

Comparative effects, nitrogen, phosphorus, potassium, *Radopholus similis*, infection, East African, Highland, Banana, plants, rhizosphere, biota

Abstract

Root parasitism by *Radopholus similis* may vary under different nutritional conditions and soil substrates. Such variations in nematode infection may affect deductions from evaluations of pest control measures. Three parallel factorial experiments (nutrients × soil sterility × nematode) were conducted to investigate the effects of N-P-K and soil biota on *similis* infection and banana plant growth. Chlorophyll content was lower in plants receiving N-deficient solution or water only, especially in non-sterile soil. Plants were larger in non-sterile than in sterile soil; but smaller when receiving N-deficient solution or water only. Compared to complete nutrient solution (CNS), *R. similis* density was higher and root death lower in plants receiving N-deficient solution or water, but not different when P-deficient and K-deficient solutions were applied. Compared to CNS, root necrosis was higher in P-deficient and lower in K-deficient plants, but not different in plants treated with N-deficient solution or water only. Root damage and *R. similis* density were lower in non-sterile than in sterile soil. Plants inoculated with *R. similis* were larger and appeared greener with tendency to have higher leaf concentrations of N, P, K, Ca, Mg and Zn, than those without the nematode inoculant when treated with N-deficient solution. Deficiency in N, P or K was associated with reduced root colonization by native *Fusarium*, but was enhanced by *R. similis* under N-deficiency. Optical density of root extracts was lower in *R. similis*-inoculated banana plants when grown in sterile soil, but was higher in the nematode-inoculated banana plants in non-sterile soil. It is concluded that, the multiplication of *R. similis* in banana roots and its associated root damage and plant growth suppressive activities can vary due to plant N-P-K nutrition and the presence of rhizosphere biota, with the nematode pest even being potentially beneficial to banana plants, especially those growing under nitrogen-limited conditions.

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