STUDY OF WEED FLORA OF MAIZE CROPS IN THE NISAVA DISTRICT

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Abstract: The damage from the present weeds in maize crop is shown by the reduction of yield in almost every year and their suppression is completely economically justified. The right selection of herbicides mostly depends on the presence of dominant weed species and the time of application. The paper presents the distribution and existence of economically harmful, invasive and quarantine weed species (*Abutilon theophrasti*, *Agropyrum repens*, *Amaranthus retroflexus*, *Ambrosia artemisiifolia*, *Capsela bursa-pastoris*, *Chenopodium album*, *Chenopodium hybridum*, *Cirsium arvense*, *Convolvulus arvensis*, *Datura stramonium*, *Avena fatua*, *Calystegia sepium*, ...) on ten locations of maize crops in the Nisava district. Estimation of the species presence was done in two shootings (May and August) on scale 1-4 (1 - species appears individually and occupy up to 5% of the surface, 2 - appears and occupies 5-25% of the surface, 3 - appears often and occupies 25-50% of the surface, 4 - the species prevails over the cultivated plant and occupies over 50% of the surface).

Keywords: weed flora, maize crop, existence, distribution.

1. INTRODUCTION

The composition of the weed flora in one habitat depends primarily on the characteristics of climate and soil, crop types, applied agro-technology (fertilization, soil treatment, fertilization, herbicide application, etc.), as with other factors. Herbicides usage is one of the factors that has significantly affected the change of the composition of weed communities in recent years [4]. Long-term usage of herbicides with similar or the same active substance has led to a greater presence of more resistant weeds [1]. The analysis of the number and representation of the most important weed species enables the application of adequate measures in the protection of bred crops and the control of new species of weed community. Also, results of the researches can be used as one of the ways of effective control of weed vegetation in the concept of sustainable agriculture.

Former researches of presence and representation of weed species in maize crop at Nisava district are very poor. Because of that, results of these researches can be used proper selection of control measures as well as for the monitoring of weed species in these areas.

2. METHODS

The shooting had included 10 sites in the Nisava district, plots under the maize crop. The presence and representation of 25 weeds were observed. The applied method of assessing the representation of mapped species was as follows:

- method of evaluation: visual
- evaluation time: 2 measurements per season
- the size of the assessed area: 0.5 ha, 1 parcel, 100m bound to the npp.
- number of recordings per crop: 3. The representation of the mapped species was done on scale 1-4 (1 - the species is shown individually and occupies up to 5% of the surface; 2 - shown and occupies 5-25% of the surface; 3 - shown often 25-50% of the surface; 4 - the

species prevails over the cultivated plant and occupies over 50% of the area [2,5]. The plant crop phase (according to the BBCH scale) is equal as phase of more than 50% of the plants. Phase of the weed (PW): P – from cotyledons up to 5.6 plant leaf, V – plant, G – phase of fertility.

3. EXPERIMENTAL RESULTS

The results of phytocoenological shootings are shown in the tables.

Table 1. Distribution of weed species in maize crop (the first shooting on first five locations)

