IWMPRAISE — H2020-SFS-2016-2017/H2020-SFS-2016-2 – Inspiration sheet no.31
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 727321

COMBINED WEEDING IN OIL-SEED RAPE

Combined rapeseed weed control associates mechanical weeding (flex-tine harrow or hoe) and herbicides. Its objective is to relieve the herbicide programs (costs and TFI) by using the additional efficiency provided by mechanical weeding, while guaranteeing good final weeding efficiency.

DID YOU KNOW ?

Mechanical weeding giving better results on broadleaf weeds than on grasses, mixed weeding is more relevant when grass pressure is low.

WHICH COMBINED WEEDING STRATEGIES IN OIL-SEED RAPE?

Combined weeding of rapeseed should only be considered in situations where grass pressure is low. In all cases of high-level of grasses, pre-emergence herbicides and propyzamide will be used.

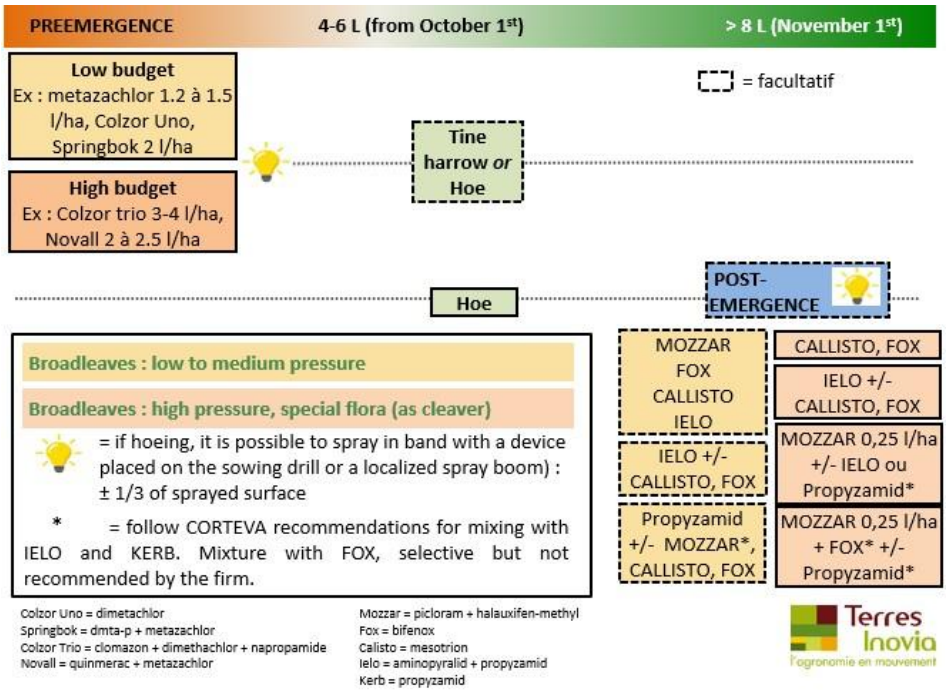

Figure 1 – Proposals of mixed weeding strategies for oilseed rape

The principle is to apply either herbicides in pre-emergence and a flex-tine harrow or hoe in autumn, or to skip pre-emergence (no weeding) and hoe in autumn (a flex-tine harrow in autumn without prior weeding will be ineffective on weeds that already have 2-4 leaves), and then carry out a catch-up (post-emergence herbicides) if necessary.
The choice of herbicides should be adapted according to the level of broadleaf weed pressure (programmes in orange on figure 1 for low to medium pressure; programmes in pink for high pressure or difficult flora). To reduce the quantity of applied herbicides, it is possible to spray only the row of the crop (with a band-spray device placed on the sowing drill or a localized spray boom) and to complete the weeding of the inter-row with hoe.

