

New species of *Labiobulura* (Nematoda: Ascaridida), and *Dorcopsinema* and *Paralabiostrongylus* (Nematoda: Strongylida) from *Dorcopsis muelleri* (Macropodidae) from Lengguru, West Papua, Indonesia

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New species of *Labiobulura* (Nematoda: Ascaridida), and *Dorcopsinema* and *Paralabiostrongylus* (Nematoda: Strongylida) from *Dorcopsis muelleri* (Macropodidae) from Lengguru, West Papua, Indonesia

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ABSTRACT

A new species of the Subuluridae (Nematoda: Ascaridida) *Labiobulura lengguruensis* n. sp. is described from the caecum and colon and two new species of the Chabertiidae: Cloacininae (Nematoda: Strongylida) *Paralabiostrongylus tuberis* n. sp. and *Dorcopsinema amplum* n. sp. are described from the stomach of the macropodid marsupial *Dorcopsis muelleri* (Lesson, 1827) (Mammalia: Macropodidae) in Papua Indonesia. *Labiobulura lengguruensis* differs from all congeners in having a simple denticle associated with each labial lobe of the buccal capsule. *Paralabiostrongylus tuberis* can be distinguished from its congeners in by the position of the deirid and the form of the dorsal ray and genital cone. *Dorcopsinema amplum* can be distinguished from its congeners by the length of the spicule, the morphology of the appendages on the ventral lip of the genital cone, the position of the lateral branches of the dorsal ray, the shape of the female tail, the morphology of the vagina and the size of the eggs. The known nematode fauna of *D. muelleri* is summarised. The finding of three species of *Dorcopsinema* each in a different geographical locality suggests the possibility of allopatric speciation. A revised key to the species of *Dorcopsinema* is given.

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Introduction

The nematode genus *Labiobulura* (Ascaridida: Subuluridae) occurs in the caecum and colon of bandicoots (Peramelidae) and bilbies (Thylacomyidae) from Australia and an endemic species of rodent, *Leptomys* (Muridae; Murinae), from Papua New Guinea (Smales, 2009). The genera *Dorcopsinema* and *Paralabiostrongylus* (Strongylida: Chabertiidae: Cloacininae: Labiostrongylinae) occur in the stomachs of forest wallabies, species of *Dorcopsis* and *Dorcopsulus*, macropodid marsupials that are found only on New Guinea and associated islands and also in tree kangaroos, species of *Dendrolagus*, macropodid marsupials that are found in Australia, New Guinea and associated islands (Purwaningsih & Smales, 2010, 2011, 2014; Smales, 2006b; Wilson & Reeder, 2005).

Dorcopsis muelleri (Lesson, 1827) (Macropodidae: Macropidinae), the brown dorcopsis, is a poorly known species that occurs at low altitudes from the Mimika River west to the Vogelkop and east towards the north of the central cordillera as well as Misool, Salawati, Aru and Yapen Islands (Flannery, 1995; Wilson & Reeder, 2005). In some previous descriptions of stomach nematodes from Papua New Guinea, the identification of the host, recorded as the grey dorcopsis, has been erroneously given as *D. veterum* or *D. muelleri* (see Baylis, 1940; Mawson, 1977a; Smales, 1982a, 1982b). Since *D. muelleri* is found only in Indonesian New Guinea, the correct identification of the host is *D. luctuosa* (D'Albertis, 1874) which is found only in Papua New Guinea.

The nematodes reported as occurring in the stomach of *D. muelleri* include the chabertiids *Cervonemella reardonii* Beveridge, 2002; *Cloacina caballeroi* Mawson, 1977; *C. erigone* Beveridge, 2002; *C. polymela* Beveridge, 2002; *C. procris* Beveridge, 2002; *C. syphax* Beveridge, 2002; *Coronostrongylus spearei* Beveridge, 2002; *Dorcopsinema dorcopsis* (Baylis, 1940); *Do. longispiculare* Purwaningsih & Smales, 2014 (orthography corrected); *Dorcopsisstrongulus ewini* Purwaningsih & Smales, 2010; *Dr. salawatiensis* Purwaningsih & Smales, 2010; *Labiosimplex papuensis* Purwaningsih & Smales, 2011; *Labiomultiplex sagawinensis* Purwaningsih & Smales, 2011; *Paralabiostrongylus bicollaris* Smales, 1982; and *P. rajampatensis* Purwaningsih & Smales, 2014. There are, however, no records of subulurids occurring in macropodid marsupials from Australia or New Guinea.

During an expedition to Lengguru, Papua, parasitic nematodes were collected from the stomach, caecum and colon of *D. muelleri* and the three new species recovered, a new species of subulurid and two new species of chabertiid, are described herein.

Materials and methods

The material examined was collected from the brown dorcopsis, *D. muelleri*, from Lengguru, West Papua, on 13 November 2014. Nematodes recovered from the gastrointestinal tract were fixed in warm 70% ethanol, 80°C, and then stored in that solution. The specimens obtained were cleared and mounted in lactophenol for examination as wet mounts under a compound microscope. Specimens for electron microscope examination were post-fixed in cacodylate buffer and glutaraldehyde, dehydrated in a concentration series of ethanol, beginning from 70% through to absolute ethanol and vacuum dried. Then dried specimens were attached to stubs with double-sided cello-tape, coated with gold and observed with a JSM-5310LV Electron Microscope. Figures were made with the aid of a drawing tube attached to a compound microscope. Measurements are given in micrometres as the mean, followed by the range in parentheses, unless otherwise stated. Terminology of the structure of the cephalic end of the genus *Labiobulura* follows Inglis (1958, 1960). All specimens described here were deposited in the nematode collection of Museum Zoologicum Bogoriense, Research Centre for Biology, Indonesian Institute of Sciences, Cibinong, Indonesia.

