

New technological links with increased efficiency in weed control at the rape crop - NARDI FUNDULEA -

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Keywords: weeds, herbicides, time of application, selectivity and efficacy

INTRODUCTION

Rapeseed is one of the most popular cultivated plants, it belongs to the Brassicaceae (Crucifera) family, the Brassica genus, which includes 34 species, of which only five are cultivated for the oil used for human consumption, the production of biodiesel fuel and fodder. Integrated weed control in rapeseed is a combination of prevention, mechanical work and chemical treatments to reduce environmental pollution. To be economically effective, herbicide application must be made according to the damage thresholds of the prevailing weeds (Lukacs and Halasz, 1987; O'Donovan, 1991; Klaus, 1992; O'Donovan and Newman, 1996). Weeds have a negative effect on the level of production and its quality, the presence of a large number of weeds makes harvesting difficult, they also increase drying costs, they can have toxic effects on people and animals, and they can also favor the transmission of diseases and pests to plants (Chirilă, 2001).

The number and spectrum of weeds depends on different factors such as soil type, crop rotation, tillage, crop density, fertilization level, etc. (Hanzlik and Gerowitt, 2011; Partal et al., 2023).

The application of herbicide treatments used for rape must be correlated with the degree of infestation, the spectrum and dominance of the weed species, the time of application, the technical potential of effectiveness and the pedoclimatic conditions. The main objective of this paper is the study of the new technological links with increased efficiency in weed control at the rape crop.

Weed control is the main care work for rapeseed culture, being necessary to eliminate the competition of weed species present from the first stages of their appearance and development.

MATERIALS AND METHODS

The research was carried out in the period 2024, at the National Institute for Agricultural Research and Development - Fundulea, being studied the application of new herbicide treatments to rape crop. In the fall of 2024, research was carried out regarding the study of the effectiveness of herbicides applied postem - (BBCH 12-13) and 1 mechanical weeding was carried out in the stage of growth and development of rapeseed crops BBCH 16-18. In the experimental field, the experiment being located on a soil of cambic chernozem type (3.2% organic matter, 37% clay, 6.5 pH), using the rape hybrid.

The organization of the experiment was done according to the method of randomized blocks, with a plot area of 1000 mp, in 3 replications, the amount of water used was 300 l/hectare. The sowing density was 350 thousand grains/hectare, with the distance between rows of 70 cm. The herbicides used as well as the experimental variants are described in the table 1 and technical data in the table 2 below:

Table 1. Experimental variants

Nr. var.	Herbicide treatments	Active substance content	Dose g.l/ha	Time of application
1	Untreated control	-	-	-
2	Gajus + Targa Max	petoxamid 400 g/l + picloram 8 g/l (Gajus), quizalofop-p-etil 100 g/l (Targa Max)	2,25 l/ha + 0,5 l/ha	postem BBCH 12-13
3	Gajus+ Targa max	petoxamid 400 g/l + picloram 8 g/l	3 l/ha + 0,5 l/ha	Postem BBCH 12-13
4	Gajus	petoxamid 400 g/l + picloram 8 g/l	3 l/ha	postem BBCH 12-13
5	Mechanical sod	-	-	postem BBCH 16-18

Table 2. Technical data

Type of soil	cambic chernozem (3.2% organic matter, 37% clay, 6.5 pH)
The preceding plant	Wheat
Mechanical works	Plow 20-25 cm Discussed + Stupled Combinator
Hybrid	ARCHITECT
Date of sowing	Sept.16.2024
Sunrise date	Sept.23.2024
Date of treatments	Nov.04.2024
Precipitations	- 2 weeks before treatments - 4 weeks after treatments
	32,6 mm 7 mm

- Placement of the experience: randomized blocks
- Plot area - 1000 m²
- Solution: 300 l/ha
- Observations:
- Selectivity (%): 7-14-21 days after treatment, Efficacy (%): 21 days after treatment

