

# A Key and Diagnostic Compendium to the Species of the Genus *Pratylenchus* Filipjev, 1936 (Lesion Nematodes)<sup>1</sup>

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**Abstract:** An identification key to 63 species of *Pratylenchus* is given. A compendium of the most diagnostic characters to be used directly in identification of species is included as a practical alternative and supplement to the key. *P. tenuis*, *P. similis*, *P. impar*, *P. ranjani*, and *P. neocapitatus* are recognized as valid species on the basis of study of type specimens. *P. hyderabadensis* Singh & Gill, 1986 is synonymized with *P. dasi* Fortuner, 1985. *P. hexincisus* Taylor & Jenkins, 1957 is confirmed as occasionally having 4-6 lines in lateral field (instead of 6 only). Comments on the status of some species and a list of species of the genus are given.

**Key words:** diagnostic compendium, identification, key, morphology, *Pratylenchus*, taxonomy.

The genus *Pratylenchus* at present comprises 63 valid species of world-wide distribution which parasitize a wide variety of plants. De Man is credited with describing the first root-lesion nematode as *Tylenchus pratensis* in 1880. In 1884 de Man redescribed and illustrated this species. *Pratylenchus* was erected by Filipjev in 1936 (6) with *P. pratensis* as the type species. The name had already been published in 1934 by Filipjev (5), but at that time no generic diagnosis was given; only the type species was indicated. The first comprehensive work on the genus was that of Filipjev and Schuurmans Stekhoven (7). Sher and Allen (16) put the taxonomy of the genus on a sound basis. Their revision contained good historical, morphological, and biological sections; it also gave a key to the 10 acknowledged species of *Pratylenchus*. Loof (11) published taxonomic studies on the genus that formed a supplementary review to that of Sher and Allen (16). Corbett (2) gave a key to 36 species in the genus. Loof

(12) reviewed in detail the anatomy, morphology, distribution, systematics, and identification of the genus and provided a key to 29 valid species; presented a check list of all nominal species, indicating their present status; synonymized five species; and considered 14 species as inquirendae. Taylor and Jenkins (19), Roman and Hirschmann (14), and Anderson and Townshend (1) studied variation within the genus. Corbett and Clark (3) contributed to knowledge of the surface features of *Pratylenchus*. Seinhorst (15) discussed the cephalic framework and spermatheca in the genus. Luc (13) revised the classification of Pratylenchidae and included *Pratylenchus* as a type genus for Pratylenchinae. He also gave the diagnosis of the genus and considers *Pratylenchus* as a stenomorphic genus in which species are difficult to separate because of the small number of characters diagnostic at species level and because of the intraspecific variability of some of these characters, for example, the tail shape. He discussed some of these characters and gave a list of 60 valid species, half of which he considers to be parthenogenetic.

In the present study a key for identification of 63 *Pratylenchus* species was prepared and a compendium containing morphometric and related details was developed for use as a further aid in species identifications.

## MATERIALS AND METHODS

All specimens were already mounted in glycerine and accompanied by pertinent records. Paratype specimens of 16 species

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(*P. fallax*, *P. flakkensis*, *P. hexincisus*, *P. macrostylus*, *P. minyus*, *P. morettoii*, *P. mulchandi*, *P. pinguicaudatus*, *P. pratensisobrinus*, *P. scribneri*, *P. sefaensis*, *P. sensillatus*, *P. subpenetrans*, *P. sudanensis*, *P. thornei*, and *P. ventroprojectus*) and nontype specimens of 14 other species (*P. agilis*, *P. alleni*, *P. andinus*, *P. brachyurus*, *P. coffeae*, *P. crenatus*, *P. delatterii*, *P. goodeyi*, *P. loosi*, *P. neglectus*, *P. penetrans*, *P. pratensis*, *P. vulnus*, and *P. zaeae*) were examined from the USDA Nematode Collection, Beltsville, Maryland. Type specimens of five additional species (*P. impar*, *P. neocapitatus*, *P. ranjani*, *P. similis*, and *P. tenuis*) were provided by colleagues. Examinations were made with a compound light microscope usually at highest magnification, and morphometric data were obtained with an eyepiece micrometer. In evaluation of the species, our own data and the original descriptions of most species, as well as any subsequent re-descriptions or other relevant data, were utilized.

SYSTEMATICS

Pratylenchus Species Key

- 1. Lip region composed of two annules ..... 2
- 1. Lip region composed of three annules ..... 21
- 1. Lip region composed of four annules ..... 56
- 2. Tail terminus crenate ..... 3
- 2. Tail terminus smooth ..... 7
- 3. Males common; spermatheca filled with sperm ..... 4
- 3. Males rare; spermatheca empty ..... 6
- 4. Stylet 12–13  $\mu\text{m}$  long; vulva at 80% (76–85); tail with 16–18 annules .....  
..... *P. similis* Khan & Singh, 1975
- 4. Stylet 14–17  $\mu\text{m}$  long; vulva at 73% (70–77); tail with 18–39 annules ..... 5
- 5. Tail with 18–24 annules; tail terminus bluntly rounded (occasionally smooth around tip); posterior uterine branch short, about one vulval body width long without a rudimentary ovary .....  
..... *P. flakkensis* Seinhorst, 1968
- 5. Tail with 24–39 annules; tail terminus truncate or broadly rounded with shallow notch at the top or rarely bifurcate; posterior uterine branch long, more than two vulval body widths long with a rudimentary ovary .....  
..... *P. gibbicaudatus* Minagawa, 1982
- 6. Lateral field with four lines; stylet knobs flattened, rounded; vulva at 66–72% .....  
..... *P. impar* Khan & Singh, 1975
- 6. Lateral field with six lines; stylet knobs slightly pointed and directed forward; vulva at 79–86% .....  
..... *P. estoniensis* Ryss, 1982

- 7. Males common; spermatheca filled with sperm ..... 8
- 7. Males rare; spermatheca empty ..... 13
- 8. Tail terminus narrowly rounded to subacute .....  
..... *P. loosi* Loof, 1960
- 8. Tail terminus slender, broadly to conically rounded, truncate or indented ..... 9
- 9. Stylet less than 15  $\mu\text{m}$ ; spermatheca spherical; tail terminus usually with one or two indentations .....  
..... *P. alleni* Ferris, 1961
- 9. Stylet 15  $\mu\text{m}$  or more long; spermatheca usually oval (occasionally rounded to rectangular) ..... 10
- 10. Stylet 15–18  $\mu\text{m}$  long ..... 11
- 10. Stylet 19–25  $\mu\text{m}$  long ..... 12
- 11. Spermatheca oval; stylet longer than 15  $\mu\text{m}$ ; tail terminus rounded or occasionally indented; vulva at 75–84% .....  
..... *P. coffeae* (Zimmerman, 1898)  
Filipjev & Schuurmans Stekhoven, 1941
- 11. Spermatheca oval to round; stylet 15  $\mu\text{m}$  long; tail terminus flat, truncate; vulva at 77% .....  
..... *P. obtusicaudatus* Romaniko, 1977
- 12. Lip region low, angular; stylet 19–22  $\mu\text{m}$  long with rounded knobs; tail terminus rounded or broadly rounded; males rare .....  
..... *P. brachyurus* (Godfrey, 1929)  
Filipjev & Schuurmans Stekhoven, 1941
- 12. Lip region high, roundly convex; stylet 22–25  $\mu\text{m}$  long with strong, flattened or slightly cupped knobs; tail terminus slender, conically rounded; males rare .....  
..... *P. macrostylus* Wu, 1971
- 13. Lateral field usually with six incisions on most of body; stylet knobs rounded; valve of median bulb anterior to center .....  
..... *P. hexincisus* Taylor & Jenkins, 1957
- 13. Lateral field with four, occasionally five lines ..... 14
- 14. Vulva at 80–87% ..... 15
- 14. Vulva at 72–80% ..... 16
- 15. Lip region not set off, with anterior margin of apical lip annule convex, second annule wider than the first; central zone of lateral field with oblique striae; tail terminus rounded or slightly oblique .....  
..... *P. neglectus* (Rensch, 1924)  
Filipjev & Schuurmans Stekhoven, 1941
- 15. Lip region set off, cup-like with first annule larger than second; central zone of lateral field without oblique striae; tail terminus almost clavate .....  
..... *P. neocapitatus* Khan & Singh, 1975
- 16. Stylet 14.5–15  $\mu\text{m}$  long ..... 17
- 16. Stylet 15  $\mu\text{m}$  or more long ..... 18
- 17. Lip region high; "a" and "c" ratios greater (a = 26–32, c = 16–25); intestinal fasciculi present; tail conoid with a characteristic indentation on tail terminus .....  
..... *P. jordanensis* Hashim, 1983
- 17. Lip region low; "a" and "c" ratios smaller (a = 16.6–17, c = 12.7–13.5); intestinal fasciculi absent; tail cylindrical to broadly rounded with a smooth, rounded terminus .....  
..... *P. stupidus* Romaniko, 1977
- 17. Lip region low; "a" and "c" values smaller (a = 14.3–15, c = 17.5–18); intestinal fasciculi absent; tail conoid with a variable tail terminus

