

The Subgenus *Cytostethum* Domrow (Acari : Atopomelidae): Multiple Speciation on the Marsupial *Potorous tridactylus* (Kerr)

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Abstract

New locality records are given for the eight species of fur mites of the genus *Cytostethum* Domrow, subgenus *Cytostethum*, known to parasitize the potoroo, *P. tridactylus*. The true host of the ninth, and only other, known species is uncertain. Thirteen new species of *Cytostethum* s.s. are described from the potoroo: *C. potorou*, *C. mediotriatum*, *C. procharactum*, *C. mesocharactum*, *C. tubiferum*, *C. pseudotubiferum*, *C. neotubiferum*, *C. toooloomense* (female unknown), *C. hamatum*, *C. gracile*, *C. dendriticum*, *C. postscutatum* and *C. spinulatum*. A key to all 21 known females of *Cytostethum* s.s. is given.

Such extreme speciation in a group whose members all parasitize the same host is rare, and may result from microisolation caused by variations in fur texture, skin secretions, etc. Not enough populations have been analysed to determine the influence—if any—of geographical isolation on speciation in these mites, but several are known to be widespread both on the mainland of south-east Australia and in Tasmania, supporting the thesis that potoroos in these two areas are conspecific.

Introduction

The fur mite genus *Cytostethum* Domrow, 1956, was erected for five new species from the potoroo or long-nosed rat-kangaroo, *Potorous tridactylus* (Kerr) (Marsupialia: Macropodidae). These comprised *C. promeces*, *C. trachypyx*, *C. charactum*, *C. pseudocharactum* and *C. nanophyes* (see also Domrow 1958); two more species (*C. mollisoni* and *C. domrowi*) were later described from this host by Domrow (1961) and Fain (1972a). Fain (1970, 1972a) also described *C. macropus* and recorded *C. mollisoni* from museum specimens of various non-potoroos marsupials. However, later material has confirmed the potoroo as the true host of these two species, and we now believe these museum specimens were contaminants. Lastly, Fain (1972a) described *C. nudum* from museum spirit containing a marsupial; its true host remains unknown. These nine species comprise the typical subgenus *Cytostethum* (see Fain 1972a).

Recent collections from the potoroo have yielded another 13 species of *Cytostethum* s.s., bringing the number of species of this taxon now known from this host to 21. That all are good (sexually isolated) species is indicated by: (1) the ease with which the females are separable morphologically; (2) the sighting of ova in all known females except *C. mediotriatum*, *C. pseudocharactum*, *C. neotubiferum* and *C. nudum*; (3) the genitalia, caudal processes, and modified (clasping) legs IV peculiar to each known male. We recall no other single vertebrate species harbouring as large a number of parasites of the same genus, and the case of the potoroo may well be unique in parasitology.

The key and taxonomic sequence adopted below assume the most primitive species are those with the most fully developed body shields. Fourteen of the 22 species show an extensive opisthonotal shield. Of these, six, being somewhat heterogeneous, are keyed out serially (*C. potorous*, *C. mediostriatum*, *C. promeces*, *C. trachypyx*, *C. nanophyes* and *C. macropus*), but the remaining eight species are divisible into two distinct entities. Thus, *C. procharactum*, *C. mesocharactum*, *C. pseudocharactum* and *C. charactum*, with stout body, short copulatory tube, and posteriorly incised opisthonotal shield, key out together, while *C. tubiferum*, *C. pseudotubiferum*, *C. neotubiferum* and *C. toooloomense* show distinctive terminalia in both sexes. Four species show a moderately developed opisthonotal shield (*C. mollisoni*, *C. hamatum*, *C. gracile* and *C. dendriticum*), and four lack this shield (*C. postscutatum*, *C. spinulatum*, *C. domrowi* and *C. nudum*). Of these, the last (*C. nudum*, host unknown) shows the hysteronotal shield almost divided medially, rather than entire as in all other members of the typical subgenus. All other species of *Cytostethum*—those comprising the subgenus *Metacytostethum* Fain, 1971, which is discussed by Fain and Domrow (1975)—lack this shield, and parasitize macropodids other than the potoroo. The true host of *C. nudum* will therefore prove of considerable interest.

Some descriptive brevity is possible because the capitulum and legs I–II hardly vary at familial level. Likewise, legs III–IV in the female, and leg III in the male, are stereotyped (Domrow 1956). Lengths given for the body include the capitulum, but exclude the copulatory tube in the species that possess one; widths are maximum. The body chaetotaxy (Figs 39 and 40) and shields are given after Fain (1963, 1972a), except that the constantly mentioned anterior and posterior hysterosomatal shields present dorsally are termed hysteronotal and opisthonotal respectively. No synonymies are given for known species, since these are available in Fain (1972a). The collection data in the text are restricted to locality (those given in italics represent published records); full details are given below.

Nomenclaturally, one new specific name is a noun in apposition to the generic name (*potorous*); the rest are adjectives.

The 13 holotypes and five allotypes of the new species have been deposited in the Australian National Insect Collection, Division of Entomology, CSIRO, Canberra; the paratypes are divided between the authors' institutions.

Collection Data

Queensland: Mount Nebo, 27 km NW. of Brisbane, 24.ix.1954, T. Lawton; 17.i.1955, G. C. Taylor (the two original series); 15.xi.1962, R. Domrow (*C. trachypyx*, *C. nanophyes* and *C. mollisoni*); 20.x.1964, E. H. Derrick (*C. pseudocharactum* and *C. charactum*); 22.viii.1967, R. W. Campbell (*C. charactum*).

New South Wales: Toooloom, 22 km NW. of Bonalbo, 15.xi.1961, J. H. Calaby; 8 km N. of Cobargo, 8.ix.1968, A. L. Dyce.

Victoria: Orbost, 25.vii.1967, R. M. Warneke; Pomonal, 24 km W. of Stawell, 17.vi.1964, R. M. Warneke; Gorae West, 15 km NW. of Portland, 10.i.1963, J. K. Dempster and B. Fuhrer.

Tasmania: Green's Beach, near mouth of Tamar River, 9.iv.1964, R. H. Green; Myrtle Bank, 37 km NE. of Launceston, 16.viii.1961, R. H. Green; Launceston, 10.i.73, R. H. Green; Maydena, 27.vi.1960, B. C. Mollison; Sandfly, 21 km SW. of Hobart, 8.v.1962, B. C. Mollison.

Genus *Cytostethum* DomrowSubgenus *Cytostethum* DomrowKey to Females of the Genus *Cytostethum*, Subgenus *Cytostethum**

1. Opisthonotal shield present2
Opisthonotal shield absent18
- 2(1). Opisthonotal shield reaching extremity of body, or least about twice as long as unarmed portion of body behind it.....3
Opisthonotal shield at most only slightly longer than unarmed portion of body behind it...15
- 3(2). Copulatory tube very wide, or narrow and short, or absent.....4
Copulatory tube long and narrow (at least 100 μm long and 7 times longer than wide).....13
- 4(3). Opisthogaster with about 4 rows of scales in front of anus and extending to sides of body. Copulatory tube short, cylindrical, 25–30 μm long, 20 μm wide.....*C. trachypyx* Domrow
Opisthogaster without scales.....5
- 5(4). Opisthogaster with large, square median shield anteriorly.....*C. nanophyes* Domrow
Opisthogaster lacking this shield.....6
- 6(5). Bursa copulatrix opening at apex either of opisthosoma or of copulatory tube.....7
Bursa copulatrix opening in posteromedian sclerotized strip on opisthonotal shield.....
.....*C. promeces* Domrow
- 7(6). Opisthonotal shield 1.5 times longer than wide, with few poorly defined transverse annulations. Posterior four-fifths of opisthogaster sclerotized and punctate.....
.....*C. potorous*, sp. nov.
Opisthonotal shield either as long as wide, or distinctly wider than long.....8
- 8(7). Opisthonotal shield as long as wide, with about 15 very short, coarse, oblique annulatory remnants in midline. Opisthogaster largely sclerotized and similarly textured. Body elongate.....*C. mediostriatum*, sp. nov.
Opisthonotal shield distinctly wider than long. Opisthogaster soft and annulate, except posteriorly. Body stout9
- 9(8). Only 5 annulations between hysteronotal and opisthonotal shields, with latter not incised posteriorly. Apex of body less abruptly narrowed, with narrow, cylindrical copulatory tube.....*C. macropus* Fain
At least 9 annulations between hysteronotal and opisthonotal shields, with latter incised posteriorly. Apex of body abruptly narrowed, with wide, sometimes very short copulatory tube10
- 10(9). Two short, narrow paramedian incisions on posterior margin of opisthonotal shield. Copulatory tube short.....*C. procharactum*, sp. nov.
One median incision on posterior margin of opisthonotal shield.....11
- 11(10). Incision on posterior margin of opisthonotal shield not reaching forward to midlength of shield. Copulatory tube long.....12
Incision on posterior margin of opisthonotal shield reaching well beyond midlength of shield. Copulatory tube very short.....*C. charactum* Domrow
- 12(11). Anterior limit of incision on posterior margin of opisthonotal shield nearer setae d_4 , and 44–53 μm from setae d_3 . Incision smaller, overall dimensions 75–86 μm long, 93–105 μm wide; length in midline 177–212 μm . Copulatory tube at least as long as wide.....
.....*C. mesocharactum*, sp. nov.
Anterior limit of incision on posterior margin of opisthonotal shield nearer setae d_3 , and 31 μm from setae d_3 . Incision larger, overall dimensions 93–102 μm long, 150–159 μm wide; length in midline 155–159 μm . Copulatory tube tending to be wider than long.....
.....*C. pseudocharactum* Domrow
- 13(3). Copulatory tube about 12 times longer than wide (135 by 11 μm in holotype). Incision on posterior margin of opisthonotal shield falling well short of setae d_3 ...*C. tubiferum*, sp. nov.

