

## Descriptions of Four New and An unknown Species of Predatory Nematodes (Mononchida) from Korea

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## 韓國產 捕食線蟲 (Mononchida: Nematoda)의 4新種 및 1未記錄種 記載

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### ABSTRACT

*Mylonchulus jinjuensis* n. sp. is 1.8-2.2 mm long, spicules 58-67  $\mu$ m long and is distinguishable by basally situated subventral teeth, presence of hypodermal glands and ventral body pores. *Mylonchulus taeguensis* n. sp. is 1.3-1.8 mm long, spicules 52-64  $\mu$ m long and is characterized by having an additional small denticle on dorsal wall of buccal cavity at the level of dorsal tooth apex, and two each pre- and post-vulval papillae. *Mylonchulus polonicus* is reported here for the first time from Korea, is described and illustrated. *Prionchulus pachydermis* n. sp. is 2-2.3 mm long and is distinctive in having very thick body cuticle and absence of caudal glands and spinneret. *Prionchulus koriensis* n. sp. is 1.7-2.0 mm long and is characterized by having elongate-conoid tail with sharply pointed terminus and presence of caudal glands.

**Key words :** Taxonomy, Mononchida, *Mylonchulus*, *Prionchulus*.

### INTRODUCTION

During the study of predatory nematodes of the order Mononchida from Korea the soil samples including four new and an unknown species were collected from the various localities. The species described and illustrated below.

### MATERIALS AND METHODS

The nematodes were extracted from soil samples by Cobb's sieving methods and centrifugal sugar-flotation technique. Nematodes obtained in clear water were killed and fixed in hot (70°C) F:G 4-1 fixative. These nematodes were dehydrated by Seinhorst's rapid glycerine method. Measurements and drawings were made with a drawing tube attachment with Olympus BX50 microscope.

### DESCRIPTIONS

#### *Mylonchulus jinjuensis* n. sp.

(Figs. 1, 2)

#### Measurements

**Holotype** (Female): L = 1.9 mm; a = 45; b = 3.6; c = 31; c' = 1.5; V = 69%.

**Paratype** (Females, n = 4): L = 2 mm  $\pm$  0.15 (1.9-2.2); a = 47  $\pm$  5.1 (42-54); b = 3.8  $\pm$  0.1 (3.6-3.9); c = 34.5  $\pm$  4.1 (31-39); c' = 1.6  $\pm$  0.2 (1.5-1.8); V = 68.3%  $\pm$  1.7 (66-70).

**Paratype** (Males, n = 6): L = 1.9 mm  $\pm$  0.05 (1.8-2.0); a = 50  $\pm$  3.7 (45-54); b = 3.8  $\pm$  0.13 (3.6-3.9); c = 33.5  $\pm$  3.8 (31-39); c' = 1.5  $\pm$  0.8 (1.4-1.6)

**Female:** Body medium sized, stout, ventrally arcuate when relaxed. Cuticle smooth, 1.5-2  $\mu$ m thick through out the body. Internal striations faintly visible. Hypodermal glands discernable through out the body. Ventral body pores present. Lip

region hexagonal, offset by slight depression, 26-29  $\mu\text{m}$  wide and 10-12  $\mu\text{m}$  high. Labial papillae prominent. Amphids slit-like, 3-4  $\mu\text{m}$  wide, situated at the level of dorsal tooth apex. Buccal cavity 26-34  $\mu\text{m}$  long and 16-20  $\mu\text{m}$  wide. Dorsal tooth very large, claw-like, obliquely forward directed with sharply pointed apex; located at 12-18% of stoma length from

anterior end. Submedian teeth nearly basal, relatively large. Subventral denticles fairly large, almost equal in size, arranged in 6-7 rows. Two minute foramina present at base of buccal cavity. Posterior fourth of stoma embedded in anterior portion of oesophagus. Excretory pore conspicuous, situated at 130-136  $\mu\text{m}$  from anterior end. Oesophagus 486-554  $\mu\text{m}$  long.

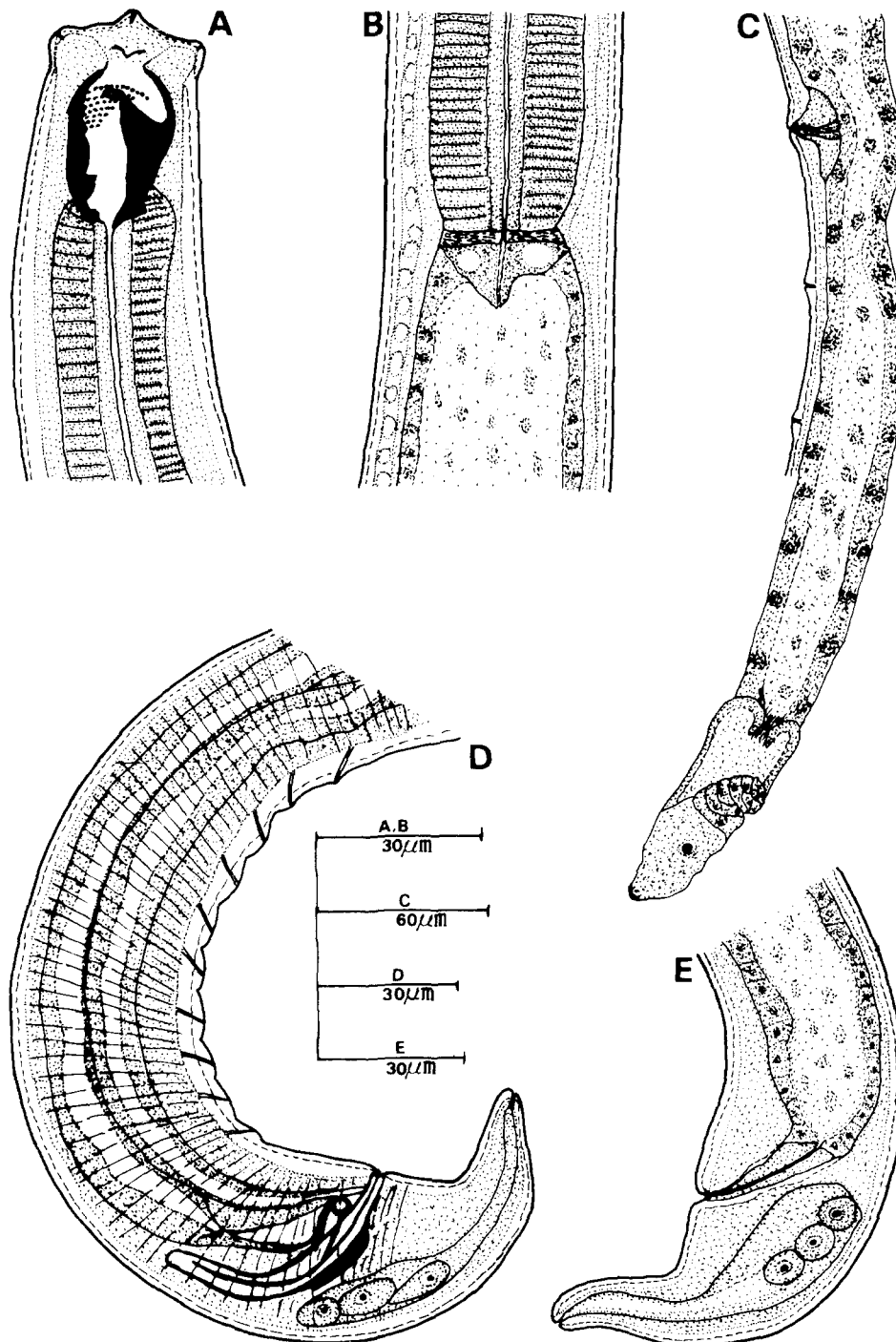


Fig. 1. *Mylonchulus jinjuensis* n. sp., A: Anterior region; B: Oesophago-intestinal junction; C: Female gonad (posterior); D: Male posterior region; E: Female posterior region.

