Research Journal of Agricultural Science, 58 (2), 2026; ISSN: 2668-926X;

http://doi.org/10.59463/RJAS.2026.2.33

CONTROL OF THE SEGETAL SPECIES *FALLOPIA CONVOLVULUS* L. IN MAIZE CROPS

Dan Nicolae MANEA[1] (ORCID 0009-0007-4570-9127)
Ioana GROZEA[1] (ORCID 0000-0002-2186-4364)
Ramona ȘTEF[1] (ORCID 0000-0001-6443-5896)
Anișoara Aurelia IENCIU[1] (ORCID 0009-0000-0626-3483)
University of Life Sciences "King Michael I" from Timisoara, Romania
Corresponding author: anisoara_ienciu@usvt.ro

Abstract. *In maize, weed control plays a decisive role in reducing expenditure per hectare, as uncontrolled weeds compete strongly with young plants for light, soil water and fertilizers administered. Among the many weed species that can be found, in the most varied climate and soil conditions, in corn crops, the species Fallopia convolvulus L. (black-bindweed or wild buckwheat). The research spanned the 2024/2025 agricultural years and included determinations on the effects of some vegetation treatments with the herbicide product Dicopur TOP (344 g/l acid 2.4 D from dimethylamine salt + 120 g/l dicamba), applied in 4 different doses, to the maize crop, in order to control the sgetal species Fallopia convolvulus (L.). The experiences were located in the area of Pecica commune, Arad County. The soil on which the research was carried out was a typical, moist phreatic eutricambosol, on medium/coarse fluvial deposits, medium clay/clayey sandy clay. The dose effect was observed in all treatments, which indicates how important it is to comply with the application dose recommended by the manufacturer. The maize crop was not affected by phytotoxicity for any of the treatments.From a practical point of view, but also economically and ecologically, the use of a higher dose of herbicide than the one recommended by the manufacturer is not justified, the only difference being the shorter time it takes for the herbicide to take effect.*

Keywords*: maize, Fallopia convolvulus L., weed control, herbicide*

INTRODUCTION

Weed control in maize is the main care work, having a decisive role in optimizing costs per hectare, as uncontrolled weeds can consume a large part of the soil water and fertilizers administered. The slow growth of the maize crop in the early stages of vegetation and the low density per m^{-2} generate very favorable conditions for the appearance and development of weeds; Therefore, it is vital to protect young plants from competition of segetal species, especially during this period, which is considered critical [1][2][3][4][8].

Of the numerous segetal species that are found, in the most varied climate and soil conditions, in maize crops, the species *Fallopia convolvulus* (L.). sin. *Polygonum convolvulus* or *Bilderdykia convolvulus* (L.). is one of the most common. Common names of this species include: black-bindweed wild buckwheat, cornbind or climbing-buckwheat.The identification code of *Fallopia convolvulus* (L.). is POLCO. [9][10].

The black-bindweed is part of the fam. *Polygonaceae* and originates from Europe, Asia and northern Africa. The plant is an annual dicotyledonous with a richly branched spindle-shaped root. The voluble stem to the right is thin, rough and over 1 m long. The leaves are satiated, with a cordate base and an acuminate tip, with petioles. Variability is low. The flowers are grouped in small buds (3-6 pcs.), and as a whole there are spiciform racemes. Flowering occurs from June to September. The perigon on type 5 is laciniate, greenish and with white edges. The fruit is a black, matte trine, wrapped in perigon and is 3-4 mm long. Trigon matures from summer to autumn, and germination occurs in spring [7][11][12].

The preferred climate is temperate, with rich, deep and aerated soil. Drought and shade negatively affect them. The seedling has oval elongated cotyledons and satiated leaves (Figure 1.) [13][14].

Fig. 1. *Fallopia convolvulus* L. in the cotyledon stage
(https://www.inaturalist.org/observations/72267208)

MATERIAL AND METHODS

The research spanned the 2024/2025 agricultural years and included determinations on the effects of some treatments in vegetation with the herbicide product Dicopur TOP (344 g/l acid 2.4 D from dimethylamine salt + 120 g/l dicamba), applied in 4 different doses, to the maize crop, for the purpose of controlling the segetal species *Fallopia convolvulus* (L.). The proposed objectives refer to: weed mapping; evaluation of production; processing and interpretation of experimental data; conclusions and recommendations. The experiences were located in the area of Pecica commune, Arad County. The commune is located in the western part of Romania, respectively in the Western Plain; the GPS coordinates of the experimental group were 46°10'42.5"N21°02'39.6"E. The Western Plain has a very high agricultural potential, ensuring very good pedo-climatic conditions [15].

