



UNIVERSITY OF LIFE SCIENCES "KING MIHAI I" FROM TIMISOARA

"YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH IN APPLIED LIFE SCIENCES"



"Young people and multidisciplinary research in applied life sciences"

16-17 November 2023

CONTROL OF THE SEGETAL SPECIES POLYGONUM AVICULARE L. (KNOTWEED) IN THE WINTER WHEAT CROP

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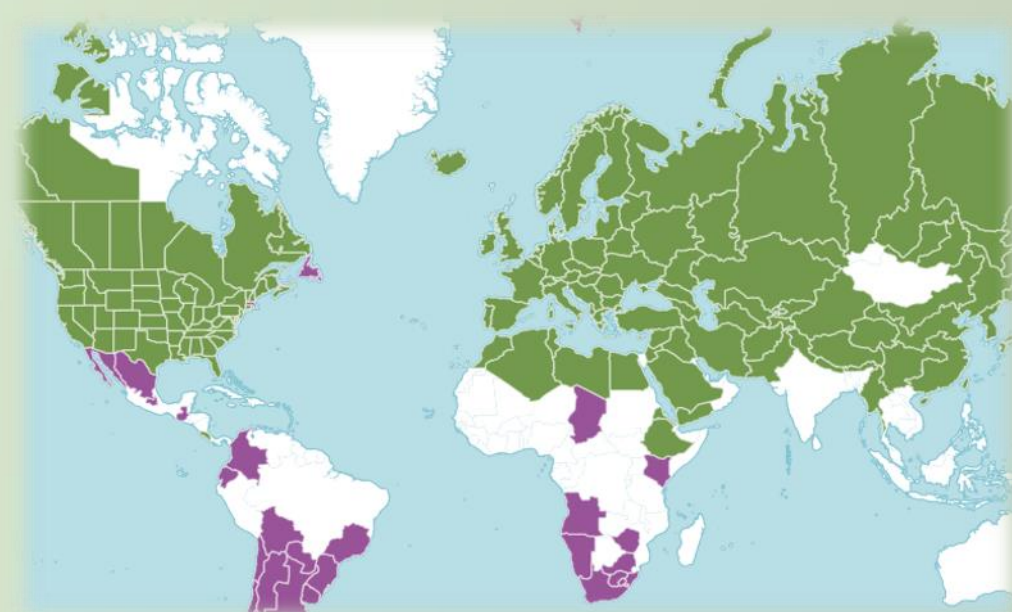
Abstract: *Polygonum aviculare* L. (common knotgrass, birdweed, knotweed lowgrass, or pigweed) is a segetal species that is found in many temperate areas and is thought to be native to Eurasia. The semi-erect stem of common knotgrass, an annual herb, can reach heights of 10 to 30 cm. It is an extremely prevalent weed that seriously harms grain harvests. The observations were made in a wheat crop located in the western part of Romania, respectively in the Western Plain. Research has been conducted during the agricultural years 2022-2023, and included determinations on the effects of vegetation treatments with the herbicide product Resital Duo (SE) (452.42 g/l 2,4-D 2-Ethylhexyl Ester (EHE) + 6.25 g / l Florasulam.), applied in 4 different doses (untreated, 0.2 l / ha, 0.4 l / ha, 0.6 l / ha), to wheat crop, in order to control the segetal species *Polygonum aviculare* L. (knotgrass). Therefore, a monofactorial experience was set up in the field, placed according to the method of randomized blocks, in four repetitions. On average, over the two years, the total number of weeds / m² was 94 / m², of which *Polygonum aviculare* (knotgrass) - 80 plants / m² (85.1% of the total weeds), the surface of the soil covered by this segetal species being 20 %. 15 days after application of Resital Duo (SE) (452.42 g / l 2,4-D 2-Ethylhexyl Ester EHE) + 6.25 g / l Florasulam), the most effective treatments in experience were treatment 3 (0.4 l / ha) and treatment 4 (0.6 l / ha), with an efficacy of 57.5%, respectively 77.5%. After 30 days of the application of the Resital Duo (SE) product, the most effective treatments in our experience were both treatment 3 (0.4 l/ha) and treatment 4 (0.6 l/ha), which accumulated an efficacy of 92.5%, respectively 99.5%. The applied product did not create any kind of phytotoxicity to our crop, at any of the 3 doses tested, and the vigor of the wheat was maintained at the level of 100%;