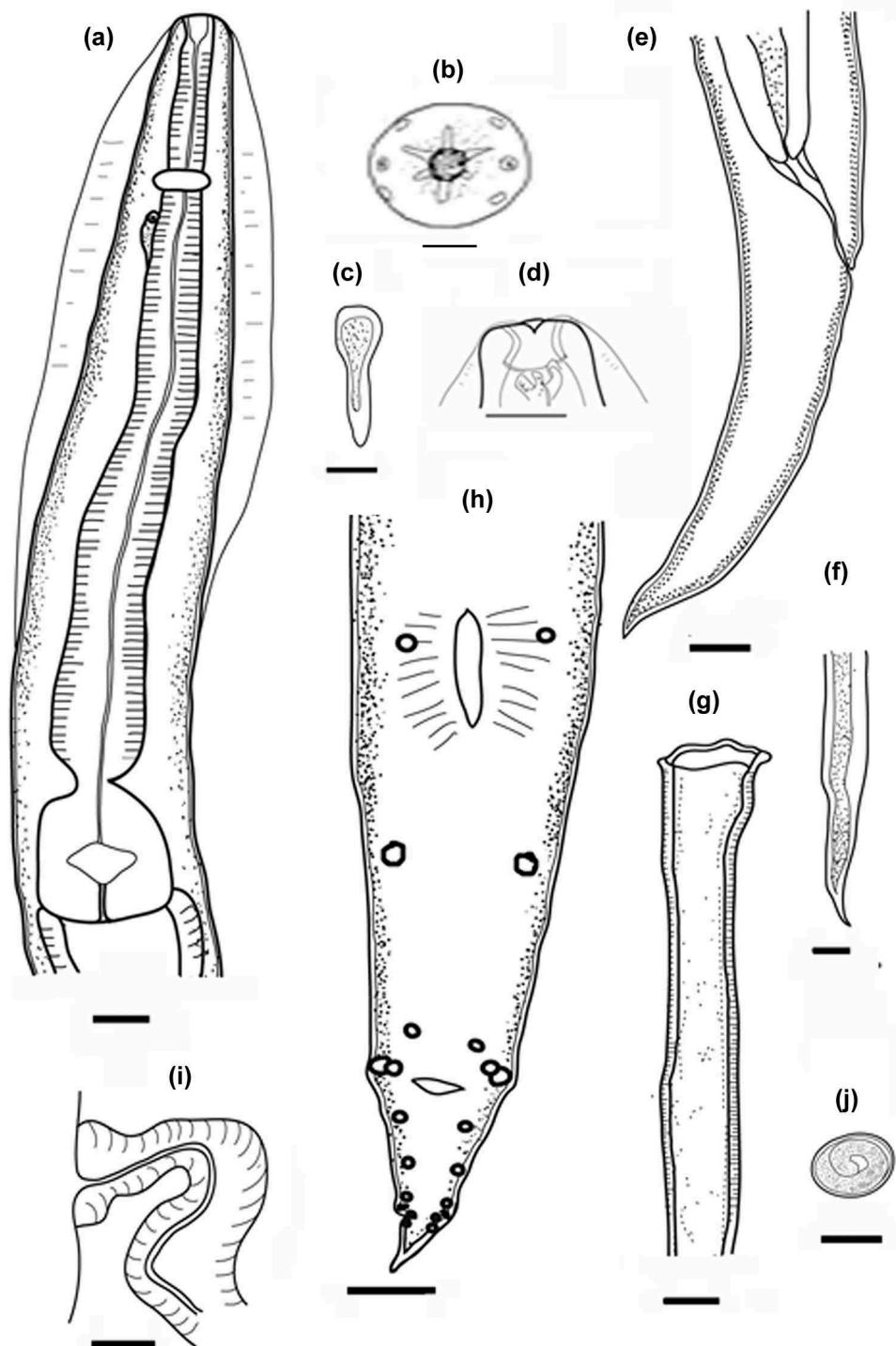


Figure 1. *Labiobulura lengguruensis* sp. n. (a) Anterior end male, ventral view. (b) Cephalic end, end face view. (c) Gubernaculum, ventral view. (d) Cephalic end, ventral view. (e) Posterior end female, lateral view. (f) Distal tip spicule, lateral view. (g) Proximal tip spicule, ventral view. (h) Posterior end male, ventral view. (i) Vagina vera, lateral view. (j) Egg.

Scale bars: 1(a,e,h) – 100 μm ; 1(c,d,i,j) – 50 μm ; 1(f) – 10 μm ; 1(b,g) – 20 μm .

Results

Subuluridae

Labiobulura (Archeobulura) lengguruensis n.sp.

Description. General: Body medium sized, cuticle with annulations, cervical alae wide, 70–100 extend to the posterior third of the oesophagus (Figure 1(a)). Mouth opening bounded by six simple labial lobes, triangular in outline truncate at distal end; four submedian lobes, each with cephalic papilla; two lateral lobes each with amphid; all amphids and papillae lie at bases of lobes (Figure 4(a)). Buccal capsule circular in cross section, with thick cuticular walls (Figure 1(b)), separated from portion by fine transverse ridge. Pharyngeal lobes cuticularised; three larger chordal lobes with rounded proximal surfaces, project anteriorly into buccal capsule, radial lobes smaller (Figure 4(g)), wedge shaped, reach base of buccal capsule, peripheral lobes form cup for chordal and radial lobes. Oesophageal corpus widens posteriorly, followed by isthmus and bulb; nerve ring surrounds anterior oesophagus, excretory pore posterior to it, deirids not seen (Figure 1(a)).

