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# Influence of different sowing dates on plant growth and yield of hybrid sweet corns

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**ABSTRACT :** A field experiment was conducted at Tansa Farm, ASPEE Agricultural Research and Development Foundation, Maharashtra during *Rabi* season of 2015-16 and 2016-17 to study the effects of different sowing time on different sweet corn varieties. The experiment was laid out in Randomized Block Design with twelve treatment combinations having four sowing dates *viz.*, 15<sup>th</sup> December, 30<sup>th</sup> December, 15<sup>th</sup> January, 30<sup>th</sup> January and three hybrid sweet corn varieties *viz.*, Hibrix 39, Madhu 5 and Sugar 75. The seed was sown at 30cm x 15cm distance having net plot size 6.6 m x 4.5 m with three replications. Observations on plant height, cob length, cob weight, number of seeds/cob, test weight of 1000 grains and grain yield were recorded and data were statistically analysed using appropriate method. All quantity traits were promising when the sowing was carried out on 15<sup>th</sup> December. Further delay of the sowing had negative effects on the performance of sweet corn varieties. Hybrid sweet corn var. Sugar 75 proved to be which recorded higher grain yield of 2616 kg ha<sup>-1</sup> in pooled study when sowing was done on 15<sup>th</sup> December, over remaining two varieties *viz.*, Hibrix 39 and Madhu 5.

**KEY WORDS :** Sowing dates, Sweet corn, Sugar-75, Yield

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**M**aize (*Zea mays* L.) is a miracle crop emerging as the third most important cereal food crop next to rice and wheat. It is grown for food, feed and as a source for numerous industrial products. Sweet corn is one type of maize that contains 13 to 15% sugar in immature grains. It is consumed at the soft dough stage with succulent grains, emerges as an alternative dish of urbanites namely vegetable, roasted ears, soups, corn syrup, sweeteners, etc. Sweet corn can be harvested within 80 to 90 days after sowing. They are harvested earlier by 35 to 45 days compared to normal grain corn. Presently, greater emphasis is given to the cultivation of sweet corn due to increasing demand. There is an increasing tendency to produce sweet corn at commercial level to augment the income of the farming

community dwelling in the outskirts of big cities and metropolis. Since, there is limited scope to increase the area under sweet corn cultivation because of competition from other cereals and cash crops, the only alternative is through enhancement of productivity by various management factors. It is an established fact that higher grain yield depends on optimum planting time and appropriate crop variety. Proper planting time which is important from the point of intercepting sunlight for photosynthesis besides efficient use of plant nutrients and soil moisture. Correlating these functions to produce the highest possible yields with the greatest efficiency has been the aim of this research. Planting date and variety selection, including soil fertility, temperature regimes and irrigation are the major factors contributing sweet corn

production and productivity (Ramankutty *et al.*, 2002). For optimization of yield, planting at the appropriate time is very critical as delay in planting date can lead to a linear decrease in grain yields (Anapalli *et al.*, 2005). They further contended that early planting in the spring is optimum and more efficient than delayed planting as through early planting germination occurs when days are longer and sun shines impact is more by way of an acute angle whereas delaying planting results in decrease in maize grain yields. Farmer's choice on improved varieties is one of the most crucial factors affecting the productivity of a crop. High yielding varieties are of primary importance for potential yield positively. Yield can be increased to a greater extent through high yielding varieties and appropriate time of sowing with advanced agronomic practices (Qureshi *et al.*, 2007). Therefore, it was felt necessary to conduct this experiment for determination of appropriate time of sowing of newly introduced sweet corn hybrids and their performance under North Konkan Coastal zone of Maharashtra.

## RESEARCH PROCEDURE

The experiment was conducted at ASPEE Agricultural Research and Development Foundation Farm, Village- Nare, Taluka- Wada, district- Palghar during *Rabi* season of 2015-16 and 2016-17. Three sweet corn varieties *viz.*, Hibrix 39, Madhu 5 and Sugar 75 with four planting dates *viz.*, 15<sup>th</sup> December, 30<sup>th</sup> December, 15<sup>th</sup> January and 30<sup>th</sup> January were tried in Randomized Block Design with factorial concept in three replications. Each variety was sown at 30cm x 15cm in a plot 6.6 m x 4.5 m. Entire dose of phosphorus and potassium along with half of the nitrogen as per the recommended dose 120:60:40 kg NPK ha<sup>-1</sup> was applied as basal. The remaining half of the nitrogen was top dressed in two equal split at knee high stage and tasselling and silking stage of crop. Plant protection measures were taken as per the recommended schedule. Five plants were selected randomly from each plot for recording observations on yield attributing components like plant height, cob length, cob weight, seeds/cob, test weight and grain yield. Two season data were compiled and pooled statistical analysis using appropriate statistical method.

