

1	<b>Title</b>	:	<b>Study of planting geometry and date of transplanting on growth and yield of brinjal (<i>Solanum melongena</i> L.) under South Gujarat condition.</b>
2	<b>Background information</b>		<p>Brinjal (<i>Solanum melongena</i> L.) is a member of the Solanaceae family and having the chromosome number is <math>2n=24</math>. It is also known as ‘Aubergine’ an economically important vegetable crop widely cultivated in the tropics and subtropics regions. Brinjal is named as “Poor man’s vegetable” because of its low cost of production, ease of culture and availability throughout the year.</p> <p>Optimum plant spacing ensures proper growth and development of plants resulting in maximum fruit yield and economic use of land. Lesser competition between plants and larger amount of available nutrients and soil moisture for vigorous growth of fruit parameters in widely spaced plants as compare to closer spacing. The plants grown with wider spacing produce maximum number of branches per plant, number of leaves per plant, canopy spread, total dry matter production, yield and nutrient uptake. Further, higher spacing in brinjal recorded significantly lower shoot and fruit borer infestation compare to closer spacing (Sollapur and Hiremath, 2016). On the other hand, knowledge of optimum time of transplanting and optimum plant spacing would be useful to achieve good yield and quality of brinjal. Examination of the interaction of environment and cultural methods will lead to a better understanding of the development of brinjal and contribute to sustained yield.</p>
3	<b>Objectives</b>	:	<ul style="list-style-type: none"> <li>• To study the effect of planting geometry on growth, yield and quality of brinjal.</li> <li>• To study the effect of date of transplanting on growth, yield and quality of brinjal.</li> <li>• To find out interaction effect of planting geometry and date of transplanting on growth, yield and quality of brinjal.</li> </ul>
4	<b>Principal Investigators and Associates</b>	:	PI : Dr. J. M. Vashi Co- PI: Prof. Hetal R. Rathod Dr. N. K. Patel
5	<b>Location and Agro- climatic zone :</b>		Region Horticulture Research Station, ASPEE college of Horticulture, Navsari Agriculture University, Navsari. South Gujarat Rainfall Zone, AES-III
6	<b>Year of commencement</b>	:	2023-24
7	<b>Crop and variety</b>	:	Brinjal cv. GNRB-1

8	<b>Details of experiment</b>	<p>Treatment details:</p> <p><b>Factor 1 : Planting geometry</b>  S<sub>1</sub>: 90 X 60 cm  S<sub>2</sub>: 90 X 90 cm  S<sub>3</sub>: 120 X 90 cm</p> <p><b>Factor 2 : Time of transplanting</b>  T<sub>1</sub>: Second fortnight of August  T<sub>2</sub>: Second fortnight of September  T<sub>3</sub>: Second fortnight of October</p> <p>A) Experimental Design: FRBD  B) No. of replication: 3  C) No. of plants/treatment: S<sub>1</sub>: 48 plants  S<sub>2</sub>: 32 plants  S<sub>3</sub>: 24 plants  D) Plot size: S<sub>1</sub>: Gross plot area: 3.6 m x 7.2 m  Net plot area: 1.8 m x 6.0 m  S<sub>2</sub>: Gross plot area: 3.6 m x 7.2 m  Net plot area: 1.8 m x 5.4 m  S<sub>3</sub>: Gross plot area: 3.6 m x 7.2 m  Net plot area: 1.2 m x 5.4 m  E) Manure and fertilizer: 100:50:50 NPK kg/ha  50:50:50 NPK kg/ha at 30 DATP and remaining  50 kg nitrogen at 60 DATP.</p>
9	<b>Observations recorded</b>	<p><b>Growth parameters:</b></p> <ol style="list-style-type: none"> <li>1. Plant height (cm) (60 DATP and Final harvest)</li> <li>2. No. of primary branches / plant (Final harvest)</li> <li>3. Days to first flowering</li> <li>4. Days to 50 % flowering</li> <li>5. Days to first harvest</li> </ol> <p><b>Fruit characters:</b></p> <ol style="list-style-type: none"> <li>6. Fruit length (cm)</li> <li>7. Fruit diameter (cm)</li> <li>8. Average fruit weight (g)</li> </ol> <p><b>Yield parameters:</b></p> <ol style="list-style-type: none"> <li>9. Marketable Yield (kg/plant)</li> <li>10. Total yield (kg/plot)</li> <li>11. Total yield (t/ha)</li> <li>12. No. of fruit per plant</li> </ol> <p><b>Economics:</b></p> <p><b>Pest and diseases (If any):</b></p>

