THE CONTROL OF WEEDS PRESENT IN THE RAPE CROP FROM NARDI FUNDULEA

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Abstract

This paper present the results obtained at National Agricultural Research and Development Institute Fundulea, during 2020-2022, according to the herbicide treatments: : Galera Super (40 g/l aminopyralid +240 g/l clopyralid+80 g/l picloram), Galera Super (40 g/l aminopyralid +240 g/l clopyralid+80 g/l picloram), Korveto (5g/l halauxifen-metil+ 120g/l clopyralid), postemergently (rape, BBCH 12-13 in autumn) and postemergently (rape, BBCH 33-39 in spring) applied for the weeds controlling from the rape crop. The main objective of this work focused on the study of the selectivity and effectiveness of the application of herbicide treatments to combat the weeds present in the rape crop.

The herbicides must be correlated with the infestation degree of weed, the spectrum and dominance of weeds, the time of application, the technical potential for efficacy, the local climatic conditions.

Key words*: weeds, herbicides, time of application, selectivity and efficacy.*

INTRODUCTION

The crop flora is very diverse and numerous, due to the numerical ratio of weed species present, especially the numerous combinations between the various biological groups. This variety is explained by the diversity of pedoclimatic conditions existing in the areas where this crop plant is grown (*Anghel et al., 1972*).

The presence of weeds in field crops is a reality in all their cultivation areas. The damage caused by weeds can be diverse and often lead to a reduction in production, an increase in production costs, a deterioration in the quality of products, ideal hosts for pathogens and pests, etc. (*Mortensen et al., 2000; Roman and Lăzureanu, 2012*). Weeds have the highest negative impact at around 37% compared to insects (18%), fungi and bacteria (16%) and viruses (2%) (Oerke, 2006). Weeds have the greatest negative impact, around 37%, compared to insects (18%), fungi and bacteria (16%) and viruses (2%) (*Oerke, 2006*).

In the field of weed control in field crops, the main objective is, permanently, to eliminate the competition of weeds below the level of the damage threshold throughout the vegetation period, in order to reduce the consumption of water and nutrients by them, so that in the future the plants culture to have a normal development, which will lead, in the end, to obtaining high productions/ha, qualitative and at the level of the biological potential of the cultivated varieties. (*Popescu 2007*)

Herbicide is one of the most valuable works in the entire complex of works performed in plant protection actions and constitutes the most expensive and demanding technological link (*Berca, 2004*).

In a modern agriculture, in the integrated management of weeds, the use of the chemical control method remains a very important link contributing to the increase of productions by reducing the competition of weeds (*Sarpe et al., 1975; Vlăduțu et al., 1988*). Although the nature of crop production varies greatly around the world, herbicides have become a primary tool for weed control in most areas. (*Peterson et al., 2017*).

Herbicides will remain in future agriculture an efficient tool for control of

weeds as part of an integrated weed control. The application of herbicides requires only a quarter of the fuel used than one passage over the same surface with a row crop cultivator (*Hanna M., 2001 cited by Gianessi, L., 2013*)

The purpose of the research was to combat the weeds present in the rape crop by using the treatment with herbicides, with the objective of widening the spectrum of combat, synergism, persistence and without negative impact on the environment.

The main objective is focused on the study of the selectivity and the efficacy of the application of herbicide treatments to combat the weeds present in the crop.

Table 1

The herbicide treatments applied in the rape crop. Experimental variants

No var	Herbicide treatments	Active ingredient	Dose l /ha	Time of application
1	Untreated	-	-	-
2	Galera Super	40 g/l aminopyralid +240 g/l clopyralid+80 g/l picloram	0.2	Postemergence BBCH 12-13
3	Galera Super	40 g/l aminopyralid +240 g/l clopyralid+80 g/l picloram	0.25	Postemergence BBCH 33-39
4	Korvetto	5g/l halauxifen-metil+ 120g/l clopyralid	1.0	

