

COMPOSITION, DENSITY AND DOMINANCE OF WEEDS IN MAIZE AT DIFFERENT NUTRIENT SUPPLY

Aim of the study For a sustainable crop production, the interactions between weeds and cultivated plants, and the behaviour of weeds in agro-ecosystems have to be known. Our main objective was: what kind of differences could be realised in the diversity and density of weeds depending on fertilization.

Materials and methods Investigations were carried out in a long-term fertilization experiment in Nagyhörcsök, Hungary. Weed survey was executed on control (Ø) and fertilized (NPK) plots, with 3 replications. On each of them two 2x2 m (4 m²) areas were kept herbicide free. Sampling and counting of weeds was carried out on the non-controlled weedy areas (1 m²) and all of the plants were collected from. The composition of weed flora and the density of weed species were determined on 4th June, 2013, on the eighth week after the sowing of maize. The index of dominance of weeds was calculated by the Berger-Parker index*. Statistical analysis of the experimental data was made by MSTAT software. * $d=N_{max}/N_T$; N_{max} : the number of individuals of the most abundant species; N_T : total number of individuals

Table 1 Precipitation and temperature values between sowing and sampling time

	January	February	March	April	May	June
Precipitation (mm)	54.5	63.6	98.6	25.0	58.5	87.5
Temperature (°C)	0.5	2.6	4.1	13.7	17.3	20.3

Table 2 Density and frequency of weed species on the experimental plots

Weed species	Code	Freq.	Density (plant · m ⁻²)		
			Ø	NPK	Average**
<i>Ambrosia artemisiifolia</i> L.	AMBAR*	6	62.0	23.3	42.7
<i>Datura stramonium</i> L.	DATST	6	4.7	13.3	9.0
<i>Sorghum halepense</i> (L.) Pers.	SORHA*	4	31.3	8.0	19.7
<i>Chenopodium album</i> L.	CHEAL	3	-	86.7	43.3
<i>Fallopia convolvulus</i> (L.) Á. Löve	FALCO	3	0.7	3.3	2.7
<i>Solanum nigrum</i> L.	SOLNI	3	0.7	1.3	2.0
<i>Chenopodium hybridum</i> L.	CHEHY	3	-	5.3	1.0
<i>Helianthus annuus</i> L.	HELAN	3	1.3	0.7	1.0
<i>Amaranthus blitoides</i> S. Watson	AMABL	1	-	20.7	10.3
<i>Echinochloa crus-galli</i> (L.) P. B.	ECHCG	1	-	2.0	1.0
<i>Heliotropium europaeum</i> L.	HELEU	1	-	0.7	0.3
<i>Stachys annua</i> L.	STAAN	1	0.7	-	0.3
Total:			101.4	165.4	LSD_{5%}=28.2

* LSD_{5%} AMBAR: 27.3 pc·m⁻²; SORHA: 13.6 pc·m⁻²; ** in average of control and NPK treatments