*The female of *C. (C.) toloomense*, sp. nov., is unknown.

- Copulatory tube about 8 times longer than wide. Incision on posterior margin of opisthonotal shield reaching setae d_3 14
- 14(13). Copulatory tube short and narrow (110 by 12 μm). Opisthogaster without posteromedian scales.....*C. pseudotubiferum*, sp. nov.
 Copulatory tube long (150 μm) and slightly inflated at midlength (maximum width 21 μm).
 Opisthogaster with patch of posteromedian scales.....*C. neotubiferum*, sp. nov.
- 15(2). Copulatory tube well developed. Annulations of opisthosoma with scales both dorsally and ventrally 16
 Copulatory tube poorly developed. Annulations of opisthosoma with scales ventrally at most..... 17
- 16(15). Hysteronotal shield deep, 48–52 μm long in midline. Copulatory tube parallel-sided. Length of body (excluding copulatory tube) 530–580 μm*C. mollisoni* Domrow
 Hysteronotal shield shallow, 28–30 μm long in midline. Copulatory tube tapering. Length of body (excluding copulatory tube) 510–520 μm*C. hamatum*, sp. nov.
- 17(15). Postscapular shield uniformly sclerotized. Opisthonotal shield about 1.6 times wider than long, and separated from hysteronotal shield by about 10 annulations.....
*C. gracile*, sp. nov.
 Postscapular shield poorly sclerotized medially. Opisthonotal shield 3–4 times wider than long, and separated from hysteronotal shield by about 15 annulations.....
*C. dendriticum*, sp. nov.
- 18(1). Posterior third of opisthogaster with distinct, but anteriorly incised, shield.....
*C. postscutatum*, sp. nov.
 Opisthogaster without shield19
- 19(18). Posterior third of opisthosoma with numerous long triangular scales.....
*C. spinulatum*, sp. nov.
 Opisthosoma without scales20
- 20(19). Opisthosoma short, and body accordingly stout (618 by 240 μm). Postscapular and hysteronotal shields deep. Opisthosomatal setae very long.....*C. domrowi* Fain
 Opisthosoma long, and body accordingly elongate (630 by 195 μm). Postscapular and hysteronotal shields shallow, the latter almost divided medially. Opisthosomatal setae short
*C. nudum* Fain

Cytostethum (Cytostethum) potorous, sp. nov.

(Figs 1–4)

Types

Holotype ♀, allotype ♂, and 3♂ paratypes, Launceston, Tas.; 8♀, 5♂ paratypes, Gorae West, Vic.

Female Holotype

Length 486 μm ; width 160 μm . All body shields heavily sclerotized, with pre-scapular shield especially so laterally, and separated laterally from postscapular shield by narrow, textureless band of cuticle, as often. Opisthonotal shield very long, reaching extremity of body, and with few indistinct transverse annulations. Copulatory tube terminal, conical, and very small. Opisthogastric shield only slightly shorter than opisthonotal, with rather more transverse striae, and separated from coxae IV by 6–7 annulations.

Male Allotype

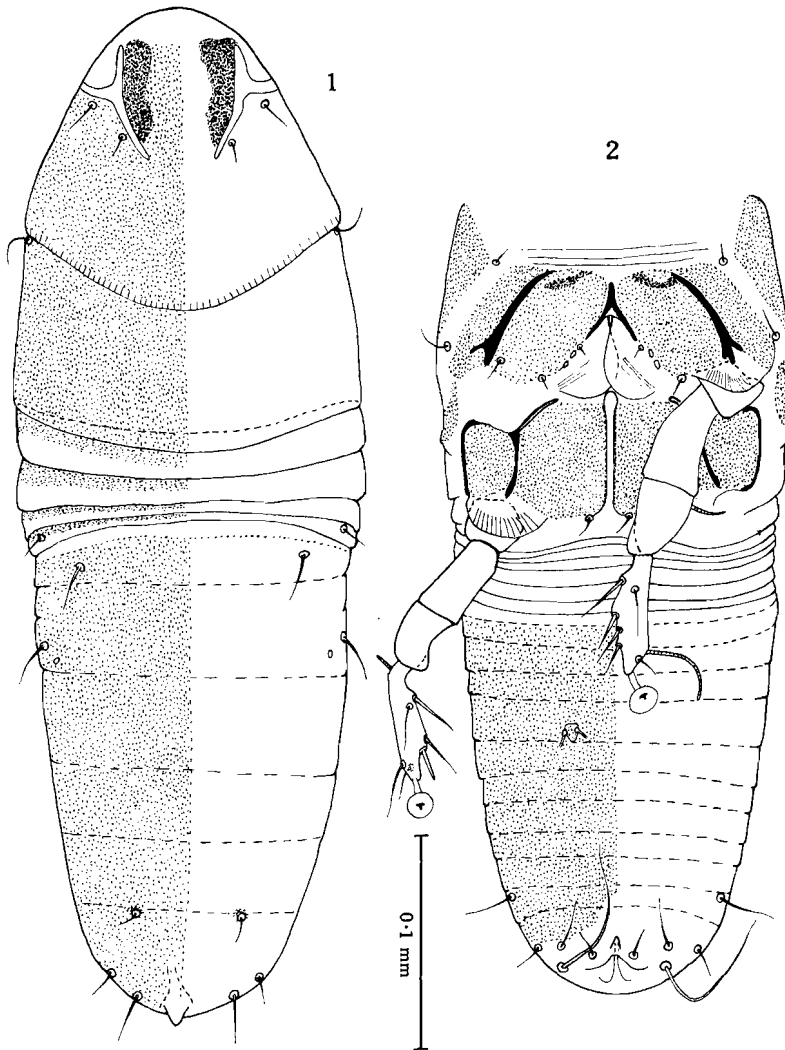
Length 342 μm ; width 156 μm . Opisthosoma very short. Dorsum as in female, but opisthonotal shield without transverse striae. Extremity of body almost rectilinear. Venter with all coxal shields strongly sclerotized; epimera III poorly sclerotized. Penis cylindrical, 30 μm long. Adanal organs subtriangular, with minute disc.

Legs IV rather thin, extending well beyond extremity of body; tibiotarsi IV long and thin.

Cytostethum (Cytostethum) mediostriatum, sp. nov.
(Figs 5 and 6)

Types

Holotype ♀ and 1♀ paratype, Cobargo, N.S.W.; 1♀ paratype, Tooloom, N.S.W.



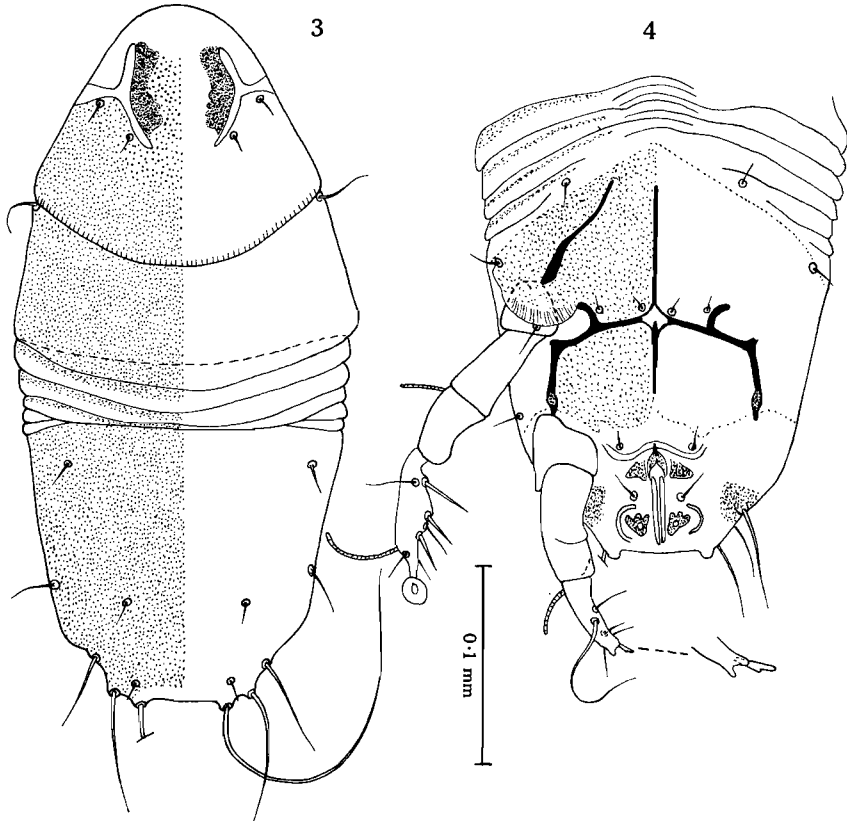
Figs 1 and 2. *C. potorous*, sp. nov. female: 1, dorsum; 2, venter.

Female Holotype

Length 705 μm ; width 215 μm . All body shields strongly sclerotized. Postscapular shield unusually long. Opisthonotal shield slightly longer than its maximum width, and leaving small portion of extremity of body uncovered; less well sclerotized in

midline, where it bears about 16 short, thick annulatory remnants. Copulatory tube small, conical, 21 μm long. Opisthogastric shield similar to opisthonotal, and also bearing series of short, transverse or oblique annulatory remnants in midline (anteriorly, these remnants are longer and finer).

The male is unknown.