Trials conducted within the IWMPRAISE project

In order to assess the strategies proposed above, trials were carried out in France (7 trials in Somme [Picardy], Meurthe-et-Moselle [Lorraine] and Charente-Maritime [Poitou-Charentes] in 2018-2019, 2019-2020 and 2020-2021) comparing the technical performance of different types of strategies.

Modality	pre-emergence	oilseed rape 4 leaves	october, 1st	around november 1st	number of trials
Untreated	Untreated plots (adjacent control)				7/7
Chemical ref 1	-	-	Mozzar 0,25 L/ha	-	7/7
Chemical ref 2	-	-	-	Mozzar 0,25 L/ha	7/7
Combined 1	-	Flex-tine harrow		Mozzar 0,25 L/ha	6/7
Combined 2	Flex-tine harrow	Flex-tine harrow		Mozzar 0,25 L/ha	4/7
Combined 3	-	Hoe		Mozzar 0,25 L/ha	2/7
Combined 4	metazachlor 1.2 l/ha	Flex-tine harrow		-	3/7
Mechanical 1	-	Flex-tine harrow		-	3/7
Mechanical 2	Flex-tine harrow	Flex-tine harrow		-	4/7
Mechanical 3	Flex-tine harrow	Hoe		-	1/7

Mozzar = Halauxifen-méthyl,+ Picloram

Table 1 – combined weeding strategies tested in the IWMPRAISE trials.

IWMPRAISE — H2020-SFS-2016-2017/H2020-SFS-2016-2 – Inspiration sheet no.31
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 727321

COMBINED WEEDING IN OIL-SEED RAPE

The objective of these methods is to compare the combined strategies and to answer the following questions. Does mechanical weeding (flex-tine harrow or hoe in autumn) allow:

- To postpone the application of Mozzar (broadleaf weed control)? To use only half a dose?
- To reduce the use of pre-emergence herbicides (for catchment areas of groundwater issues)?

The economic performances of these strategies are also evaluated.

