

## WEED CONTROL STRATEGIES OF RAPE CROPS IN CONSERVATIVE AGRICULTURE

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**Abstract:** The paper presents data on weed control in agricultural cropping adjacent nature reservation Comana, Giurgiu. In this protected areas had been placed demonstration plots at cultures of rape in the conservative crop rotations. The aimed was to assess the risk posed by weeds in rape crops, weeds control and identification of the most effective techniques and alternative methods of control. The results showed that control integrate has the best chance of protecting the rape crops in conservative agriculture against to weed competition especially in the early stages of growth, as well as in reducing the degree of infestation for to obtain the adequate productions economically and environmentally.

**Key words:** *weeds, conservative agriculture, integrated control, post-emergent herbicide*

### INTRODUCTION

In the agricultural crop rotations specific of area protected „Nature 2000”, weeds are accepted ecological as producers in agro-ecosystems. Under these conditions is necessary should be clarified what is more important, the damages caused by weeds or the benefits they bring as primary energy producers and what control of weeds methods are acceptable ecologically.

This paper presents data on weed control in agricultural cropping adjacent nature reserve Comana Giurgiu. Following research performed and concerning the application of technologies conservative has been established a rotation with crops of rape, wheat and corn. These cultures have a different capacity to suppress weeds because at wheat crop do not apply mechanical and manual hoeing, this culture favoring increasing the degree of infestation. In this protected areas have been conducted demonstration plots at cultures of rape in the conservative crop rotations. The aimed was to assess the risk posed by weeds at rape crops, the control of weeds and identification of the most effective techniques and alternative methods of control

### MATERIAL AND METHOD

The experiments were conducted by method of randomized blocks with a plot area of 100 m<sup>2</sup> and herbicides have been applied pre-emergent and post-emergent (Table 1).

Based on the concept of „conservative agriculture” were made:

- deep plowing in autumn to 30 cm depth
- seedbed preparation through 2 passes with disc harrow followed by milling
- high quality hybrids
- sowing in optimum time of sowing densities respecting the technology of cultivation.

Observations at 15 and 30 days after treatments was aimed the efficacy and selectivity of herbicides applied.

Table 1

Herbicides applied to rape crops

Herbicides	Dose	Time of application
Control	-	-
Metazachlor 400 g/l	2.0 l/ha	preemergent
Cycloxdim100 g/l	2.0 l/ha	postemergent

## RESULTS AND DISCUSSIONS

In „conservative agriculture" weed problem has a technological dimension and also an economic one because for preventing and combating weeds are necessary additional expenditure. (Barralis, 1982., Berca, 2004). At establish technology for rape crops of special importance are methods control at weeds without neglecting choosing hybrids, seeding, tillage, fertilizer and treatments with plant products protection against diseases and pests. A crop rotation of at least 4 years has an important role in weed control at rape crops for reducing the degree of infestation. Chemical control of weeds in rape crops is a necessity, due the infestation with diverse dicotyledonous and monocotyledonous weeds, and seeding in dense rows (25 cm), which does not permit application of mechanical and manual hoeing and which favors the degree of infestation. (Ciorlaus 1976., Lazureanu 1994). Making pre-emergent treatments at rape crops is a major goal to achieve secure and stable yields. The rape crops forming in autumn 50% of its production, and the culture is pretentious at technology applied in this season because do not tolerate the presence of weeds. Some weeds (*Amaranthus*, *Chenopodium*, *Solanum*) do not survive at low temperatures, but damage is already evident before winter by reducing density culture (Table 2). For other weeds (*Matricaria*, *Agrostemma*), the periods of frost does not affect their development over the winter, because at early spring they being found at an advanced stage of development. (Chirila, 2001).

The main weeds observed on the experimental plots were:

- annual grasses : *Echinochloa crus-galli* (L) Pal Beauv., *Setaria glauca* Pal. Beauv., *Setaria viridis* Pal. Beauv.
- annual dicotyledonous: *Amaranthus retroflexus* L., *Chenopodium album* L., *Galinsoga parviflora* Cav., *Portulaca oleracea* L., *Polygonum convolvulus* L., *Capsella bursa-pastoris* L.
- perennial dicotyledonous: *Convolvulus arvensis* L., *Sonchus arvensis* L., *Cirsium arvense* L.

