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Four Unrecorded Species of Spiral Nematode (Hoplolaimidae) from Korea

螺旋線蟲科의 韓國 未記錄 4種에 대하여

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ABSTRACT In a survey of spiral nematode (Hoplolaimidae) in Korea, *Helicotylenchus cavenessi* Sher, 1966, *Helicotylenchus paraplatyurus* Siddiqi, 1972, *Rotylenchus alius* Van den Berg, 1986 and *Rotylenchus incultus* Sher, 1965 were newly found and recorded in Korea.

KEY WORDS Taxonomy, *Helicotylenchus, Rotylenchus*, Korea

초 록 한국산 나선선충(Hoplolaimidae)을 조사하던 중 *Helicotylenchus cavenessi* Sher, 1966, *Helicotylenchus paraplatyurus* Siddiqi, 1972, *Rotylenchus alius* Van den Berg, 1986 그리고 *Rotylenchus incultus* Sher, 1965 등 4種이 우리나라 미기록종으로 확인되어 보고한다.

검색어 分類, 螺旋線蟲科, 韓國

INTRODUCTION

Spiral nematodes (Hoplolaimidae) comprise two subfamilies, Hoplolaiminae, and Rotylenchulinae, all of which have slender females which are migratory ectoparasities of roots but some have a tendency to bury themselves in roots. The spiral nematodes penetrate root tissues intracellurarly, and reach the inner layers of the cortical tissue by thrusting of the stylet and then the anterior end of the body. Their feeding produces single cell damage often with necrotic and brownish lesions. About 376 species in Hoplolaimidae have been recorded in the world and 15 species were reported in Korea. In a study of Hoplolaimidae in Korea, four unrecorded species were newly identified and their morphological characteristics were described.

Descriptions

Helicotylenchus cavenessi Sher, 1966

솔재나선선충(신칭)
(Fig. 1)

Measurements: Female (n=13). L=618.2 μm±70.8 (508~715); a=27.8±3.2(22.2~34.0); b=4±0.3(4.0~5.2); b'=4.2±0.4(3.4~4.8); c=37.4±4.9(30.4~48.4); c'=1.2±0.2(0.9~1.6); V=63.4%±5.3(56.9~66.8); O=28.1%±4.8(22.2~37.6); Stylet=27.0 μm±1.3(24.0~29.0); Tail length=16.8 μm±2.8(11.0~22.0); Anus body width=13.6 μm±1.0(12.0~15.2); Body width=22.2 μm±1.6(18.5~24.1); DGO=7.6 μm±1.1(6~9); Tail annules=12.0±2.2(8.0~15.0).

Description: Female. Body in spiral shape. Lip region hemispherical, with four indistinct annules. Stylet knobs slightly indented anterior surfaces. Excretory pore anterior to level of esophago-intestinal junction. Spermatheca inconspicuous, without sperm. Phasmids inconspicuous, 1~6 annules anterior to anus level. Inner lines of lateral field fuse about posterior part of tail. Tail more curved dorsally, with 8~15 annules. Ter-

