Description of *Pratylenchus pseudofallax* n. sp. with a key to species of the genus *Pratylenchus* Filipjev, 1936 (Nematoda : Pratylenchidae) (1)

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SUMMARY

Pratylenchus pseudofallax n. sp. from the rhizosphere of apple *(Malus silvestris)* is described and illustrated. The new species comes from the temperate region of southern Brazil and is characterized by its three lip annules and presence of males. It differs from the three most related species *(P. penetrans, P. subpenetrans* and *P. fallax)* by the shorter stylet, deeper body annulation and deeper crenation of the external incisures of the lateral field in the caudal region, which frequently extends to the whole body. *P. pseudofallax* n. sp. differs further from *P. penetrans* by the smooth or crenate terminus, lower percentage of males and shape of the spermatheca. From *P. fallax* by the non-cellular terminus of the post-uterine sac and shape of spermatheca. From *P. subpenetrans* by the smooth or crenate terminus, lower percentage of males, bigger body length and by the shape of the spicules of the males. An actualized key to the genus is proposed, including 54 species validated till 1986 and *P. pseudofallax* n. sp.

RÉSUMÉ

Description de Pratylenchus pseudoffallax *n. sp. et clé des espèces du genre* Pratylenchus *Filipjev, 1936 (Nematoda : Pratylenchidae)*

Pratylenchus pseudofallax n. sp., provenant de la rhizosphère de pommier *(Malus silvestris)* de la région tempérée du Sud du Brésil, est décrit et illustré. Cette nouvelle espèce est caractérisée par les trois anneaux labiaux et la présence de mâles. Elle se sépare des trois espèces les plus proches *(P. penetrans, P. subpenetrans* et *P. fallax)* par son stylet plus court, l'annélation du corps plus fortement marquée et par la crénation des lignes du champ latéral, toujours plus fortement marquée dans la région de la queue, et parfois sur toute la longueur du corps. *P. pseudofallax* n. sp. se sépare également de *P. penetrans* par l'extrémité de la queue crénelée ou lisse, le pourcentage de mâles plus faible et la forme de la spermathèque; de *P. fallax* par l'extrémité du sac post-uterin non cellulaire et la forme de la spermathèque; de *P. subpenetrans* par l'extrémité de la queue crénelée ou lisse, le pourcentage de mâles plus faible, la plus grande longueur du corps et la forme des spicules. Une clé, actualisée jusqu'à 1986, des femelles du genre *Pratylenchus* est proposée; elle comprend les 54 espèces décrites et *P. pseudofallax* n. sp.

During a survey carried out in the Nematology Collection of the University of Brasilia (CNUB) six species of *Pratylenchus* were found (Café Filho & Huang, 1988), including a new species, *Pratylenchus pseudofallax* n. sp., described here.

Soil samples were processed by the flotation-sedimentation method (Flegg & Hooper, 1970), followed by the centrifugal-flotation technique of Jenkins (1964) or by the Baerman's funnel method (Flegg & Hooper, 1970). Root samples were processed by the Baerman's funnel method. The nematodes extracted were killed in water heated to 60° for one minute and immediately fixed in glycerin-formol-water (2 : 8 : 90) (Hooper, 1970). For the taxonomic studies, the fixed specimens were impregnated with glycerin, according to the method of Seinhorst (1959) and mounted in permanent slides according to Huang, Bittencourt and Mota Silva (1984).

Specimens for scanning electron microscopy (SEM) were prepared according to the technique described by Luc, Coomans and Sarr (1987).

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Pratylenchus pseudofallax n. sp.
(Figs 1, 2)

MEASUREMENTS

Female (paratypes; n = 22) : L = 471 ± 26 (415-525) µm; a = 29 ± 2.8 (24.7-36.3); b = 6.3 (5.4-7.6); b′ = 4.1 (3.6-4.5); c = 17 (14.5-19); c′ = 2.5 (1.7-3.4); V = 80.1 ± 1.3 (77-82) % stylet = 14.8 ± 0.5 (14-16) µm; G = 24-47 %; VA (vulva to anus) = 67.1 (57-80) µm; tail = 27.3 (22-32) µm; s* = 1.4 (1.1-2.1).

Male (paratypes; n = 8) : L = 421 ± 40 (370-480) µm; a = 28.3 ± 2.0 (24.7-31.5); b = 6.3 (5.4-7.3); b′ = 4.1 (3.5-4.6); c = 17.1 (15.7-19); c′ = 2.7 (2.0-3.2); stylet = 14.2 ± 0.5 (13.5-15) µm; t = 28-63 %; spicules = 15.9 (13-19) µm.

Holotype (female) : L = 462 µm; a = 33; b = 5.5; b′ = 3.6; c = 18.5; c′ = 2.8; V = 81 %; stylet = 15.5 µm; G = 35 %; VA = 64.5 µm; tail = 25 µm; s* = 1.4.

Allotype (male) : L = 420 µm; a = 30; b = 6.0; b′ = 3.8; c = 17.5; c′ = 2.7; stylet = 14 µm; t = 29 %; spicules = 14.6 µm.

DESCRIPTION

Female : Body relatively slender, cylindrical, tapering in both extremities, slightly curved, very rarely straight. Body annules strongly marked, mean width 1.1 (0.8-1.3) µm, deeper marked than the other species studied. Lateral field bearing four incisures, beginning in the oesophageal region. Usually only the external incisures extend past the phasmid, but sometimes one, or even both incisures may continue for some micrometers posterior to the phasmids. Phasmids 7-14, usually 9-11 annules from the caudal end. External incisures conspicuously crenate in the caudal region and usually also in the rest of the body. In some specimens even the internal incisures were faintly crenate in the posterior region of the body. Lip region off-set with three annules, sometimes not very distinct. SEM face views revealed one submedian and two lateral wedge-shaped segments fitting in " group 3 " (Corbett & Clark, 1983). Cephalic framework strongly developed. Stylet massive; stylet knobs extending to the laterals, anteriorly flattened, sometimes retort or, less often, forward pointed. Dorsal oesophageal gland orifice 2-3 µm posterior to the stylet knobs. Metacorpus oval. Isthmus short, surrounded by nerve ring. Oesophago - intestinal junction at vicinity of excretory pore. Hemizonid one annule anterior or immediately anterior to the excretory pore, 74-85 µm from the anterior end. Hemizonion about eight annules posterior to hemizonid, sometimes indistinct. Posterior oesophageal glands overlapping intestine in a sub-ventral lobe. Ovary does not reach the oesophagus. Ovocytes, in a single row. Spermatheca with spermatozoa generally rounded, rarely more ovate. Often the spermatheca is devoid of spermatozoa (Fig. 1-D_3). Tricolumella well-developed, with four groups of three cells. Post-uterine sac with non-cellular terminus. Caudal end variable, from clearly crenate to plainly smooth. Sixteen to 24 (usually 17 to 20) caudal annules.

Male : The proportion of males to females was 1 : 4 in two populations (69 : 17 and 53 : 13); in a third population here studied (nine females and three larvae) males were not observed. Body slender, almost straight or slightly curved. Lateral field with four incisures. Lip region almost continuous with the body, with three annules. Cephalic framework strongly developed. Stylet less massive than in female; stylet knobs rounded, slightly anteriorly flattened or rarely forward pointed. Dorsal oesophageal gland orifice 2-3 µm posterior to the stylet knobs. Metacorpus ovate. Isthmus short, surrounded by nerve ring. Oesophago-intestinal junction at vicinity of excretory pore. Hemizonid immediately anterior or few annules anterior to the excretory pore, 68-88 µm from anterior end. Hemizonion 7-11 annules posterior to the hemizonid. Posterior oesophageal glands overlapping intestine in a subventral lobe. Testis outstretched, with multiple row of spermatocytes. *Vas deferens* longer than testis. Spicules curved; Bursa strongly crenate. Phasmids posterior to the mid-tail.

TYPE SPECIMENS

Holotype (female) : Collected by Licelma M. Fehn, in 1981, Municiple of Pelotas, RS, Brazil, in an apple *(Malus silvestris)* orchard. Deposited in the CNUB under code number 1638/H.

Allotype (male) : Collected by L. L. Bavaresco, in 1980 in the locality of Lageadinho, Municiple of Veranópolis, RS, Brazil associated with *Malus silvestris.* Deposited in the CNUB under code number 1232/A".

Paratypes (131 females; 30 males). Same data as the holotype and allotype and the population CNUB 1227/1228, collected by D. Bortolli, in 1980, also in the locality of Lageadinho, Municiple of Veranópolis, RS, Brazil, associated with *Malus silvestris.* The paratypes are distributed in the following institutions : Muséum national d'Histoire naturelle, Laboratoire des Vers, Paris, France : two females, one larva, one male; University of California, Davis, Nematology Collection, California, USA : two females, one larva, one male; Landbouwhogeschool, Department of Nematology, Wageningen, the Netherlands : two females, one larva,

* S = L post-uterine sac/vulval diameter.