## RESEARCH ANALYSIS AND REASONING

The findings of the present study as well as relevant

discussion have been presented under following heads :

### Growth parameters:

The height of various hybrid sweet corn varieties varied significantly due to different sowing dates (Table 1). From the data it was found that significantly higher plant height (170 cm, 172.1 cm and 171.1 cm) was recorded in variety Sugar-75 during 2015-16, 2016-17 and in pooled, respectively. While in case of date of planting, the crop grown on 15<sup>th</sup> December showed significantly higher plant height (176.6 cm, 178.7 cm and 177.7 cm) in 2015-16, 2016-17 and in pooled, respectively. The early sowing had significant effect on plant stature, where plants with more height were recorded as compared to late sowing. Sarvari *et al.* (2007) and Abdul Rahman *et al.* (2001) also confirmed the same findings in maize. It was found that among different crop varieties, maximum cob length was obtained (20.4 cm, 19.5 cm and 19.9 cm) in Sugar-75 and was significantly higher than those recorded in Madhu-5 and Hibrix-39 (Table 1). Among different dates of sowing, sweet corn grown on 15<sup>th</sup> December gave significantly higher cob length (21.8 cm, 20.8 cm and 21.3 cm) during 2015-16, 2016-17 and in pooled study. Similar results was found by Maryam *et al.* (2011) who reported delay planting reduces cob length.

The research findings of Maryam *et al.* (2011) also indicated the fact that timely planting will give higher cob weight than late planting. Among three sweet corn varieties Sugar-75 gave significantly higher cob weight (227.6 g) than Mahu-5 (223.7 g) and Hibrix-39 (225.7 g) in pooled study. While in case of sowing dates, 15<sup>th</sup> December gave significantly higher cob weight (233.3 gm, 236.3 g and 234.8 g) during both the years as well as in pooled study than late sowing (Table 1).

### Yield parameters:

The number of seeds/cob showed non significant differences during both the years of experimentation and in pooled study. It was evident from the results that decrease in number of seeds/cob when sowing was delayed. This indicated that sowing done after 15<sup>th</sup> December showed decrease in number of seeds/cob. Significantly higher number of seeds/cob was recorded in sowing sweet corn on 15<sup>th</sup> December (347.7, 330.3 and 339.0) during 2015-16, 2016-17 and in pooled. Similar findings were also reported by Khan *et al.* (2009) who reported that delaying sowing would lead to a lesser row number and less grain numbers in the rows of corn. The

test weight of sweet corn was also found significant among different varieties and sowing dates. The higher test weight was recorded in sugar-75 during first year (25.7 g), second year (27.2 g) and remained at par with Hibrix-39. While in case of pooled sugar-75 gave significantly higher test weight (26.6 g) over other two varieties. Test weight was also found significant with different sowing dates. 15<sup>th</sup> December sowing date had significantly higher test weight (27.1 g, 28.8 g and 27.9 g) during 2015-16, 2016-17 and in pooled study. Similar results have been obtained where varieties and sowing dates significantly influenced on 1000 grain weight by

Abdul Rahman *et al.* (2001) and Nielson *et al.* (2002).

The corn varieties did not differ significantly with regard to grain yield during both the year as well as in pooled study. However, variety sugar-75 gave maximum grain yield (2401 kg, 2533 kg and 2467 kg/ha) in 2015-16, 2016-17 and even in pooled year, respectively over remaining two varieties *viz.*, Hibrix-39 and Madhu-5 (Table 2). Environmental changes associated with different sowing dates (sunshine and temperature) have a modifying effect on growth and development of corn plants. In present study, it was observed that corn hybrids gave highest grain yield, when sown in the third week of

**Table 1 : Effect of different dates of sowing on plant height, cob length and cob weight of different sweet corn hybrids**