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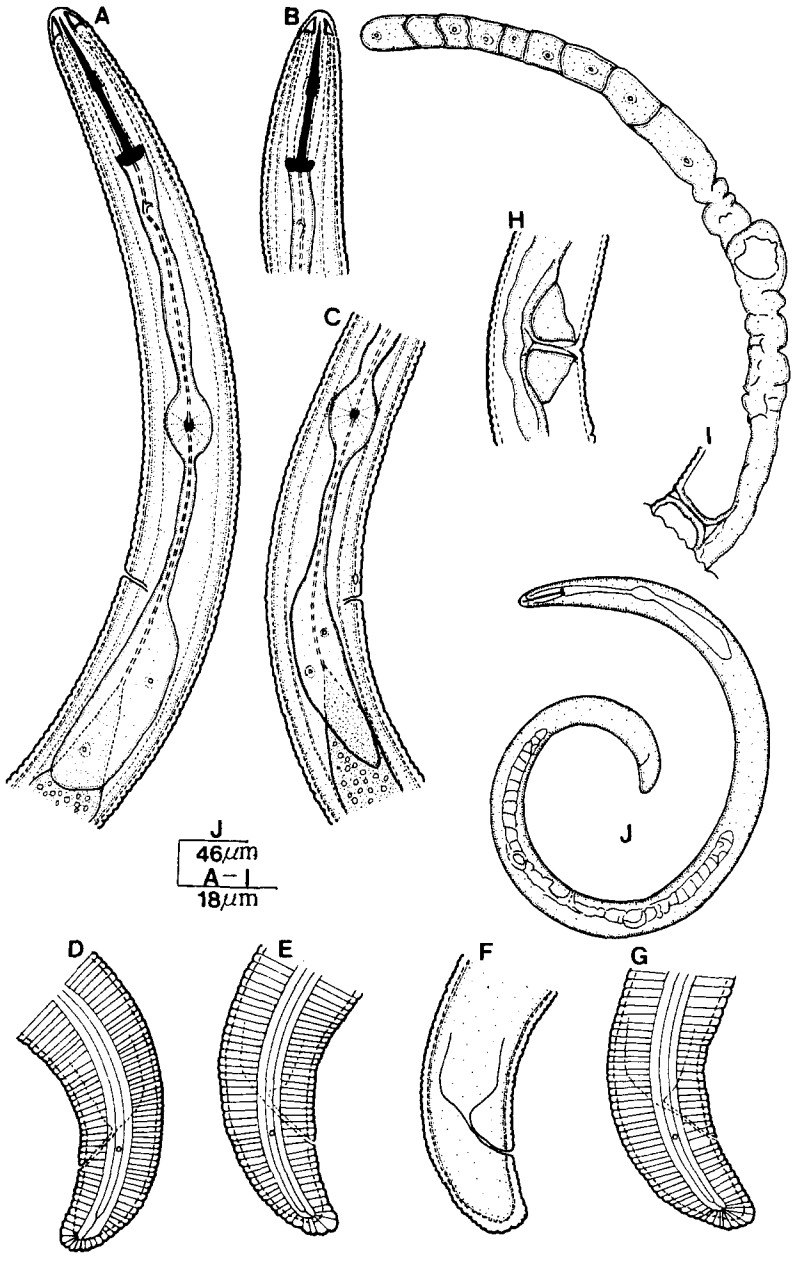

Fig. 1. *Helicotylenchus cavenessi.* A; Anterior part of female, B; Head region, C; Oesophageal region, D-G; Female Tail, H; Vulval region, I; Female gonad, J; General shape of female.

minus irregularly hemispherical.

Male. unknown.

Discussion: This species found in Korea was almost similar to the original description of the species (1956, Sher) in morphological characters and measurements, but when compared to the description given by Sher (1956), phasmids position (one to six annules anterior to the anus) was different from the orignal species (three to seven annules anterior to the anus).

Localities and host plants: Kurye-gun, Chŏllanam-do,

Juniperus chinensis L.

***Helicotylenchus paraplatyurus* Siddiqi, 1972**
머리빗나선선충(신칭)
(Fig. 2)

Measurement: Female (n=18). L=677.1 μm±49.6 (600~790); a=30.4±1.5(28.2~32.9); b=4.9±0.4(4.4~5.7); b'=4.5±0.3(3.8~5.1); c=40.6±3.9(33.9~46.4); c'=1.2±0.1(1.0~1.3); V=63.1%±1.7(59.1~66.2); O=37.3%±9.1(21.1~54.5); Stylet L=25.5 μm±2.7(22~31); Tail L=16.8 μm±1.5(14~19); ABW=14.4 μm±0.8(13~16); BW=22.3 μm±1.5(20~26).