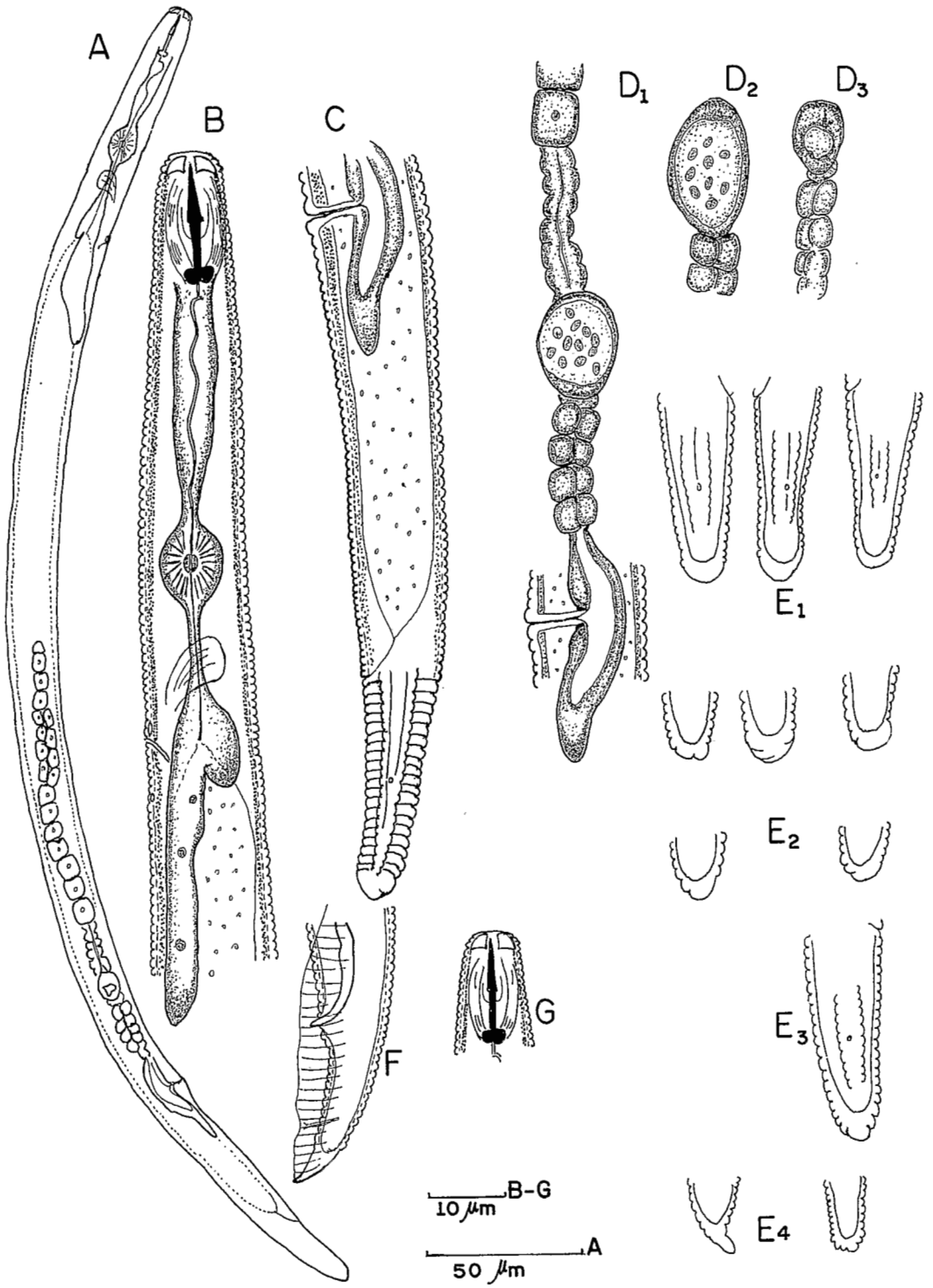

Fig. 1. *Pratylenchus pseudofallax* n. sp. A - E : Female; A : Whole body; B : Anterior part of the body; C : Posterior part; D : Detail of the reproductive system showing the round spermatheca (Dl, frequent), ovate (D 2, not frequent) and empty spermatheca (D 3); E 1 - E 4 : Some kinds of tail and tail termini; E 1 : Smooth; E 2 : Intermediate; E 3 : Crenate; E 4 : Aberrant; F - G : Male; F : Posterior part; G : Head region.

