



Fig. (a) *Pratylenchus coffeae* at various juvenile and adult stages in water; (b) lesion on carrot used for culturing (black arrow); (c) Egg at the early tadpole stage under differential phase contrast and, (d) same egg stained with propidium iodide respectively. Scale bar in (a) represents 200 μ m.

Common Name: Root lesion nematode (RLN)

Disease: Root lesion

Classification: K: Animalia P: Nematoda C: Secernentea O: Tylenchida F: Pratylenchidae

P. coffeae is a migratory endoparasite of the root cortex and corm of *Musa* species (e.g. bananas and plantains). This species is an issue in banana growing regions of Northern Queensland, where banana farm production was valued at \$600 million in 2016/17 and the industry contributed \$1.3 billion to the national economy. It also infects coffee roots and is a major pest in many coffee growing countries such as Vietnam and Indonesia. Vietnam produced 1 770 000 t in 2017 and one of the biggest *Coffea canephora* (Robusta coffee) producers for 2017–2018.

Biology and Ecology:

P. coffeae is a bisexual species that reproduces by obligatory amphimixis, so males are common. They range from 0.46–0.70 mm in body length and stylets are approx. 15–18 μ m long. Both sexes and all juvenile stages are invasive. As an obligate parasite, it needs to exploit a host for its reproduction to complete its lifecycle. Studies in potato tubers showed that *P. coffeae* had an average lifespan of 27 days (at 25°–30°C). It infects roots, tubers, corms and rhizomes of their host plants. They feed on the plant root cortical tissues forming dark brown necrotic lesions. Temperature, soil moisture and plant root debris are factors that contribute to their survival in soil. *P. coffeae* can persist in soil up to 9 months after the removal of infected coffee plants. In coffee, plants symptoms are decreased root system mass, stunting and chlorosis/defoliation in the upper plant. In banana, plantains and *Musa* species, it causes similar symptoms to *Radopholus similis* i.e. from stunting to toppling.

Impact:

In the Pacific islands, *P. coffeae* is the principal causal organism of dry rot in yams. Other crops that have been impacted by *P. coffeae* in the Pacific islands are taro, banana and plantains. This is important due to the banana lines grown in Papua New Guinea, the Solomon Islands and Vanuatu (*Musa* genome AA, AAA, AAB and Fe'i group of the Australimusa section). *P. coffeae* was found in one potato growing field in NSW and in sugarcane fields in Burdekin (North Qld).

Distribution:

It is thought that *P. coffeae* originated in the Pacific Rim/Southeast Asia region but it is now distributed primarily in tropical and subtropical regions worldwide.

Host Range:

The host range of *P. coffeae* includes more than 250 plant species. These include anthuriums and other tropical ornamentals, strawberry, citrus, sugarcane and some gramineous weeds such as *Cynodon dactylon* (couch grass) and *Setaria verticillata* (L.) P. Beauv. (bristle pigeon grass).

Management options:

Crop rotation, fallowing and planting with healthy materials are recommended.

For bananas, corms are immersed in hot water at 55°C for 20 minutes or in non-volatile Nematicur/Mocap solutions. The use of partial resistant cultivars or tolerant lines are recommended.

For coffee, the replacement of old plants takes at least five years for seedlings to develop and produce beans. In Vietnam, farmers remove infected plants and replant with leguminous crops for 1-2 years. Root debris are thoroughly removed from the soil. Nematicide application e.g. Benfuracarb or agro-chemicals recognized by the government are recommended. *C. canephora* is tolerant to *P. coffeae* compared to *C. arabica* (Arabica coffee). Breeding programs in Vietnam involve generating specific clones of *Coffea* spp. resistant to *P. coffeae*.

Further Reading: Bridge (1988) J Nematol. 20(2):173-183; Blair et al. (1999) " Proceedings of the 1999 Conference of the Australian Society of Sugar Cane Technologists, Townsville, Queensland, Australia, 27-30 April 1999.; Burke et al. (2015) Nematol. 17(6): 621- 637; EPPO (2018) EPPO Global Database (<https://gd.eppo.int/>); Grandison et al. (2009) Australas. Plant Pathol, 38, 408–410; Gotoh (1964) Jpn J Appl. Entomol. Z. 8 (1): 26-33; Harding and Wick (2007) Australas. Plant Pathol, 36, 62–67; Luc et al. (2005) Plant parasitic nematodes in subtropical and tropical agriculture. CABI Pub; Wallingford, UK; Trinh et al. (2012) Euphytica 185:233–241; International Coffee Organization (<http://www.ico.org/prices/po-production.pdf>).

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