

**A NEW NEMATODE, *MERLINIUS ACUMINATUS* N. SP.  
(TYLENCHIDA : TYLENCHORHYNCHIDAE) FROM JAPAN**

Nozomu MINAGAWA\*

日本産イシユクセンチュウ科の新種 *Merlinius acuminatus*

皆 川 望\*

**Synopsis**

*Merlinius acuminatus* n. sp. was described from the rhizosphere of *Imperata cylindrica* (L.) in Kumamoto, and from an apple orchard in Nagano, Japan. This new species resembles *M. joctus* and *M. processus* in the acute tail terminus but it is distinguished from them by its shorter stylet and irregular lateral incisures. This also resembles *M. circellus* in the irregular lateral incisures but differs from it in the shorter body and stouter tail.

**Introduction**

A plant-parasitic nematode having peculiar shape of lateral incisures and acute tail terminus was found in Kumamoto and Nagano Prefectures. This species was considered to belong to the subfamily Merliniinae of family Tylenchorhynchidae, in which five genera were known up to the present time, namely *Merlinius*, *Amplimerlinius*, *Geocenamus*, *Nagelus* and *Scutylenchus*. SIDDIQI (1979) revised this subfamily and gave differential diagnosis from the closest subfamily Tylenchorhynchinae as follows; six incisures in lateral field, peculiar shape of spicules, simple gubernaculum, not strongly developed postcorpus, usually two lobed spermatheca, and structure of vulva. According to his key to the genera of Merliniinae, radial grooves interrupting labial annules are the morphology substantially separate the genera,

\* Department of Environmental Biology, National Institute of Agro-Environmental Sciences, Kannondai, Yatabe, Tsukuba, Ibaraki 305, Japan

\* 農業環境技術研究所環境生物部

however, this character could be observed by the scanning electron microscope but not by the optical one in the present species. Although this species has above mentioned characters of Merliniinae, some problems still remained about the generic position in the subfamily because of its abnormal nature of the lateral incisures. Under these circumstances, a single specimen which had six incisures in lateral field was found among hundreds specimens from Nagano, so that this species is placed in the genus *Merlinius*, and described as a new species here. The specimens examined in this study were treated by gentle heat, fixed by TAF fixative and mounted in glycerine after slow dehydration.

Before going further, the author expresses his hearty thanks to Dr. Y. ITO, Nagano Fruit Tree Experiment Station, who kindly cooperated with him to collect soil samples from apple orchards in Nagano Prefecture.

### *MERLINIUS ACUMINATUS* N. SP.

MEASUREMENTS. *Female*: Holotype: L = 663  $\mu\text{m}$ , a = 28.4, b = 5.7, c = 12.8, c' = 3.1, V = 53.7, excretory pore to anterior end of body = 94.6  $\mu\text{m}$ , do./L = 14.2%, stylet = 13.3  $\mu\text{m}$ , prorhabdion = 7.7  $\mu\text{m}$ , stylet knob height = 1.3  $\mu\text{m}$ , do. width = 3.0  $\mu\text{m}$ . Paratypes: population from Kumamoto, n = 25, L = 564–716  $\mu\text{m}$  (634  $\pm$  39: mean  $\pm$  standard deviation), a = 23.7–29.5 (26.7  $\pm$  1.5), b = 4.9–6.4 (5.6  $\pm$  0.3), c = 10.1–14.4 (12.4  $\pm$  1.1), c' = 2.3–4.4 (3.2  $\pm$  0.5), V = 52.6–56.7 (54.7  $\pm$  1.1), excretory pore to anterior end of body = 88.7–110.0  $\mu\text{m}$  (99.0  $\pm$  6.5), do./L = 13.8–18.4% (15.6  $\pm$  1.1), stylet = 12.7–14.0  $\mu\text{m}$  (13.2  $\pm$  0.4), prorhabdion = 6.7–8.0  $\mu\text{m}$  (7.4  $\pm$  0.3), stylet knob height = 1.3–1.7  $\mu\text{m}$  (1.3  $\pm$  0.1), do. width = 2.7–3.7  $\mu\text{m}$  (3.1  $\pm$  0.2); paratypes: population from Nagano, n = 25, L = 421–590  $\mu\text{m}$  (496  $\pm$  41), a = 24.0–29.8 (26.9  $\pm$  1.7), b = 4.6–5.8 (5.2  $\pm$  0.3), c = 10.3–13.9 (11.7  $\pm$  0.9), c' = 2.8–3.9 (3.3  $\pm$  0.3), V = 54.0–60.1 (56.4  $\pm$  1.4), excretory pore to anterior end of body = 72.7–94.0  $\mu\text{m}$  (80.3  $\pm$  4.6), do./L = 14.7–18.5% (16.2  $\pm$  1.1), stylet = 11.0–12.7  $\mu\text{m}$  (11.8  $\pm$  0.5), prorhabdion = 6.7–8.0  $\mu\text{m}$  (7.0  $\pm$  0.2), stylet knob height = 1.0–1.7  $\mu\text{m}$  (1.3  $\pm$  0.1), do. width = 3.0–3.7  $\mu\text{m}$  (3.3  $\pm$  0.2).