Figs 3 and 4. *C. potorous*, sp. nov. male: 3, dorsum; 4, venter.

Cytostethum (Cytostethum) promeces Domrow

Collection Localities

Queensland: *Mount Nebo*. **New South Wales:** Cobargo. **Victoria:** Orbost; Gorae West. **Tasmania:** Green's Beach; *Maydena*; Sandfly.

Cytostethum (Cytostethum) trachypyx Domrow

Collection Localities

Queensland: *Mount Nebo*. **New South Wales:** Tooloom; Cobargo.

Cytostethum (Cytostethum) nanophyes Domrow

Collection Localities

Queensland: *Mount Nebo*. **New South Wales:** Tooloom; Cobargo. **Victoria:** Orbost; Gorae West. **Tasmania:** Green's Beach; Myrtle Bank; Launceston; Sandfly.

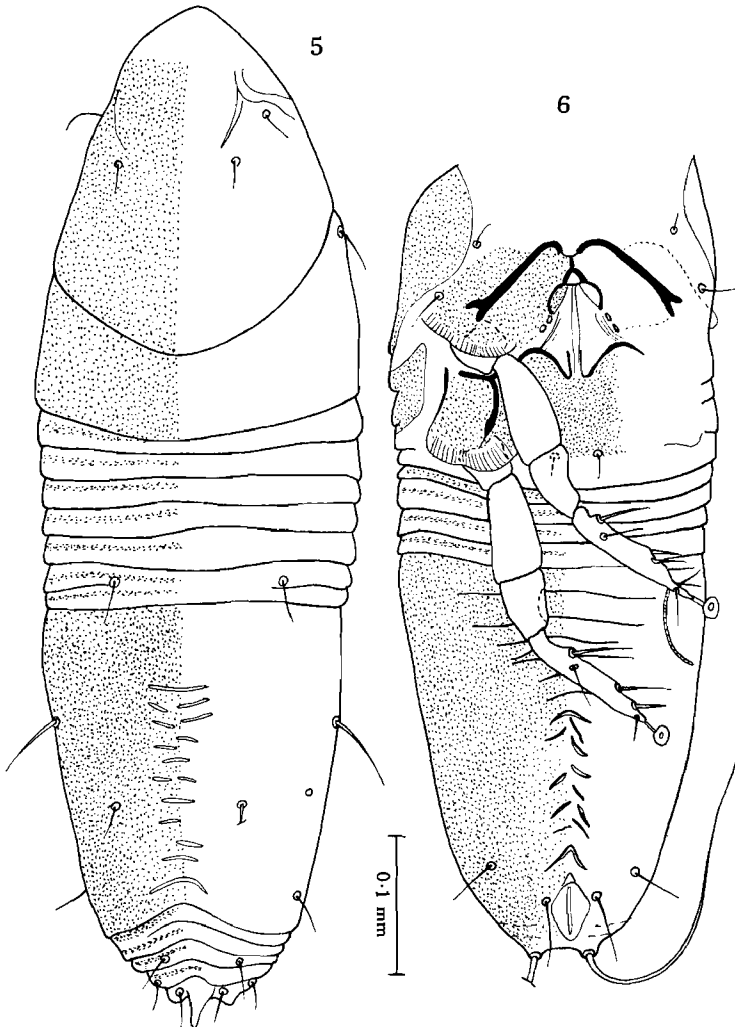
Cytostethum (Cytostethum) macropus Fain

Collection Localities

New South Wales: Cobargo. Victoria: Gorae West. Tasmania: Green's Beach.

Note

This species was originally described from the red and the black-striped wallabies, *Macropus rufogriseus* (Desmarest) and *M. dorsalis* (Gray), respectively. Later specimens were from the common wombat, *Vombatus ursinus* (Shaw). All three series were from museum specimens of these marsupials, and may now be placed as contaminants.



Figs 5 and 6. *C. mediotriatum*, sp. nov. female: 5, dorsum; 6, venter.

Cytostethum (Cytostethum) procharactum, sp. nov.

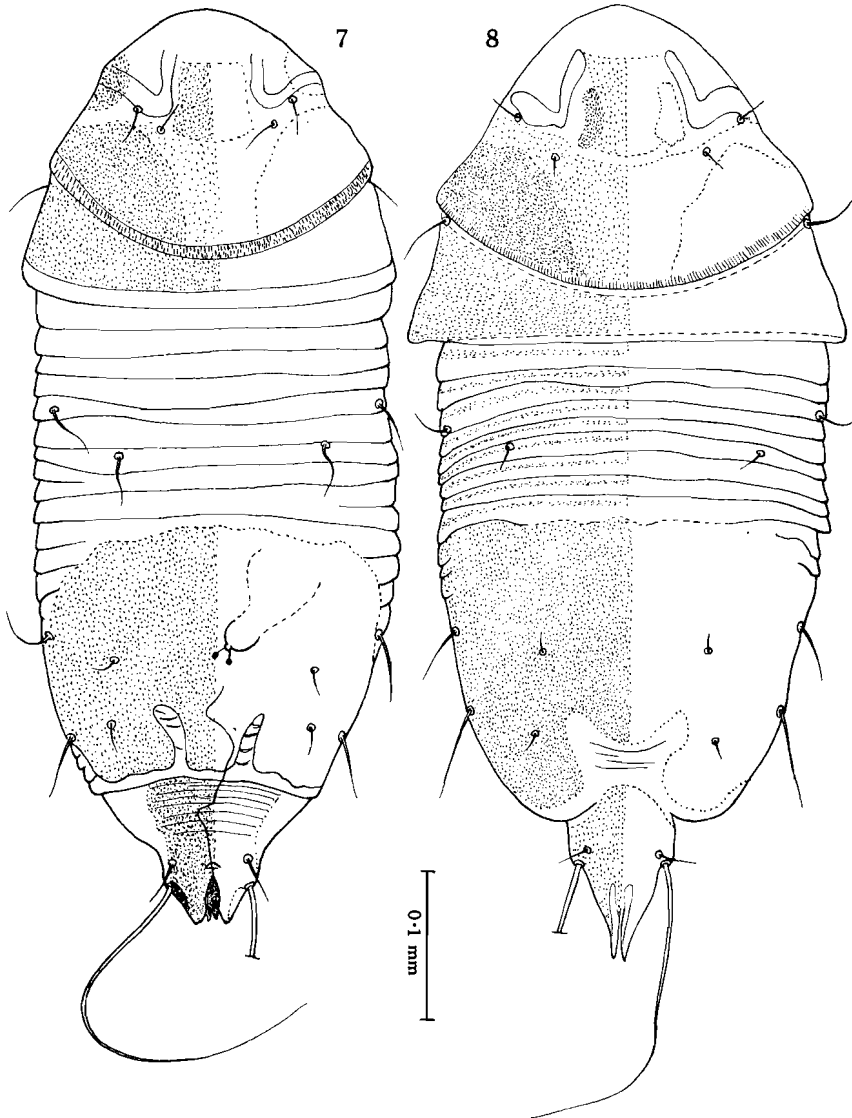
(Figs 7 and 9)

Types

Holotype ♀ and 8♀ paratypes, Sandfly, Tas.

Female Holotype

Length 705 μm (including base of copulatory tube up to insertions of setae I_5); width 300 μm . Postscapular shield weakly sclerotized medially. Opisthonotal shield with 2 narrow, paramedian incisions on posterior margin; cuticle behind this shield



Figs 7 and 8. *Cytostethum* spp., dorsum of females: 7, *C. procharactum*, sp. nov.; 8, *C. mesocharactum*, sp. nov.

partly annulate and punctate. Copulatory tube very short and wide. Coxae III–IV strongly punctate towards sides of body, but poorly or not so internally. Annulations of opisthogaster coarse and widely spaced; posterior region of opisthogaster punctate.

The male is unknown.

Cytostethum (Cytostethum) mesocharactum, sp. nov.
(Fig. 8)

Types

Holotype ♀ and 2♀ paratypes, Launceston, Tas.; 4♀ paratypes, Cobargo, N.S.W.; 6♀ paratypes, Pomonal, Vic., and Gorae West, Vic.; *Maydena*, Tas. (not types).

Female Holotype

Length 660 μm (including base of copulatory tube up to insertions of setae l_5); width 330 μm . Posterior margin of opisthotal shield with median incision resembling that of *C. pseudocharactum*, but differing as in key above. Copulatory tube 75 μm long, 63 μm wide basally, and sharply narrowed terminally. Venter as in *C. pseudocharactum*.

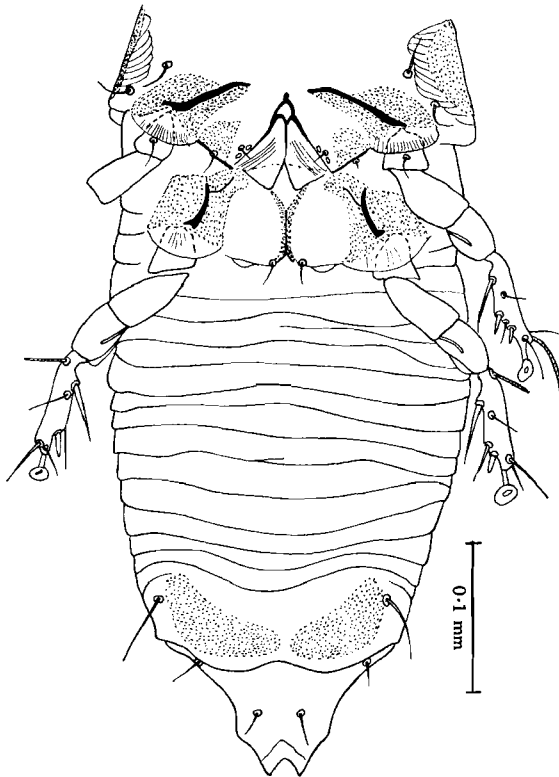


Fig. 9. *C. procharactum*, sp. nov., venter of female.

