Report on 1st stakeholders' workshop on the development of a framework for management strategies for invasive fruit fly pests

Wednesday 26 June 2024

Lemoenkloof Boutique Hotel, Paarl, South Africa

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Summary

A one-day consultation workshop was organized with stakeholders in the citrus industry in South Africa on Wednesday 26 June 2024 at Lemoenkloof Boutique Hotel, Paarl, South Africa. The workshop was organized as part of the project REACT (*Rapid elimination of invasive agricultural insect pest outbreaks by tackling them with Sterile Insect Techniques programs*) which is supported by the EU Horizon 2021 Farm to Fork Research and Innovation Actions (Grant Agreement number: 101059523). REACT aims to tackle invasive pests like *Bactrocera dorsalis* (*Bd*) using environmentally friendly management strategies, such as the Sterile Insect Technique (SIT). In South Africa, *Bd* became established in the northern areas of the country in 2013 and to date, it still has a restricted distribution, being absent in most of the southern regions including the Western Cape Province. There are SIT operations on two other insect pests in parts of the Western Cape Province: *Ceratitis capitata* and *Thaumatotibia leucotreta*. This workshop focused on stakeholders who are in the Western Cape Province and offered a scenario where *Bd* is absent and SIT operations are ongoing on other pests. The workshop aimed at understanding the challenges that stakeholders face with fruit fly and other insect pests, assessing the perception of the potential impact of *Bd* invasion, evaluating current fruit fly management strategies and determining whether SIT would be an acceptable technology for combating *Bd.* There were 16 participants in total. Participants were representatives of different stakeholder roles in the citrus industry: producers, packhouse managers, exporters and crop protection agents including SIT operators. Stakeholders reported important challenges in the citrus industry due to fruit flies and other insect pests. Stakeholders reported fruit fly damage levels, albeit low (about 1%), at all nodes in the value chain from production to export. An outbreak of *Bd* in an area in the Western Cape Province with mixed fruit crops was perceived to potentially increase control measures and costs. With limitations in the number of insecticidal residues on fruit, stakeholders perceived that SIT could reduce residues in fruit. The workshop provided valuable inputs for a cost and benefit model for SIT and alternative strategies.

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Background

The import and export of fresh commodities, the movement of people between countries, and changes in agricultural landscapes and the global climate are increasing the risk of the spread and introduction of invasive pests, including fruit flies and other organisms, into new areas. Once these pests are detected, immediate management strategies must be implemented to eradicate them. If the pests establish themselves, long-term management strategies are required to suppress them. Both suppression and eradication actions have significant economic and environmental consequences.

Bactrocera dorsalis (*Bd*) is an example of an invasive pest in South Africa. When *Bd* is detected in pest-free areas, rapid eradication actions are necessary. In areas where *Bd* is established, long-term suppression strategies are required.

A project REACT (*Rapid elimination of invasive agricultural insect pest outbreaks by tackling them with Sterile Insect Techniques programs*), in which Citrus Research International (CRI) is a partner together with 14 other partners, was initiated in November 2022 and aims to tackle invasive pests like *Bd* using environmentally friendly management strategies, such as the Sterile Insect Technique (SIT). The Project REACT is supported by the EU Horizon 2021 Farm to Fork Research and Innovation Actions (Grant Agreement number: 101059523).

It is realized that for the successful implementation of SIT in the use against an invasive fruit fly pest, perceptions of stakeholders on impact of fruit fly pests and management strategies should be understood.

The aims of the workshop were to (1) understand the challenges stakeholders face with fruit fly pests and other insect pests, (2) assess the perception of the impact of *Bd* invasion, (3) evaluate current fruit fly management strategies and (4) determine whether SIT would be an acceptable technology for combating *Bd*. An understanding of the impact of insect pests including fruit flies and the management strategies would enable the development of a framework for cost-benefit analysis model for SIT and alternative strategies.

Workshop Agenda

9:00 – 09:30: Registration

9:30 – 10:30: Welcome and Introduction

10:30 – 12:30: Small Group Discussions

Topics

- Major insect pest problems on citrus, management strategies, and costs
- Ranking of insect pests and fruit flies, damage levels, and control costs
- Impact of *Bd* and associated management strategies
- Chemical use in management strategies:
    - Restrictions and challenges with residues (MRLs)
    - Registration issues in the EU for active ingredients
    - Effects on applicator health, biodiversity, water, and soil quality
- Costs of Global Gap certification, audits, permits, and system approaches
- Market access issues when management strategies fail or residues exceed MRLs
- Impact of pests on fruit safety, prices, and production practices, including organic cultivation

12:30 – 13:00: Feedback and Conclusion

The workshop was attended by 16 participants. The participants were representatives of different stakeholder roles in the citrus industry: producers (2), packhouse managers/staff (5), exporters (3) and crop protection agents including SIT operators (6). The facilitators of the workshop were the team from the REACT project at CRI: Aruna Manrakhan, Kandas Cloete and Elma Carstens.

