



TRIALS WITHOUT GLYPHOSATE: SOME RESULTS

One of the main reasons for using glyphosate during the intercropping period was to sow the following crop on a weed-free soil. Indeed, before spring crops, there may be situations in which weeds, especially grasses, need to be destroyed: re-emergence from ploughing, or when weeds present since the last tillage operation have overwintered and developed; a cover crop if it is only destroyed at the end of the winter; or new spring weed emergence induced by tillage in March that needs to be eliminated before sowing. To control these weeds, several tillage tools have been tested as alternatives to glyphosate.

DID YOU KNOW?

On 22 June 2018, the French government launched a global action plan for the withdrawal of glyphosate to end its main uses within three years at the latest and within five years for all uses, while making it clear that farmers would not be left in a bind.

SUNFLOWER AND SOYBEAN TRIALS

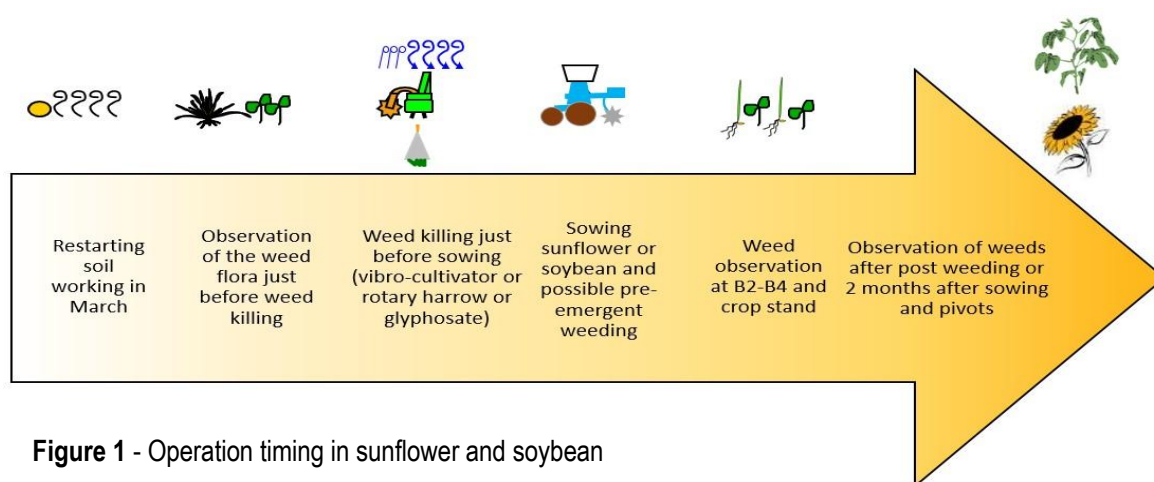


Figure 1 - Operation timing in sunflower and soybean

Results on grassweeds (Rye-grass *Lolium multiflorum* and Blackgrass *Alopecurus myosuroides*)

Tillage did not destroy all the grassweeds very well, especially when they began tillering (from Stage B). Moreover, tillage induced new germinations of grassweeds in the following crop, more than glyphosate, because the soil is finer and has been moved. It seems that a rotary harrow is slightly more efficient than a vibro-cultivator for destroying grassweeds due to its more aggressive action on weed roots, as it separates them from the soil. However, it induces less grassweed germination than a vibro-cultivator. These conclusions, however, need to be confirmed.

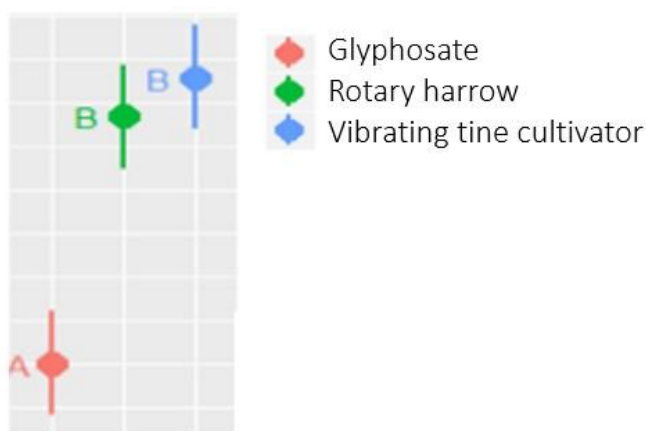


Figure 2 - Density-adjusted average (log+1) with Tukey test on ryegrass in sunflower trials