**Results :**

Table.1 : Effect of planting geometry and date of transplanting on plant height (cm) at 60 DATP

	<b>Plant height (cm) at 60 DATP</b>			
<b>Treatment</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>Mean (D)</b>
<b>D1</b>	46.37	44.61	40.65	43.88
<b>D2</b>	45.27	37.67	38.01	40.32
<b>D3</b>	45.57	41.52	37.06	41.38
<b>Mean (P)</b>	45.74	41.27	38.57	
	<b>D</b>	<b>P</b>	<b>DXP</b>	
S.Em.±	0.86	0.86	1.49	
C.D. at 5 %	2.57	2.57	NS	
C.V. %	6.15			

Table. 2: Effect of planting geometry and date of transplanting on plant height (cm) at harvest

	<b>Plant height (cm) at harvest</b>			
<b>Treatment</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>Mean (D)</b>
<b>D1</b>	98.82	88.52	74.17	87.17
<b>D2</b>	91.81	81.90	75.34	83.02
<b>D3</b>	90.28	85.33	68.24	81.28
<b>Mean (P)</b>	93.64	85.25	72.58	
	<b>D</b>	<b>P</b>	<b>DXP</b>	
S.Em.±	1.42	1.42	2.46	
C.D. at 5 %	4.26	4.26	NS	
C.V. %	5.08			

Table.3 : Effect of planting geometry and date of transplanting on number of primary branches

	<b>Number of primary branches</b>			
<b>Treatment</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>Mean (D)</b>
<b>D1</b>	4.47	4.93	6.00	5.13
<b>D2</b>	4.33	4.67	5.60	4.87
<b>D3</b>	3.60	3.67	5.20	4.16
<b>Mean (P)</b>	4.13	4.42	5.60	
	<b>D</b>	<b>P</b>	<b>DXP</b>	
S.Em.±	0.12	0.12	0.20	
C.D. at 5 %	0.35	0.35	NS	
C.V. %	7.39			

Table.4 : Effect of planting geometry and date of transplanting on days to first flower on brinjal

	<b>Days to first flower</b>			
<b>Treatment</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>Mean (D)</b>
<b>D1</b>	59.00	60.00	60.33	59.78
<b>D2</b>	60.00	62.00	58.67	60.22
<b>D3</b>	61.33	58.00	63.00	60.78
<b>Mean (P)</b>	60.11	60.00	60.67	
	<b>D</b>	<b>P</b>	<b>DXP</b>	
S.Em.±	1.27	1.27	2.20	
C.D. at 5 %	NS	NS	NS	
C.V. %	6.31			

Table. 5: Effect of planting geometry and date of transplanting on days to fifty percentage flowering

<b>5</b>	<b>Days to fifty percentage flowering</b>			
<b>Treatment</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>Mean (D)</b>
<b>D1</b>	72.00	72.67	72.00	72.22
<b>D2</b>	72.00	74.67	71.00	72.56
<b>D3</b>	74.67	71.00	76.33	74.00
<b>Mean (P)</b>	72.89	72.78	73.11	
	<b>D</b>	<b>P</b>	<b>DXP</b>	
S.Em.±	1.13	1.13	1.96	
C.D. at 5 %	NS	NS	NS	
C.V. %	4.64			

Table.6 : Effect of planting geometry and date of transplanting on days to first harvesting

	<b>Days to first harvesting</b>			
<b>Treatment</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>Mean (D)</b>
<b>D1</b>	82.33	83.67	83.67	83.22
<b>D2</b>	85.00	85.00	82.33	84.11
<b>D3</b>	85.67	82.33	89.33	85.78
<b>Mean (P)</b>	84.33	83.67	85.11	
	<b>D</b>	<b>P</b>	<b>DXP</b>	
S.Em.±	1.18	1.18	2.04	
C.D. at 5 %	NS	NS	NS	
C.V. %	4.19			

Table.7 : Effect of planting geometry and date of transplanting on fruit length (cm) of brinjal

	<b>Fruit length (cm)</b>			
<b>Treatment</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>Mean (D)</b>
<b>D1</b>	6.59	7.01	7.41	7.00
<b>D2</b>	6.64	6.62	7.27	6.84
<b>D3</b>	6.15	6.01	5.96	6.04
<b>Mean (P)</b>	6.46	6.55	6.88	
	<b>D</b>	<b>P</b>	<b>DXP</b>	
S.Em.±	0.11	0.11	0.20	
C.D. at 5 %	0.34	0.34	NS	
C.V. %	5.11			

Table. 8: Effect of planting geometry and date of transplanting on fruit diameter (cm) of brinjal