*Male*: Paratypes: population from Kumamoto, n = 25, L = 519–645  $\mu\text{m}$  (562  $\pm$  37), a = 20.6–32.6 (27.8  $\pm$  2.6), b = 4.6–5.9 (5.3  $\pm$  0.3), c = 9.2–13.1 (10.7  $\pm$  0.9), c' = 3.2–4.6 (3.9  $\pm$  0.4), T = 43.6–58.4 (49.7  $\pm$  3.6), excretory pore to anterior end of body = 76.7–98.7  $\mu\text{m}$  (87.2  $\pm$  5.3), do./L = 14.2–17.0% (15.5  $\pm$  0.8), stylet = 12.0–13.3  $\mu\text{m}$  (12.8  $\pm$  0.3), prorhabdion = 6.7–7.7  $\mu\text{m}$  (7.3  $\pm$  0.3), stylet knob height = 1.0–1.3  $\mu\text{m}$  (1.3  $\pm$  0.1), do. width = 2.7–3.3  $\mu\text{m}$  (3.1  $\pm$  0.2), spicules = 20.0–26.7  $\mu\text{m}$  (22.8  $\pm$  1.8), gubernaculum = 6.7–9.7  $\mu\text{m}$  (7.8  $\pm$  0.7); paratypes: population from Nagano, n = 25, L = 417–559  $\mu\text{m}$  (484  $\pm$  37), a = 24.4–33.5 (28.4  $\pm$  1.9), b = 4.3–5.8 (5.1  $\pm$  0.4), c =

