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Ruscus hypophyllum: A New Host for *Aphelenchoides fragariae*

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Abstract: Aphelenchoides fragariae was isolated from the phylloclades of the ornamental plant *Ruscus hypophyllum* (Liliaceae). *Rotylenchus buxophilus, Scutellonema brachyurum,* and *Meloidogyne* were identified as the most common plant-parasitic nematodes in the soil near the roots. The pathology and life history of *A. fragariae* were closely related to the climate. To our knowledge, this is the first report of *R. hypophyllum* as a host of plant-parasitic nematodes.

Key words: Aphelenchoides fragariae, Meloidogyne spp., nematode, *Rotylenchus buxophilus, Ruscus hypophyllum, Scutellonema brachyurum.*

Ruscus hypophyllum (Liliaceae) is a very important ornamental grown commercially in screenhouses in Israel. Recently, a severe dry necrosis of *R. hypophyllum* phylloclades appeared, causing severe economic damage to growers. Symptoms began with chlorotic patches, which turned to purple and then ended with necrosis of entire phylloclades (Fig. 1). Treatment of the above- and below-ground parts of the plant with fungicides did not prevent symptom development.

MATERIALS AND METHODS

Initially, nematodes were extracted from symptom-bearing phylloclades and from soil around the roots; nematodes were identified with the assistance of Drs. D. Sturhan, S. Lewis, and R. Robbins. Field surveys were undertaken in four commercial screenhouses in Israel during the winter (December–February), spring (March–May), summer (June–September) and autumn (October–November) by soil sampling at a depth of 10–30 cm in a random pattern. After treatment for 3 minutes in 2% sodium hypochlorite, phylloclades were carefully washed and stained with 0.005% acid fuchsin in lactic acid:glycerin:distilled water (1/3/3) and were then incubated at 50 C for 4 days. This procedure clarified the phylloclades and enabled observation of nematodes within the mesophyll.

The effect of phylloclade age on pathogenicity was determined. Each of five old and five young phylloclades on the same uninfected plant was enveloped with Parafilm (American National Can, Greenwich, CT) and labeled, and an aqueous suspension of ca. 10,000 nematodes was inserted into the space between the Parafilm cover and the phylloclade. Uninfected controls on the same plant were five young and five old phylloclades identically treated, except water was used instead of the nematode suspension. Ten plants were tested. Seven days later, the covers were removed and symptoms were recorded for 4 weeks.

To study the effect of temperature on *A. fragariae* pathogenicity, infected plants were transplanted into 20-liter containers filled with a sandy soil (88% sand, 6% silt, 6% clay; pH 8.1–8.3) devoided of any plant-parasitic nematodes by autoclaving twice. The containers were kept at 10, 18, or 26 C and arranged in a randomized block design with four replicates per treatment.

RESULTS AND DISCUSSION

The only nematode species identified in the phylloclades was *Aphelenchoides fraga-*

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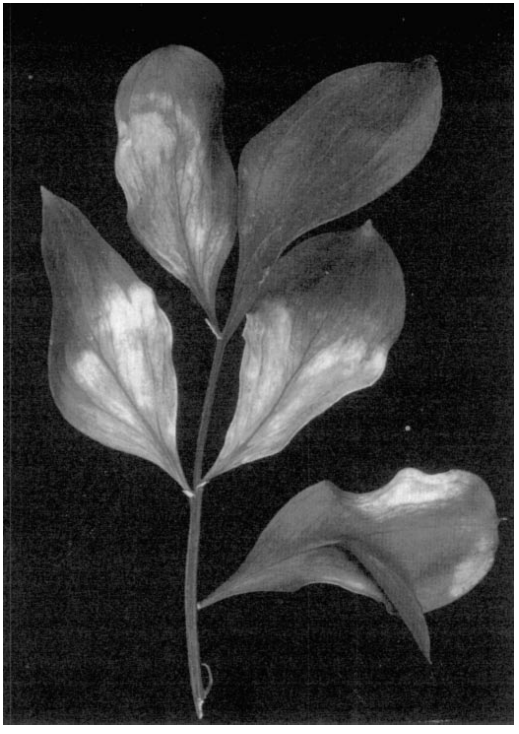

FIG. 1. Symptoms induced by *Aphelenchoides fragariae* on *Ruscus hypophyllum* phylloclades.

riae (Ritzema Bos, 1891) Christie, 1932. *Rotylenchus buxophilus* Golden, 1956 and *Scutellonema brachyurum* (Steiner, 1938) Andrássy, 1958 (mean of 950 and 350 specimens, respectively, per 200 g soil), as well as *Meloidogyne* spp., were the most common phytoparasitic nematodes in the soil. *Meloidogyne* life stages (juveniles, young females, and adult females with egg masses) were observed inside the roots; the heads of several *R. buxophilus* were also within the roots. Moreover, 6 months after inoculation of healthy plants with *S. brachyurum* or *R. buxophilus* (ca. 2,000 nematodes per pot), the numbers of vermiform nematodes in soil increased by ca. 30%.

Inoculations of healthy plants with ca. 10,000 *A. fragariae* extracted from symptom-bearing phylloclades caused the described symptoms (Fig. 1) and thus confirmed that this species is the main pathogen causing this damage to *Ruscus* plants. The pathology and life history of *A. fragariae* were closely related to climate. As rainfall began in November, resulting in coverage of the phylloclade surface with a thin film of water, nematodes were observed to penetrate through stomata and reproduce within the phylloclades, as indicated by egg formation. The nematodes became more active through December and early January than in November, as temperatures decreased to 10–15 C and humidity increased. Chlorotic patches began to appear between the phylloclade veins and *A. fragariae* numbers peaked in late March to early April, when ca. 20,000 nematodes per phylloclade were counted. After mid-April, the chlorotic patches turned purple, followed by the shoot tissue becoming necrotic. Nematode movement slowed during June through August, and *A. fragariae* populations decreased until the following autumn. In the controlled temperature experiment, the optimal temperature for *A. fragariae* multiplication was 18 C, at which chlorotic symptoms between the phylloclade veins first appeared 40 days after the removal of the Parafilm. Symptoms appeared at the same speed and intensity in both old and young phylloclades.

Aphelenchoides fragariae (=*A. olesistus*), a bud and leaf nematode, is a major pest of strawberries and ferns and occurs in many countries (1). To our knowledge, this is the first report of *Ruscus hypophyllum* as a host of *A. fragariae* or other plant-parasitic nematodes.

LITERATURE CITED

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