

***PRACTINOCEPHALUS BRZESKII* SP. NOV.**  
**(NEMATODA: ACTINOLAIMIDAE) FROM ECUADOR,**  
**WITH TAXONOMIC NOTES ON THE GENUS**

MARIA TERESA VINCIGUERRA and MIRELLA CLAUSI

*Dipartimento di Biologia Animale, Università di Catania, Italy, e-mail vincimar@mbox.unict.it*

**Abstract.**— The new species *Practinocephalus brzeskii* from Ecuador is described and illustrated. It is characterised by a medium length body, transversely striated cuticle with 30–34 longitudinal cuticular ridges, lip region conspicuous, set off by a depression but only slightly expanded, inner labial and cephalic papillae in the same circle external to the sclerotized anterior ring, odontostyle 30–34 µm long, onchia multi-pointed, cheilostomal sclerotizations heavy and complex, muscular part of pharynx starting at level of nerve ring, female reproductive apparatus didelphic, vulva longitudinal, vagina with sclerotized pieces, female tail elongate conoid to filiform. Males are also described and illustrated for the first time in the genus; they are characterised by a convex conoid tail with a filiform appendix, shorter than female tail and variable in length. A new diagnosis of the genus *Practinocephalus* and a key to its species are given.



**Key words.**— Actinolaimidae, Nematoda, new species, *Practinocephalus*, taxonomy.

## INTRODUCTION

Thorne (1967) described the new genus and new species *Actinocephalus bizarrus*, which he attributed to the subfamily Brittonematinae in the family Actinolaimidae. The new genus was characterised by a greatly expanded lip region, odontostyle longer than in other actinolaims and “a complicated assembly of sclerotized mouth parts”. He based his description on the female, illustrated in a drawing, but he reported also a male of the same genus from a different station, which he was not certain belonged to the same species of the former; about this male specimen he only wrote that it had “supplements in two fascicles, filiform terminus about half as long as that of *Brittonema sulcatum*”.

Andrássy (1986) described a new species of the same genus, which he (Andrássy, 1974) had re-named *Practinocephalus*, being the previous name already existing among Sporozoa. The description of the new species, *Practinocephalus secundus* Andrásy, 1986, was based only on female specimens.

During a survey on nematode fauna in forest ecosystems of Ecuador we found some specimens, both females and males, belonging to a third species of this rare genus, which we named *P. brzeskii* sp. nov.; the male of a species of *Practinocephalus* is therefore here fully described and illustrated for the first time. A female specimen of a further species is also described and a new diagnosis of the genus, based on both sexes, is given.

## MATERIAL AND METHODS

The sample, collected on March 1996, was a mixture of screened mosses, litter and soil of a forest near Rio Verde

at Lita (Imbabura), at 700 m above sea level. For light microscope observation the specimens were fixed in 4% formaldehyde and mounted in dehydrated glycerin. For scanning electron microscope observation some glycerin-embedded specimens were first washed with gradually added distilled water, and then dehydrated in a gradual series of ethanol concentrations increasing to 100%. They were subsequently critical point dried with CO<sub>2</sub>, mounted on stubs and coated with gold.

*Practinocephalus brzeskii* sp. nov.  
(Figs 1–29)

**Description.** Measurements: see Table 1.

Female. Body of medium length, variously curved ventrad and only slightly tapering towards the anterior end: lip region width 21–25% of body width at pharynx base and 19–23% of body width at vulva. Cuticle 5–7 µm thick at mid-body, finely transversely striated all along body, bearing 30–34 longitudinal ridges, each 1.5–2.0 µm wide and 1.0 µm high; the ridges rise about 10 µm behind amphidial opening and regularly run all along body up to anus, beyond which they decrease in number. Many small papillae scattered along body, especially at pharynx level, opening in the ridges. Lip region 45–70% as high as wide, only slightly set off from adjoining body by a depression at level of amphidial openings. Amphidial fovea wide, stirrup-shaped; amphidial opening width 50–70% of corresponding body diameter. Distance fusus – amphidial opening 1.6–1.9 lip region widths. Anterior end rather flat; its exterior margin bearing the six inner labial and, in the same circle, the four cephalic papillae; the six outer labial papillae located just



Table 1. Measurements and diagnostic features of *Practinocephalus brzeskii* and *Practinocephalus* sp. (all measurements in  $\mu\text{m}$  except L in mm).

