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WEED CONTROL IN CONFECTIONARY SUNFLOWER

Miklós, Szabó[1] – Tibor, Szele[2]
[1]College of Nyíregyháza Department of Horticulture and Food Processing,
[2]College of Nyíregyháza Department of Crop Science

Abstract: *The confectionary sunflower is an important field crop in the Nyírség region. Its cultivation is much more different from that of oil seed sunflower. The basic difference is that 15-30 cm high ridges are made when the plants reach 6-8 leaves stage. In case of rainy and windy reasons 30-50 % of the sunflower stock would be fully lodged. Department of Crop Science of College of Nyíregyháza has been carrying out an European Sunflower Moth monitoring study from 2005 all over the Szabolcs-Szatmár-Bereg county. In the same area a weed control study was carried out in 2006. We aimed to examine the efficiency of different kind of weed control practices applied in confectionary sunflower fields in Szabolcs-Szatmár-Bereg county.*
Keywords: *confectionary sunflower, weed control, Szabolcs-Szatmár-Bereg county, weed species, Orobanche spp.*

1. INTRODUCTION

Confectionary sunflower is a very important field crop in Nyírség region. History of its traditional cultivation practice dates back many hundreds of years in Szabolcs-Szatmáár-Bereg County (HORVÁTH - BÉKÉSI - VIRÁNYI, 2005). 80% of the confectionary sunflower cultivation area (20 000-25 000 ha) could be find in this county.

Cultivation practice of confectionary sunflower is much more different from that of oil seed sunflower because of the heterogeneity and height (2,5- 3,5 m) of cultivars (VRANCEANU, 1977). Due to its high profitability the applied cropping system is the monoculture. At the stage of 6-8 leaves plants are hilled up by making 15-30 cm height ridges in the rows. Without making ridges 30-50% of the stock would be lodged in case of rainy and windy seasons. Dishes of the lodged sunflower getting rotted in the earth surface, causing considerable crop failure.

Weed community of sunflower is greatly determined by the sowing time because tillage applied during the seed bed preparation is a very efficient way to kill the germed weed. Monocotyledon and dicotyledon weeds belong to T_3 and T_4 life cycle were appeared int he largest quantities in the field (REISINGER. 2000). The most frequent sunflower weeds are:

- Perennial monocotyledons: *Agropyron repens*, *Sorghum halepense*;

- Annual monocotyledons: *Avena fatua*, *Echinochloa crus-galli*, *Setaria spp*., *Panicum spp*.;
- Perennial dicotyledons: *Cirsium arvense*, *Convolvulus arvensis*;
- Annual dicotyledons: *Amaranthus spp*., *Chenopodium spp.*, *Ambrosia artemisiifolia*, *Xanthium spp*., *Datura stramonium*, *Polygonum spp*.
- Special parazite weed: sunflower broomrape *(Orobanche cumana*) (HORVÁTH, 1996).

Sunflower field has to be free from annual and perennial dicotyledonous and hard-to-kill weeds. The humus content must be more than 1% and the soil plasticity more than 32 to protect the sunflower against the fitotoxic effect of herbicides. Mechanical weed control is an important tool for confectionary sunflower production and improves the soil aeration (REISINGER, 1997).

In case of sunflower the weed control is accomplished by presowing and/or preemergent way because the supplementary postemergent spraying is risky (fitotoxicity, weather conditions, lack of machines) (SZABÓ, 2005). Therefore the basis of the chemical weed control is the presowing or preemergent spraying which provides the satisfactory weedlessness (HORNYÁK, 2006). Since there are only few herbicides suitable for postemergent treatment the so called hard-to-kill weed could be eradicated only spraying on the stable field or in the previous crop stock (NÉMETH, 1998). Our examination aimed to study the effect of the different cultivation practices applied in oil seed and confectionary sunflower production on the weed species and on the efficiency of weed control.

2. MATERIALS AND METHODS

Our examinations were carried out in the four cultivation site of Szabolcs-Szatmár-Bereg County most important for confectionary sunflower production. These sites included eight settlements, namely Nyíregyháza, Nyíregyháza-Oros, Érpatak, Geszteréd, Ajak, Nyírtass, Győrtelek and Ököritófülpös (Figure 1). Our research activity tended toward the efficiency examination of sunflower weed control in 2006. Weed contamination of the four most important cultivation area was compared to each other, and effect of soil type on weed species occurring on the field was also examined.

