IPM ADOPTION FACTSHEETS

Greenhouse sector

The aim of IPMWORKS is to encourage the implementation of IPM methods across the European Union by utilizing a network of farmers. Through peer-to-peer learning and collaborative efforts, these farmers will advance in their use of IPM strategies and showcase the effectiveness of holistic IPM in achieving reduced pesticide reliance, improved pest control, cost savings, and increased profitability.

This factsheet outlines the IPM practices employed by the greenhouse crops sector.

COUNTRIES

BELGIUM SPAIN

HUBS

There are **2** greenhouse hubs, one per country. There are **11** farmers involved in Belgium and **12** in Spain.

BELGIUM

CROP: Strawberry and raspberry

PEST: Aphids

IPM STRATEGY TO HIGHLIGHT

Use of commercial biocontrol agents to control aphids.

EFFICACY OF THE IPM STRATEGY

Several natural enemies of aphids are commercially available, but not often used. Predatory wasps can be used in a preventative way. Galmidges (*Aphidoletes aphidimyza*), hoverflies (such as *Sphaerophoria rueppellii* or *Eupeodes corollae*) or lace wings (*Chrysoperla carnea* or *Micromus angulatus*) can be released preventative or curative. At low aphid pressure the biocontrol agents can manage the aphids and so replace the pesticide application. In most of the crops 1 to 2 pesticide applications against aphids are normally applied.

Lacewing larvae feeding on aphid

Demo about aphid biocontrol

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 101000339

CROPS: Strawberry and raspberry

PESTS AND DISEASES: *Drosophila suzukii*

IPM STRATEGY TO HIGHLIGHT

Holistic approach to control *Drosophila suzukii* (crop management, monitoring, trapping)

EFFICACY OF THE IPM STRATEGY

The pesticide applications against *Drosophila suzukii* are not compatible with the predatory mites that are used against thrips, so a holistic approach is necessary. It starts with picking hygiene. At regularly time points fruits should be picked. Furthermore damaged fruits should be managed correctly so the life cycle is stopped. For instance the fruits should be stored in closed containers during a week so the larvae are killed. It is also important to monitor in the crop so the grower is aware of their occurrence and if they occur, they can be mass trapped. Traps with the right opening and lure should be used for monitoring or mass trapping.

Demo about IPM of Drosophila suzukii

Drosophila suzukii *trap*

SPAIN

CROPS: Sweet pepper, tomato, watermelon, melon, zucchini, aubergine and cucumber.

PESTS: Whiteflies, thrips, aphids (most crops)

IPM STRATEGY TO HIGHLIGHT

Flower strips and/or hedgerows to boost biological control of pests.

EFFICACY OF THE IPM STRATEGY

Favouring the abundance and diversity of autochthonous plant species inside and outside the greenhouses boost the activity of beneficial insects such as predators and parasitoids of pests. These plants offer nutrients (nectar, polen, insects) and shelter for beneficial insects, and can also act as a barrier against pest species. This strategy reinforces biological control, including natural enemies that are released over the crop, and those spontaneously appearing from the surroundings. Particularly, hedgerows have been shown to increase the diversity of natural enemies in greenhouses, indirectly promoting a reduction of major pests such as aphids and whiteflies.

Whitefly (Bemisia tabaci)

Flower strips on a watermelon crop

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CROP: Tomato

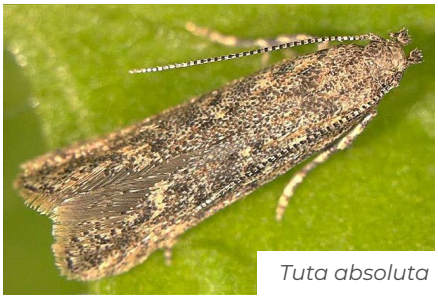
PEST: *Tuta absoluta*

IPM STRATEGY TO HIGHLIGHT

Holistic approach to control *Tuta absoluta* (augmentative and conservative biological control, mating disruption technique, light traps, bioinsecticides and crop management).

EFFICACY OF THE IPM STRATEGY

Tuta absoluta is the top pest of tomato crops worldwide. It receives a high number of insecticide applications, but it has developed resistance to most of the commercially available pesticides. Therefore, a holistic approach is necessary to prevent damage in tomato crops. For greenhouses in the Mediterranean area, we recommend using a combination of strategies: i) releasing mirid predators (*Nesidiocoris tenuis* or *Macrolophus sp.*) and egg parasitoids (*Trichogramma sp.*); ii) Using flower strips to attract spontaneous, parasitoid species such as *Necremnus tutae*; iii) Using sex pheromones to promote mating disruption and thus slow down the population build-up of *T. absoluta*; iv) Using light traps to reduce the abundance of adults (moths); and v) using bioinsecticides such as *Bacillus thuringiensis*. Also, it is important to use crop management techniques such as manual defoliation to reduce the number of galleries in the crop, and solarization at the end of the crop cycle to eliminate all *T. absoluta* pupae in the soil. Each of these elements have proven to successfully reduce *T. absoluta* abundance in tomato greenhouses. Since each element targets different stages of the pest (egg, larva, pupa, adult), it is recommended to combine all, to maximize their effect.



Tuta absoluta

Light traps

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