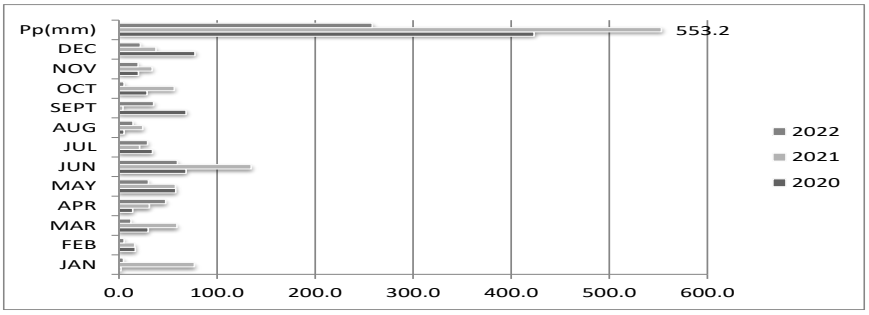

Figure 1 The climatic conditions (precipitations) during 2020-2022

Table 2

Monthly sum of precipitation (mm)

	Mar	Apr	May	Jun
LTA (1968-2017)	37.0	46.4	60.9	76.5
St. Dev. LTA	26.0	23.2	45.2	45.3
2021	59.0	31	57.6	135.0
2022	12.3	47.6	30.0	59.4

Table 3

Monthly average temperature (°C)

	Mar	Apr	May	Jun
LTA (1968-2017)	5.0	11.2	17.1	20.8
St. Dev. LTA	2.4	1.6	1.5	1.4
2021	5.1	9.7	17.2	21.1
2022	4.4	12.1	17.9	22.6

MATERIAL AND METHOD

The research was carried out in the period 2020-2022, at the National Institute for Agricultural Research and Development - Fundulea, being studied the application of new herbicide treatments to the rape crop. The research was carried out 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 PT-271 rape hybrid.

The organization of the experiment was done according to the method of randomized blocks, with a plot area of 25 m^2, in 3 replications, the amount of water used was 300 l/hectare. In this experiment, we observed the degree of selectivity of the rape plants and the degree of control of weeds by applying

herbicide treatments (table 1): Galera Super (40 g/l aminopyralid +240 g/l clopyralid+80 g/l picloram), Galera Super (40 g/l aminopyralid +240 g/l clopyralid+80 g/l picloram), Korveto (5g/l halauxifen-metil+ 120g/l clopyralid).The herbicide treatments were applied in the post-emergence (growth and development stage of the rape: BBCH 12-13 autumn) and post-emergence(growth and development stage of the rape:BBCH 33-39 spring). After the application of herbicide treatments, the observations of selectivity (%) were made at different intervals (7 - 14 - 28 days after the application of herbicides) and the degree of control (%) of weeds at the intervals 14 - 28 (days from the application of herbicides).

The climatic conditions, more precisely the amount of precipitation recorded was diversified for the years:2020(423.2mm), 2021 (553.2 mm) and 2022 (258.4 mm).

The average monthly air temperature in March-June was close to normal in 2021 and with 0.7°C warmer in 2022 (Table 2). These months were drier than long term average with 62 mm in 2021 and 71 mm in 2022 (Table 3).

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 - 66% (in autumn) and 79% (in spring), with weeds, extremely diversified, depending on the local pedoclimatic conditions. The most representative (Figure 2) weed species in autumn were: *Anthemis arvense, Matricaria inodora,Chenopodium album, Papaver rhoeas and Galium aparine.*

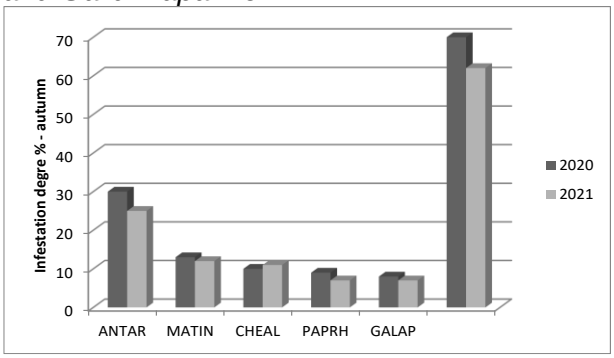

Figure 2 The infestation degree (%) in autumn with weed species present in the untreated plot

In the spring, in the rape crop, the weeds present were (Figure 3): *Matricaria inodora, Chenopodium album,Papaver rhoeas,Galium aparine,Amaranthus retroflexus and Cirsium arvense.*