RESULTS AND DISCUSSIONS

In the rape experience carried out in the experimental field at the NARDI - Fundulea, the crop showed a high infestation degree of -74% - weeds, extremely diversified, depending on the local pedoclimatic conditions of the years of research -2024. The most representative (fig. 1) weed species were annual dicotyledons: *Anthemis arvensis* (ANTAR), *Capsella bursa pastoris* (CAPBP), *Chenopodium album* (CHEAL), *Galium aparine* (GALAP), *Papaver rhoase* (PAPRH), *Veronica hederifolia* (VERHE) and monocotyledon: *VOLCE*. The efficacy of herbicide treatments applied to control weed species is presented in Fig.2 - Fig.5. In the rape crop, following the treatments with herbicides applied postemergence (BBCH 12-13,16-18), the results obtained showed a good weed control effect, highlighting the effectiveness of the treatments through a single application. After the application of the new treatments with herbicides, good results were obtained regarding the fight against weeds, depending on: the climatic conditions, the degree of infestation, the spectrum and the dominance of the species present in this crop.

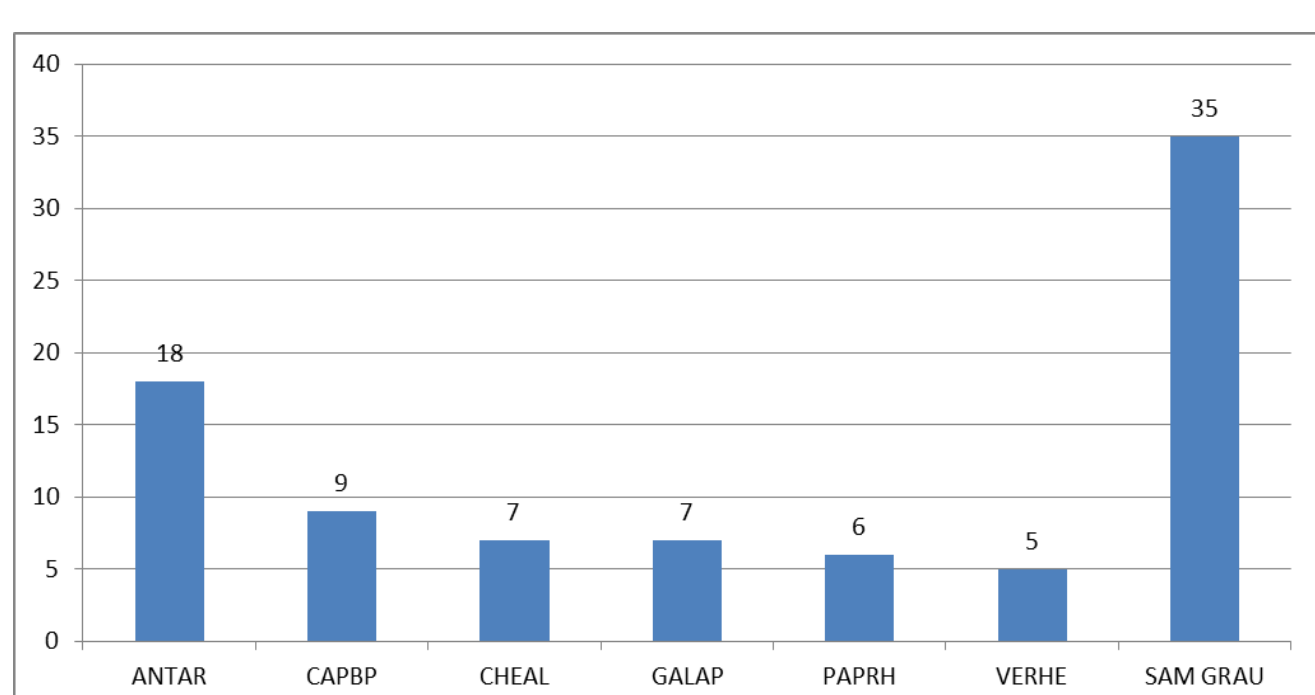


Figure 1. The infestation degree (%) with weeds

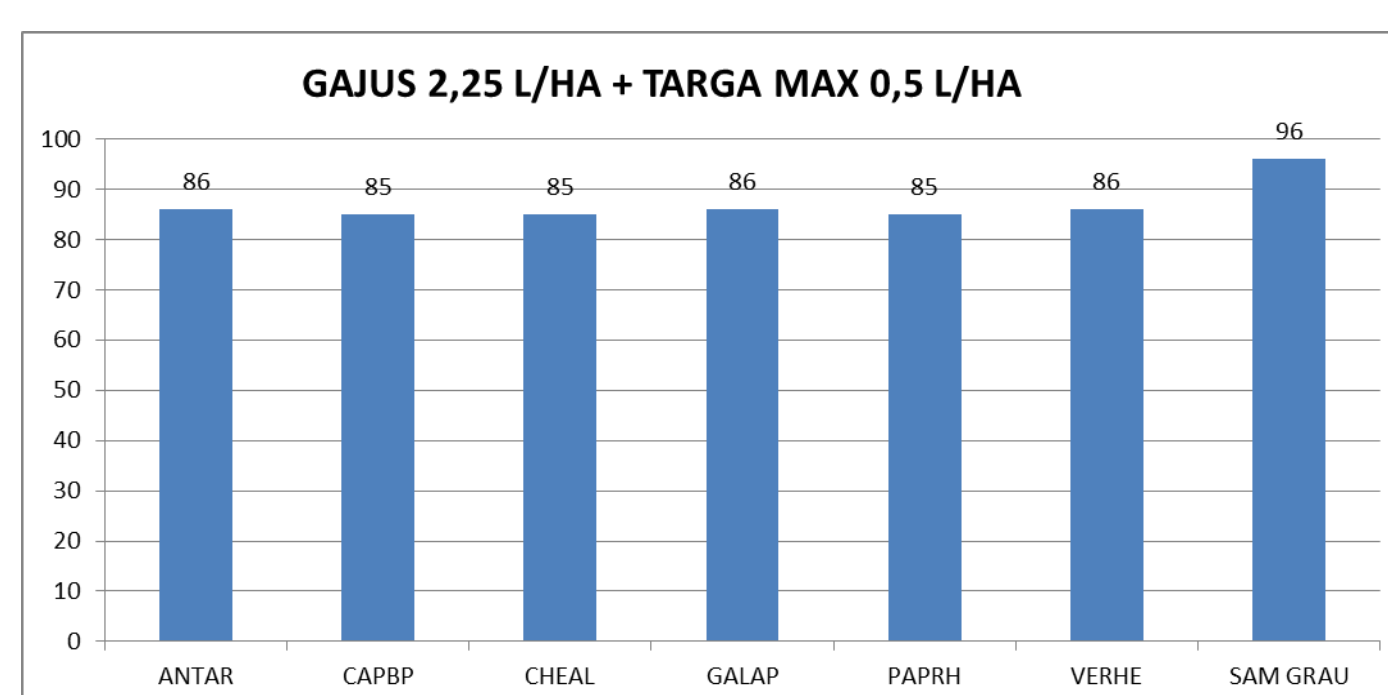
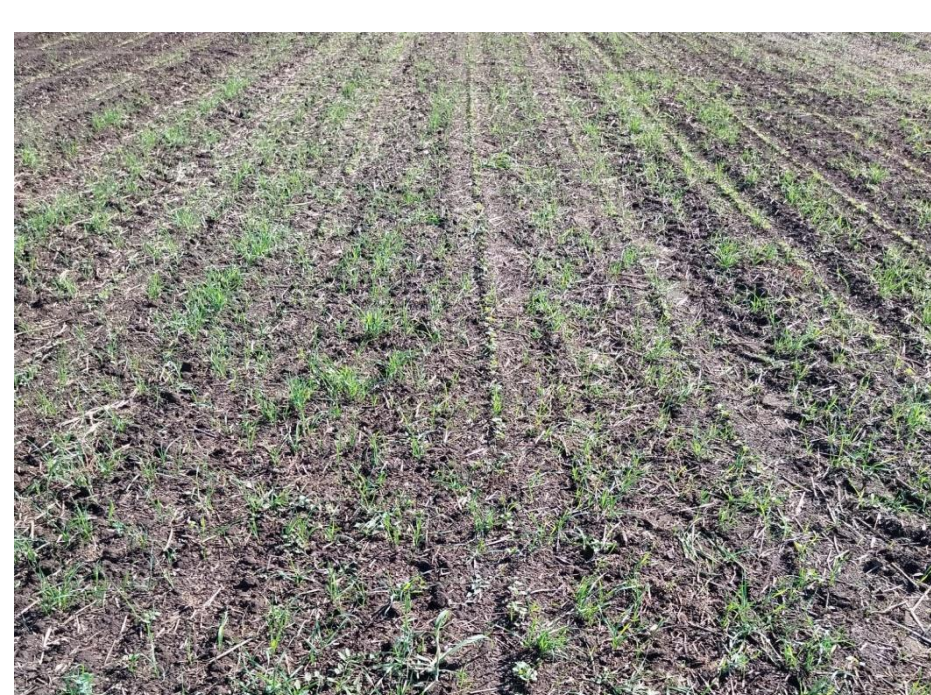