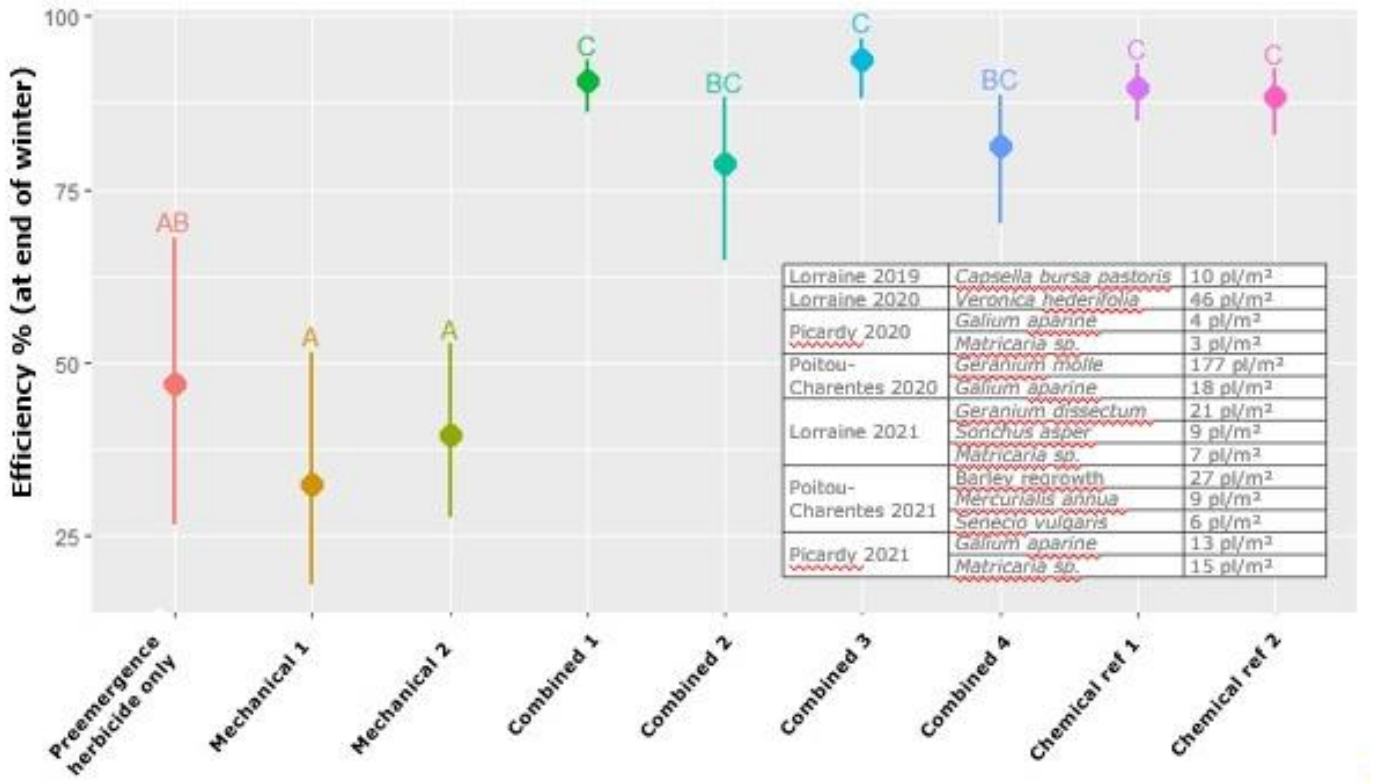

Figure 2 – Efficiencies (%) at end of winter of combined control methods over the 7 trials in 2019, 2020 and 2021.

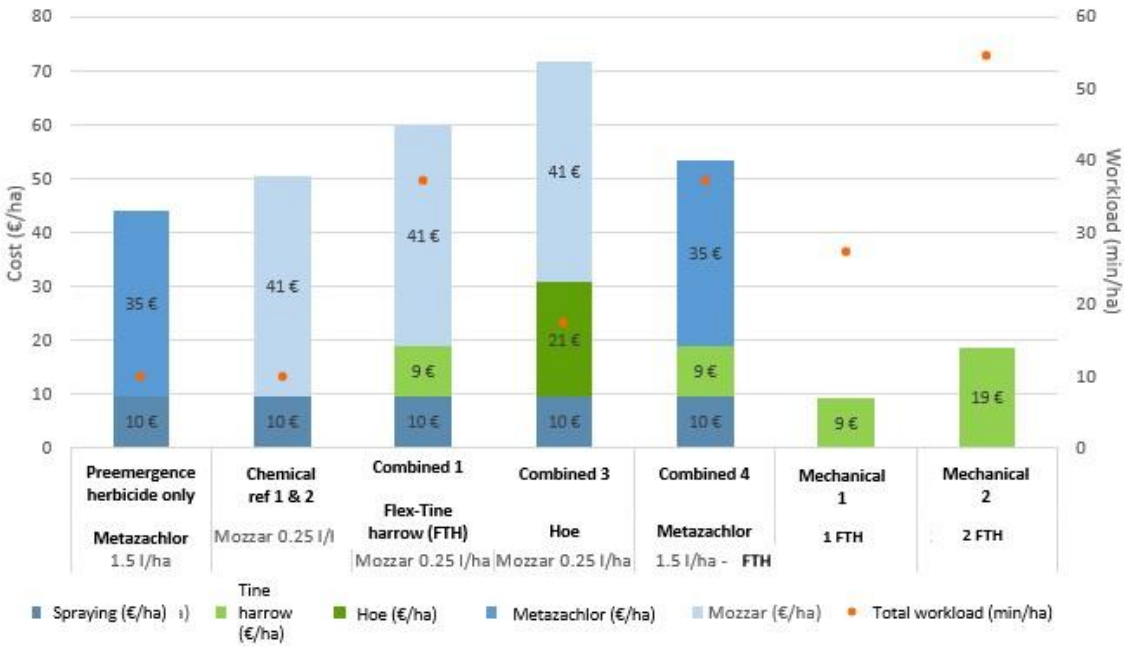

Figure 3 – Cost (€/ha) without labour (tool, traction with fuel, depreciation, product) and working time (min/ha).