Main informations about date and shooting place		1. shooting		1. shooting		1. shooting		1. shooting		1. shooting	
Date of shooting		24.05.		24.05.		24.05.		24.05.		16.05.	
Place (nearest inhabited town):		Bovan		Subotinac		Glogovica		Mozgovo		Rutevac	
Coordinates (GPS) W:		[7556288]		[7554726]		[7559970]		[7553054]		[7550308]	
E:		[4830763]		[4831686]		[4820009]		[4834752]		[4828595]	
A:		[215 ± 4]		[257 ± 4]		[190 ± 4]		[328 ± 4]		[174 ± 5]	
Grown plant:		maize		maize		maize		maize		maize	
Phase of grown plant (accordnig to BBCH scale):		1		1		1		1		1	
Herbicide usage: (enroll <u>yes</u> , <u>no</u> or <u>unknown</u>)		unknown		unknown		yes		unknown		no	
Information of representation of weed from scale and 1-4 phase of weed											
Weed specie	Repre. mark	PW	Repre. Mark	PW	Repre. mark	PW	Repre. mark	PW	Repre. mark	PW	
1. <i>Abutilon theophrasti</i>											
2. <i>Agropyrum repens</i>	1	V	1	v	1	v			1	v	
3. <i>Amaranthus retroflexus</i>									1	v	
4. <i>Amaranthus hybridus</i>											
5. <i>Ambrosia artemisiifolia</i>											
6. <i>Asclepias syriaca</i>											
7. <i>Avena fatua</i>											
8. <i>Calystegia sepium</i>	1	V	1	v	1	v	1	v			
9. <i>Cannabis sativa</i>											
10. <i>Cirsium arvense</i>	2	V	1	v	1	v	1	v	1	v	
11. <i>Chenopodium album</i>	1	V	1	v			1	v	1	v	
12. <i>Chenopodium hybridu.</i>					1	p					
13. <i>Convolvulus arvensis</i>	1	V	1	v	1	v	1	v	1	v	
14. <i>Cuscuta spp.</i>											
15. <i>Cynodon dactylon</i>	2	V	1	v			1	v	1	v	
16. <i>Datura stramonium</i>											
17. <i>Erigeron canadensis</i>											
18. <i>Galium aparine</i>											
19. <i>Helianthus tuberosus</i>											
20. <i>Iva xanthifolia</i>											
21. <i>Lactuca serriola</i>											
22. <i>Orobanche spp.</i>											
23. <i>Sonchus arvensis</i>											
24. <i>Sorghum halepense</i>					1	v			2	p-v	
25. <i>Xanthium strumarium</i>	1	P									

Table 2. Distribution of weed species in maize crop (the first shooting on second five locations)

Main informations about date and shooting place	1. shooting	1. shooting	1. shooting	1. shooting	1. shooting					
Date of shooting	16.05.	16.05.	16.05.	10.05.	10.05.					
Place (nearest inhabited town):	Donja Trnava	Drazevac	Deligrad	Moravac	Nozrina					
Coordinates (GPS) W:	[7565001]	[7565054]	[7547957]	[7558041]	[7558520]					
E:	[4807938]	[4811595]	[4830128]	[4816553]	[4815400]					
A:	[194 ± 5]	[180 ± 5]	[176 ± 5]	[176 ± 6]	[182 ± 4]					
Grown plant:	maize	maize	maize	maize	maize					
Phase of grown plant (accordnig to BBCH scale):	1	1	1	1	1					
Herbicide usage: (enroll <u>yes</u> , <u>no</u> or <u>unknown</u>)	unknown	unknown	unknown	unknown	unknown					
Information of representation of weed from scale and 1-4 phase of weed										
Weed specie	Repre. mark	PW	Repre. mark	PW	Repre. mark	PW	Repre. mark	PW	Repre. mark	PW
1. <i>Abutilon theophrasti</i>	1	p-v	1	p-v						
2. <i>Agropyrum repens</i>					1	V				
3. <i>Amaranthus retroflexus</i>					1	V				
4. <i>Amaranthus hybridus</i>							1	p	1	p
5. <i>Ambrosia artemisiifolia</i>										
6. <i>Asclepias syriaca</i>										
7. <i>Avena fatua</i>										
8. <i>Calystegia sepium</i>							1	p-v	1	p-v
9. <i>Cannabis sativa</i>	1	p-v	1	p-v						
10. <i>Cirsium arvense</i>	1	p-v	1	p-v	1	V				
11. <i>Chenopodium album</i>					1	V				
12. <i>Chenopodium hybridum</i>							1	p-v	1	p-v
13. <i>Convolvulus arvensis</i>					1	V	1	p-v	1	p-v
14. <i>Cuscuta</i> spp.	1	p-v	1	p-v						
15. <i>Cynodon dactylon</i>					1	V				
16. <i>Datura stramonium</i>										
17. <i>Erigeron canadensis</i>										
18. <i>Galium aparine</i>										
19. <i>Helianthus tuberosus</i>										
20. <i>Iva xanthifolia</i>										
21. <i>Lactuca serriola</i>										
22. <i>Orobanche</i> spp.	1	p-v	1	p-v						
23. <i>Sonchus arvensis</i>	1	p-v	1	p-v						
24. <i>Sorghum halepense</i>					1	P				
25. <i>Xanthium strumarium</i>										