Introduction

Polygonum aviculare L. species. Common knotgrass, *Polygonum aviculare*, is also known as birdweed, prostrate knotweed, lowgrass, or pigweed. It is common in many temperate-zone nations, and it is presumably native to Eurasia. The semi-erect stem of common knotgrass, an annual herb, can reach heights of 10 to 30 cm. The leaves have short stalks and no hair. The lower ones are few, linear, and stalkless, while the upper ones are longish-elliptic, with short stalks and rounded bases. The stipules unite to form an ochrea, a membranous, silvery translucent sheath that encloses the stem. Regularly shaped, green blooms with pink or white edges surround them. Each bears three fused carpels, five to eight stamens, and five overlapping perianth segments. The fruit is a three-edged, dark brown nut. This plant grows in disturbed soil where its seeds may have been dormant for years because the seeds require light to germinate.

The flavonols avicularin, myricitrin, and juglanin are found in *Polygonum aviculare* L. Additionally discovered are the lignan aviculin and the flavonoids astragalin and betmidin. Panicudine, a diterpene alkaloid, is an additional recognized component.

Prostrate knotweed, a sign of compacted soils, is frequently observed growing in full sun on thin turf or beside overflowing driveways and sidewalks. Many of these areas would be covered in bare soil if it weren't for this weed.

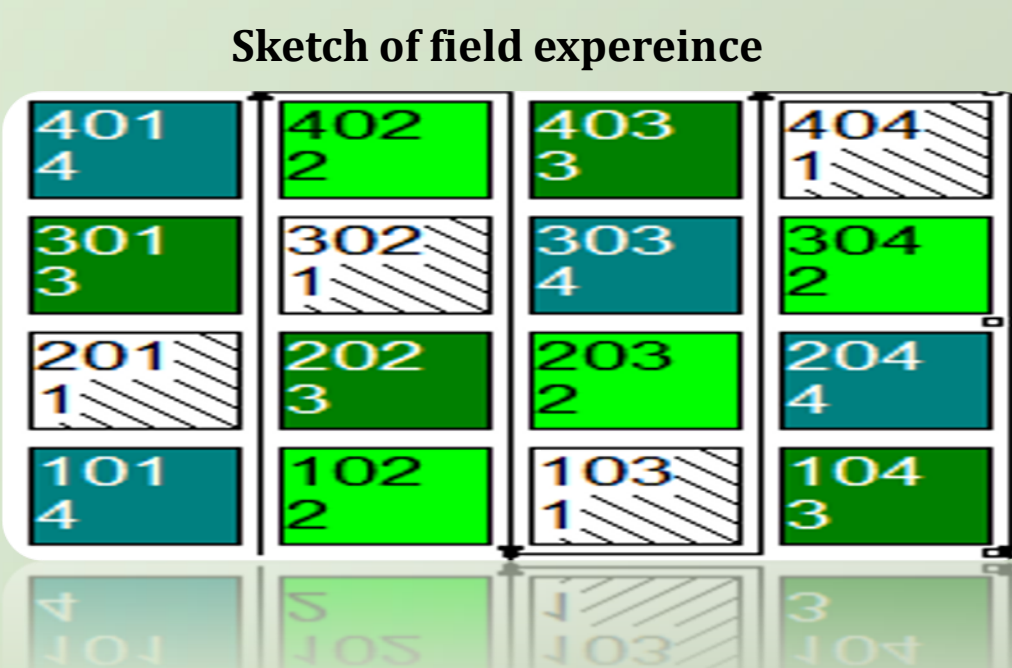


Distribution of *Polygonum aviculare* L. in the world (green -Native; magenta - Introduced) (<https://powp.science.kew.org/taxo/n/urn:lsid:ipni.org:names:695422-1#source:KBD>)



Material and method

The observations were made in a wheat crop, in the vicinity of the city of Arad, located in the western part of Romania, respectively in the Western Plain. Research has been conducted during the agricultural years 2022-2023, and included determinations on the effects of vegetation treatments with the herbicide Resital Duo (SE) (452.42 g/l 2,4-D 2-Ethylhexyl Ester (EHE) + 6.25 g / l Florasulam.), applied in 4 different doses (untreated, 0.2 l / ha, 0.4 l / ha, 0.4 l / ha, 0.6 l / ha), to wheat cultivation, for the purpose of controlling the native species *Polygonum aviculare* L. (knotgrass).



The first observations included readings on weeds in the crop before applying herbicide treatments, determining the number of weeds per square meter and the degree of soil coverage.

The second round of observations included readings of *Polygonum aviculare* plants, 15 days after applying the treatments, to determine the effectiveness of the herbicide, administered in different doses. Also in this observation, phytotoxicity to wheat plants and the vigor of the crop were evaluated.