- which has a broad process with a large acute terminal annule .....  
 ..... *P. variacaudatus* Romaniko, 1977
18. Basal esophageal lobes elongated, nuclei in tandem ..... 19
18. Basal esophageal lobes broad, nuclei not in tandem ..... 20
19. Stylet knobs slightly cupped and rounded posteriorly; body striae coarse, about 1.7  $\mu\text{m}$  apart at midbody; esophageal lobes elongate, less than twice body width .....  
 ..... *P. agilis* Thorne & Malek, 1968
19. Stylet knobs tulip-shaped which are narrow and high; body striae fine, less than 1  $\mu\text{m}$  apart at midbody; long isthmus and unusually elongate esophageal lobe three times body width .....  
 ..... *P. tenuis* Thorne & Malek, 1968
20. Lip region high, body striae fine, about 1.2  $\mu\text{m}$  apart at midbody; posterior uterine branch about equal to body width at vulva; tail conoid to broad .....  
 ..... *P. scribneri* Steiner, 1943
20. Lip region low; body striae fine, less than 1  $\mu\text{m}$  apart at midbody; posterior uterine branch less than one body width at vulva; tail cylindrical .....  
 ..... *P. crassi* Das & Sultana, 1979
21. Tail terminus crenate or with a distinct subventral or terminal projection ..... 22
21. Tail terminus smooth ..... 32
22. Males unknown; spermatheca without sperm ..... 23
22. Males common; spermatheca with sperm ..... 24
23. Vulva at 80–86%; lateral field with four lines; body annulation prominent .....  
 ..... *P. crenatus* Loof, 1960
23. Vulva at 69–78%; lateral field with six lines; body annulation fine .....  
 ..... *P. teres* Khan & Singh, 1975
24. Spermatheca large, elongate ..... 25
24. Spermatheca round, square, or broadly oval to rectangular ..... 26
25. Stylet 14–15  $\mu\text{m}$  long; spermatheca oblong, 24–27  $\mu\text{m}$  long; tail with 20–28 annules (excluding those around tip); tail terminus oblique sometimes more symmetrically conoid or slightly mucronate; spicules 17–19  $\mu\text{m}$  long .....  
 ..... *P. pratensis* (de Man, 1880) Filipjev, 1936
25. Stylet 16–17.5  $\mu\text{m}$  long; spermatheca elongate, 28–77  $\mu\text{m}$  long and 2–5 times its width; tail width 32–44 annules (excluding those around tip); tail terminus sharply conical; spicules 20–21  $\mu\text{m}$  long .....  
 ..... *P. hasari* Ryss, 1982
26. Spermatheca round ..... 27
26. Spermatheca square or broadly oval to rectangular ..... 30
27. Tail cylindrical or conical; tail terminus rounded and finely crenate ..... 28
27. Tail bluntly rounded or conoid; tail terminus truncate ..... 29
27. Tail long, conical; tail terminus variable, from more-or-less pointed to stout but always showing a terminal projection .....  
 ..... *P. morettoii* Luc, Baldwin & Bell, 1986
28. Vulva at 77–81%; tail conical with 16–26 annules; posterior uterine branch often with rudimentary elements ..... *P. fallax* Seinhorst, 1968
28. Vulva at 73–76%; tail cylindrical with 17–20 annules; posterior uterine branch without rudimentary elements .....  
 ..... *P. exilis* Das & Sultana, 1979
29. Lip region high; excretory pore posterior, located at level of junction between esophagus and intestine; tail bluntly rounded; terminus coarsely crenate .....  
 ..... *P. convallariae* Seinhorst, 1959
29. Lip region low; excretory pore anterior, located above median bulb; tail conoid; terminus finely crenate .....  
 ..... *P. cerealis* Haque, 1966
30. Lip region high, flat; stylet 18–19  $\mu\text{m}$  long; tail conoid with a bluntly ending annulated terminus; ovary reflexed; spermatheca oval .....  
 ..... *P. barkati* Das & Sultana, 1979
30. Lip region low, rounded or sometimes flat; stylet 14–17  $\mu\text{m}$  long; tail elongate conoid to broadly conoid with a large terminal annule or with a distal subventral projection; ovary outstretched ..... 31
31. Stylet 15–17  $\mu\text{m}$  long; lip region low, rounded; tail elongate conoid with coarsely annulated terminus or with a large terminal annule; spermatheca square to oval elongate .....  
 ..... *P. pratensisobrinus* Bernard, 1984
31. Stylet 14–16  $\mu\text{m}$  long; lip region low flat; tail broadly conoid; tail terminus truncate with a distal subventral projection one or two annules long; spermatheca oval to rectangular .....  
 ..... *P. ventroprojectus* Bernard, 1984
32. Males common; spermatheca filled with sperm ..... 33
32. Males rare; spermatheca empty ..... 41
33. Spermatheca oval ..... 34
33. Spermatheca round, sometimes more square and subspherical ..... 38
34. Body slender; average  $a = 29$  or more ..... 35
34. Body stout; average  $a =$  less than 29 ..... 36
35. Stylet 14–18  $\mu\text{m}$  long; lip annules usually three or four on one side and four on the other; median bulb oblong; central zone of lateral field narrower than lateral zones;  $a = 26.6$ – $39.5$  .....  
 ..... *P. vulnus* Allen & Jensen, 1951
35. Stylet 11–13  $\mu\text{m}$  long, lip annules three on both sides; median bulb oval; central zone of lateral field not narrower than lateral zone;  $a = 20$ – $39$  (29) .....  
 ..... *P. ekrami* Bajaj & Bhatti, 1984
36. Vulva at 68–76% ..... 37
36. Vulva at 76–80% (with  $a = 21$ – $25$ ) .....  
 ..... *P. pseudopratensis* Seinhorst, 1968
37. Oral aperture truncate; ( $a = 22$ – $31$ ,  $b = 4.9$ – $7.2$ ); tail with 18–23 annules; tail terminus without any indentation .....  
 ..... *P. sudanensis* Loof & Yassin, 1971
37. Oral aperture slightly depressed; ( $a = 18$ – $24$ ,  $b = 3.4$ – $4.7$ ); tail with 15–19 annules; tail terminus indented .....  
 ..... *P. emarginatus* Eroshenko, 1978
38. Posterior uterine branch short, undifferentiated; body long and slender; average  $a =$  more than 25 ..... 39
38. Posterior uterine branch longer with cellular