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Nerve ring at 110-119  $\mu\text{m}$  from anterior end. Oesophago-intestinal junction simple, non-tuberculate. Intestine with wide lumen and filled with numerous refractive granules. Reproductive system didelphic, amphidelphic, both sexual branches equally developed. Ovary small, reflexed. Sphincter present

between oviduct and uterus. Vagina thin with sclerotization. Vulva a transverse slit. Rectum straight, muscular almost equal size with anal body width. Tail 56-62  $\mu\text{m}$  long, conoid-digitate, ventrally arcuate. Caudal glands present, arranged in tandem, ampula conspicuous, duct opening (spinneret) slightly

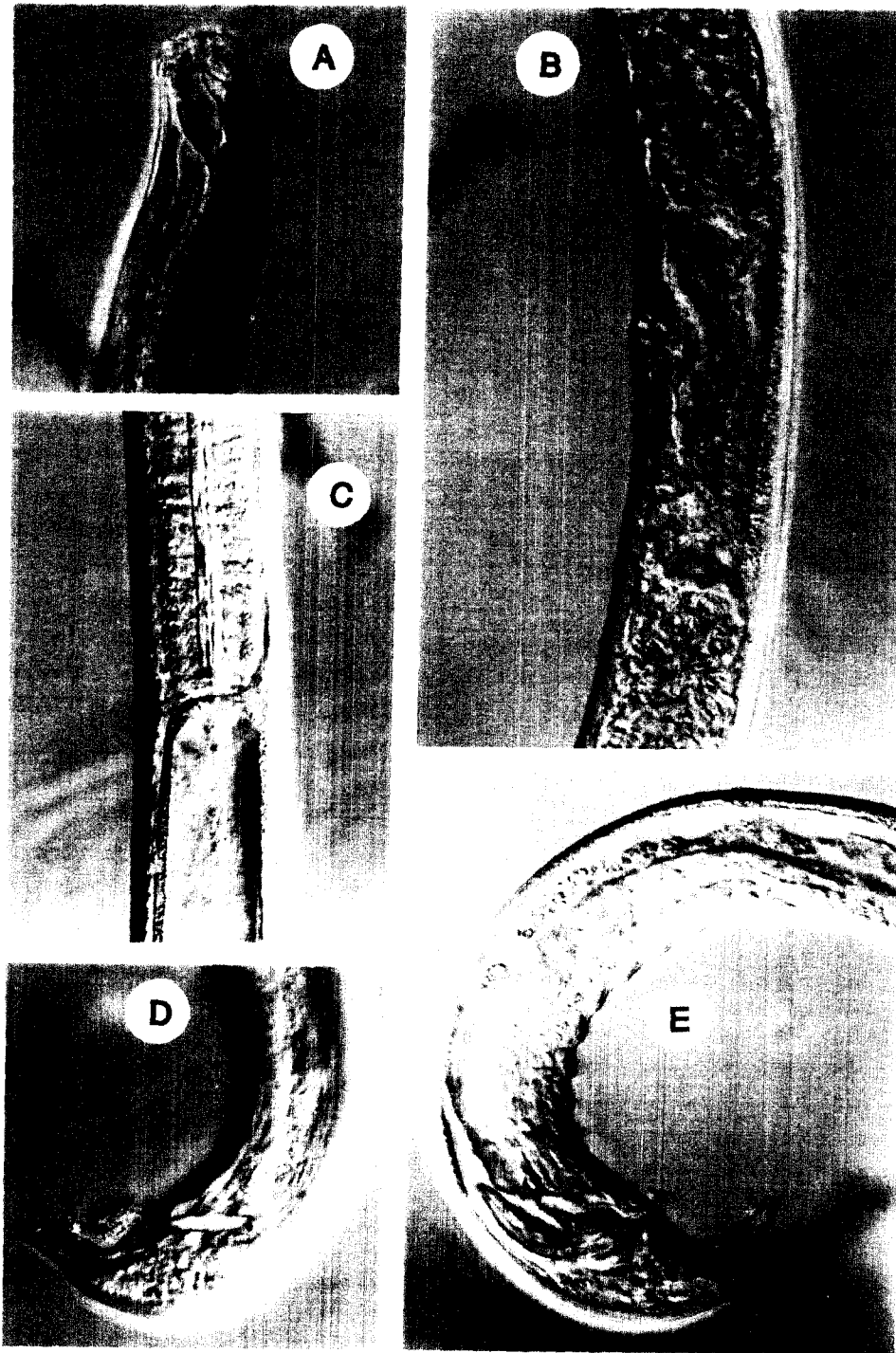


Fig. 2. *Mylonchulus jinjuensis* n. sp., A: Anterior region; B: Vulval region; C: Oesophago-intestinal junction; D: Female posterior region; E: Male posterior region.

dorsally subterminal.

**Male:** Similar to female in general morphology but posterior part of body more strongly curved. Testes paired, opposed with elongate, spindle shaped spermatozoa. Spicules paired, free, slender, ventrally curved, tips rounded measuring 58-67  $\mu\text{m}$  along median line. Gubernaculum 15-22  $\mu\text{m}$  long; lateral guiding pieces 15-18  $\mu\text{m}$  long with heavily cuticularized notched terminus. Ventromedian supplements 10-11 in numbers, regularly spaced. Copulatory muscles strongly developed. Tail 57-64  $\mu\text{m}$  long, conoid-digitate, ventrally curved. Caudal glands and their duct similar to those of female.

**Diagnosis:** The new species is characterized by having barrel-shaped buccal cavity, basally situated submedian teeth, presence of hypodermal glands and numerous ventral body pores.

Because of the basally located sub-median teeth and the shape of tail the new species shows resemblance to *M. prodenticulatus* Mulvey, 1961. But it can be distinguished from that in the position of amphids, by the presence of hypodermal glands and lateral body pores, longer spicules and tail (amphids situated at the base of dorsal tooth, hypodermal glands and lateral body pores absent, spicules 55  $\mu\text{m}$  and tail 52  $\mu\text{m}$  long in *M. prodenticulatus*).

**Type material:** Holotype female, paratype females and males on slides deposited in the nematode collection of Department of Agricultural Biology, College of Agriculture, Kyungpook National University, Taegu, Korea.