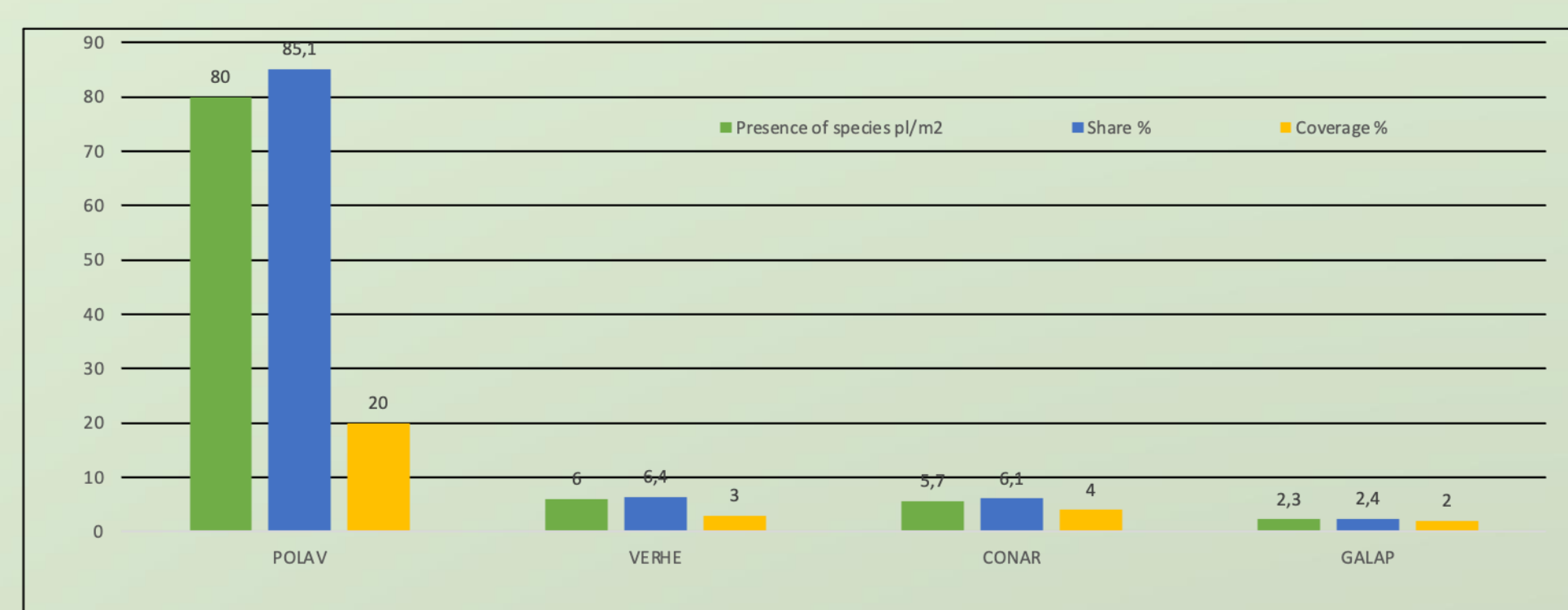
The third round of observations was made 30 days after the application of the treatments. On the same occasion, the phytotoxicity and vigor of the wheat crop was evaluated. The effects of various doses of herbicide on weed plants were quantified in grades on a linear percentage scale from 0 to 100, specified in EPPO PP 1/50.

The autumn wheat variety was Glosa, a variety created at INCDA Fundulea. It is an early wheat variety, with good resistance to fall, winter, drought and heat. The Glosa wheat variety is moderately susceptible to powdery mildew, susceptible to leaf septoria and moderately susceptible to brown rust.

A combination of herbicide ingredients, Resital Duo (SE) herbicide can be applied post-emergence to efficiently control a variety of weeds. Resital Duo doesn't reduce yield and is safe for use with all types of wheat. Rain has no effect on its effectiveness beginning two hours after application. It is advised to use in cereals (wheat, barley) from the time weeds fully emerge until the end of the cereal's tillering process.

