Chapter 10

Management strategies of *Pratylenchus* species

The loss of many nematicides from the market due to environmental concerns and the cost of re-registration have focused attention on the development of alternative methods for managing plant-parasitic nematodes, including *Pratylenchus* spp. The impending complete loss of methyl bromide from the market has increased the urgency to develop such strategies for susceptible fruit and vegetable crops. Crop rotation, host plant resistance, cover crops, irrigation management, fallow periods, soil amendments and other cultural practices can all be used to minimise damage caused by *Pratylenchus* spp. Currently, most nematode management programmes focus on tactics involving the reduction of the initial nematode population density and/or the suppression of their reproduction during the growing season. Most nematode management tactics also have the inherent feature of limiting damage associated with the target crop. The purpose of this chapter is to summarise the management strategies used to reduce soil populations of *Pratylenchus* spp., including strategies for avoiding dispersion of *Pratylenchus* spp. in propagating material, crop rotation and cultural practices, the use of organic amendments and cover crops, the use of nematicidal plants, strategies of physical control (solarisation, thermotherapy), host plant resistance, biological control (beneficial endophytic microorganisms, nematophagous fungi, entomopathogenic and predaceous nematodes, the endospore-forming bacterium *Pasteuria penetrans* (Thorne) Sayer & Starr) and chemical control.

*Pratylenchus* nematodes are difficult to control once introduced into soil and much effort is spent on prophylactic measures. The choice of management tactic to reduce *Pratylenchus* spp. damage depends upon many factors, but all require accurate diagnosis of the species and population levels of *Pratylenchus* as assessed from soil and root samples taken from any given field or plant material. Both prerequisites
of diagnosis and estimation of nematode populations are of great importance as damage thresholds may vary among *Pratylenchus* species and crops depending upon geographic location, crop value and the potential for disease complexes. Unfortunately, breeding for resistance to *Pratylenchus* species is difficult with the result that moderate resistance to *Pratylenchus* nematodes is presently limited to only a few cultivated crops (e.g., forage legumes, potato, fruit rootstocks). Rotations with non-host crops also offer limited opportunities to manage *Pratylenchus* nematode field populations since most *Pratylenchus* species have wide host ranges, including both dicots and monocots. If the species of *Pratylenchus* is accurately diagnosed and a suitable economic non-host can be grown, rotations offer some promise as a management tactic. There are suggestions that microbial antagonists of *Pratylenchus* nematodes, such as soil fungi, can reduce population levels, but this has not yet been proven to be effective in production systems. The two most effective tactics for *Pratylenchus* nematode management remain sanitation and the use of chemical nematicides. However, the best way to manage *Pratylenchus* species is to prevent their introduction into a field or plant material. Choosing an uninfested field site or choosing non-host rotation crops are two ways to circumvent problems with *Pratylenchus* species. Once *Pratylenchus* spp. infest a field or a plant material it is highly unlikely that they can be eradicated. Inoculum levels can be reduced by turning over the soil layer to expose infected roots to the elements. Planting stock should be monitored and certified free of *Pratylenchus* nematode infestation. This is especially important for seedlings of crops that will be grown perennially (e.g., fruits and ornamentals).

Thus, integrating nematode management practices involving exclusion, crop rotation and host resistance (where available), biocontrol practices and selective nematicide application may help to reduce nematicide usage and so delay the onset of loss of efficacy of chemical control agents.

**Pratylenchus** spp. in propagating plant material

Exclusion is the first control strategy to consider in *Pratylenchus* management as it is easier to deal with *Pratylenchus* nematodes before they become established in soil or plant material than it is subse-