

REPORTBACK ON A MEETING OF FRUIT FLY SCIENTISTS IN MEXICO IN APRIL 2018

Notes on the 10th International Fruit Fly Symposium

ABSTRACT

Fruit fly scientists across the world meet once every four years to share new developments and research findings on fruit flies. The recent meeting took place from 23 - 27 April 2018. This report provides information on new developments with regard to fruit fly control.

REPORT

The International Symposium on Fruit Flies of Economic Importance (ISFFEI) is a quadrennial event which brings together scientists working on fruit fly pests in different parts of the world. The 10th International Fruit Fly Symposium of Economic Importance took place from 23 to 27 April 2018 in Tapachula, Chiapas, Mexico. The scientific programme of the symposium covered various aspects of fruit fly biology, ecology and management. As per the tradition with these international fruit fly symposia, Tapachula was chosen as a venue due to a number of fruit fly research activities and control operations ongoing there. Mexico is the main exporter of mango in the world. About 19 000 tons are exported to the USA annually. The fruit fly control programme in mango orchards

includes releases of sterile *Anastrepha ludens* and *Anastrepha obliqua* (main fruit fly pests on mango) as well as releases of fruit fly parasitoids. A site visit to a mango packing house equipped with hot water treatment facilities for disinfestation of *Anastrepha spp* was included in the programme of the 10th ISFFEI.

In this report, information on new developments on fruit fly control which was presented at the 10th ISFFEI is provided. A brief on the visit of the mango packing house is also presented.

Key talks on fruit fly control

Stochastic model for fruit fly management

Slawomir A. Lux (SAL) from in-silico IPM, Poland, presented the stochastic agent-based model PESTonFARM (Lux 2014). The model uses information on biology and behaviour of the pest and integrates this with climate, landscape, crop phenology and integrated pest management tools. In the presentation by SAL, PESTonFARM was used to estimate survival and establishment of fruit fly incursions in a specified area. The Mediterranean fruit fly, *Ceratitis capitata*, was used as a model insect.



Figure 1. Hot water treatment of mangoes for fruit fly disinfestation in Tapachula, Mexico: (A) Tank for hot water treatment in a mango packing house and (B) Mangoes packed for export to USA after hot water treatment.

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Increasingly, models are being used to assist in decision making for management of local fruit fly pest populations and new incursions. There are possible values in using this model in typical fruit production landscapes in South Africa for management of fruit fly pests and for estimation of survival of invading fruit fly pests.

New control products

New attract and kill products presented were the protein-based bait ANAMED (presented by William Urutia, ISCA Technology, USA) and the long lasting lure and kill device (Díaz-Fleischer et al. 2016) that uses the Toricelli barometer principle (presented by D. Perez-Staples, Universidad Veracruzana, Mexico). The new lure and kill device can be used with any fruit fly bait mixture. The device was tested with GF-120 and protein hydrolysate and malathion mixture. The bait station effectively killed flies for 35 days. The bait station also remained attractive for 42 days.

Dong H. Cha from USDA-ARS, Hawaii, presented his research findings on the toxicity of the non-nutritive and poorly metabolized sugar Erythritol (2M) to fruit flies. The use of Erythritol and sugar in bait spray mixtures for fruit fly control was suggested. Results on the use of linalool, a component of citrus oil, as an oviposition deterrent for *C. capitata* was presented by Nikos T. Papadopoulos. A reduction in oviposition by *C. capitata* was observed in linalool treated fruit.

New control technology

In Tapachula drones are currently used for releases of sterile insects and fruit fly parasitoids. Specialised methods and equipment (Mubarqui system) have been developed for aerial releases of biological control agents. For releases of sterile flies, 380 000 flies can be loaded at once and released at 30 km/h at altitudes of up to 100 m.

The use of drones for sterile insect releases should be explored in South Africa.

Visit to hot water treatment facilities for fruit fly disinfection

The Ataulfo variety is the main mango variety produced in Tapachula and is in high demand because of its organoleptic properties and its tolerance to hot water treatment for disinfection of fruit flies.

Export of Ataulfo mango to USA requires a hot water treatment. For disinfection of *Anastrepha* spp. including *A. ludens*, the target temperature of the water in the tank is 46.1°C. The treatment time depends on fruit size. Treatment time can be up to 110 minutes. Temperatures in the tanks are monitored and have to be provided at the end of the treatment.

I visited a mango packing house which had an inhouse facility for hot water treatment. The facility was certified by USDA. Fruit arriving from the orchard were first sorted into different grades. The fruit were then washed and dipped in a fungicide bath. Export grade fruit were sorted according to weight and packed in baskets. Fruit of a particular weight range were dipped in a selected tank with circulating hot water (Fig. 1A) at 46.1 °C for a specified time. Soon after the hot water treatment, the fruit were lowered in cool water at 20°C before drying and packing (Fig. 1B). The packed fruit were stored in a cool room at 12°C until transportation by road to USA.

Conclusion

The 10th ISFFEI proved to be a good forum to learn about new control tools for fruit flies. I encourage those interested to participate at the next ISFFEI which will take place in Sydney, Australia in 2022 (see <https://nucleus.iaea.org/sites/naipc/twd/Pages/International-Fruit-Fly-Symposia.aspx>).

Acknowledgments

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Further reading

DIAZ-FLEISCHER, F., PEREZ-STAPLES, D., CABRERA-MIRELES, H., MONTOYA, P. & LIEDO, P. 2016. Long-term attraction and toxic effects of tephritid insecticide-bait mixtures by applying Torricelli's barometer principle in a trapping device. *Pest Management Science* 72: 1346-1349.

LUX, S.A. 2014. PESTonFARM – stochastic model of on-farm insect behaviour and their response to IPM interventions. *Journal of Applied Entomology* 138: 458-467.