Species	<i>Practinocephalus brzeskii</i> sp. nov.			<i>Practinocephalus</i> sp.
	Locality	Lita/Holotype	Lita/Paratypes	
N	♀	8 ♀♀	4 ♂♂	♀
L	1.516	1.58±0.08 (1.45 – 1.70)	1.454±0.08 (1.34 – 1.51)	1.152
a	27.0	24.8±1.95 (22.4 – 27.4)	21.1±2.250 (18.3 – 23.4)	26.8
b	3.20	3.50±0.09 (3.40 – 3.60)	3.2±0.37 (2.60 – 3.40)	3.07
c	4.60	5.80±0.70 (5.00 – 6.60)	24.1±10.6 (15.0 – 38.8)	4.40
c'	12.0	9.30±1.70 (7.30 – 11.6)	1.70±0.63 (1.00 – 2.50)	13.2
V/VD	44.0	43.5±1.23 (41.9 – 45.0)	49.7±3.40 (46.0 – 52.7)	43.1
G/T''	6.70	10.9±2.02 (6.80 – 13.4)	12.1±2.02 (9.80 – 13.6)	6.80
G''/T''	10.4	14.0±1.97 (10.7 – 16.4)	12.4±5.39 (8.80 – 18.6)	9.46
Body width at mid-body	56.0	63.9±5.00 (59.0 – 73.0)	69.5±8.50 (63.0 – 82.0)	43.0
Pharynx	471	455±24.4 (423 – 481)	464±30.2 (436 – 507)	375
Body width at pharynx base	55.5	60.7±4.50 (55.0 – 67.0)	69.5±8.5 (63.0 – 82.0)	42
Tail	326	278±38.6 (233 – 326)	68.4±26.1 (38.0 – 100)	264
Anal body width	27.0	30.1±2.47 (28.0 – 34.0)	39.0±2.16 (36.0 – 41.0)	20.0
Lip region width	13.0	13.5±0.46 (13.0 – 14.0)	16.4±1.05 (15.5 – 17.5)	13.0
Lip region height	8.00	7.50±0.97 (6.00 – 9.00)	9.4±1.25 (8.00 – 11.0)	11.0
Lip region height/ width	0.60	0.60±0.09 (0.40 – 0.70)	0.6±0.10 (0.47 – 0.70)	0.85
Fixed ring-onchia base	12.0	11.3±0.30 (11.0 – 11.5)	14.2±0.80 (13.5 – 15.0)	11.5
Fixed ring-anterior end	22.0	20.7±0.96 (19.0 – 22.0)	14.2±1.30 (24.5 – 27.3)	23.0
Odontostyle	30.0	29.4±2.32 (26.0 – 32.0)	34.4±1.33 (33.0 – 35.7)	30.0
Odontophore	28.0	30.7±1.98 (28.0 – 33.0)	37.0±1.41 (36.0 – 38.0)	
Cuticle width/odontostyle width	1.50	1.60±0.23 (1.30 – 2.00)	1.90±0.17 (1.70 – 2.10)	1.20
Amphidial opening	8.00	7.40±0.25 (7.00 – 7.50)	8.80±1.26 (7.50 – 10.0)	7.00
Fusus – amphidial opening	23.0	23.8±1.04 (22.5 – 25.0)	25.4±3.45 (21.0 – 29.0)	
Nerve ring-anterior end	169	164±7.80 (154 – 174)	178±13.7 (159 – 191)	143
Nerve ring% pharynx	36.0	36.0±0.66 (35.0 – 37.0)	38.4±1.69 (36.4 – 40.0)	38.0
Basal bulb% pharynx	53.0	54.3±2.19 (50.2 – 57.3)	53.4±1.30 (52.0 – 55.0)	51.5
Muscular pharynx% pharynx	64.0	64.7±2.16 (61.6 – 68.0)	63.5±1.78 (61.5 – 65.0)	58.1
Vagina	29.0	33.1±2.12 (30.0 – 36.0)		23.0
Spicules			73.3±1.05 (72.0 – 74.5)	
Lateral guiding pieces			23.3±2.40 (20.0 – 25.5)	
Pre-rectum	100	91.3±11.5 (72.0 – 106)	209±44.5 (148– 250)	61.0
Pre-rectum/anal body width	3.70	3.00±0.50 (2.60 – 3.80)	5.40±1.20 (3.60 – 6.25)	3.00
Rectum	53.0	55.9±3.85 (50.0 – 61.0)		23.0
Rectum/anal body width	1.90	1.90±0.25 (1.50 – 2.20)		1.15