Description: Female. Lip region elevated, continuous with 4~5 annules. Outer margins of labial framework extending posteriorly over 1~2 body annules. Lateral

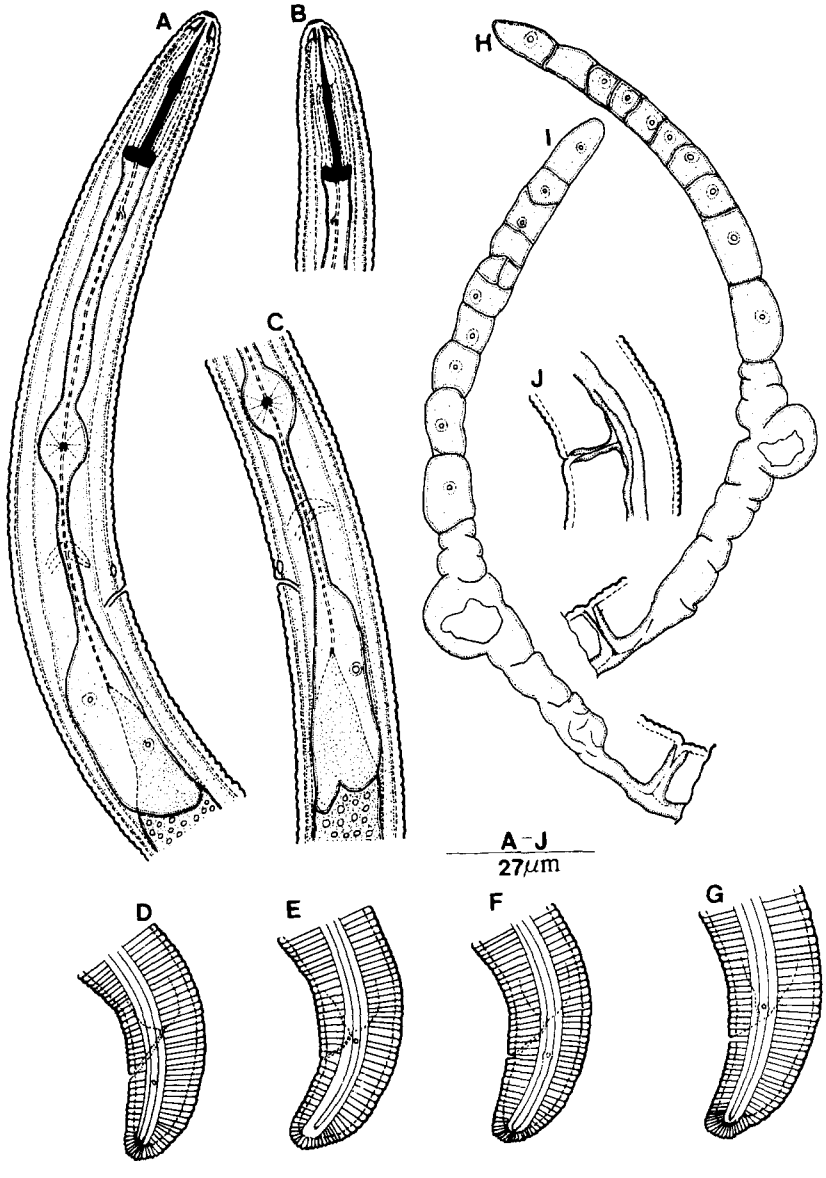

Fig. 2. *Helicotylenchus paraplatyurus.* A; Anterior part of female, B; Head region, C; Oesophageal region, D-G; Female Tail, H-I; Female gonad, J; Vuval region.

field with smooth incisures, about one-fourth as wide as body. Stylet knob rounded, occasionally indented anteriorly. Excretory pore opposite, oesophago-intestinal junction, or a little anterior 105~118 μm from anterior end, 1~2 annules behind hemizonid which is 2~3 annules long. Spermatheca dorsally offset, without sperms. Tail dorsally convex, sub-cylindroid to a broadly rounded terminus, with 13~16 annules. Phasmids situated from one annule behind to five annules anterior to level of anus.

Male unknown.

Discussion: The differences between the species found in Korea and the original species (1972, Siddiqi) were in length and excretory pore position. Length (570~790 μm) of the species found in Korea was different from the original species (680~850 μm). Excretory pore of the species in Korea situated at 110~125 μm from the anterior end, while that of the original species was 115~132 μm from the anterior end.