Table 1 shows the presence and number of recorded weeds in phase of the adult plant (V) at five locations. Maze crop was in phase 1. Present weeds were estimated with mark 1 at all localities. At location Bovan weeds *Cirsium arvense* and *Cynodon dactylon* occupied 5-25% of maize crop (mark 2).

In Table 2 the presence and the number of recorded weeds at 10 and 16 of May were estimated, and the weeds were in the to 5.6 plant leaf to the adult plant and the phase of the growth of corn 1, at the five selected locations. At all localities weeds were present in most of the evaluation grades 1. At the locality of Deligrad it was noted the biggest number of weed species.

Table 3. Distribution of weed species in maize crop (the second shooting on first five locations)

Main informations about date and shooting place	2. shooting	2. shooting	2. shooting	2. shooting	2. shooting					
Date of shooting	09.08.	22.08.	09.08.	22.08.	22.08.					
Place (nearest inhabited town):	Bovan	Subotinac	Glogovica	Mozovo	Rutevac					
Grown plant:	maize	maize	maize	maize	maize					
Phase of grown plant (accordnig to BBCH scale):	8	8	8	8	8					
Herbicide usage: (enroll <u>yes</u> , <u>no</u> or <u>unknown</u>)	unknown	unknown	unknown	unknown	unknown					
Information of representation of weed from scale and 1-4 phase of weed										
Weed specie	Repre. mark	PW	Repre. mark	PW	Repre. mark	PW	Repre. mark	PW	Repre. mark	PW
1. <i>Abutilon theophrasti</i>					2	V				
2. <i>Agropyrum repens</i>	2	V	2	G	2	G	2	G	3	G
3. <i>Amaranthus retroflexus</i>	2	G	3	G			3	G	3	G
4. <i>Amaranthus hybridus</i>									1	G
5. <i>Ambrosia artemisiifolia</i>			1	V-G						
6. <i>Asclepias syriaca</i>										
7. <i>Avena fatua</i>					3	V				
8. <i>Calystegia sepium</i>	3	V								
9. <i>Cannabis sativa</i>					1	V				
10. <i>Cirsium arvense</i>	1	V	3	G	1	G	3	G	2	G
11. <i>Chenopodium album</i>	1	G	3	G			3	G	3	G
12. <i>Chenopodium hybridu.</i>					2	V				
13. <i>Convolvulus arvensis</i>	2	V	1	V			2	V	2	V
14. <i>Cuscuta spp.</i>					1	G				
15. <i>Cynodon dactylon</i>	1	G	3	G			2	G	2	G
16. <i>Datura stramonium</i>			1	V	1	V				
17. <i>Erigeron canadensis</i>	1	V					1	V		
18. <i>Galium aparine</i>										
19. <i>Helianthus tuberosus</i>										
20. <i>Iva xanthifolia</i>										
21. <i>Lactuca serriola</i>									1	V
22. <i>Orobanche spp.</i>										
23. <i>Sonchus arvensis</i>										
24. <i>Sorghum halepense</i>			1	G	1	V	2	G		
25. <i>Xanthium strumarium</i>	1	V	1	V						

Table 3 shows data from second shooting of weed distribution at 9 and 22 of August, at first five locations. Most of the weeds were in G phase (phase of fertility), while maize plants were in phase 8 (according to BBCH scale). Weed plants were seen in almost all locations, where marks were from 1 to 3. Weed species *Agropyrum repens*, *Amaranthus retroflexus*, *Cirsium arvense* and *Chenopodium album* were present at all locations with representation mark from 2 to 3.