- distal part; body short and stout; average  $a = 25$  or less ..... 40
39. Lip region low, slightly set off; oral aperture with six adjoining sensilla; in en face view by SEM the dorsal and ventral segments of oral disk are either hexaradiate or dumbbell shape; stylet 15–17  $\mu\text{m}$  long;  $a = 21$ –31 (26) .....  
..... *P. penetrans* (Cobb, 1917)  
..... Filipjev & Schuurmans Stekhoven, 1941
39. Lip region high, continuous; oral aperture oval, surrounded by six small pores; in en face view by SEM the subdorsal and subventral segments of oral disk fused to produce a pandurate outline; stylet 14–16  $\mu\text{m}$  long;  $a = 24$ –31 (27) .....  
..... *P. mediterraneus* Corbett, 1983
40. Lip region low, flat; stylet 15–16.5  $\mu\text{m}$  long with spherical knobs; vulva at 80% (78–83); tail tip rounded;  $a = 18$ –27 (24) .....  
..... *P. subpenetrans* Taylor & Jenkins, 1957
40. Lip region high, dome-shaped; stylet 14–15  $\mu\text{m}$  long with wide forwardly directed knobs; vulva at 74–80%; tail tip pointed;  $a = 20$ –30 .....  
..... *P. kralli* Ryss, 1982
41. Tail subcylindrical to cylindrical-conoid; terminus round to truncate ..... 42
41. Tail conoid, tapering to narrow, rounded terminus ..... 55
42. Lip region high, continuous; body contracted ventrally behind vulva; tail terminus bluntly rounded to truncate; vulva at 73–80% .....  
..... *P. thornei* Sher & Allen, 1953
42. Lip region not conspicuously high, slightly set off, occasionally continuous or dome-shaped; body not contracted behind vulva; tail subcylindrical to cylindrical conoid, conical or obtuse, occasionally with a terminal process ..... 43
43. Stylet 13–20  $\mu\text{m}$  long ..... 44
43. Stylet 11–12  $\mu\text{m}$  long .....  
..... *P. microstylus* Bajaj & Bhatti, 1984
44. Lateral field areolated; length of esophageal gland lobe about 60  $\mu\text{m}$  .....  
..... *P. pinguicaudatus* Corbett, 1969
44. Lateral field not areolated or only outer band areolated, occasionally with oblique striae in middle band; esophageal gland lobe shorter than 60  $\mu\text{m}$  ..... 45
45. Ovary reflexed ..... 46
45. Ovary outstretched ..... 47
46. Lip region dome-shaped; posterior uterine branch long, about two vulval body widths long, with rudimentary ovary; tail obtuse and truncate ... *P. mulchandii* Nandkumar & Khera, 1970
46. Lip region flattened; posterior uterine branch short, less than one vulval body width long, without rudimentary ovary; tail subcylindrical .....  
..... *P. singhi* Das & Sultana, 1979
47. Stylet 13–18  $\mu\text{m}$  long ..... 48
47. Stylet 18–20  $\mu\text{m}$  long ..... 53
48. Vulva at 73%; tail terminus oblique-truncate with two small protuberances .....  
..... *P. uralensis* Romaniko, 1966
48. Vulva at 76–84%; tail terminus round to broadly round, truncate or with a cleft, no protuberance ..... 49
49. Body length shorter,  $L = 420$ –590  $\mu\text{m}$  ..... 50
49. Body length longer,  $L = 590$ –790  $\mu\text{m}$  ..... 52
50. Posterior uterine branch short, about one vulval body width long, undifferentiated .....  
..... *P. andinus* Lordello, Zamith & Boock, 1961
50. Posterior uterine branch long with non-functional rudimentary posterior ovary ..... 51
51. Stylet 13–16  $\mu\text{m}$  long; tail with 16–23 annules .....  
..... *P. sefaensis* Fortuner, 1973
51. Stylet 15–18  $\mu\text{m}$  long; tail with 13–15 annules .....  
..... *P. manohari* Quraishi, 1982
52. Body length 730  $\mu\text{m}$  (648–793); anterior surface of stylet knobs concave; hemizonid located at 2–8 annules anterior to excretory pore; excretory pore 90–104  $\mu\text{m}$  from head end; tail terminus smoothly rounded to truncate .....  
..... *P. cruciferus* Bajaj & Bhatti, 1984
52. Body length 621  $\mu\text{m}$  (570–685); stylet knobs rounded, sloping or flattened; hemizonid located immediately anterior to excretory pore; excretory pore 87  $\mu\text{m}$  (81–95) from head end; tail terminus broadly rounded, truncate or with a cleft .....  
..... *P. sensillatus* Anderson & Townsend, 1985
53. Vulva at 72–78% ..... *P. dasi* Fortuner, 1985
53. Vulva at 77–83%, usually above 81% ..... 54
54. Outer two bands of lateral field narrower than middle one, areolate, occasionally with oblique striae in middle band; lip region sometimes with four annules, subdorsal and subventral segments of first annule fused to form almost rectangular shape with convex dorsal and ventral margins ..... *P. bolivianus* Corbett, 1983
54. Outer bands of lateral field not narrower than middle one, not areolate and without oblique striae; lip region outer margins rounded; cephalic framework bell-shaped in lateral view; amphidial aperture reniform .....  
..... *P. australis* Valenzuela & Raski, 1985
55. Vulva at 66–76%; tail terminus narrowly rounded to subacute; 21 or more tail annules .....  
..... *P. zeae* Graham, 1951
55. Vulva at 72–81%; tail terminus round; 19 or fewer tail annules ..... *P. delattrei* Luc, 1958
56. Males common; spermatheca filled with sperm ..... 57
56. Males rare; spermatheca empty ..... 58
57. Vulva at 73–75%; tail tapering to a narrow almost pointed terminus, dorsal contour of tail sinuate anterior to terminus; posterior uterine branch short, about one vulval body width long .....  
..... *P. goodeyi* Sher & Allen, 1953
57. Vulva at 79–84%; tail conoid with a smooth terminus; posterior uterine branch long, more than two vulval body widths long .....  
..... *P. typicus* Rashid, 1976
58. Tail terminus crenate .....  
..... *P. nizamabadensis* Maharaju & Das, 1981
58. Tail terminus smooth ..... 59
59. Stylet 15–17  $\mu\text{m}$  long with flattened knobs; tail bearing 25–35 annules with blunt terminus .....  
..... *P. ranjani* Khan & Singh, 1975
59. Stylet 17–19  $\mu\text{m}$  long with angular knobs; tail

bearing 16–20 annules with rounded terminus  
 ..... *P. wescolagricus* Corbett, 1985

COMMENTS ON SOME SPECIES  
 OF *PRATYLENCHUS*

*Pratylenchus capitatus* Ivanova, 1968

Das and Sultana (4) described a new species, *P. capitatus*, which is a junior primary homonym of *P. capitatus* Ivanova (9). *P. capitatus* Ivanova is a synonym of *P. neglectus* according to Loof (12). Fortuner (8) proposed a new name, *P. dasi*, for *P. capitatus* of Das and Sultana (4). Singh and Gill (18) also proposed the new name, *P. hyderabadensis*, for *P. capitatus* of Das and Sultana, which is *P. dasi* of Fortuner. Therefore, *P. hyderabadensis* is synonymized with *P. dasi* Fortuner.

*Pratylenchus neocapitatus*  
 Khan & Singh, 1975

Loof (12) considered this species to be species inquirenda. It was described from specimens collected in two different localities (10). We checked paratype slide no. T556-I563 (Bhabarai population) sent us by Dr. E. Khan. The measurements are: N = 2 females; L = 414–426  $\mu\text{m}$ ; stylet = 15  $\mu\text{m}$ ; V = 71–73%. The tail and stylet knobs were like those of *P. zaeae*; lip annules were not observed. Sixteen other females from this population also seem in all respects to be *P. zaeae* and are considered to be conspecific. The other paratypes (eight females) had a high V, i.e., V = 82% (79–85), and conoid tail. We consider these specimens to represent the valid species of *P. neocapitatus* and the designated holotype in the original description (10) will remain the same.