The soil on which the research was carried out was a typical, moist phreatic eutricambosol, on medium/coarse fluvial deposits, medium clay/clayey sandy clay. Moderate humus reserve in the first 50 cm, moderately acidic soil reaction between 0 – 22 cm and weakly acidic between 22 – 48 cm. The nitrogen index is medium in the Ap [16].

The maize hybrid grown in the experiment fields was KWS Magnifico, from group PLUS4GRAIN, FAO group 440. Toothed hybrid, with very good production characteristics,

http://doi.org/10.59463/RJAS.2026.2.33

good vigor even at low temperatures, which recommends it for early sowing, good speed of moisture loss from the grain after the formation of the black spot [17].

Discopur Top herbicide is a selective and systemic herbicide, which contains two active substances: DMA salt 2.4 D acid 344 g/l + Dicamba 120 g/l and is applied post-emergence to wheat and maize crops, in order to control numerous species of annual and perennial dicotyledonous weeds. The mechanism of action is based on the disruption of growth processes, the appearance of malformations and the inhibition of root growth. Crop plants quickly metabolize the 2 active substances, on the other hand, in dicotyledonous (sensitive) weeds this process is slow. Dicopur Top decomposes quickly in the soil, through microbiological activity, depending on humidity and temperature. Under normal conditions, the herbicide degrades in 14 days, and in drought conditions, in 2-3 months. Dicopur Top acts at temperatures above 10 °C. In corn, Dicopur Top is applied when crop plants have 4-6 leaves, and annual or perennial dicotyledonous weeds are in the rosette phase. The recommended dose is 1.0 l/ha, in 200-400 liters of water/ha. Under normal climatic conditions, there are no restrictions in crop rotation [5][6][18][19].

In order to establish the efficiency of herbicides in combating the rising buckwheat in the corn crop, a single-factor experiment was set up in the field, placed according to the randomized block method, in four repetitions, each experimental variant having an area of 42 m^{-2} (10 meters long and 4.2 meters wide), the total area being 840 m2.

The variants of the experience were:

- Treatment 1: Untreated (control);
- Treatment 2: Dicopur TOP (344 g/l 2.4 D acid from dimethylamine salt and 120 g/l dicamba) – 0.5 l/ha;
- Treatment 3: Dicopur TOP (344 g/l acid 2.4 D from dimethylamine salt and 120 g/l dicamba) – 0.75 l/ha;
- Treatment 4: Dicopur TOP (344 g/l 2.4 D acid from dimethylamine salt and 120 g/l dicamba) – 1 l/ha (recommended dose);
- Treatment 5: Dicopur TOP (344 g/l acid 2.4 D from dimethylamine salt and 120 g/l dicamba) – 1.5 l/ha.

The readings were carried out in the first month after the application of the herbicides. The readings were direct, on *Fallopia convolvulus* plants and corn plants. The first observations included readings on the weeds in the crop before applying herbicide treatments and the number of weeds per square meter and the degree of soil cover were determined. The second round of observations included readings on *Fallopia convolvulus* stakes 14 days after the application of the treatments, to determine the degree of effectiveness of the herbicide, administered in different doses. Phytotoxicity in maize plants and crop vigor were also evaluated at this observation. The third round of observations was made 28 days after the application of the treatments, to determine the degree of effectiveness of the herbicide. Also on the same occasion, the possible phytotoxicity to the maize crop and the vigor of the crop were assessed. Observations on the effects of varying herbicide doses on weed plants were evaluated in notes on a linear percentage scale from 0 to 100, depending on the degree of effectiveness of the herbicide studied, specified in EPPO PP 1/50 (4) (Figure 2.).

The proposed objectives refer to: weed mapping; evaluation of production; processing and interpretation of experimental data; conclusions and recommendations.