Figure 2 . The efficacy (%) of the herbicide GAJUS + TARGA MAX for the weeds controlling from the rape crop

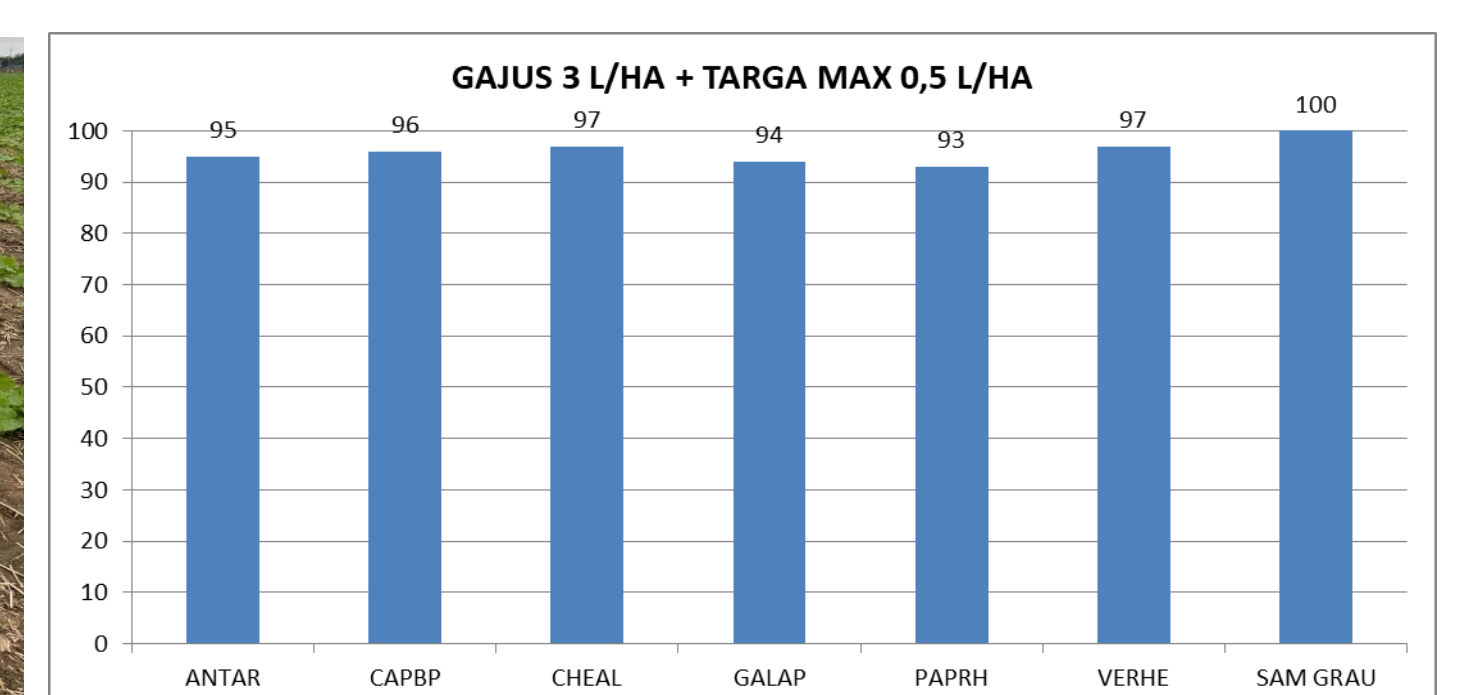


Figure 3 .The efficacy (%) of the herbicide GAJUS + TARGA MAX for the weeds controlling from the rape crop

