



AGROECOLOGY FOR WEEDS

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AGROECOLOGICAL WEED MANAGEMENT REPOSITORY

The Agroecological Weed Management (AWM) Repository

<https://www.goodhorizon.eu/platform/awm-practices/>

is a virtual space where you can freely and openly find information and educational material on current and agroecological weed management practices in the European Union. You can browse and learn about several weed management practices and crops.

The **Agroecological Weed Management (AWM) Toolbox**, our Decision Support System that supports the user to reduce the use of synthetic herbicides and/or improve weed management by combining different Agroecological Weed Management (AWM) strategies with cover crops is LIVE !

<https://dss.goodhorizon.eu/>



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COVER CROPS + ALLELOPATHIC CROPS

DESCRIPTION & BENEFITS

Cover crops + allelopathic crops is a preventive agroecological weed management approach that combines the physical and competitive effects of cover crops with the potential weed-suppressive effects of allelopathic plant species. Allelopathy refers to the release of natural biochemical compounds by plants that may inhibit weed germination, seedling emergence or early weed growth. This approach could:

- **suppress weed emergence** through cover crop competition and soil cover
- **reduce weed seedling growth** through residues or allelochemical effects
- **reduce the amount of light reaching the soil surface**
- **contribute to weed seedbank management** by reducing weed establishment and seed production

However, allelopathic effects should not be considered a stand-alone solution, because field performance is often variable and can be difficult to separate from the effects of biomass, shading, mulch and crop competition.

STRENGTHS

- Additional weed suppression through natural allelochemical effects, combined with competition, and physical mulch from the cover crop
- Reduction of weed emergence and early weed growth, especially when high-biomass residues remain on the soil surface after cover crop termination
- Contribution to soil protection, organic matter inputs and agroecosystem diversification while supporting non-chemical weed management

OPPORTUNITIES

- Potential to reduce reliance on synthetic herbicides by strengthening biological and preventive weed suppression within integrated weed management
- Could support breeding and selection of cover crop species or cultivars with stronger weed-suppressive and allelopathic traits
- Could be combined with cover crop mixtures, crop rotation, roller crimping, mulching, reduced tillage and competitive crop varieties

WEAKNESSES

- Allelopathic effects are variable and often difficult to separate from biomass, residue cover, soil moisture and crop competition effects
- Requires careful selection of species, cultivars, termination timing and residue management to avoid weak weed control or negative effects on the following crop
- Some allelopathic cover crops may compete for water and nutrients, immobilize nitrogen temporarily, or complicate crop establishment when residue levels are high

THREATS

- Allelopathic residues may also suppress or delay germination and early growth of the following cash crop if species choice, residue management or planting interval are poorly managed
- Repeated use of the same allelopathic species may select for tolerant weed species or shift the weed community towards species less affected by the residues
- Weather variability, low biomass production, rapid residue decomposition or unsuitable soil conditions may reduce allelopathic activity and overall weed suppression

TIPS

- **select cover crop species or mixtures with strong biomass production** and, where locally suitable, known allelopathic potential
- **prioritize good cover crop establishment and high biomass** because weed suppression usually depends strongly on dense soil cover and residue quantity, not only allelopathy
- **match the allelopathic cover crop to the following cash crop**, as some residues may also inhibit or delay crop germination and early growth
- **consider cultivar differences**, because allelopathic potential can vary within the same species
- **terminate the cover crop at the correct growth stage to maximize biomass and weed suppression** while avoiding seed production or regrowth
- **manage residues carefully**, either leaving them as mulch, incorporating them shallowly or combining them with reduced tillage depending on the system objective
- **avoid relying only on allelopathy** where weed pressure is high, perennial weeds are present or the weed community is dominated by species that are not sensitive to the selected cover crop
- **monitor cash crop emergence**, because some allelopathic residues may negatively affect small-seeded crops or crops planted too soon after termination
- **test the practice on a small area first** to evaluate local weed suppression, crop safety, residue persistence and yield effects

LIABILITY DISCLAIMER

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