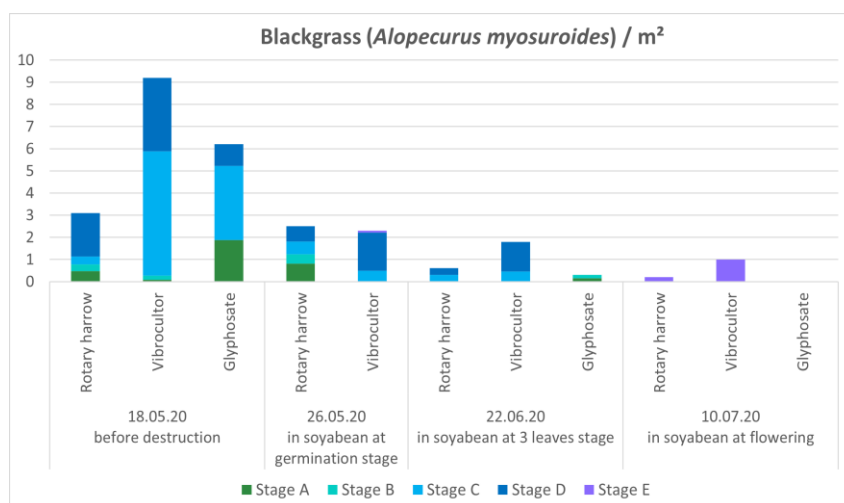


Figure 3 - Effect of each method on blackgrass management in soybean trial

Results on ragweed (*Ambrosia artemisiifolia*)

On ragweed, most of the trials showed that tillage is efficient for destroying young seedlings. Nevertheless, ragweed germinates in great numbers, in sunflower or soybean, especially after tillage. After glyphosate application, we had only a few germinations of ragweed, as we can see in Figure 4 and Figure 5. Moreover, it seems that use of a rotary harrow led to more germinations of ragweeds than a vibrocultor, partly because the rotary harrow used in these trials was equipped with a Packer roller, which facilitates germination. This conclusion needs to be confirmed.

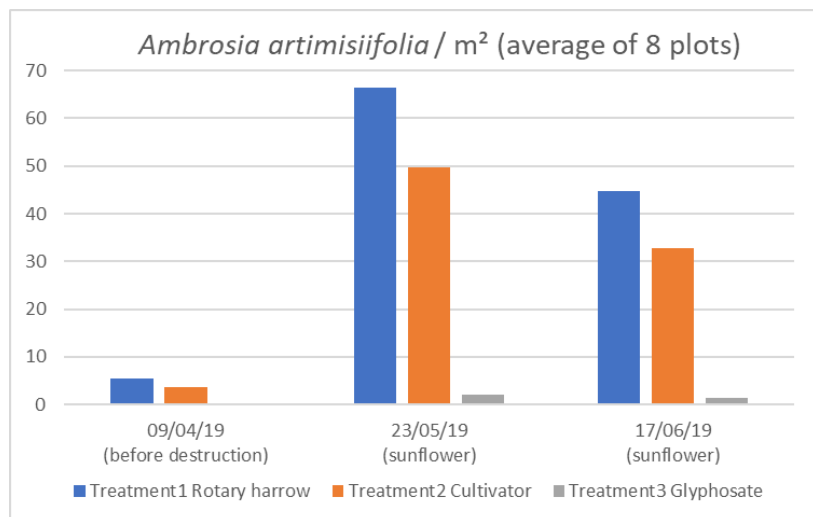


Figure 4 – Results of 2019 ragweed trial on sunflower (Terres Inovia)

