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Study of combined effect of sowing dates and varieties on growth attributes in Garden Pea (*Pisum sativum* L.)

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Abstract

Pea (*Pisum sativum* L.), is being recognized as an important protein supplement vegetable crop. Pea cultivation is widespread in areas having a mild and warm climate, because relatively high or low temperatures are the most important factors limiting pea cultivation. The study of combined effect of sowing dates and varieties on growth attributes in Garden Pea (*Pisum sativum* L.) was conducted at Research Field Department of Vegetable Science, College of Horticulture, Mandsaur, RVSKVV, Gwalior (M.P.) during *Rabi* season in 2014-15. Twenty eight treatment combinations comprising of four different sowing dates viz., (D₁: 1st November, D₂:16th November, D₃:1st December, D₄:16th December) and seven varieties viz., (V₁: Arkel, V₂: Azad Pea-3, V₃: Pusa Pragati, V₄: Kashi Nandini, V₅: Mater Ageta-6, V₆: Arka Ajit and V₇: Kashi Samarth) were taken under study to estimate response in growth attributes of garden pea. Combined effect of varieties and sowing dates had non significant influence on plant height, number of branches per plant number of leaves per plant and SPAD value at 30, 45 and 60 days after sowing respectively. Numerically sowing date D₁ (1st November) with variety V₇ (Kashi Samarth) recorded maximum plant height, number of branches per plant and number of leaves per plant at all the growth stages i.e. 30, 45 and 60 DAS after sowing.

Keywords: Pea (*Pisum sativum* L.), sowing date, variety, growth attributes

Introduction

Pea (*Pisum sativum* L.), is being recognized as an important protein supplement vegetable crop. Pea is highly nutritive and contains digestible protein (7.2 g), carbohydrate (15.8 g), vitamin-C (9 mg), phosphorus (139 mg) per 100 (g) of edible portion (Gopalakrishnan, 2007) [2]. Fresh seed and pea pods can be used as a fresh vegetable or consumed as a frozen product. Dry seeds are used as pulse for human consumption. Early cultivation of pea was for pulse purpose and mostly round seeded varieties were grown mainly as a rainfed crop. The vegetable pea varieties are sweet in taste and hence are mostly wrinkled or dimpled because of high sugar content.

Pea cultivation is widespread in areas having a mild and warm climate, because relatively high or low temperatures are the most important factors limiting pea cultivation. A dry climate is also unsuitable for the plant, particularly during flowering and pod development. Cumulative mean temperature requirements for floral initiation varied and this data could be used to decide sowing dates for different cultivars. Yield can be increased by early sowing and with the use of the seeds of early flowering and maturing cultivars. However, another important factor determining the sowing time and cultivar is the required product (Bozoglu *et al.*, 2007) [1]. Peas are sown in *Rabi* season from beginning of October to the end of November in northern plains as the cool climate of about four months is ideal for pea growing. The areas where there is slow transition from cool to warm weather are ideal for pea growing. The optimum temperature for seed germination is about 22 °C however, it can germinate up to 5 °C but at slow rate. Peas grow best at mean temperature of 13-18 °C. It is tolerant to frost at early stage of growth. At later stage, the flowers and pods are affected. The wrinkled seeded cultivars are more sensitive to high temperature and a temperature of 30 °C and above even for a day affects the quality of pods. Since the seed crop of garden pea remains in the field for a longer duration, it is very much affected by the sowing time (Singh and Singh, 2011) [4].

Malwa region of Madhya Pradesh is not a traditional area of pea cultivation. But now days with increasing urbanization and growing awareness for vegetable consumption, demand for pea is increasing. Hence, there is a need to enhance the availability of pea by increasing the pea cultivation which requires supply of good quality seed of suitable varieties. Keeping above facts in view, an experiment was carried out to combined effect of sowing dates and varieties on growth attributes in Garden Pea (*Pisum sativum* L.).

Material and Method

A field experiment entitled 'Study of Combined effect of sowing dates and varieties on growth attributes in Garden Pea (*Pisum sativum* L)' was conducted at Research Field Department of Vegetable Science, College of Horticulture, Mandasaur, RVSKVV, Gwalior (M.P.) during *Rabi* season in 2014-15. Twenty eight treatment combinations comprising of four different sowing dates *viz.*, (D₁: 1st November, D₂:16th November, D₃:1st December, D₄:16th December) and seven varieties *viz.*, (V₁: Arkel, V₂: Azad Pea-3, V₃: Pusa Pragati, V₄: Kashi Nandini, V₅: Mater Ageta-6, V₆: Arka Ajit and V₇: Kashi Samarth) were taken under study to estimate response in growth attributes of garden pea. Nitrogen, phosphorus and potash were applied at the rate of 50:90:50 kg/ha, respectively, seed was sown in lines at a spacing of 30 x 10 cm and covered with soil. Seeds were sown at a depth of 3-4 cm. before sowing; seed was treated with mancozeb + carbendazim @ 2+1g per kg seed. The applications of thimet, dimethoate 30% EC (1.5ml/litre), chlorpyrifos 20% EC (2ml/l) + Neem oil (5ml/l) were done to control the insect pests. Prophylactic spray of mancozeb 75% WP (2g/l) and carbendazim (1g/l) was done to check the diseases. Five plants were randomly selected and tagged from each treatment under each replication excluding the border plants. Observation data were recorded on the tagged plants for the growth, yield and quality attributes of garden pea. The data obtained on various observations for each treatment were

subject to 'Analysis of variance' as recommended by Panse and Sukhatme (1985) [3].