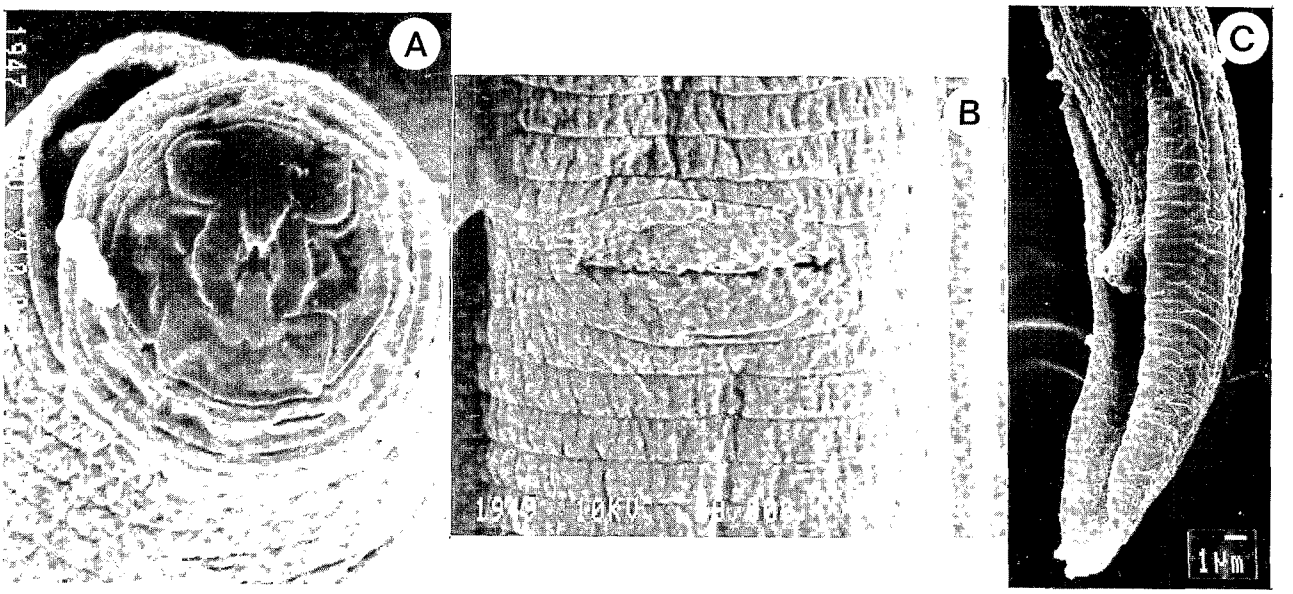

Fig. 2. SEM photographs of *P. pseudofallax*. A : Juvenile's face view; B : Vulva; C : Male posterior part.

one male; Rijksuniversiteit Ghent, Instituut voor Dierkunde, Ghent, Belgium : two females, one larva, one male.

The remaining paratypes are deposited in the Nematology Collection of the University of Brasília (CNUB) (slides n° s. 1227/I to 1227/XIII, 1228/I to 1228/XI, 1231/I to 1231/VIII, 1232/I to 1232/XI, 1638/I and 1638/II).

TYPE LOCALITY AND HABIT

Apple orchards, in the temperate region of Southern Brazil.

DIAGNOSIS AND RELATIONSHIPS

Pratylenchus pseudofallax n. sp. differs from all previously described species except *P. fallax* Seinhorst, 1968, *P. penetrans* (Cobb, 1917) Filipjev & Schuurmans Stekhoven, 1941 and *P. subpenetrans* Taylor & Jenkins, 1957, by the lip region with three annules, presence of males, outstretched ovary, stylet length at most 16 µm, V value 80, and rounded spermatheca. It can be distinguished from *P. fallax* by the smaller stylet [14.8 (14-16) µm *vs* 16-17 µm], by the non-cellular terminus of the post-uterine sac, by the deeper body annulation, by the incisures of the lateral field, which are conspicuously crenate in caudal region and frequently also in the rest of the body, and by the rounded or ovate spermatheca. From *P. penetrans* it can be distinguished by the smaller stylet [14.8 (14-16) µm *vs* 16-18 µm)], by the smooth or crenate caudal end, by the lower proportion of males, by the deeper body annulation, by the deeper crenation of the incisures of the lateral field, and by the rounded or ovate spermatheca. From *P. subpenetrans* it can be separated by the smaller stylet [14,8 (14-16) µm *vs* 15.8 (15-16.5) µm)], by the smooth or crenate caudal end, lower proportion of males, longer body length [471 (415-525) µm *vs* 400 (330-481) µm)], by the shape of the spicules of the males, which do not have the two characteristic swellings of the males of *P. subpenetrans*, by the deeper body annulation, and by the deeper crenation of the incisures of the lateral fields.

Key to species of the genus *Pratylenchus* Filipjev, 1936

During the procedures to find out the correct taxonomic place of *P. pseudofallax* n. sp., a strong need for an actualised key came up. A proposal for such a key is presented here.

The latest key to species of the genus *Pratylenchus* Filipjev, 1936 was published by Loof (1978) and included 29 species. Since then 28 other species have been described. The purpose of this key is though, to actualize this instrument of identification for *Pratylenchus*, including *P. pseudofallax* n. sp. The species synonymized or considered *species inquirendae* by Loof (1978) have not been included in this key.

Crenation of the tail terminus has been used as a character of second order to distinguish species of *Pratylenchus* (Corbett, 1969; Loof, 1978). This character however was shown to be quite variable in some species, as in *P. penetrans*, *P. fallax* and *P. pseudofallax* (Seinhorst, 1968; Tarté & Mai, 1976, Café Filho & Huang, unpubl.). In this key the main characteristics to separate the species were the vulva position (V) and stylet length

(st), for which the stability have already been experimentally shown (Taylor & Jenkins, 1957; Seinhorst, 1968; Román & Hirschmann, 1969; Tarté & Mai, 1976; Rashid & Khan, 1978; Tarján & Frederick, 1978; Singh & Khan, 1981; Bajaj & Bhatti, 1984; Café Filho & Huang, 1988). As, however, these values frequently overlap, other parameters, including the shape of the spermatheca and the tail terminus (Figs. 3, 4) were also used.

As it has been observed in the case of *P. zeae* (Café-Filho & Huang, unpubl.) there seems to be some confusion about the stylet length of some species. For example, Sher and Allen (1953) redescribed *P. penetrans* with stylet length 18 µm (neotype) and 17-19 µm (paraneotypes). Other authors (Loof, 1960; Róman & Hirschmann, 1969; Tarté & Mai, 1976) reported medium stylet lengths of 16 to 17 µm, agreeing well with the emendation of *P. penetrans* made by Seinhorst (1968). This value (16-17) µm was therefore accepted for this key. In some other cases of disagreement, if no emendation or redescription of a species was published, the figures reported in the original description were used.