Research Journal of Agricultural Science, 58 (2), 2026; ISSN: 2668-926X;
http://doi.org/10.59463/RJAS.2026.2.33

Fig. 2. a - 0 % treatment efficiency**;** **b -** 100 % treatment efficiency

RESULTS AND DISCUSSIONS

The research carried out in 2024/2025, on the land in Pecica, in our experience, highlights a weeding characteristic of corn, which includes species from the group of annual and perennial dicotyledonous weeds. From the data in Table 1 and Figure 3 it can be seen that the total number of weeds/m^{-2} was 56.4 plants/m^{-2}, of which *Fallopia convolvulus* – 19.3 plants/m^{-2} (32.4 % of the total weeds), with a soil cover of 18 %.

Table 1

Weed mapping before herbicide application, Pecica commune (average 2024/2025)

No. Crt.	Segetal species identified	Presence of weed species (plants/m^{-2})	Share of weed species (%)	Degree of soil cover with weeds (%)	Class Botany/Botanical Family
1.	***Falllopia convolvulus* L.** (black-bindweed)	**19.3**	**32.70**	**18**	D.a./*Polygonaceae*
2.	*Ambrosia artemisiifolia* L. (common ragweed)	12.8	22.69	10	D.a./*Asteraceae*
3.	*Chenopodium album* L. (white goosefoot)	10.7	18.97	7	D.a./ *Amaranthaceae*
4.	*Amaranthus retroflexus* **L.** (red-root amaranth)	7.1	12.59	5	D.a./ *Amaranthaceae*
5.	*Convolvulus arvensis* L. (field bindweed)	4.6	8.16	10	D.p./ *Convolvulaceae*
6.	*Cirsium arvense* L. Scop. (Canada thistle)	1.9	3.37	3	D.p./ *Asteraceae*
	TOTAL	**56.4**	**100.0**	**53**	-

Research Journal of Agricultural Science, 58 (2), 2026; ISSN: 2668-926X;
http://doi.org/10.59463/RJAS.2026.2.33

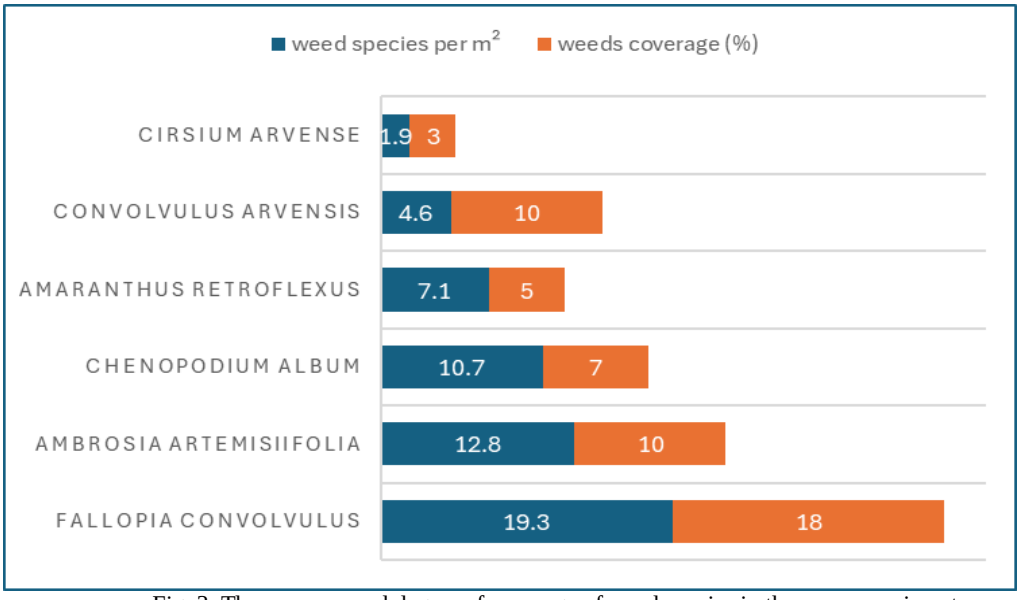

Fig. 3. The presence and degree of coverage of weed species in the corn experiment.

Falllopia convolvulusa (climbing buckwheat) was present with a number of 19.3 plants/m^{-2}, with a contribution percentage of about 33 % of the total segetal species in our experience (Figure 4.).

