

Ditylenchus acris (Thorne, 1941) Fortuner and Maggenti 1987, A New Strawberry Nematode in Korea

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Ditylenchus acris was isolated from diseased strawberry plants. Frequently, *D. acris* and *Aphelenchoides fragariae* occur together in a strawberry plant. Both species appeared very similar in the shape, length, swimming behavior and causing symptoms, and difficult to distinguish them by a stereomicroscope. But they were easily distinguished under a compound microscope especially by their tail shape, median bulb, vulva position, and bursa.

Keywords : bud and leaf nematodes, clover stem nematode, *Fragaria × ananassa*, identification, morphology, new record

During the studies of bud and leaf nematodes, *Aphelenchoides fragariae* in strawberry, we found *Ditylenchus acris*, from Goryeong, Gyeongbuk in 2003. *D. acris* (Thorne, 1941) Fortuner and Maggenti, 1987 was first described by Thorne in 1941 as *Nothotylenchus acris* (Thorne, 1941). He found the nematode from soil around alfalfa crowns, red clover roots, and sugar beets in USA. Nishizawa and Iyatomi (1955) found this species infesting strawberry plants in a nursery of the Shizyoka Agricultural Experimental Station, Japan. The nematode inhabits the axils and leaflets, with the highest populations in the centers of the buds, where they apparently feed ectoparasitically on the plant tissues (Thorne, 1961).

In 1987, Fortuner and Maggenti transferred *N. acris* Thorne, 1941 to *Ditylenchus acris*. But Brzeski (1991) left this species as inquirendae; He could not differentiate this species from other related forms because of insufficient informations on stylet and spicule length. Here, we followed Fortuner and Maggenti's classification scheme.

In Korea, the species was first reported as *N. acris* (Park, 1963). But the report did not include the species description, information on host plant, and the specimen keeping record. Therefore, in our opinion, this is the first description of the species in Korea as well as a confirmation of strawberry as a host.

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Materials and Methods

Nematodes were isolated from diseased strawberry plants. Plants were cut ca. 0.5 cm size and placed in water in a beaker for overnight. Extracted nematodes were fixed with hot F:G 4-1, transferred to glycerin by Seinhorst's rapid glycerin method (1959), and permanently mounted using paraffin ring method for examination with light microscopy. All measurements not otherwise noted are in μm .

Description

Ditylenchus acris. (Thorne, 1941) Fortuner and Maggenti, 1987 = *Nothotylenchus acris* Thorne, 1941.

Measurements:

Female. n=10. L=800(731.0-858.8) μm ; a=45.4(41.2-53.1); b=6.6(5.1-7.8); C=14.9(13.7-17.8); C'=4.4(3.5-5.2); V= 80.9(79-82); Oesophagus length=122.1(102.9-147.8) μm ; Stylet=7.0(5.6-9.8) μm ; Head to hemizonid=95.3(91.7-101.5) μm ; Body wide=17.7(15.3-20.4) μm ; Posterior uterine branch=37.4(28.7-47.6) μm ; Tail length=59.1(44.1-93.2) μm ; Excretory pore=99.4(96.6-103.6) μm ; G1=32.7(21.3-44).

Male. n=10. L=723.8(678.3-775.2) μm ; a=48.9(43.1-55.3); b=6.4(5.7-7.6); C=15.1(14.1-16.1); C'=4.6(3.9-5.2); Stylet=7.0(5.6-9.8) μm ; Oesophagus length=112.8(99.4-120.4) μm ; Spicule=16.6(12.6-19.6) μm ; Gubernaculum=5.5(4.2-6.3) μm ; Excretory pore=93.1(85.4-95.9) μm ; Body wide=14.8(14.0-16.1) μm ; Tail length=48.2(44.1-52.5) μm ; Head to hemizonid=89.4(82.6-93.1) μm .

Female lip region not offset. Corpus of oesophagus with a small, fusiform, valveless median bulb. Isthmus slender. Basal bulb not overlap intestine. Tail conoid with pointed terminus. Lateral field marked by four incisures. Stylet slender with stylet knobs. Ovary outstretched, the oocytes arranged in a single file. Post-uterine sac two to three times as long as body diameter.

Male similar to female in shape. Spicule and gubernaculum Tylenchoid. Bursa finely crenate, rising, about opposite anterior end of spicula and extending slightly past middle of tail.

Locality and habitat: The nematodes were collected on

Table 1. Differential characters of *Ditylenchus acris* and *Aphelenchoides fragariae*

| Characters | <i>D. acris</i> | <i>A. fragariae</i> | Fig. |
|----------------|-----------------|--------------------------|--------|
| Head shape | not offset | not offset | |
| Stylet | weak | weak | |
| Body length | 0.72-0.83 mm | 0.73 mm | |
| Body thickness | a=45-49 | a=45-51 | |
| Body shape | slender | slender | |
| Swimming | well | well | |
| Tail tip | Acute | Acute | |
| Tail shape | ♀, ♂ = straight | ♀ = straight; ♂ = curved | 1C, 3D |
| Median bulb | small, fusiform | large, prominent | 2 |
| Vulva position | 81% | 67% | 3A, B |
| Bulsa | present | absent | 3C, D |

Bold types are distinguishable characters of two species.