In the first session of the workshop, there were five presentations to provide a background to the workshop. The first presentation provided an overview of the fruit fly problem in South Africa and covered the objectives of the workshop. The second presentation provided a brief of the REACT project. The third presentation provided an overview of a cost and benefit model for management of invasive fruit fly pests. The fourth presentation covered a typical cost and revenue in a citrus value chain. The fifth presentation was on the results of an online survey with citrus stakeholders on the impact of fruit flies including *Bd*.

In the second session of the workshop, the stakeholders were divided into two groups to have equal representation of the different stakeholder roles. The groups discussed topics outlined in the agenda as shown above. Information arising from the discussion within each group was captured on templates provided.

Workshop Outcomes

Challenges faced by stakeholders with fruit flies and other pests

Fruit fly was ranked among the top pests by the workshop participants. The other insect pests that had top-rankings were thrips, mealybug, snails and moths. Stakeholders perceived more or less similar fruit fly damage levels across the value chain, with average estimates of 0,75% in orchard, 1,1% in the packhouse and 1,25% at ports. For fruit in the orchard and packhouse, thrips were estimated to cause the highest damage levels, at 10%. On packed fruit, rejection levels at ports were estimated to be highest for mealybug, at 2%. Fruit fly control costs were estimated to be on average at 7500 South African Rands per ha per year. Control costs for the other top-ranking pests (thrips, mealybug and moths) were estimated to be on average at 20750 South African Rands per ha per year. This implies that fruit fly control costs were estimated to be 26,5% of the total insect pest control costs in orchards.

Inspection costs for regulated pests including fruit flies were estimated to be at 1,35 South African Rands per carton. Cold disinfestation costs for some markets such as Japan and India were estimated to be at 50 South African Rands per carton.

Fruit flies were perceived to have an impact on fruit prices and production practices. Fruit flies were perceived to have no impact on fruit safety. Stakeholders attending the workshop were not involved in organic cultivation, but noted that organic cultivation would be a challenge with the current control methods to their disposal on commodities susceptible to fruit fly.

Fruit flies (all pest species on citrus: *C. capitata, Ceratitis rosa* and Bd) are actionable pests for all markets. The South African Agricultural Product Standards Act, 1990 (Act no. 119 of 1990) stipulates that all citrus pallets presented for inspection for export must be free from fruit flies. In the event that there are rejections of fruit consignments due to fruit flies during official inspection at packhouses and ports in South Africa, these consignments are directed towards processing or the local market. If there are rejections of fruit consignments due to fruit flies post border, these are then destroyed or returned to South Africa.

Current fruit fly management strategies

Fruit fly management strategies reported were the use of bait sprays, cover sprays, Last Call (attract and kill method targeting *Ceratitis* males), bait station, mass trapping and SIT. For fruit fly control, an average of 14 bait sprays (aerial and ground) were reported to be carried out per year. The active ingredients in the bait sprays include either spinosad or malathion or cyantraniliprole.

Chemical use in citrus

Currently on citrus, the maximum number of residues allowed is five for fruit destined for retailers in Europe. These residues include post-harvest disease control products in packhouses as well as pest control products in orchards. None of the detectable residues so far were those contained in fruit fly control products. The volume of fruit that were previously linked to exceedances of residues were estimated at 0,1%. Residue management is more problematic for thrips, mealybug and moths. For fruit flies specifically, malathion and cyantraniliprole could become problematic with regard to residues if pre-harvest intervals and correct applications are

not adhered to. One of the insecticides used in fruit fly control products - malathion is not permitted for some retailers in Europe.

No effects of chemical use were reported on applicator health and environmental health.

Impact of Bd invasion

Stakeholders currently carry out monitoring for early detection of *Bd*. Costs of monitoring for *Bd* were estimated to be at 700 South African Rands per Production Unit Code (PUC) (for 1 trap per PUC). The perception among stakeholders was that there would be an increase in management (monitoring and control) measures and costs in case of an outbreak of *Bd.* Additionally, production areas will be quarantined. The mixture of fruit crops, harvesting windows and proximity of orchards of different crops in Western Cape Province was deemed to increase infestation risk by this pest.

SIT for combating Bd

SIT for *Bd* and other fruit fly pests was perceived as a control technique that adds an additional control method to their existing set of control methods, which could reduce insecticide residues in fruit.

Conclusion

It was clear from this workshop that stakeholders in the Western Cape Province face important challenges in the citrus industry due to fruit flies and other insect pests. With extensive implementation of control measures, stakeholders reported fruit fly damage levels, albeit low (about 1%), at all nodes in the value chain.

An outbreak of *Bd* in an area in the Western Cape Province with mixed fruit crops was perceived to potentially increase control measures and costs. With limitations in the number of insecticidal residues on fruit (to retailers) and a general compliance requirement regarding the residue levels per market, stakeholders perceived that SIT could reduce residues in fruit.

Estimates of control costs and damage due to fruit flies and insect pests obtained in this workshop would represent important inputs in the cost and benefit model for SIT and alternative strategies.