Controlling plant-parasitic nematodes in sandy soil in the Senegal River Valley using composts based on potentially nematicidal plants

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ABSTRACT

Objective: This study in the Senegal River Basin evaluated the effect of three types of compost, made from manure combined with straw, Calotropis procera (Sodom Apple) or Crotalaria juncea (Indian Hemp), on plant-parasitic as well as free-living nematodes and on the growth of tomato plants.

Methodology and results: This study was performed in a greenhouse where a Mongal tomato was grown during 3 months in a soil that had been abandoned due to infestation by nematodes. The treatments were composts of straw, Calotropis procera Crotalaria juncea and control without compost. The soils amended with compost had significantly higher nematode abundances than the unamended. The compost with Crotalaria juncea gave the highest abundance. The soils with compost also had a much lower proportion of plant-parasitic nematodes than the control soil and much higher proportion of bacterivorous nematodes. The height of the plants was positively correlated with the proportion of bacterivorous nematodes and negatively correlated with the proportion of plant-parasitic nematodes.

Conclusions and application of the results: The influence on the soil nematode community of compost materials is associated more with their phenol content than the total organic carbon. The Calotropis procera and Crotalaria juncea encourage the growth of the bacterivorous nematode community, which plays an important role in maintaining soil fertility, and the growth of omnivorous and predatory nematodes while limiting the growth of the plant-parasitic nematode community. The results suggested that the compost with Crotalaria juncea seems to be worthwhile pursuing as it maintained the equilibrium between nematode feeding guilds while suppressing plant-parasitic nematodes.

Keywords: Compost, Crotalaria, Calotropis, Straw, Nematode, sandy soil.