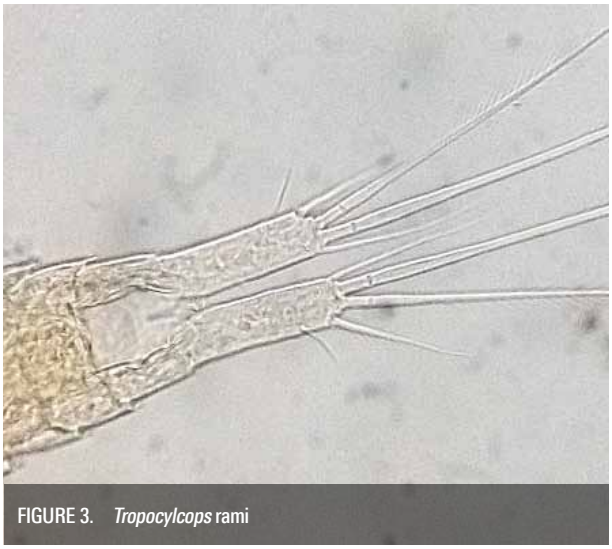
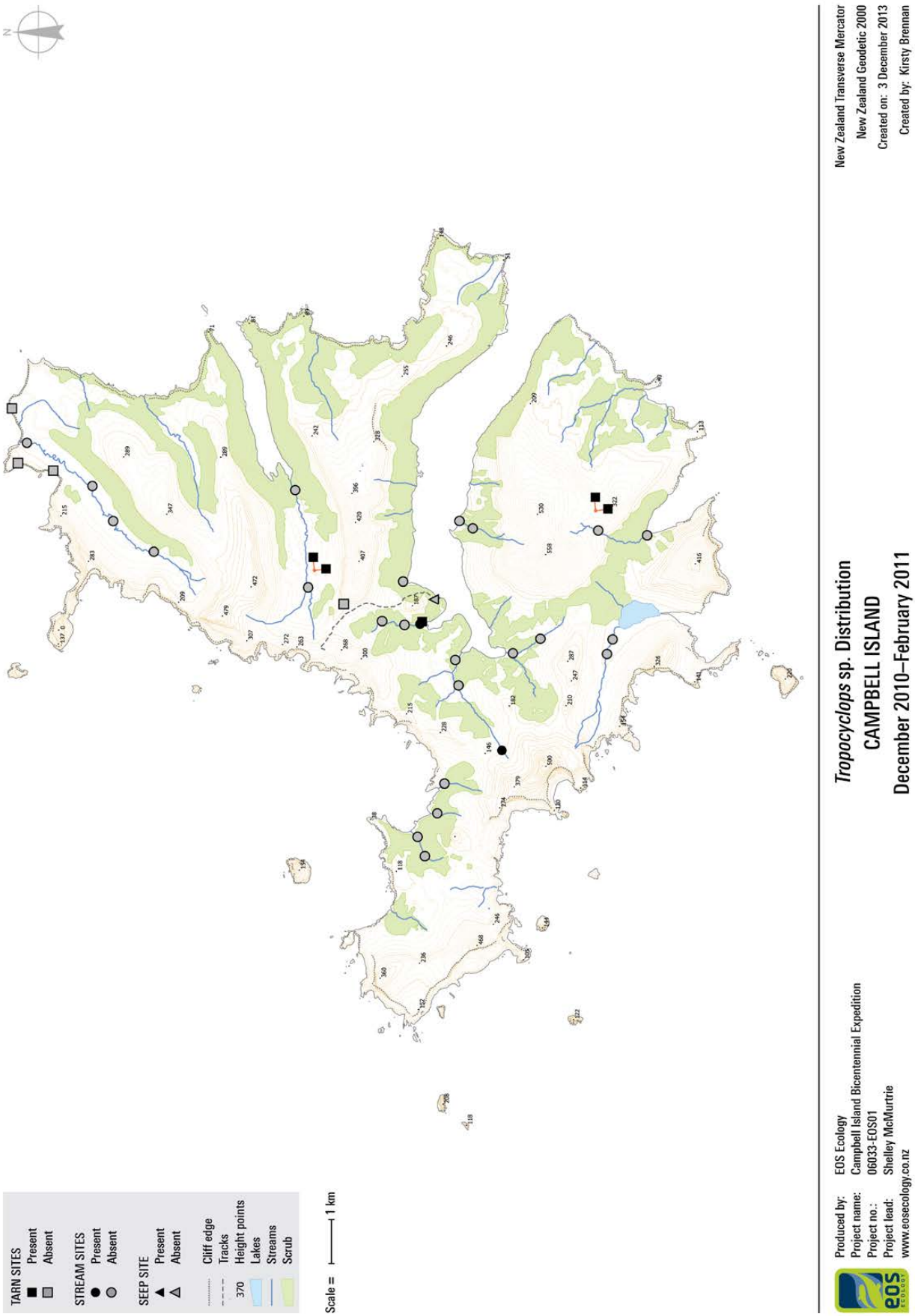


FIGURE 3. *Tropocylcops* rami

Biogeographic Information

Presence/absence on streams, tarns, and a seepage sampled on Campbell Island.

Distribution map based on surveys undertaken by EOS Ecology during the 2010–11 Campbell Island Bicentennial Expedition (www.campbellisland.org.nz). Distribution data © EOS Ecology, 2013.



Original Description

N/A

References & Further Reading

Chapman, M.A., Lewis, M.H. & Winterbourn, M.J. 2011. *Guide to the freshwater Crustacea of New Zealand.* New Zealand Freshwater Sciences Society, Christchurch. 188pp

Morton, D. W. 1990. Revision of the Australian Cyclopidae (Copepoda: Cyclopoida). II. *Eucyclops* Claus and Ectocyclops Brady. *Australian Journal of Marine and Freshwater Research* 41: 657–675.

Thorp, J. H. & Covich, A. P. (eds) 2001. Ecology and classification of North American freshwater invertebrates. Academic Press, San Diego.

How to Cite this Information Sheet

McMurtrie, S.A., Sinton, A.M.R., & Winterbourn, M.J. 2014. Lucid Identification Key to Campbell Island Freshwater Inverterbrates: *Tropocyclops* sp. information sheet. EOS Ecology, Christchurch, New Zealand.

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