AdvisoryNetPEST

Mating disruption to control *Gortyna xanthenes*

Farmer's name
SAT Agorreta

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Name of the farm
SAT Agorreta

Country
Spain

Description of the farm context

This is a large family farm dedicated to the production of onions and artichokes in southern Navarre. This area has a Protected Geographical Identification (PGI) for the "Blanca de Tudela" variety of artichoke. This variety, highly prized for its organoleptic characteristics, is also highly valued in other areas. The production of this variety of artichoke has two important pillars: on the one hand, the sale of the product fresh and preserved, and on the other, the sale of plants for artichoke production in other areas of Spain.

Partner Organization

INTIA

THE TECHNIQUE

Short Description:

Gortyna xanthenes in artichoke can no longer be controllled by pesticides. An alternative solution is to use mating disruption.

Crop Sector:

Vegetable - Artichoke

Targeted pest and diseases:

Gortyna xanthenes

Objective of the NA:

The insecticides that are been used to control the pest *Gortyna xanthenes* in artichoke are not effective enough and complementary measures are needed. Mating disruption is an interesting technique that is already used in other crops. Mating disruption efficiency relies on 3 main elements : medium pest pressure, monitoring during the season (using traps and observations) and a good design and distribution of the pheromones.

Level of practice adoption across the country:

1 2 3 4

AdvisoryNetPEST

The **AdvisoryNetPEST** project aims to create a **network** and **upgrade advisory services** across the EU to increase the sharing of knowledge and the **adoption of innovative solutions to reduce the use and risks of pesticides** (RURP) in all **EU Member States**, enabling the agricultural sector to achieve the targets proposed by the Farm to Fork Strategy.

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The practices identified in this project are called 'Novel Approaches' and abbreviated as 'NA'

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Expectations regarding RURP

*RURP : Reduction of Use and Risks of Pesticides

The use of mating disruption enables to reduce the number of treatments to control the pest. Usually 4-5 treatments are needed to control de pest. With the technique the number of treatments can be 1 or 2 (still testing it)

Key success factors

There are several aspects that are considered key. First, the initial pest level should not be too high to prevent accidental encounters of pest males and females. On the other hand, monitoring is essential to detect technical malfunctions or incorrect distribution of diffusers in a timely manner. Carrying out a control to count the number of eggs after the flight provides a lot of information, allowing to determine the level of infestation and decide on the number of treatments to be applied.

Methods/strategy of application in the farm

Mating disruption diffusers are placed before the start of the flight in early September. Until December, when the flight ends, the plots are monitored every week/two weeks to verify that the technique is working properly. In December, an egg-laying control is carried out to see if the application of mating disruption has reduced the number of eggs. Based on this information, a reduction in the number of treatments can be considered during the hatching period, which takes place from February onwards.

Improvements of the NA

The technique improves pest control in the current situation where control with pesticides is insufficient. The use of the technique reduces the level of pests and allows for improved pest control with fewer treatments, thus contributing to better use of pesticides.

Resources and skills needed to adopt the NA

No special skills are required. It is only necessary to know how to differentiate adults of *Gortyna xanthenes* in the traps and be able to find the eggs laid in the plants in December. The design and placement of diffusers is determined by the supplier.

Figure 1: Gortyna xanthenes larvae

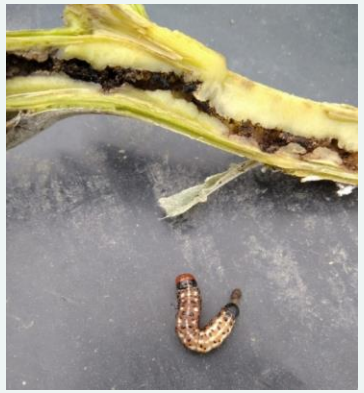

Figure 2: Damage in the stem

Figure 3: Mating disruption diffuser

Figure 4: Monitoring trap

Advice from the Advisor

The technique is very interesting because it allows for better pest control, reducing the number of treatments.
The application of the technique in this crop paves the way for the use of mating disruption in other annual horticultural crops.

Farmers Testimony

The use of this technique has made it possible to reduce the level of *Gortyna* infestation, which had been reaching historic levels in recent years due to the withdrawal of the active ingredients that were most effective in controlling the pest.

Policies and Regulatory Support

It is important to promote the use of alternative techniques among farmers, providing them with opportunities to learn about, test, and adopt them. Usually, these products are used when there are no other alternatives left, so it would also be beneficial to speed up the authorisation process for alternative products so that they are available as soon as possible.

Social and Cultural Acceptance

Although the use of alternative techniques is becoming increasingly widespread, most producers tend to use them only when there are no other options or when they need to improve control. At first, there may be some resistance to applying these types of techniques.

To go further on NA replication:

Replicating the technique is simple. It could be applied both in artichoke crops for *Gortyna xanthenes* and in crops affected by *Helicoverpa armigera*, since the pheromone used in both cases is the same.

However, experimentation would be necessary to verify the effectiveness of the technique in other conditions and for other pests.

One of the main limitations at this time is that the pheromone is in the process of being authorised and could only be used experimentally.

BENEFITS

- Better pest control with fewer treatments
- Increased knowledge of the pest: identification, life cycle, etc.
- Wider use of alternative techniques and reduced use of pesticides on artichokes

BOUNDARIES

The difficulty in finding effective alternative techniques for pests that have fewer and fewer pesticides control tools available.

Systemic Feasibility Analysis: Expert insights from Literature and Field Data

CRITERIUM	INDICATOR	INDICATOR SCORE	EVALUATION
Pesticide use reduction level	Reduction of the applied volume of pesticides	**high reduction (>25%)** moderate reduction (10-25%) low reduction (<10%) no reduction	
Effectiveness of controlling the target pest/diseases/weed	Percentage reduction of the target pest/weed infestation or of the damage caused by the target disease	**high reduction (>60%)** moderate reduction (30-60%) low reduction (<30%) no reduction	
Biodiversity	Impact on aquatic organisms	-- / - / 0 / + / **++**	
	Impact on bees	-- / - / **0** / + / ++	
Air quality	Impact on pesticide emissions	-- / - / 0 / **+** / ++	
	Impact on air pollutants emissions	-- / - / **0** / + / ++	
Working conditions	Knowledge requirements	high training level moderate training level **low training level** no training	
	Impact on working-time	**+ 5%**	
	Impact on human health	high risk moderate risk low risk **no risk**	
Costs	Impact on various types of variable costs: fuel, energy, labour, water, consumables...	**+ 5%** Labour / **+ 5%** Consumables	
Outputs	Impact on crop quality	-- / - / 0 / **+** / ++	

Impact Highlights

The conventional control of Gortyna xanthenes in artichoke typically involves four or five insecticide applications during the pest risk period. However, these treatments have proven insufficiently effective and complementary measures are required.

Pheromone-based mating disruption offers a promising alternative that can potentially replace insecticide use entirely. Already applied in other crops, this technique reduces treatment frequency and pesticide use, contributing positively to environmental and sustainability indicators.

Its effectiveness depends on moderate pest pressure, proper seasonal monitoring, and correct pheromone placement.

A feasibility assessment has shown strong results across multiple areas, including effective pest control and improved crop quality from a technical perspective; environmental benefits such as reduced impact on aquatic systems and no harm to bees or air quality; minimal training requirements from a social standpoint; and, economically, reduced input

Evaluation: