STUDY ON THE DIVERSITY OF WEED FLORA IN AGRICULTURAL CROPS IN TELECHIU AREA (BIHOR COUNTY)

Călin Gheorghe PĂŞCUŢ [1], Octavian BERCHEZ [1], Stelian Dorian PANTEA [1], Valeriu Adrian ŞTEF [1], David Emanuel BARA [1], Andrea Maria PĂŞCUŢ [2], Ioana Maricica Brudaşca [3]

[1] University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea, Romania
[2] Partenie Cosma Economic College, 1F Calea Armatei Române St., 410087 Oradea, Romania
[3] Secondary School No. 16 Oradea, 4 Călugăreni St., 410415 Oradea, Romania

RESEARCH ARTICLE

Abstract

The study was conducted in the locality of Telechiu in Bihor County, aiming to identify weeds in agricultural crops. For the study, 11 sample plots were established in corn, winter wheat, bean, sweet corn and sunflower fields. Weeds are unwanted plants in agricultural crops, foreign to the cultivated variety or hybrid, which cause damage by consuming water, soil nutrients, and other growth factors, leading to a decrease in both the quality and quantity of the harvested crop. When establishing control strategies, the following aspects must be considered: identifying the weeds and the methods to combat them. To develop and implement a comprehensive set of measures and methods for controlling weeds in agricultural crops, a thorough study of their life cycles and behavior under different climatic conditions is necessary, especially since weeds have biological characteristics that differ from those of cultivated plants. Despite the progress made in agriculture in recent years, weeds continue to be present in cultivated fields. The floristic composition of agricultural land, in terms of arable flora, has been systematically modified through soil tillage, fertilization, and the application of herbicide treatments. Effective control of weeds in agricultural crops requires a solid understanding of the weeds themselves, the pedoclimatic conditions in which they grow, and the effectiveness of the control treatments applied.

Keywords: weeds, agricultural crop, floristic composition, ecological indices
#Corresponding author: pascutcalin@yahoo.com

INTRODUCTION

The study of the segetal flora was conducted on agricultural lands located in the village of Telechiu, Bihor County. In terms of the composition of the segetal flora, 11 crops were analyzed, including maize, sweet corn, winter wheat, sunflower and beans. Telechiu village is situated in the central-eastern part of Bihor County (figure 1), approximately 30 km from the city of Oradea, with the nearest town being Aleşd, located only 3 km away. Regarding neighboring areas, to the south is Vârciorog locality, to the east is Aştileu locality, to the north is Lugaşu de Jos locality, and to the west is Tileagd locality.

Within these boundaries, Telechiu village covers an area of 51.2 km^2, representing 0.67% of the total area of the county. Climatically, due to its geographical position, the studied area falls under the influence of maritime air masses, present throughout the year, with a higher frequency in summer.

Additionally, the arrangement of the two marginal hilly/mountain units and the presence of the Crişul Repede river play an important role in the local climate.

Figure 1 **Location of the study in Bihor County (processing after - https://ro.wikipedia.org)**

The average air temperature is 9°C-10°C. Regarding average monthly temperatures, the highest occurs in July at 19°C, and the lowest in January at 1.7°C. Annual precipitation ranges around 700-800 mm. Its distribution over the year shows a main summer maximum in June with 102.2 mm and a secondary maximum in December with approximately 60 mm. Although the territory of Telechiu village is extensive, with an agricultural area of 4064 ha, representing 79.4% of the area, it is composed of 2663 ha of arable land, 1149 ha of pastures, 204 ha of hayfields, 16 ha of orchards and nurseries, and 32 ha of vineyards. The land is suitable for agriculture, cultivating: cereals on 1693 ha (63.4% of arable land), potatoes on 200 ha, sunflowers on 71 ha, vegetables on 50 ha, with the remainder occupied by other crops.

For the study of the crop flora in the area, several specialized works were consulted: Anghel, 1972; Bujorean et al., 1962; Bujorean & Grigore, 1967; Chirilă, 2001; Grigore et al., 1979; Grigore et al., 1981; Ionescu-Şişeşti, 1955; Soran, 1962.

MATERIAL AND METHOD

The synopsis and analysis of the weed flora in the studied agricultural crops were carried out based on original field research conducted in 2025.

Species identification was done using specialized identification guides, "Segetal flora of Romania" by Ciocârlan et al. (2004).

