Objectives & Rationale

Currently the most preferred method of orchard management is to plant a cover crop in the work row to improve fertility and soil structure, and reduce erosion. However, in choosing a cover crop it is important to ensure that it is not a good host for lesion nematodes, the main nematodes of economic importance on apples in South Africa. The aim of this study was to assess the susceptibility of selected cover crops to different lesion nematode species by estimating nematode reproduction on these crops.

Methods

To successfully culture the lesion nematodes, it was necessary to optimise an in vitro culturing method using carrot discs. After propagation of the cover crops, they were inoculated with lesion nematodes that were harvested from the carrot discs. After 12 weeks, the crops were evaluated for their susceptibility to lesion nematodes. To do this, the reproductive potential (Rf) of the nematodes in each crop as well as the percentage of the nematodes g-1 roots of each crop in relation to the nematodes g-1 roots of the most susceptible crop (%R) was calculated.

Key Results

Several of the cover crops screened during this study has been proven to be poor hosts for the three main lesion nematode species occurring in South African apple orchards, but some are considered good hosts of which the utilisation as cover crops should be carefully considered. If the species of lesion nematode present in an orchard is known, an informed decision can be made with regard to the choice of cover crops. Indian buckwheat is considered a moderate to good host for all 3 species of lesion nematodes, and can cause an increase in nematode numbers if planted at high density. Nasturtium is considered a moderate to good host for all 3 species of lesion nematodes and has the potential to increase nematode numbers in the orchard. Pink serradella (cv. Margarita), rye (cv. Duiker Max) and subterranean clover (Aarbei klawer) are considered good hosts for P. penetrans only and should be avoided as cover crops if P. penetrans is present in an orchard. Reproduction of P. hippeastri is minimal on most cover crops in winter, but has the potential to increase on certain crops (pink serradella, rye, Triticale, subterranean clover, medics) during spring and summer if the cover crops persist in the orchard. Pratylenchus penetrans has a wider host range and is more adapted to colder conditions than P. hippeastri or P. vulnus.

Conclusion and Discussion / Recommendation

The results of this project contributes towards a database of cover crop characteristics, which will enable growers to select the most appropriate one to use for their specific set of circumstances. The successful optimising of the carrot disc culturing method has a far-reaching effect extending to more than just this project. The availability of large numbers of lesion nematode inoculum will now enable us to take on several projects where such high numbers of inoculum is required. These include screening trials for nematode resistance and evaluation of control measures. We recommend that screening of a wider range of potential cover crops for use in apple orchards should continue as new cultivars become available. Also,

evaluations of the influence of cover crops on tree performance as related to lesion nematode numbers should be continued in field environments. Research into the utilisation of cover crops that have an allelopathic effect on plant-parasitic numbers, in addition to being poor hosts, should also be prioritised.