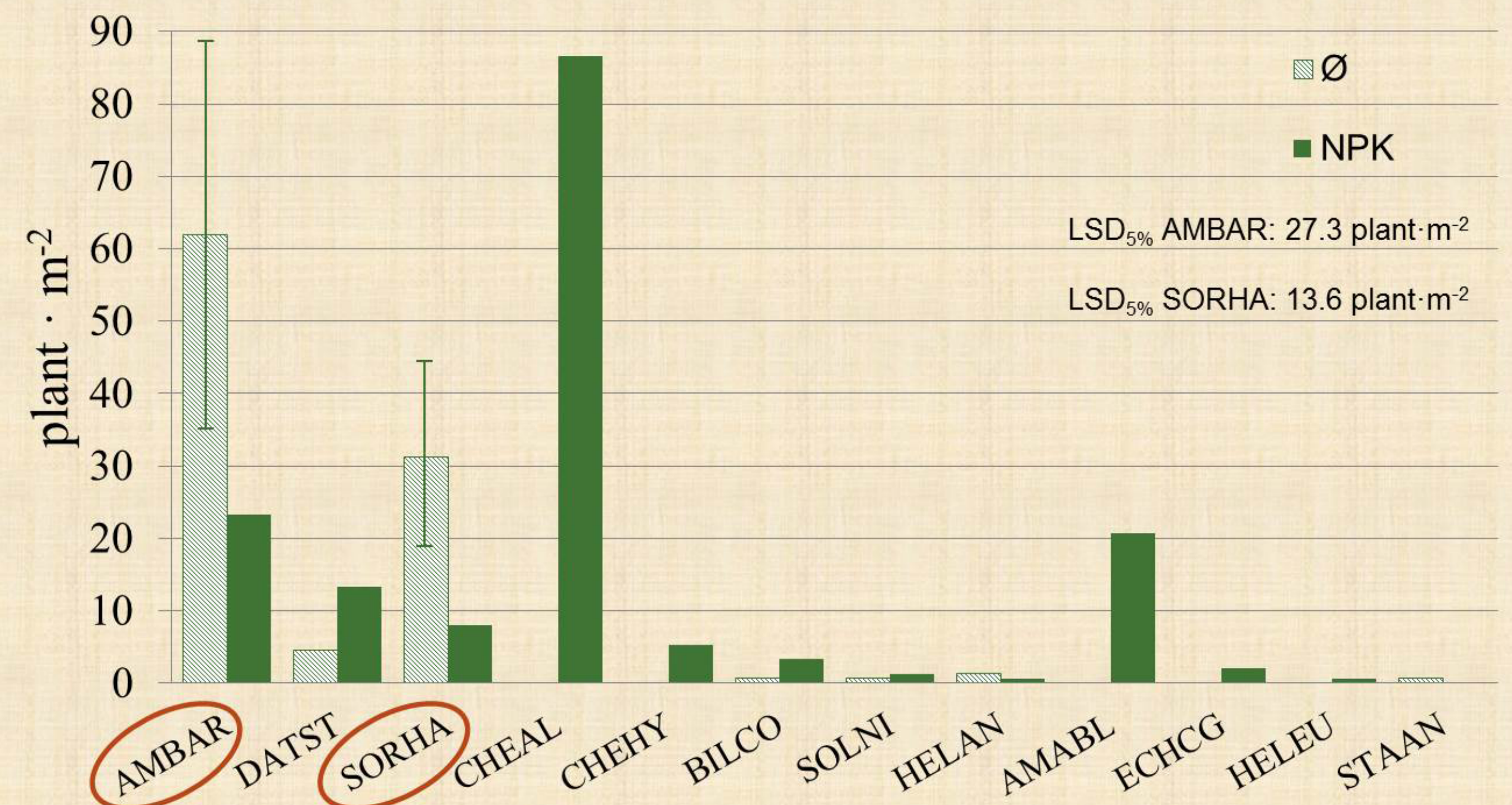


Figure 3 Density of weed species on the experimental plots

Table 2 Dominance index of weed species in the different treatments

Weed species	Ø	NPK	Average*
<i>Ambrosia artemisiifolia</i> L.	0.610	0.140	0.320
<i>Sorghum halepense</i> (L.) Pers.	0.310	0.050	0.150
<i>Datura stramonium</i> L.	0.050	0.080	0.070
<i>Solanum nigrum</i> L.	0.010	0.007	0.007
<i>Helianthus annuus</i> L.	0.010	0.004	0.007
<i>Stachys annua</i> L.	0.010	-	0.002
<i>Fallopia convolvulus</i> (L.) Á. Löve	0.006	0.020	0.020
<i>Chenopodium album</i> L.	-	0.520	0.330
<i>Amaranthus blitoides</i> S. Watson	-	0.130	0.080
<i>Chenopodium hybridum</i> L.	-	0.030	0.020
<i>Echinochloa crus-galli</i> (L.) P. B.	-	0.010	0.007
<i>Heliotropium europaeum</i> L.	-	0.004	0.002

* in average of control and NPK treatments

Conclusions

- Remarkable weed density was detected on the herbicide free sample areas. It was in average of control and NPK treatments 133 plant·m⁻².
- The total weed density was 101 plant·m⁻² on the control plots (Ø) and 165 plant·m⁻² on the plots with good nutrient supply (NPK).
- The number of the weed species was higher in the fertilized treatment (11) compared to the control (7).
- The dominance index of weed species was different in the control and NPK treatment. In the order of dominance, *Ambrosia artemisiifolia* L. (61%) was on the first place in the control plots and *Chenopodium album* L. (52%) in the NPK treated plots.
- In the control treatment without fertilizers *Ambrosia artemisiifolia* L. was the most frequented weed species and had the highest density.

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