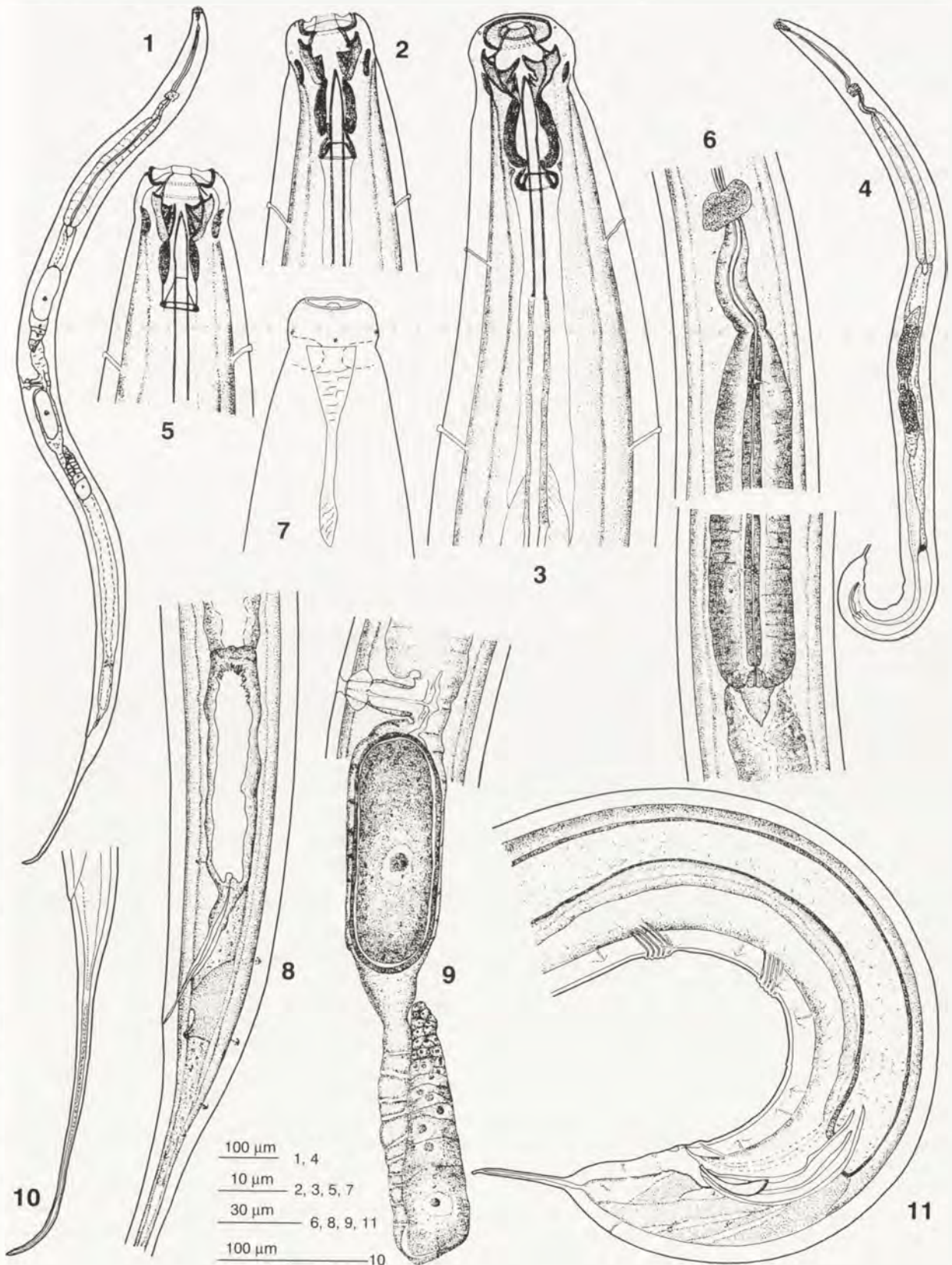
in front of the amphidial opening. Internal to the margin a thick sclerotized ring, separated from the peri-oral disc by a groove paved with a radially folded membrane. Peri-oral disc also with radial folds which appear more prominent and sclerotized along the external margin.

Cheilostom with four large onchia heavily sclerotized, especially at their distal margins, appearing split into three secondary teeth. Just anterior to each onchium from the cheilostom walls, also heavily sclerotized, four thick longitudinal sclerotizations rise directing anteriorly and connecting to the peri-oral disk. Post-onchial cavity

expanded; its wall lined by a heavy sclerotization 1.5–2.0  $\mu\text{m}$  thick and 7.5–8.5  $\mu\text{m}$  long. Fixed ring connected to the base of such sclerotization by a cuticular lining which varies in shape, according to the position of odontostyle, from a bell-like to a cylindroid tube; accordingly, also the folded guiding sheath length modifies.

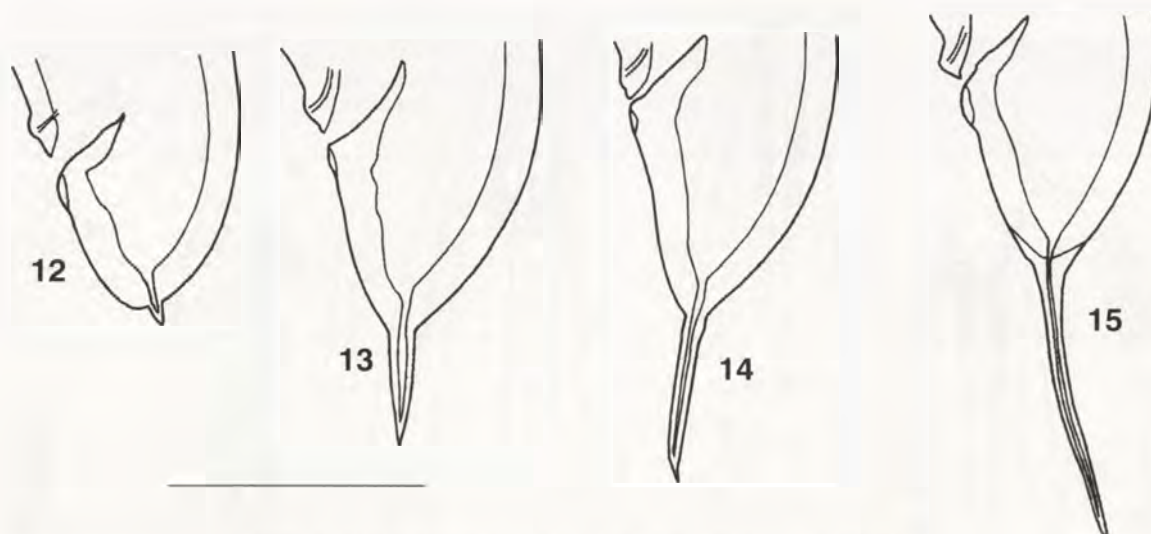
Between mouth cavity lining and external surface further sclerotizations are visible: two large, ribbon-shaped plates (visible when focusing towards body surface) encircling the lip region ventrally and dorsally at level of the basal depression, with lateral interruptions; probably they