The species *P. typicus* Rashid, 1974, *P. crassi* Das & Sultana, 1979, *P. barkati* Das & Sultana, 1979, *P. singhi* Das & Sultana, 1979 and *P. dasi* Fortuner, 1985, were described with a full spermatheca, but no males were found. For convenience, these species were considered as bisexual in the key, despite the point raised by Corbett (1984), about the possible confusion of the spermatheca with a developing oocyte, in the case of *P. typicus.*

P. obtusicaudatus Romaniko, 1977, *P. stupidus* Romaniko, 1977 and *P. varicaudatus* Romaniko, 1977 are here declared *species inquirendae,* because of their poor descriptions, which lacked number of lip annules and other information. *P. hyderabadensis* Singh & Gill, 1986, a junior homonym of *P. dasi* Fortuner, 1985 is rejected here.

Genus ***Pratylenchus*** Filipjev, 1936

1. Lip region bearing 2 annules 2
   Lip region bearing 3 annules 15
   Lip region bearing 4 annules 51
2. Spermatheca filled with sperm (males usually common) 3
   Spermatheca empty (males rare or unknown) 7
3. V = 72-77. Stylet 17 µm or more (mean) 4
   V = 76-85. Stylet under 17 µm (mean) 5
4. Head region low and flat. Spermatheca 3.0 × as long as wide. Tail terminus smooth ..... *P. crassi* Das & Sultana, 1979
   Head region somewhat rounded. Spermatheca less than 2.0 × as long as wide. Tail terminus crenate ..... *P. flakkensis* Seinhorst, 1968
5. V = 82.5 (79-85). Tail bluntly pointed ..... *P. loosi* Loof, 1960
   V = 81 (76-83). Tail terminus rounded 6

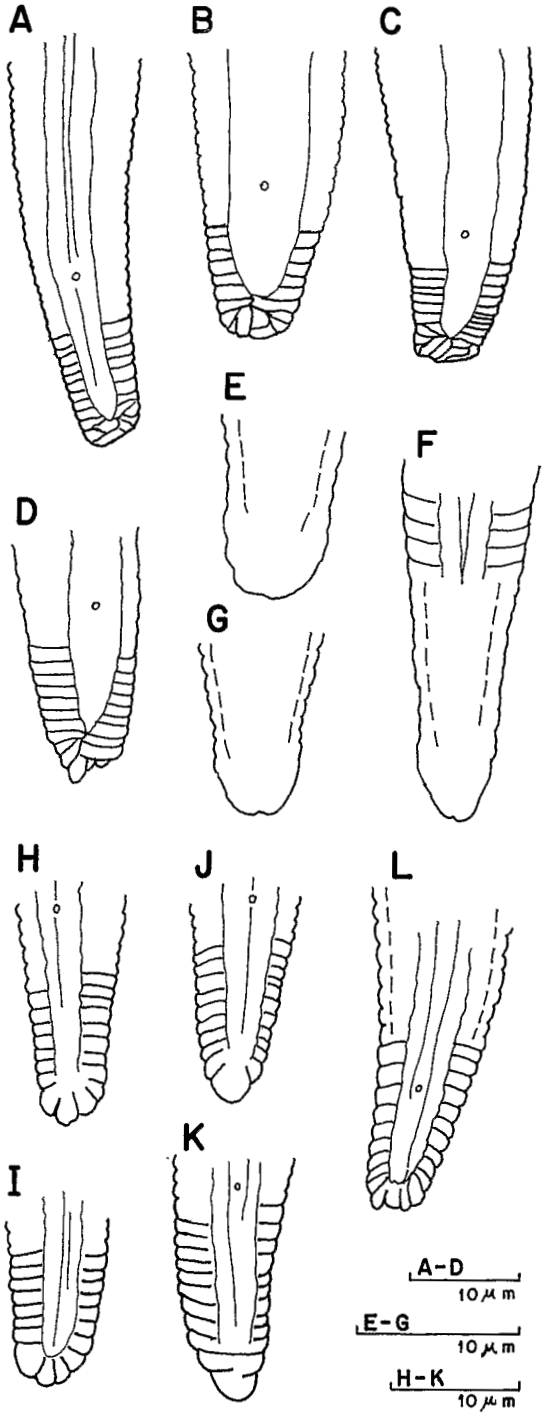

Fig. 3 : Tail termini of some *Pratylenchus* species. A - D : *P. gibbicaudatus,* A-C : common, D : rare; E-G : *P. jordanensis;* H-K : *P. pratensisobrinus;* L : *P. convallariae* (A-D after Wu, 1982, E-G after Hashim, 1983, H-K after Bernard, 1984, L after Seinhorst, 1959).