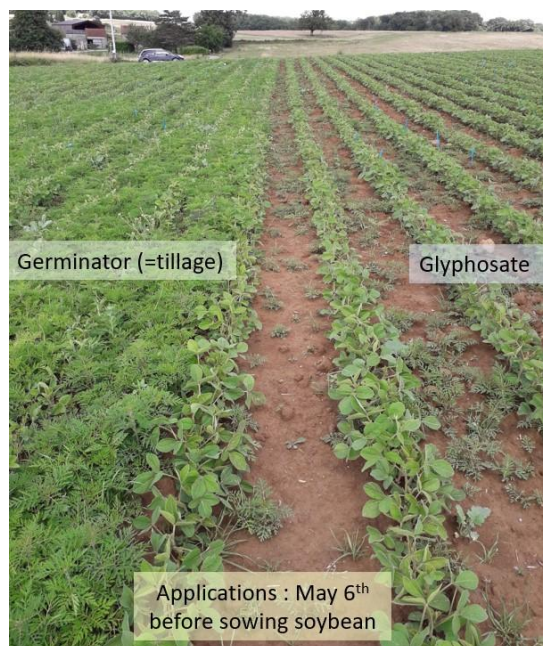


Figure 5 - Ragweed trial on soybean (Terres Inovia, picture taken on 2 June 2020)

TILLAGE AND CLIMATE

The destruction efficiencies of various tillage strategies were gathered. We also studied the climate with a climatic index, which represents the difference between rain and potential evapotranspiration: when the index is positive, the climate is wet; when it is negative, the climate is dry. Figure 6 shows that for grass species, destruction efficiency is lower when the climate is wet, especially from the tillering stage. For broadleaf species, destruction efficiency seems to be unaffected by climate and weed stages.

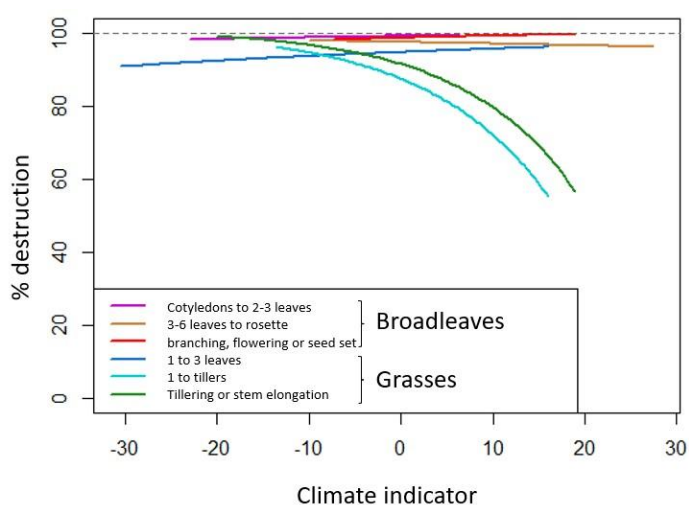


Figure 6 – % of weed destruction among weeds type and climate indicator (compilation of trials)

TO SUM UP

- Tillage is not fully efficient for destroying grassweeds, especially at tillering and when the climate is not dry enough.
- Tillage can destroy broadleaf species before crop sowing.
- Destruction is more efficient when the equipment tools (tines or disks) have a good recovery (i.e. all weeds have their roots cut).
- Tillage can induce new weed germination, especially when grassweed pressure is high (e.g. rye-grass *Lolium multiflorum* or blackgrass *Alopecurus myosuroides*), or ragweed. Consequently, these plants expand in the crop.
- Tillage feasibility and efficiency depend on climate conditions. Indeed, a period with good climate conditions is necessary to till the soil correctly and a dry climate after tillage is required to prevent weeds transplanting or new germination.
- Glyphosate without any tillage prevents new germination of weeds (and destroys plants quite well), but is not enough to correctly prepare the soil for sowing, especially for spring crops (e.g. sunflower). Soil structure is better for crop sowing when some tillage operations are performed.

CONTACTS

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