Male (measurements of eight specimens): Body length 9.6 (8.4–10.7) mm; width 314 (250–360). Cervical alae length 1008 (820–1020), width 80 (70–100). Buccal capsule 53 (43–65) long, 36 (30–40) wide; pharyngeal part of oesophagus, including pharyngeal lobes, maximum dimensions 72 (70–73) long, 48 (46–50) wide. Oesophagus 1500 (1400–1540) long, bulb 217 (180–240) long. Nerve ring 279 (270–280), excretory pore 314 (280–370), respectively from anterior end. Spicule slender, wider at proximal end, pointed at distal end (Figure 1(f,g)), 972 (832–1070) long (about 10% of body length). Gubernaculum spatulate (Figure 1(c)), 163 (155–190) long. Precloacal sucker 180 (170–190) long, 296 (290–420) anterior to cloaca. Caudal papillae 11 pairs; 1 pair at level of sucker, 2 pairs between sucker and cloaca, 2 pairs anterior to cloaca, 6 pairs post-cloacal, 3 pairs of them near tip of tail (Figures 1(h) and 4(b)). Tail tapering, tip pointed (Figure 1(h)), 209 (200–255) long.

Female (measurements of 15 specimens): Length 12.9 (10.5–17.7) mm; width 387 (350–410). Cervical alae 1190 (1120–1260) long, 100 (99–110) wide. Buccal capsule 36 (25–38) long, 31 (25–33) wide; pharyngeal part of oesophagus, including pharyngeal lobes, maximum dimensions 59 (48–63) long, 44 (38–50) wide; oesophagus 1510 (1220–1640) long, bulb 238 (200–250) long. Nerve ring 325 (298–360), excretory pore 430 (360–450), respectively from anterior end. Vulva 5887 (4940–8200) from tip of tail. Vagina vera simple (Figure 1(i)). Tail tapering, with pointed tip (Figure 1(j)), 857 (690–1120) long. Egg ovoid, thin shelled (Figure 1(j)), 70 (65–75) by 49 (45–53).

Type host: *Dorcopsis muelleri* (Lesson) (Mammalia: Macropodidae).

Type locality: Lengguru, West Papua, Indonesia (1°6' S, 130°51' E).

Site of infection: Caecum/colon.

Prevalence: 1/1 wallabies examined.

Type specimens: Holotype male, allotype female (MZB Na 739); paratypes, 7 male and 14 females (MZBNa 740).

Etymology: The species was named after the type locality.

Remarks: *Labiobulura (Archeobulura) lengguruensis* n.sp. with six labial lobes surrounding the mouth, a circular buccal capsule, peripheral pharyngeal lobes cuticular, radial and chordal lobes distinct and slightly muscular; cervical alae present, belongs in the genus *Labiobulura* and lacking interlabial lobes in the subgenus *Archaeobulura* (see Smales, 2009). There are three species presently known in the subgenus; the type species *L. (A.) peragale* (Johnston & Mawson, 1940), *L. (A.) leptomyidis* Smales, 2006 and *L. (A.) perditus* Smales, 2009. *Labiobulura (A.) lengguruensis* differs from each of these congeners in having a simple denticle associated with each labial lobe. The shape of the labial lobes of *L. (A.) lengguruensis* truncate at the distal end is most similar to those of *L. perditus*, but *L. (A.) lengguruensis* further differs from *L. (A.) perditus* in having a shorter spicule (832–1070 long, one-tenth of body length, compared with 1100–1700 long, one-fourth of body length), chordal lobes rounded not rectangular with a notch and radial lobes pointed not blunt (Smales, 2009). *L. (A.) lengguruensis* occurs in a macropodid marsupial from Papua Indonesia while *L. (A.) perditus* was found in a bandicoot from South Australia. *Labiobulura (A.) lengguruensis* further differs from *L. (A.) peragale* in having wider cervical alae, in the shape of the chordal and radial lobes, a shorter spicule (832–1070 long, one-tenth of body length, compared with 2000–2009 long, one-fourth of body length) and the male and female tails with pointed not rounded tips (Smales, 2009). The host for *L. (A.) peragale* was *Macrotis leucura*, the lesser bilby, from Central Australia and now extinct. *L. (A.) lengguruensis* further differs from *L. (A.) leptomyidis*, also from New Guinea, in having triangular, not rounded, and shorter labial lobes of lips, and the shapes of chordal and radial lobes of pharyngeal portion. The spicules of *L. (A.) lengguruensis* are shorter (832–1070 compared with 1900–2145) and the female tail longer (690–1120 compared with 480–590) and both female and male tails, although pointed, do not terminate in a spike as found in *L. (A.) leptomyidis* (Smales, 2006a). *L. (A.) leptomyidis* occurs in rodents of the genus *Leptomys* in Papua New Guinea *Leptomys* spp., rodents, while *L. (A.) lengguruensis* occurs in a macropodid marsupial.

Chabertiidae

Paralabiostrongylus tuberis n. sp.

Description. General: Robust worms, cuticle with fine transverse striae. Cephalic extremity square in cross section (Figures 2(b) and 4(c)), mouth opening surrounded by six fleshy lips, each with paired lateral flaps (Figure 4(h)), lateral lips largest, bearing amphids, four submedian lips with pointed tips, cephalic collar distinct (Figure 2(a)), with four setate submedian papillae (Figure 2(b) and 4(c,f)). Buccal capsule more or less cylindrical, thick walled deeper than wide (Figure 2(c)). Oesophagus long cylindrical, widening posteriorly, about one-fourth of body length (Figure 2(a)). Oesophago-intestinal diverticula well defined, about same length as width of oesophagus (Figure 2(a)). Two cuticular frills (Figure 4(d)) surround cephalic extremity between cephalic collar and level of nerve ring. Nerve ring surrounds oesophagus at about one-fourth its length, deirid and excretory pore posterior to nerve ring.