*Pratylenchus similis* Khan & Singh, 1975

Loof (12) considered this species a synonym of *P. neglectus*. We checked type slide no. T542-I549 and found an annulated tail terminus in *P. similis* unlike that of *P. neglectus*. Also, in Khan and Singh's Jadid population, we measured the stylet length as 15  $\mu\text{m}$  and could not see a spermatheca.

Thus, we consider *P. similis* as a valid species related to *P. gibbicaudatus* but differing by V%, stylet length, and fewer tail annules; further, we think the four females of the Jadid population, in the original description of *P. similis* (10), are identical to *P. neglectus*.

*Pratylenchus tenuis* Thorne & Malek, 1968

Loof (12) considered this form species inquirenda. We checked type specimens (two females) and found that they had a very slender stylet, tulip-shaped stylet knobs which are narrow and high, long isthmus, and unusually elongated esophageal lobe. Also, the stylet was 14.5–15  $\mu\text{m}$ , not 17  $\mu\text{m}$  as in the original description, and "b" value = 3.1–3.6 vs. 8.0 in the original description (20). We consider *P. tenuis* a valid species.

*Pratylenchus ranjani* Khan & Singh, 1975

Loof (12) considered this species as species inquirenda, possibly *P. thornei*. We checked type slide no. T526-I533 and observed only one immature female on the slide. Identity is uncertain; however, we consider *P. ranjani* to be a valid species.

*Pratylenchus impar* Khan & Singh, 1975

Loof (12) considered this species as species inquirenda, possibly *P. zaeae*. We examined type slide no. T545-I552 (two females) and consider *P. impar* as a valid species. Lip annules in *P. impar* are two vs. three in *P. zaeae*. We could not clearly see the lip annules on the type specimens, but the lip annules in *P. zaeae* are often difficult to see and count accurately.

*Pratylenchus hexincisus*  
 Taylor & Jenkins, 1957

Corbett and Clark (3) mentioned *P. hexincisus* as having basically four lines in the lateral field, along with oblique striae in the middle band in some specimens and in others a broken line to make five lines. We examined populations of *P. hexincisus* from five different locations in Maryland and one each from New Jersey and South Dakota,

and observed 4–6 lines (usually 6) in the lateral field, and also some additional differentiating characters used in the key.

LIST OF VALID *PRATYLENCHUS*  
SPECIES

*Type species:*

1. *Pratylenchus pratensis* (de Man, 1880)  
Filipjev, 1936

*Other species:*

2. *Pratylenchus agilis* Thorne & Malek, 1968
3. *P. alleni* Ferris, 1961
4. *P. andinus* Lordello, Zamith & Boock, 1961
5. *P. australis* Valenzuela & Raski, 1985
6. *P. barkati* Das & Sultana, 1979
7. *P. bolivianus* Corbett, 1983
8. *P. brachyurus* (Godfrey, 1929) Filipjev & Schuurmans Stekhoven, 1941
9. *P. cerealis* Haque, 1966
10. *P. coffeae* (Zimmerman, 1898) Filipjev & Schuurmans Stekhoven, 1941
11. *P. convallariae* Seinhorst, 1959
12. *P. crassi* Das & Sultana, 1979
13. *P. crenatus* Loof, 1960
14. *P. cruciferus* Bajaj & Bhatti, 1984
15. *P. dasi* Fortuner, 1985  
=*P. capitatus* Das & Sultana, 1979 *nec*  
Ivanova, 1968  
=*P. hyderabadensis* Singh & Gill, 1986
16. *P. delattrei* Luc, 1958
17. *P. ekrami* Bajaj & Bhatti, 1984
18. *P. emarginatus* Eroshenko, 1978
19. *P. estoniensis* Ryss, 1982
20. *P. exilis* Das & Sultana, 1979
21. *P. fallax* Seinhorst, 1968
22. *P. flakkensis* Seinhorst, 1968
23. *P. gibbicaudatus* Minagawa, 1982
24. *P. goodeyi* Sher & Allen, 1953
25. *P. hexincisus* Taylor & Jenkins, 1957
26. *P. impar* Khan & Singh, 1975
27. *P. jordanensis* Hashim, 1983
28. *P. kasari* Ryss, 1982
29. *P. kralli* Ryss, 1982
30. *P. loosi* Loof, 1960
31. *P. macrostylus* Wu, 1971
32. *P. manohari* Quraishi, 1982
33. *P. mediterraneus* Corbett, 1983

34. *P. microstylus* Bajaj & Bhatti, 1984
35. *P. morettoii* Luc, Baldwin & Bell, 1986
36. *P. mulchandi* Nandkumar & Khera, 1970
37. *P. neglectus* (Rensch, 1924) Filipjev & Schuurmans Stekhoven 1941
38. *P. neocapitatus* Khan & Singh, 1975
39. *P. nizamabadensis* Maharaju & Das, 1981
40. *P. obtusicaudatus* Romaniko, 1977
41. *P. penetrans* (Cobb, 1917) Filipjev & Schuurmans Stekhoven, 1941
42. *P. pinguicaudatus* Corbett, 1969
43. *P. pratensisobrinus* Bernard, 1984
44. *P. pseudopratensis* Seinhorst, 1968
45. *P. ranjani* Khan & Singh, 1975
46. *P. scribneri* Steiner, 1943
47. *P. sefaensis* Fortuner, 1973
48. *P. sensillatus* Anderson & Townshend, 1985
49. *P. similis* Khan & Singh, 1975
50. *P. singhi* Das & Sultana, 1979
51. *P. stupidus* Romaniko, 1977
52. *P. subpenetrans* Taylor & Jenkins, 1957
53. *P. sudanensis* Loof & Yassin, 1971
54. *P. tenuis* Thorne & Malek, 1968
55. *P. teres* Khan & Singh, 1975
56. *P. thornei* Sher & Allen, 1953
57. *P. typicus* Rashid, 1976
58. *P. uralensis* Romaniko, 1966
59. *P. variaudatus* Romaniko, 1977
60. *P. ventroprojectus* Bernard, 1984
61. *P. vulnus* Allen & Jensen, 1951
62. *P. wescolagricus* Corbett, 1985
63. *P. zaeae* Graham, 1951

*Species inquirendae:*

1. *Pratylenchus bicaudatus* Meyl, 1954  
(Meyl, 1961)  
(syn. *P. pratensis bicaudatus* Meyl, 1954)
2. *P. brevicercus* Das, 1960
3. *P. capitatus* Ivanova, 1968  
(syn. of *P. neglectus* by Loof, 1978)
4. *P. chrysanthus* Edward, Misra, Rai & Peter, 1969
5. *P. clavicaudatus* Baranovskaya & Haque, 1968
6. *P. coffeae brasiliensis* Lordello, 1956
7. *P. cubensis* Razjivin & O'Reilly, 1976  
(syn. of *P. zaeae* by Loof, 1978)