The information obtained was organized in a systematic table, in which species were grouped by families according to a current plant classification system. For each species, its classification is indicated based on the number of seed embryo cotyledons, along with ecological indices for moisture (U), temperature (T), and soil chemical reaction (R).

The ecological index values were determined according to synthesis works by Soó (1964-1980), Májovsky & Murin (1987), Sanda et al. (1983), Pop (1977), Ellenberg, 1979, Cristea (1993), Ciocârlan et al. (2004) and Cristea et al. (2004).

RESULTS AND DISCUSSIONS

For the study of segetal flora, a total of 11 physical plots were considered, encompassing 5 types of crops (corn, sweet corn, winter wheat, beans, sunflower) (table 1), where the weeds present both inside and at the edges of the plots were identified and described.

Table 1

Weed species identified in agricultural crops in the Telechiu area (Bihor County)

U	T	R	Cot.	Sample surface no. (type of culture)		1	2	3	4	5	6	7	8	9	10	11
				GPS coordinates	N	47. 05607	47. 04362	47. 04313	47. 05592	47. 03850	47. 05526	47. 04103	47. 04162	47. 03693	47. 05182	47. 04562
					E	22. 25696	22. 26172	22. 26090	22. 26766	22. 26489	22. 26017	22. 27417	22. 26010	22. 26382	22. 26920	22. 25583
0	*1*	*2*	*3*	*4*		*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
Weed species identified within the crops																
3-3.5	3-3.5	4-4.5	D	*Convolvulus arvensis*		x	x	x	x	x	x	x	x	x	x	x
2-2.5	0	0	D	*Cirsium arvense*		·	x	·	x	·	x	·	·	·	x	x
3-3.5	0	0	D	*Chenopodium album*		x	x	·	·	·	·	·	·	·	x	x
3-3.5	0	4-4.5	D	*Sonchus arvensis*		·	·	x	·	·	·	·	·	·	·	x
3-3.5	2-2.5	3-3.5	D	*Oxalis stricta*		x	x	·	·	·	·	·	·	·	x	·
2-2.5	2-2.5	3-3.5	D	*Polygonum convolvulus*		x	x	x	x	·	·	x	·	·	x	·
2-2.5	3-3.5	4-4.5	D	*Papaver rhoeas*		·	·	x	x	x	x	·	·	·	·	·
2-2.5	4-4.5	5-5.5	D	*Lathyrus tuberosum*		x	x	·	·	·	x	x	x	x	x	x
3-3.5	0	0	D	*Capsella bursa-pastoris*		·	·	·	·	·	·	·	x	·	·	·
3-3.5	2-2.5	4-4.5	D	*Mentha arvensis*		·	·	·	·	·	·	·	·	·	·	x
2-2.5	2-2.5	5-5.5	D	*Aristolochia clematitis*		·	·	·	·	·	·	·	x	·	·	·
3-3.5	0	4-4.5	D	*Matricaria inodora*		·	·	·	x	x	·	·	x	x	·	x
5-5.5	2-2.5	4-4.5	D	*Calystegia sepium*		·	·	·	·	·	·	·	x	·	·	·
2-2.5	0	5-5.5	D	*Consolida regalis*		·	·	x	x	x	x	·	·	·	·	·
3-3.5	0	0	M	*Agropyron repens*		x	x	x	x	·	·	x	x	x	x	x
4-4.5	0	0	D	*Polygonum lapathifolium*		x	·	·	·	·	·	·	·	·	·	·
2-2.5	4-4.5	0	D	*Bifora radians*		·	·	x	·	·	·	·	·	·	·	·
4-4.5	4-4.5	0	D	*Xanthium strumarium*		x	x	·	·	·	·	x	·	·	·	·
2-2.5	3-3.5	4-4.5	D	*Fumaria schleicheri*		·	·	x	x	x	·	·	·	·	·	·
3-3.5	2-2.5	0	D	*Sinapis arvensis*		·	·	·	·	x	·	·	·	·	·	·