Male (measurements of 13 specimens): Body length 15.62 (12.33–18.06) mm, width 915 (820–990); buccal capsule 105 (90–120) deep, 70 (55–85) wide. Nerve ring, deirid, excretory pore (Figure 2(a)), at 490 (420–700), 556 (410–780), 667 (580–780) from

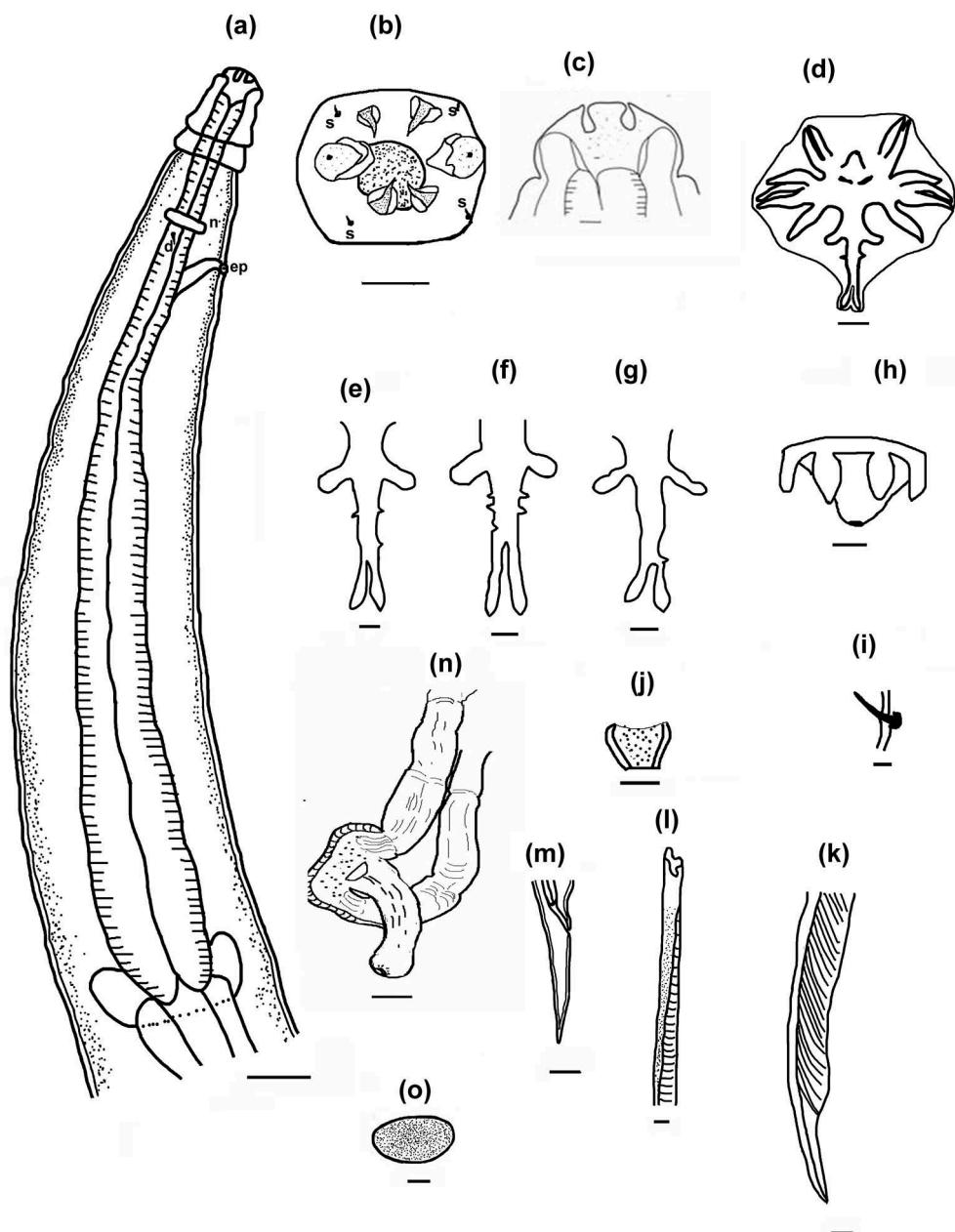


Figure 2. *Paralabiostrongylus tuberis* sp. n. (a) Anterior end male, lateral view. (b) Cephalic end, en face view, male. (c) Buccal capsule, lateral view. (d) Copulatory bursa, ventral view. (e) Dorsal ray type 1. (f) Dorsal ray type 2. (g) Dorsal ray type 3. (h) Genital cone, ventral view. (i) Deirid, ventral view. (j) Gubernaculum, ventral view. (k) Distal end spicule. (l) Proximal end spicule. (m) Tail female, lateral view. (n) Ovejector, lateral view. (o) Egg.

Scale bars: 2(a,m) – 250 µm; 2(b,d) – 50 µm; 2(c) – 20 µm; 2(e–o) – 25 µm.

anterior end respectively. Oesophagus 3321 (3011–3580) long. Bursal lobes not separate, dorsal lobe longest, ventral lobes shortest. Ventro-ventral and ventro-lateral rays

apposed, reaching bursal margin, exterro-lateral ray divergent, antero-lateral shortest, not reaching bursal margin, medio-lateral and postero-lateral apposed, reaching bursal margin, extero-dorsal ray arising close to lateral trunk, not reaching bursal margin; dorsal trunk stout, giving off pair of short lateral branches at one-fourth its length, bifurcating at half to two-thirds its length (Figure 2(d)). Some specimens with one or two pairs protrusions distal to lateral branches (Figure 2(d–g)). Spicules equal, with transversely striated alae, broader posteriorly, not extending to pointed tip (Figure 2(k, l)), spicule 1251 (1135–1380) long, about one-eighth of body length. Gubernaculum small (Figure 2(j)) 199 long, 93 wide. Genital cone prominent, anterior lip conical, posterior lip with two pairs simple appendages (Figure 2(h)).