Note

The material from *Maydena* (both sexes) identified as *C. pseudocharactum* by Domrow (1961) is, in fact, *C. mesocharactum*.

Cytostethum (Cytostethum) pseudocharactum Domrow

Collection Localities

Queensland: *Mount Nebo*. **New South Wales:** *Toooloom*. **Victoria:** *Orbost*; *Gorae West*. **Tasmania:** *Green's Beach*.

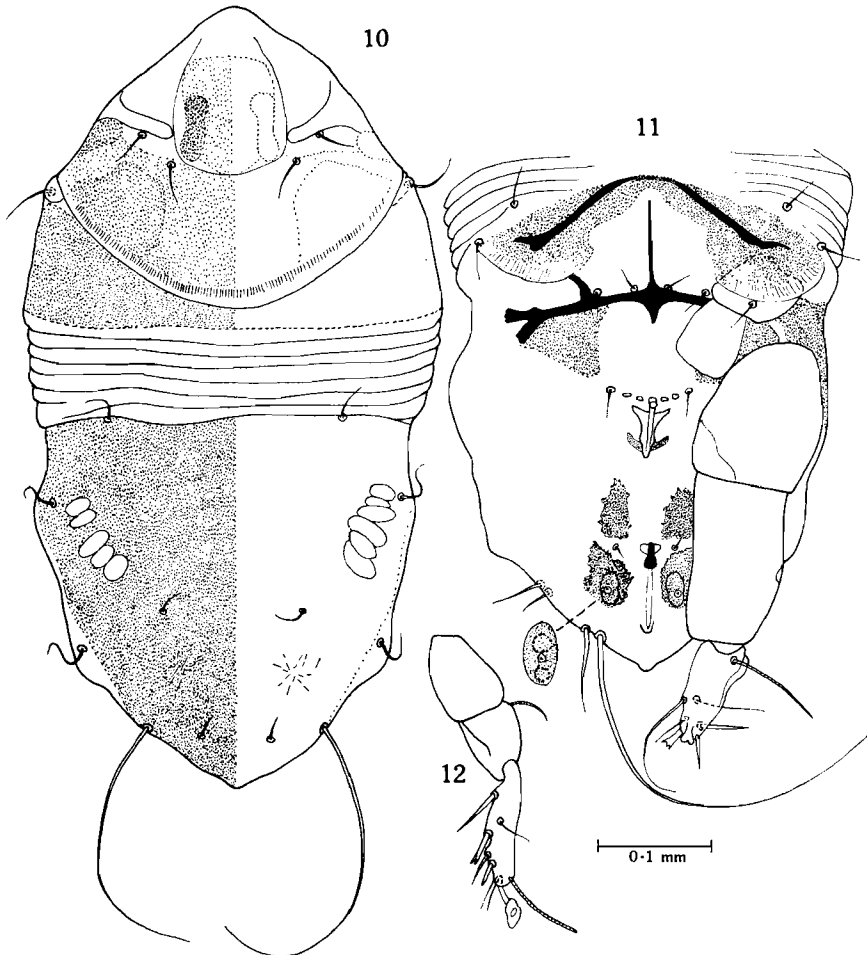
Note

See that on *C. mesocharactum* above.

Cytostethum (Cytostethum) charactum Domrow
(Figs 10–12)

Collection Localities

Queensland: Mount Nebo. **New South Wales:** Tooloom; Cobargo. **Victoria:** Orbost; Pomonal; Gorae West. **Tasmania:** Myrtle Bank; Launceston; Sandfly.



Figs 10–12. *C. charactum* Domrow, male: 10, dorsum; 11, venter; 12, leg III.

Male

Specimen figured 675 μm long, 330 μm wide. Hysteronotal shield very short as in female. Opisthonotal shield well sclerotized, with ovate markings anterolaterally. Adanal organs with minute disc rather than seta shown in original description; preceded by 2 further ill-defined sclerotizations and 2 setae. Additional characters as in original description.

Cytostethum (Cytostethum) tubiferum, sp. nov.

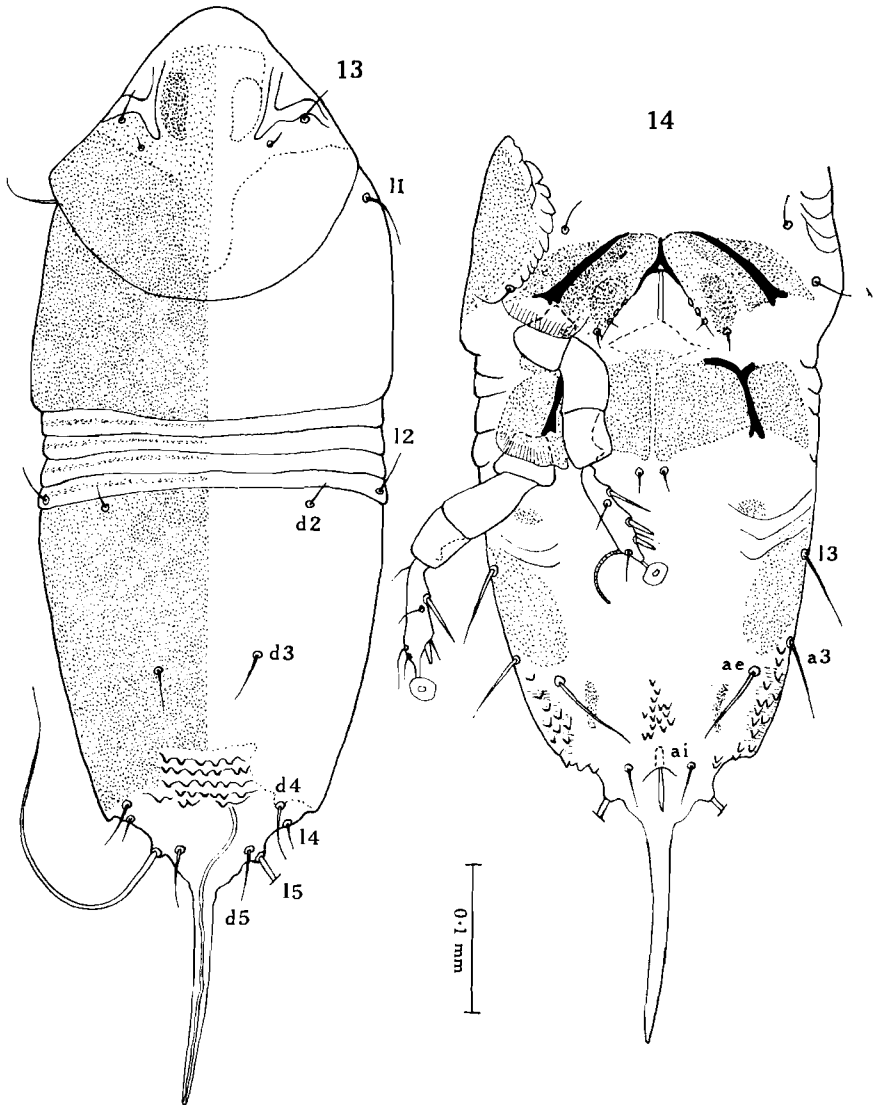
(Figs 13–16)

Types

Holotype ♀, allotype ♂, and 30♀, 2♂ paratypes, Sandfly, Tas.; 1♀ paratype, Green's Beach, Tas.

Female Holotype

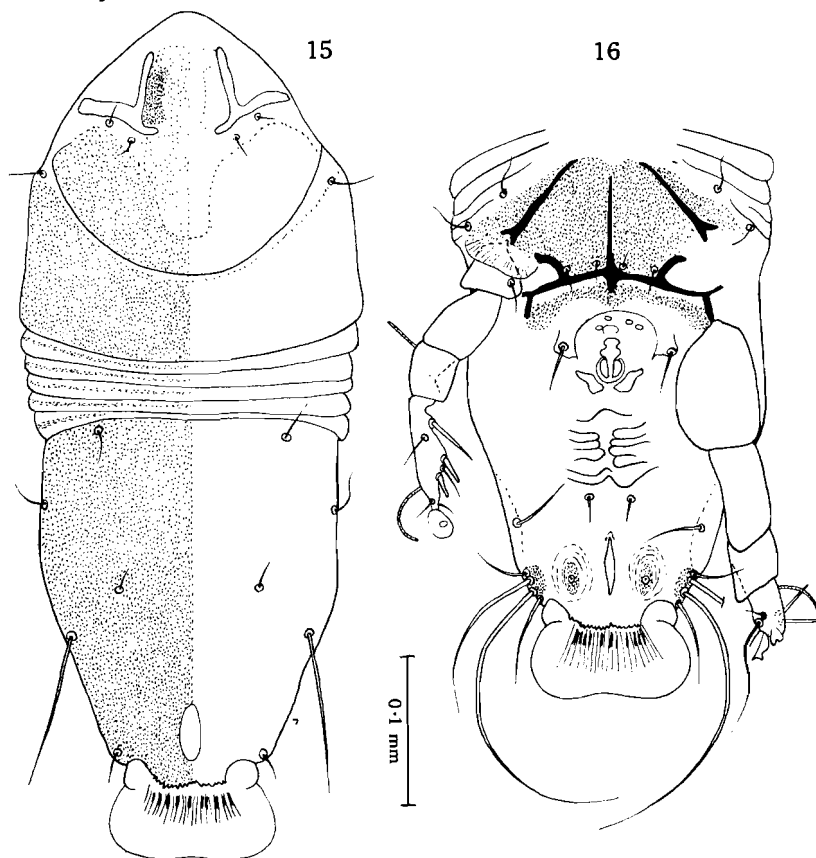
Length 585 µm (excluding copulatory tube); width 250 µm. Postscapular shield less densely sclerotized anteromedially. Opisthonotal shield long, with wide (but



Figs 13 and 14. *C. tubiferum*, sp. nov., female: 13, dorsum; 14, venter.

shallow) median incision on posterior margin. Soft cuticle within incision with 4–5 transverse rows of scales. Copulatory tube 135 µm long, 11 µm wide (maximum). Coxae IV completely punctate, and almost reaching midline. Opisthogaster with

12–15 small scales preceding anus; cuticle in front of these textureless. Laterally, opisthogaster bears (from front to back) 2 or 3 incomplete annulations, punctate shield, and scaly area.