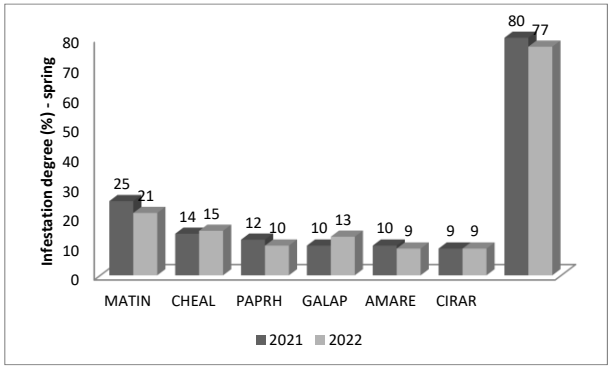

Figure 3 The infestation degree (%) in spring with weed species present in the untreated plot

In the experimental field, all the selectivity observations made for the rape hybrid cultivated, not registered phytotoxic phenomena (EWRS scale = 0).

In the rape crop, following the treatments with herbicides applied post-emergence (BBCH 12-13; BBCH 33-39), the results obtained showed a good weed control effect, highlighting the effectiveness of the treatments through a single application. After the application of the 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.

The figure 4 shows the average effectiveness results (%) recorded at the post-emergence application of the Galera super herbicide, which has in its composition 240 g/l clopyralid + 80 g/l picloram + 40 g/l aminopyralid. This treatment has a double action: contact, due to picloram, and systemic, due to clopyralid and aminopyralid.

The three active substances in Galera super have a similar mode of distribution and action. Substances are absorbed both at the foliar and at the root level, are translocated both acropetal and basipetal, and accumulate in plant meristematic tissues.

The herbicide Galera super was applied in autumn (post-emergence, BBCH 12-13) at the dose - 0.2 l/ha, after which very good efficacy results were obtained for annual dicotyledons: *Anthemis arvense* -92 *%, Matricaria inodora* -90%.The other weed species *Chenopodium album* – 85%, *Galium*

aparine – 84% and *Papaver rhoseas* – 83% showed a good control effect.

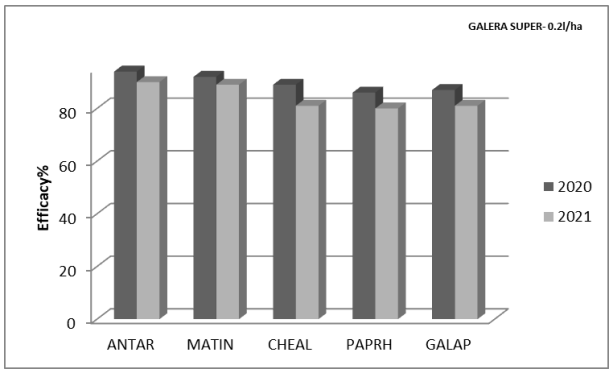

Figure 4 The efficacy (%) of the Galera Super (0.2l/ha) for the weeds controlling from the rape crop.

Figure 5 shows the average effectiveness results (%) recorded in spring at the postemergence application of the Galera super treatment (240 g/l clopyralid + 80 g/l picloram + 40 g/l aminopyralid).This treatment was aplied at 0.25 l/ha.

The obtained results show a very good control effect for the annual dicotyledon *Papaver rhoeas* - 94%. Following the application of this treatment, the annual dicotyledonous *Matricaria inodora*- 88% and Chenopodium album, *Galium aparine, Amaranthus retroflexus* - 89% presented a good controlling effectiveness.

The perennial weed species – *CIRAR*- recorded an average control effect of 89%.

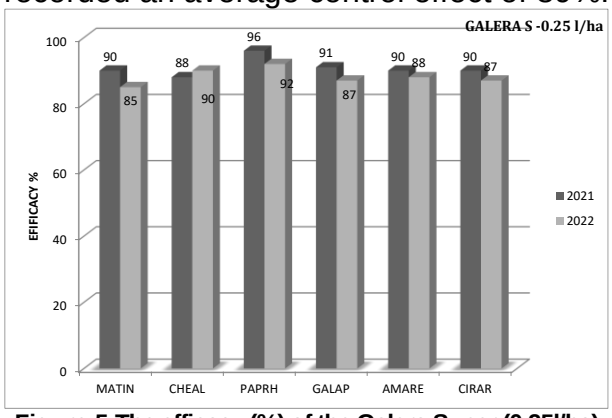

Figure 5 The efficacy (%) of the Galera Super (0.25l/ha) for the weeds controlling from the rape crop.