Soil samples were taken and analysed in laboratory for soil texture, pH, plasticity according to Arany and proportion of particles less than 0.02 mm.

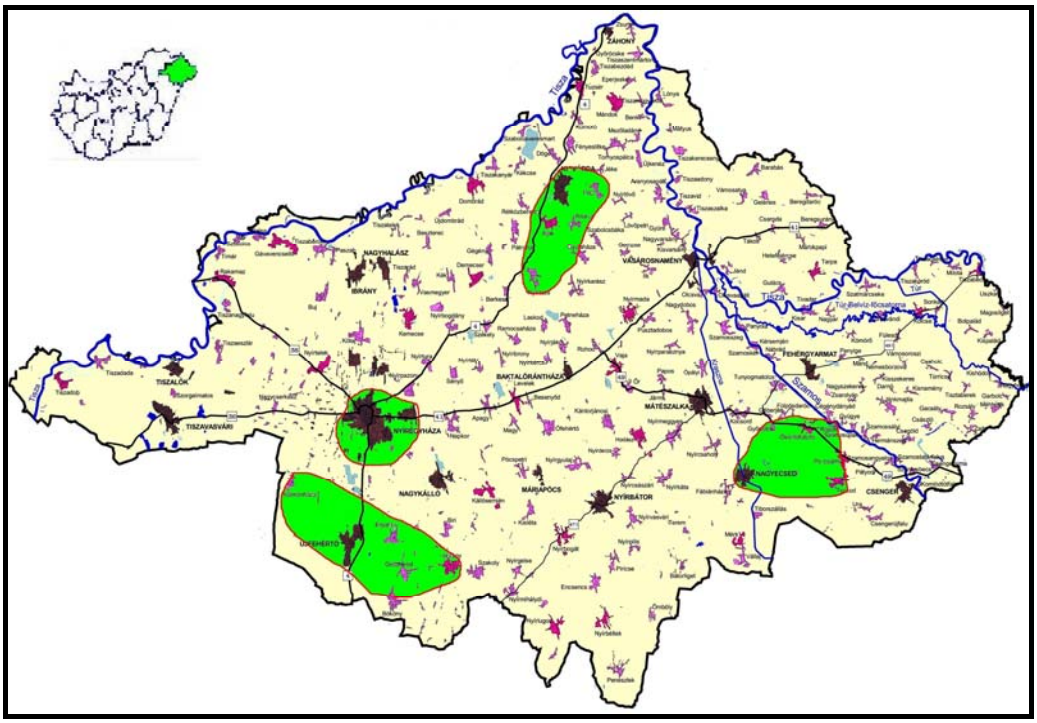

Figure 1. Location of examined confectionary sunflower cultivation areas in Szablocs-Szatmár-Bereg County.

Kisvárdai cultivar is the only registered one that proves the biological basis of domestic confectionary sunflower production. Besides Kisvárdai cultivar numerous local varieties (Szabolcsi, Kállói, Ecsedi, Anarcsi) are cultivated in our county .

Kisvárdai cultivar was breeded in Teichmann Establishment belongs to Research Centre of Debrecen University and registered in 1967 (FRANK, 1999). Its growing period is 135-145 days, 250-320 cm height, branching in 5-10 %. Dishes are large, arching in fully ripe. Its early development is quick vegetative mass is large. Due to the height stalk its cultivation is recommended in small scale farms. Extremely suitable to utilize the loose soils with thin humus layer. Its harvest needs hand labour (SZABÓ - ROMHÁNY, 2005).

From 2005 comprehensive examinations have been carrying out related to European sunflower moth (*Homoeosoma nebulellum* DENIS et SCHIFFERMÜLLER) monitoring in the entire county by the College of Nyíregyháza Department of Crop Science (SZABÓ et al, 2005). In the frame of this project a survey was accomplished on weed control in 2006. Our purpose was to examine the weed control methods and their efficiency on confectionary sunflower fields in Szabolcs-Szatmár-Bereg County.

The survey was performed in September 2006 before harvesting. Weed survey was carried out in 3 plot in every cultivation area according to NÉMETH-SÁRFALVI (1998). One

survey spot was marked out in every plots in random way. Farmers were asked about the method, frequency and date of weed control.

Chemical weed control was applied only in one case in Geszteréd from the 12 examined plots. Mechanical weed control included ridge making in two different time. Ridge making time conformed to development stage of the plants. The first ridge was made at 6-8 leaves stage, the second one at 70-80 cm plant height. Height of the first ridge was 10-2 cm that of the second was 20-25 cm. In Geszteréd szőlődomd, and Geszteréd nyárfás fileds the second ridge was 30-35 cm height. Supplementary mechanical weed control was applied in the almost the half of the examined area after preparing the second ridge.