Figs 15 and 16. *C. tubiferum*, sp. nov., male: 15, dorsum; 16, venter.

Male Allotype

Length 555 μm (including caudal membrane); width 225 μm . Dorsum as in female, but opisthonotal shield not incised posteriorly. Posterior margin of body with transparent membrane which is wider than long, and slightly concave medially. Penis small, flanked by 2 short posterointernally directed sclerotizations. Cuticle behind penis with 4–5 short, thick transverse folds. Adanal organs with minute disc. Legs IV with femora relatively long and tibiotarsi very short.

Cytostethum (Cytostethum) pseudotubiferum, sp. nov.

(Figs 17–20)

Types

Holotype ♀, allotype ♂ and 4♂, 4♀ paratypes, Launceston, Tas.

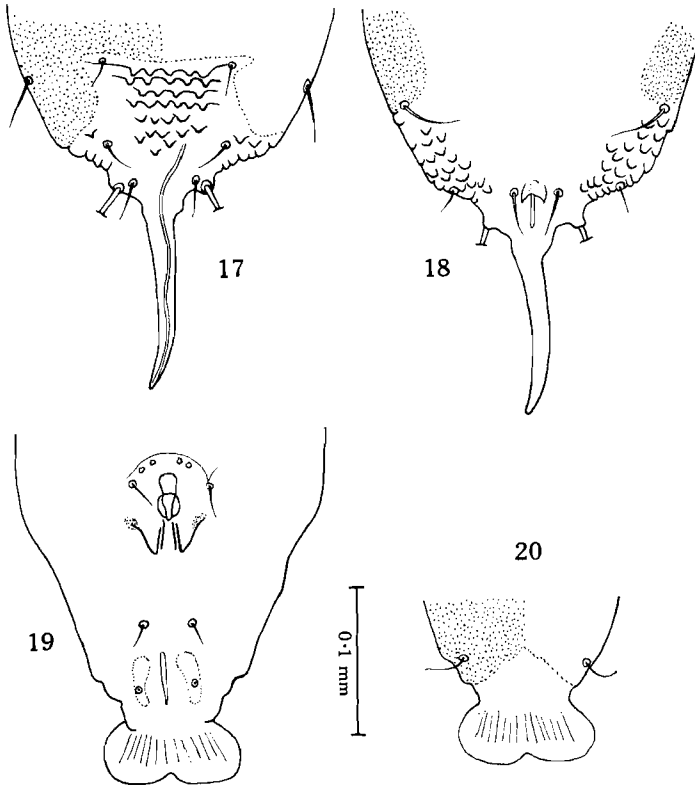
Female Holotype

Length 600 μm (excluding copulatory tube); width 290 μm . Dorsum as in *C. tubiferum*, but incision on posterior margin of opisthonotal shield larger, and setae d_3

free of shield and set on soft skin in incision. Copulatory tube much shorter, but very slightly thicker (length $110\ \mu\text{m}$, maximum width $12\ \mu\text{m}$). Opisthogaster as in *C. tubiferum*, but median scales absent.

Male Allotype

Length $579\ \mu\text{m}$ (including caudal membrane); width $255\ \mu\text{m}$. Dorsum as in *C. tubiferum*, but caudal membrane slightly smaller, with deeper and narrower median concavity. Opisthonotal shield with posterior margin concave. Sclerotizations flanking penis longer than in *C. tubiferum*, and cuticle behind penis bare, without folds. Adanal organs with minute disc. Tibiotarsi IV ($48\ \mu\text{m}$) longer than in *C. tubiferum* ($39\ \mu\text{m}$).



Figs 17-20. *C. pseudotubiferum*, sp. nov.: 17, dorsum, female; 18, venter, female; 19, venter, male; 20, dorsum, male.

Cytostethum (Cytostethum) neotubiferum, sp. nov.

(Figs 21-24)

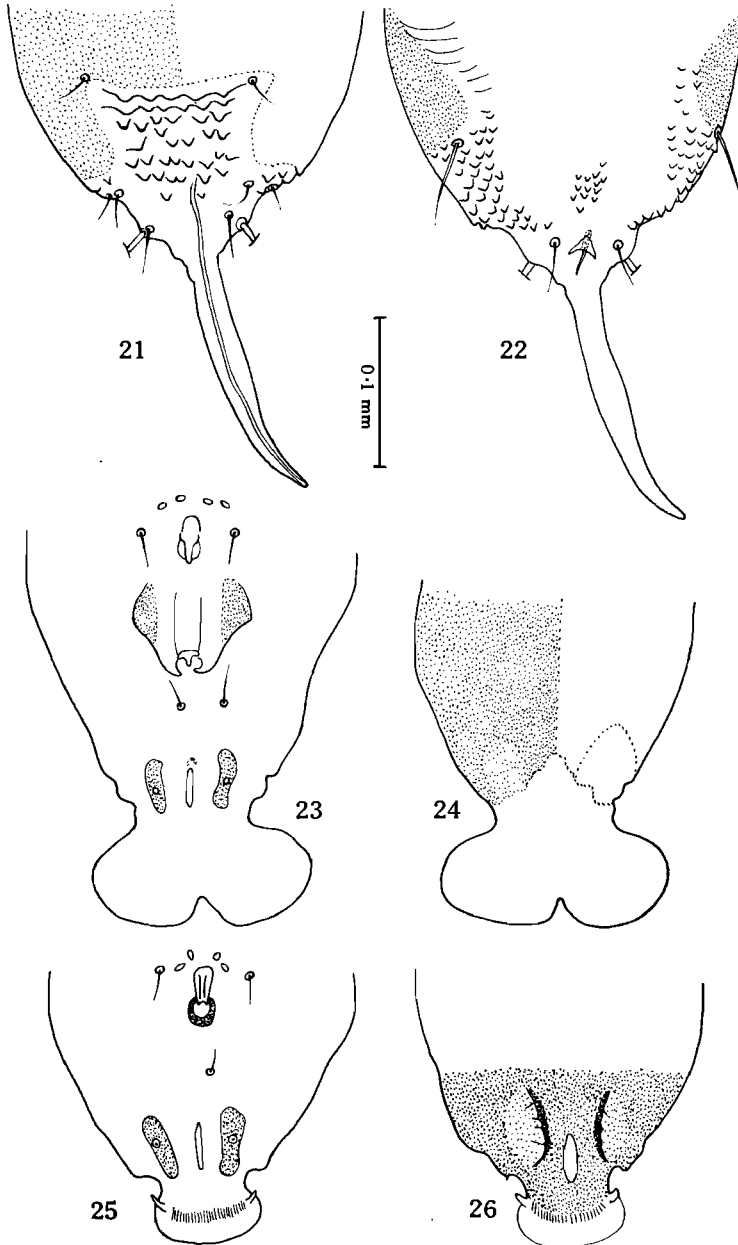
Types

Holotype ♀ and 6♀, 7♂ paratypes, Gorae West, Vic.; allotype ♂ and 3♀, 3♂ paratypes, Orbost, Vic.

Female Holotype

Length $630\ \mu\text{m}$ (excluding copulatory tube); width $285\ \mu\text{m}$. Dorsum as in *C. pseudotubiferum*. Copulatory tube $150\ \mu\text{m}$ long, slightly inflated towards midlength;

maximum width 21 μm . Opisthogaster as in *C. tubiferum*, but anterolateral annulations and posterolateral scales more numerous.



