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Effect of Sowing Date and Density on Yield and Leaf Area Index in Weed Interference Johnsongrass (*Sorghum halepense*) with Corn (*Zea mays* L.), in Region Moghan-Iran

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Abstract: Increasing crop competitive ability as one of the key is to weed management. The study was carried out 2009 and 2010 in the Moghaan Agro-industrial &Livestock co. respectively 39 and 47 degrees North Latitude and 32 meters from sea level, was performed. Experimental in randomized complete block design In four replications at two sowing date were conducted separately. The treatments included four levels of weed density Johnsongrass (*Sorghum halepense*) (0,4,8,12,16) m^2 and the cultivated varieties corn, single cross 704. Analysis of variance results showed. The effect of sowing date on grain yield, leaf area index of corn, Johnsongrass (*Sorghum halepense*) LAI was significant at the 1% level. Between the experimental treatments in terms of traits Yield, harvest index, leaf area index of corn, leaf area index Johnsongrass (*Sorghum halepense*) There are significant differences in the 1% level. The Interaction between sowing date × treatment for yield traits, Corn leaf area index, LAI Johnsongrass (*Sorghum halepense*) was significant at the 1% level. According to the results of the study compared traits, control treatment (treatment 6). Had the highest yield, the fifth treatment (treatment 5). The lowest yield in between the treatments. It seems that the ability to utilize environmental resources including water, light And nutrients by weeds than crops, the most important reasons yield by reducing the corn is in the study. Results of simple linear correlation coefficients Showed for studied traits (Table 3-10). Between yield with harvest index, leaf area index of corn positive correlation significant And with LAI Johnsongrass (*Sorghum halepense*), there significant negative correlation.

Key words: Sowing Date · Density · Yield · Weed Interference · Corn

INTRODUCTION

Increasing crop competitive ability, as one of the key tools for managing weeds is. Recognized that in sustainable agriculture is considered. Through plant breeding, crop management, soil fertility and changes in canopy spatial pattern can be achieved [1, 2]. Agronomic practices for the development of competitive Crops And inhibits weed growth**,** reducing the competitive Their crops, mainly in the consumption of resources such as water, Depends on crop nutrient and light [3]. To believe Tollenaar *et al*. [4], in competition between corn and weeds, the factors that in corn yields has the most effective. Competition to attract greater amounts of photosynthetic active radiation (PAR),Crotser and Witt [5] showed that the leaf crop is more, the rate of photosynthetic active radiation received by the weed decreases Consequently, the ability to compete with weeds and crop will be added. The crop canopy more quickly to its full. Less light will be available for the growth of weeds And crop competition with weeds powerful will be [6]. This study aims to determine the appropriate planting density and weed control, Prevent the indiscriminate use of chemical pesticides in region Moghan and the production costs were reduced.

MATERIALS AND METHODS

This study was carried out during 2009 and 2010 in the Moghaan Agro-industrial &Livestock co. respectively 39 and 47 degrees North Latitude and 32 meters from sea level, was performed.

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Experimental in randomized complete block design. In four replications at two sowing date were conducted separately. The treatments included five levels of weed density Johnsongrass (*Sorghum halepense*) (0, 4, 8, 12, 16) m^2 (Table 1). And the cultivated varieties corn, single cross 704. First sowing (first experiment), 8 May 2010. The second sowing (second experiment) in the June 18 2010, was done manually. Immediately after sowing, First irrigation (soil water) On 19 May for First sowing And 19 June for the second sowing was done. Subsequent irrigation, water requirements of plants according the regional pattern. The notes for the traits, Sample by quadrant, $1m^2$ were selected randomly from each plot. Obtain LAI Johnsongrass (*Sorghum halepense*) corn, leaves and each sample, isolated in the laboratory using leaf area meter(LAM) Measured by the mean, the plants were recorded. harvest index corn, calculated by the following formula.

$$HI = \frac{Yield}{Biomas} \text{x} 100$$

Yield = Grain yield (economic yield) kg / ha
Biomass = Total dry weight per plant
Data analysis and mean comparisons at LSD 1% level using the statistical software SAS for was used.