Result and Discussion

Growth attributes of garden pea *viz.*, plant height, and number of branches, number of leaves and SPAD value were recorded during the present investigation presented in Table 1 Table 2. Combined effect of varieties and sowing dates had non-significant influence on plant height, number of branches per plant number of leaves per plant and SPAD value at 30, 45 and 60 days after sowing respectively. Numerically sowing date D1 (1st November) with variety V7 (Kashi Samarth) recorded maximum plant height, number of branches per plant and number of leaves per plant at all the growth stages i.e. 30, 45 and 60 DAS after sowing. Among the treatment combinations D1V6 had recorded minimum SPAD value at all the stages under study. It indicates that interaction effect of sowing dates and varieties in the present investigation was non-significant and had exerted no remarkable influence on these parameters. Contrary to the present findings Bozoglu *et al.* (2007) [1] reported significant effect of interaction between sowing date and varieties on plant height. Singh and Singh (2011) [4] had found significant interaction between sowing date and varieties for plant height, number of branches per plant. Tiwari *et al.* (2014) [5] had also observed significant influence of interaction between sowing dates and varieties on plant height, number of primary branches.

Table 1: Combined effect of sowing dates and varieties on plant height and number of branches of pea

Treatment	Plant height			Number of branches		
	30DAS	45DAS	60DAS	30DAS	45DAS	60DAS
D1V1	23.00	31.80	55.00	3.93	6.53	9.03
D1V2	29.90	34.93	55.77	4.73	6.60	9.33
D1V3	30.40	33.87	56.80	5.07	7.20	9.40
D1V4	29.67	31.57	55.73	3.00	6.50	9.00
D1V5	25.50	32.87	55.27	2.90	6.07	8.87
D1V6	31.87	35.40	61.93	2.80	6.03	8.80
D1V7	34.53	38.00	63.15	5.47	7.23	9.60
D2V1	22.86	29.97	46.40	3.53	5.73	7.83
D2V2	27.79	32.29	49.13	3.60	5.97	8.23
D2V3	28.03	32.67	51.40	3.83	6.07	8.33
D2V4	26.92	31.87	48.30	3.40	5.73	7.47
D2V5	26.62	31.40	47.20	3.33	5.27	7.40
D2V6	28.46	34.53	50.86	3.13	5.30	5.00
D2V7	31.54	36.20	71.93	4.20	6.67	8.53
D3V1	22.86	27.60	31.60	3.47	5.40	7.23
D3V2	27.79	32.23	40.07	3.50	5.87	7.27
D3V3	28.03	33.33	40.40	3.80	5.97	7.33
D3V4	26.62	34.13	37.71	3.23	5.33	6.83
D3V5	26.62	32.00	37.24	3.17	5.17	5.73
D3V6	28.46	33.20	48.00	3.10	4.53	5.53
D3V7	31.54	33.67	51.13	4.33	6.73	7.87
D4V1	24.13	31.37	36.73	3.33	5.27	6.27
D4V2	27.17	32.00	39.89	3.67	5.80	7.23
D4V3	28.60	33.27	42.01	3.87	6.37	7.60
D4V4	25.40	31.03	39.14	3.20	4.93	6.13
D4V5	24.97	31.33	38.87	2.93	4.77	6.07
D4V6	28.73	33.50	42.29	2.83	5.90	5.90
D4V7	29.57	32.33	44.04	4.20	6.87	8.20
S.Em ±	1.33	1.36	3.62	0.31	0.52	0.56
CD5%	NS	NS	NS	NS	NS	NS

Table 2: Combined effect of sowing dates and varieties on SPAD value and Number of leaves of pea

Treatment	SPAD value			Number of leaves		
	30DAS	45DAS	60DAS	30DAS	45DAS	60DAS
D1V1	50.60	50.97	50.97	26.40	47.60	53.67
D1V2	51.27	51.18	51.18	27.47	50.47	54.17
D1V3	52.95	53.50	53.50	27.57	50.20	55.67
D1V4	50.44	50.43	50.43	26.07	44.67	52.60
D1V5	49.01	50.10	51.44	23.13	47.07	48.53
D1V6	47.92	42.51	42.51	19.40	41.87	47.07
D1V7	55.49	56.62	56.62	30.07	56.80	63.13
D2V1	49.11	47.95	50.73	22.13	44.67	51.67
D2V2	51.47	49.14	52.35	22.40	44.87	52.00
D2V3	50.47	52.35	53.84	25.07	47.00	55.00
D2V4	46.02	47.41	47.41	21.27	44.50	51.33
D2V5	44.11	46.31	44.80	19.67	43.17	51.17
D2V6	39.86	41.23	43.55	18.80	43.00	50.73
D2V7	69.03	53.94	53.24	26.27	47.60	55.33
D3V1	42.98	47.01	47.70	16.73	39.90	47.33
D3V2	43.21	47.15	47.87	18.40	40.40	48.00
D3V3	43.71	47.59	52.87	18.87	41.67	48.80
D3V4	41.38	45.70	40.40	16.00	39.00	47.07
D3V5	39.87	40.40	41.19	15.73	36.00	46.67
D3V6	37.47	40.40	45.77	14.87	27.53	43.33
D3V7	48.64	53.91	55.33	22.60	41.67	49.00
D4V1	31.67	43.73	45.91	16.73	37.67	45.67
D4V2	35.27	45.91	47.12	18.40	37.73	46.33
D4V3	35.34	47.68	51.46	18.87	38.47	47.67
D4V4	29.90	41.60	42.73	16.00	37.50	45.67
D4V5	31.73	41.58	40.91	15.73	35.00	44.67
D4V6	27.73	40.04	38.47	14.87	34.13	43.33
D4V7	35.69	51.46	51.53	22.27	38.77	48.00
S.Em ±	3.97	4.13	3.74	1.87	2.62	1.72
CD5%	NS	NS	NS	NS	NS	NS

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