

## Early destruction of a green cover limits risks of loss at the emergence stage

Before sowing a spring crop, care must be taken when destroying the cover crop established in winter, in order to ensure optimum emergence. Control over the date and method of destruction of the cover crop is a prerequisite in order to limit risks when the main crop is being established as well as to help it develop in good conditions.



Early destruction of the cover crop gives it time to decompose before the main crop is sown.



To establish a maize or sunflower crop after a green cover, the cover should be destroyed at an early date.

The main objectives of putting green covers in place during the intercropping season are: to limit the risk of erosion, trap nitrogen residue, encourage biological activity in the soil (helps worm activity, game...) and improve soil structure both at depth and on the surface, to help create a crumbly texture and facilitate crop emergence. It is important to remember that those cover crops require appropriate management. The date of destruction is a key element. Potentially, it can have a negative impact on the main crop establishment. Once destroyed, the green cover is likely to keep the soil surface very damp (mulch effect) if the season is particularly wet, even if it stays standing, and therefore result in a less hospitable seed bed (sowing furrow not properly closed up, unsatisfactory contact between soil and seed...).

In addition, parasite attacks (slugs, field mice) may increase the number of plants that do not emerge properly and therefore result in poor plant density likely to affect the yield potential of the crop. Conversely, in dry years the cover crop may increase water deficit in the soil and create conditions which are detrimental to seed germination for example, and to

the development of the young crop. It is therefore essential to manage the cover crop destruction properly in order to derive maximum benefits from it. This is why a long-term experiment was put in place in 2003 in silty soils on the Inter-institute Research Station of Baziège (southwestern France, near Toulouse), with the objective of determining the impact that the date of destruction of the cover crop has on the establishment of the main crop. The green cover is established after durum wheat, either before harvest (broadcast sowing of oilseed rape), or after (shallow cultivation and sowing of cover crop: oats + rye). Emergence of a broadcast sown cover crop very much depends on the level of humidity of the soil following sowing and its success is therefore not guaranteed.

Recommended date of destruction of cover crop in the Midi Pyrénées region, depending on which summer crop is to be established (table 1)		
Soil type	Summer crop	
	Sunflowers	Maize
Silt	January - February	February - March
Clayey silt	January - 15 <sup>th</sup> February	February - 15 <sup>th</sup> March
Clayey soil	End of January	End of February

The later the cover crop destruction date is, the poorer emergence is.



Setting an early destruction date helps to limit the amount of residue hindering sowing and increasing the risk of parasites being present.

This trial helps to compare three main crop establishment methods in a winter crop (durum wheat) - summer crop (sunflowers or sorghum) rotation:

- establishment of the main crop in a traditional system with cultivation based on ploughing,
- establishment of the main crop after early destruction of green cover (end of January),
- establishment of the main crop after late destruction of green cover (end of February).

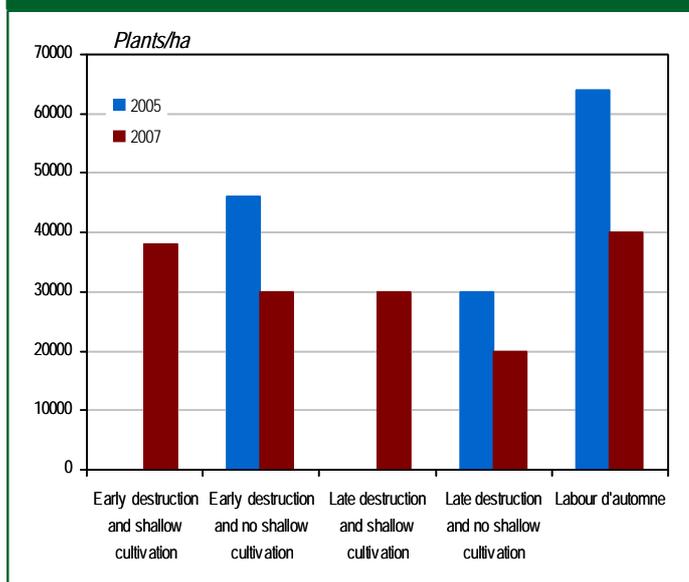
In 2005, the only parameter taken into account was the early or late destruction of the green cover. In 2007, the date of destruction of the green cover was combined, or not, with shallow cultivation before sowing sunflowers (*table 1*). Emergence losses in a sunflower crop get heavier as the cover destruction date gets later and preparation of the seed bed is limited to opening a furrow which does not always close up properly again.

Generally, the objective at the end of a green cover is to establish a summer crop with absolutely minimal soil cultivation, in order to benefit, among other things, from the restructuring effect created by the root system of the cover crop, and therefore to limit the number of passes

One of the main problems with sowing into a cover crop is the insufficient amount of fine earth in the seed bed to ensure good contact between the soil and the seed.

which damage the structural quality of the subsoil. However, one of the main problems associated with this technique is the insufficient amount of fine soil present in the seed bed to ensure good contact between the soil and the seed. Even though the seed placing components of current direct drills are capable of penetrating hard soils, this problem remains topical and must be solved to help produce fine soil which is essential for the seed to germinate. It is easier to create a good environment for the seed with fine soil than to try and close up a furrow opened by a disc device and containing no fine soil.

Sunflower emergence depending on cover crop destruction and seed bed preparation (*fig. 1*)



### Determining an early destruction date

Control over the date and method of destruction of the cover crop is a prerequisite in order to limit risks when the main crop is being established and to help it develop in good conditions.

The first step is to take account of the green cover destruction rules specific to each "*département*" (for France). In addition, although the amount of biomass produced does not seem to alter the outcome of the

main crop, the date of destruction of the cover crop should not be left too late (even if the amount of biomass produced is under 500 kg), or there may be a nitrogen deficit at the start of the cycle which would be detrimental to the development of the summer crop and cause growth stage differences.

Therefore, an early destruction date (end of January or end of February, *table 1*) will let the cover crop evolve and decompose in such a way that will cause very limited inconvenience when the main crop is being established. That way, plant residue degradation can continue over a longer period of time and facilitate the use of the drilling component, which may be fitted with a debris-clearing device that will be even more effective if the plant residue is only loosely attached to the ground.

In conclusion, to establish a main crop after a green cover, it is recommended to determine that an early destruction date is opted for (depending on the summer crop and soil type), in order to limit the amount of residue which makes sowing more difficult, increases the risk of parasites (slugs, field mice), and, finally, reduces soil evaporation and creates plastic soil conditions which prevent the furrow left by the drill from closing up properly.

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