IWMPRAISE — H2020-SFS-2016-2017/H2020-SFS-2016-2 – Inspiration sheet no.31
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 727321

COMBINED WEEDING IN OIL-SEED RAPE

The efficiencies of combined weeding are in the same statistical group as those of herbicide programmes. The efficiency of the mechanical alone (with a flex-tine harrow) is on the other hand significantly different and unsatisfactory. A pre-emergence herbicide alone is also not enough to achieve satisfactory weed control. We observe a slight benefit with hoe associated with Mozzar later on November 1 compared to Mozzar alone on the same date, but this difference is not significant.

Unsurprisingly, the combined strategies are those that have the highest cost because they combine mechanical weeding and treatment. The lowest costs are those of the mechanical passages but on the other hand they are the ones which require the most working time.

CONCLUSION OF THE EXPERIMENTS

On broadleaf weeds, in the flex-tine harrow or hoe programmes followed by Mozzar on November 1st, the flex-tine harrow or hoe bring a slight benefit (but not always) compared to Mozzar alone on November 1st.

Hoeing seems more efficient. It can help to avoid pre-emergence weeding or choose programmes with less herbicides (for example Kerb flo [propyzamid] instead of Kerb flo + Mozzar (-40€ et -0.5 TFI) or Ielo in place of Mozzar + Kerb (-20€ et -0.5 TFI).

Finally, mechanical weeding tools can bring a benefit concerning tactical "shoot on sight": it will not necessarily be the reduction in dose that will be targeted but the no-herbicide treatments after mechanical weeding (if the weed infestation allows it). The experiments will be continued by using other methods with a flex-tine harrow only or a hoe only from rapeseed at 4 leaves to see if the catch-up with Mozzar is necessary or not. A no-treatment, if the level of infestation allows it, would decrease the TFI.

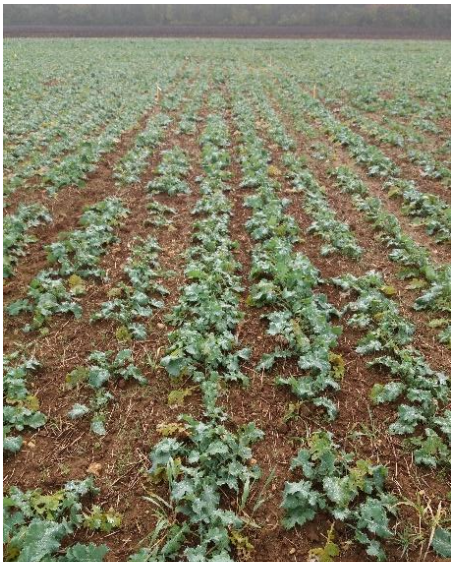

Figure 4 – Combined weed control trial (Nancy - November 19, 2019).

REFERENCES

- «Colza: les stratégies de désherbage mixte à expérimenter» F. Vuillemin and F. Duroueix, Arvalis Terres Inovia Infos, June 2021.
- «Pulvérisation localisée puis binage, une combinaison efficace» F. Vuillemin and JL. Lucas, Perspectives Agricoles no. 491, September 2021.
- On the Terres Inovia website :
  - https://www.terresinovia.fr/-/desherbage-mecanique-ou-mixte-du-colza-avec-binage
  - https://www.terresinovia.fr/-/desherbage-mecanique-ou-mixte-du-colza-avec-herse-etrille

CONTACT

F.VUILLEMIN
Weeds and IWM Expert
f.vuillemin@terresinovia.fr