

## **Forbidden Fruit Fly: Eliminating Male Mates for Saving Fruits using Integrated Pest Management Techniques**



*Fruit Fly*

### **Background**

Three districts of South Gujarat: Surat, Navsari and Valsad are leaders in horticulture. These are also part of an agri-export zone for fruits and vegetables. But, the life of these fruit-farmers was made miserable by tiny fruit fly. Fruit fly is a major pest of mango, sapota and cucurbits. Intensity of damage recorded was as high as over 30 percent in mango and sapota, and between 20-40 percent in cucurbitaceous vegetables. Fruit flies cause heavy damage in terms of quality and quantity to the farmers every year. Insecticidal sprays, though they control infestation a little bit, are not only uneconomical but they leave residual effect much above tolerance limit, affecting adversely the prospects of export of such fruits and vegetables.



Fruit flies are a modern-day pestilence which ravage production. These flies, moreover, are good fliers and therefore their spread is extensive. Hence, area wide adoption of management strategy is required. Male Annihilation Technique (MAT), an Integrated Pest Management Technique (IPM), which uses sexual lures to capture males of fruit flies and kill them, is the only way to control growth and spread of fruit flies. This however, requires a Community approach for implementation.

Navsari Agriculture University designed, developed and commercialized an eco-friendly, economical and easily adoptable fruit fly trap popularly known as “Nauroji-Stonehouse Fruit Fly Trap”. The trap uses Methyl Eugenol and Cuelures as par pheromones well-known for fruit flies. In this trap, plywood blocks are soaked in the solution of lures + solvent + insecticide. Such traps remain effective for 5 to 6 months, which cover the entire fruiting period in mangos, sapotas as well as cucurbitaceous vegetables and no recharge is necessary. It is eco-friendly, economical and easily adoptable.

It was decided to adopt this technology and spread it in the Surat-Navsari-Valsad belt for controlling and managing the fruit fly problem. It was also recognized that wide area adoption would help in developing this zone as a pest free area (PFA). The project was taken under RKVY.

## **Intervention**

“Nauroji-Stonehouse Fruits Fly Traps” are prepared in food quality Testing Laboratory, NAU Navsari. Six talukas viz., Gandevi, Chikhali, Valsad, Pardi, Dharampiur and Kaprada of Navsari and Valsad districts

were selected for the purpose. A block of orchards in each village in each Taluka was selected for first year implementation. Other blocks were selected during the following years.



In the selected blocks, farmers of all categories were covered. Traps were distributed to the farmers taking into account their area of plantation of mango, sapota and cucurbitaceous vegetables. Farmers' meetings were organized at village level to educate them regarding biology of fruits fly, nature of damage, technology for its management, installation of traps etc. They were educated by delivering lectures using LCD projector, display of flex banner, booklet and actual demonstration of the traps. To generate awareness of technology, 93 farmer's group training meets were scheduled. During group meetings scientific information of fruit flies emphasizing the life cycle of the pest, host range, damage symptoms, severity of damage and control methods to combat the pest in eco-friendly manner were covered. Gram Panchayats, Village level co-operative societies and milk collecting centers collaborated in organizing meetings, preparing lists of farmers, disbursement of traps etc.

With all this training and awareness, Farmers themselves installed the traps in their fields. Fruits fly population was also recorded at fortnightly intervals during the fruiting period in randomly selected orchards. The percent damage of fruits was worked out from orchards where traps were installed as well as uninstalled orchards. The level of

damage in treated and untreated orchards was compared to know the actual impact of technology.

In all, 209 villages in 6 talukas of two districts were selected as target area during 2009 and 2010. The project was implemented in about 6814 ha area comprising of 6367 ha of fruit orchards and 447 ha of melon orchards of 15339 farmers of all categories. 1,10,640 traps were distributed to the farmers in the targeted villages for mango, sapota and cucurbitaceous vegetables.

Farmers were also educated on maintaining sanitation in the orchard. The fallen/damaged fruits in the orchards were collected by the farmers and buried in the pits with application of methyl parathion dust to minimize further multiplication of fruit flies. About 6000 booklets were disbursed to the farmers while 500 flex banners were displayed in the target villages. Data on fruit fly catches and infestation were recorded regularly in the target area.

The project involved an investment of Rs. 7.86 crores funded through RKVY.

## Preparation of fruit fly trap



Supervision



Plywood blocks in trays



Preparation of chemical mixture



Nailing & Threading



Heap of soaked blocks



Blocks soaking in chemical (24 hrs)



Sealing of blocks



Blocks ready to install in traps



Labels of trap



Trapped fruit flies



Ready fruit fly trap

## Outcome

By installing the fruit fly traps in a wide area it was possible to successfully bring down the infestation level to 3 to 4 percent, which meant 85 percent control of the pest. Using this technology, the fruit fly damage in mango orchards minimized to 3.06 (0 to 4) per cent and the damage in untreated orchards was 30.34 (30 to 35%) per cent. Thus, more than 85.0 per cent damage due to fruit fly was reduced which resulted in increase of 27.27 per cent yield.



Moreover, being an eco friendly approach, it was possible to certify the produce as organic. Thus, the quality of a large quantity of fruits and vegetables improved making them suitable for export. Low expenditure incurred on the control of fruit fly could motivate the growers and possibly enhance the sustainability of the technology demonstrated. The area wide adoption of fruit fly traps could effectively kill the male flies and thereby check further multiplication without disturbing the ecosystem. If such technology is adopted for a considerable time it would

definitely be helpful in recognizing the area as PFA (pest Free Area) and ultimately it will help boosting the export trade.

About 15339 farmers of all categories as well as free riders of six taluka in two districts could save about Rs. 35 crores every year by controlling fruit flies in mango, sapota and cucurbitaceous vegetables. The quality of the products, increase in production and goodwill generated in terms of healthy production ultimately benefited the farmers adopting this technology. Area wide control strategy is not known in our country. Therefore, farmers could also ascertain the actual benefits of adopting such technology which will further motivate them in future.

The effectiveness of low cost IPM technology in controlling infestation of fruit fly disseminated through the RKVY project has brought tremendous behavioral changes in the attitude of fruits and vegetable farmers. Now farmers have adopted this technology which has resulted in export oriented organic production of fruits and vegetables.

In terms of cost-benefit analysis, an estimated benefit of Rs. 81,840/ha is achieved by spending merely Rs. 350/ha. Thus, implementation of fruit fly technology in over 6000 hectares of mango could have benefited the farmers to the tune of about Rs. 49 crore, while in case of cucurbitaceous vegetables, the fruit fly damage was minimized up to 2.5 to 4.6 per cent by using the technology while the damage was 19 to 32 (30.50) per cent in untreated fields. Thus, more than 85.0 per cent damage due to fruit fly was reduced resulting in yield increase of 27 per cent. Ultimately an estimated benefit of Rs. 26,250/ha in bitter gourd and Rs. 39,350/ha in bottle gourd was attained by spending only Rs. 550/ha. Thus implementation of fruit fly technology in over 447 hectares of cucurbitaceous vegetables crops benefits the farmers to the tune of Rs. 1 crore.