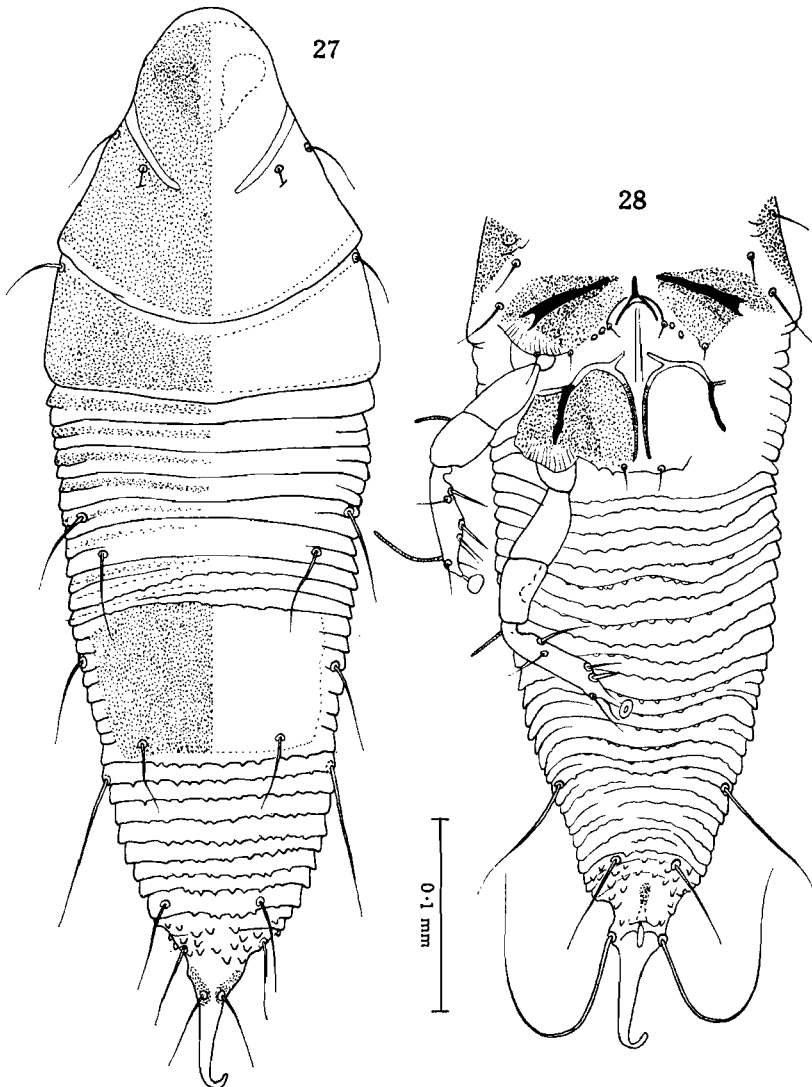
Figs 21-24. *C. neotubiferum*, sp. nov.: 21, dorsum, female; 22, venter, female; 23, venter, male; 24, dorsum, male.

Figs 25 and 26. *C. toloomense*, sp. nov., male: 25, venter; 26, dorsum.

Male Allotype

Length 630 μm (including caudal membrane); width 255 μm . Opisthonotal shield as in *C. neotubiferum*, but with 2 weakly sclerotized paramedian patches on more

eroded posterior margin. Caudal membrane wider and more deeply incised medially than in preceding 2 species. Sclerotizations flanking penis larger, incurved posteriorly towards median triangular formation. Adanal organs with minute disc.



Figs 27 and 28. *C. hamatum*, sp. nov., female: 27, dorsum; 28, venter.

***Cytostethum (Cytostethum) tooolomense*, sp. nov.**
(Figs 25 and 26)

Types

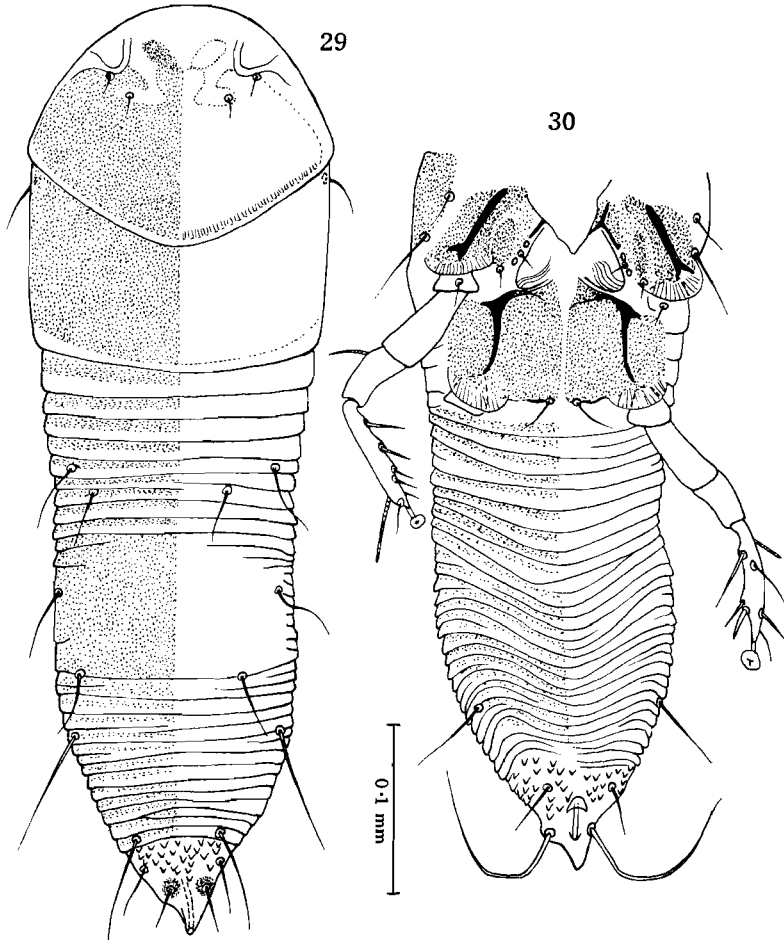
Holotype ♂ and 7♂ paratypes, Tooloom, N.S.W.

Male Holotype

Length 585 μm (including caudal membrane); width 280 μm . Dorsum as in 3 preceding species, but opisthonotal shield with 2 elongate, peculiarly textured zones

posteriorly. Caudal membrane shorter and narrower than in 3 preceding species, and provided with 2 retrorse crotchets. Penis not flanked by sclerotizations. Adanal organs with minute disc.

The female is unknown.



Figs 29 and 30. *C. gracile*, sp. nov., female: 29, dorsum; 30, venter.

Cytostethum (Cytostethum) mollisoni Domrow

Collection Localities

Queensland: Mount Nebo. **New South Wales:** Cobargo. **Victoria:** Orbost; Gorae West. **Tasmania:** Green's Beach; Myrtle Bank; Launceston; *Maydena*.

Notes

The copulatory tube in this species may appear tapered distally, but only because of torsion; in life, this structure is parallel-sided and distinctly flattened dorso-ventrally.

Specimens of this species recovered from the same museum specimens of *M. dorsalis* and *V. ursinus* noted under *C. macropus* above are also contaminants.

Cytostethum (Cytostethum) hamatum, sp. nov.

(Figs 27 and 28)

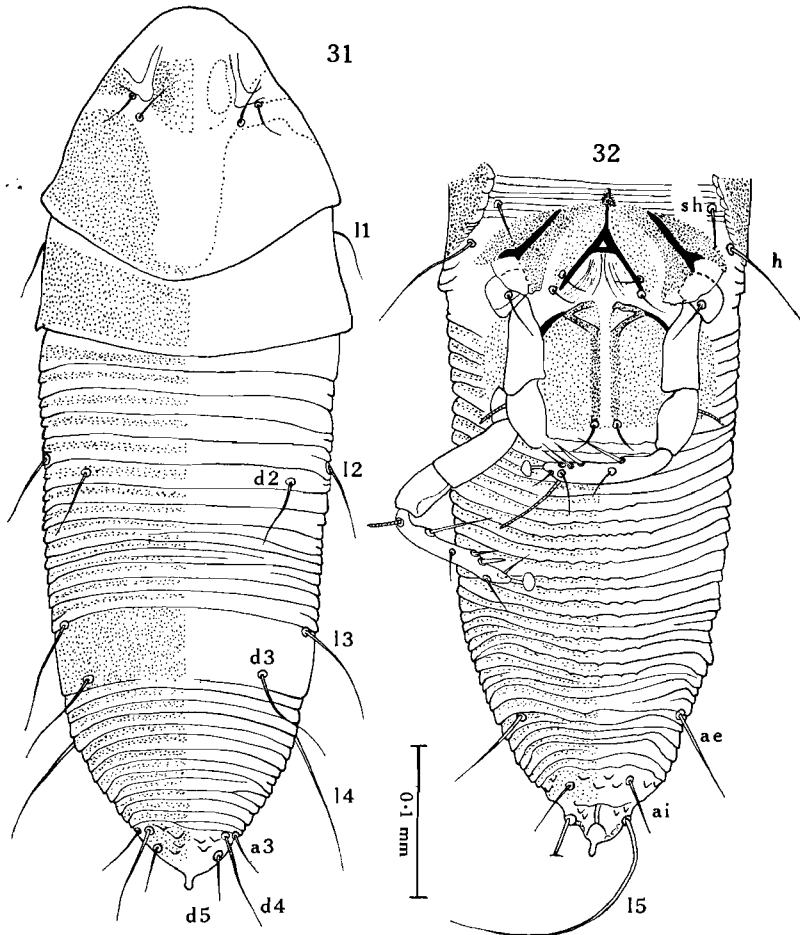
Types

Holotype ♀ and 6♀ paratypes, Myrtle Bank, Tas.

Female Holotype

Length 495 μm (excluding copulatory tube); width 174 μm . Opisthonotal shield wider than long, followed by extensive area of scaly annulations. Copulatory tube longer and narrower than in *C. mollisoni*, distinctly attenuated and hooked in distal fifth. Venter as in *C. mollisoni*, but without posterolateral scales.

The male is unknown.

Figs 31 and 32. *C. dendriticum*, sp. nov., female: 31, dorsum; 32, venter.*Cytostethum (Cytostethum) gracile*, sp. nov.

