

EFFECT OF PLANTING DATES ON GROWTH AND YIELD OF GARLIC (*ALLIUM SATIVUM* L.)

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Abstract: An experiment was conducted to study the different dates of planting in garlic at the Instructional Farm, Department of Agronomy, Junagadh Agricultural University, Junagadh, Gujarat, India during the *Rabi* season of year 2017- 2018. The objective of the work was to find out the different dates of sowing on the yield of garlic. There were four planting time *viz.*, 7th November, 14th November, 21st November and 28th November with four cvs. GG-4, GJG-5, Promising and Local variety. The experiment was laid out in Split Plot Design with three replications. The delay in planting time after 21st November yield was reduced in later plantings.

Keywords: *garlic, yield, phenological, germination.*

INTRODUCTION

Garlic (*Allium sativum* L.) belong to family "*Alliaceae*". Garlic is the second most important bulb crop grown in India for spices and condiments. It is considered as a valuable, nutritive, medicinal and condimental crop produce used throughout the world. It comprises of more than 600 species (Davies, 1992). It is believed to be a native of central Asia Mediterranean regions (Thompson and Kelly, 1957). Garlic is mostly use for culinary purposes and as a condiment for different food items. Allicin present in aqueous extract of garlic reduces cholesterol concentration in the human blood. Recent research has focused on garlic's role in preventing heart disease, enhancing the immune system, preventing cancer and enhancing memory. Allylsulphide in garlic is responsible for cancer fighting ability (Singh *et al.* 2004). Garlic is monocotyledonous, bulbous crop; it has flat narrow leaves and bears small white flowers and bulbils. It has superficial adventitious root system. Agrometeorological environment of garlic varies with the location and accordingly its growth and development are also affected. Differences in photoperiod and mean diurnal temperature has great effects on time of bulb development. Garlic is cool season crop. Mild climate conditions are much suitable.

MATERIALS AND METHODS

The field experiment was conducted during *Rabi* season of year 2017-18 at Instructional Farm, Department of Agronomy, JAU, Junagadh (Gujarat). Geographically the experimental site was situated at 21.5222° N latitude and 70.4579° E longitude at an altitude of 107 m above mean sea level. The experiment was laid out in split plot design, consisting 48 treatment combinations comprised of four sowing dates were 7th November (D₁), 14th November (D₂), 21st November (D₃) and 28th November (D₄) and four varieties were GG-4 (V₁), GJG-5 (V₂), Promising (V₃) and Local (V₄) with three replications.

After field preparation, the layout of experiment was laid out. The recommended doses of nitrogen, phosphorus and potassium (50-50-50 N, P₂O₅, K₂O kg/ha) in the urea, DAP (Di-ammonium phosphate) and MOP (Muriate of potash) was applied in each plot. The garlic crop was sown as per treatments in 15 cm x 10 cm apart drawn by *kudali* using a seed rate of 600-700 (cloves) kg/ha. As per requirement, irrigation was applied and hand weeding should be carried out at 30 and 60 days. The crop was harvested manually on different dates as per follow date of sowing. Before harvesting, five plants already tagged were pulled out from every plot to record post-harvest observations (yield attributes). The crop was threshed by manual labourers and was weighed to get bulb yield in kg/plot. Thereafter, these yield was converted into kg/ha.

Various phenological observations were carried out on individual plant as number of days from germination, vegetative growth, bulb formation and bulb maturity. Besides, various characters like germination (%), plant height at harvest time, bulb girth and bulb yield were noted. All the traits were analyzed statistically with the following the method described by Panse and Sukhatme (1989).

RESULT AND DISCUSSION

Planting dates significantly influenced the various growth and development traits of garlic (Table 1). The results revealed that all the yield attributing characters of varieties were mostly significantly affected by the dates of sowing.

Germination (%)

The germination was significantly affected by sowing dates. The maximum germination (99.11%) was observed in second date of sowing and minimum (89.03%) was observed in first date of sowing. Among the different varieties, the germination did not significantly influenced.

Plant height at harvest (cm)

The plant height was significantly affected by sowing dates. The maximum plant height (37 cm) was observed in second date of sowing and for subsequent dates it decreased. Among the different varieties, maximum plant height (36.2 cm) was observed in Local variety (V₄) and minimum plant height (31.2 cm) was observed in Promising variety (V₃).