**Type habitat and locality:** Soil samples collected from around rhizosphere of *Styrax japonica* S. et Z. at Chinju Kyongsangnam province, Korea. Collected in July, 1990.

#### *Mylonchulus taeguensis* n. sp.

(Figs. 3, 4)

##### Measurements

**Paratype** (Female, n = 3): L = 1.51 mm  $\pm$  0.03 (1.48-1.54); a = 39  $\pm$  2.1 (37-41); b = 3.3  $\pm$  0.2 (3.2-3.5); c = 32  $\pm$  4 (28-36); c' = 1.3  $\pm$  0.1 (1.2-1.4); V = 68%  $\pm$  1.5 (67-70)

**Holotype** (Male): L = 1.5 mm; a = 43; b = 3.5; c = 28; c' = 1.5;

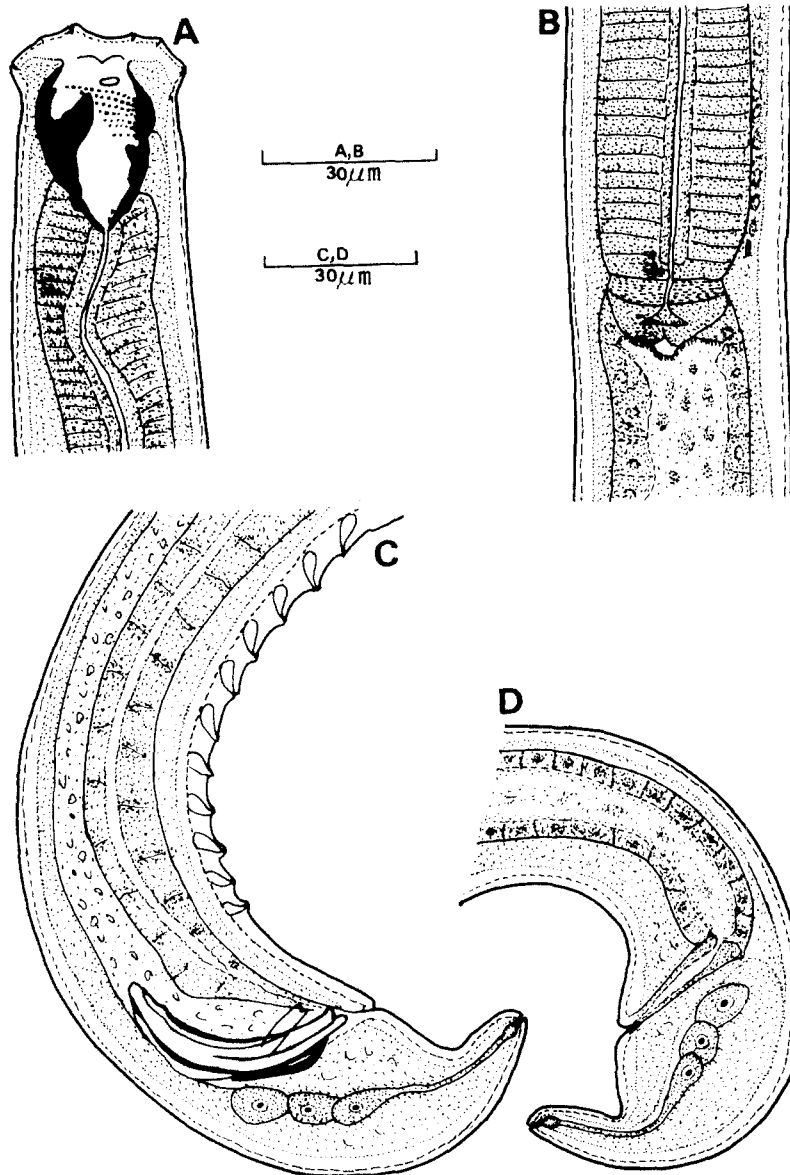
**Paratype** (Males, n = 7): L = 1.57 mm  $\pm$  0.13 (1.47-1.77); a = 41.7  $\pm$  2.1 (38-44); b = 3.4  $\pm$  0.1 (3.2-3.6); c = 32.4  $\pm$  3.6 (28-36); c' = 1.3  $\pm$  0.1 (1.1-1.5)

**Female:** Body medium sized, ventrally arcuate when relaxed. Cuticle smooth, about 2  $\mu\text{m}$  thick through out the body. Internal striations faintly visible. Lip region demarcated by

slight expansion, 24-28  $\mu\text{m}$  wide and 8-10  $\mu\text{m}$  high. Labial papillae prominent. Amphids slit-like, about 3  $\mu\text{m}$  wide, situated a little anterior to dorsal tooth apex. Buccal cavity 29-31  $\mu\text{m}$  long and 18-23  $\mu\text{m}$  wide. Dorsal tooth very large, claw-like, obliquely forward directed with sharply pointed apex; located at 14-15% of stoma length from anterior end. A small denticle present on dorsal wall at the level of dorsal tooth apex. Submedian teeth located at 13-15  $\mu\text{m}$  or 45-50% of stoma length from anterior end. Subventral denticles fairly large almost equal in size arranged in 6-7 rows. Two minute foramina present at base of buccal cavity. Posterior fourth of stoma embedded in anterior portion of oesophagus. Excretory pore distinct, located at 110-147  $\mu\text{m}$  from anterior end. Oesophagus cylindrical, 421-532  $\mu\text{m}$  long. Nerve ring at 98-124  $\mu\text{m}$  from anterior end. Oesophago-intestinal junction simple, non-tuberculate. Intestine with wide lumen and filled with numerous refractive granules. Reproductive system didelphic, amphidelphic, both sexual branches equally developed. Ovary small, reflexed. Sphincter present between oviduct and uterus. Vagina thin with sclerotization. Vulva a transverse slit. Two each pre- and post-vulval papillae present. Rectum straight, muscular less than an anal body width long. Tail 42-53  $\mu\text{m}$  long, conoid-digitate, ventrally arcuate. Caudal glands arranged in tandem, ampula conspicuous, duct opening (spinneret) terminal.

**Male:** Similar to female in general morphology but posterior part of body more strongly curved. Testes paired, opposed with elongate, spindle shaped spermatozoa. Spicules paired, free, slender, ventrally curved, tips rounded, measuring 52-64  $\mu\text{m}$  along median line. Gubernaculum spoon shaped, 20-26  $\mu\text{m}$  long; lateral guiding pieces 15-18  $\mu\text{m}$  long with bifid terminus. Ventromedian supplements 12-13 in numbers, regularly spaced. Copulatory muscles strongly developed. Tail 42-53  $\mu\text{m}$  long, conoid-digitate, ventrally curved. Caudal glands and their duct similar to those of female.

**Diagnosis:** The new species is characterized by having funnel-shaped buccal cavity, a small denticle on dorsal wall at the level of dorsal tooth apex, two each pre- and post-vulval papillae, conoid-digitate tail, and terminal spinneret. *Mylonchulus taeguensis* n. sp. belongs to those group of *Mylonchulus* species which are provided with terminal spinneret, and closely resembles to *M. sigmaturus* Cobb, 1917; but differs from it by having larger buccal cavity, presence of pre- and post-vulval papillae and larger tail (buccal cavity = 22-26  $\times$  9-13  $\mu\text{m}$ , vulval papillae absent and tail = 24-35  $\mu\text{m}$  in *M. sigmaturus*).