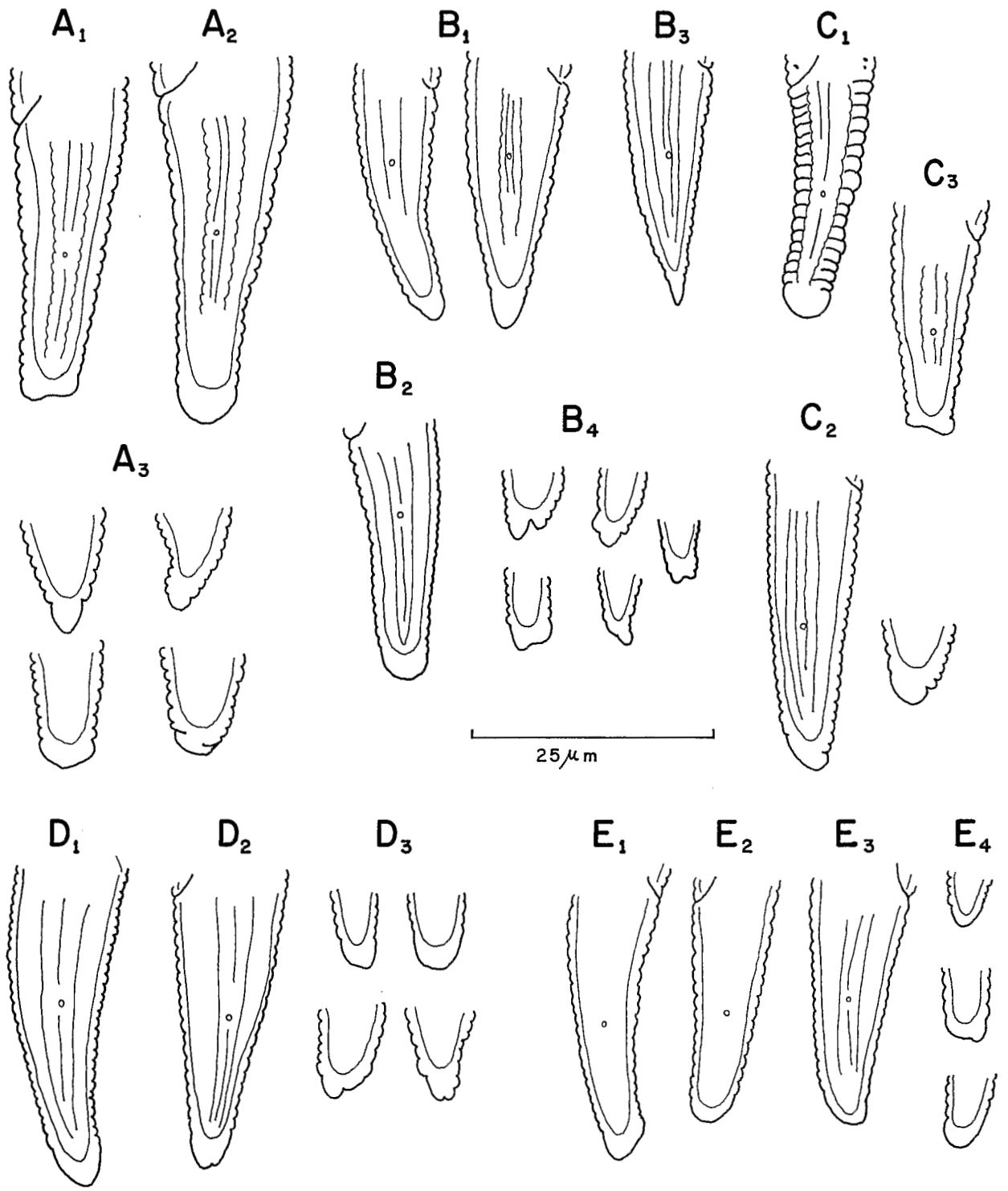

Fig. 4. Tail termini of some *Pratylenchus* species found in Brazil A 1 - A 3 : *P. brachyurus;* A 1-A 2 : Normal; A 3 : Aberrant; B 1-B 4 : *P. zeae;* B 1-B 3 : Normal; B 4 : Aberrant; C 1-C 3 : *P. coffeae;* C 1 : Normal; C 2 : Frequent; C 3 : Rare; D 1-D 3 : *P. jordanensis;* E 1-E 4 : *P. pseudopratensis;* E 1-E 3 : Common; E 4 : Rare.

6. L = 330-440 µm; body stout (a = 19-27). Spermatheca always round. Stylet = 14 µm (13.5-15) mm .... *P. alleni* Ferris, 1961
L = 450-700 µm; body slenderer (a = 25-35). Spermatheca round to oval. Stylet 15 µm or more (mean) .... *P. coffeae* (Zimmerman, 1898) Filipjev & Schuurmans Stekhoven, 1941

7. Lateral field with 6 incisures .... *P. hexincisus* Taylor & Jenkins, 1957
Lateral field with 4 incisures 8

8. Vulva very posterior (mean V = 81) 9
Vulva more anterior (mean V = 73-78) 12

9. Stylet length mean less than 18 µm (range : 15-19 µm) 10
Stylet length mean more than 19 µm (range : 17-25 µm) 11

10. Tail terminus crenate. Central band of lateral field plain ..... *P. estoniensis* Ryss, 1982
Tail terminus smooth. Central band of lateral field with oblique striations ..... *P. neglectus* (Rensch, 1924) Filipjev & Schuurmans Stekhoven, 1941