RESULTS AND DISCUSSION

Analysis of variance results showed (Table 2) the effect of sowing date on grain yield, leaf area index of corn, Johnsongrass (*Sorghum halepense*) LAI was significant at the 1% level. Between the experimental treatments in terms of traits Yield, harvest index, leaf area index of corn, leaf area index Johnsongrass (*Sorghum halepense*) there are significant differences in the 1% level.

The interaction between sowing date × treatment for traits yield, corn leaf area index corn, LAI Johnsongrass (*Sorghum halepense*) was significant at the 1% level.

According to the results of the study compared traits (Table 3), control (treatment 6) had the highest yield, the (treatment 5) the lowest yield in between the treatments.

It seems that the ability to utilize environmental resources including water, light and nutrients by weeds than crops, the most important reasons yield by reducing the corn is in the study.

Cavero *et al*. (1999) reported that corn yields was reduced in some plots when weed density was higher than that reported in the plots. Highest harvest index was even lower than in the second (treatment 2)With the 0.41 was observed. This can be in terms of competitiveness,

Table 1: The treatments included five levels of weed density Johnsongrass (*Sorghum halepense*)

Sowing date 1		Sowing date 2	
Number treatment	Density Johnsongrass (m^2)	Number treatment	Density Johnsongrass (m^2)
1	0	6	0
2	4	7	4
3	8	8	8
4	12	9	12
5	16	10	16

Table 2: Analysis of variance combined for traits studied

		MS			
S.O.V	df	Yield	HI	LAI_{corn}	LAI_{sorgum}
Sowing	1	6996.03**	0.004	7049281.60**	2452230.40**
Error1	6	264.59	0.017	11861.53	830.87
Treatment	4	1416832**	0.104**	3.92	8.30**
Treatment× Sowing	4	9018.40**	0.018	1056612.10**	963247.40**
Error2	24	292.30	0.016	6817.70	787.54
CV%	-	3.49	4.20	1.10	0.50

* and ** Significantly at p > 0.05 and > 0.01, respectively.

Table 3: The treatmentments included four levels of weed density Johnsongrass (*Sorghum halepense*)

Treatment	Yield	HI	LAI
T1(Sowing1Density0)	1197.50	0.41	12015.0
T2(Sowing1 Density 4)	602.50	0.47	8264.5
T3(Sowing1 Density8)	296.00	0.18	7780.0
T4(Sowing1 Density12)	218.50	0.16	6393.5
T5(Sowing1 Density16)	70.00	0.30	5261.5
T6(Sowing2 Density0)	1130.00	0.38	10057.5
T7(Sowing2 Density4)	610.25	0.41	7494.0
T8(Sowing2 Density8)	412.50	0.29	6724.5
T9(Sowing2 Density12)	240.50	0.19	6107.5
T10(Sowing2 Density16)	123.50	0.15	5133.0
LSD5%	24.95	0.184	120.5

Table 4: Correlation coefficients between For traits studied

	Yield	HI	LAI_{corn}	LAI_{sorgum}
Yield	1			
HI	0.509**	1		
LAI_{corn}	0.952**	0.450**	1	
LAI_{sorgum}	-0.968**	-0.393*	-0.923**	1

* and ** Significantly at p > 0.05 and > 0.01, respectively.

the high corn density noted.In (treatment 7) had a higher harvest index Than control have. The lowest harvest index in the (treatment 4) And (treatment 10) All that is about to control sowing date, respectively 39% and 39.5% showed decrease. According to Hall *et al*. [8] and Kenzevic and *et al*. [9], LAI is one of the main indicators in the process of weed interference with crops Indicates, competition is intense. The highest leaf area index compared with control Without weed. The second treatment (8264.5) And the lowest Related to (treatment 10) And (treatment 5) Respectively 5133 and 5 / 5261 is. Rafael and *et al*. [10]. Discovered that corn LAI With the increasing density of weed Amaranthus reduced. And this reduction In the second interference. (the 4-6 leaf stage of corn) ratio to The first interference (With corn) Was lower. Reduced leaf area index of corn, resulting in weeds interference By Clarence and Seanton [11] has also been reported.

Results of simple linear correlation coefficients for the studied traits (Table 4) showed. That Between yield With harvest index, leaf area index corn correlation positive significant And LAI Johnsongrass (*Sorghum halepense*), correlation negative significant. With the increase in LAI Johnsongrass (Sorghum halepense) Around, corn plant yield will be severely reduced.

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