

Mowing

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Factsheet about integrated weed management



Introduction

Weed population dynamics are affected by post-harvest treatments in the field, such as mowing weed stubbles. This prevents further development of the weed plants, the seeds and vegetative propagation in the soil¹ while nutrients and water between weeds and crops are balanced due to the short weed canopy height.

Applicability

Before herbicides became a common strategy, mowing was widely used in farming and still remains one of the most common alternatives to herbicides for direct weed control. It is a common practice in orchards and nurseries where the wide spacing allows for operations of a mower between the woody vegetation. Perennial weeds in pastures and whole-year green manure crops are managed by mowing as well. In crops that need intra-row management it is still in its infancy².

Mowing can be done to manage living mulch as well. In this case a living mulch is mowed to cover the soil between the main crop plants while weeds are suppressed and kept short to prevent competition with the crop. A trial with continuous mowing compared to flaming and tillage performances as living mulch management strategies highlights that autonomous mowers benefits organic vegetable production and saves energy compared to flaming and conventional tillage³.

Efficacy

Perennial weed growth can be reduced significantly by repeated mowing of the weed stubbles in the post-harvest period. Timing and frequency are important for the efficacy. In general, the most effective time to mow weeds is at the moment that the desired plants (e.g. grasses) are dormant while weeds have reached their early flowering stage. In this case weeds have lost a large amount of energy for bolting while seed production is prevented.



Stubble treatments may lead to survival of annual weed seeds after they have been buried⁴.



The effectivity of mowing depends on multiple local factors such as the soil type.

Equipment

Mowing is done using simple mowers or autonomous vehicles. A mower is even efficient with very developed weeds while it does not induce erosion. Interplanted and young vines however should be protected from the dust.

Mowers are available that can cut weeds from cereal crops, like the CombCut⁵ (fig. 1). The selectivity is based on the flexibility of the stem. Plants with a more rigid stem will be cut, while the species with more flexible stems will remain intact. Examples of application are: thistles and broad leaved species in cereal crops, thistles, broad leaved species in grassland, large species growing above crops.



Figure 1 | The CombCut cutting weeds (mainly *C. album*) in grassland.

1] Melander, B., Munier-Jolain, N., Charles, R., Wirth, J., Schwarz, J., Van der Weide, R.Y., Bonin, L., Jensen, P.K., Kudsk, P., 2013. European perspectives on the adoption of nonchemical weed management in reduced-tillage systems for arable crops. *Weed Technol.* 27 (1), 231–240. <https://doi.org/10.1614/WT-D-12-00066.1>.

2] Melander, B., Rasmussen, I. A. and Olesen, J. E. (2016). Incompatibility between fertility building measures and the management of perennial weeds in organic cropping systems. *Agriculture, Ecosystems and Environment* 220, 184–192.

3] Sportelli, M.; Frascioni, C.; Fontanelli, M.; Pirchio, M.; Gagliardi, L.; Raffaelli, M.; Peruzzi, A.; Antichi, D. Innovative Living Mulch Management Strategies for Organic Conservation Field Vegetables: Evaluation of Continuous Mowing, Flaming, and Tillage Performances. *Agronomy* 2022, 12, 622. <https://doi.org/10.3390/agronomy12030622>

4] Jensen, P.K., 2009. Longevity of seeds of four annual grass and two dicotyledonous weed species as related to placement in the soil and straw disposal technique. *Weed Res.* 49 (6), 592–601. <https://doi.org/10.1111/j.1365-3180.2009.00725.x>; Jensen, P.K., 2010. Longevity of seeds of *Poa trivialis* and *Vulpia myuros* as affected by simulated soil tillage practices and straw disposal technique. *Grass Forage Sci.* 65 (1), 76–84. <https://doi.org/10.1111/j.1365-2494.2009.00720.x>.

5] CombCut - Agri Bio-Solutions (agribiosolutions.eu)



Core results

Multiple studies have shown that mowing allowed an acceptable weed control effect together with lower energy consumption and emissions of greenhouse gasses^{61,71,81}.

Extra information

See <https://iwmpraise.eu/publications/> for all crop diversification strategies and their definitions, and for more information on integrated weed management and the following inspiration sheet:

- Mechanical weeding technologies



Figure 2| Lamb's quarters (*C. album*) mown by CombCut.



Figure 3| Mowing grassland.

61 | Magni, S.; Sportelli, M.; Grossi, N.; Volterrani, M.; Minelli, A.; Pirchio, M.; Fontanelli, M.; Frascioni, C.; Gaetani, M.; Martelloni, L.; et al. Autonomous mowing and turf-type bermudagrass as innovations for an environment-friendly floor management of a vineyard in coastal tuscany. *Agriculture* 2020, 10, 189.;

71 | MacLaren, C.; Bennett, J.; Dehnen-Schmutz, K. Management practices influence the competitive potential of weed communities and their value to biodiversity in South African vineyards. *Weed Res.* 2019, 59, 93–106.;

81 | Sportelli, M.; Frascioni, C.; Fontanelli, M.; Pirchio, M.; Raffaelli, M.; Magni, S.; Caturegli, L.; Volterrani, M.; Mainardi, M.; Peruzzi, A. Autonomous mowing and complete floor cover for weed control in Vineyards. *Agronomy* 2021, 11, 538.

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