**Fig. 3.** *Mylonchulus taeguensis* n. sp., A: Anterior region; B: Oesophago-intestinal junction; C: Male posterior region; D: Female posterior region.

**Type material:** Holotype male, paratype female and males on slides deposited in the nematode collection of Department of Agricultural Biology, College of Agriculture, Kyungpook National University, Taegu, Korea.

**Type habitat and locality:** Soil samples collected from around rhizosphere of *Robinia pseudoacacia* L. Taegu, Korea. Collected in July, 1990.

*Mylonchulus polonicus* (Stefanski, 1915) Cobb, 1917  
(Figs. 5, 6)

**Measurements**

**Females** (n = 2): L = 1.7-1.8 mm; b = 33-34; c = 18-19; c' = 2.4-2.6; V = 62-64%.

**Female:** Body medium sized, ventrally arcuate when relaxed. Cuticle smooth, 1.5-2  $\mu$ m thick through out the body. Internal striations faintly visible. Dorsal body pores present in posterior region of body. Lip region almost continuous with adjoining body, 29-30  $\mu$ m wide and 12-14  $\mu$ m high. Labial papillae weak. Amphids slit-like, 3-4  $\mu$ m wide, situated just above the buccal cavity. Buccal cavity 34-36  $\mu$ m long and 20  $\mu$ m wide. Dorsal tooth large sized, obliquely forward directed, located at 21-28% of stoma length from anterior end. Submedian teeth at 21-22  $\mu$ m or 58-65% from anterior end of

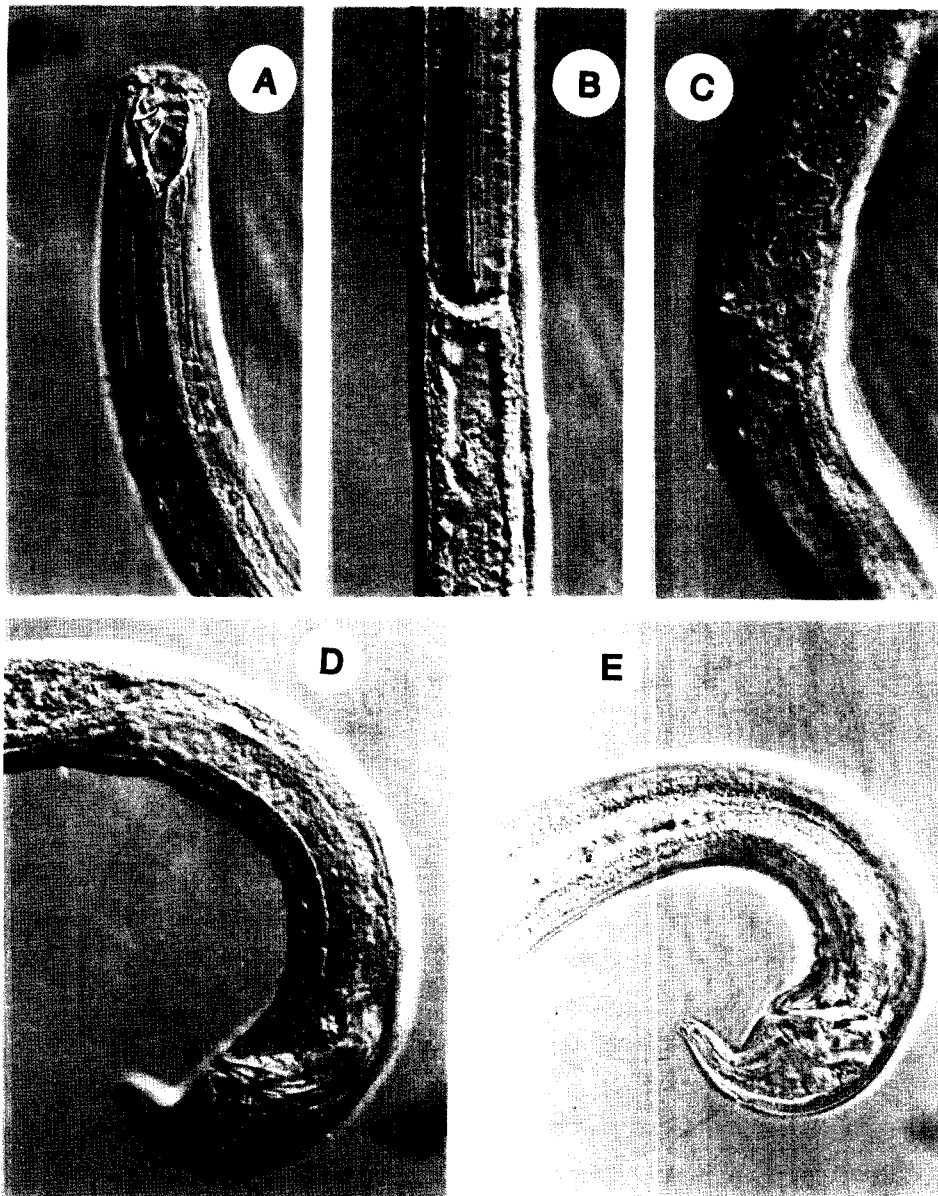


Fig. 4. *Mylonchulus taeguensis* n. sp., A: Anterior region; B: Oesophago-intestinal junction; C: Vulval region; D: Male posterior region; E: Female posterior region.

buccal cavity. Subventral denticles fairly large, almost equal in size, arranged in 6-7 rows. Two minute foramina present at base of buccal cavity. Posterior fourth of stoma embedded in anterior portion of oesophagus. Excretory pore distinct situated at 167-170  $\mu\text{m}$  from anterior end. Oesophagus 493-504  $\mu\text{m}$  long. Nerve ring at 137-145  $\mu\text{m}$  from anterior end. Oesophago-intestinal junction simple, non-tuberculate. Intestine with wide lumen and filled with numerous granules. Reproductive system didelphic, amphidelphic, both sexual branches equally developed. Ovary small, reflexed. Sphincter present between oviduct and uterus. Vagina thin with sclerotization. Vulva a

transverse slit. Rectum straight, muscular almost equal to anal body width long. Tail 93-95  $\mu\text{m}$  long, conoid, ventrally arcuate with flattened terminus. Caudal glands present, lying on one another, ampula conspicuous, spinneret terminal.