Figures 1–11. *Practinocephalus brzeskii* sp. nov. (1) female body, (2, 5) female anterior ends, (3) male anterior end, (4) male body, (6) details of pharynx, (7) surface view of female anterior end, (8) rectum and pre-rectum, (9) female reproductive organs, (10) female tail, (11) male tail.





Figures 12–15. *Practinocephalus brzeskii* sp. nov., male tails. Scale bar 50  $\mu$ m.

are connected with the two thick lenticular sclerotizations visible dorsally and ventrally in the median optical section (Figs 2, 3, 5, 24, 28).

Odontostyle 2.0–2.4 times as long as lip region width and 0.5–0.8 times as wide as cuticle thickness at the same level; its aperture 25–35% of its length. Odontophore almost as long as odontostyle. Pharynx in three parts: its non-muscular part 32–38% of total length; the intermediate muscular part starting at the same level as the nerve ring. The five pharyngeal glands, the nuclei of which are often obscure, located as follows:

DO (n = 8) 48.3–52.7%	S1O1 (n = 8) 71.8–79.3%
S1O2 (n = 8) 77.9–82.2%	S2O (n = 8) 88.9–90.7%
DN (n = 7) 50.3–52.8%	S1N1 (n = 5) 72.3–77.8%
S1N2 (n = 5) 79.1–83%	S2N (n = 6) 90.4–92.2%

Excretory pore not seen. Nerve ring at 35–37% of pharynx length. Cardia conoid. Pre-rectum 2.6–3.8 anal body widths long; rectum 1.7–2.2 anal body widths long. Reproductive apparatus didelphic with reflexed ovaries. Vulva small, longitudinal, rectangular; its cuticularized margin laterally deepening into the vagina with two tongue-like extensions. Vagina length 47–56% of corresponding body width; pars distalis vaginae virtually absent, pars refringens vaginae with rather developed sclerotized pieces; pars proximalis vaginae twice as long as pars refringens. No sphincter was seen in the junction between uterus and oviduct; oocytes in a single row except that at the ovary tip. The uteri in two females contained ellipsoidal sperms 5–10  $\mu$ m long and, in various females, eggs 82–84  $\mu$ m  $\times$  23–27  $\mu$ m in size, covered with a thick corion. Tail elongate to filiform, rather variable in length, slightly curved ventrad, especially in its distal part, regularly tapering up to the pointed terminus.

Male. Body generally rather broader and shorter than in female, curved ventrad, especially at the posterior end, only slightly tapering at the anterior end: lip region width 21–27% of body width at pharynx base and 21–26% of mid-

body width. Lip region conspicuous, generally larger than in female, well set off from the adjoining body by a depression at amphidial opening level; its height 47–70% of its width. Anterior end rather truncate; location of anterior sensilla as in female; anterior sclerotized ring rather wider than in female. Mouth cavity sclerotizations showing the same pattern as in female except that at level of the four onchia, where they appear rather larger and thicker. Post-onchial sclerotization as thick as in female; its length 9.5–11.0  $\mu$ m. Odontostyle 2.0–2.2 times as long as lip region; its width 0.5–0.6 times cuticle thickness at the same level; odontostyle aperture 25–29% of its length. Odontophore, where observed, slightly longer than odontostyle. Pharyngeal glands located as follows:

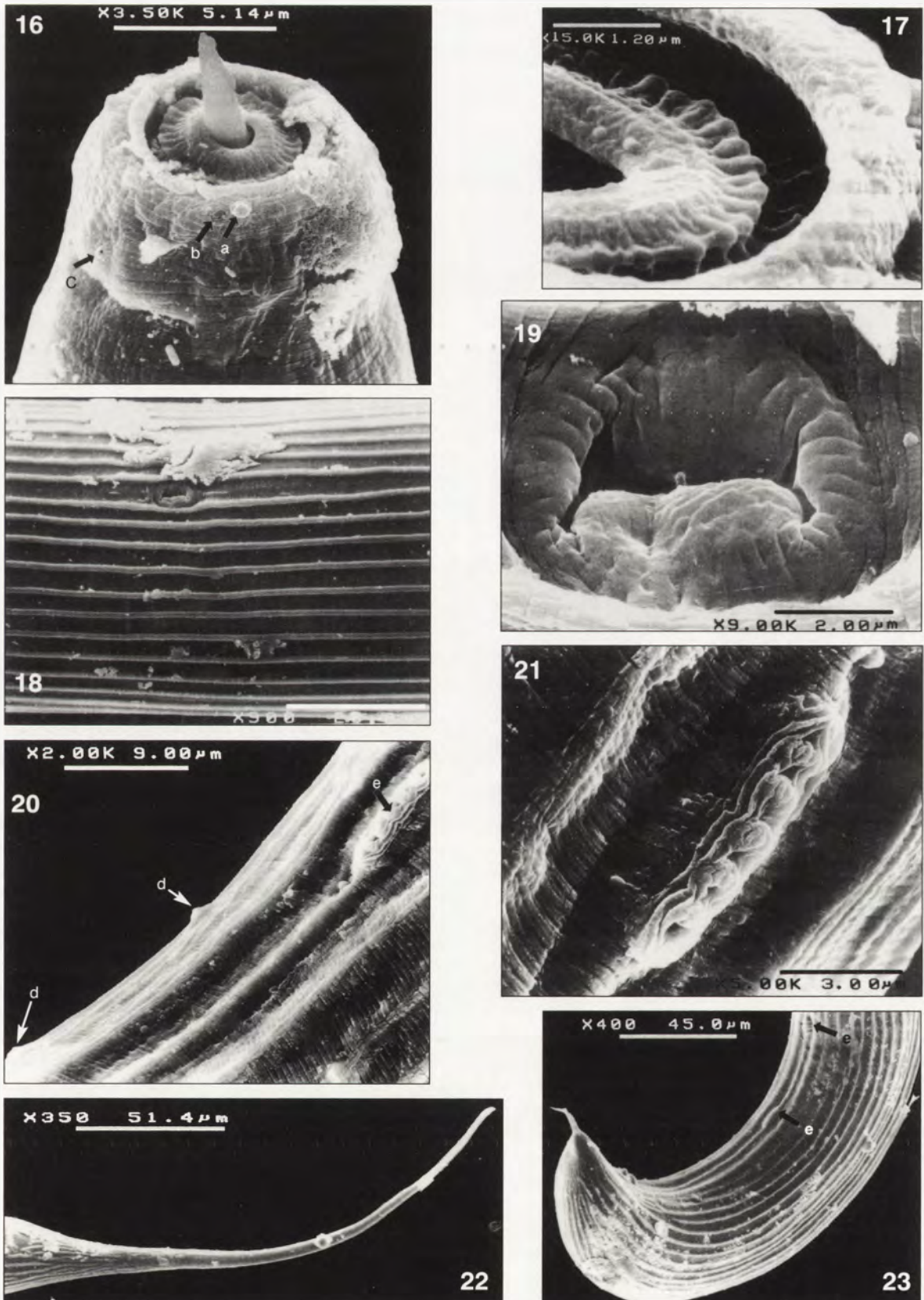
DO (n = 4) 51.5–52%	S1O1 (n = 3) 72.8–78.1%
S1O2 (n = 4) 77.7–79.7%	S2O (n = 4) 86.5–91.9%
DN (n = 3) 54.3–56.7%	S1N1 (n = 2) 74–79.9%
S1N2?	S2N (n = 2) 92–92.7%

Reproductive apparatus diorchic. Spicules length 1.8–2.0 cloacal body widths. Lateral guiding pieces 0.5–0.7 times as long as cloacal body width. Supplements arranged in two fascicles of respectively 5 (the posterior one) and 4–6 papillae in addition to the adanal pair. In the same region six pairs of sub-median papillae; no copulatory hump nor pseudo-supplements were observed. Tail constituted by a convex-conoid part and by a filiform appendix highly variable in length (Figs 12–15) but always much shorter than in female. Seven pairs of papillae in the tail.

In all the respects and measurements not reported there are no differences between the two sexes.