3. RESULTS AND DISCUSSION

Based on the determination of soil plasticity and of size of soil particles soil of the experimental sites could be divided into three soil texture categories (Table 1).

Table 1. Soil physical and chemical characteristics of the experimental plots

	Field identification	Soil plasticity according to Arany	pH		Proportion of soil particles less than 0.02 mm.	Soil texture
		K_A	H_2O	KCl	%	
1	Geszteréd 1 (szőlődomb)	32	5.29	4.23	14	sandy loam
2	Geszteréd 2 (nyárfás)	27	5.43	4.49	12	sand
3	Érpatak 2 (szilvás)	28	5.76	5.14	26	sand
4	Nyíregyháza 1 (repülőtér)	27	5.35	5.00	17.6	sand
5	Nyíregyháza 2 (bemutatók)	31	5.41	5.15	9.6	sandy loam
6	Oros 1 (kert)	34	6.85	6.87	4	sandy loam
7	Győrtelek (szárító)	58	5.67	4.78	44	clay
8	Ök. Fülpös 1 (dió)	55	5.55	4.80	72	clay
9	Ök. Fülpös 2 (kert)	43	5.85	4.86	36	clay loam
10	Nyírtass 2 (Gyh-i út)	26	5.60	5.03	8.8	sand
11	Ajak 1 (kert)	30	7.51	7.67	12	sandy loam
12	Ajak 2 (bende)	31	7.31	7.12	12	sandy loam

Soil texture was sand in case of four, sandy loam in case of five and clay in case of three sites out of the twelve. The pH values was acid in case of four, slightly acid in case of five, neutral in case of one and slightly alkalic in case of two experimental sites. According to these, eight site out of the twelve probably require liming.

Although weed covering values were not influenced by the soil type but they showed strong correlation with the applied cultivation practice. Soil type had significant impact on number and racial composition of weed species.

Results of the applied weed control proved to be very diverse and are summarized in Table 2. Number of weed species found in the fields was between 5 and 25, out of which the number of perennials was 2-5, number of annuals was 3-21. Weed covering value was the highest in Ajak bende with 81% and the lowest in Geszteréd szőlődomb with 8 %. Covering value related to the perennials was 1-21, in case of annuals it was 7-64%. Dominant perennial species: *Cynodon dactylon*, *Agropyron repens*, *Equisetum arvense*. Dominant annuals: *Ambrosia artemesiifolia, Setaria spp., Orobanche cumana.*

Table 2. Distribution of annual and perennial weeds in certain fields

	Field identification	Weed species		Perennials		Annuals	
		item (ps)	covering (%)	item (ps)	covering (%)	item (ps)	covering (%)
1	Geszteréd 1 (szőlődomb)	5	8	2	1	3	7
2	Geszteréd 2 (nyárfás)	8	11	2	3	6	8
3	Érpatak 2 (szilvás)	7	14	2	2	5	12
4	Nyíregyháza 1 (repülőtér)	11	37	4	12	7	25
5	Nyíregyháza 2 (bemut.k)	14	14	3	4	11	10
6	Oros 1 (kert)	12	12	3	3	8	9
7	Győrtelek (szárító)	17	63	3	15	14	48
8	Ök. Fülpös 1 (dió)	14	51	4	18	10	33
9	Ök. Fülpös 2 (kert)	13	67	2	16	11	51
10	Nyírtass 2 (Gyh-i út)	20	43	3	14	17	29
11	Ajak 1 (kert)	14	64	5	21	9	43
12	Ajak 2 (bende)	25	81	4	17	21	64

4. CONCLUSION

Based on our results it could be concluded that:

- Presence of weed species greatly depends on soil type and the ridge height.
- Dominant annual weed were: common ragweed (*Ambrosia artemesiifolia*), sunflower broomrape (*Orobanche cumana*)
- Dominant perennial weeds were: bermudagrass (*Cynodon dactylon*) and couch grass (*Agropyron repens*), and common horsetail (*Equisetum arvense*) in acid soils.
- Sunflower broomrape was observed in such a field where sunflower was not cultivated for ten years.
- Weed composition of confectionary sunflower do not differ from that of oil seed sunflower, but it is contaminated with sunflower broomrape much more.

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