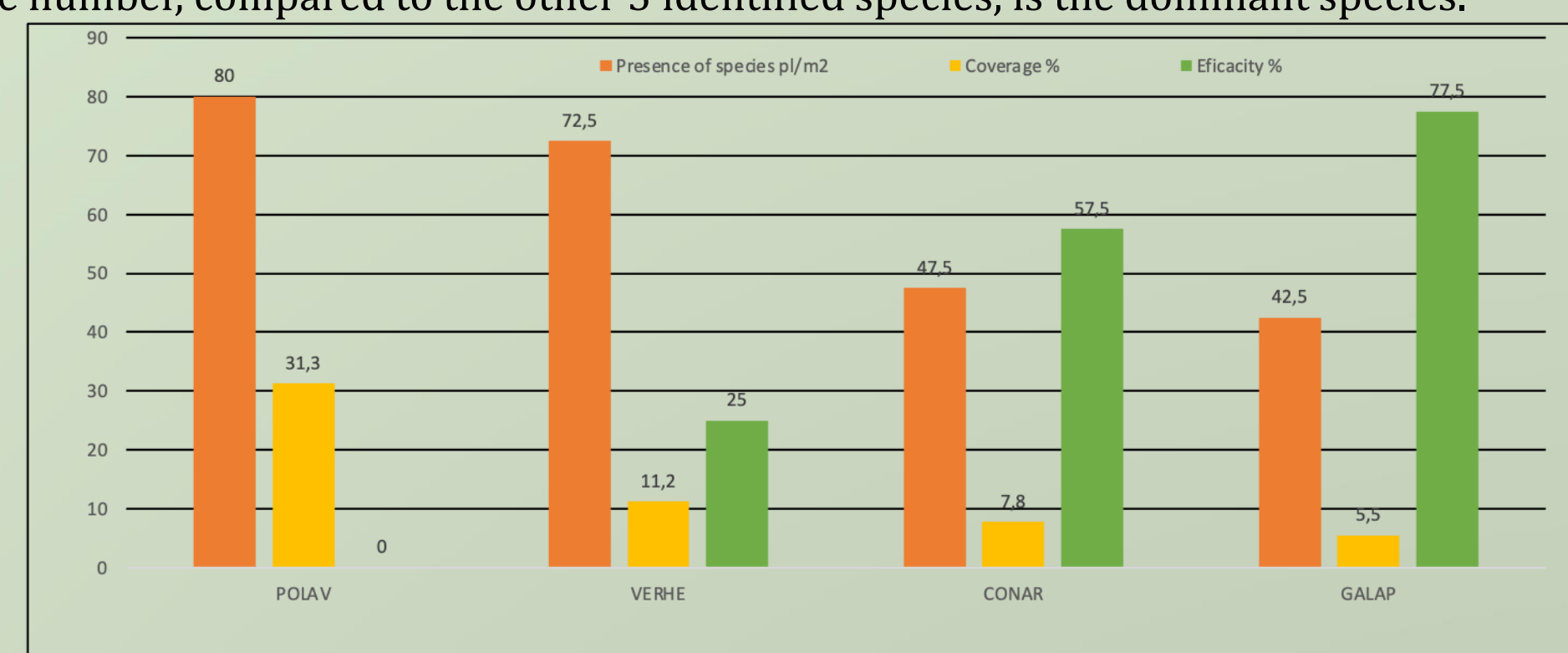
Results and discussions

The main factors that can influence the degree of weeding (increase or reduce the degree of weeding), can be climatic and / or technological. The experience, carried out in the wheat soil, highlights a pronounced weeding of the culture, including 4 segetal species, all dicotyledonous, of which 3 are annual (*Polygonum aviculare* - POLAV, *Veronica hederifolia* - VERHE, *Galium aparine* (GALAP) and one perennial- *Convolvulus arvensis* (GALAP).