Treatments	Plant height (cm)			Cob length (cm)			Cob weight (g)		
	2015-16	2016-17	Pooled	2015-16	2016-17	Pooled	2015-16	2016-17	Pooled
<b>Hybrid (Hy)</b>									
Hibrix-39	168.3	170.4	169.4	20.0	19.1	19.6	224.1	227.2	225.7
Madhu-5	166.4	168.5	167.5	19.6	18.7	19.1	222.2	225.3	223.7
Sugar-75	170.0	172.1	171.1	20.4	19.5	19.9	226.1	229.1	227.6
S.E. ±	0.29	0.29	0.20	0.14	0.13	0.10	0.36	0.36	0.25
C.D. (P=0.05)	0.84	0.84	0.58	0.41	0.39	0.28	1.04	1.04	0.72
<b>Sowing Date (SD)</b>									
15 <sup>th</sup> December	176.6	178.7	177.7	21.8	20.8	21.3	233.3	236.3	234.8
30 <sup>th</sup> December	170.5	172.6	171.5	20.2	19.3	19.7	226.8	229.8	228.3
15 <sup>th</sup> January	165.5	167.6	166.5	19.4	18.5	19.0	221.2	224.2	222.7
30 <sup>th</sup> January	160.5	162.5	161.5	18.6	17.7	18.1	215.5	218.5	217.0
S.E. ±	0.33	0.33	0.23	0.16	0.15	0.11	0.41	0.41	0.29
C.D. (P=0.05)	0.97	0.97	0.58	0.47	0.45	0.28	1.20	1.20	0.72
Interaction (Hy x SD)	NS								

NS=Non-significant

**Table 2 : Number of seeds/cob, test weight and grain yield of different sweet corn hybrids influenced by different sowing dates**

Treatments	No. of seeds/cob			Test weight (g)			Grain yield (kg/ha)		
	2015-16	2016-17	Pooled	2015-16	2016-17	Pooled	2015-16	2016-17	Pooled
<b>Hybrid (Hy)</b>									
Hibrix-39	338.7	321.8	330.2	25.3	26.8	26.1	2363	2493	2428
Madhu-5	336.6	319.8	328.2	24.9	26.3	25.6	2316	2443	2380
Sugar-75	340.6	323.6	332.1	25.7	27.2	26.6	2401	2533	2467
S.E. ±	1.83	1.74	1.26	0.18	0.19	0.13	44.51	46.96	32.35
C.D. (P=0.05)	NS	NS	NS	0.52	0.55	0.37	NS	NS	NS
<b>Sowing Dates (SD)</b>									
15 <sup>th</sup> December	347.7	330.3	339.0	27.1	28.8	27.9	2546	2686	2616
30 <sup>th</sup> December	341.3	324.3	332.8	25.5	27.0	26.2	2379	2510	2444
15 <sup>th</sup> January	335.7	318.9	327.3	24.7	26.2	25.4	2300	2427	2363
30 <sup>th</sup> January	329.9	313.4	321.6	23.9	25.3	24.6	2215	2337	2276
S.E. ±	2.12	2.01	1.46	0.20	0.22	0.15	51.40	54.23	37.36
C.D. (P=0.05)	6.20	5.89	3.60	0.60	0.63	0.37	150.76	159.05	92.28
Interaction (Hy x SD)	NS								

NS=Non-significant

December. The significantly higher grain yield (2546 kg, 2686 kg and 2616 kg) was recorded when crop was sown on 15<sup>th</sup> December during 2015-16 and 2016-17 and in pooled, respectively. However, when sowing was delayed, the reduction in crop yield became substantial. The present findings are in agreement with the findings of Anapalli *et al.* (2005) and Khan *et al.* (2009) who observed that yield can be increased to a greater extent when sown at appropriate time.

### Conclusion :

It was concluded from the findings of present study that all quantitative traits were promising when the sowing of hybrid corn varieties was carried out on 15<sup>th</sup> December. Delay in sowing adversely affected plant growth parameters and yield components which ultimately significantly reduced grain yield. However, Sugar-75 proved to be superior over other hybrids with respect to quantity contributing factors followed by Hibrix-39 and Madhu-5. It is, therefore suggested that sweet corn variety Sugar-75 should be sown on 15<sup>th</sup> December to obtain higher grain yield.

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