Female (measurements of 14 specimens): Body length 17.49 (15.73–24.20) mm, width 1013 (706–1170); buccal capsule 99 (92–120) deep, 70 (60–90) wide. Nerve ring 520 (450–540), deirids 599 (510–705), excretory pore 723 (550–770), from anterior end. Oesophagus 3533 (3200–3670) long. Vulva anterior to anus, 1361 (960–1090) from tip of tail. Ovejector (Figure 2(n)) with infundibulum 190, sphincter 80 (70–120), vestibule 347 (250–440) long; vagina vera 310 (230–380) long. Tail tapering, conical tip (Figure 2(m)), 1049 (830–1170) long. Eggs ellipsoidal, thick shelled (Figure 2(o)), 102 (96–106) by 52 (50–55).

Type host: *Dorcopsis muelleri* (Lesson) (Mammalia: Macropodidae).

Type locality: Lengguru, Papua, Indonesia (1°6' S, 130°51' E).

Site of infection: Stomach.

Prevalence: 1/1 wallabies examined.

Type specimens: Holotype male, allotype female (MZB Na 741); paratypes, 12 male and 13 females (MZBNa742).

Etymology: The specific name refers to the protuberances on the dorsal ray in this species

Remarks: Two species of *Paralabiostrongylus* have been described, i.e. *P. bicollaris* Smales, 1982 from *Dorcopsis luctuosa* as *D. veterum*, in Papua New Guinea, and *P. rajampatensis* Purwaningsih & Smales, 2014, from *D. muelleri* from Raja Ampat Island, Papua (Purwaningsih & Smales, 2014; Smales, 1982b). *Paralabiostrongylus tuberis* differs from *P. bicollaris* in the position of the deirids, behind the nerve ring not anterior to it, in the bifurcation of dorsal ray, close to the lateral branches not markedly posterior to them, in having small protrusions on the dorsal ray between the lateral branches and the bifurcation of the ray, not present in *P. bicollaris*, and the posterior lip of genital cone with two pairs simple appendages, not two pairs irregularly shaped appendages (Smales, 1982b).

Paralabiostrongylus tuberis can be distinguished from *P. rajampatensis* in having the deirids posterior to the nerve ring, not at the same level, a longer oesophagus in the males (2650 compared with 3011–3580), the posterior lip of the genital cone with two pairs simple appendages, compared with one pair simple appendages, between two pairs bifid appendages and having small protrusions on the dorsal ray, the proportions

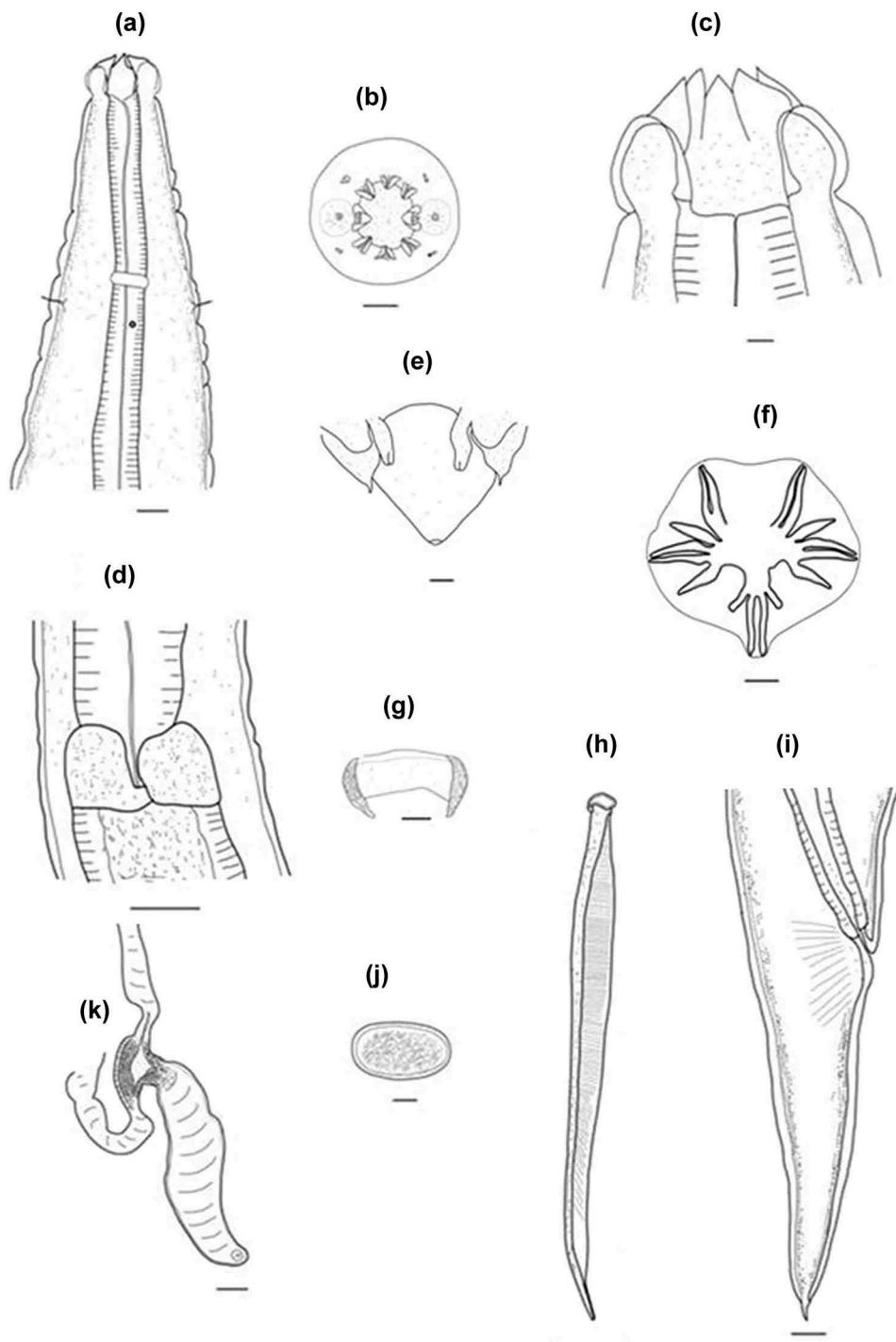


Figure 3. *Dorcopsinema amplum* sp. n. (a) Anterior end male, ventral view. (b) Cephalic end male, en face view. (c) Buccal capsule, lateral view. (d) Oesophagus, posterior end, lateral view. (e) Genital cone, ventral view. (f) Copulatory bursa, ventral view. (g) Gubernaculum, ventral view. (h) Spicule, lateral view. (i) Posterior end female, lateral view. (j) Egg. (k) Ovejector, lateral view.

