Farmer evaluation of biocontrol methods against root knot nematodes in tomatoes

Anni McLeod, Beth Ndungu, Daniel Karanja, Peter Karanja
c/o VEERU, The University of Reading, Reading, UK

ABSTRACT

Root-knot nematodes in tomatoes cause financial loss to Kenyan smallholders. While soil fumigation appears to be losing effectiveness two bio-control agents (bcas), *Pasteuria penetrans* and *Verticillium chlamydosporium,* appear promising. Participatory budgeting is being used to compare the bcas with chemical and other biological controls on commercial and organic smallholdings.

Keywords: tomato; root-knot nematode; participatory budget

INTRODUCTION

Tomatoes are financially important for smallholder growers in Kenya and crop loss from root knot nematode is a problem (Oruko & Ndungu, 2001). Although farmers recognise a soil borne problem exists they do not generally know of the nematode. Soil fumigation with Furadan has been used for control but an informal survey suggested that its use is declining because it is becoming less effective. Two bcas, *Pasteuria penetrans* and *Verticillium chlamydosporium,* applied in the seedbed have been found to be an effective control. However, it is hard to provide an immediate and convincing demonstration of their effect because the nematode is invisible, the bcas cannot be seen and their impact on plant growth is slow. Therefore, it was important to find an evaluation process that would encourage dialogue between farmers and researchers. Reports from other crop protection projects (e.g. Little *et al.*, 2000) suggested the value of participatory approaches and this paper reports on an on-farm participatory evaluation of biological control of root knot nematode

METHODS

A rapid appraisal identified two types of target farmer in the project areas: commercial smallholders interested in a sustainable alternative to Furadan and organic smallholders averse to the use of chemicals. One farmer group of each type chose one of their number to act as host to the trial. The group attended meetings at the trial site during preparation of the seedbed, care of seedlings and transplanting. The seedlings were planted in a randomised block design with four replicates and five treatments: soil fumigation; combined *Pasteuria* and *Verticillium;* two weeds with nematicidal properties; trash burning; and a control. Transplanting was completed in December and the groups will visit the trial sites in mid February to observe progress, and in March for the harvest.

The trial was fully explained to the farmers at the start. At each on-site group meeting activities necessary for the treatments were explained and carried out jointly by the researchers and the farmers. A flip-chart record sheet, large enough to be visible to all, was kept for each treatment, in order to record inputs made on each visit and by the caretaker farmer in between visits. Farmers dictated what should be recorded. Some volunteered to keep similar records for their own tomato crops. The records will be used to construct profiles and compare treatments, control and farmers' crops. After the harvest, the income from each crop will be estimated and enterprise profits and cash flows constructed jointly by the research team and the farmers. The farmers will make a comparative evaluation based on the financial assessments and intangible benefits and costs they have observed.

PRELIMINARY RESULTS

Taking into account the quantity and frequency of inputs, the organic group concluded that if yields were identical :

- Trash burning would rank highest because materials are easily available on farm and the labour requirement is low.
- *Verticillium/Pasteuria* would rank lower because of concern about where farmers would obtain the inputs, but was appreciated because it requires little labour.
- Fumigation would rank lowest because application needs many activities and much precision, cash outlay is high, and it is poisonous to soil.

DISCUSSION

This study is part of a project which began in consultative and contractual modes and has now moved towards a collaborative mode (see Biggs, (1989). The collaboration has been rewarding and will improve the quality of the final evaluation although the amount of time needed for rapport building and planning should not be under-estimated. Ultimately, participation was high and there was a lively discussion at each meeting. Farmers seem to appreciate the amount of information they were receiving and used the meetings as an opportunity to ask other questions about crop protection. A local extension agent has attended several sessions. We acknowledge that those who are participating are representative of well-motivated farmers but will still learn from them what will affect uptake of the bcas and how they will need to be delivered.

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