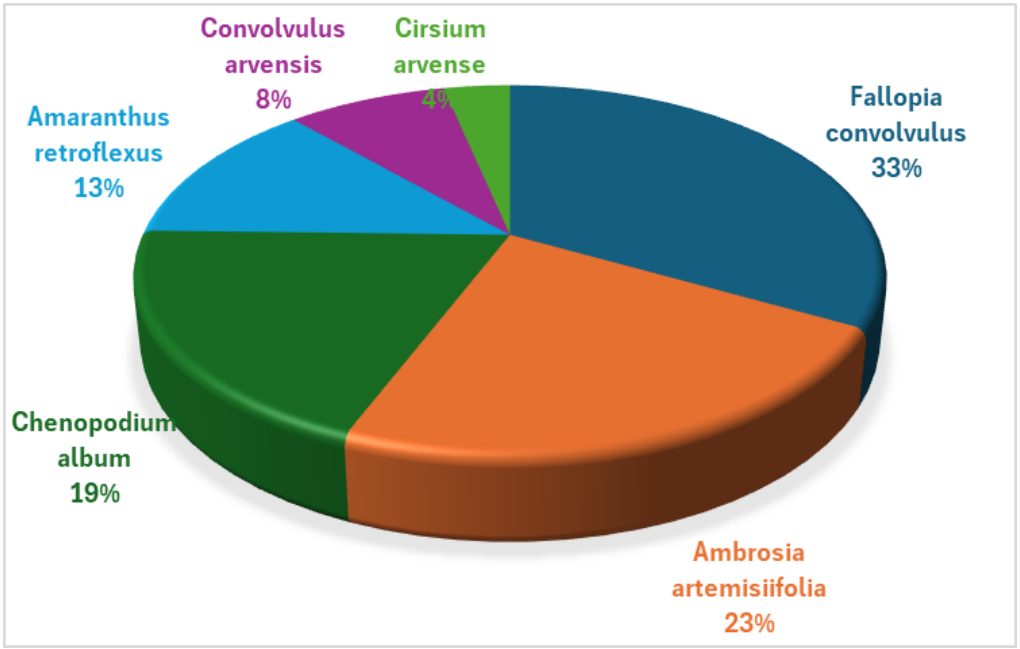

Fig. 4. Share of the target species *Fallopia convolvulus* L. in the group of identified weeds

http://doi.org/10.59463/RJAS.2026.2.33

After 14 days from the application of the herbicide, we carried out an evaluation in each plot, counting the plants of *Fallopia convolvulus*/m^{-2}, the degree of soil cover with the studied weed and giving a note of effectiveness of the herbicide, regarding its control. Table 2 and Figure 5 show differences between treatment 1 (Untreated) and the other treatments with the herbicide Dicopur TOP at doses of 0.5 l/ha, 0.75 l/ha, 1 l/ha and 1.5 l/ha). The control variant (Treatment 1), is the most weedy plot, with an average of 24.3 plants/m^{-2} and a soil cover of 42.5 %.

Table 2

Data recorded for each treatment of the experience, 14 days after application (average 2024/2025)

Variant number	Presence *of Fallopia convolvulus* (plants/m^{-2})	Degree of soil cover with the studied species (%)	Herbicide efficacy on the species studied (%)
1	24.3	42.5	0
2	15.1	25.1	38.2
3	11.4	17.3	53.1
4	5.2	7.9	79.3
5	3.6	3.8	85.6