**Male:** Not found.

**Remarks:** The Korean specimens well agree with the morphology and measurements of *Mylonchulus montanus* given by Mulvey, 1961. Later in 1992 Andrassy has synonymised this species with *M. polonicus* because they belong to same species-range, we agree with Andrassy's opinion and considered present specimens as *M. polonicus*. Two females

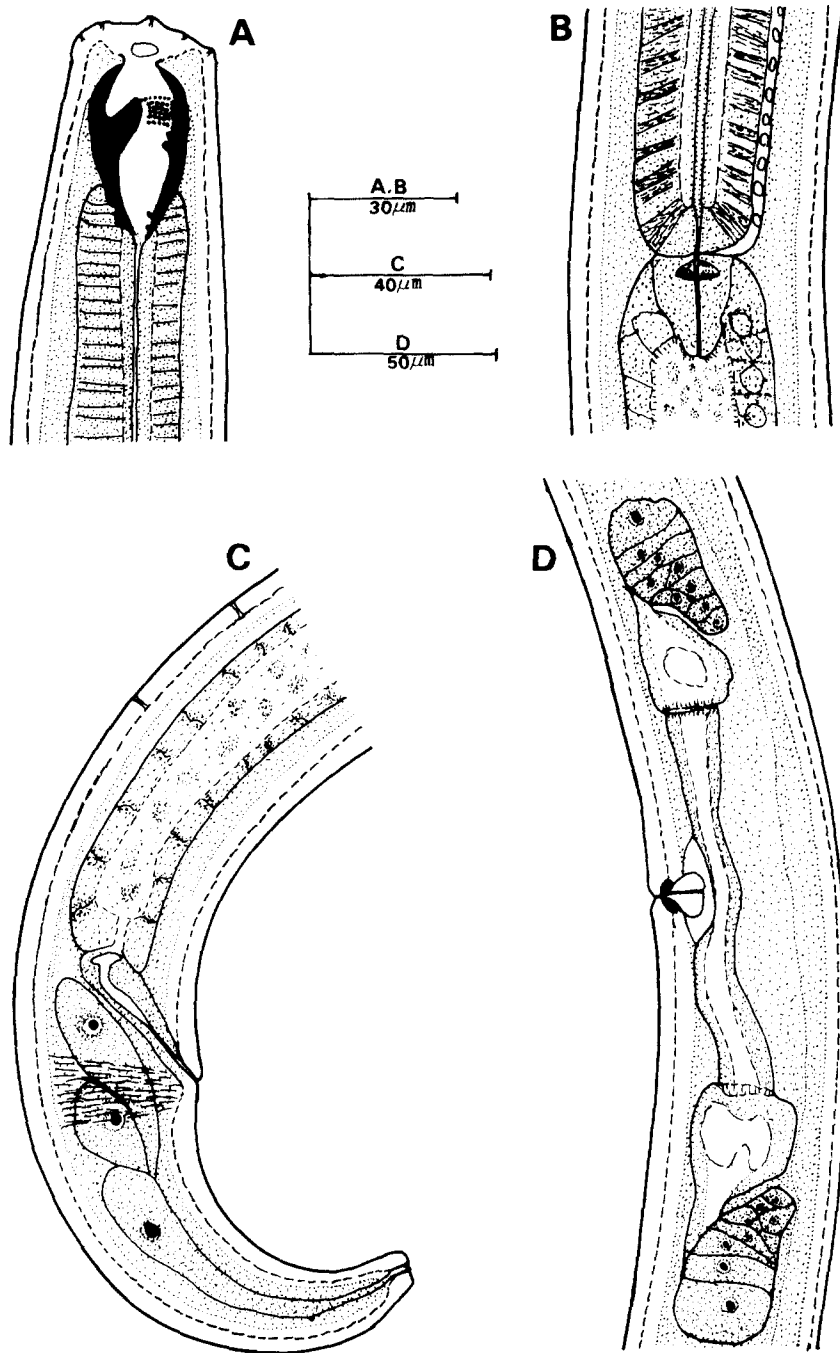


Fig. 5. *Mylonchulus polonicus*, A: Anterior region; B: Oesophago-intestinal junction; C: posterior region; D: Vulval region.

of this species is herein reported for the first time from Korea.

**Habitat and locality:** Soil samples collected from rice fields (*Oryza sativa* L.) at Ulsan, Kyungsangnam province, Korea. Collected in July, 1987.

*Prionchulus pachydermis* n. sp.  
(Figs. 7, 8)

#### Measurements

**Holotype** (Female): L = 2.2 mm; a = 34; b = 3.9; c = 13; c' = 4; V = 64%.

**Paratype** (Females, n = 4): L = 2.2 mm ± 0.18 (1.9-2.3); a = 31.5 ± 1.9 (30-34); b = 3.9 ± 0.1 (3.8-4.1); c = 13.1 ± 0.8 (12-14); c' = 3.6 ± 0.3 (3.4-4.0); V = 64.5% ± 1.0 (64-66).

**Female:** Body medium sized, ventrally arcuate when fixed.

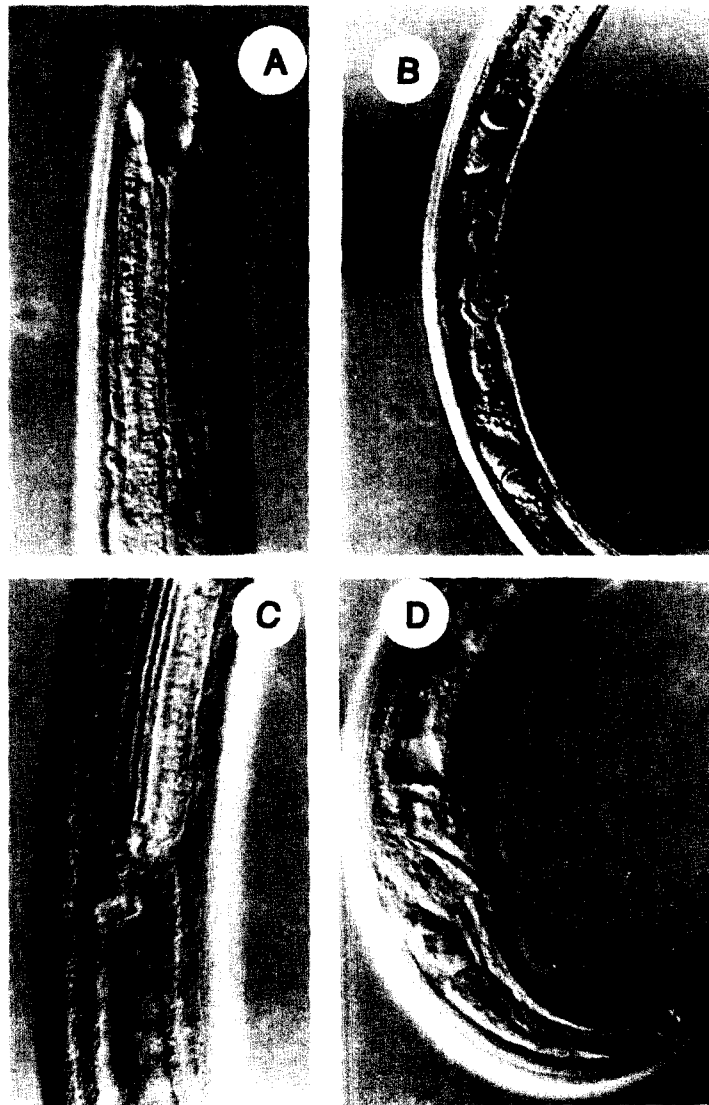


Fig. 6. *Mylonchulus polonicus*, A: Anterior region; B: Vulval region; C: Oesophago-intestinal junction; D: posterior region.