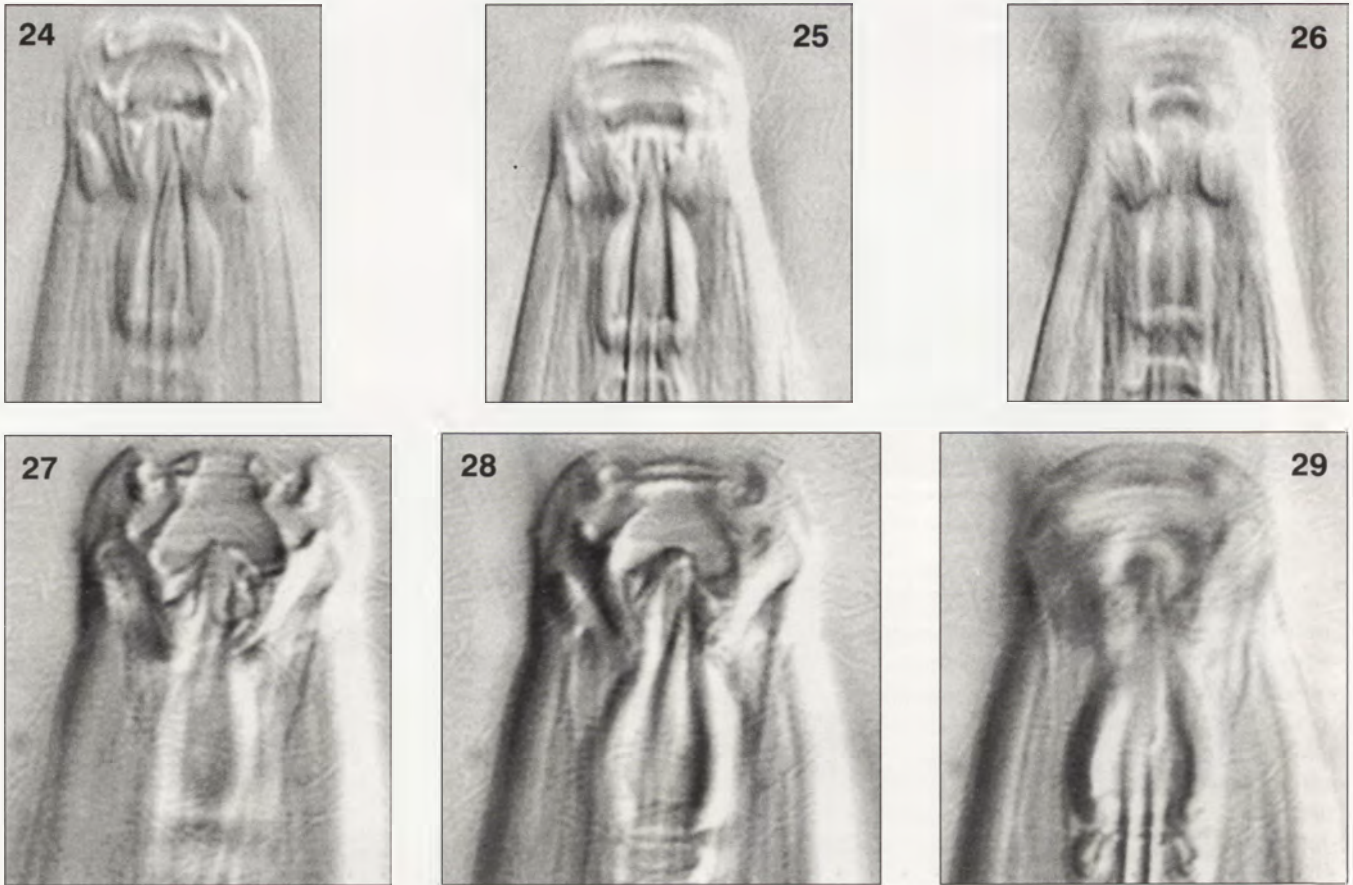
**Diagnosis.** *Practinocephalus brzeskii* sp. nov. is characterized by its medium body length, transversely striated cuticle with 30–34 longitudinal cuticular ridges, lip region conspicuous, set off by a depression but not greatly expanded, inner labial and cephalic papillae in the same circle external to the sclerotized anterior ring, onchia split into secondary teeth, cheilostomal sclerotizations heavy and complex, mus-





Figures 16–23. *Practinocephalus brzeskii* sp. nov. (16) female head, (17) detail of the sclerotized ring and of the peri-oral disc, (18) female body surface at vulva level, (19) detail of vulva, (20) male surface at supplements level, (21) detail of supplements, (22) female tail, (23) male tail; a = inner labial papillae, b = cephalic papillae, c = outer labial papillae, d = subventral papillae, e = supplements.





Figures 24–29. *Practinocephalus brzeskii* sp. nov. (24–26) female anterior end at different focus, (27–29) male anterior end at different focus. Scale bar 10  $\mu$ m.

ular part of pharynx starting at level of nerve ring, female reproductive apparatus didelphic, vulva longitudinal, vagina with sclerotized pieces, female tail elongate conoid, male supplements in two fascicles, male tail convex-conoid with a filiform appendix of variable length, shorter than female tail.

**Relationships.** The new species differs from the two other known species in the shorter body ( $L = 2.8$  mm in *P. bizarrus*;  $L = 2.08$ – $2.16$  mm in *P. secundus*), in the less expanded lip region. Moreover, it differs from *P. bizarrus* in the lower number of ridges (100 in the latter) and in the shorter odontostyle (47  $\mu$ m in the latter) and in the post-onchial sclerotization shape; it differs from *P. secundus* also in the rather shorter female tail ( $c = 6.9$ – $7$  in the latter).

**Type locality and habitat.** Lita (Imbabura, Ecuador): mosses, litter and soil of a riparian forest near Rio Verde at 700 m above sea-level.

**Type material.** Holotype, 2 female paratypes and 2 male paratypes in the collection of the Dipartimento di Biologia Animale, University of Catania, Italy; 1 female paratype at the Állatrendszertani Intézet, University of Budapest, Hungary; 1 female and 1 male paratypes at the Instituut voor Dierkunde, University of Gent, Belgium.

**Etymology.** The species is named in honour of the well known nematologist and dear friend of the authors Michal Brzeski.