0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
3-3.5	0	4-4.5	D	*Sonchus oleraceus*	·	·	·	·	x	x	·	·	·	·	·
3-3.5	4-4.5	0	D	*Hibiscus trionum*	·	x	·	x	·	·	·	·	·	·	·
2-2.5	0	4-4.5	M	*Avena fatua*	·	·	·	·	x	x	·	·	·	·	·
3-3.5	2-2.5	0	-	*Equisetum arvense*	·	·	·	·	·	·	x	x	x	·	·
3-3.5	3-3.5	2-2.5	M	*Apera spica-venti*	·	·	x	x	x	x	·	·	·	·	·
2-2.5	4-4.5	0	D	*Amaranthus retroflexus*	x	·	·	·	·	·	x	x	x	x	x
2-2.5	4-4.5	0	D	*Ambrosia trifida*	x	·	·	·	·	·	·	·	·	·	·
2-2.5	2-2.5	5-5.5	D	*Datura stramonium*	·	·	·	·	·	·	x	·	·	·	·
3-3.5	0	5-5.5	D	*Atriplex patula*	·	x	·	·	·	·	·	·	·	·	·
2-2.5	4-4.5	4-4.5	D	*Anthemis arvensis*	·	·	·	x	x	·	·	·	·	·	·
3-3.5	0	4-4.5	M	*Setaria pumila*	·	·	·	·	·	·	x	·	·	x	·
4-4.5	2-2.5	4-4.5	D	*Symphytum officinale*	x	·	·	·	·	·	·	·	·	x	·
2-2.5	4-4.5	4-4.5	M	*Digitaria sanguinalis*	·	·	·	·	·	x	·	x	·	·	·
2-2.5	4-4.5	4-4.5	D	*Cardaria draba*	·	·	·	·	·	x	·	·	·	·	·
3-3.5	0	0	D	*Galinsoga parviflora*	·	·	·	·	·	·	·	x	x	·	·
2-2.5	0	4-4.5	D	*Thlapsi arvense*	·	·	·	·	x	·	·	·	·	·	·
Weed species identified at the edge of the crops															
3-3.5	2-2.5	5-5.5	D	*Rubus caesius*	x	·	·	·	·	x	x	x	·	x	·
3-3.5	2-2.5	5-5.5	D	*Rubus sulcatus*	·	·	·	·	·	x	·	·	·	·	·
2-2.5	2-2.5	5-5.5	D	*Datura stramonium*	·	x	·	·	·	·	·	·	·	·	x
3-3.5	2-2.5	0	D	*Sinapis arvensis*	x	·	x	·	·	·	·	·	·	·	x
2-2.5	4-4.5	0	D	*Xanthium spinosum*	·	x	·	·	·	·	·	·	·	·	x
3-3.5	0	4-4.5	D	*Veronica hederifolia*	x	·	·	·	x	x	·	·	·	·	·
2-2.5	2-2.5	4-4.5	D	*Raphanus raphanistrum*	·	·	·	·	x	·	·	·	·	·	·
3-3.5	0	0	D	*Galinsoga parviflora*	·	·	·	x	·	·	·	·	·	·	·
2-2.5	2-2.5	3-3.5	D	*Conium maculatum*	x	·	x	·	x	·	·	·	·	·	x
3-3.5	0	4-4.5	D	*Solanum nigrum*	x	·	·	·	·	·	·	·	·	·	·
3-3.5	0	0	D	*Stellaria media*	·	·	·	x	·	·	·	·	x	·	·
3-3.5	0	0	M	*Agropyron repens*	·	·	·	·	·	x	·	·	·	·	·
4-4.5	0	3-3.5	M	*Echinochloa crus-galli*	·	x	·	·	·	·	x	x	x	·	·
4-4.5	2-2.5	0	D	*Galium aparine*	·	·	·	·	x	·	·	·	x	·	x
4-4.5	2-2.5	4-4.5	D	*Symphytum officinale*	·	·	·	·	x	·	·	·	·	·	·
3-3.5	0	5-5.5	D	*Atriplex patula*	·	·	·	·	·	x	·	x	x	·	·
3-3.5	0	4-4.5	M	*Setaria pumila*	x	·	x	x	x	x	·	·	·	·	x
2-2.5	0	0	D	*Erigeron annuus*	·	·	·	·	·	·	x	x	x	x	·
2-2.5	0	0	D	*Erigeron canadensis*	·	·	·	·	·	·	x	x	·	x	·
3-3.5	0	4-4.5	M	*Lamium amplexicaule*	·	·	·	·	·	·	x	x	x	·	·
2-2.5	4-4.5	4-4.5	M	*Digitaria sanguinalis*	·	x	·	x	·	·	·	·	·	·	x
2-2.5	4-4.5	4-4.5	M	*Sorghum halepense*	·	·	·	x	·	·	·	x	·	·	·
2-2.5	4-4.5	0	D	*Ambrosia artemisiifolia*	·	·	·	·	·	·	·	·	·	·	x

