



Natural Vineyard Protection

A practical guide for DO Emporda wine growers



Emporda vineyards with calcareous soils, cypress trees and dry stone walls.

What you will find in this guide: Practical, low-cost strategies to protect your vines from downy mildew, powdery mildew, botrytis, and grape moth, using local plants and the systemic logic that turns the vineyard into a self-protecting ecosystem.

Crop: Vineyard (Grenache, Carignan, Macabeu, Muscat) | **Region:** DO Emporda | **Scale:** 0.5 - 15 ha | **Cost:** 280 - 530 EUR/ha/season

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1. Know your enemy: the 3 main vineyard threats

The Emporda has a specific phytosanitary profile for vines, shaped by its Mediterranean climate, calcareous soils, and the Tramontana wind. The latter is a free ally: its natural ventilation significantly reduces fungal pressure. Indigenous varieties (Grenache, Carignan) are naturally more resistant than many international varieties, but knowing the threats allows you to anticipate them.

Threat	What it does	When to watch
Downy mildew <i>(Plasmopara viticola)</i>	Fungus attacking leaves, shoots and clusters. Oil spots, necrosis, premature drop. Can destroy the entire crop in wet years.	Spring - summer. Activated by rain + warmth (>10 C + >10 mm in 24-48h). Peak risk: May-July.
Powdery mildew <i>(Erysiphe necator)</i>	White powder on leaves and clusters. Splits berry skin, opens the door to botrytis. Reduces must quality.	Spring - summer. Favoured by dry heat and excessive shade. High risk in dense canopies.
Grape moth <i>(Lobesia botrana)</i>	Moth with 3 annual generations. Larvae bore into berries, causing secondary rots (botrytis) and crop loss.	April - September. The 2nd and 3rd generations (green and ripe grapes) cause the most damage.

The Tramontana advantage: Unlike more sheltered wine regions (Priorat, inland Penedes), the Emporda benefits from natural ventilation that quickly dries foliage after rain. This reduces leaf wetness hours and therefore the frequency of antifungal treatments. Never forget this free ally.

2. Your zero-cost toolkit

The following preparations use wild plants from the Emporda. Zero cost. Vines are the crop where plant ferments have the most tradition and the strongest evidence of efficacy.



Vineyard preparation workspace: sprayer, ferments, sulphur, alembic, fresh aromatics.

Rotate applications every 2-3 weeks. Diversity of preparations is your best insurance.

Horsetail decoction (*Equisetum arvense*)

Key preventive antifungal for vines. Rich in silica, strengthens cell walls against downy and powdery mildew.

Ingredients: 100 g dried horsetail (or 1 kg fresh) + 10 L water

1. Boil in 10 L water for 30 min.
2. Cool, strain through fine mesh.
3. Dilute 1:5 before spraying.
4. Apply every 2-3 weeks from bud break to harvest.
5. Use within 48 hours.

Cost: Free. Grows along streams and wetlands.

Nettle fermented extract (*Urtica dioica*)

Immunity stimulant. Strengthens vines against water stress and disease.

Ingredients: 1 kg fresh nettle (before flowering) + 10 L water + non-metallic container

1. Submerge cut nettle in 10 L water (plastic or wood).
2. Ferment 10-14 days, stirring daily. Ready when foaming stops.
3. Strain: 1:10 foliar, 1:5 soil drench.
4. Storage: 2-3 months sealed in dark container.

Cost: Free. Ubiquitous in shaded areas.

2. Your zero-cost toolkit (continued)

Olivarda fermented extract (*Dittrichia viscosa*)

*Proven antifungal against vine downy mildew. Field trials confirm efficacy on *Plasmopara viticola*.*

Ingredients: 1 kg fresh leaves and stems + 10 L water

1. Chop coarsely, submerge in 10 L water.
2. Ferment at 30-35 C for 10 days, stirring daily.
3. Filter carefully, store in refrigerator.
4. Spray at 2:50 (extract:water).
5. Reapply every 10-12 days.

Cost: Free. Olivarda grows on roadsides and field margins everywhere.

