Culturing of *Radopholus similis* Within Mesocarp of Coconut

P. K. KOSHY, Senior Scientist (Nematology), and V. K. SOSAMMA, Junior Scientist (Nematology), Nematology Laboratory, Central Plantation Crops Research Institute (CPCRI), Regional Station, Kayangulam, Krishnapuram P.O. 690 533, Kerala, India

ABSTRACT

Koshy, P. K., and Sosamma, V. K. 1982. Culturing of *Radopholus similis* within mesocarp of coconut. Plant Disease 66:811.

Culturing of the burrowing nematode *Radopholus similis* was successful within mesocarp of coconut. Parasitization by nematode caused rotting of tissues without affecting the quality or size of coconut.

Production of lesions and multiplication of *Radopholus similis* (Cobb) Thorne in coconut plumule was reported by Koshy and Sosamma (1). They later reported culturing of the coconut isolate of *R. similis* on carrot disks (2). Although the coconut isolate of *R. similis* population was found to retain infectivity on coconut (*Cocos nucifera* L.) even after continuous culturing on carrot disks, it is desirable to culture the nematode on coconut tissue itself. Results of an attempt made in this direction are reported herein.

MATERIALS AND METHODS

Dwarf Orange (DO) and West Coast Tall (WCT) coconut palms growing on a CPCRI farm and supporting 4-mo-old bunches 1–2 m above the ground were selected for study. An aseptic nematode suspension was collected by adding 20 ml of sterile water to a 45-day-old carrot disk culture, shaking, recovering the resulting nematode suspension, and diluting it serially to get 100 nematodes per milliliter of water. In November 1980, 1 ml of this suspension was injected into the mesocarp (husk) of 40 immature nuts in the bunches, 2.5 cm below the perianth, using a sterile, 5-ml, glass hypodermic syringe with a 2.5-cm-long needle (no. 20). An equal number of immature nuts on the same bunches received 1 ml of sterile water and served as controls.

After 150 days, 10 nematode-inoculated nuts and 10 nuts injected with sterile water were removed from the bunches of DO and WCT palms. The samples of the mesocarp were cut out with a sharp chisel and shredded in water at 10–15 C in a watch glass to detect nematodes. Nematode counts resulting from examination of shredded, discolored mesocarp in water were compared with counts obtained by examining stained (3) mesocarp tissue and by counting nematodes in tissue processed in a blender.

During 5 mo of observations, the average weekly meteorologic data included temperatures of 21–35 C, humidity of 50–95%, sunshine for 4–10.6 hr, and total rainfall of 0.4–193 mm.

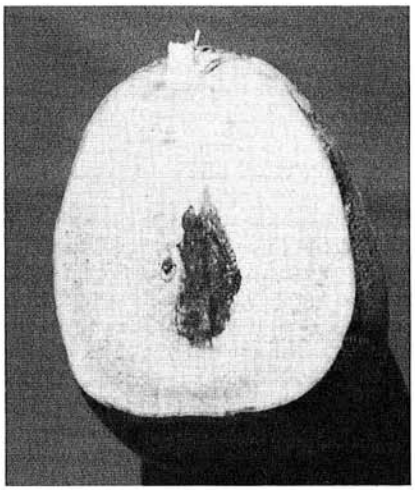

Fig. 1. Infected coconut showing discolored mesocarp.

RESULTS AND DISCUSSION

Nematode-inoculated nuts exhibited a 1-mm needle opening throughout the period, with an equally wide, grayish, dead tissue border that was surrounded by a reddish brown ring. There was also a slight depression of the husk surrounding the needle opening. On removal of epicarp, discoloration of tissue was noticeable. The size of the lesions increased with depth from the epicarp and along the long axis corresponding to the growth of the nut. Rotting and browning of the tissues were more intense in the center; the peripheries were zoned in different shades of brown, orange, and yellow, gradually merging with the color of the husk (Fig. 1). In DO, the browning was a shade deeper than in WCT. Lesions were 5–10 cm long and 2–5 cm wide.

There was discoloration and slight reduction in thickness of the endocarp (shell) below the discolored mesocarp, but there was no difference in color or taste of the kernel below this area or of the water inside.

There was no discoloration of husk or shell of nuts injected with sterile water. The needle opening was seen from the epicarp to the point of introduction, which was surrounded by a few dead, blackened cells centered within a hardened, corky pith 1 cm in diameter.

The affected mesocarp on teasing in water yielded large populations of active nematodes (all stages) from the pith but not from the fibers. The counts of nematodes recovered by extraction at 10–15 C as well as by staining and blending ranged in DO from 86 to 17,550 per nut with an average of 2,589; in WCT, the counts ranged from 1 to 24,966 per nut, with an average of 4,403. The quality and size of the nut were not affected. The affected mesocarp was cultured for other microorganisms associated with it, but no fungi or bacteria were recorded.

One point of inoculation spreads only to 2–5 cm in width, which allows two to three inoculations to be done on the three sides of the same nut. This method can be used for quick varietal screening of coconut.

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