

DEMONSTRATING BIOLOGICAL APPROACHES FOR SUSTAINABLE MANAGEMENT OF TOMATO LEAFMINER IN KENYA

Locations Kenya

Dates 01/09/2019 - 30/08/2020

Summary

Since 2014, the tomato leafminer has become the most serious threat to the sustainable productivity of tomato in Kenya, causing up to 80% yield loss. Almost 98% of farmers' crop suffer from this pest and when using pesticides as a control method, only 27% of farmers report success. Building on CABI's expertise in biological control and integrated pest management, in this project, CABI collaborated with Koppert, a global supplier of biological control products, to demonstrate to farmers, the benefits of biological control within an integrated approach.

The problem

Tomato is one of the most popular and widely grown vegetables in Kenya, cultivated in all 47 counties. However, despite its socio-economic significance, the production of this key crop is constrained by numerous biotic and abiotic factors, namely insect pests.

Since its arrival in Kenya in 2014, the tomato leafminer, *Tuta absoluta,* has become the most serious threat to sustainable productivity, causing between 50-80% yield loss if no control method is applied.

Almost 98% of Kenyan farmers suffer from *T. absoluta* attacks in their tomato fields each season. To manage this pest, smallholder vegetable farmers typically rely on insecticides and spray between 6-10 times per season. As a result, *T. absoluta* is resisting pesticide, leading to production losses and increased input costs. A study by CABI on farmers' coping strategies towards the tomato leafminer showed that 96.5% of farmers apply pesticides but only 27% report success. Furthermore, many farmers do not observe pre-harvest intervals resulting in pesticide residues entering the human food chain, posing health risks to consumers.

Biological control, therefore, becomes an important component in the integrated management of this pest. It can offer a safer, more cost-effective and

environmentally-friendly control option for smallholder tomato farmers.

What we are doing

CABI has promoted the use of biological control and integrated pest management since its origin.

CABI worked, collaboratively, with Koppert, a leading global supplier of biological control products, to demonstrate biocontrol within an integrated approach.

For two seasons, CABI and Koppert, together with smallholder tomato growers from Nairobi and Kajiado counties, implemented an Integrated Pest Management (IPM) approach involving the predatory mirid *Macrolophus pygmaeus* (MIRICAL) and the pheromone trap system (Tutasan and Pherodis) with the hope that by using this spectrum of methods, pesticide use would reduce and yields increased. This approach builds on previous work conducted by Koppert and Kenyatta University to validate the use of pheromone traps for *T. absoluta.* Work involved deploying the two techniques in open fields and greenhouses.

One problem encountered is the attitudes of smallholder farmers towards biocontrol in that it is perceived as being expensive, not readily available and not always as effective as synthetic pesticides.

This project aimed to contribute to making that change by enabling farmers to try out biological control, experience the benefits, and provide lessons and evidence for furthering the uptake of low-risk pest control products. Biological control learning sites were set-up to act as information hubs and focal points for communities to learn and be trained on biological control.

Together, partners and CABI aimed to:

- Demonstrate the efficacy of selected biological methods for the management of the tomato leafminer in different tomato cropping systems (open field and greenhouse)
- Build the capacity of smallholder farming communities on the use of biological approaches for sustainable management of tomato pests
- Create awareness on the use and benefits of biological approaches for managing tomato pests
- Determine the cost-benefit, as perceived by smallholder farmers, of different biological packages (singly or integrated) for control of the tomato leafminer

Key project outputs included:

- Uptake of biological methods for management of tomato leaf miner among smallholders in target areas increased
- Knowledge among farming communities on available biological methods for management of tomato leafminer and the benefits enhanced
- Awareness by farmers and communities of the use of biological control for the sustainable management of invasive pests improved
- Information on the cost-benefit of different biological approaches for control of the tomato leafminer produced and disseminated
- Lessons learned for future efforts to promote wider use of biological control in smallholder production

Results so far

The project inception workshop, held on 27th August 2019, emphasized the need to deliver the project in more areas since *T. absoluta* remains a serious challenge for farmers in various regions. Farmers and growers hosting the demonstrations were identified, both for open fields and greenhouses, and planting dates were agreed.

Establishing the cost-benefit of different biological approaches in controlling the tomato leaf miner

Two studies, baseline and endline, were conducted to determine the cost-benefit of biological approaches and traditional methods for control of the tomato leafminer. The baseline survey aimed to establish production methods used by farmers in the management of *Tuta absoluta* and the costs incurred, while the endline study aimed to establish the gains, such as farmers' profitability when using biological *Tuta* management practices compared with the traditional methods of chemical sprays. The results were packaged and shared through the project's websites, blogs, WhatsApp groups, Telegram, farmer meetings and stakeholder forums (inception and closeout meetings), TV and radio.

Communication outreach

1000 farmers and 250 extension workers were reached with messages on the use and benefits of biocontrol technologies through their participation in several trainings and field days. Various materials have also been produced and disseminated to stakeholders including a Training Manual for extension workers, which incorporates the Plantwise fact sheets and Pest Management and Decision Guides (PMDGs), pest photo guides, three technology videos on the use of key products promoted by the project, and four blogs on lessons learnt from the technology use.

Outcomes

Though the project duration could not allow demonstration of change in farmers' practices, farmer knowledge and willingness to use the various biological solutions were assessed. The numbers below indicate farmers who began to 'use biological interventions' as well as those that indicated 'likely use of them in the near future' after exposure to the technologies through trainings and demonstrations.

	Started to use technology	
	Male %	Female %
Tutasan	68	24
Sticky traps	8	12
Trianum	–	–

Videos

A selection of videos produced by CABI, in association with Koppert, are available on CABI's YouTube channel. The videos were developed to help raise awareness of biological crop protection approaches and focused on three key methods: delta trap, Trianum and tutasan trap. They were shared with Plant Doctors and extension workers on the Telegram and WhatsApp platforms.

Donors	The Netherlands Ministry of LNV
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