where: U-humidity; T-temperature; R-chemical reaction of the soil ; Cot - No. of cotyledons at the level of the embryo; M - monocotyledonous; D - dicotyledonous; 1 - Bergold bean crop (*Phaseolus vulgaris*); 2 - Bergold bean crop (*Phaseolus vulgaris*); 3 - Anapurna wheat crop (*Triticum aestivum*); 4 - Anapurna wheat crop (*Triticum aestivum*); 5 - Anapurna wheat crop (*Triticum aestivum*); 6 - Anapurna wheat crop (*Triticum aestivum*); 7 - Pioneer P9241 corn crop (*Zea mays*); 8 - Pioneer P9241 corn crop (*Zea mays*); 9 - Pioneer P9241 corn crop (*Zea mays*); 10 - Golden Bantam sweet corn crop (*Zea mays* ssp. *saccharata);* 11 - Pioneer P64LP170 Lumisena sunflower crop (*Helianthus annuus*).

The weed flora is characterized by a relatively high diversity of species, as a consequence of the diversity of the studied agricultural crops. Investigations carried out in the agricultural crops studied during the year 2025 highlighted a total of 51 weed species belonging to 45 genus and 23 families. The analysis of ecological indices (table 2) for field crops highlights the specific characteristics of agricultural cultures in this area, viewed through the lens of the local pedoclimatic factors.

Table 2

The proportion of ecological categories in the studied crop field flora

Ecological indices	Categories	1-1.5	2-2.5	3-3.5	4-4.5	5	6	0
U	%	-	45.10	43.14	9.80	1.96	-	-
	No. of species	-	23	22	5	1	-	-
T	%	-	1.96	33.34	23.53	-	-	41.17
	No. of species	-	1	17	12	-	-	21
R	%	-	1.96	7.84	39.22	13.73	-	37.25
	No. of species	-	1	4	20	7	-	19

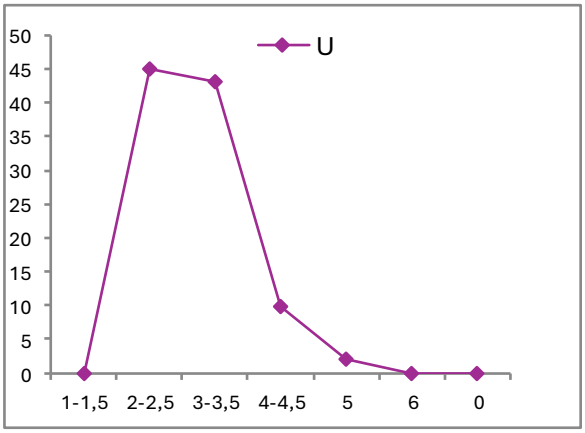

Figure 2 **The spectrum of ecological indices depending on humidity (U)**

Analyzing the grouping of weed species according to their water requirements, it is observed that the majority belong to the xeromesophilous category ($U_{2-2.5}$=45.10%) and mesophilous category ($U_{3-3.5}$=43.14%) (figure 2).

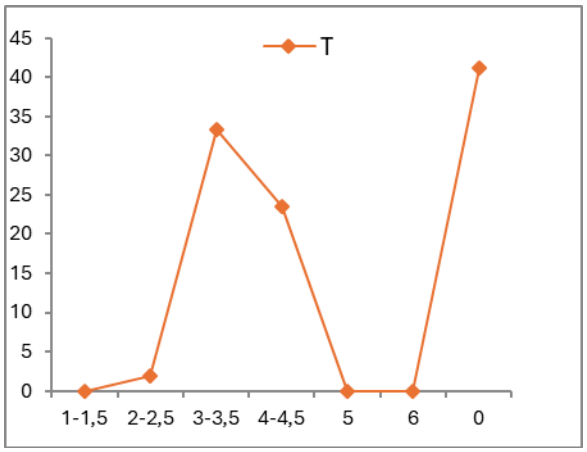

Figure 3 **The spectrum of ecological indices according to temperature (T)**

Under the report on the behavior of the studied plants in relation to temperature, the abundance in the weed flora of eritherms is noted (T_0=41.17%), followed by micromezotherms ($T_{3-3.5}$=33.34%) and moderately thermophilic species ($T_{4-4.5}$= 23.53%) (figure 3).