<b>5</b>	<b>Fruit diameter (cm)</b>			
<b>Treatment</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>Mean (D)</b>
<b>D1</b>	4.89	5.21	5.85	5.32
<b>D2</b>	4.82	4.97	5.22	5.00
<b>D3</b>	4.58	4.67	4.99	4.75
<b>Mean (P)</b>	4.76	4.95	5.35	
	<b>D</b>	<b>P</b>	<b>DXP</b>	
S.Em.±	0.10	0.10	0.18	
C.D. at 5 %	0.31	0.31	NS	
C.V. %	6.08			

Table.9: Effect of planting geometry and date of transplanting on average fruit weight (g) of brinjal

	<b>Fruit weight (g)</b>			
<b>Treatment</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>Mean (D)</b>
<b>D1</b>	65.83	69.09	67.21	67.38
<b>D2</b>	62.47	65.13	69.90	65.83
<b>D3</b>	67.00	67.44	69.26	67.90
<b>Mean (P)</b>	65.10	67.22	68.79	
	<b>D</b>	<b>P</b>	<b>DXP</b>	
S.Em.±	0.95	0.95	1.65	
C.D. at 5 %	NS	2.85	NS	
C.V. %	4.25			

Table.10 : Effect of planting geometry and date of transplanting on number of fruits per plant

	<b>Number of fruits per plant</b>			
<b>Treatment</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>Mean (D)</b>
<b>D1</b>	28.33	31.27	35.37	31.66
<b>D2</b>	21.87	28.00	32.33	27.40
<b>D3</b>	24.13	23.73	28.07	25.31
<b>Mean (P)</b>	24.78	27.67	31.92	
	<b>D</b>	<b>P</b>	<b>DXP</b>	
S.Em.±	0.71	0.71	1.22	
C.D. at 5 %	2.12	2.12	NS	
C.V. %	7.54			

Table. 11: Effect of planting geometry and date of transplanting on fruit yield (kg/plant)

	<b>Fruit yield (kg/plant)</b>			
<b>Treatment</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>Mean (D)</b>
<b>D1</b>	1.87	2.16	2.38	2.13
<b>D2</b>	1.37	1.82	2.27	1.82
<b>D3</b>	1.62	1.60	1.93	1.71
<b>Mean (P)</b>	1.62	1.86	2.19	
	<b>D</b>	<b>P</b>	<b>DXP</b>	
S.Em.±	0.06	0.06	0.10	
C.D. at 5 %	0.17	0.17	NS	
C.V. %	8.74			

Table.12: Effect of planting geometry and date of transplanting on fruit yield (kg/net plot)

	<b>Yield (kg/net plot)</b>			
<b>Treatment</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>Mean (D)</b>
<b>D1</b>	37.30	25.92	14.27	25.83
<b>D2</b>	27.92	22.61	14.52	21.68
<b>D3</b>	26.80	20.22	12.48	19.83
<b>Mean (P)</b>	30.67	22.91	13.76	
	<b>D</b>	<b>P</b>	<b>DXP</b>	
S.Em.±	0.63	0.63	1.09	
C.D. at 5 %	1.89	1.89	3.27	
C.V. %	8.41			

Table.13: Effect of planting geometry and date of transplanting on fruit yield (t/ha)

	<b>Fruit yield (t/ha)</b>			
<b>Treatment</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>Mean (D)</b>
<b>D1</b>	34.54	26.66	22.03	27.74
<b>D2</b>	25.85	23.26	22.41	23.84
<b>D3</b>	24.81	20.80	19.26	21.63
<b>Mean (P)</b>	28.40	23.57	21.23	
	<b>D</b>	<b>P</b>	<b>DXP</b>	
S.Em.±	0.66	0.66	1.15	
C.D. at 5 %	1.98	1.98	3.43	
C.V. %	8.13			

Table.14: Damage of shoot and fruit borer (%) on number of fruits

<b>Treatments</b>		<b>R-I</b>	<b>R-II</b>	<b>R-III</b>	<b>Av.</b>
T1	D1P1	4.64	5.30	5.59	5.18
T2	D1P2	6.16	6.85	6.58	6.53
T3	D1P3	4.41	4.96	5.32	4.90
T4	D2P1	6.60	7.55	7.34	7.16
T5	D2P2	6.38	4.96	5.48	5.61
T6	D2P3	4.49	3.93	4.82	4.42
T7	D3P1	6.50	6.50	5.56	6.19
T8	D3P2	7.09	7.87	7.63	7.53
T9	D3P3	5.30	5.30	7.03	5.88