Table 4. Distribution of weed species in maize crop (the second shooting on second five locations)

Main informations about date and shooting place	2. shooting		2. shooting		2. shooting		2. shooting		2.shooting	
Date of shooting	09.08.05.		09.08.05.		22.08.05.		22.08.05.		22.08.05.	
Place (nearest inhabited town):	D.Trnava		Drazevac		Deligrad		Moravac		Nozrina	
Grown plant:	maize		maize		maize		maize		maize	
Phase of grown plant (accordnig to BBCH scale):	8		8		8		8		8	
Herbicide usage: (enroll yes, no or unknown)	unknown		unknown		unknown		unknown		unknown	
Information of representation of weed from scale and 1-4 phase of weed										
Weed specie	Repre. mark	PW	Repre. Mark	PW	Repre. mark	PW	Repre. mark	PW	Repre. mark	PW
1. <i>Abutilon theophrasti</i>			1	V						
2. <i>Agropyrum repens</i>	2	V	2	V	2	G	2	V	2	G
3. <i>Amaranthus retroflexus</i>	2	G	2	V	2	G	3	G	2	G
4. <i>Amaranthus hybridus</i>			2	V						
5. <i>Ambrosia artemisiifolia</i>					1	V				
6. <i>Asclepias syriaca</i>										
7. <i>Avena fatua</i>										
8. <i>Calystegia sepium</i>	2	V	2	V	2	V	2	V	2	V
9. <i>Cannabis sativa</i>										
10. <i>Cirsium arvense</i>	2	V	3	V	2	G	2	V	2	V
11. <i>Chenopodium album</i>	2	G	3	V	2	G	2	G	3	G
12. <i>Chenopodium hybridum</i>										
13. <i>Convolvulus arvensis</i>	2	V	1	V	2	V	2	V	2	V
14. <i>Cuscuta</i> spp.										
15. <i>Cynodon dactylon</i>	2	G	3	V	2	G	2	G	2	G
16. <i>Datura stramonium</i>			1	V			1	V		
17. <i>Erigeron canadensis</i>	2	V			2	V	2	V	2	V
18. <i>Galium aparine</i>										
19. <i>Helianthus tuberosus</i>										
20. <i>Iva xanthifolia</i>										
21. <i>Lactuca serriola</i>			1	v	1	G				
22. <i>Orobanche</i> spp.										
23. <i>Sonchus arvensis</i>										
24. <i>Sorghum halepense</i>	2	G	1	G	1	G	1	G	2	G
25. <i>Xanthium strumarium</i>	2	V	1	V	2	V	2	V	2	V

Table 4 shows information from second shooting of distribution of weed spices at 9 and 22 of August, on second five locations. Most of weeds were in G (phase of fertility) and V (adult plant) phase, while maize plants were in phase 8 (according to BBCH scale). Weed species were seen at almost all location (10-12) with representation mark from 1 to 3. Weed species *Cirsium arvense*, *Chenopodium album*, *Agropyrum repens*, *Amaranthus retroflexus*, *Convolvulus arvensis*, *Cynodon dactylon* *Sorghum halepense* , *Xanthium strumarium* were found at all locations with average representation mark 2.

4. CONCLUSIONS

Based on all presented information from two shootings of distribution and representation of most significant weed species in maize crops at ten locations of Nisava district, we can conclude:

- Significant percentage of weed species were found at all ten locations in both shootings;
- In first shooting all present weed species were in phase of mature plant, while their representation was rated with average mark 1, except weed species *Cirsium arvense*, *Cynodon dactylon* and *Sorghum halepense* which had mark 2 on three locations;
- In first shooting perennial weed species had the most coverage of the maize crops;
- Second shooting of the same locations (in August) shown significantly increase of weed species number at all location of Nisava district;
- Most of weed plants were in phase V and G (adult plant and phase of fertility) in second shooting, with the representation mark from 2 to 3;
- Weed species *Agropyrum repens* and *Cirsium arvense* had representation mark of 2 or 3 at all ten locations in second shooting, which means they occupied from 25% to 50% of viewed field.

5. REFERENCES

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