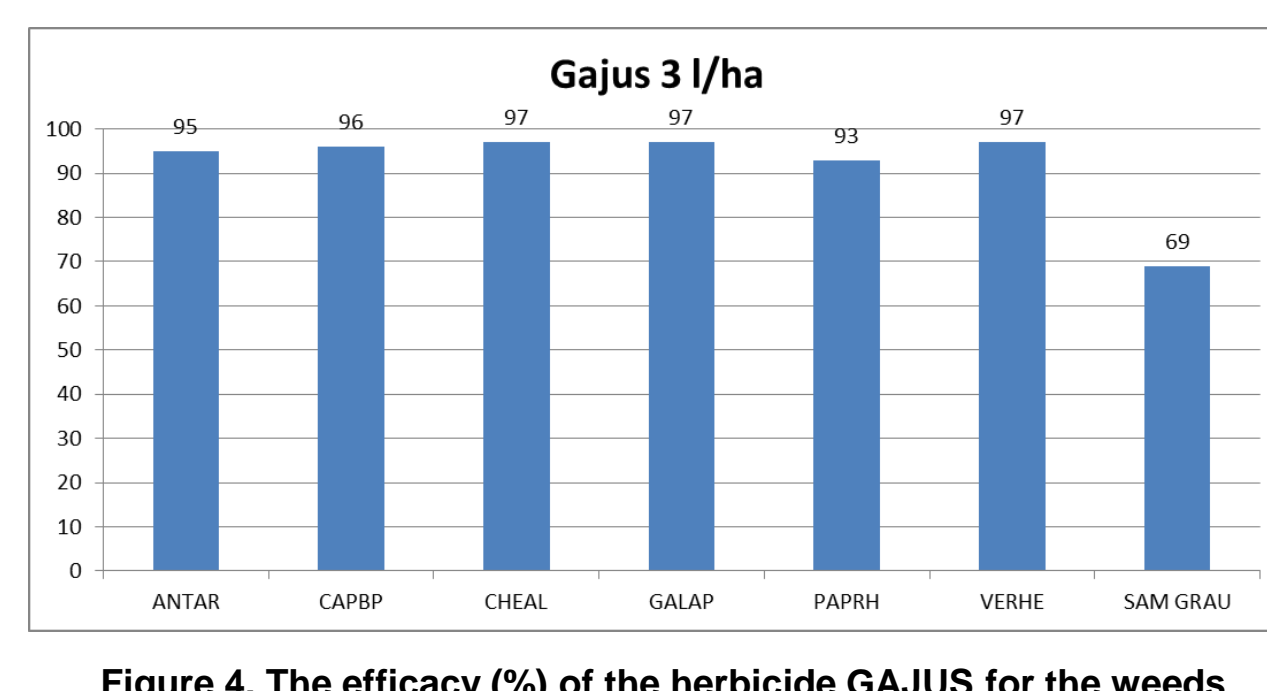


Figure 4. The efficacy (%) of the herbicide GAJUS for the weeds controlling from the rape

