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The effects of sowing date on yield of silage corn hybrids

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ABSTRACT

In order to find the most suitable planting date for more producing silage corn hybrids, the field experiments were conducted for two years at agricultural research station Iranshahr in 2004-2005. The cultivars were sown at three planting dates from 16 July with 15 days interval. The experimental was laid out in a split plot randomized complete block design arranged with four replications. The main plots were planting date and the sub-plot consisted of varieties. The harvesting areas for early matured, mid matured and later matured varieties were 10.08, 9.27 and 8.48, respectively. The usual agricultural planting were done. During the growth the usual notes were taken. The analysis revealed that late variety single cross 711 with 42.75 Ton ha^{-1} had the highest yield on August 1 planting date and single cross 301 on July 16 planting date produced the lowest yield (26.81 Ton ha^{-1}).

Keywords: Planting Date, Maize, Hybrid

INTRODUCTION

With the increase in world population, demand for food consequently will grow. It is expected that human population will increase to over 8 billion by the year 2020 and this will worsen the current scenario of food security. Improved crop productivity over the past 50 years has resulted in increasing world food supplies up to 20% per person and reducing proportion of food-insecure peoples living in developing countries from 57% to 27% of total population [5]. It is predicted that at least 10 million people will be hungry and malnourished in the world by the end of this century [5]. Thus, to reduce the food insecurity, crop production will have to be doubled, and produced in more environmentally sustainable ways [2]. This can be achieved by expanding the area of crop production, increasing per hectare yield and improving crop quality. Furthermore, during the second half of the past century, rise in per hectare crop productivity was due to improved or high yield potential [1].

Understanding the relationship between growths of corn at different planting date would aid the improvement of growth conditions and crop yield and would provide useful tools for future genetic engineering. Research in the late 1980s demonstrated that yields can be raised two to three-fold by using available improved varieties and appropriate agronomic techniques. But these findings need to be refined, improved and tested for local climatic, soil and crop conditions [8].

These include in the aspects of to what extent of planting date and different cultivars affect the yield of corn. In addition, no comprehensive database is available on corn under combination of sowing date and hybrids of corn at south of Iran. Thus, studies are still needed to improve understanding of the effects of planting date and different cultivars corn. Hence, the present study was designed with the following objectives:

1. To determine the performance of different silage corn hybrids.
2. To study the effect of different levels of planting date on yield of silage corn.
3. To identify how interaction of sowing date and different cultivars affect yield of silage corn.

MATERIALS AND METHODS

The field experiments were conducted for two years in 2004 and 2005 at Iranshahr agricultural research station, southern Iran (36ºN 54.00´ 54ºE 25.00´, 51m altitude).

The experiment was laid out in a randomized complete block design and replicated four times. The experiment consisted of 18 treatments outlined as follows:

The experimental design was a split plot using a 3×6 treatments based on randomized complete block design with four replications. The main plot was allocated to dates of planting at four levels started from 16 July with time interval of 15 days and sub plot was allocated to different corn hybrids at three levels including; one group farm group's early-matured variety and mid matured and late varieties. In this study the number of

plants or planting density was considered to be 75000 plants per hectare with seed spacing of 18 cm and row spacing of 75 cm. Each treatment combination was replicated in four blocks using a randomized complete block design. Each plot comprised of four raised beds of 4 meters length –and plants were harvested at the milk douching stage.

The harvesting areas for early matured, mid matured and later matured varieties were 10.08, 9.27 and 8.48, respectively. The usual agricultural planting were done. During the growth the usual notes were taken.

The land was plowed to a depth of 20-25 cm followed by harrowing before planting. During the growth the usual notes were taken. Data were analyzed using the analysis of variance (ANOVA) procedure with of SAS (2004) by means between the treatments were compared using LSD Test at P<0.05.

RESULTS AND DISCUSSION

The results of comparing hybrids of corn at three planting date (Tables 2 & 3) showed, most of the corn hybrids were significantly different (P<0.05) between sowing date.

The analysis revealed that interaction of August 1×SC 711 with 42.75 Ton ha-1 was the maximum yield harvested from late matured hybrid. Combination of July 16 ×SC 301 with 26.81

Ton ha-1 produced the lowest yield (Table 3). It means at early and mid-maturity gropes of corn, the bushes can't grow better and produce a good ear and biomass [9, 11].

The yield at late planting date due to lacking number of fertile flower because of high temperature degree, male and females flowers become limited [3,4].

Table1. Climatically data at Agricultural Research Station of Iranshahr during the growth period of corn

Month	Precipitation			Mean temperature (c)			Mean of maximum temperature (c)			Mean of minimum temperature (c)			Evaporation(mm)			Mean of Relative humidity (%)		
	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3
May	34.6	33.8	19.6	20.7	27.2	26.3	26.9	28.4	29.3	24.6	13	11.4	148.9	95.2	118.1	66.5	74.8	74.5
June	20.2	10.5	37.4	24	35.1	32.6	39.4	38.9	38.4	18.6	18.3	16.9	170.3	181.6	143.4	65.4	60.6	68.1
July	24.4	32	18.3	27.5	28.3	26.2	42.1	43.9	40.7	22.9	22.8	21.7	213.6	225.7	371.9	61.7	65.4	77.3
Agust	16.3	19	25.9	29.3	29.2	28.3	45.1	44	44.1	23.6	24.4	22.6	247.4	213.3	211.6	59	64.9	61.9

Y1 : 2004 Y2: 2005   Y3: 2006

Table 2. Analysis variance on fresh yield of silage corn hybrids at different sowing date.

S.O.V	D.F	Sum of square	Mean square
Year (Y)	1	133.325	133.325
Block (B)	6	344.429	57.405
Sowing date (S)	2	763.587	381.494 **
Y × S	2	143.004	71.502 ns
Error	12	224.708	18.726
Cultivar	48	1168.93	292.234 **
Y × C	4	75.138	18.784

S × C	80	4429.10	53.638**
Y × S × C	8	383.475	47.934**
Error	72	991.050	13.735
CV (%)	-	23.10	

zMeans with same letter within a column are not significantly different at 5% level by LSD test.
SC = Single Crass,

Table 3. Mean comparison of fresh forage of silage corn hybrids at different planting date (Average of two years).

Treatment	Sowing date	Fresh forage yield (Ton ha^{-1})	Class
SC 711	1 August	42.75	a
SC 704	1 August	41.25	ab
SC 604	1 August	40.13	abc
SC 711	16 August	39.63	abc
SC 647	16 August	38.06	bcd
SC 604	16 August	37.38	bcd
SC 647	1 August	36.44	cd
SC 711	16 July	35.25	de
SC 704	16 July	35.19	de
SC 704	16 August	34.75	def
SC 301	16 August	34.42	def
SC 604	16 July	32	efg
SC 647	16 July	30.94	Fg
SC 301	1 August	28.44	h
SC 301	16 July	26.81	gh
LSD	3.698		

^{z}Means with same letter within a column are not significantly different at 5% level by LSD test.
SC = Single Crass,

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