



Use of cover crops for weed control



Farmer's name

Cooperativa San Gregorio de Azagra



Contact

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Name of the farm

Cooperativa San Gregorio de Azagra (Navarra-Spain)



Country

Spain



Description of the farm context

Agricultural cooperative with 1100 hectares of vineyard, but where cover crops only practiced sporadically on less than 10%. Mediterranean climate, with drip irrigation and production limited by the Rioja Designation of Origin.

Partner Organization



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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www.advisorynetpest.eu

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

THE TECHNIQUE

Short Description:

The use of cover crops in the rows has proven to be a good alternative for controlling summer weeds, specifically *Coniza sp.* in vineyards.

Crop Sector:

Viticulture

Targeted pest and diseases:

Weed control

Objective of the NA:

Cover crops in viticulture fulfils a number of different objectives, firstly to improve soil structure and reduce erosion, limiting the resort to herbicides. However, it also acts on the vegetative vigor of the vine. It helps a lot with the drying and good ventilation of the vegetation and bunches. The type of cover must be adapted to the growing area, availability of water, etc. Cover crops can also help control weeds, especially those with small seeds that depend on light to germinate, by preventing light from reaching them, thus limiting their germination.

Level of practice adoption across the country:

1 2 3 4



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Expectations regarding RURP

Controlling conyza once stem elongation has begun is impossible with herbicides, even with drastically increased doses. Therefore, achieving early control through alternative techniques such as cover crops allows for a reduction in the use of excessive and ineffective herbicides (Figure 1).



Key success factors

Rain is necessary for the cover crop to establish properly and effectively compete with weeds. Earliest sowing in autumn also ensures good establishment of the cover crop. Achieving good sowing accuracy is crucial.

The area between the cover crop and under the vines offers more limited control and requires occasionally widening the working width of the inter-row cultivator.(Figure 2).

*RURP : Reduction of Use and Risks of Pesticides



Methods/strategy of application in the farm

Several species were tested, all sown manually, although fertilizer spreaders or seeders can be used. All sowing should be done in autumn. Soil preparation is necessary before sowing, and compaction afterward is recommended. The cover crop finishes naturally or is mowed at flowering time. The best-performing species are barley, vetch, and white mustard (Figure 3-4).



Improvements of the NA

Stop systematically tilling the vineyard. Use a chopper to complete the cover crop cycle. If herbicides were used to control *Coniza* sp., the application had to be brought forward from March to the end of January and repeated again in April if anything had escaped the initial control.



Resources and skills needed to adopt the NA

- Irrigation to compensate for competition with the vineyard.
- A chopper to control the cover crop.
- Knowledge of the best species adapted to the vineyard cycle, of weeds (that are winter species) and to the climatic conditions of each site



Figure 1: Visual effect of herbicides 21 days after treatment
Source: "Evaluation of the efficacy of various herbicides in Conyza spp. at different stages of development. Phytoma 315, January 2020



Figure 2: Conizas at the edge of the vetch cover in summer



Figure 3: Vetch cover crop



Figure 4: White Mustard cover crop chopping



Advice from the Advisor

Always sow in the fall. Avoid trying to switch the entire vineyard to a new management system all at once. Understand the cover crop as a tool and the vineyard as your livelihood. If at any point the cover crop becomes too much competitive for the vineyard, it should be removed, either partially or completely, before it compromises the vineyard.



Farmers Testimony

The control of conyza, a difficult-to-control weed, has almost no impact when cover crops are used, while using only herbicide in spring is impossible. Ensure good emergence of the cover. Lose your fear of cover crops if you have water for irrigation.



Policies and Regulatory Support

We should encourage the use of cover crops, as is currently being done, but without being too restrictive, since cover crops are a tool and must be used correctly to avoid jeopardizing the viability of the vineyard. Currently in Spain, a CAP program promotes its use in permanent crops.



Social and Cultural Acceptance

It allows you to see a greener field all year round, improving biodiversity as well as reducing the use of herbicides. Traditionally, vineyards have been cultivated with tilled soil to avoid competition with other vineyards, and this change to using cover crops may represent a break with the traditional concept of vineyards.



BENEFITS

The incidence of Conyza was greatly reduced, by more than 90%, and the development of what did appear, and therefore the competition with the vineyard, was very low. When inter-row weeding was used under the vines, herbicide use was completely eliminated. When herbicides were used, they were applied effectively, avoiding high doses that had no effect.



BOUNDARIES

There is often concern that a cover crop might compete with the vines, making its use a delicate decision. Choosing the right species is equally challenging, as it must effectively suppress weeds while remaining compatible with vineyard conditions. Additionally, the transition zone between the canopy and the area beneath the vines tends to escape effective weed control, which sometimes requires increased inter-row weeding in late spring or mowing near the flowering stage of the vine weed.

To go further on NA replication:

The challenges exist in other areas and also occurs with other weeds such as *Dittrichia viscosa*. Irrigation in the vineyard or high rainfall is recommended to reduce competition problems. Carefully select the weed species, choosing those that are autumn-winter growing, easily accessible, inexpensive, and with a high soil cover rate.

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	
Soil quality	Impact on soil infiltration	-- / - / 0 / + / ++	
Biodiversity	Impact on non-target soil micro-organisms	-- / - / 0 / + / ++	
Water quality	Impact on pesticide losses to surface water (runoff)	-- / - / 0 / + / ++	
Air quality	Impact on pesticide emissions	-- / - / 0 / + / ++	
Working conditions	Knowledge requirements	high training level moderate training level low training level no training	
Outputs	Impact on yields (produced volumes)	- 5%	
	Impact on crop quality	-- / - / 0 / + / ++	

Impact Highlights

The use of cover crops in viticulture is a promising novel approach for controlling difficult weeds such as *Conyza sp.*, as well as aerial diseases such as powdery mildew and botrytis.

The systemic feasibility analysis identifies strong environmental benefits: there is a clear reduction in herbicide and pesticide use, which leads to both direct and indirect improvements in environmental quality. Notably, cover crops enhance soil structure, increase infiltration capacity, support a healthier soil microbiome, and contribute to better water quality.

Although working conditions are largely unchanged, the analysis notes that initial training and management costs can be significant depending on the farm's capacity to implement and maintain the cover system. Importantly, the approach achieves effective disease control without compromising yield or grape quality, positioning it as a high-potential tool in integrated vineyard management.

Evaluation:


Not Satisfying


Not Satisfying


Moderately Satisfying


Satisfying


Very Satisfying

Find out more details:

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