Cuticle smooth, very thick, 6-8  $\mu\text{m}$  thick through out the body. Lip region continuous with adjoining body, 42-46  $\mu\text{m}$  wide and 13-16  $\mu\text{m}$  high. Labial papillae prominent. Amphids apertures crescentic slits, 3-5  $\mu\text{m}$  wide, at the level of dorsal tooth. Buccal cavity 45-53  $\mu\text{m}$  long and 29-31  $\mu\text{m}$  wide, elongate-ovoid, one and half times longer than wide. Dorsal tooth large sized, forward directed, its apex located at 23-25% of stoma length from anterior end. Subventral denticles moderately developed, 11-15 on each ridge. Two prominent foramina present at base of buccal cavity. Ventrally posterior half of stoma embedded in anterior portion of oesophagus. Excretory pore conspicuous, at 183-200  $\mu\text{m}$  from anterior end. Oesophagus 511-583  $\mu\text{m}$  long. Nerve ring at 159-177  $\mu\text{m}$  from anterior end. Oesophago-intestinal junction simple.

non-tuberculate. Intestine a simple tube, cells with abundant dark granules. Reproductive system didelphic, amphidelphic, both sexual branches equally developed. Ovaries reflexed through a third to half of the length of oviduct and uterus. Oocytes arranged in a single row. A weakly developed sphincter present between oviduct and uterus. Vagina muscular, extending inwards about one third of corresponding body width, and uniting with the uteri. Vulva a transverse slit with cuticularized pieces. No prerectum; rectum straight, muscular, almost equal to anal body width long. Tail 137-174  $\mu\text{m}$  long, elongate-conoid, ventrally arcuate with acutely rounded terminus. Caudal glands and spinneret absent.

**Male:** Not found.

**Diagnosis:** The new species is characterized by having



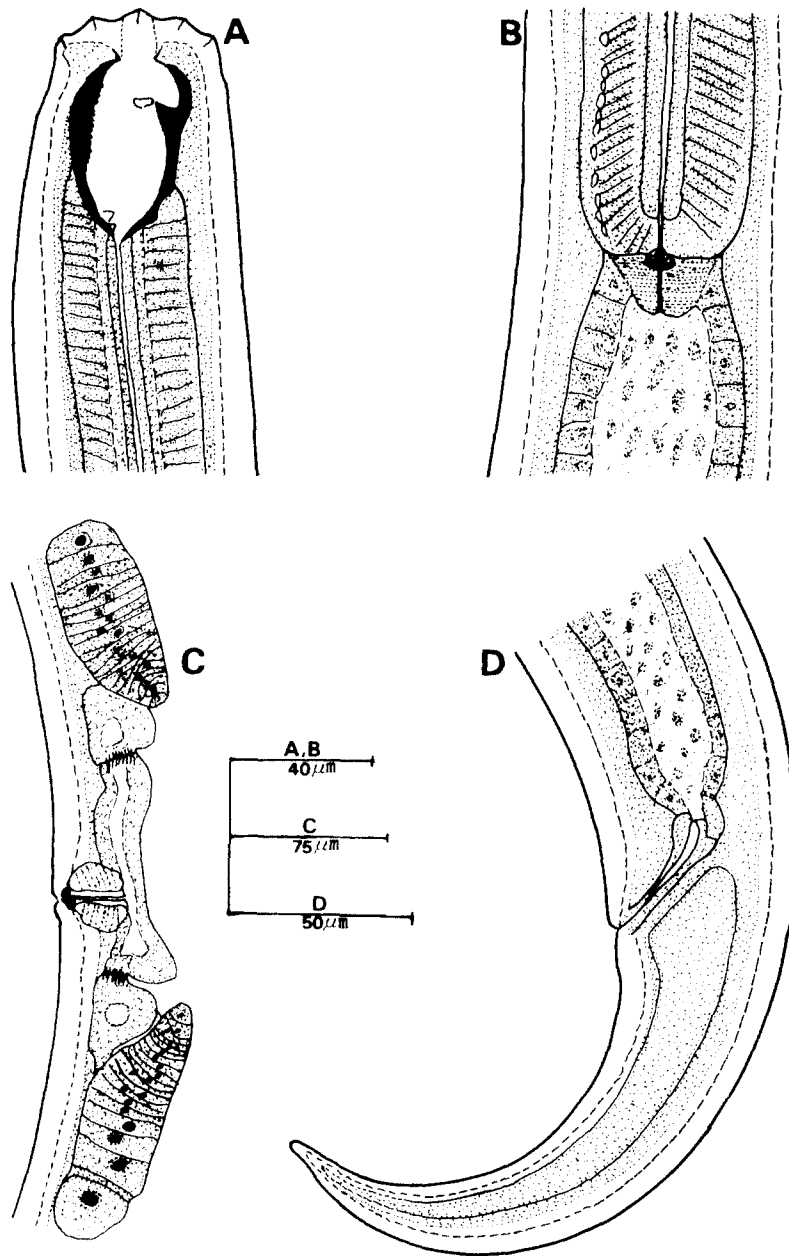


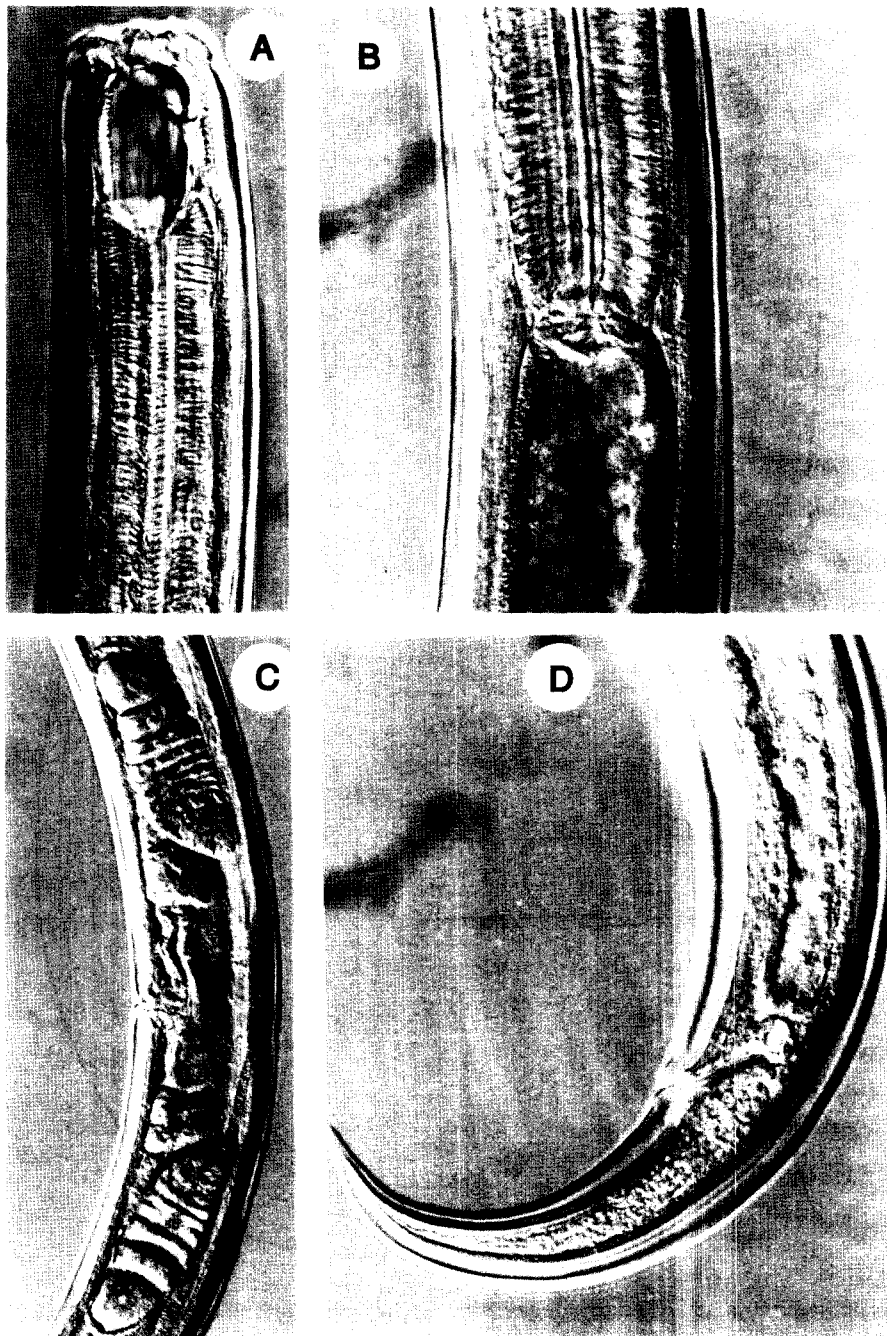
Fig. 7. *Prionchulus pachydermis* n. sp.. A: Anterior region; B: Oesophago-intestinal junction; C: Vulval region; D: posterior region.

large sized buccal cavity, ventrally posterior half of buccal cavity embedded in anterior portion of oesophagus, presence of a weakly developed sphincter between oviduct and uterus, absence of caudal glands and spinneret. *Prionchulus pachydermis* comes close to *P. muscorum* (Dujardin 1845) Wu & Hoeppli, 1929 and *P. punctatus* (Cobb 1917) Andrassy, 1958 but differs from them by having very thick body cuticle and presence of sphincter between uterus and oviduct (body cuticle thin and sphincter absent in *P. muscorum* and *P. punctatus*).

**Type material:** Holotype and paratype females on slides deposited in the nematode collection of Department of Agricultural Biology, College of Agriculture, Kyungpook National University, Taegu, Korea.

**Type habitat and locality:** Soil samples collected from around rhizosphere of marigold (*Tagetes patula* L.) from Uisong Kyungbuk province, Korea. Collected in July, 1994.

***Prionchulus koriensis* n. sp.**  
(Figs. 9, 10)



**Fig. 8.** *Prionchulus pachydermis* n. sp., A: Anterior region; B: Oesophago-intestinal junction; C: Vulval region and gonads; D: posterior region.

#### Measurements

**Holotype** (Female): L = 1.9 mm; a = 32.3; b = 4.2; c = 14.3; c' = 3.5; V = 66%.

**Paratype** (Females, n = 5): L = 1.9 mm ± 0.08 (1.7-2.0); a = 31.8 ± 1.3 (29.6-33); b = 4.1 ± 0.1 (4.0-4.3); c = 14.5 ± 0.5 (13.6-14.8); c' = 3.5 ± 0.1 (3.3-3.7); V = 64.9% ± 0.5 (64.5-65.5).

**Female:** Body medium sized, ventrally arcuate when relaxed. Cuticle smooth, 2-3 μm thick through out the body. Lip region continuous with adjoining body, 30-34 μm wide and 11-15 μm high. Lips conoid but low. Amphids slit-like, 3-5 μm wide, situated at the level of dorsal tooth apex. Buccal cavity 34-36 μm long and 18-21 μm wide, barrel shaped. Dorsal tooth large sized, forward directed, its apex located at