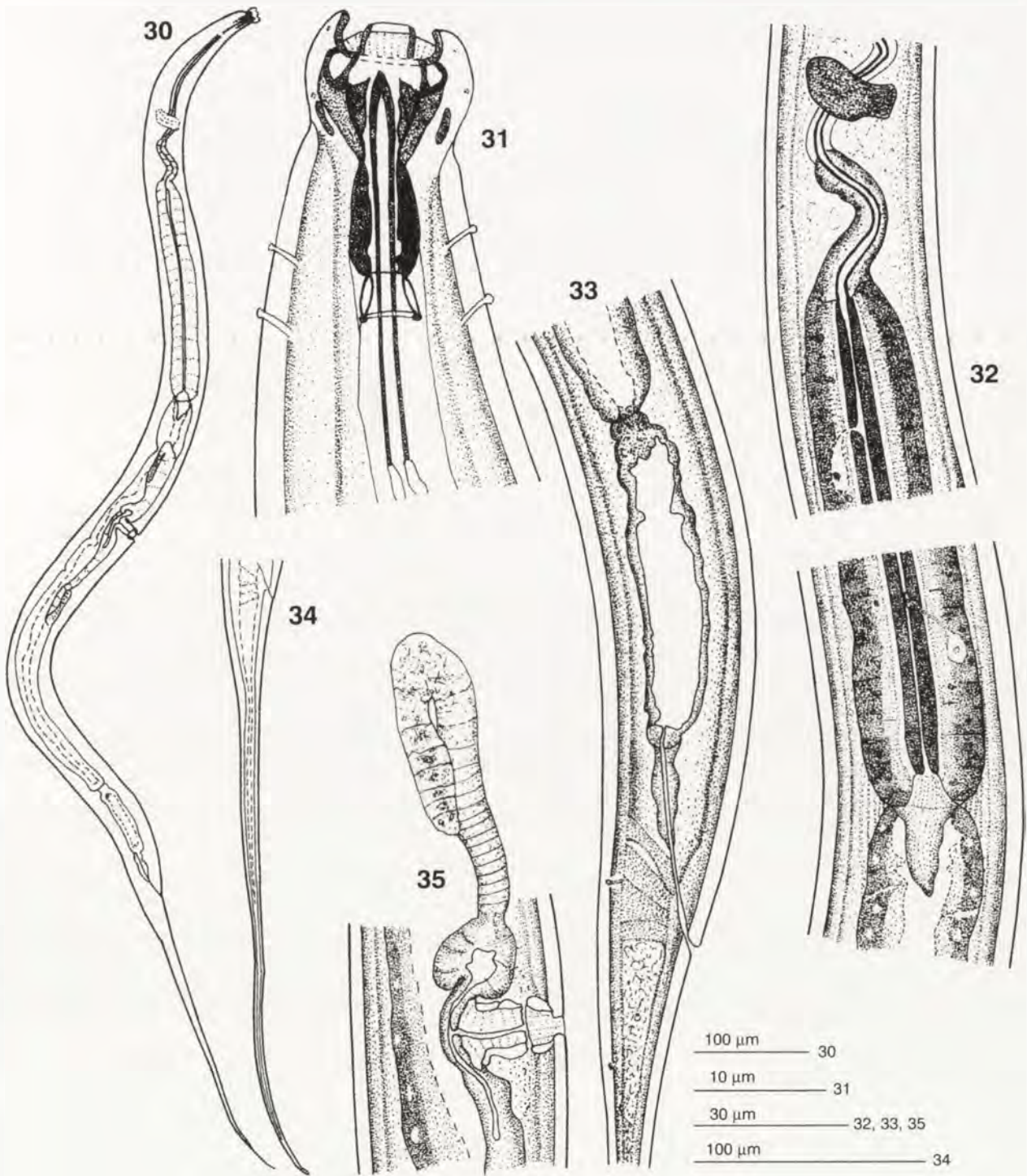
**Remarks.** *Practinocephalus brzeskii* sp. nov. shows an unusual sexual dimorphism, not limited to the reproductive organs and to the tail, but involving also the length of odontostyle and odontophore and the sizes of lip region and of the sclerotizations of the mouth cavity at onchia level, all of which are more developed in males. The punctual correspondence of the other characters in the two sexes, however, including the complicated pattern of the mouth sclerotizations, allowed us to attribute all the examined specimens to the same species. A rather high variability of some characters (viz. lengths of tail, pharynx, pre-rectum, post-onchial sclerotization), however, was registered also within a single sex. Being *Practinocephalus brzeskii* sp. nov. the first species of this genus of which males are described, it is not possible to infer if such a sexual dimorphism is peculiar of the genus or only of this species.