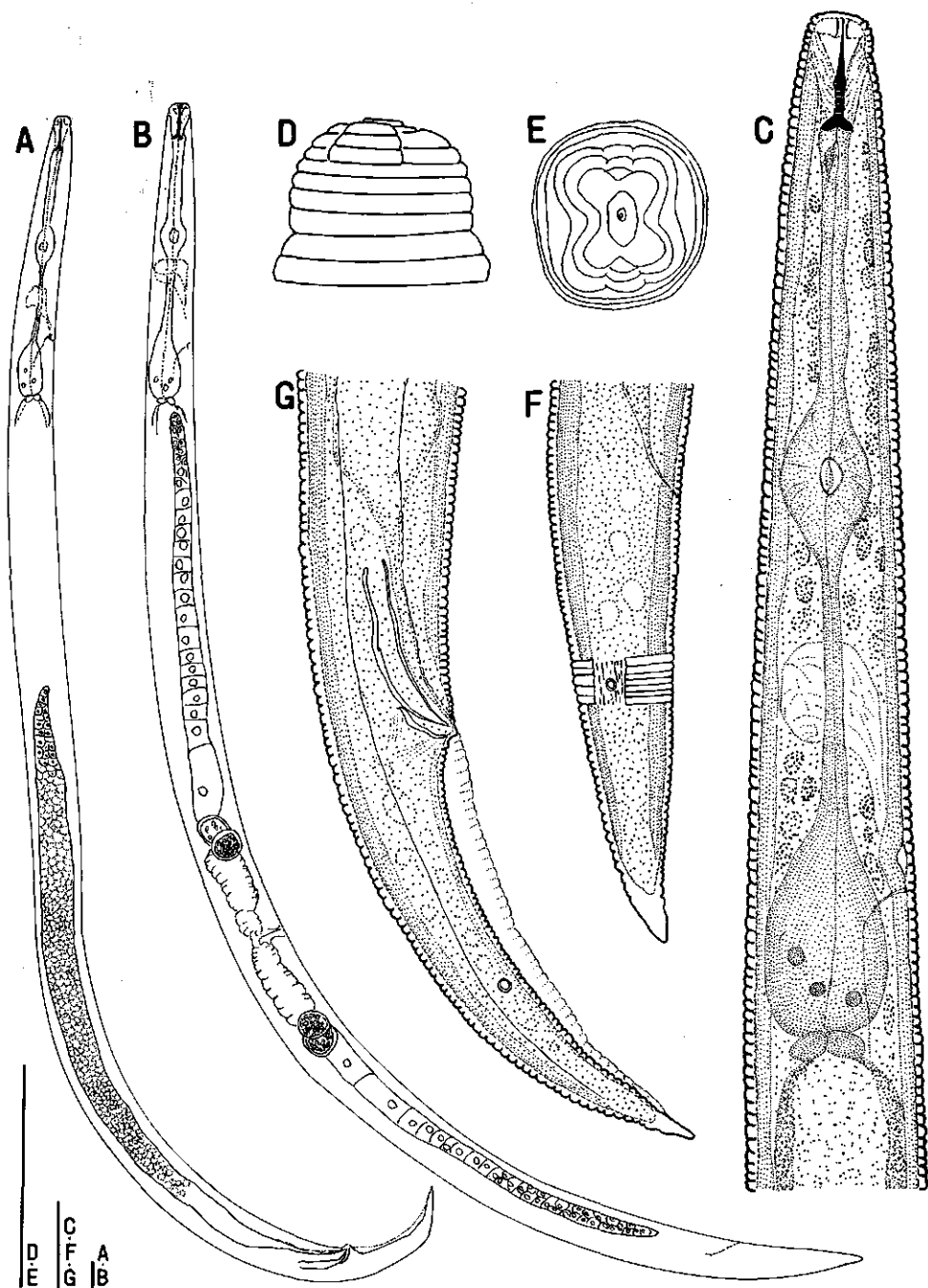


Fig. 1. *Merlinius acuminatus* n. sp. A: male adult, general view; B: female adult, general view; C: do., anterior part of body; D: do., head (lateral view; drawn from SEM photography); E, do., face view (drawn from SEM photography); F: do., tail region; G: male adult, posterior part of body. Scales indicate 10  $\mu$ m.

9.2–13.4 ( $10.9 \pm 1.0$ ),  $c' = 2.9–3.9$  ( $3.4 \pm 0.3$ ),  $T = 29.4–53.6$  ( $44.4 \pm 4.9$ ), excretory pore to anterior end of body =  $63.3–90.7 \mu\text{m}$  ( $79.0 \pm 6.0$ ),  $do./L = 14.3–17.9\%$  ( $16.3 \pm 1.0$ ), stylet =  $11.3–12.7 \mu\text{m}$  ( $11.7 \pm 0.4$ ), prorhabdion =  $6.7–7.7 \mu\text{m}$  ( $7.2 \pm 0.3$ ), stylet knob height =  $1.0–1.3 \mu\text{m}$  ( $1.2 \pm 0.1$ ),  $do.$  width =  $3.0–3.3 \mu\text{m}$  ( $3.1 \pm 0.1$ ), spicules =  $20.7–26.7 \mu\text{m}$  ( $22.9 \pm 1.8$ ), gubernaculum =  $6.3–8.0 \mu\text{m}$  ( $7.3 \pm 0.5$ ).

DESCRIPTION (mainly based on Kumamoto population). *Female*: Body arcuate after treatment by gentle heat; body annules fine,  $0.7–1.2 \mu\text{m}$  ( $1.0 \pm 0.1$ ) apart around midbody; lateral fields without distinctive lateral incisures, but having inconspicuous striae irregularly arranged in length and intervals from the anterior to tail region. Six incisures observed in one specimen from Nagano. Lip region dome-like, slightly offset from the body contour,  $3.3–5.0 \mu\text{m}$  ( $4.4 \pm 0.4$ ) high and  $8.0–9.0 \mu\text{m}$  ( $8.3 \pm 0.3$ ) wide at base, with five to seven, rarely eight annules, and anterior ones interrupted by radial grooves by SEM observation. Stylet short; prorhabdion non-tubular and needle-like for slightly longer than the half stylet length; basal knobs rounded posteriorly. Stylet protractor muscle attached to labial framework. Orifice of dorsal esophageal gland  $1–2 \mu\text{m}$  behind stylet base. Median esophageal bulb oval, basal bulb saccate. Hemizonid about three annules long, around the level of base of isthmus to opposite middle of basal bulb. Deirid at the level of hemizonid; excretory pore usually immediately behind or one to four annules posterior to hemizonid. Esophageal-intestinal bulb of a moderate size; intestinal canal distinctive. Ovaries outstretched; anterior one slightly longer than posterior ovary; spermatheca two lobes, with sperms. Vulva transverse, with inconspicuous epitygma. Intestine may be partially overlapped by rectum but a postanal intestinal sac absent. Tail straight to arcuate, elongated conoid; terminus abruptly narrowed to form a process or mucro which may be sharply pointed or finely rounded;  $2.3–4.4$  times anal body width long and with  $42–79$  annules ( $58 \pm 7.8$ ). Phasmids distinct, usually at the anterior to middle of tail.