Localities and Host plants: Namhansansŏng, Kwangju-gun, Kyŏngi-do, *Albizza julibrissin* Durazz. Chinwol-myŏn, Kwang-yang-gun, Chŏllanam-do, *Morus bombycis* Koidz.

Rotylenchus alius Van den Berg, 1986
바둑판무늬나선선충(신칭)
(Fig. 3)

Measurements: Female (n=3). L=1080 μm±40.9 (1035~1134); a=40.5±1.7(38.3~42.5); b'=7.5±0.7(7.0~8.5); c=64.5±12.5(54.1~82.1); c'=0.9±0.2(0.6~1.0); V=54%±0.6(53.2~54.6); Stylet=28.5 μm±0.4(27.9~28.8); Anus body width=19.8 μm; BW=26.7 μm±1.1 (25.2~27 .9): Tail L=17.4 μm±3.4(12.6~19.8)

Male (n=2). L=916 μm±61.0(855.0~977.0); a=40.9±4.4(36.5~45.2); b'=6.2±0.3(5.9~6.5); c=25.8±0.6(25.2~26.4); c'=2.2±0.1(2.1~2.3); Stylet=27.5 μm±1.3 (26.1~28.8); Tail L=35.6 μm±3.1(32.4~38.7); ABW =16.2 μm±0.9(15.3~17.1); BW=22.5 μm±0.9(21.6~23.4); O=16.3%±2.5(13.8~18.8); Spicule=24.8 μm±0.4(24.3~25.2); Gubernaculum=9.5 μm±0.4(9.2~9.9).

Description: Female. Lip region conoid, blunt anteriorly, not offset with 5 annules. Labial framework well developed, streching 1 annule posteriorly from basal plate. Stylet slender. Stylet knobs varing from flattened to hollow anteriorly. Position of excretory pore varing from opposite of isthmus to level of ventral gland. Spermatheca rounded and filled with sperms. Epiptygma indistinct. Phasmids situated from 18 to 22 annules anterior to anus. Tail 10 to 13 annules long.

Male. Excretory pore situated from part of oesophageal lobe to opposite middle of isthmus. Hemizonid 1 and 1/2 annulus long, situated directly anterior to excretory pore. Hemizonion not seen. Lateral field areolated opposite oesophageal region, with only occasionally areolated over rest of body, markedly less than in female. Phasmid situated 1/2 body width anterior to cloaca.

Discussion: This species found in Korea was almost similar to the original species (1986, Van den Berg) in morphlogical characters. However, in case of female, the length (1035~1134 μm) of the species in Korea was different from the original species L (600~900 μm).

Localities and host plants: Jungmun, Namcheju-gun, Cheju-do, *Musa paradisiaca* var. *sapientum* L.

Rotylenchus incultus Sher, 1965
인쿨투스나선선충(신칭)
(Fig. 4)

Measurements: Female (n=12). L=931 μm±68.5 (815~1031); a=37.2±4.0(28.3~44.1); b=6.9±0.7(6.1~8.2); b'=6.7±0.6(5.8~7.8); c=51.6±9.8(34.8~73.3); c'=1.0±0.1(0.7~1.2); V=56.7%±1.1(55.1~59.5); Stylet=27.7 μm±0.7(26.1~28.8); O=18.7%±2.8(13.3~20.7) Body width=25.3 μm±1.6(21.6~31.5); Anus body width=18.9 μm±1.1(18.0~24.3).

Male (n=2). L=954 μm±13.5(941.0~968.0); a=38.6±0.1(38.4~38.7); b'=6.2(6.1~6.2); c=31.2±(29.9~32.4); c'=2.0(1.9~2.0); Stylet=26.8 μm±0.2(26.6~27.0); Body width=24.8 μm±0.3(24.3~25.2); Anus body width=15.8 μm±0.6(15.3~16.2); Spicule=26.6 μm±0.4(26.2~27.0); Gubernaculum=12.2 μm±0.4(11.7~12.6).

