

Effects Of Sowing Dates On The Growth And Yield Of Maize Crop

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Abstract: *Maize is a tropical grass that gets well adapted to many climates and hence has wide-ranging maturities from 70 days to 120 days. Maize plants are erect and may grow as tall as 3m, with little tillering capacity. The scientific name of Maize is Zea Mays, also commonly known as Corn. The main aim of this research is to test the hypothesis that the impact of different dates of sowing on crop growth and yield of Maize. Best sowing dates provide favourable temperature to obtain maximum yield. Early and late sowing is done to grow the Maize crop of different varieties at 10 days interval. Early sown crop mature early than those sown later. Early sown crop reduced from the different types of injuries like drought and diseases other environmental factor like rainfall, temperature, humidity. Dose of fertilizers were used in all plots to enhance the yield and growth of Maize. On the behalf of this research work we conclude that the different dates of sowing like early sowing and late sowing give crop growth and yield of Maize.*

Keywords: *Sowing date, Maize, plant growth*

1. INTRODUCTION

Maize (*Zea mays*) is also known as corn in some countries. It is a member of Poaceae. It was found in central Mexico in around 5,000 BC. The crop was introduced to Europe in sixteenth century, from where it was spread to Africa and Asia. It is now-a-days one of the most widely-grown crops around the world in both the temperate and tropical regions. It is now the third most essential crop of the world. Maize is a leafy plant whose kernels have seeds inside. It is an angiosperm, which means that its seeds are enclosed inside a fruit or a shell. It has been considered as a staple food by many people in Mexico, Central and South America and also in parts of Africa. In Europe and North America, maize is grown usually for the use of feeding animals. Now-a-days, maize or corn has become an essential part of the world. People have been eating corn in the form of food like, sweet corn and popcorn. (Source : bspublishing.com)

Over 80 percent of maize production is located in the Americas (53%) and Asia (28%), followed by Europe (15%). Main areas of cultivation include the US belt of maize, north eastern China and Eastern Europe (Sharma (2020); ChitraMani & Kumar, P. (2020); Sharma, M., & Kumar, P. (2020); Chand, J., & Kumar, P. (2020); Naik, M., & Kumar, P. (2020); Kumar, P., & Naik, M. (2020); Kumar, P., & Dwivedi, P. (2020); Yaman, (2020); Yaman and Kumar, (2020). Devi, P., & Kumar, P. (2020); Kumari, P., & Kumar, P. (2020); Kaur, S., & Kumar, P. (2020); Devi, P., & Kumar, P. (2020); Sharma, K., & Kumar, P. (2020); Kumar, S. B. P. (2020); Devi, P., & Kumar, P. (2020); Chand, J., & Kumar, P. (2020). Major producers in 2012 consisted of the US (over 270 million tons), China (over 200 million tons) and Brazil (71 million tons), also followed by India, Mexico, Argentina, Ukraine, Indonesia, France and Canada.

Forage and Feed – It is used for livestock feeds for cattle poultry and piggery both in the form of seeds and fodder. The green fodder can be used as a feed to milch cattle to boost up the milk production to a considerable extent. The digest ability of maize fodder is higher than sorghum, bajra and non- leguminous forage crops. Food – In most developing countries, maize is consumed directly as food. In India, around 85 percent of the maize produced is used as food. Maize is most commonly used in the form of Chapatti, porridges, boiled or roasted green ears, breakfast food, and popcorn.

Temperature, rainfall, humidity, sunshine (day length) are important climatic elements that effect crop production (Sowunmi and Kintola, 2010). In agriculture, heat units are often known as growing degree days (GDD). Sometimes growing degree days are called growing degree units (GDU), but the two terms are identical (Kumar, P. (2019); Kumar, D., Rameshwar, S. D., & Kumar, P. (2019); Dey, S. R., & Kumar, P. (2019); Kumar et al. (2019); Dey, S. R., & Kumar, P. (2019); Kumar, P., & Pathak, S. (2018); Kumar, P., & Dwivedi, P. (2018); Kumar, P., & Pathak, S. (2018); Kumar et al.,2018; Kumar, P., & Hemantaranjan, A. (2017); Dwivedi, P., & Prasann, K. (2016). Kumar, P. (2014); Kumar, P. (2013); Kumar et al. (2013); Prasann, K. (2012); Kumar et al. (2011); Kumar et al. (2014).

Calculating GDD for a specific day uses a simple formula that involves subtracting a base or threshold temperature from the average temperature for the day. The base temperature is known as the threshold temperature, after which plant growth begins. Plant species differ for base temperature. The base temperature of corn is 10°C (Rao, 2008). If the crop is sown on several dates of sowing and irrigation is provided on various crop growth stages which are crucial for the growth and development of the crop, the results may provide data sufficient to find the best option with logical understanding (Sharangi and Roychowdhury, 2014). Having these in view it was considered to take the experiment to determine optimum sowing date as well as effect on growth, phenology and Agro meteorological indices for maize varieties. (source : the bioscan.in)

2. MATERIALS AND METHOD

The investigation entitled “Effects of sowing dates on the growth and yield of maize crop” involved a field experiment conducted during 2017-2018 at the agriculture research farm of, School of Agriculture at Lovely Professional University, Phagwara (Punjab) under field condition.