Wormwood infusion (*Artemisia absinthium*)

*Powerful insect repellent. Particularly effective against grape moth (*Lobesia botrana*).*

Ingredients: 300 g fresh wormwood (leaves and flowers) + 10 L boiling water

1. Infuse in 10 L boiling water, cover for 24 hours.
2. Strain and dilute 1:5 before spraying.
3. Apply at dusk (volatile compounds are UV-sensitive).
4. Reapply every 10-14 days during *Lobesia* flight period.

Cost: Free. Native, grows on dry slopes.

LiFoFer: the weapon to reduce copper. At the Monastere de Solan (Gard, France), CIRAD has documented that foliar LiFoFer application significantly reduces the need for copper sulphate against downy mildew. Trials by the Cabinet d'Agronomie Provencale (2020-2023) confirm improvements in vegetative growth and vine water status. AGECO integrates LiFoFer as the central axis of the viticultural programme.

3. Mineral and biological protection

Plant ferments are the preventive base. For strong mildew pressure in wet years or powdery mildew in dry years, complement with copper, sulphur, and Bt authorised in organic farming.

Copper and sulphur (the safety net)

The AGECO objective is not to eliminate them but to reduce doses to the minimum through ferments, LiFoFer, and cover crop management.

Copper	Limit: <4 kg Cu/ha/year. 3-5 apps/season, reduced dose, weather-timed. Cost: 50-100 EUR/ha.
Sulphur	Against powdery mildew. 3-5 apps/season. Do not apply >35 C. Cost: 30-60 EUR/ha.

Bacillus thuringiensis (Bt) against grape moth

Selective biological insecticide against Lobesia larvae. No impact on beneficials. 2-3 apps/season with traps. Cost: 60-100 EUR/ha. Apply at dusk.

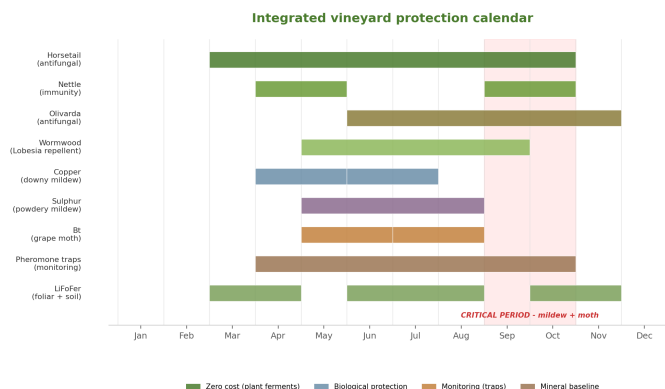
Pheromone traps

The intelligence layer. 2-4 traps/ha for Lobesia. Cost: 20-40 EUR/ha. The most cost-effective investment.

4. Integrated calendar and costs

Every vineyard is unique. Observe, record, adjust.

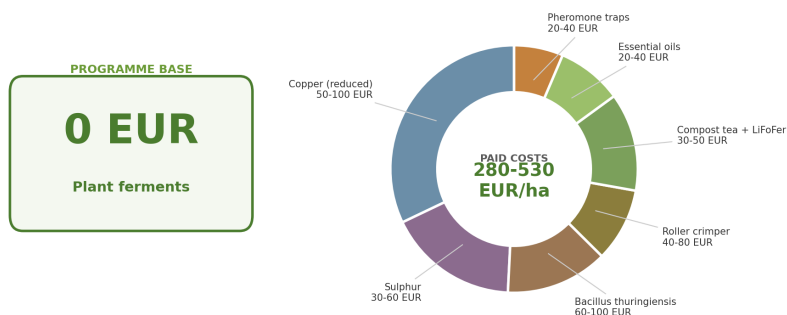
Period	Action	Objective
Feb - Mar	Compost tea soil. LiFoFer soil. Pheromone traps.	Activate biology. Monitor Lobesia.
Apr - May	Horsetail /2-3 weeks (from bud break). Nettle foliar. Copper if wet.	Mildew/powdery mildew prevention.
May - Jun	Flowering: NO INSECTICIDE. Horsetail. Sulphur if powdery mildew. LiFoFer foliar.	Protect flowering. Reduce copper.
Jul - Aug	Full rotation: olivarda + horsetail + wormwood. Bt if traps confirm. EOs. Roller crimper cover.	Critical season. Max diversity.
Sep - Oct	Reduce treatments pre-harvest. LiFoFer soil post-harvest. Compost tea.	Prepare winter dormancy.
Nov - Jan	Rest. Pruning. Planning. Prepare ferments for spring.	Diseased wood. Compost residues.