Scale bars: 3(a,d,i) – 100 μm ; 3(b) – 50 μm ; 3(c,e,f,g,j,k) – 25 μm ; 3(h) – 250 μm .

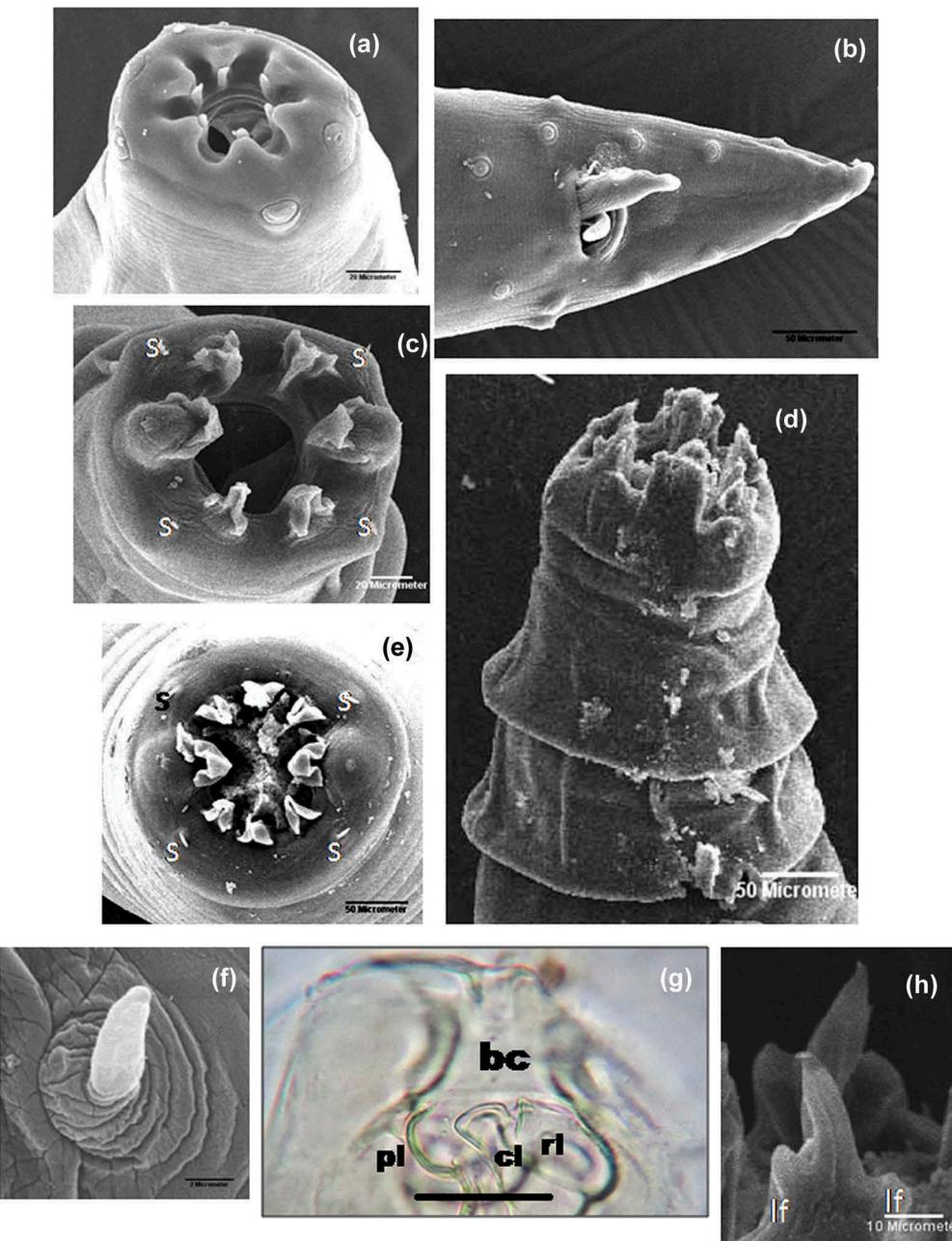


Figure 4. SEM images of *Labiobulura lengguruensis* sp. n. (a) Cephalic end male, en face view. (b) Posterior end male, ventral view. SEM images of *Paralabiostrongylus tuberis* sp. n. (c) Cephalic end male, en face view. (d) Cephalic end, showing two cuticular frills, lateral view. (f) Setate cephalic papilla, en face view. (h) Lip with lateral flaps and mucronate tip, sublateral view. SEM image of *Dorcosinema amplum* sp. n. (e) Cephalic end male, en face view. Light micrograph of *Labiobulura lengguruensis* sp. n. (g) Buccal apparatus, hand-cut longitudinal section showing pharyngeal lobes. bc: buccal capsule; cl: chordal lobe; If: lateral flap; pl: peripheral lobe; rl: radial lobe; s: seta. Scale bars: 4(a,c) – 20 µm; 4(b,d,e,g) – 50 µm; 4(f) – 2 µm; 4(h) – 10 µm.

of the ovejector with the sphincter the shortest element for *P. tuberis* and all the elements a similar size for *P. rajampatensis*. Although both species occur in the genus *Dorcopsis* one is found in *D. muelleri* on Raja Ampat Island, Papua, and the other in *D. luctuosa* on the Island of New Guinea.

Dorcopsisinema amplum n. sp.

Description. General: Large-sized worms; body with fine transverse cuticular striations, the body widest in mid region, narrower posteriorly. Cephalic extremity with well-defined fleshy collar bearing two amphids, each on dome-like projection and four submedian cephalic papillae. Mouth opening circular, perioral cuticle forming eight sclerotised liplike processes arising within the buccal capsule; two lateral processes largest (Figures 3(b) and 4(e)), dorsal, ventral and submedian processes with mucronate tips (Figure 3(c)). Buccal capsule deeper than wide (Figure 3(c)). Oesophagus relatively long, cylindrical about one-fifth of body length. Deirids setate (Figure 4(e)), 73–85 long, and excretory pore just posterior to nerve ring which encircles oesophagus at about one-fifth its length (Figure 3(a)). Oesophago-intestinal diverticula small, about same width as oesophagus (Figure 3(d)).

Male (measurements of six specimens): Body length 21.53 (19.58–24.93) mm, maximum width 844 (720–940). Buccal capsule 139 (100–170) long, 83 (80–108) wide. Nerve ring 544 (420–770), deirids 679 (620–860) and excretory pore 781 (710–970) from anterior end; oesophagus 4617 (4040–5120) long. Spicules with striated alae widening posteriorly then narrowing, not extending to tips (Figure 3(h)), 2077 (1950–2220) long, about one-tenth of body length. Gubernaculum small, rectangular (Figure 3(g)), 65 (60–70) long, 123 (110–140) wide. Bursa small, bursal lobes not separate, dorsal lobe longest, ventral lobes shortest. Ventro-ventral and latero-ventral rays apposed, reaching margin of bursa; externo-lateral ray short, not reaching margin of bursa; medio and postero-lateral rays same length apposed, reaching margin of bursa; externo-dorsal ray arising close to lateral trunk, not reaching margin of bursa, dorsal trunk stout, bifurcating at about one-third its length, dorsal rays reaching margin of bursa, lateral branches arise slightly anterior to bifurcation (Figure 3(f)). Genital cone prominent, dorsal lobe large, conical, ventral lobe small with one pair bifid, one pair simple, one pair pointed appendages (Figure 3(e)).

Female (measurements of six specimens): Body length 33.63 (23.94–44.08) mm, maximum width 1145 (1005–1330). Buccal capsule 139 (110–190) long, 103 (80–128) wide. Nerve ring 778 (730–840), deirids 933 (840–1010), excretory pore 957 (910–1020) from anterior end. Oesophagus 5748 (5450–6300) long. Vulva anterior to anus 1822 (1733–1935) from tail tip. Ovejector with infundibulum 480 (440–520), sphincter 67 (60–80), vestibule 247 (230–270) long, vagina very large, 877 (810–920) long (Figure 3(k)). Tail 952 (820–1095) long, with spiked tip (Figure 3(i)). Eggs elongated, thick shelled, 108 (103–110) by 62 (60–65) (Figure 3(j)).

Type host: *Dorcopsis muelleri* (Lesson) (Mammalia: Macropodidae).

Type locality: Lengguru, Papua, Indonesia (1°6' S, 130°51' E).

Site of infection: stomach. Prevalence: 1/1 wallabies examined.

Type specimens: Holotype male, allotype female (MZB Na 743); paratypes, five male and five females (MZBNA 744).

Etymology: The specific name refers to the distinctively large vagina in this species.

Remarks: The genus *Dorcopsinema*, known only from Papua New Guinea, Papua Indonesia and associated islands (Mawson, 1977a; Purwaningsih & Smales, 2014; Smales, 1997, 1999) comprises five species: *Do. dorcopsis*, *Do. simile* Smales, 1999 and *Do. longispiculare* Purwaningsih & Smales, 2014 found in the forest wallabies *Dorcopsis* spp. Schlegel & Mueller and *Dorcopsulus* spp. Matschie; *Do. dendrolagi* Smales, 1982 and *Do. mbaiso* Smales, 1997 from tree kangaroos, *Dendrolagus* spp. Mueller & Schlegel, and *D. muelleri* (Baylis, 1940; Purwaningsih & Smales, 2011, 2014; Smales, 1982a, 1997, 1999). *Do. amplum* n. sp. has the characters of the cephalic end typical of the genus *Dorcopsinema* (Mawson, 1977a) and is most similar to *Do. simile* in the key of Purwaningsih and Smales (2014). *Do. amplum* differs from *Do. simile* in the position of the lateral branches of the dorsal ray at about one-third, as compared with half its length, the shapes of the appendages on the posterior lip of the genital cone third pair appendages pointed compared with appendages irregular, longer spicules 10% body length compared with 9%, the shape of the female tail, with a spiked not a blunt tip, a larger, longer vagina and shorter eggs 103–110 compared with 119–122 long (Smales, 1999). *Do. amplum* differs from *Do. longispiculare*, which is also found in *D. muelleri*, in having a longer oesophagus (4040–5120 compared with 2560–2790), the position of the lateral branchlets arising anterior to the bifurcation of the dorsal ray not posterior, in having shorter spicules 1950–2220 (10% body length) with alae not reaching the tips compared with longer spicules 2400–2570 (28% body length) and alae reaching the tips, the anterior lip of the genital cone with three not two pairs of appendages and a smaller vagina. *Do. amplum* is found on West Papua while *Do. longispiculare* has been reported only from Raja Ampat Island. *Do. dorcopsis*, also occurring in *D. muelleri*, but from Japen Island, differs from *Do. amplum* in having the deirids anterior to the nerve ring, externo-dorsal and extero-lateral rays reaching the margin of the bursa, vagina very short, 250 long, and larger eggs, 120 long.