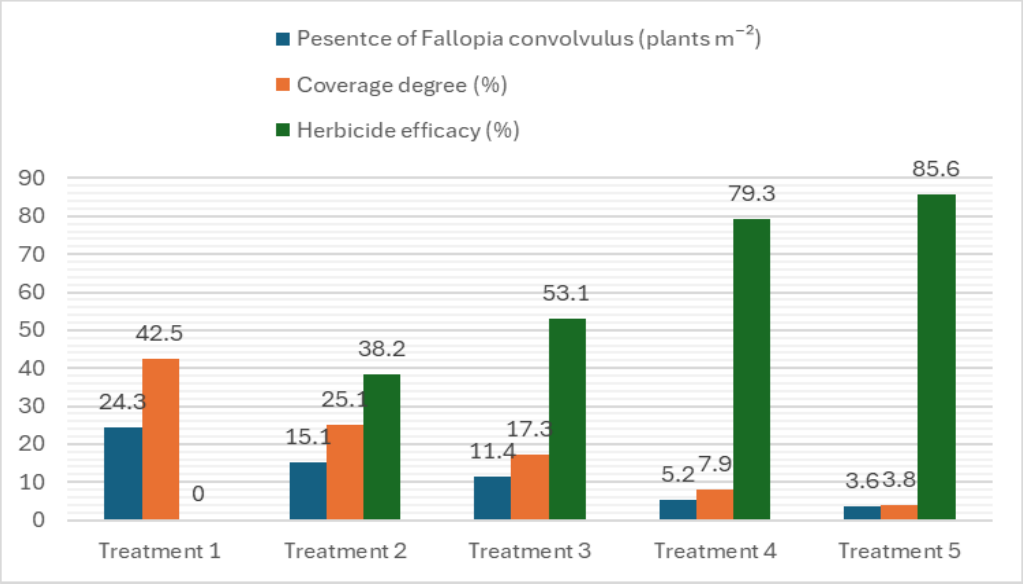

Fig. 5. Presence *of Fallopia convolvulus*/m^{-2}, degree of soil cover with weeds (%) and herbicide efficiency (%), for the 5 treatments

The lowest dose (Treatment 2 – 0.5 l/ha) registers a slightly lower degree of weeding compared to the control version (an average of 15.1 plants/m^{-2}), but higher than the other treatments. The degree of soil cover decreases by approximately 17 % compared to the control version. Treatment 3, which represents half of the recommended dose, generated a lower degree of weaning than treatment 2, and higher than treatments 4 and 5. The same can be said about soil cover (17.3 %) and herbicide efficiency (53.1 %). Treatment 4, being the recommended application dose (1 l/ha), registered a degree of weeding of 5.2 plants/m^{-2},

reducing the number of weeds to almost a fifth compared to the control version. The efficiency of the herbicide was 79.3 %, in optimal parameters for the period since application. Treatment 5, the highest dose (1.5 l/ha), gave the best results. The presence of *Fallopia convolvulus* plants was only 3.6 plants/m^{-2}, the coverage rate of 3.8 % and the best herbicide efficiency (85.6 %).

We observe that the presence of the species *Fallopia convolvulus* (plants/m^{-2}) gradually decreases from treatment 1 (control variant) – 24.3 plants/m^{-2}, to treatment 5 (highest herbicide dose) – 3.6 plants/m^{-2}. The same can be said about the degree of soil cover with *Fallopia convolvulus*. The efficiency of the herbicide gradually increases as the herbicide dose increases, from 38.2 % in treatment 2 (0.5 l/ha) to 85.6 % in treatment 5 (1.5 l/ha) (Figure 5.).

After 28 days from the application of the herbicide, we carried out a third evaluation in each plot, counting the *Fallopia convolvulus* plants/m^{-2}, the degree of soil cover with the studied weed and giving a note of herbicide effectiveness. Differences between treatment 1 (Untreated) and the other treatments with the herbicide Dicopur TOP at doses of 0.5 l/ha, 0.75 l/ha, 1 l/ha and 1.5 l/ha can be seen from Table 3. and Figure 6. We can see that the control variant (Treatment 1) is the most weedy plot, with an average of 27.3 plants/m^{-2} and a soil cover of 63 %. The lowest dose (Treatment 2 – 0.5 l/ha) registers a significantly lower degree of weeding compared to the control variant (an average of 14.8 plants/m^{-2}), but higher than the other treatments. The degree of soil cover decreases to almost a third compared to the control version. Treatment 3, which was half of the recommended dose, had a lower degree of weeding than treatment 2 and higher than treatments 4 and 5. The same can be said about soil cover (10 %) and herbicide efficiency (63.9 %). Treatment 4, being the recommended application dose (1 l/ha), registered a degree of weeding of 3.2 plants/m^{-2} (plants that sprouted after the application of the herbicide). The efficiency of the herbicide was 95.7 %. Treatment 5, the highest dose (1.5 l/ha), gave results practically similar to treatment 4. The frequency of the *Fallopia convolvulus* plant being only 2.3 plants/m^{-2} (plants sprouted after the application of the herbicide), the degree of coverage of 3 % and a herbicide efficiency as good as the treatment 4 (98.1 %).