Girth of bulb (cm)

The beneficial influence on plant girth due to early planting has been reported by Qaryouts & Kasarawi (1995).

i. Horizontal girth of bulb

Horizontal girth of bulb was significantly influenced by different sowing dates. The maximum horizontal girth (3.35 cm) of bulb was observed in second date of sowing (D₂) and for subsequent dates it decreased. Among the varieties under study maximum horizontal bulb girth (3.13 cm) was observed in Local variety (V₄) and minimum horizontal bulb girth (2.43) was observed in Promising variety (V₃).

ii. Vertical girth of bulb

Vertical girth of bulb was significantly affected by different sowing dates. The maximum vertical girth (3.51 cm) of bulb was observed in second date of sowing (D₂) and for subsequent dates it decreased. Among the varieties under maximum vertical bulb girth (3.33 cm) was observed in Local variety (V₄) and minimum vertical bulb girth (2.58 cm) was observed in Promising variety (V₃).

iii. Mean girth of bulb

The mean girth of bulb was significantly affected by different sowing dates. The maximum mean girth (3.43 cm) of bulb was observed in second date of sowing (D₂) and for subsequent dates it decreased. Among the varieties under study maximum mean bulb girth (3.23 cm) was observed in Local variety (V₄) and minimum mean bulb girth (2.50 cm) was observed in Promising variety (V₃).

Yield (kg/ha)

Early planting gave higher yield due to the large size production of bulb. Delay planting reduced significantly the number of cloves and clove size. It may be due to the fact that plant did not received a long cool growing period which was essential for the development of the bulb as stated by Rahim (1988).

The different dates of sowing significantly influenced the bulb yield. The maximum bulb yield (6205 kg/ha) was observed in second date of sowing (D₂) and for subsequent dates it

decreased. Among the varieties under study, bulb yield was significantly observed. The maximum bulb yield (6191 kg/ha) was observed in Local variety (V₄) and minimum bulb yield (5050 kg/ha) was observed in Promising variety (V₃).

CONCLUSION

From the results of one-year field study during *Rabi* season of year 2017-18, it was highlighted that under the agro-climatic condition of Junagadh (Gujarat) that garlic crop sown between 7th to 21st November recorded higher bulb yield of crop as compared to late sown 21st and 28th November and resulted into improved growth and yield attributes, which reflected into greater bulb yield as compared to delayed sowings thus this period can be recommended for sowing of the garlic crop for that region. Among different garlic varieties, Local and GG-4 variety were found to be the most suitable for higher productivity of garlic under agro-climatic condition of Junagadh (Gujarat).

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Table 1: Effect of sowing dates on yield attributes and yield of garlic cultivars

Treatment	Germination (%)	Plant height (cm) at harvest	Horizontal girth of bulb (cm)	Vertical girth of bulb (cm)	Mean girth (cm)	Yield (kg/ha)
Planting dates (D)						
D₁	89.03	36.8	3.20	3.34	3.27	5910
D₂	99.11	37.0	3.35	3.51	3.43	6205
D₃	98.96	33.7	2.35	2.58	2.46	5341
D₄	96.25	28.6	1.93	2.13	2.03	4769
S.Em.±	2.17	1.4	0.09	0.10	0.09	290.14
C.D. at 5 %	7.50	5.0	0.30	0.34	0.32	1004.00
C.V. %	7.83	14.7	11.12	11.92	11.45	18.09
Varieties (V)						
V₁	90.48	34.7	2.74	2.93	2.84	5694
V₂	96.87	34.1	2.53	2.72	2.62	5288
V₃	99.73	31.2	2.43	2.58	2.50	5050
V₄	96.26	36.2	3.13	3.33	3.23	6191
S.Em.±	2.47	1.0	0.06	0.06	0.06	198.54
C.D. at 5 %	NS	2.9	0.17	0.18	0.17	579.50
C.V. %	8.94	10.1	7.58	7.37	7.25	12.38
Interaction (D X V)						
S.Em.±	4.95	2.0	0.12	0.12	0.12	397.08
C.D. at 5 %	NS	NS	NS	0.36	0.34	NS
C.V. %	8.94	10.1	7.58	7.37	7.25	12.38