8. *P. globulicola* Romaniko, 1960  
(syn. of *P. penetrans* by Loof, 1978)
  9. *P. heterocercus* (Kreis, 1930) Andrassy, 1960  
(syn. *Dolichodoros heterocercus* Kreis, 1930; syn. of *P. penetrans* by Andrassy, 1960)
  10. *P. indicus* Das, 1960  
(sp. inq. by Loof, 1978)
  11. *P. kolourus* (Fortuner, 1985) Siddiqi, 1986  
(syn. *Tylenchus (Chitinotylenchus) coffeae brevicauda* Rahm, 1928)
  12. *P. montanus* Zyubin, 1966  
(sp. inq. by Loof, 1978)
  13. *P. obtusus* (Bastian, 1865) Goodey, 1951  
(syn. *Tylenchus obtusus* Bastian, 1865; *Anguillulina obtusa* (Bastian) Goodey, 1932; *Rotylenchus obtusus* (Bastian) Filipjev, 1936; *Tylenchorhynchus obtusus* (Bastian) Filipjev & Schuurmans Stekhoven, 1941)
  14. *P. pratensis tenuistriatus* Meyl, 1953
  15. *P. sacchari* (Soltwedel, 1888) Filipjev, 1936  
(syn. *Tylenchus sacchari* Soltwedel, 1888; *Anguillulina sacchari* (Soltwedel) Goodey, 1932)
  16. *P. tulaganovi* Samibaeva, 1966  
(sp. inq. by Loof, 1978)
  17. *P. tumidiceps* Merzheevskaya, 1951
- Nomina nuda:*
1. *Pratylenchus angelicae* Kapoor, 1983
  2. *P. himalayaensis* Kapoor, 1983
  3. *P. menthae* Kapoor, 1983
  4. *P. rhizasinus* Sher, 1948

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TABLE 1. Diagnostic data on *Pratylenchus* spp.

	Length (mm)	a	b	c	V%	Labial annules (n), labial region†	Stylet length ( $\mu$ m), stylet knobs‡	Lateral incisures
<i>P. agilis</i> Thorne & Malek, 1968	0.50	24	6.1	18	76	2	16–18, SL- CURP	4
<i>P. alleni</i> Ferris, 1961	0.33–0.44	19–27	4.7–6.1	15–25	78–83	2, L, BR	13.5–15, FA	4
<i>P. andinus</i> Lordello, Zamith & Boock, 1961	0.48–0.59	24–33	5.7–8	17–22	78–81	3, L, ST-FL, OFF-SLC	15–17, R	4
<i>P. australis</i> Valenzuela & Ras- ki, 1985	0.57–0.72	25–33	6.4–8.2	16–22	77–83	3, OUT-MAR-R, OFF-SLC	18–20, R	4
<i>P. barkati</i> Das & Sultana, 1979	0.49–0.55	25–29.1	8.3–9.6	17–21	74–79	3, L, FL	18–19.3, AD	4
<i>P. bolivianus</i> Corbett, 1983	0.53–0.62	26–29	3.9–5.9	16–21	80–82	3–4	17–20, R	4
<i>P. brachyurus</i> (Godfrey, 1929) Filipjev & Schuurmans Stekhoven, 1941	0.39–0.75	15–29	5–10	13–28	82–89	2, ANG, OFF	17–22, R	4
<i>P. cerealis</i> Haque, 1965	0.39–0.43	15–17	3.8–4.7	17–19	78–80	3, L, FL	15–16.2, R	4
<i>P. coffeae</i> (Zimmerman, 1898) Filipjev & Schuurmans Stekhoven, 1941	0.37–0.69	17.7–30.5	5.0–7.8	13.7–23.9	75.8–84.2	2, OFF-SLC, R	15–18, BR	4–5 (occas. with 6 incisures)
<i>P. convallariae</i> Seinhorst, 1959	0.58–0.61	23–27	6–9	17–28	78–81	3, OFF	16–17, HN	4
<i>P. crassi</i> Das & Sultana, 1979	0.41–0.45	20–26	7.7–8.8	18–24	72–77	2, L, FL	17–18, AD, CU	4 crenate inci- sures
<i>P. crenatus</i> Loof, 1960	0.32–0.59	19.7–29.9	4.9–7.9	16.4–26.8	78.2–86.3	3 (OCC 2 or 4)	14–18	4 outer ones cre- nate, central zone with sculp- ture forming 2 additional irreg- ular lines
<i>P. cruciferus</i> Bajaj & Bhatti, 1984	0.64–0.79	26–40	7.3–9.2	19–28	76–81	3, FL, CON	15.6–16, CON	4, central zone with oblique striations
<i>P. dasi</i> (Das & Sultana, 1979) Fortuner, 1985	0.45–0.56	23–31	7.6–9.5	14–21.3	72–78	3	18–19, R	4
<i>P. delattrei</i> Luc, 1958	0.38–0.47	20.4–25.8	3.7–4.8	18–22.3	72.7–80.5	3	16.5–18, FL-AM	4
<i>P. ekrami</i> Bajaj & Bhatti, 1984	0.40–0.53	29–34	5.2	19–26	77–83	3, CON, TRU-A	11–13, R, SLO	4



TABLE I. Continued.

	Length (mm)	a	b	c	V%	Labial annules (n), labial region†	Stylet length (μm), stylet knobs‡	Lateral incisures
<i>P. emarginatus</i> Eroshenko, 1978	0.28–0.40	18–24	3.4–4.7	14–21	68–73	3, slightly de- pressed	15, R	4
<i>P. estoniensis</i> Ryss, 1982	0.33–0.50	17–38	4.6–7.6	16–22	79–86	2, L, FL	15.5–17, FP	6
<i>P. exitis</i> Das & Sultana, 1979	0.49–0.56	30–34.5	8.6–9.2	15–20	73–76	3, FL	17.1–18.2, LD	4, crenate
<i>P. fallax</i> Seinhorst, 1968	0.42–0.56	24–33	5.2–6.7	18–24	77–81	3, FL	16–17, FA or FP	4 + some addi- tional lines run- ning obliquely between inner incisures
<i>P. flakkensis</i> Seinhorst, 1968	0.42–0.57	20–27	5.2–7.1	12–18	73–77	2	17, FP-AM	4
<i>P. gibbicaudatus</i> Minagawa, 1982	0.40–0.53	16–29.7	5.3–9.5	12.8–19	69.5–77.4	2, N, ST-FL	13.9–16.4, R or SL-FA	4
<i>P. goodeyi</i> Sher & Allen, 1953	0.64–0.68	27–37	5.5–6.1	16–18	73–75	4, SL-OFF	17, CONS-FA	4, SL-OFF
<i>P. hexincisus</i> Taylor & Jenkins, 1957	0.34–0.54	18.2–28.8	5.9–8.4	16–22.7	75.3–82.2	2 (OCC 3), L, FL, LM-R	14.5–15.4, SPH	6 usually, rarely 4
<i>P. jordanensis</i> Hashim, 1983	0.38–0.59	26–32	4.5–5.9	16.1–25	75.1–79.1	2, SL-OFF	14.5–15, IND-A	4, additional oblique striae often occur
<i>P. kasari</i> Ryss, 1982	0.56–0.77	32–44	5.6–8.4	16–20	75–81	3, DOM	16–17.5, R	4
<i>P. kralli</i> Ryss, 1982	0.40–0.50	20–33	4.8–6.5	17–23	74–80	3, H, DOM	14–15, WFD	4
<i>P. loosi</i> Loof, 1960	0.48–0.64	28–36	5.7–7.1	18–25	79–85	2, R	14–18, R, B- FUS	4 (occas. 5–6)
<i>P. macrostylus</i> Wu, 1971	0.51–0.68	22–33	5–7.4	16–24	85–88.8	2, R-CONV	21–24.7, FL, or SL-CU-A	4
<i>P. manohari</i> Quraishi, 1982	0.42–0.51	17–25	5–6	18–20	78–80	3, OFF-SLC	15–18, SL-IND- A	4
<i>P. mediterraneus</i> Corbett, 1983	0.42–0.57	24–31	5.2–7.6	17–25	77–80	3, H, SL-OFF	14–16, R	4
<i>P. microstylus</i> Bajaj & Bhatti, 1984	0.33–0.45	19–26	5.3–6.4	16–22	75–77	3, L, CON	11–12, FA	4
<i>P. morettoii</i> Luc, Baldwin & Bell, 1986	0.74 (0.56–0.93)	34 (26–40)	6.6 (5.3–7.4)	15.2 (13–19)	76 (73–80)	3–4, DOM	16.5 (14–19), R or SL-SLO	4
<i>P. mulchandi</i> Nandkumar & Khera, 1970	0.44–0.58	22–28	5–6.4	17–27	75–78	3, H, OFF	16–20, BF	4

TABLE 1. Continued.

	Length (mm)	a	b	c	V%	Labial annules (n), labial region†	Stylet length (μm), stylet knobs‡	Lateral incisures
<i>P. neglectus</i> (Reusch, 1924) Filipjev & Schuurmans Stekhoven, 1941	0.31–0.58	16.5–32.2	4.9–7.8	13.8–26.8	75.5–86.6	2, AM-CONV	15–19	4 + oblique striae in central zone
<i>P. neocapitatus</i> Khan & Singh, 1975	0.46 (0.40–0.49)	23.8 (20.9–27.5)	4.6 (4.0–5.0)	18.9 (15.6–21.3)	82.0 (79–85)	2, OFF, CAP	15 (15–17)	4
<i>P. nizamabadensis</i> Maharaju & Das, 1981	0.41–0.52	23.4–27	8.5–9.7	17–27	67–78.7	4, FL	17.5–18.7, R-A	
<i>P. obtusicaudatus</i> Romaniko, 1977	0.40–0.47	21.4–22	4.9–5.1	20–22	77	2, L, FL	15	4
<i>P. penetrans</i> (Cobb, 1917) Filipjev & Schuurmans Stekhoven, 1941	0.43–0.81	19–32	5.3–7.9	15–24	75–84	3, L, SL-OFF, FL-INF with R-OUT-MAR	15–17, BR or CU-A	4
<i>P. pinguicaudatus</i> Corbett, 1969	0.50–0.61	21–28	5.6–7.0	15–19	78–81	3, OFF-SLC	16–20, R	4 irreg. areolate along whole body
<i>P. pratensis</i> (de Man, 1880) Filipjev, 1936	0.40–0.63	21.8–30.3	5.5–7.6	13.7–26.8	76–80	3, SL-OFF	12–16, WS-BR	4
<i>P. pratensisobrinus</i> Bernard, 1984	0.47 (0.39–0.55)	28.4 (25.0–31.5)	5.3 (4.4–6.0)	13.9 (11.8–15.1)	77 (75–80)	3, MH, R	16 (15–17), CU-A	4
<i>P. pseudopratensis</i> Seinhorst, 1968	0.41–0.50	21–25	5.8–7.4	21–26	76–80	3 (OCC 4)	15, FL-A	4 (sometimes 5th line in between)
<i>P. scribneri</i> Steiner, 1943	0.5–0.7	17–26	5.4–6.6	16–18	79	2	15–17, SL-CU	4
<i>P. sefaensis</i> Fortuner, 1973	0.40–0.52	25–31	5–6.8	19–24	76.7–80.5	3	13.5–16, R, SL-FA	4 (often 5th incisure present, oblique striae sometimes)
<i>P. sensillatus</i> Anderson & Townshend, 1985	0.62 (0.57–0.69)	34 (28–42)	7.8 (7.1–8.3)	24 (20–31)	79 (77–81)	3, L, R, SL-OFF	15.6 (15–17), R-OCC, SLO or FL	4
<i>P. similis</i> Khan & Singh, 1974	0.40–0.50	20.7–31.7	3.5–4.5	11.1–23.7	76–85	2, L	12–14, FL	4
<i>P. singhi</i> Das & Sultana, 1979	0.44–0.49	20–25	8.1–8.8	18–22.7	75–77	3, FL, H	17–18.2, LD	4
<i>P. stupidus</i> Romaniko, 1977	0.39–0.47	16.6–17	8–8.5	12.7–13.5	77	2, L	15	4
<i>P. subpenetrans</i> Taylor & Jenkins, 1957	0.33–0.48	18.4–27.7	5.0–7.2	16.2–21.4	77.4–82.9	3, SL-OFF	14.9–16.5, SPH	4

TABLE 1. Continued.

	Length (mm)	a	b	c	V%	Labial annules (n), labial region†	Stylet length (µm), stylet knobs‡	Lateral incisures
<i>P. sudanensis</i> Loof & Yassin, 1971	0.39–0.59	22–31	4.9–7.2	14–23	70–76	3, H, R	14–16, FL or SL-CON-A	4 (sometimes 5th line observed)
<i>P. tenuis</i> Thorne & Malek, 1968	0.4	25	8.0	22	79	2, L, FL	14–15, TU, HN	4, obscure inci- sure
<i>P. teres</i> Khan & Singh, 1975	0.42–0.63	22.1–39.9	3.5–5.6	11.5–27.0	69–78	3, L, CONO	16–18, SL-ANC	6
<i>P. thornei</i> Sher & Allen, 1953	0.45–0.77	26–36	5.5–8	18.6–25.1	74–79	3, H, CONI, CON	15–19, BR to FL	4 (occas. oblique striae found)
<i>P. typicus</i> Rashid, 1976	0.59–0.68	27–37	5.0–6.2	10–26	79–84	4, SL-OFF	15–17, HR	4
<i>P. uralensis</i> Romaniko, 1966	0.53	24	9	22	73	3, L, FL	14	4
<i>P. variacaudatus</i> Romaniko, 1977	0.42–0.50	14.3–15	5–6	17.5–18.1	80	2, L	15	4
<i>P. ventroprojectus</i> Bernard, 1984	0.39–0.47	27.4–34.7	5.6–6.4	14.3–22.4	78–80	3, L, CONO, FL	14–16, CU or RS	4 (occas. oblique striae found)
<i>P. vulnus</i> Allen & Jensen, 1951	0.47–0.71	27.8–37.6	5.7–7.7	18.4–24.7	77.3–82.2	3–4, H	14–18, BR	4
<i>P. wescolagricus</i> Corbett, 1983	0.50–0.67	25–32	5–6.6	17–25	79–82	4 (OCC 3), R	17–19, ANG	4 (extra lines give appearance of 6 lines)
<i>P. zaeae</i> Graham, 1951	0.36–0.58	25–30	5.4–8	17–21	66–76	3, CON, R	15–17, BF	4

† For number of labial annules and nature of labial region: AM-CONV = anterior margins of apical annule convex; ANG = angular; BR = bluntly rounded; CAP = cap like; CON = continuous; CONI = conical; CONO = conoid; DOM = dome shaped; FL = flattened; H = high; INF = in front; MH = median height; L = low; LM = lateral margins; OCC = occasionally; OFF = offset; OFF-SLC = offset by slight constriction; OUT-MAR = outer margins; R = rounded; R-CONV = roundly convex; SL-OFF = slightly offset; ST-FL = stepped at sides & flat at front; TRU-A = truncate anteriorly.

‡ For stylet length (in µm) and shape of stylet knobs: A = anteriorly; AD = anteriorly directed; AM = anterior margins; ANC = anchor shaped; ANG = angular; B = broadly; BF = broad, flattened; BR = broadly rounded; CON = concave; CONS-FA = conspicuous, flattened anteriorly; CU = cup shaped; CURP = cupped & rounded posteriorly; FA = flattened anteriorly; FL = flattened; FP = forwardly pointing; FUS = fused to shaft; HN = high, narrow; HR = high, rounded; IND-A = indented anteriorly; LD = laterally directed; OCC = occasionally; R = rounded; RS = rounded, sloping; SL = slightly; SLO = sloping; SPH = spherical; TU = tulip shaped; WFD = wide, forwardly directed; WS-BR = well-separated, broadly rounded.

