# Dead mulching

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## Introduction

Cover crops can be killed and left on the soil surface as a dead mulch. Also other materials can be used as a dead mulch; as long as they provide a dense soil cover, dead mulches can have a significant effect on weed suppression.

## Applicability

Dead mulching can either be applied after a cash crop by growing a cover crop that is killed later on and left on •

Table 1| Summary of the types of mulches available on the market.

the field, or by adding mulch material on the soil surface while the cash crop is grown. After a period in which the mulch has suppressed weeds, the dead mulch can be incorporated into the soil, depending on the cash crop and material used for mulching.Materials applicable as dead mulch are broad (table 1), including:

- Residues of cover crops (figure 1).
- Organic based mulches such as straw, hay, compost, absinth wormwood plants, black biodegradable plastic, paper, spruce bark and cocoa husk mulches (figure 2).
- Polyethylene (PE)<sup>11</sup>.

Product	Material	Feasible uses		Advantages and disadvantages
Various	Paper	Planted crops with little competitive strength and crops that need to be harvested in a 'clean' condition, such as strawberries, lettuce, and fennel.	+	No detrimental effects on the growth of the crop. Good suppression of weeds. Dry and clean product.
			5	Tears easily whilst being laid. Expensive. Rapid decay of edges inserted in the soil.
Biodegradable	Natural starch or biodegrad- able plastic	As for paper; also suitable for gherkins, pumpkins and glasshouse crops.	+	No detrimental effects on the growth of the crop. Readily suited to laying using machines. Good suppression of weeds, clean product on harvesting. No disposal fees.
Plastic film	PE-film	As for biodegradable films	-	Growth of weeds in plant holes. As expensive as PE film, but cheaper than paper. Can tear more readily than PE film.
			+	As for biodegradable films, but with disposal fees.
	~	3	-	Not ecological. Costs of clearance and disposal. Growth of weeds in plant holes
Compost	Weed-free compost or black soil	Layer of at least 3 cm required. Can be used once in croprotation cycles. In view of the use of minerals these materials are governed by the manure legislation.	+	No detrimental effect on the growth of crops. Has a fertilizing effect.
			-	In view of the presence of minerals the compost can also constitute an excellent growing medium for weeds when used for longer periods. A large quantity of minerals is applied. This can cause bottlenecks with respect to the manure legislation.
Chopped straw	Straw	Outdoor crops. Apply a thick layer of between 3-5 cm (15-18 tonnes straw/ha).	+	Easy to apply when the surface is still bare after planting (for example, bulb crops). Cheapest covering material ( $\in 1,750$ , inclusive of application and chopping).
			-	Retarded growth due to nitrogen capture and lower soil tem- perature. Increased risk of damage caused by night frosts. Second growth of cereals and, on occasion, weeds. Nitrogen capture after harvesting due to straw residues. Additional costs on disposal.
Animal star	Straw	Dispersible granules for planted crops with little competitive strength and for sown crops (from the three-leaf stage).	+	Biodegradable. Weed suppression > 4 months. Metering possible. Simple to use.
			-	Can have a detrimental effect on the growth of the crop due to nitrogen capture; the soil remains cold for a longer period in the spring. Expensive (approx. € 5,000/ha). Nitrogen capture, also after ploughing under following harvesting.







#### Efficacy

Dead mulching can replace or supplement tillage operations for the management of weeds, and is an option for zero till systems.

The efficacy on weed suppression depends on a number of factors:

- Penetrability;
- Resilience to weather conditions;
- Thickness of the mulch layer<sup>1</sup>.

If it provides a dense soil cover, dead mulching creates a physical layer that can prevent weeds from emerging since most weeds germinate and emerge from the top 2.5 cm of the soil<sup>11</sup> while crop seeds are often sown at a greater depth. Therefore, the choice of dead mulching material and thickness should be adjusted to the sowing depth of the cash crop and the targeted weed species, in order to avoid the mulch to inhibit crop establishment.

#### Costs

Costs for dead mulching vary from zero up to the costs to buy the mulching material and for maintenance operations (e.g. sowing and killing a cover crop). As long as the period of mulching does not replace the production of a cash crop, costs remain relatively low.

#### Equipment

There are several steps that require equipment:

- A sowing machine and equipment for seedbed preparation in case a cover crop is used as mulching material;
- In most cases any other material can be applied with a regular mulch spreader.

#### **Core results**

 A practical example of a dead mulch practice, is carrots and onions sown under a layer of compost (2–6 cm deep) that reduces weed emergence by 69–85%<sup>2|</sup>.

#### Extra information

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



Figure 1 | A cover crop can be incorporated into the soil or used as a dead mulch by leaving it at the soil surface.



Figure 2| Compost heaps to be used as dead mulch.

Contact| Timo Sprangers M| *timo.sprangers@wur.nl* T| (+31)320 29 12 37

Contact| Saskia Houben M| *saskia.houben@wur.nl* T| (+31)320 29 12 09



<sup>21</sup> Achten, VTJM, Bleeker, PO, Lotz, LAP, Molema, GJ (2005). Onkruidvrije zaaistroken, doorontwikkeling machine en praktijkproeven 2005. Rapport 578, ISBN 90-6754-988-6.