(Figs 29 and 30)

Types

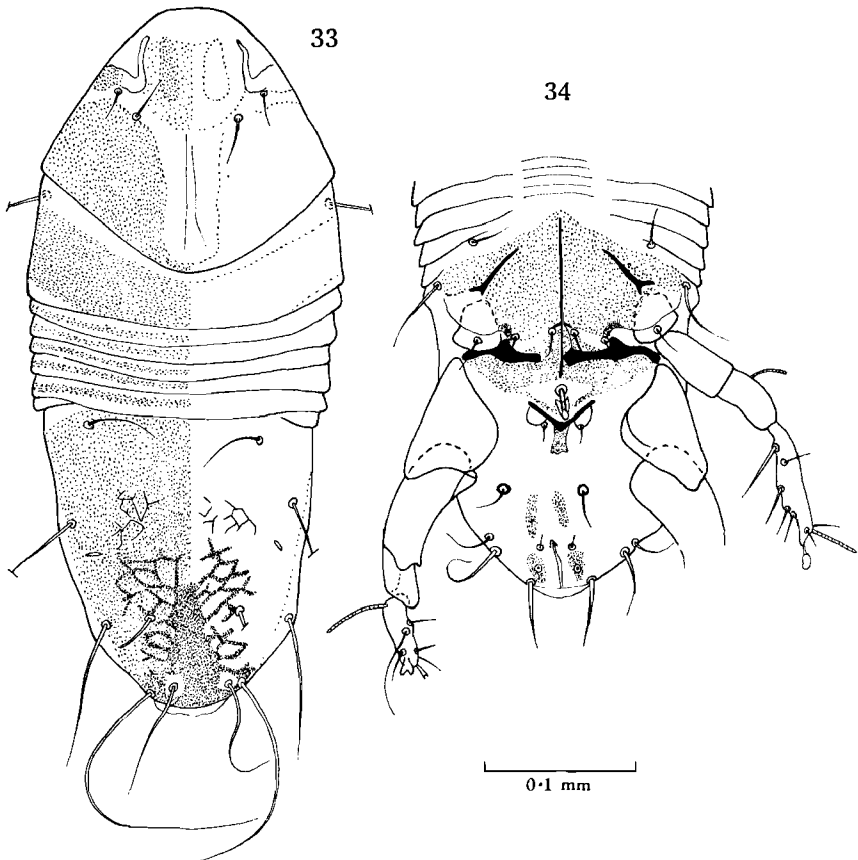
Holotype ♀ and 3♀ paratypes, Myrtle Bank, Tas.; 1♀ paratype, Cobargo, N.S.W.

Female Holotype

Length 540 μm (excluding copulatory tube); width 168 μm . Opisthonotal shield wider than long, separated from extremity of body by about 12 annulations. Small

scaly area at extremity, both dorsally and ventrally. Copulatory tube short, conical. Opisthogaster without shields. Coxae IV large, punctate, and almost meeting in midline.

The male is unknown.



Figs 33 and 34. *C. dendriticum*, sp. nov., male: 33, dorsum; 34, venter.

Cytostethum (Cytostethum) dendriticum, sp. nov.

(Figs 31–34)

Types

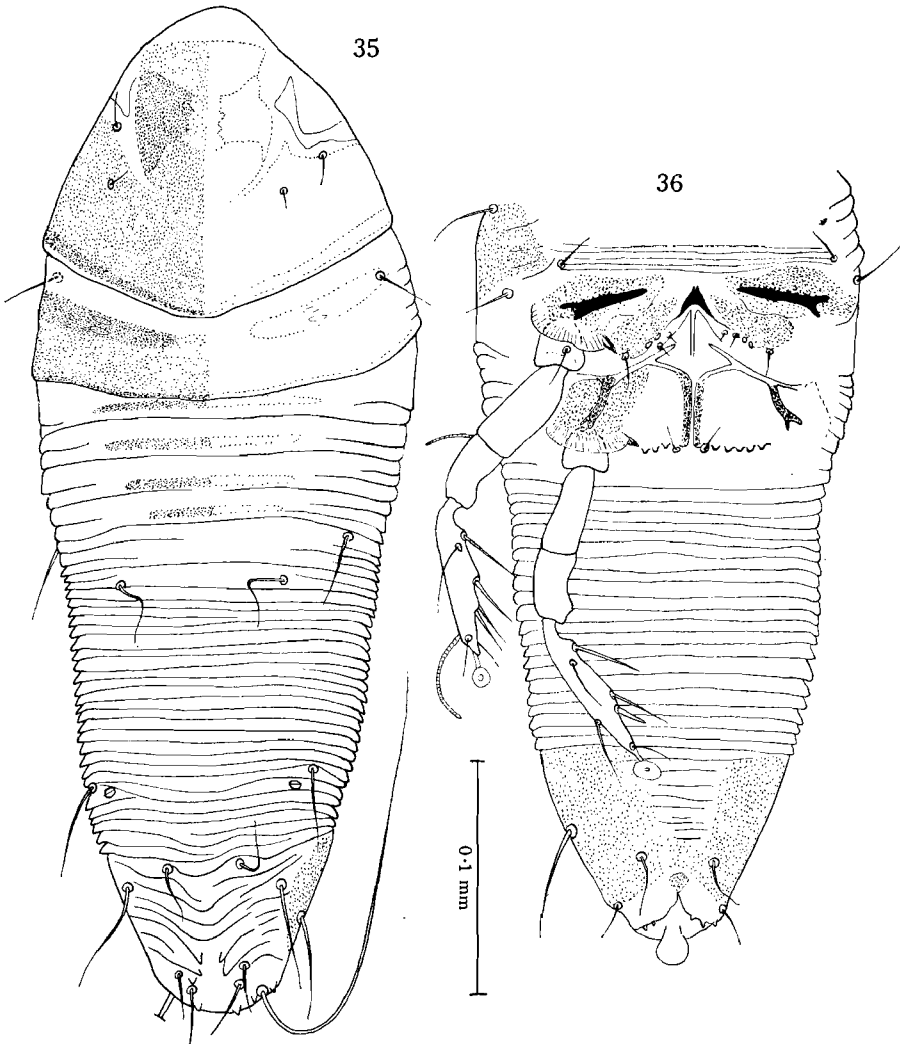
Holotype ♀ and 2♀ paratypes, Myrtle Bank, Tas.; allotype ♂ and 1♀ paratype, Sandfly, Tas.; 2♀ paratypes, Green's Beach, Tas.; 1♀ paratype, Orbost, Vic.; 1♀ paratype, Pomonal, Vic.

Female Holotype

Length 579 μm (excluding copulatory tube); width 204 μm . Postscapular shield with large subrectangular median area very weakly sclerotized. Opisthonotal shield very short (54 μm long), followed by about 15 annulations. Small scaly area at extremity, both dorsally and ventrally. Copulatory tube very short and narrow. Opisthogaster without shields; annulations sinuous, with indications of scales.

Male Allotype

Length 459 μm ; width 155 μm . Dorsum anteriorly as in female. Opisthonotal shield extensive, with peculiar texture resembling a tree. Adanal organs with minute disc. Posterior extremity rounded, with very short membrane. Legs IV decidedly larger than III; tibiotarsi IV 45 μm long.



Figs 35 and 36. *C. postscutatum*, sp. nov., female: 35, dorsum; 36, venter.

***Cytostethum (Cytostethum) postscutatum*, sp. nov.**

(Figs 35 and 36)

Types

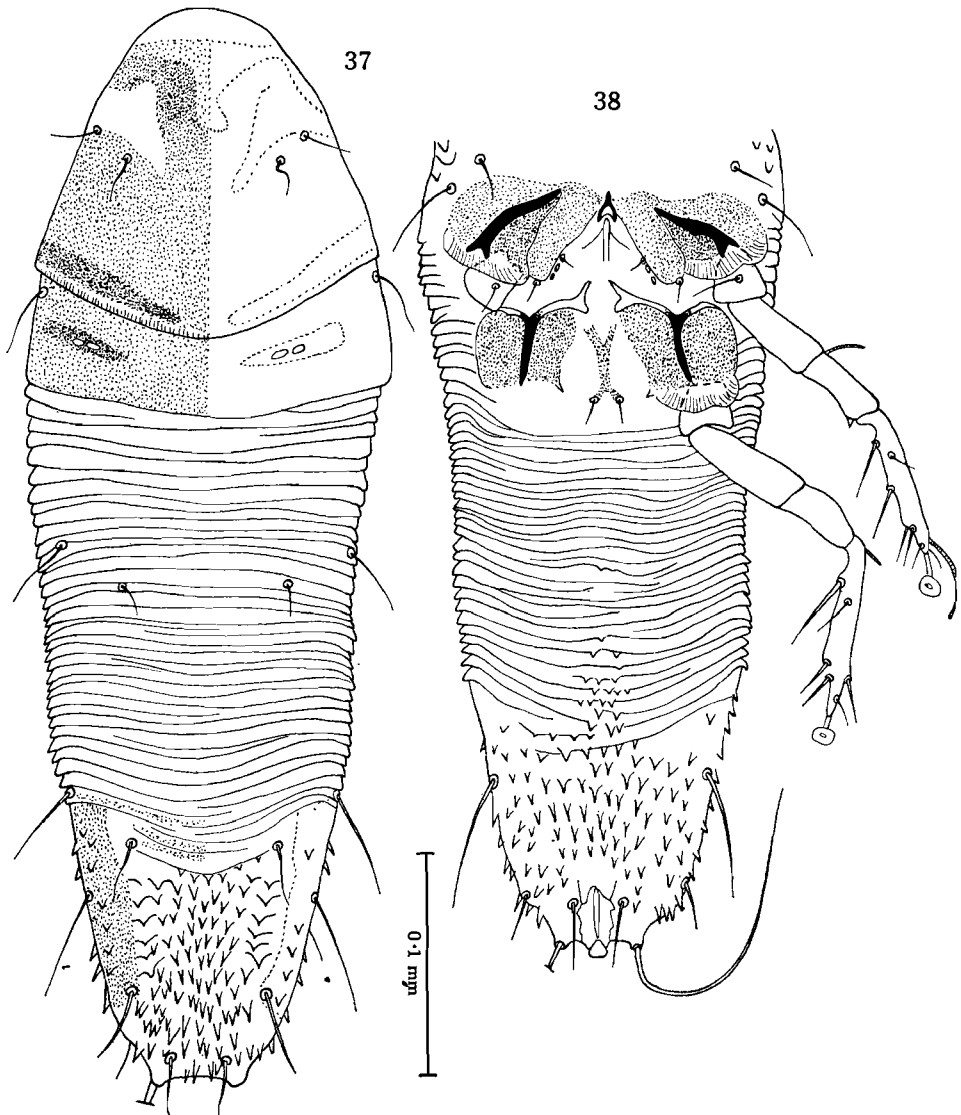
Holotype ♀ and 1♀ paratype, Gorae West, Vic.; 5♀ paratypes, Myrtle Bank, Tas.