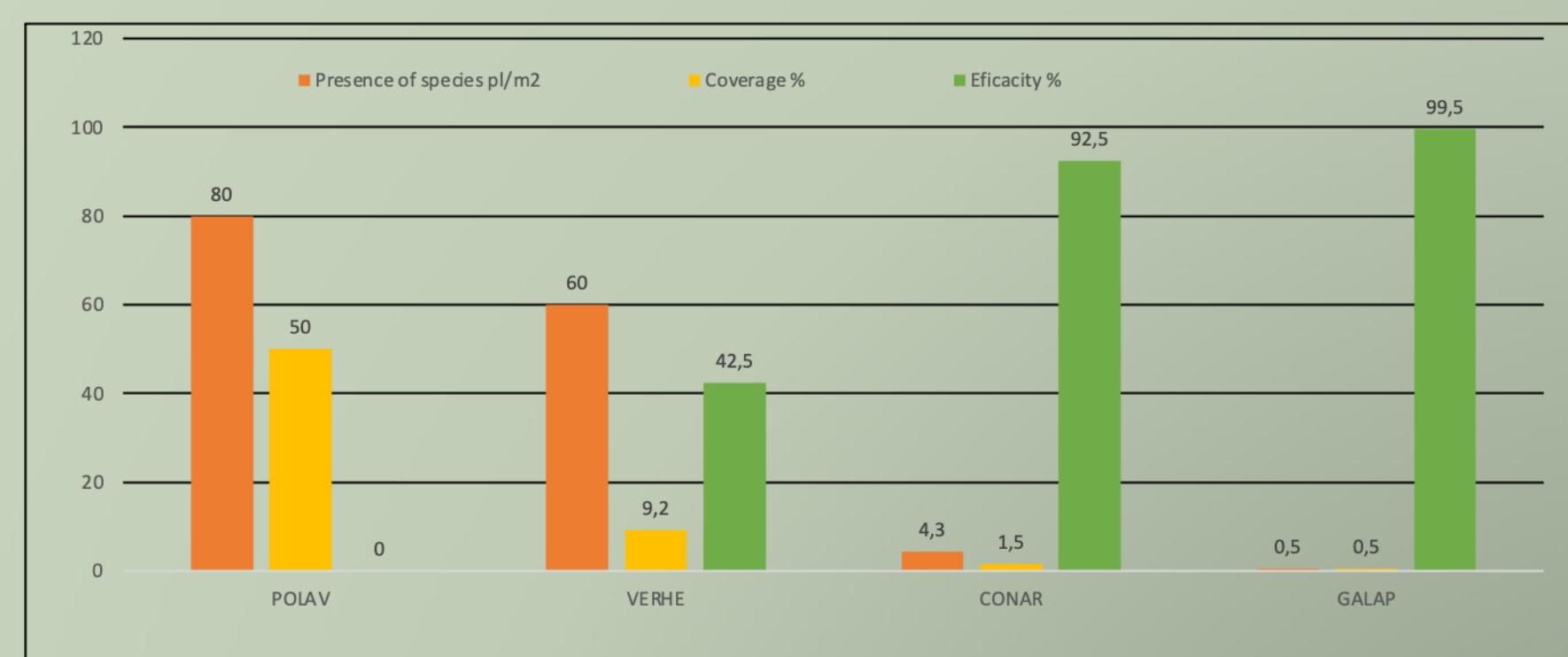
Status of weeds in the wheat crop, before herbicide application

In the table above, it can be obviously seen that *Polygonum aviculare* (knotgrass), present in such a large number, compared to the other 3 identified species, is the dominant species.



Status of weeds in the wheat crop, 15 days after herbicide application

The differences between treatment 1 (Untreated) and the rest of the treatments with the herbicide Resital Duo (SE) can be observed in doses 0.2 l / ha (trt. 2), 0.4 l/ha (trt. 3), 0.6 l / ha (trt. 4). The treatments had similar values in the 4 repetitions, with minor differences. It can also be seen that the first version (Treatment 1) is the plot that has the largest number of weeds, the average being 80 plants/m² and soil cover of 31.5 %. Treatment 4, (0.6 l / ha) has a number of weeds of 42.5 plants / m², which halves the number of weeds compared to the first variant. The herbicide had an efficiency of 77.5%, being in acceptable parameters, taking into account the number of days passed since the application of the product



Status of weeds in the wheat crop, 30 days after herbicide application

After the 30 days since the application of the product Resital Duo (SE), the third evaluation was made and it can be observed that the plots with treatment 1 have the most weeds, the average being 80 plants/m² and the surface covered by weeds of 50%. Treatment 4 (0.6 l/ha), records a number of weeds of 0.5 plants/m² (which sprouted late after applying the product). The herbicide had an efficiency of 99.5%.

Data on the phytotoxicity and vigor of wheat plants were performed and recorded 15 and 30 days after spraying with the product Resital Duo (SE) (452.42 g/l 2,4-D 2-Ethylhexyl Ester (EHE) + 6.25 g / l Florasulam). These observations reveal that the wheat plants did not have phytotoxicity, the applied product did not create any phytotoxicity to our crop at any of the 3 doses tested, and the vigor of the wheat remained at the level of 100 %.

Conclusions

- The dose effect was visible in all treatments, which indicates the importance of following the recommended dose by the manufacturers; the applied product did not create any kind of phytotoxicity to our crop, at none of the 3 doses tested, and the vigor of the wheat was maintained at the level of 100%;
- In order to keep the wheat crop clean of weeds, it is necessary to use selective herbicides for this crop, with known efficiency on the weeds present in each soil, respecting the recommended doses and period of application.