§ For shape of tail, tail terminus, and number of tail annules: ABW = anal body width; ACU = acute; ANN = annulated; ANT = annulated terminus; ASY = asymmetrical; BIF = bifid; BIFU = bifurcate; BIL = bilobed; BL = blunt; BLP = bluntly pointed; BLR = bluntly rounded; BR = broadly rounded; CLA = clavate; CON = conoid; CONI = conical; CONV = convex; CLE = cleft; CR = crenate; CYL = cylindrical; DIGI = digitate; EL = elongate; IND = indentations; IRR = irregular; IRR-ANN = irregularly annulated; MUC = mucron; NA = narrow; NAP-T = narrow pointed terminus; NAR = narrow, rounded; NOT = notched; OBB = obliquely blunt; OBT = obtuse; OCC = occasionally; PLU = plump; PT = pointed; R = rounded; SINT = sinuate tail; SPA = spatulate; SQU = squared; SRT = smooth rounded terminus; ST = smooth terminus; STO = stout; SUB-ACU = subacute; SUB-CYL = subcylindrical; SUB-HEM = subhemispherical; T = tail; TA = tail annules; TAP = tapering; TP = terminal projection; TR = truncate; TRAP = trapezoid; TT = tail terminus; UT = uniformly tapering.

TABLE 1. Continued.

	Shape of tail & tail terminus§	Males	Spermatheca	Postuterine branch	Spicule length ( $\mu\text{m}$ )	Gubernaculum length ( $\mu\text{m}$ )
<i>P. agilis</i> Thorne & Malek, 1968	UT to SRT	Unknown	Absent	Pouch like		
<i>P. alleni</i> Ferris, 1961	ST, R	Present	Round	Slightly longer than vulval body diam.		
<i>P. andinus</i> Lordello-Zamith & Boock, 1961	CYL to BR with ST (OCC-IND or NOT), TA = 16-19	Unknown	Empty, small, rounded functionless spermatheca	Length = 19-34 $\mu\text{m}$ , undifferentiated		
<i>P. australis</i> Valenzuela & Ras-ki, 1985	CON, ST, TA = 22	Unknown	Indistinct without sperm			
<i>P. barkati</i> Das & Sultana, 1979	CON with BL, ANT	Unknown	Small, oval in shape filled with sperm	1 vulval body diam. in length		
<i>P. bolivianus</i> Corbett, 1983	IRR-ANN, TA = 15-19 (OCC 24)	Unknown	Functionless, inconspicuous spermatheca	Length = 22-31 $\mu\text{m}$ , about $\frac{1}{4}$ vulval body diam. in length		
<i>P. brachyurus</i> (Godfrey, 1929) Filipjev & Schuurmans Stekhoven, 1941	SUB-CYL, ST, R to TR	Very rare, present	Empty	Short, less than 1 vulval body diam. in length		
<i>P. cerealis</i> Haque, 1965	SUB-CYL, SUB-HEM, CR, TA = 24	Present	Rounded with sperm	Short, less than 1 vulval body diam. in length		
<i>P. coffeae</i> (Zimmerman, 1898) Filipjev & Schuurmans Stekhoven, 1941	ST, BR to TR or IND or IRR-ANN	Present, common	Broadly oval to nearly rounded, filled with sperm	Variable in length, 0.8-1.7 vulval body diam. in length, sometimes with rudimentary ovary		
<i>P. convallariae</i> Seinhorst, 1959	IRR-ANT, TR	Present, common	Round, filled with sperm	A little over 1 vulval body diam. in length (short)		
<i>P. crassi</i> Das & Sultana, 1979	CYL with SRT, TA = 12-15	Unknown	Large, oval, filled with sperm	Very small, less than 1 vulval body diam. in length		
<i>P. crenatus</i> Loof, 1960	BR, TT-SPA-CON to CLA-R-ANT	Unknown	Empty, absent	Rather long, more than 1 vulval body diam. in length		
<i>P. cruciferus</i> Bajaj & Bhatti, 1984	SUB-CYL to CYL with SRT to TR-TT	Unknown	Indistinct	0.7-1.4 vulval body diam. in length		

TABLE 1. Continued.

	Shape of tail & tail terminus§	Males	Spermatheca	Postuterine branch	Spicule length (µm)	Gubernaculum length (µm)
<i>P. dasi</i> (Das & Sultana, 1979) Fortuner, 1985	CYL, CON with BLP-ST	Unknown		1-1½ vulval body diam. in length		
<i>P. delattrei</i> Luc, 1958	TAP to NA-SRT, TA under 20	Unknown	Empty, not observed	Undifferentiated, slightly longer than vulval body diam.		
<i>P. ekrami</i> Bajaj & Bhatti, 1984	EL, CON to SUB-CYL, T/ABW = 1.9-3, TT-NA to BR or TR or with MUC or BIF, TA = 26-40	Present	Elongate, oval, filled with sperm		15	7-8
<i>P. emarginatus</i> Eroshenko, 1978	EL, CON, TT-IND, TA = 15-19	Present	Oval	Undifferentiated, less than 1 vulval body diam in length		
<i>P. estoniensis</i> Ryss, 1982	CONI, ANT, TA = 22-30	Unknown	Round without sperm	Short, less than 1 vulval body diam. in length		
<i>P. exilis</i> Das & Sultana, 1979	CYL, T/ABW = 2-2½, ANT, TA = 17-20	Present	Small, spherical	About 1 vulval body diam. in length	16.1	4.3
<i>P. fallax</i> Seinhorst, 1968	CONI, TT-R or IRR, CR to almost ST, TA = 16-26	Present, common	Round, sometimes empty & then narrower & longer than when filled with sperm	About ¼ to ½ of vulval anus distance, posterior part often with 2-3 rudimentary elements	14-16	4
<i>P. flakkensis</i> Seinhorst, 1968	CONI, (OCC faint ANT), TA = 18-24	Present	Round to angular		15	
<i>P. gibbicaudatus</i> Minagawa, 1982	ANT, TR or BR with shallow NOT rarely BIFU, TA = 24-39	Present	Round without sperm	Length = 21.5-46.7 µm, 0.7-2.6 vulval body diam. in length	17.7	5.1
<i>P. goodeyi</i> Sher & Allen, 1953	SINT ant. to ST, TAP to NAPT, BLR	Present	Oblong, often nearly rectangular, filled with sperm (oval as per Allen)	1 vulval body diam. in length		
<i>P. hexincisus</i> Taylor & Jenkins, 1957	SRT	Unknown	Empty, not observed	Short, undifferentiated		

TABLE 1. Continued.

