CRITICAL PERIODS FOR WEED CONTROL IN SUNFLOWER IN SOUTH-EASTERN REGION OF HUNGARY

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Introduction

Competition between weeds and crops is influenced by several factors; the species, density, occupied space and distribution of weeds and crops, duration of competition period, genetic and soil factors (Bleasdale, 1960).
The crops may tolerate the weed infestation, or if the area is kept weed-free for certain time, the crops are able to suppress the later developing weeds. (Rademacher, 1966).
The concept of critical competition period was introduced by Nieto et. al (1968) that means the time period between the length of tolerable weed competition and the length of necessary weed-free period.
Sunflower is grown on 400 000-600 000 hectares in Hungary, on 10 % of total arable crop territory. Results of experiments could provide a useful basis for contemplation of weed control technologies.

Materials and Methods

Defining the critical competition period for sunflower, we completed experiments in Hódmezővásárhely (South-eastern part of Hungary) in 2001 and 2002, on chernozem soil with lime deposits, on small plots, in four replicates. The experiment applied plots with intact weed vegetation up to the 2nd,-4th,-8th,-12th,-16th week (till the end of the vegetation period) after emerging and plots treated against weeds up to the 2nd,-4th,-8th,-12th,-16th week (till the end of the vegetation period) after emerging. Yield was calculated in t/ha at 14% moisture content of the achenes, by measuring the yield harvested from one row with accurately adjusted numbers of plants, chosen randomly. Weed cover was expressed in percentages, also the percentage of the most important weed species within the total weed cover was calculated.

Results and discussion

Development of the crop and of weeds was considerably influenced by the quantity of precipitation fallen during vegetation period and the temperature trend.
In 2001 year the fallen large quantity of precipitation made possible only a late sowing.
As a consequence of late sowing, the heat demanding seed-borne weeds emerged much earlier and early, a strong weed infestation could be observed.
The damage caused by weed competition manifested itself strongly on the relatively underdeveloped sunflower plants and showed up also in yield results (Table. 1.).
In 2002 there was considerably less summer precipitation so the sowing could be done in proper time.
The sunflower crop was significantly more developed at the time of emerging and sprouting of the heat demanding weeds, this way its weed suppressing effect could appear much earlier. One could see from the yield results that in case of early sowing the sunflower as a crop was able to tolerate the appearing weed competition and this showed up in considerable yield surplus as well (Table. 2.).

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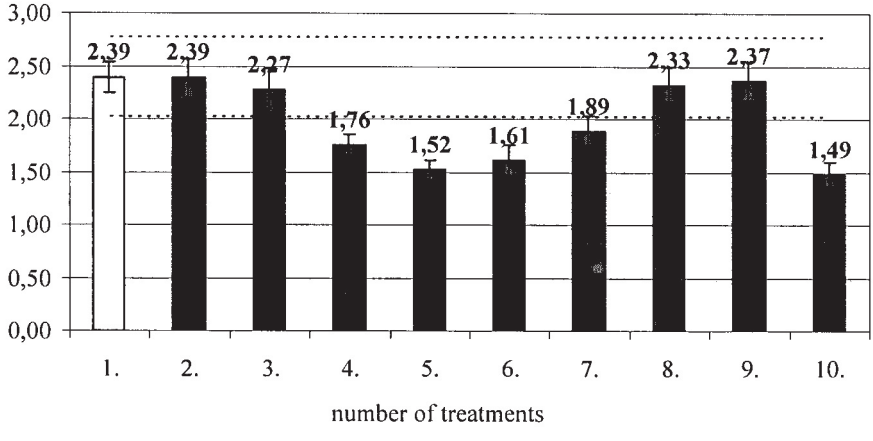
On the basis of the two years of the study it could be established that a sowing carried out in optimal time (generally in-between 15-25 of April) has a favourable effect on the weed suppressing ability of the sunflower. The sunflower utilises better the lesser summer precipitation and it is more advantageous for driving back of the weed competition.
At determination of the critical competition period it was established that weed cover for the duration of 2-4 weeks counted from emergence did not have significant effect on the yield results. Yield results of a crop kept 8-12 weeks covered by weeds came near to that of untreated control. No significant yield loss was observed in sunflower crop kept weed free for 8-12 weeks (Figure 1.-2.).

Tab. 1: Effect of different timing of herbicide treatments on sunflower yield, 2001.

Number	Treatments	Average t/ha	% of hoed control
1.	Hoed control	2,39	100,0
2.	Weedy for 2 weeks	2,39	99,8
3.	Weedy for 4 weeks	2,27	95,0
4.	Weedy for 8 weeks	1,76	73,6 ***
5.	Weedy for 12 weeks	1,52	63,6 ***
6.	Weed free for 2 weeks	1,61	67,5 ***
7.	Weed free for 4 weeks	1,89	79,0 **
8.	Weed free for 8 weeks	2,33	97,3
9.	Weed free for 12 weeks	2,37	99,0
10.	Untreated control	1,49	62,1 ***
$SD_{10\%}$=*		0,38	16,0
$SD_{5\%}$=**		0,46	19,2
$SD_{1\%}$=***		0,62	26,0

CV= 15,8 %



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