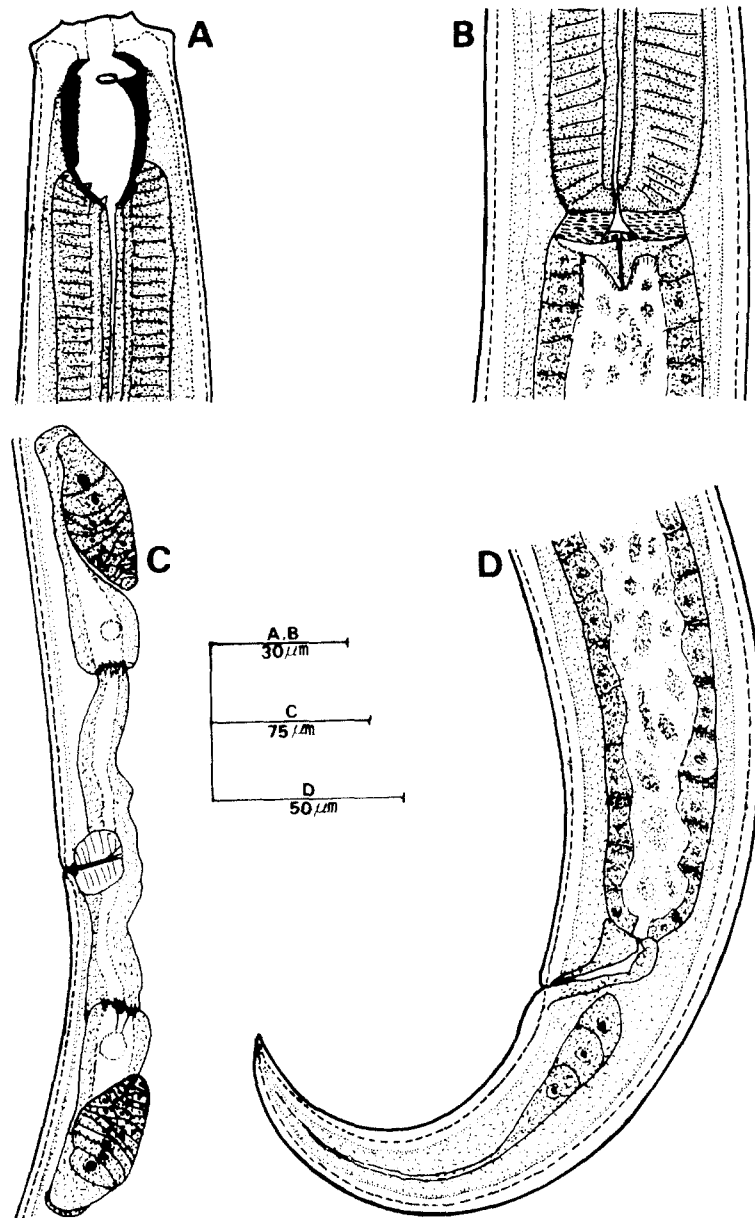


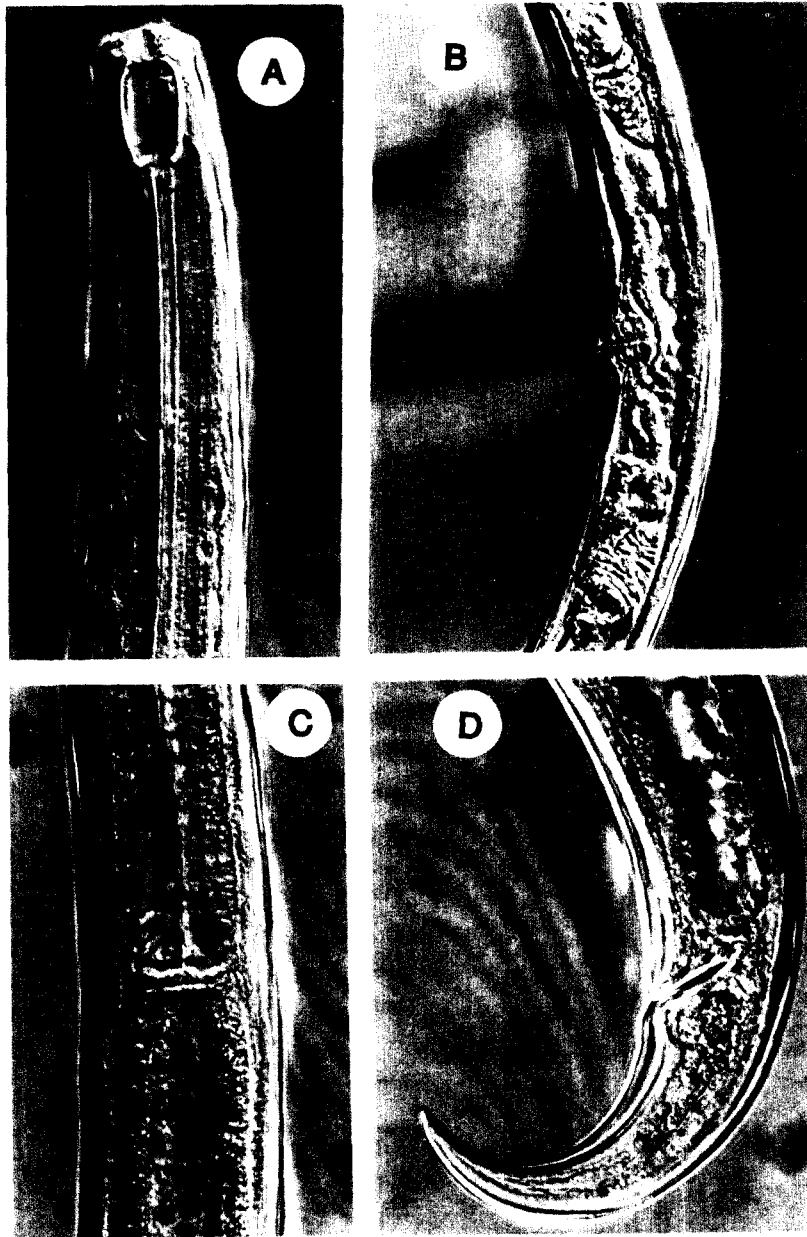
Fig. 9. *Prionchulus koriensis* n. sp., A: Anterior region; B: Oesophago-intestinal junction; C: Vulval region; D: posterior region.

16-18% of stoma length from anterior end. Subventral denticles moderately developed or weak, 14-15 on each ridge. Two prominent foramina present at base of buccal cavity. Posterior fourth of stoma embedded in anterior portion of oesophagus. Excretory opening conspicuous, 161-175  $\mu\text{m}$  from anterior end. Oesophagus 441-469  $\mu\text{m}$  long. Nerve ring at 123-143  $\mu\text{m}$  from anterior end. Oesophago-intestinal junction simple, non-tuberculate. Intestine with wide lumen and filled with numerous refractive granules. Reproductive system didelphic, amphidelphic, both sexual branches equally developed. Ovaries small, reflexed through about one-third of

gonad length. Oocytes arranged in a single row. Sphincter present between oviduct and uterus. Vagina strongly muscular about two-fifths of corresponding body width deep. Vulva a transverse slit, provided with cuticularized pieces. No rectum; prerectum straight, muscular, about three-fourth of anal body width long. Tail 124-133  $\mu\text{m}$  long, elongate-conoid, ventrally arcuate with sharply rounded terminus. Three caudal glands lying in row, but no spinneret.

**Male:** Not found.

**Diagnosis:** The new species is characterized by having barrel-shaped buccal cavity, elongate-conoid, ventrally curved



**Fig. 10.** *Prionchulus koriensis* n. sp., A: Anterior region; B: Vulval region and gonads; C: Oesophago-intestinal junction; D: posterior region.

tail with sharply rounded terminus and presence of caudal glands. The new species closely resembles to *Prionchulus mordax* Andrassy, 1993. However it differs by having the posteriorly located amphids, thinner body, well developed caudal glands and absence of caudal pores (amphids located at the level of anterior end of stoma; body 66-76  $\mu\text{m}$  wide, caudal glands reduced and a pair of subventral papillae present on tail in *P. mordax*).

**Type material:** Holotype and paratype females on slides deposited in the nematode collection of Department of Agri-

cultural Biology, College of Agriculture, Kyungpook National University, Taegu, Korea.

**Type habitat and locality:** Soil samples collected from around rhizosphere of *Artemisia asiatica* Nakai at Chinju, Kyungsangnam province, Korea. Collected in July, 1994.

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## Descriptions of Four New and An unknown Species of Predatory Nematodes (Mononchida) from Korea

Sciences and Technology.

### 적 요

捕食線蟲目 (Mononchida)의 4新種 및 1未記錄種을 기재하였다. *Mylonchulus jinjuensis* n. sp.는 體長이 1.8-2.2 mm, 交接刺는 58-67  $\mu\text{m}$ 이며, 亞腹部 齒는 기부에있고, 眞皮腺과 腹部體孔이 있는 것이 특징이다. *Mylonchulus taegunsis* n. sp.는 體長이 1.3-1.8 mm, 交接刺는 52-64  $\mu\text{m}$ 이며, 背部齒 頂点선의 口腔 背部壁에 추가적인 작은 齒를 가지며, 陰門 前後方に 각각 2개의 突起가 있다. *Mylonchulus polonicus*는 한국 未記錄種으로 보고되며. *Prionchulus pachydermis* n. sp.는 體長이 2-2.3 mm이며, 體벽이 두껍고, 미선과 미선공이 없다. *Prionchulus koriensis* n. sp.

는 體長이 1.7-2.0 mm이며 끝이 뾰족하고 신장된 원추형의 꼬리와 미선공이 있는 것이 특징이다.

검색어: 분류, 捕食線蟲目, *Mylonchulus*, *Prionchulus*.

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