The last treatment shows the average effectiveness results (%) recorded after the post-emergence application of Korvetto (5 g/l halauxifen-metil+ 120 g/l clopiralid). The active substance halauxifen-methyl is absorbed by sensitive weeds through the leaves and is rapidly translocated through the vascular system to the weed growth points where it accumulates.Clopyralid acts as a plant growth regulator, is absorbed into roots and leaves, replaces natural auxins and causes disruption of normal growth and development of target weeds. The obtained results show a very good control effect for the annual weeds *Papaver rhoseas and Galium aparine* - 89%.The species *Chenopodium album* and *Amaranthus retroflexus* registered a good efficacy – 86% and *Matricaria inodora* - 82%.

In the 2 years of research, the perennial species CIRAR presented an average effectiveness of 83%.

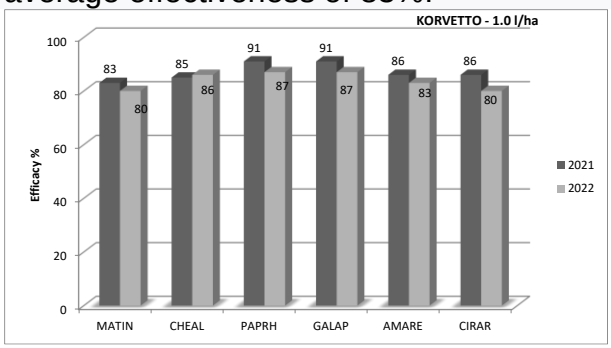

Figure 6 The efficacy (%) of the herbicide Korvetto (1,0 l/ha) for the weeds controlling from the rape crop

Figure 7 shows the average productions obtained from this crop. In the first year, the yields obtained from the rape crop were significant compared to the untreated control (670 kg/ha) due to the favorable climatic conditions and the effectiveness of the herbicide treatments used. Following the application of herbicide treatments, the highest production values were: the Galera Super variant (0.25 l/ha) – 2350 kg/ha; Korvetto variant (1.0 l/ha) – 2050 kg/ha. The Galera Super variant (0.2 l/ha) recorded a production of 2400 kg/ha. Compared to the following year, in the rapeseed culture the productions obtained were much lower, due to the unfavorable local climatic conditions that affected the biological production potential. In the rapeseed experiment, more precisely in the untreated control, an average production of 520 kg/ha was recorded, this being lower than the previous year, with a difference of 150 kg/ha. The highest

production values were: the variant treated with Galera Super (0.25 l/ha) – 2100 kg/ha; the variant treated with Korvetto (1.0 l/ha) – 1873 kg/ha. The Galera Super variant (0.2 l/ha) recorded a production of 2260 kg/ha.

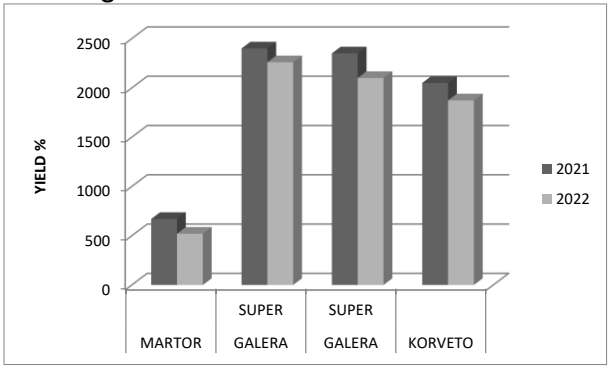

Figure 7 The yields averages for two years .

The chemical control of the weed species existing in the 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 to identify the most effective combinations of substances, to reduce both the impact on the environment.

CONCLUSIONS

Treatments with post-emergence herbicides applied (BBCH 12-13, BBCH 33-39) did not register phytotoxic phenomena for the cultivated hybrid – PT 271.

In the research years 2020-2022, the use of herbicide treatments applied post-emergence (BBCH 12-13; BBCH 33-39) had a good control effect, highlighting their effectiveness through a single application..

The degree of control of herbicide treatments depends on the level of infestation, dominance, weed spectrum, applied dose and climatic conditions.

The yields obtained was in close correlation with the biological potential of the rape hybrid, the efficiency of each treatment and the recorded climatic conditions.

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