TERMITES AND PLANT PARASITIC NEMATODES IN SUGARCANE IN KWAZULU-NATAL

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In the South African sugar industry, the occurrence of circular patches of exceptionally well-grown sugarcane is a common feature of sandy soils. Most of these patches correspond to termite mounds levelled by the ploughing of the field before planting. These mounds and the associated better grown cane are known locally as 'isiduli'. The soil of the mound contains more clay than the surrounding area – a consequence of the activity of the termite *Macrotermes natalensis,* that bring clay particles up from the deeper soil layers, and mix them with saliva to build their underground galleries and the walls of the nest. To study the influence that the termites have on the physical, chemical and biological properties of the soil, root and soil samples were collected at two depths every 70 cm along a 21 m transect along a sugarcane row which passed through an isiduli. The isiduli was situated in a ratoon field of NCo376 on the La Mercy Farm on the North Coast of KwaZulu-Natal. Physical and chemical analyses were conducted on the soil from each sampling point. Also, from each sample the numbers of each of the plant feeding nematode genera in the soil and roots of cane were determined and bacterial activities were characterised with the 'Biolog' test. The number, height, weight and sucrose content of the stalks at the various points along the transect were recorded. In addition, chemical analyses were performed on leaf samples collected from each sampling point. The number of internodes damaged by the sugarcane stalk borer, *Eldana saccharina,* was also estimated.

The greater stalk length defines the extent of the isiduli (Figure 1). Cane yield was 6 times greater on the isiduli than that elsewhere along the transect, corresponding to 89 and 15 t cane/ha, respectively, at the time of sampling. *Meloidogyne* was absent and *Xiphinema* less abundant in the isiduli, which paradoxically hosted a greater total number of plant feeding nematodes than the neighbouring area. *Helicotylenchus*, *Pratylenchus* and *Paratrichodorus* were more numerous within the isiduli than elsewhere along the transect. The contrasting nematode communities closely matched the limits of the isiduli – as defined by the vegetative parameters. The levels of the different soil elements in the topsoil (0-30 cm) were always higher within the isiduli. However, the extent of the isiduli, when defined by the greater concentrations of soil elements, did not correspond very well with the limits determined by the vegetative parameters. A better correspondence was observed with the soil characteristics of the deeper (30-60 cm) soil layer, but this was not as good as that achieved with the nematode analysis. The bacterial activity gave the poorest discrimination of the extent of the isiduli. High bacterial activity was observed in samples collected both inside and outside the isiduli. Eldana infestation was slightly higher within the isiduli.

Although the termites modified the physical and chemical properties of the soil in a way favourable for sustainable sugarcane growth, the observed effect did not seem to result only from these changes. Biological factors also played a role. As far as plant-feeding nematodes are concerned, the isiduli was not associated with fewer individuals, as might have been expected. On the contrary, it promoted the numbers of one of the species in particular, *viz*, *Helicotylenchus dihystera*. This species has already been found associated with better sugarcane growth in other fields where isiduli were absent.

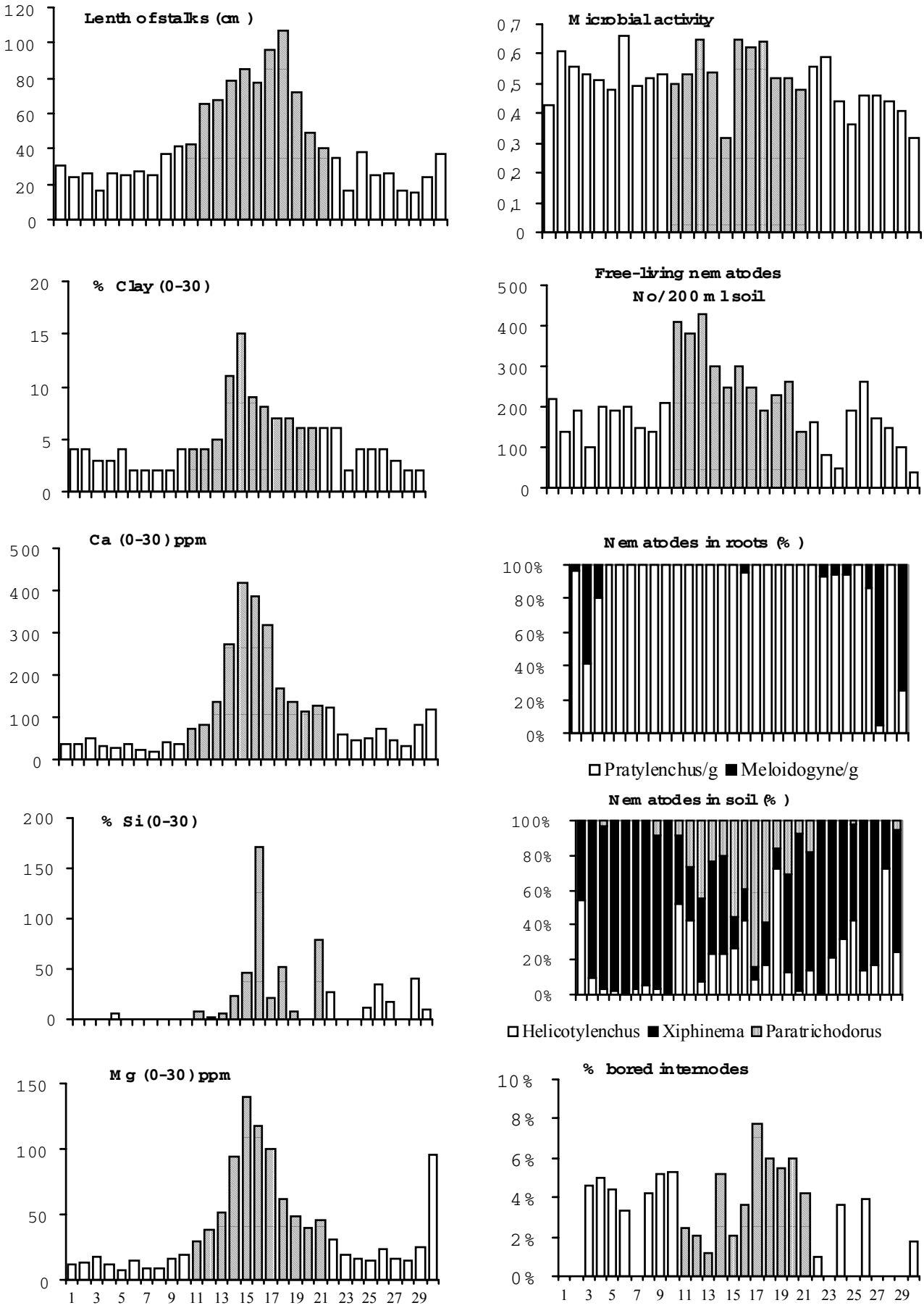

Figure 1. Change in physical, chemical and biological factors along the transect. The isiduli is located between sample 10 and 21 according to the plant characteristics.