Table 2

The damage caused by weeds in rape crops

Ways of limiting	Weeds
<b>Compete the culture in the most critical moments</b> - Installation of the culture-	Some weeds ( <i>Amaranthus</i> , <i>Chenopodium</i> , <i>Solanum</i> ) although germinate at the same time with rape crop by a faster growth compete directly the rape crop. Thus the aim of achieving optimal stage (8-10 leaves - parcels 1 cm) at the entrance in winter is very difficult to achieve.
<b>Reducing density culture</b> - In autumn-	Is common in the presence of the grain of volunteer, where young the rape plants are suffocated during emergence by the plants of wheat or barley.
<b>Hinder harvest</b> -The weeds grow until to capsule-	In most cases, weeds are still green when there is maturing the seed of rape ( <i>Matricaria chamomilla</i> ), and have effect of decreasing harvesting speed and of increasing the humidity. More, such as <i>Agrostemma githago</i> bring and the contamination with weed seeds.

Applied pre-emergent herbicides had a good efficacy in controlling weeds (Table 3) Metazachlor has been effective in control of monocotyledonous and dicotyledonous annual weeds: *Echinochloa crus - galli*, *Setaria glauca*, *Setaria viridis*, *Amaranthus retroflexus*, *Chenopodium album*, *Capsella bursa-pastoris*. The degree of control was 92 % to dicotyledonous and 88 % at monocotyledonous compared to control at 2 weeks after treatment. When applying preemergent, metazachlor is being taken over by weeds germinate, they destroy before or just after sunrise. When applying pre-emergent, metazachlor is being taken over by weeds during germination, and them destroy before or just after sunrise. Good seedbed preparation and a good moisture of soils favors absorption of the active substance and increase effectiveness. If the soil is dry, the effect is felt after the first rain.

Table 3

The effectiveness of herbicides pre-emergent at rape crops

Variant	14 days after treatment				30 days after treatment			
	dicotyledonous		monocotyledonous		dicotyledonous		monocotyledonous	
	Dens.	E %	Dens.		Dens.	E%	Dens.	E%
Control	25.0	-	36.0	-	30.0	-	38.0	-
Metazachlor 400 g/l	2.0	92.0	4.0	88.8	10.0	66.6	14	63.1

Dens. - No. weeds / m<sup>2</sup> E% - effectiveness in % compared to control

Although treatments pre-emergent have provided a good weed control in rape crops because monocotyledonous weeds which grow faster and compete this culture were necessary and post-emergent treatments (Table 4). The active substance cycloxdim was effective against annual and perennial monocotyledonous weeds and against the grain of volunteers, the degree of control being 35 % at 15 days after treatment and 25 % at 30 days.

Table 4

The effectiveness of herbicides post-emergent at rape crops

Variant	14 days after treatment		30 days after treatment	
	monocotyledonous			
	Dens.	E %	Dens.	E%
control	35.0	-	25.0	-
Cyloxidim 100 g/l	3.0	91.4	2.5	90.0

Dens. - No. weeds / m<sup>2</sup> E% - effectiveness in % compared to control

For preserving biodiversity and for reducing the amount of herbicides applied per hectare, in some lots demonstrative, control of weeds was conducted only by applying the post-emergent treatments. The results showed that although the post-emergent treatments have some advantages (are effective against the spectrum whole of weeds, including against weeds late, not influence emergence of rape seed, perennial weeds can be controlled in hearths), the rape crop needs protection as against weeds before they trigger competition with crop plants, the pre-emergent treatments providing the best results.

## CONCLUSIONS

- At early winter the rape crops must be well developed to withstand low temperatures in winter, so in the spring to be continued the cycle of vegetation.
- The rape crops need protection against weeds before they trigger competition with crop plants, which means protection autumn - early winter.
- Crop rotation of at least 4 years has an important role in weed control at rape crops for reducing efficient of degree of infestation.
- In the agricultural crop rotations specific of areas protected of Nature 2000, weeds are designed from ecologically as producers in agro-ecosystems.
- In „conservative agriculture” must be respected and applied the most effective techniques and alternative methods of weed control (organizational methods, preventive and agro-technical).
- The control integrate has the best chance of protecting the rape crops in conservative agriculture against to weed competition especially in the early stages of growth, and reducing the degree of infestation and for to obtain the adequate productions economically and environmentally.

## REFERENCES

- BARRALIS, G., 1982 – Bull. Tech. d’inf., nr. 337 – 372, 463 – 466  
 BERCA, M., 2004 – Integrated weed management, Ed.Ceres, Bucharest  
 CIORLAUS, A., 1976 - *Herbicides*, Ed. Ceres, Bucharest, 20-52  
 CHIRILA, C., 2001 - *Weed Biology*, Ed.Ceres, Bucharest  
 LAZUREANU, A., 1994 - *Agrotechnics*, Ed. Helicon, Timisoara, 46-82