Table 3

Data recorded for each treatment of the experience, 28 days after application (average 2024/2025)

Treatment No.	Presence of the *species Fallopia convolvulus* (plants/m^{-2})	Degree of soil cover with weeds (%)	Efficacy of the herbicide on the target species (%)
1	27.3	63	0
2	14.8	22	42.5
3	9.9	10	63.9
4	3.2	5	95.7
5	2.3	3	98.1

At each of the observations (at 14 and 28 days, respectively), data on the phytotoxicity and vigor of the maize plants in the cultivated hybrid were also made and recorded. We found that all the plants had zero phytotoxicity and their vigor was 100 %. These data tell us that the herbicide did not create phytotoxicity to the corn crop in any dose, and the vigor of the plants was not affected.

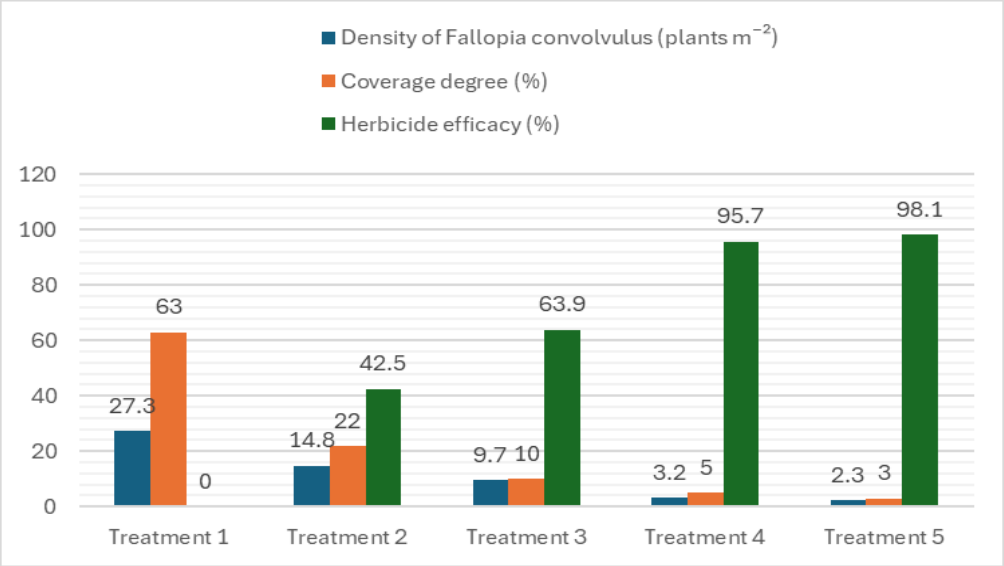

Fig. 6. Presence of *Fallopia convolvulus*/m^{-2}, degree of soil cover (%) and herbicide efficiency (%), for the 5 treatments.

Results obtained from the harvesting of experience. The gross production data (t/ha^{-1}), as well as their analysis, were included in Table 4. The values taken from the field were analyzed in comparison with the average production of the experiment (6.69 t/ha^{-1}).

Table 4

Harvest results, expressed in tonnes/ha, compared to the average experience (average 2024/2025)

Treatment applied (variant)	**Grain maize production (t/ha^{-1})**				**Average**	**Absolute diff.**	**Meaning**
	Repetition I	**Repetition II**	**Repetition III**	**Repetition IV**			
Average experience	**7.09**	**6.14**	**6.47**	**6.96**	**6.69**	**0.00**	**Mt**
T1 - non-herbicide	0.83	0.97	1.21	1.35	1.09	-5.61	000
T2- Dicopur TOP 0.5 l/ha	7.46	5.61	6.84	5.57	6.12	-0.57	0
T3- Dicopur TOP 0.75 l/ha	7.86	6.95	6.29	8.30	7.35	+0.66	X
T4- Dicopur TOP 1 l/ha	10.61	7.93	9.27	8.43	9.06	+2.37	XXX
T5- Dicopur TOP 1.5 l/ha	8.55	9.24	10.41	11.16	9.84	+3.15	XXX

LD 5% = 0.48 t/ha^{-1} LD 1% = 1.17 t/ha^{-1} LD 0.1% = 1.89 t/ha^{-1}

The maximum yields, very close to each other, were obtained at treatments 4 and 5 (9.06 t/ha^{-1}, respectively 9.84 t/ha^{-1}), very significantly higher compared to the average production of the experience. The very similar productions of the T4 and T5 variants attest that, from a practical, but also economic and ecological point of view, the maximum dose of 1.5 l/ha of Dicopur TOP is not justified, the 1.0 l/ha being sufficient.