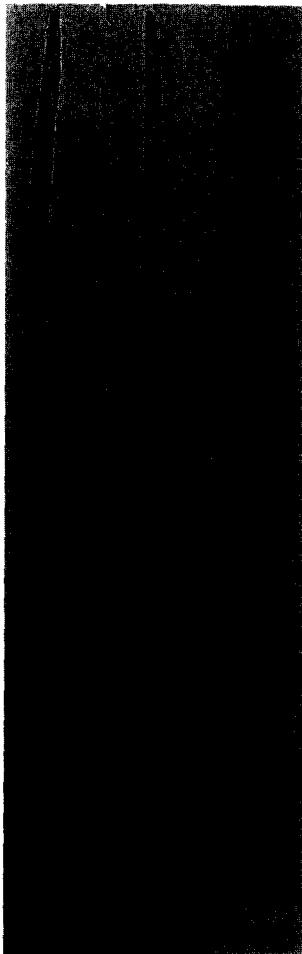


Fig. 1. Body shapes of *Ditylenchus acris* and *Aphelenchoides fragariae*; **A**, *D. acris* male, **B**, *A. fragariae* female, and **C**, *A. fragariae* male (curved tail).

December 10, 2003 from strawberry plants (*Fragaria × ananassa* Duch. cv. 'Redpearl') from Deoggog, Goryeong, Gyeongbuk, Korea. Strawberry plants frequently contained

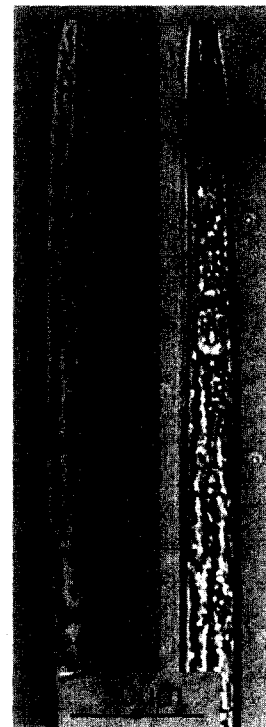


Fig. 2. Anterior portion of *Ditylenchus acris* (**A**, small, fusiform) and *Aphelenchoides fragariae* (**B**, large, prominent) showing the median bulb (arrows).

both *Aphelenchoides fragariae* and *Ditylenchus acris*. *A. fragariae* and *D. acris* appeared very similar in the shape, length, swimming behavior, and plant symptoms, and difficult to distinguish them by a stereomicroscope. But the two species were easily distinguished under a compound microscope by their tail shape, median bulb, vulva position, and bulsa (Table 1, Figs. 1-3).

Symptoms: They live as ectoparasites in buds and leaflets of the growing point. Occasionally nematodes are found within leaf tissues. Infestation resulted in stunted plants

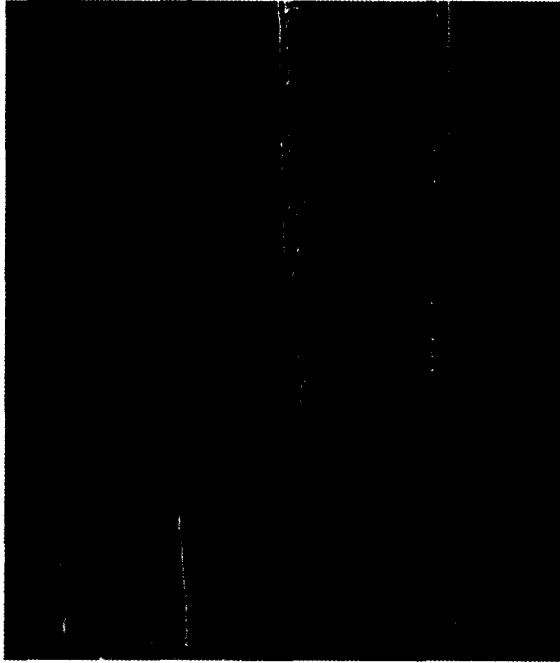


Fig. 3. Posterior portion of *Ditylenchus acris* (A, C) and *Aphelenchoides fragariae* (B, D). A, B, Female (arrow = vulva). C, D, Male (arrow = spicule).

with deformed stems, crinkled leaves (Fig. 5), malformed flowers and fruits. By the symptom, strawberry plants infested with *A. fragariae* likely showed red coloration in their foliage while those infested with *D. acris* showed tip burn on the young leaves (Fig. 4). It is now known that strawberry plants are infested by both *A. fragariae* and *D. acris*.

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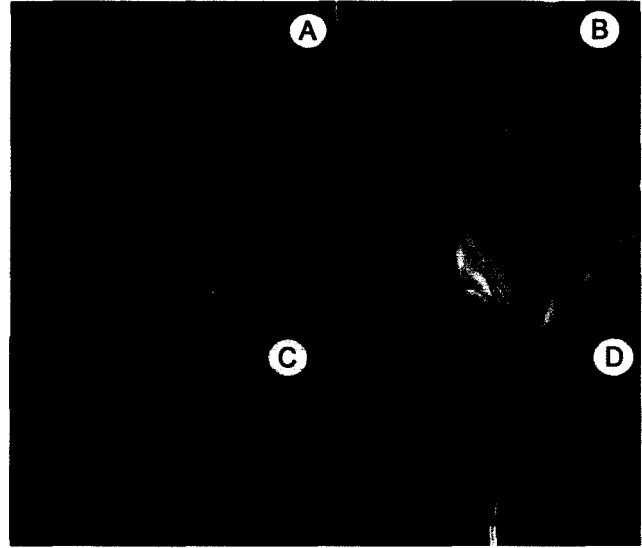


Fig. 4. Strawberry plant infested by *Ditylenchus acris* (A and C, tip burn of leaves) and *Aphelenchoides fragariae* (B and D, red coloration and malformation of leaves).

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