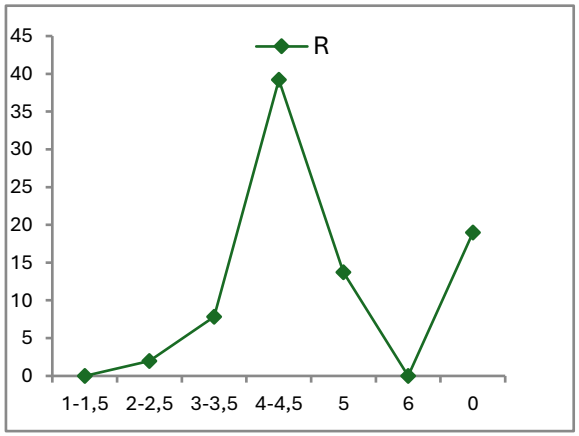

Figure 4 **The spectrum of ecological indicators depending on the soil chemical reaction (R)**

In terms of soil reaction preferences, most plants belong to the weak acid-neutral category ($R_{4-4.5}$=39.22%), followed by the euryionic ones (R_0=37.25%) (figure 4).

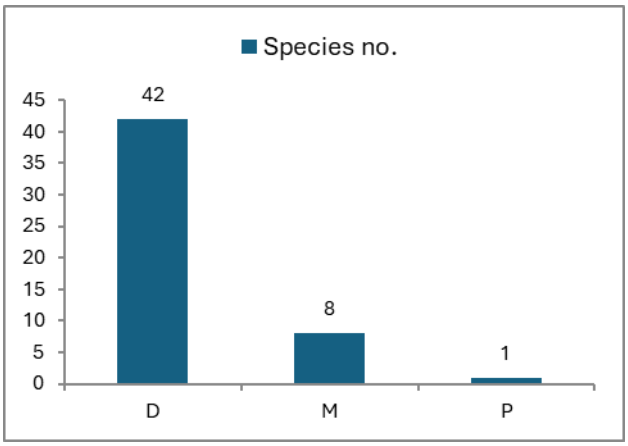

Figure 5 **The distribution of the identified species based on the number of cotyledons in the embryo (where: D - dicotyledonous; M - monocotyledonous; P - pteridophytes)**

Depending on the number of cotyledons in the seed embryo, the identified weed plant species are predominantly dicotyledonous (42 species), with a low number of monocotyledonous species (8 species) (figure 5).

CONCLUSIONS

The floristic study reveals the presence of 51 weed species, which are taxonomically classified into 45 genus and 23 families.

Analyzing the identified species in terms of ecological indices (humidity, temperature, and soil chemical reaction), we highlight the large presence of xeromesophilic species (45.10%), mesophilic species (43.14%), eurythermic species (41.17%), micromesothermic species (33.34%), moderately thermophilic species (23.53%),

weakly acidic neutrophilic species (39.22%), and euryionic species (37.25%).

In terms of seed morphology, dicotyledonous weeds are dominant (42 species), followed by monocotyledonous weeds (8 species).

Among the weed species with the highest presence within the studied agricultural crops are: *Convolvulus arvensis* (bindweed), *Amaranthus retroflexus* (redroot pigweed), *Cirsium arvense* (creeping thistle), and *Agropyron repens* (quackgrass).

We observed a higher presence of xeromesophilic species, such as *Consolida regalis*, *Polygonum convolvulus*, *Papaver rhoeas*, *Fumaria schleicheri*, *Bifora radians*, *Anthemis arvensis* and *Avena fatua*, in wheat crops.

In corn, bean, and sunflower crops, mesophilic weeds, namely *Convolvulus arvensis, Chenopodium album, Agropyron repens, Hibiscus trionum, Setaria pumila* and *Equisetum arvense*, are predominantly found.

Understanding weeds is essential in agriculture as they directly affect crop productivity, soil health, and resource use efficiency. Knowing them is crucial for identifying the most effective control methods.

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