CONCLUSIONS

Of all the treatments, the most affected by the presence of weeds was treatment 1 – Untreated (control vaccine);

At the second evaluation (14 days after application), the best treatment was treatment 5 Dicopur TOP, at a dose of 1.5 l/ha;

At the third evaluation (28 days after application), the best treatments were treatment 4 and treatment 5 - Dicopur TOP at a dose of 1 l/ha and 1.5 l/ha, respectively, the efficiency results being similar;

The dose effect was observed in all treatments, which indicates how important it is to comply with the application dose recommended by the manufacturer;

The maize crop was not affected by phytotoxicity for any of the treatments;

From the point of view of the harvest, the results correspond to those of the efficacy of the herbicide, the control variant registering the lowest harvest and, at the same time, the highest degree of weed infestation, and treatment 4 and 5 registering the highest level of harvest and at the same time the lowest degree of weed infestation;

Both the application of the Dicopur TOP herbicide to maize at a dose of 1 l/ha and at a dose of 1.5 l/ha led to very close productions to each other;

From a practical point of view, but also economically and ecologically, the use of a higher dose of herbicide than the one recommended by the manufacturer is not justified, the only difference being the shorter time it takes for the herbicide to take effect.

BIBLIOGRAPHY

BERCA M., 2004-managementul Integrat Al Buruienilor.Editura Ceres, Bucureşti.

LĂZUREANU A., MANEA D., CÂRCIU GH., ALDA S., 2006 -Agrotehnica aplicativă. Editura Eurobit, Timișoara;

JITĂREANU GR. ȘI COLAB., 2020-Tratat de Agrotehnică. Editura Ion Ionescu de la Brad, Iaşi.

MANEA D., CÂRCIU GH., LĂZUREANU A., S. ALDA A., IANCU GABRIELA, 2004 - Pre-emergent herbisising: an essential requirement in maize culture. Simpozionul Cluj Napoca, Buletin USAMV Cluj-Napoca, Vol. 60/2004, ISSN 1454-2382 pg. 205-209.

MANEA D. N., IENCIU ANIȘOARA AURELIA, 2025-Agrotehnică. Editura Agroprint, Timişoara.

MANEA D. N., 2022-Herbologie specială. Editura Agroprint, Timişoara.

NAREL Y., PANIAGUA-ZAMBRANA, RAINER W. BUSSMANN, ZAAL KIKVIDZE, 2025- Springer Nature Publishing, Switzerland (E -book).

HTTPS://AGROINTEL.RO/253683/COMBATEREA-BURUIENILOR-DIN-CULTURA-DE-PORUMB-PRIMUL-PAS-PENTRU-OBTINEREA-DE-RECOLTE-BOGATE-SI-PROFITABILEHTTPS://GOBOTANY.NATIVEPLANTTRUST.ORG/SPECIES/FALLOPIA/CONVOLVULUS/

HTTPS://GD.EPPO.INT/TAXON/POLCO

HTTPS://SEEDIDGUIDE.IDSEED.ORG/FACT_SHEETS/FALLOPIA-CONVOLVULUS/

HTTPS://WWW.CROPSCIENCE.BAYER.RO/E-TOOLS/GHIDUL-BURUIENILOR/GHID-DE-BURUIENI-DICOTILEDONATE/POLYGONUM-CONVOLVULUS

HTTPS://WWW.SOLAREX.RO/AFECTIUNI/HRISCA-URCATOARE.HTML

HTTPS://WWW.INATURALIST.ORG/OBSERVATIONS/72267208
HTTPS://RO.WIKIPEDIA.ORG/WIKI/C%C3%A2MPIA_DE_VEST.
HTTPS://PREZI.COM/XQM4PFIV0TCW/CAMPIA-DE-VEST/
(HTTPS://WWW.CULTURIAGRICOLE.RO/CULTURI/KWS-MAGNIFICO.HTML).
HTTPS://WWW.PCE.RO/ERBICIDE/NUFARM-ERBICID-DICOPUR-TOP-464-SL-100-ML.HTML#REVIEWS
HTTPS://EXTENSION.SDSTATE.EDU/REVISITING-OLD-LESSONS-CORN-WEED-MANAGEMENT-24-D-AND-DICAMBA