Food and Agriculture Organization of the United Nations

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THE STERILE INSECT TECHNIQUE FOR USE AGAINST THE DEVASTATING EUROPEAN GRAPEVINE MOTH IN CHILE

The European grapevine moth, or *Lobesia botrana (Lepidoptera: Tortricidae)*, is an insect pest that develops on more than 200 plant species of various families. It is one of the most serious vineyard pests in the Mediterranean region and southern Europe.

In Chile, the European grapevine moth was detected for the first time in the Linderos area of the Metropolitan Region in April 2008. The pest, which is native to Europe, attacks the vineyards and its larvae, causing direct damage by feeding on the grape clusters. This decreases vineyard yields.

The pest's potential direct economic damage to the production of table grape, wine, blueberries and plums has been estimated at over USD 75 million per year. In addition, indirect costs are associated with the pest control practices adopted by growers and with the additional costs for the postharvest treatments required to export table grapes.

To face this serious threat, the Agricultural and Livestock Service (*Servicio Agrícola y Ganadero*, SAG) of the Ministry of Agriculture of Chile declared that it would place the pest under official control. SAG requested support from the International Atomic Energy Agency (IAEA) and the Food and Agriculture Organization of the United Nations (FAO) in developing and field-validating the sterile insect technique (SIT) against the invasive pest. SIT is an important component of the integrated management of the pest, aimed at its suppression and eradication.

DEVELOPING A STERILE INSECT TECHNIQUE PACKAGE

Since early 2018, the IAEA and the FAO have been engaging in technical cooperation to develop SIT technology in Chile. This cooperation has taken the form of expert missions to Chile, training of technical staff in Canada and South Africa (where the technology is being applied against other moth pests), and supply of key materials and equipment.

The main challenge lay in the fact that the SIT technology to combat the European grapevine moth, which was spreading rapidly over the grape production area, had to be developed virtually from the beginning. In addition,

KEY FACTS

EUROPEAN GRAPEVINE MOTH

THE EUROPEAN GRAPEVINE MOTH AFFECTS *VITIS VINIFERA* AND OTHER SPECIES OF CROPS OF ECONOMIC IMPORTANCE IN SEVERAL COUNTRIES

THE INVASIVE EUROPEAN GRAPEVINE MOTH HAS SPREAD TO PART OF THE GRAPE-GROWING REGIONS IN CHILE, CAUSING DAMAGE IN GRAPES AND OTHER FRUIT HOSTS SUCH AS BLUEBERRY AND PLUMS

THIS PEST IS PRESENT IN BOTH TABLE AND WINE GRAPES, WHICH ARE AMONG CHILE'S MAIN AGRICULTURAL PRODUCTS

***LOBESIA BOTRANA* HAS SIGNIFICANTLY DAMAGED GRAPE PRODUCTION IN CHILE**

THE USE OF THE STERILE INSECT TECHNIQUE (SIT) IS AN ENVIRONMENTALLY FRIENDLY OPTION TO MANAGE *LOBESIA BOTRANA*

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the first infestations were detected in backyards in suburban areas adjacent to the commercial vineyards, which posed another major challenge.

Applying conventional insecticide-based control actions against the pest was not an option, under these circumstances. The lack of environmentally friendly and suitable pest control options for use in infested suburban areas resulted in these areas becoming a reservoir of the pest and a continuous source of re-infestation of commercial vineyards and orchards.

These efforts resulted in a SIT package that has been integrated with other monitoring and pest control measures. These include the establishment of a production facility, suitable techniques for artificial rearing of *L. botrana*, a moth collection system, radiation biology protocols to sterilize adults, and ground release methods. Quality control of reared moths has also been developed, including an outdoor field cage system to assess sterile moths' sexual competitiveness. With the SIT package available, in October 2018 the first field releases were conducted, in the presence of high-level SAG authorities as well as grape producers and exporters.

THE *LOBESIA* PROGRAMME IN CHILE

SAG has now established a national *Lobesia* programme. The resources and implementation of the programme are entrusted to a public/private partnership involving trade union organizations, other public bodies of the Chilean Ministry of Agriculture, academics, experts, and national and international advisors. An important contribution is the research support provided by the University of Tarapacá.

Today, the basic SIT technology package comprises a facility that dedicates 100 m^2 to rearing operations, having a production capacity of over 70 000 moths per week. Since October 2018, more than 750 000 sterile moths have been released over a selected suburban infested area where a small-scale *Lobesia* SIT operational programme is being implemented. Field data indicate that the quality of the released sterile moths is good, with 78 percent of the moths being capable of flight and the presence of adequate sterile moth recapture rates. Results are promising and show that the use of a SIT-based integrated pest management approach could lead to the effective control of *Lobesia* populations.

The *Lobesia* programme in Chile would have the capacity to produce several millions of sterile moths per week in a manner similar to that applied in other successful SIT moth mass-rearing programmes, such as established for the pink bollworm in the United States of America, the codling moth in Canada, and the false codling moth in South Africa. The scope, size and investment needed for a larger facility depend on future programme goals and on the areas where SIT releases would be made.

This is the first time an area-wide SIT has been developed against this invasive pest species, and the approach is already being used on a small scale to measure the impact on the wild population. Future technical challenges to be addressed in expanding the SIT programme in Chile against the European grapevine moth include the optimization of mass rearing, as well as the replacement of ground releases with the use of drones for aerial release over infested areas.