*Practinocephalus* sp.  
(Figs 30–35)

**Description.** Measurements: see Table 1.

**Female.** Body relatively small, curved ventrad and slightly tapering towards the anterior end: lip region width 31% of body width at pharynx base and 30% of body width at vulva. Cuticle 3  $\mu$ m thick at mid-body, furrowed by about 40 longi-





Figures 30–35. Female of *Practinocephalus* sp. (30) entire body, (31) anterior end, (32) details of pharynx, (33) rectume and pre-rectum, (34) tail, (35) reproductive organs.

tudinal ridges less than 1 μm wide. By the light microscope the probably present transverse striation was not visible. Lip region rather high and wide, appearing swollen and set off: its height 85% of its width. Amphids large, stirrup-shaped; their aperture 73% of corresponding body diameter.

Exterior margin of anterior end bearing the six inner labial and, in the same circle, the four cephalic papillae; the six outer labial papillae located just in front of the amphidial opening. Internal to the margin a thick sclerotized ring, which is separated from the peri-oral disc by a groove paved



with a radially folded membrane. The peri-oral disc, slightly protruding, also with radial folds which appear more prominent and sclerotized along the external margin.

Cheilostom with four large onchia heavily sclerotized, especially at their distal margins, appearing irregular and multi-pointed. Just anterior to each onchium from the cheilostom walls, also heavily sclerotized, four thick longitudinal sclerotizations rise directing anteriorly and connecting to the peri-oral disk.

Post-onchial cavity wall sclerotized: sclerotization 1.5  $\mu\text{m}$  thick and 9.0  $\mu\text{m}$  long. Fixed ring connected to the base of such sclerotization by a cuticular lining; the folded guiding sheath length in the observed specimen is the same as the distance between the fixed ring and the base of the post-onchial sclerotization. Between mouth cavity walls and external surface further sclerotizations are visible, but less distinct than in *P. brzeskii*. Odontostyle very slender, 2.3 times as long as lip region width; its aperture 23% of its length. Odontophore obscure. Non-muscular anterior part of pharynx 41.9% of total length; intermediate muscular part starting behind nerve ring. Pharyngeal glands located as follows:

DO 51.7%	S1O1 67%	S1O2 75.5%	S2O 88.6%
DN 55.2%			S2N 89.6%

Excretory pore not seen. Nerve ring at 38% of pharynx length. Cardia conoid. Pre-rectum 3 anal body widths and rectum 1.1 anal body widths long. Reproductive apparatus didelphic with reflexed ovaries. Vulva longitudinal, vagina 53% of body width long; its *pars refringens* with rather small and slightly sclerotized pieces; genital tracts not well developed; gonads with small oocytes. Tail elongate, regularly tapering to the pointed tip, curved ventrad in its posterior part.

**Discussion.** *Practinocephalus* sp. differs from any other described species of this genus by its very small size; from *P. brzeskii* sp. nov., which is nearer by size, it mainly differs in its more expanded and set off lip region and in the higher number of longitudinal ridges. The description of this specimen, though inadequate to establish a new species, was considered useful as a contribution to the knowledge of the morphological characters of this rare genus. The specimen was found in the same station as *P. brzeskii*.

## GENUS *PRACTINOCEPHALUS* ANDRÁSSY, 1974

### Diagnosis emended

Actinolaimidae. Cuticle finely transversely striated furrowed by longitudinal ridges; lip region well developed and set off from adjoining body, sometimes swollen or expanded beyond neck outline; inner labial papillae and cephalic papillae in the same circle at the anterior margin of lip region, external to the anterior sclerotized ring; odon-

ostyle relatively long; heavy sclerotizations in the mouth cavity walls in addition to the usual four onchia, with long and thick post-onchial extension; post-onchial cavity more or less swollen; pharynx in three parts: the anterior part a hyaline, non-muscular tube, the intermediate muscular part short and gradually expanding and the posterior part long and cylindrical; female reproductive apparatus didelphic with reflexed ovaries; vulva small and longitudinal; refractive part of vagina with slightly sclerotized pieces; female tail elongate conoid to filiform; male reproductive apparatus diorchic; supplements in two fascicles; male tail convex conoid with a filiform appendix variable in length, shorter than female tail. This genus, which by many characters can be ascribed to the group of the brittonems among the Actinolaimidae, differs from all the other brittonem genera by the particularly heavy cheilostomal sclerotizations, the relatively larger lip region and the filiform appendix in the male tail.

### Key to the species of *Practinocephalus*

1. Cuticular ridges 100, lip region greatly expanded, male unknown ( $\varnothing$  L = 2.8 mm; a = 28; b = 3.8; c = 6.3; V = 43) ..... *P. bizarrus* (Thorne, 1967)
- Cuticular ridges 30-35 ..... 2
2. Body longer, lip region high and expanded, male unknown ( $\varnothing$  L = 2.08-2.16 mm; a = 35-37; b = 3.7-3.8; c = 6.9-7; c' = 10-11; V = 46-47) ..... *P. secundus* Andrassy, 1986
- Body shorter, lip region only slightly set off, male tail with short filiform appendix ( $\varnothing$  L = 1.45-1.70 mm; a = 18-23; b = 3.2-3.6; c = 4.6-6.6; c' = 7-12; V = 42-45.  $\sigma$  L = 1.34-1.50 mm; a = 18-23; b = 2.6-3.4; c = 15-39; c' = 1-2.5) ..... *P. brzeskii* sp. nov.

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