THE DISTRIBUTION AND ABUNDANCE OF NEMATODES (especially the Plant Parasites) IN THE ARID REGION OF SOUTH AUSTRALIA.

by

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SUMMARY

The composition of the plant parasitic nematode community in the arid region of South Australia was determined from a general field survey. Most species of plant parasitic nematodes identified had been described from other areas of Australia, but rarely outside Australia, indicating that they are probably endemic. Some new species, but no new genera, were found and the plant nematodes found were mainly migratory ectoparasites.

A system of classifying each site in relation to vegetation and landform characters was developed from existing systems, thereby enabling analysis to be made of relationships between particular site characteristics and the frequency of occurrence of particular plant parasitic nematodes. *Tylenchorhynchus tobari* was the most abundant and widely distributed plant nematode within the arid region of South Australia and an association was found between the distribution of *Atriplex vesicaria* and the nematode. *T. tobari* was successfully cultured on selected species of *Atriplex* (salt bush) and the biology and host/parasite relationships of the nematode were investigated. *T. tobari* had little or no effect on the growth of an ephemeral saltbush (*A. spongiosa*); *A. vesicaria* was found to be an unsuitable experimental plant. The duration of the lifecycle of *T. tobari*, its feeding behaviour and embryology were similar to other *Tylenchorhynchus* species. It is suggested that the lack of damage to the host plant may be associated with the feeding behaviour of *T. tobari*.

The association between nematode trophic groups and plant species was also investigated, with the sampling of particular areas of similar or different vegetation/landform formations. Particular plant parasitic nematodes (other than *T. tobari*) were found to be associated with specific vegetation/landform formations and host plants. The bacterial feeders were the most abundant trophic group in the arid region of S.A., with the other trophic groups occurring in differing proportions, depending on the site sampled. Survival of nematodes over time was also investigated. The method of survival of nematodes appeared to be associated with coiling. When soil was sampled during a 'dry' period, the total numbers of nematodes were low, as was the proportion of straight to coiled nematodes. When moist soil was sampled, the proportion of straight to coiled nematodes increased, with a corresponding increase in the total number of nematodes.
This study indicated that the structure of the nematode community in the arid region of S.A. is similar to that in other arid or desert regions. This study concentrated on determining associations and distribution patterns between plant nematodes, other trophic groups and host plants. A discussion of the influence of soil nematodes on the ecology of arid regions is presented in the concluding chapter, as well as some views on possible dispersal mechanisms and the evolution of particular plant parasitic nematodes.