	Shape of tail & tail terminus§	Males	Spermatheca	Postuterine branch	Spicule length ( $\mu\text{m}$ )	Gubernaculum length ( $\mu\text{m}$ )
<i>P. jordanensis</i> Hashim, 1983	CON, ST with OCC-IND, TA = 19–24	Unknown	Devoid of spermatozoa, sometimes difficult to discern	Length = 13–20.5 $\mu\text{m}$ , undifferentiated		
<i>P. kasari</i> Ryss, 1982	TAP gradually, sharply CONI-ANT, TA = 32–44	Present	Very elongated oval, 28–77 $\mu\text{m}$ in length	Long, more than 1 vulval body diam., rudimentary ovary	20–21	
<i>P. kralli</i> Ryss, 1982	CON, BLP, ST, TA = 16–23	Present	Round with sperm	Long, more than 1.5 vulval body diam. in length	14–15.5	
<i>P. loosi</i> Loof, 1960	TAP, T/ABW = 2.5–3, ST which is NAR to SUB-ACU	Present, common	Oval, 20 $\mu\text{m}$ long, rarely more rounded	Short, in some spec. with faint traces of ovarian tissue	16–20	4–7
<i>P. macrostylus</i> Wu, 1971	CON, T/ABW = 2.1–3.3, ST, CON-R often with variations ACU-BIL, DIGI or IRR, TA = 25–40	Present	In young females, oval to somewhat rectangular, usually empty, occas. with 1 or 2 sperm cells	Length = 18–32 $\mu\text{m}$ , vestigial ovary	15	2.8
<i>P. manohari</i> Quraishi, 1982	CYL to BR, T/ABW = 1½, TA = 13–15	Unknown	Nonfunctional, without sperm	Long, with nonfunct. rudimentary posterior ovary		
<i>P. mediterraneus</i> Corbett, 1983	BR to TR sometimes NOT, ST, TA = 15–22	Present	Spherical to subspherical, sometimes oval when full of sperm	Length = 18–25 $\mu\text{m}$ , short	16–18	4.5–5.5
<i>P. microstylus</i> Bajaj & Bhatti, 1984	CON with SRT	Unknown	Indistinct, tricollumella well developed	Short, less than 1 vulval body diam. in length		
<i>P. morettoii</i> Luc, Baldwin & Bell, 1986	CONI variable from more or less PT to STO with TP	Present	Rounded, contains globular spermatozoa	Length = 59 $\mu\text{m}$ (46–74), reduced and degenerate, in some cases a cell with prom. nucleus (remnant of cap cell of ovary?) is present at distal end	18.5 (15–21)	5 (4–6.5)
<i>P. mulchandi</i> Nandkumar & Khera, 1970	Variations OBB, CONI, SQU, OBT or TR, BR-ST	Unknown	Empty, some forms reflexed ovary	More than 1½ vulval body diam. in length, rudimentary ovary		

TABLE 1. Continued.

	Shape of tail & tail terminus§	Males	Spermatheca	Postuterine branch	Spicule length ( $\mu\text{m}$ )	Gubernaculum length ( $\mu\text{m}$ )
<i>P. neglectus</i> (Reusch, 1924) Filipjev & Schuurmans Stekhoven, 1941	CONI with R to TRAP, ST	Very rare, present	Absent, empty	Short, undifferentiated		
<i>P. neocapitatus</i> Khan & Singh, 1975	SUB-CYL, ST, TA = 17	Unknown	Inconspicuous, without sperm	1½ vulval body diam. in length		
<i>P. nizamabadensis</i> Maharaju & Das, 1981	CR, TA = 15–24	Unknown	Absent	Absent		
<i>P. obtusicaudatus</i> Romaniko, 1977	BLR, TT-TR	Present	Oval to round	Small, less than ½ vulval body diam. in length		
<i>P. penetrans</i> (Cobb, 1917) Filipjev & Schuurmans Stekhoven, 1941	R, ST, TA = 15–27	Present, common	Spherical or nearly so	Short, undifferentiated	14–17	3.9–4.2
<i>P. pinguicaudatus</i> Corbett, 1969	CYL, BR-ST, TA = 19–25	Unknown	Empty, rounded	Short, 1 or less vulval body diam. in length		
<i>P. pratensis</i> (de Man, 1880) Filipjev, 1936	TAP, T/ABW = 2.5–3, ANT-R often OBB-ASY	Present, common	Large, oval, filled with sperm	Short, longer than vulval body diam., undifferentiated		
<i>P. pratensisobrinus</i> Bernard, 1984	CON, EL-ANT	Present	Square or oval to elongate, usually filled with sperm but occas. empty	Elongated, 2.0 (1.6–2.7) vulval body diam. in length, with few discrete cells	18 (17–19)	6 (5–6)
<i>P. pseudopratenensis</i> Seinhorst, 1968	CONI, SRT to TR, TA = 12–19	Present	Oval	Length 25–30% of dist. between vulva & anus	15	
<i>P. scribneri</i> Steiner, 1943	CON to BR with R-TT	Unknown	Not seen	About equal to vulval body diam.		
<i>P. sefaensis</i> Fortuner, 1973	CYL, ST-BR to TR with 1 or 2 CR, TA = 16–23	Very rare, present	Small, round & elliptical, empty	Length = 15–30 $\mu\text{m}$ , ending in a group of sm. nondifferentiated cells	13.5–16	5
<i>P. sensillatus</i> Anderson & Townshend, 1985	SUB-CYL, TT-BR, TR or with CLE, TA = 20 (14–25)	Unknown	Indistinct	Length = 23 $\mu\text{m}$ (14–32), distal end cellular		

TABLE 1. Continued.

	Shape of tail & tail terminus§	Males	Spermatheca	Postuterine branch	Spicule length ( $\mu\text{m}$ )	Gubernaculum length ( $\mu\text{m}$ )
<i>P. similis</i> Khan & Singh, 1974	CON with R-ANT, TA = 16–18	Present	Oval with sperm	Long, over 2 ABW long	14	6
<i>P. singhi</i> Das & Sultana, 1979	SUB-CYL with SUB-HEM, ST	Unknown	Large, spherical, filled with sperm (ovary reflexed)	Less than 1 vulval body diam. in length		
<i>P. stupidus</i> Romaniko, 1977	CYL to BR, ST	Unknown	Absent	Short, less than $\frac{1}{2}$ vulval body diam. in length		
<i>P. subpenetrans</i> Taylor & Jenkins, 1957	SRT	Present, common	Filled with sperm, round	$1\frac{1}{2}$ vulval body diam. in length, with cellular distal part	14	5
<i>P. sudanensis</i> Loof & Yassin, 1971	PLU, SUB-CYL, T/ABW = 1.7–2.7, BR to TR, ST, TA = 18–23	Present, common	Filled with large sperm, oval spermatheca		17–18	5
<i>P. tenuis</i> Thorne & Malek, 1968	Bent, ST	Unknown	Absent	Shorter than body diam.		
<i>P. teres</i> Khan & Singh, 1975	CON, T/ABW = $1\frac{1}{2}$ – $2\frac{1}{2}$ , CR-TT, TA = 24–30	Unknown	Inconspicuous, without sperm	About 1 vulval body diam. in length		
<i>P. thornei</i> Sher & Allen, 1953	CONV-CON, ST, BLR to TR	Very rare, present	Empty, diff. to see	Little more than $1\frac{1}{2}$ vulval body diam. in length	21	
<i>P. typicus</i> Rashid, 1976	CON, SRT, TA = 24–26	Unknown	Oblong, 30 $\mu\text{m}$ in length, filled with round sperm	More than twice vulval body diam. in length		
<i>P. uralensis</i> Romaniko, 1966	BLR, TT-OBB-TR, with 2 small protuberances	Unknown	Absent	Small, less than $\frac{1}{2}$ vulval body diam. in length		
<i>P. variacaudatus</i> Romaniko, 1977	CON, TT-variable, acute terminal annule	Unknown	Absent	Small, less than $\frac{1}{2}$ vulval body diam. in length		
<i>P. ventroprojectus</i> Bernard, 1984	BR, CON, TR-TT, coarsely or not ANN, TP	Present	Oval to rectangular or rarely elongated with sperm (occas. empty)	0.9–1.8 vulval body diam. in length, usually with single, demarcated terminal cell	14–17	4–5



TABLE 1. Continued.

	Shape of tail & tail terminus§	Males	Spermatheca	Postuterine branch	Spicule length ( $\mu\text{m}$ )	Gubernaculum length ( $\mu\text{m}$ )
<i>P. vulnus</i> Allen & Jensen, 1951	TAP to NAR-TT	Present, common	Oval, filled with sperm	Rudimentary ovary		
<i>P. wescolagricus</i> Corbett, 1983	SRT (OCC-IND), TA = 16-20	Unknown	Small, spherical, non-functional	1 vulval body diam. in length, undifferentiated		
<i>P. zae</i> Graham, 1951	TAP (almost PT), ST, NAR to SUB-ACU, TA over 20	Unknown	Empty	Short, 1 vulval body diam. in length (intestine with post rectal sac)		