11. Lip region high, rounded. Tail terminus narrow or with projection. Stylet knobs anteriorly flattened .... *P. macrostylus* Wu, 1971
Lip region lower, with the first annule bearing angular borders. Tail terminus round or truncate. Stylet knobs round (Fig. 4-A) ..... *P. brachyurus* (Godfrey, 1929) Filipjev & Schuurmans Stekhoven, 1941

12. Tail terminus variable, annulated to indented, sometimes narrow and smooth (Fig. 3) 13
Tail terminus rounded, always smooth 14

13. Tail sub-cylindrical, 24-39 annules, terminus truncate or rounded, with irregular annulation (Fig. 3 A-D) .... *P. gibbicaudatus* Minagawa, 1982
Tail conical, 19-24 annules, terminus tappering, smooth or with characteristic indentation (Fig. 3 E-G, 4 D) .... *P. jordanensis* Hashim, 1983

14. Lip region very low. Body annulation coarse. Oesophageal glands lobe normal .... *P. agilis* Thorne & Malek, 1968
Lip region and body annulation normal. Oesophageal glands lobe more massive than normal .... *P. scribneri* Steiner, 1943

15. Spermatheca filled with sperm (males usually common) *16*
Spermatheca empty (males rare or unknown) 36

16. Ovary reflexed 17
Ovary outstretched 18

17. Tail terminus smooth. Spermatheca round, well developed ..... *P. singhi* Das & Sultana, 1979
Tail terminus crenate. Spermatheca ovate, small .... *P. barkati* Das & Sultana, 1979

18. Specimens with 4 lip annules common. Lip region high, not separated from body. Body slender (a = 26-40). L = 600 µm (460-930) or more 19
Specimens with 4 lip annules unknown. Lip region not conspicuously high. Body width variable, from stout to slender. L = 280-770 µm, generally under 600 µm 20

19. Narrowly rounded tail terminus, without projection. Head truncate ..... *P. vulnus* Allen & Jensen, 1951
Tail terminus bearing a thin, well marked projection, combined with a terminal thickening of the cuticle. Head dome-shaped .. *P. morettoi* Luc, Baldwin & Bell, 1986

20. Stylet = 18-19 µm. Tail terminus smooth .... *P. dasi* Fortuner, 1985
Stylet at most 18µm. Tail terminus variable 21

21. V = 70-76 22
V = 74-83 24

22. Spermatheca round, small. Tail terminus crenate .... *P. exilis* Das & Sultana, 1979
Spermatheca elongate, big. Tail terminus not crenate 23

23. Vulva with characteristic cuticular depression or cavity ..... *P. emarginatus* Eroshenko, 1978
Vulva flush with body profile .... *P. sudanensis* Loof & Yassin, 1971

24. Spermatheca ovate to oblong (1.5-5.0 × as long as wide) 25
Spermatheca generally rounded or squarish 28

25. Tail terminus smooth 26
Tail terminus annulated 27

26. Stylet extremely short (11-13 µm). External incisures of the lateral field crenate *P. ekrami* Bajaj & Bhatti, 1984
Stylet = 15 µm. External incisures of the lateral field smooth (Fig. 4 E) .. *P. pseudopratensis* Seinhorts, 1968

27. Stylet = 16-17 µm. Thirty-two to 44 tail annules .... *P. kasari* Ryss, 1982
Stylet = 12-16 µm. Twenty to 26 tail annules .... *P. pratensis* (de Man, 1880) Filipjev, 1936

28. Tail terminus consistently coarsely annulated (Fig. 3) 29
Tail terminus smooth or striated to annulated (never coarsely annulated) 30

29. Internal incisures of lateral field extending past phasmid. Tail terminus split in irregular lobes (Fig. 3 L) .... *P. convallariae* Seinhorst, 1959
Internal incisures of lateral field fusing anterior to or slightly posterior to phasmids. Tail terminus sometimes with large terminal annule (Fig. 3 H-K) .... *P. pratensisobrinus* Bernard, 1984

30. Tail terminus smooth 31
Tail terminus annulated, striated or bearing ventral projection 34

31. Stylet = 15-17 µm. Tail conical with rounded terminus 32
Stylet = 14-16 µm. Tail conical with sub-acute terminus or cylindrical with truncate terminus 33

32. L = 330-480 µm. Post-uterine sac with cellular terminus. Spicules of the males have two swellings in the anterior region ..... *P. subpenetrans* Taylor & Jenkins, 1957
L = 430-650 µm. Post-uterine sac not cellular. Spicules of the males with no conspicuous second swelling .... *P. penetrans* (Cobb, 1917) Filipjev & Schuurmans Stekhoven, 1941

33. Tail terminus sub-acute. Metacorpus round ..... *P. kralli* Ryss, 1982
Tail terminus truncate. Metacorpus oval ..... *P. mediterraneus* Corbett, 1984