Soil samples were taken from different places from the experimental plots and were analysed for different parameters such as pH, EC, organic carbon, Nitrogen %, Pottasium %.

Required quantities of fertilizer as recommended by Punjab Agriculture University, was applied (120:60:40kg/ha) by using Urea, DAP and MOP as a source of N, P, K respectively. Half dose of NPK was applied at the time of sowing. Another half dose was applied in 2 intervals.

For the evaluation of parameters of Maize at different sowing dates, Maize was sown on 29th May 2018 (D1/T1), 8th June 2018 (D2/T2), 18th June 2018 (D3/T3) at the spacing of 60 cm X 20 cm. Effect of these sowing dates was observed on plant height, total no. of leaves, total no. of cobs, leaf length, stem girth and ear length and Cob yield without husk.

First irrigation was given at seedling sowing stage and next irrigation after five days of previous irrigation. These irrigations were applied according to the rainfall and soil moisture.

3. RESULT AND DISCUSSION

Plant Height

Data illustrated in Table 1 reveals about effects of different sowing dates on plant height of the maize crop. The maximum plant height was recorded at third sowing date i.e. 18th June 2018, mean of which was observed as 1.587 cm. However, the minimum plant height was recorded at second sowing date i.e. 8th June 2018, mean of which was observed as 1.563 cm.

Table 1: Effect of sowing dates on Plant Height

Sowing dates	Plant Height
D1	1.57ab ± 0.669
D2	1.563b ± 0.669
D3	1.587a ± 0.078

Number of Leaves

Data illustrated in Table 2 reveals about effects of different sowing dates on Number of Leaves in each plant of the maize crop. The maximum number of leaves was recorded at third sowing date i.e. 18th June 2018, mean of which was observed as 3.714. However, the minimum number of leaves was recorded at first sowing date i.e. 29th May 2018, mean of which was observed as 3.615.

Table 2: Effect of Sowing dates on total number of Leaves

Sowing dates	Total number of leaves-1
D1	3.615b ± 0.897
D2	3.626b ± 0.897
D3	3.714a ± 1.000

Number of Cobs

Data illustrated in Table 3 reveals about effects of different sowing dates on Number of Cobs in each plant of the maize crop. The maximum number of cobs was recorded at third sowing date i.e. 18th June 2018, mean of which was observed as 1.552. However, the minimum Number of cobs was recorded at second sowing date i.e. 8th June 2018, mean of which was observed as 1.418.

Table 3: Effect of Varieties and Sowing dates on total number of cobs

Sowing dates	Total number of cobs
D1	1.501a ± 0.239
D2	1.418b ± 1.000
D3	1.552a ± 0.239

Leaf Length

Data illustrated in Table 4 reveals about effects of different sowing dates on Leaf Length of the maize crop. The maximum leaf length was recorded at first sowing date i.e. 29th May 2018, mean of which was observed as 8.527 cm. However, the minimum leaf length was recorded at third sowing date i.e. 18th June 2018, mean of which was observed as 8.395 cm.

Table 4: Effect of Varieties and Sowing dates on leaf length

Sowing dates	Leaf Length
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D1	8.527a ± 0.333
D2	8.497a ± 0.333
D3	8.395b ± 1.000

Ear Length

Data illustrated in Table 5 reveals about effects of different sowing dates on Ear Length of the maize crop. The maximum ear length was recorded at second sowing date i.e. 8th June 2018, mean of which was observed as 5.496 cm. However, the minimum ear length was recorded at third sowing date i.e. 18th June 2018, mean of which was observed as 5.394 cm.

Table 5: Effect of Sowing dates on Ear Length

Sowing dates	Ear Length
D1	5.485a ± 0.115
D2	5.496a ± 0.115
D3	5.394b ± 1.000

Stem Girth of Plant

Data illustrated in Table 6 reveals about effects of different sowing dates and varieties on Stem Girth of the maize crop. The maximum stem girth was recorded at first sowing date sowing date i.e. 29th May 2018, mean of which was observed as 1.879 cm. However, the minimum stem girth was recorded at third sowing date i.e. 18th June 2018, mean of which was observed as 1.776 cm.

Table 6: Effect of Sowing dates on Stem Girth

Sowing dates	Stem Girth
D1	1.879a ± 0.838
D2	1.867a ± 0.838
D3	1.776b ± 1.000

Grain Cob Yield without husk

Data illustrated in Table 7 reveals about effects of different sowing dates on Grain cob yield without husk of the maize crop. The maximum grain cob yield without husk was recorded at first sowing date sowing date i.e. 29th May 2018, mean of which was observed as 8.476 gha-1. However, the minimum number of rows was recorded at third sowing date i.e. 18th June 2018, mean of which was observed as 7.666 gha-1.

Table 7: Effect of Sowing dates on Grain Cob Yield without husk

Replication or Varieties	Grain cob yield without husk
D1	8.476a ± 1.000
D2	7.948b ± 0.354
D3	7.666b ± 0.354

4. CONCLUSION

Significant difference was recorded on different plant growth parameters such as plant height, total no. of leaves, total no. of cobs, leaf length, stem girth and ear length and Cob yield without husk by sowing at different dates. First sowing date i.e. 29th May 2018 was seen most desirable for the sowing of maize crop.

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