*Male*: Similar to female adult, but body slightly smaller. Lip region subspherical, with five to seven annules. Stylet shorter than female's; dorsal esophageal gland orifice at  $1.0–2.0 \mu\text{m}$  ( $1.6 \pm 0.3$ ) from the stylet base. Hemizonid three to four annules long, at base of isthmus or opposite to basal bulb. Excretory pore at naught to four annules posterior to hemizonid; deirids at the same level of hemizonid. Testis single, outstretched; sperms small, rounded. Spicules arcuate with tip notched; gubernaculum crescent, simple. Bursa arising from one spicule length in front of cloaca and completely enveloping tail. Phasmids mostly at anterior half of tail, extending into bursa. Hypoptygma small. Tail terminus roundly pointed.

TYPE SPECIMENS. Holotype female and paratypes are on the deposit in the Herbarium and Insect Museum of the National Institute of Agro-Environmental Sciences (NIAES), Yatabe, Ibaraki Prefecture. Some paratypes will be sent to the following institutes: USDA Nematode Collection, Beltsville, Maryland, USA.; University of California Nematode Survey Collection, Davis, California, USA.; Rothamsted Experimental Station, Harpenden, Herts, England; Nematology Department, Landbouwhogeschool, Wageningen, The Netherlands; Laboratoria voor Morfologie en Systematiek, Rijksuniversiteit, Ghent, Belgium; and Laboratoire des Vers, Museum National d'Histoire Naturelle, Paris, France.

TYPE HABITAT AND LOCALITY. Soil around the root of cogon grass, *Imperata cylindrica* (L.) P. BEAUV. var *Koenigii* (RITZ.) DURAND et SCHINZ in the Kyushu National Agricultural Experiment Station, Nishigoshi, Kumamoto Prefecture, Japan. This species was also collected from the soil sample in the apple orchard, the type locality of *Meloidogyne mali* ITOH, *et al.*, 1969. in Toyono, Nagano Prefecture.

DIAGNOSIS AND RELATIONSHIPS. *Merlinius acuminatus* n. sp. is characterized by the irregularly interrupted lateral incisures, and bluntly pointed and annulated tail terminus. The latter character was considered to be a principle morphology of the genus *Tetylenchus* FILIPJEV, 1936, however, SHER (1973) revised this genus and treated it *genus dubia* because the type species, *T. tenuis* (MICOLETZKY, 1922), was inadequately described and never found again. He transferred the species of *Tetylenchus* to *Leipotylenchus*, *Triversus* and *Merlinius*. Although in the genus *Merlinius* SIDDIQI, 1970, some species, such as *M. joctus* (THORNE, 1949), *M. productus* (THORNE, 1949), *M. microdorus* (GERAERT, 1966), *etc.*, have bluntly pointed and annulated tail terminus, *M. acuminatus* n. sp. can be distinguished from them by the irregularly interrupted lateral incisures. This characteristic was reported in *M. circellus* ANDERSON & EBSARY, 1982 in this genus, but the present new species differs from it in the five to eight labial annules instead of three. The radial grooves of labial annules which characterize *Merlinius* (POWER, BALDWIN & BELL, 1983; SIDDIQI, 1979) were observed by SEM, but hardly seen by an optical microscope in this species. Two populations of this new species were obtained from different localities and habitats. The population from Nagano has shorter body and stylet compared with Kumamoto population, but other measurements and dimensions correspond with each other.

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## 摘 要

熊本県菊池郡西合志町の九州農業試験場(熊本)のチガヤ根辺、および長野県上水内郡豊野町のリンゴ園土壌から検出したイシユクセンチュウ科の線虫を、*Merlinius acuminatus* (新種)として記載した。本種は尾部が尖ることから、*M. joctus* および *M. processus* に似るが、それらとは口針が短く、また側線が不連続であることから区別できる。そのような形態の側線を持つと報告されている *M. circellus* とは、体長が短い・尾部がより太い等の違いが認められた。