Description: Female. Habit spiral. Lateral field areolated only anteriorly. Lip region hemisperical, not

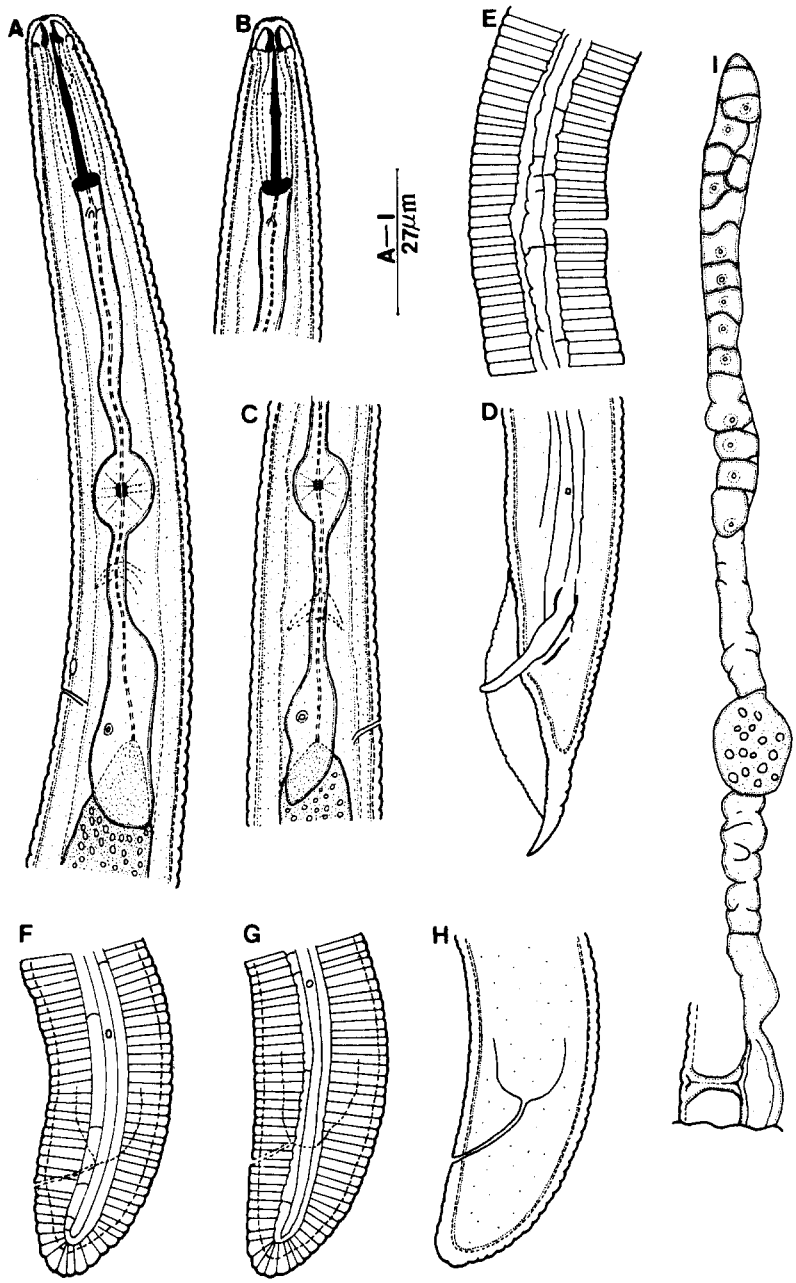

Fig. 3. *Rotylenchus alius*. A; Anterior part of female, B; Male lip region, C; Oesophageal region, D; Male tail, E; Lateral field at mid body, F-H; Female tail, I; Female gonad.

offset, five annules on the right side, five on the left. Stylet knobs rounded, slightly flattened anteriorly. Excretory pore above oesophago-intestinal valve. Hemizonid at the excretory pore level. Hemizonion not seen. Epiptygma conspicuous. Phasmids 14~20 annules anterior to anus level. Tail terminus hemispherical, more curved dorsally with annules.

Male. Habit ventrally curved. Lip region hemispherical,

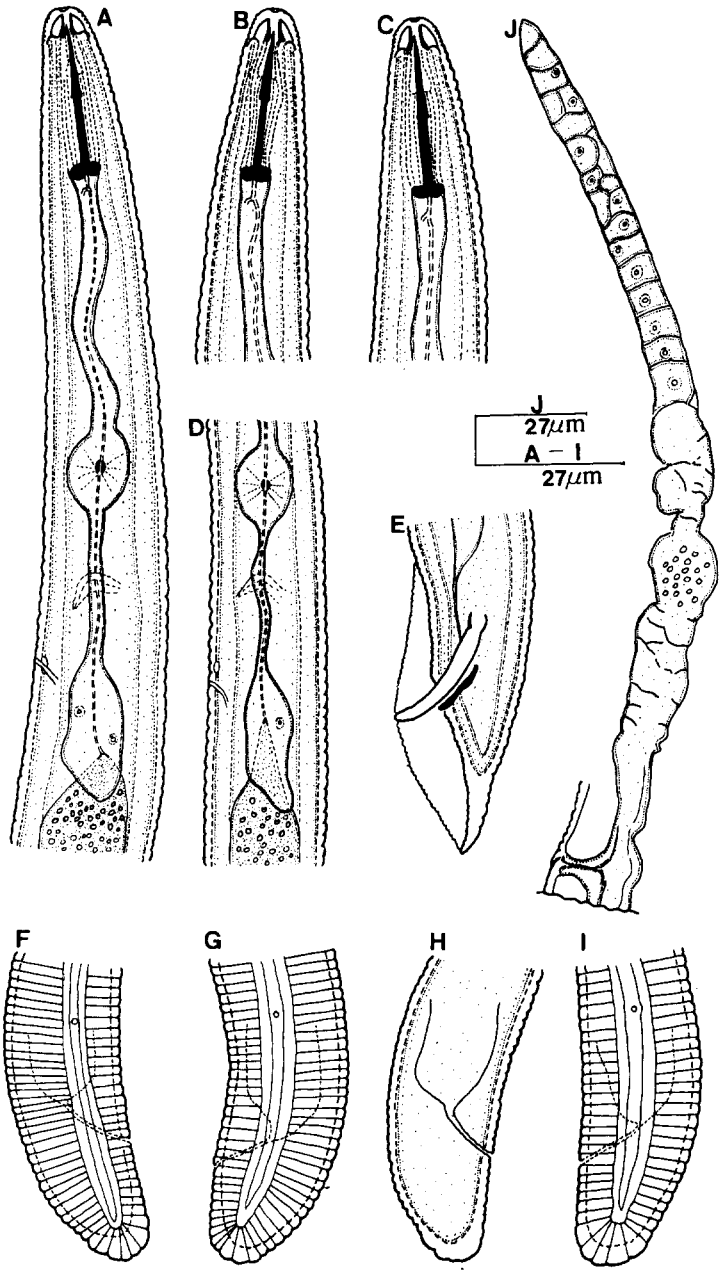

Fig. 4. *Rotylenchus incultus.* A; Anterior part of female, B; Female Head region, C; Male head region, D; Oesophageal region, E; Male tail, F-I; Various tail shape, J; Female gonad.

not offset, 5 annules. Posterior part of stylet was slightly shorter than anterior part. Stylet knobs rounded with slightly flattened anterior surfaces.

Discussion: The differences between the species found in Korea and the original species (1965, Sher) were the stylet length and phasmids position. The stylet length (26~30 μm) of the species in Korea was different from the original species (24~28 μm) and phasmids position (14~20 anterior to anus) of the former was different from that of the latter (13~14 anterior to

anus).

Localities and host plants: Yongdam-dong, Ch'ŏngju-shi, Ch'ungchŏngbuk-do, *Matasequioa glyptostroboides* Hu et Cheng. Chisan-myŏn, Chindo-gun, Chŏllanam-do, *Chionanthus retusa* Lindel. et Paxton.

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