Estimated annual costs per hectare

Category	Products	EUR/ha
Plant ferments	Horsetail, nettle, olivarda, wormwood	0 EUR
Essential oils	Thyme, rosemary, orange	20 - 40 EUR
Copper (reduced dose)	3-5 apps weather-timed	50 - 100 EUR
Sulphur	Powdery mildew (3-5 apps)	30 - 60 EUR
Bacillus thuringiensis	Grape moth (2-3 apps)	60 - 100 EUR
Pheromone traps	Lobesia botrana	20 - 40 EUR
Compost tea + LiFoFer	Compost tea + LiFoFer soil/foliar	30 - 50 EUR
Roller crimper	Cover crop management (1-2 passes)	40 - 80 EUR
TOTAL		280 - 530 EUR

Annual cost distribution per hectare



The programme base (plant ferments) is entirely free.

Comparison with conventional and certified organic

	Conventional	Certified organic	AGECO natural
Crop protection	200-400 EUR (synthetic fungicides)	300-550 EUR (copper, sulphur, Bt high)	250-470 EUR (ferments + Cu/S reduced)
Herbicides / cover	80-150 EUR (glyphosate)	100-180 EUR (repeated mowing)	40-80 EUR (roller crimper)
Fertilisation	200-400 EUR (synthetic NPK)	150-300 EUR (organic fertilisers)	30-50 EUR (compost tea + LiFoFer)
TOTAL/ha/year	480-950 EUR	550-1,030 EUR	280-530 EUR
5-year trend	Stable/increasing	Stable	-30 to -50%

The key point for wine growers: The AGECO programme reduces total input costs to less than half of conventional. And crucially, it allows **significant copper reduction** through LiFoFer and plant ferments. Less copper in soil = more microbial life = healthier vines long-term.

5. Beyond recipes: vitiforestry

This guide gives immediate tools. Real protection comes from designing the whole system.



Vitiforestry: vines with companion trees, aromatic understory, integrated grazing, cypress windbreak and swale.

Vitiforestry integrates trees, shrubs, and cover crops into the vineyard. In the Emporda, combining Grenache and Carignan with almond, fig, aromatics, and a living cover creates an ecosystem that fixes nitrogen, cools the soil, and feeds soil biology.

The vineyard as a productive ecosystem

Design element	Protective function	Other functions
Inter-row aromatics (thyme, rosemary, lavender)	Antifungal, repellent EOs	Herbs, honey, fire cover, income
Companion trees (almond, fig, carob)	Diversification, regulated shade	Income, climate adaptation
Living cover crop (sainfoin, vetch, alfalfa)	Weed competition, soil moisture	Nitrogen, grazing, erosion
Cypress windbreaks (Cupressus sempervirens)	Tramontana protection = less desiccation	Fire-resistant windbreak
Hydrological management (keyline, swales)	Hydrated soil = resistant vines	Less water stress, resilience

"We don't design utopias; we design functional ecosystems. Every recommendation is rooted in the Emporda's conditions: calcareous soils, Tramontana, dry summers, and the reality of the people who make wine here."

Want to go further?

This guide is a starting point. Every vineyard is unique.

AGECO supports landowners in the Emporda and Garrotxa transitioning to more resilient, autonomous, and profitable systems.

Step	What happens	Investment
1. Conversation	30 min to understand your situation.	Free
2. Site visit	2-3h: landscape reading, water flows, ideas.	80 EUR/h
3. Ongoing support	Monthly guidance, plans, soils, subsidies.	From 150 EUR/month

International vineyard experience: AGECO works in vitiforestry with experience in France, Canada, and Switzerland. If you also manage olive groves or orchards, we can integrate the methodology across your entire estate.

Other resources:

- **Natural Olive Protection Guide** (Emporda)
- **Fire-Resilient Agroforestry Guide** (Emporda / Garrotxa)

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*AGECO designs functional ecosystems, not utopias.
Every vineyard is unique and deserves a tailored response.*

Note: This guide is for informational and educational purposes. For certified organic crops, verify product compliance with your certifying body. AGECO, March 2026.