34. Stylet = 16-17 µm ..... *P. fallax* Seinhorst, 1968
Stylet = 14-16 µm 35

35. Body annules strongly marked. Tail terminus striated to annulated, sometimes smooth. Spermatheca round or rarely ovate (Fig. 1,2) ..... *P. pseudofallax* n. sp.
Body annules normal. Tail terminus truncate, with sub-ventral projection. Spermatheca oval to rectangular or more elongate ..... *P. ventroprojectus* Bernard, 1984

36. Tail terminus distinctly crenate. Lateral field with 6 lines 37
Tail terminus smooth. Lateral field with 4 lines 38

37. V = 78-86 ..... *P. crenatus* Loof, 1960
V = 69-78 ..... *P. teres* Khan & Singh, 1975

38. Stylet very short (11-12 µm) ..... *P. microstylus* Bajaj & Bhatti, 1984
Stylet longer (at least 13 µm) 39

39. V = 68-76 (means = 70-73) 40
V = 73-82 (means = 75-81) 41

40. Tail subcylindrical with oblique-truncate terminus ..... *P. uralensis* Romaniko, 1966
Tail conical with narrowly rounded to pointed terminus (Fig. 4 B) ..... *P. zeae* Graham, 1951

41. V = 77-81. Stylet = 13.5-18 µm. Body annulation indistinct or delicate 42
Nematodes bearing or not one of the characteristics above, but not all combined 44

42. Tail conical, with rounded terminus. Opening of the dorsal oesophageal gland 1 µm posterior to stylet basis ..... *P. manohari* Quraishi, 1982
Tail sub-cylindrical, with rounded to truncate terminus. Opening of the dorsal oesophageal glands 2-3.5 µm posterior to stylet basis 43

43. Large nematodes (L = 570-685 µm). Stylet = 15-17 µm. Tail terminus sometimes cleft ..... *P. sensillatus* Anderson & Townshend, 1985
Shorter nematodes (L = 400-525 µm). Stylet = 13.5-16 µm. Terminus sometimes with one or two identations following the insisures of lateral field ..... *P. sefaensis* Fortuner, 1973

44. Central zone of lateral field with oblique striations. Opening of the dorsal oesophageal gland 3-4 µm posterior to the stylet basis 45
Central zone of lateral field without oblique striations. Opening of the dorsal oesophageal gland 2-3 µm posterior to the stylet basis 46

45. Stylet = 15-16 µm. Tail cylindrical to subcylindrical with rounded to truncate terminus ..... *P. cruciferus* Bajaj & Bhatti, 1984
Stylet = 17-20 µm. Tail conical with rounded or subacute terminus ..... *P. bolivianus* Corbett, 1984

46. Lip region high and continuous with body. Body narrowing posterior to the vulva *P. thornei* Sher & Allen, 1953
Lip region not conspicuously high, but off-set. Vulva flush with body profile 47

47. Lateral field areolated (immersion oil mounts). Posterior oesophageal gland about 60 µm long ..... *P. pinguicaudatus* Corbett, 1969
Lateral field not areolated. Posterior oesophageal gland less than 60 µm long 48

48. Tail broad, cylindrical to subcylindrical, with broadly rounded terminus ..... *P. andinus* Lordello, Zamith & Boock, 1961
Tail sub-cylindrical to conical; terminus not broadly rounded 49

49. Large nematodes (L = 570-720 µm). Tail conical; terminus slightly expanded ..... *P. australis* Valenzuela & Raski, 1985
Moderate large to small nematodes (L = 390-580 µm). Tail conical or cylindrical; terminus not as above .. 50

50. Tail terminus truncate, square or less often, rounded. Head contour dome-shaped ..... *P. mulchandi* Nandakumar & Khera, 1970
Tail conical with rounded terminus. Head contour somewhat flat ..... *P. delattrei* Luc, 1958

51. Spermatheca empty (males unknown) 52
Spermatheca filled with sperms (males usually common) 53

52. Tail terminus rounded, smooth or occasionally indented, with conspicuous hyaline area at tip. V = 79-82 ..... *P. wescolagricus* Corbett, 1984
Tail terminus blunt and crenate. V = 67-78 ..... *P. nizamabadensis* Maharaju & Das, 1981

53. V = 73-75. Post-uterine sac short, about body width. Dorsal contour of tail characteristically sinuate anterior to terminus ..... *P. goodeyt* Sher & Allen, 1953
V = 73-89 (mean 76 or more). Post uterine sac long (at least 2.0 × body widths). Tail not as above 54

54. Males unknown. Lip region slightly off-set. Some specimens with 4 lip annules on one side and 5 annules on the other ..... *P. typicus* Rashid, 1974
Males numerous. Lip region high, not separated from body. Specimens with 3 lip annules common 55

55. Tail terminus narrowly rounded to subacute, smooth, without any projection. Head contour truncate ..... *P. vulnus* Allen & Jensen, 1951
Tail terminus always with thin, well marked projection, combined with a terminal thickening of the cuticle. Head contour dome-shapped ..... *P. morettoi* Luc, Baldwin & Bell, 1986

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