Discussion

There is no simple explanation for the host distribution and geographic range of species of the genus *Labiobulura* at this time. Previously reported hosts are bandicoots (Peramelidae) and bilbies (Thylacomyidae) from Australia and an endemic murine (*Leptomys* sp.) from Papua New Guinea (Smales, 2009). *Labiobulura* (A.) *lengguruensis*, reported in this paper, is the first species to be reported from a macropodid, the brown dorcopsis, endemic to the islands associated with Papua, Indonesia. One possibility could be that the genus was once widely distributed across the Sahul Region in a range of indigenous host clades and that now only a remnant remains.

Of the seven genera comprising the Tribe Labiostrongylinea, five have been reported from New Guinea. The genera *Labiostrongylus*, *Labiosimplex* and *Labiomultiplex* are found across the Sahul Region, but the genera *Dorcopsinema* and *Paralabiostrongylus* are found only on the island of New Guinea and its

associated islands, in endemic macropodid hosts (Smales, 2006b). Species of these latter two genera may be host and locality specific although more survey work needs to be conducted to confirm this.

Two of the six species of *Dorcopsinema* occur in species of *Dendrolagus*, one in *Dorcopsulus vanheurni*, one in *Dorcopsis luctuosa*, and three, *Do. baylisi*, from Japen Island, *Do. amplum* from West Papua and *Do. longispiculare* from Raja Ampat Island, in *D. muelleri* (Baylis, 1940; Purwaningsih & Smales, 2014; Smales, 1982a, 1997, 1999). That the three species occurring in *D. muelleri* are found in three disjunct localities (two on islands and one in West Papua) suggests the possibility of host- parasite speciation consequent on a period of isolation. *Dorcopsinema dorcopsis* has been reported from *D. luctuosa* from two localities in Papua New Guinea. Some differences in morphology between specimens from *D. luctuosa* and the description of *Do. dorcopsis* from *D. muelleri*, which did not seem sufficient to warrant a new species were noted by Smales (1982a). Although both the host species and geographic distributions support the possibility of two putative species the examination of additional material is required before a decision can be made.

Two of the three known species of *Paralabiostrongylus* are found only in *D. muelleri* with *P. tuberis* being limited to West Papua, and *P. rajampatensis* to Raja Ampat island, suggesting allopatric speciation may have occurred (Purwaningsih & Smales, 2014; Smales, 1982a). The third species *P. bicollaris*, described from *D. luctuosa* as *D. veterum*, is found in Papua New Guinea.

Species of the genera *Labiostrongylus*, *Labiosimplex* and *Labiomultiplex* have been reported from tree-kangaroos (*Dendrolagus* spp.), pademelons (*Thylogale calabyi*), wallabies (*Macropus agilis*) and forest wallabies (*Dorcopsis* spp. and *Dorcopsulus* spp.) from Australia and New Guinea localities (Smales, 2006b). *Labiosimplex papuensis* and *Labiomultiplex sagawinensis*, however, are the only known species in this cluster that have been reported from *D. muelleri* and only from Salawati Island (Purwaningsih & Smales, 2011).

Species of *Dorcopsisstrongylus* are placed in the tribe Pharyngystriphylinea and have thus far been described only from forest wallabies; *Dorcopsisstrongylus labiacarinatus* from *Dorcopsis luctuosa* (as *D. veterum*) and *Dorcopsulus vanheurni*, from Papua New Guinea, as well as *Dr. ewini* and *Dr. salawatiensis* from *D. muelleri* from Salawati island, Papua (Purwaningsih & Smales, 2010; Smales, 1982b). For these species, both allopatric and sympatric speciation may have occurred. The only other species reported from the stomach of *D. muelleri* are *Cloacina caballeroi* and *Coronostrongylus speari* (see Beveridge, 2002; Mawson, 1977b).

This preliminary analysis of two components of the helminth community infecting the stomach of *D. muelleri* is indicative of a highly endemic fauna. The data are fragmentary however and more surveys are needed before any conclusions can be drawn.

Key to species of *Dorcopsinema*, revised from Purwaningsih & Smales, 2014

- With fleshy head collar bearing amphids, and cervical papillae, eight sclerotised lip-like processes; spicules >1650 long. Parasites of *Dorcopsis* spp. and *Dorcopsulus* spp. 3
- With or without clearly defined head collar: six sclerotised liplike processes. Parasites of *Dendrolagus* spp. 2

2. With clearly defined head collar: deirids close to collar; spicules < 1275 long; female tail without spike *D. mbaiso*

Without clearly defined head collar: deirids close to nerve ring; spicules > 1300 long; female tail with spike *D. dendrolagi*

3. With deirids posterior to nerve ring; externo dorsal and externo lateral rays short, not reaching margin of bursa; lateral branchlets arise just anterior to bifurcation of dorsal ray; vagina 275 long 4

With deirids anterior to nerve ring; externo dorsal and externo lateral rays long, reaching margin of bursa; lateral branchlets arise just posterior to bifurcation of dorsal ray; vagina > 275 long; eggs 120 long *D. dorcopsis*

4. Anterior lip of genital cone with two pairs appendages, spicule 28% body length, alae reach spicule tips; vagina between 480 and 800 long *D. longispicularis*

Anterior lip of genital cone with three pairs appendages, spicule 10–11% body length; alae don't reach spicule tips; vagina ≥ 480 or ≤ 800 long 5

5. Dorsal ray bifurcates at half its length, third pair appendages complex irregular; tail of female with pointed tip; vagina ≥ 480 long; eggs ≤ 118 long *D. simile*

Dorsal ray bifurcates at one-third its length; third pair appendages simple pointed; tail of female with spiked tip; vagina ≤ 800; eggs ≥ 110 long *D. amplus*

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