Female Holotype

Length 420 μm ; width 165 μm . Postscapular shield with heavily sclerotized transverse band posteriorly; hysteronotal shield with similar band anteriorly.

Opisthonotal shield absent. Annulations with sclerotized transverse band anteriorly, and with median interruption posteriorly. Copulatory tube short and rounded. Opisthogastric shield occupying posterior third of opisthosoma; punctate and deeply incised anteriorly. Coxae IV weakly sclerotized towards midline.

The male is unknown.



Figs 37 and 38. *C. spinulatum*, sp. nov., female: 37, dorsum; 38, venter.

Cytostethum (Cytostethum) spinulatum, sp. nov.
(Figs 37 and 38)

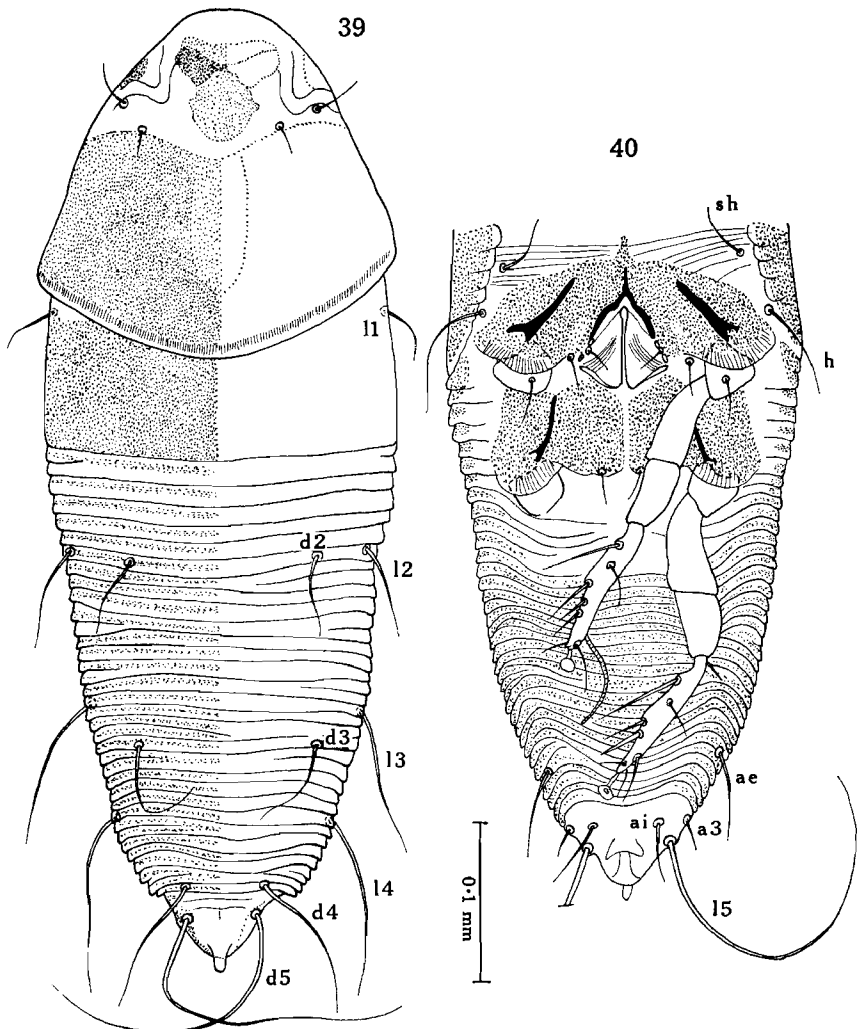
Types

Holotype ♀ and 1♀ paratype, Gorae West, Vic.; 3♀ paratypes, Green's Beach, Tas.; 9♀ paratypes, Myrtle Bank, Tas.

Female Holotype

Length 516 μm ; width 175 μm . Postscapular and hysteronotal shields with sclerotized bands as in *C. postscutatum*. Opisthotal shield absent. Annulations give way in terminal 100–110 μm to numerous long scales both dorsally and ventrally; laterally, this region is also punctate. Copulatory tube vestigial. Opisthogastric shield absent.

The male is unknown.



Figs 39 and 40. *C. domrowi* Fain, female: 39, dorsum; 40, venter.

Cytostethum (Cytostethum) domrowi Fain
(Figs 39 and 40)

Collection Localities

Queensland: *Mount Nebo*. New South Wales: *Cobargo*. Victoria: *Gorae West*. Tasmania: *Green's Beach*.

Table 1. Distribution of species of *Cytostethum* s.s. from *Potorous tridactylus*

Species	New South Wales			Victoria				Tasmania				Known localities per species
	Queensland Mt Nebo	Tooloom	Cobargo	Orbost	Pomonol	Gorae West	Green's Beach	Myrtle Bank	Launceston	Maydena	Sandfly	
<i>C. potorous</i>						+			+			2
<i>C. mediostriatum</i>		+	+									2
<i>C. promeces</i>	+		+	+		+	+			+	+	7
<i>C. trachypyx</i>	+	+	+									3
<i>C. nanophyes</i>	+	+	+	+		+	+	+	+		+	9
<i>C. macropus</i>			+			+	+					3
<i>C. procharactum</i>											+	1
<i>C. mesocharactum</i>			+		+	+			+	+		5
<i>C. pseudocharactum</i>	+	+		+		+	+					5
<i>C. charactum</i>	+	+	+	+	+	+		+	+		+	9
<i>C. tubiferum</i>							+				+	2
<i>C. pseudotubiferum</i>									+			1
<i>C. neotubiferum</i>				+		+						2
<i>C. toooloomense</i>		+										1
<i>C. mollisoni</i>	+		+	+		+	+	+	+	+		8
<i>C. hamatum</i>								+				1
<i>C. gracile</i>			+					+				2
<i>C. dendriticum</i>				+	+		+	+			+	5
<i>C. postscutatatum</i>						+		+				2
<i>C. spinulatum</i>						+	+	+				3
<i>C. domrowi</i>	+		+			+	+					4
<i>C. nudum</i>												0
Species at locality	7	6	10	7	3	12	9	8	6	3	6	—

Note

As this species was described after a single damaged specimen, with many broken setae, new illustrations are provided.

Cytostethum (Cytostethum) nudum Fain

Material

No specimens from *Potorous* are known.

Note

As this species is based on a single specimen found in alcohol containing a numbat, *Myrmecobius fasciatus* Waterhouse (Marsupialia:Dasyuridae), its true host needs confirmation.

Discussion

The literature records several examples of multiple speciation in the same genus of fur mites. Dubinina (1964) found 12 species of *Schizocarpus* Trouessart (= *Histiophorus* Friedrich) on the beaver, *Castor fiber* Linnaeus, in the U.S.S.R. In North America, the muskrat, *Ondatra zibethica* Linnaeus, harbours six species of *Listrophorus* Pagenstecher (see Fain and Hyland 1973). Fain (1972*b*, 1972*c*) noted another example from central Africa, where the rat *Malacomys longipes* Milne-Edwards is infested by six species of *Listrophoroides* Hirst, subgenus *Afrolistrophoroides* Fain.

Such intense speciation within a subgenus restricted to the pelage of a single host is at variance with a general ecological principle (Macfadyen 1963)—that, since species of the same genus are usually similar both in structure and in habits, the struggle between them, should they come into competition, is more severe than between species of different genera—but only superficially so. Thus in Dubinina's example each species was confined to a particular part of the body, the distribution apparently being determined by hair structure and diameter, skin secretions, etc.*

Studies of the potoroo along these lines would be of considerable, if academic, interest. Of the 15 potoroos examined, that from Gorae West in Victoria carried the most species of *Cytostethum* (12), though the total from Tasmanian localities is 17 (Table 1). Thus many species occur widely both in coastal mainland Australia and in Tasmania (e.g. *C. promeces*, *C. charactum*, *C. nanophyes* and *C. mollisoni*), while others are as yet known from only one locality (e.g. *C. procharactum* and *C. pseudotubiferum*). More mite populations need to be analysed to determine if geographical isolation has induced speciation in them, but, generally speaking, the data to hand do not support the contention that mainland and Tasmanian potoroos are specifically distinct (Ride 1970).†

*Likewise, in the nematode genus *Murshidia* Lane, the 14 species from the African, and the six from the Indian, elephant [*Loxodonta africana* (Blumenbach) and *Elephas maximus* Linnaeus] appear restricted each to certain parts of the digestive tract (Popova 1958).

†*Australolaelaps validipes* (Domrow), a dermanyssid mite peculiar to the potoroo, is also present both on the mainland and in Tasmania (Domrow 1965).

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