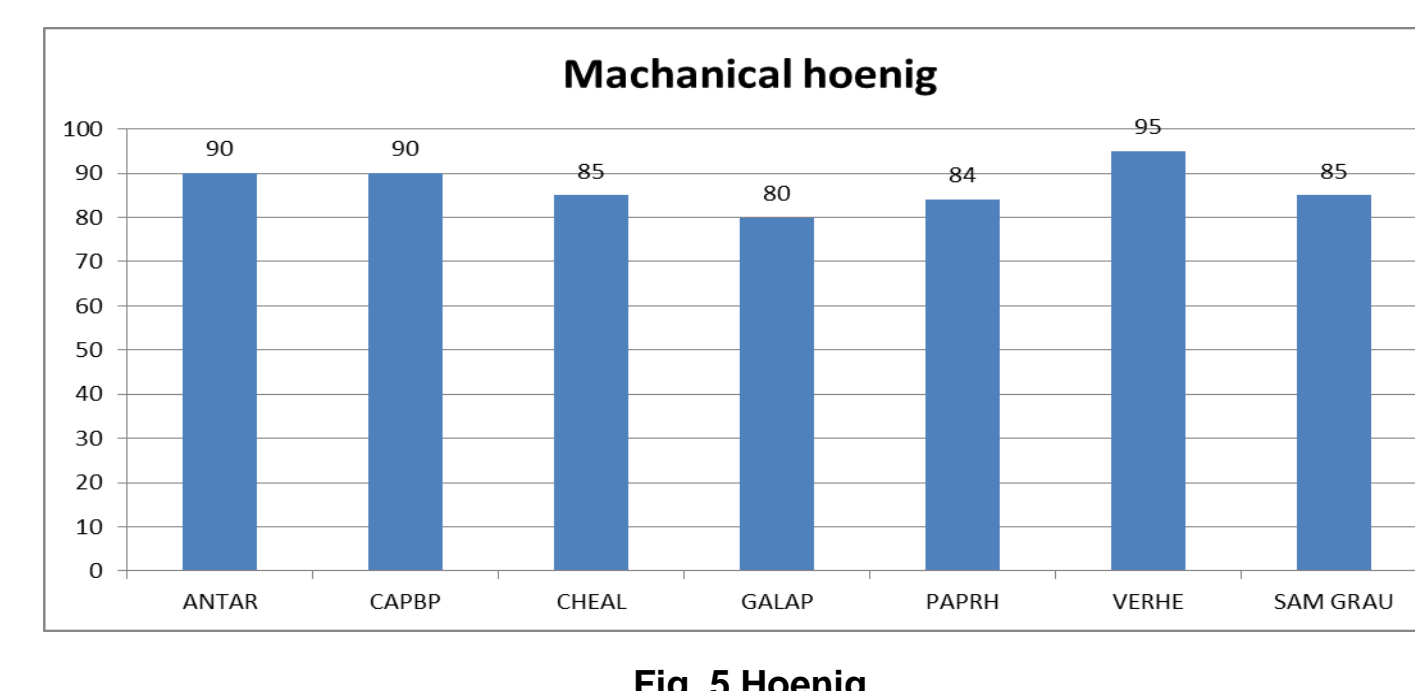


Fig. 5 Hoenig



The presence of weeds in rapeseed culture is a reality, their predominance being influenced by the cultivation area, the technological links, the preceding plant and the local pedoclimatic conditions. Weed control is the main care work for rapeseed culture, being necessary to eliminate the competition of weed species present from the first stages of their appearance and development. The application of the post-emergence association (Gajus + Targa Max, fig 2 and fig. 3) to the rape crop was correlated with the degree of infestation, weed dominance and the recorded climatic conditions led to a superior control effect of 85-100%.

The post-emergence application of the herbicide treatment (fig.4)- Gajus 3.0l/ha - in the rapeseed culture, a superior effectiveness was recorded for the annual dicotyledons 93-97% and instead for the mono - VOLCE- the control effect was 69% due to the infestation, the preceding plant and the local pedoclimatic conditions.

In figure 5, the destruction of weed species through this work can be an efficient technological link. The elimination of weeds through mechanical weeding presents economic and financial advantages and is recommended when the infestation is moderate (less than 50%).

Herbicide treatments applied to the rape crop (BBCH stage 12-13) did not show phytotoxic symptoms (EWRS scale = 0) for the cultivated rape hybrid - ARCHITECT.

The chemical control of the weed species existing in the wheat culture, on the type of cambic chernozem soil from Fundulea, represents an especially important and necessary technological measure. In the field of weed control, the main objective is to reduce the degree of infestation and, last but not least, to identify the most effective combinations of substances, so as to reduce both the impact on the environment and the costs per hectare. The damage caused by weeds can be diverse and often lead to a decrease in production, an increase in costs, a deterioration in the quality of products, weeds being ideal hosts for pathogens and pests.

CONCLUSIONS

- In rapeseed culture, herbicide is an important technological link, because it controls the appearance and evolution of weeds over a long period of time, from the stage BBCH 12-13 to BBCH 51-53.
- The application of the post-emergence association (Gajus + Targa Max) to the rape crop was correlated with the degree of infestation, weed dominance and the recorded climatic conditions led to a superior control effect of 85-100%.
- The post-emergence application of the herbicide treatment - Gajus 3.0l/ha - in the rapeseed culture, a superior effectiveness was recorded for the annual dicotyledons 93-97% and instead for the mono - VOLCE- the control effect was 69% due to the infestation, the preceding plant and the local pedoclimatic conditions.
- Herbicide treatments applied to the rape crop (BBCH stage 12-13) did not show phytotoxic symptoms (EWRS scale = 0) for the cultivated rape hybrid - ARCHITECT.
- Sowing at a distance of 70 cm between rows offers an alternative, in case of moderate infestations (50-70%) with weeds (excluding dicotyledons perene), without the application of chemical treatments.