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Effect of sowing dates and varieties on fresh pod yield and related traits in garden pea (*Pisum sativum* L.) under sub-humid temperate environment

Akhilesh Sharma*, GD Sharma and SS Rana

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Abstract

A field experiment was conducted in split plot design with three replications for two consecutive years during 2007-2008 and 2008-2009. Twelve treatment combinations were evaluated comprising three dates of sowing at 10 days interval starting from 31st October in main plot and four varieties ('Azad P-1', 'Palam Priya', 'Arkel' and 'Pb-89') in sub-plots. Dates of sowing and varieties significantly influenced pod yield and yield contributing traits. The early sowing on 31st October significantly increased the pod yield by 13% and 43% over 10th November and 21st November, respectively. Among the varieties, 'Pb-89' significantly outperformed 'Azad P-1' and 'Arkel' for fresh pod yield with an increase of 23% and 75%, respectively in pooled over years. Significantly better performance for primary branches/plant, nodes/plant and pods/plant was also recorded in this variety. Interaction effects of sowing dates and varieties revealed that the fresh pod yield of each variety decreased with delay in sowing. Highest fresh pod yield was recorded in 'Pb-89'on 31st October sowing during 2007-08 and pooled data while the yield was at par with 'Palam Priya' during 2008-09. More number of seeds/pod was found in 'Pb-89' irrespective of sowing dates. Hence, early sowing on 31st October and the cultivar 'Pb-89' was the most ideal combination to obtain higher fresh pod yield in garden pea under sub-humid temperate environment.

Key words: *Pisum sativum*, varieties, sowing time, spacing, pod yield, interaction

Introduction

Garden pea (*Pisum sativum* L.), a member of *Papilionaceae* family, is one of the principal vegetable crops of the temperate and sub-tropical areas of the world. It is the second most important food legume worldwide after *Phaseolus vulgaris* (Taran *et al.* 2005). The crop is principally consumed for its green pods and is a rich source of health building substances *viz.*, proteins, vitamins, minerals and also lysine (a limiting essential amino acid in cereals). It holds a very coveted position in the north-western Himalayan region of India in general and a leading vegetable crop of Himachal Pradesh in particular by covering more than one-fourth of the total area under vegetable crops. Owing to diverse agro-climatic conditions in the state, it is grown throughout the year as cash crop during summer in high hills and during winters in mid and low hills.

Optimum sowing time of variety plays very crucial role to exploit potential yield (Sharma *et al*. 2014). Time of sowing is known to influence the establishment of growth and development and also the pod formation without involving additional costs and it varies according to cultivars. Pea requires a cool moist climate. The pea seeds germinate and grow vigorously at lower temperature than do many other pulses (Siddique *et al*. 2002). Pea yield is affected greatly by unfavourable environmental conditions such as water stress, frost and high temperatures (Salter 1963). In principle, delay in sowing beyond optimum date results in a progressive reduction in the potential yield of the crop (Green *et al*. 1985). Boswell (1929) reported that as temperature during the growing season rose, the pod yield dropped off rapidly. Hence, the positive effect of environmental factors on growth and yield could be harnessed if the information on optimum time of sowing is made available (Moniruzzaman *et al*. 2007). Keeping in view the importance of genotypes and sowing time as key factors in determining the yield and pod quality, the present investigation was conducted to investigate performance of different varieties of garden pea under varied sowing dates for yield and yield attributing traits.

Materials and Methods

A field experiment was conducted at Vegetable Research Farm, CSK Himachal Pradesh Agricultural University,

CSK Himachal Pradesh Agricultural University, Palampur-176062, HP
*Corresponding author, e-mail: akhilesh.palampur@yahoo.com

Palampur (32^0 62 N and 76^0 32 E at an elevation of 1291 m amsl). The experiment comprised of twelve 12 treatment combinations which were laid out in split plot design for two consecutive years during winter season from October-April 2007-08 and 2008-09, respectively. The main plot treatments consisted of three dates of sowing at 10 days interval starting from 31st October while sub-plot treatments consisted of 4 varieties namely, 'Azad P-1', 'Palam Priya', 'Arkel' and 'Pb-89'. The sowing of seeds of these varieties was done in flat beds of 3.60 m × 2.70 m size with spacing of 45 cm between rows and 10 cm between plants. Soil was ploughed once with tractor using a 3-disc plough and harrowed twice using a 7-disc harrow followed by one ploughing with power tiller. The seeds were sown at depth of 4-5 cm. The crop was well managed for optimum growth and yield. The fertilizers were applied at the time of sowing at the rate of 50 kg N, 60 kg P_2O_5 and 60 kg K_2O/ha. Weeds were controlled with pendimethalin @ 1.5 kg a.i./ha as pre emergence application followed by two manual weedings at 40 days and 60 days after sowing. The sprinkler irrigation was applied in the initial stages at fortnight interval followed by flooding once at flowering and pod formation stage each.

The data were recorded on ten plants selected randomly for days to flowering, days to first picking, internodal length (cm), nodes/plant, branches/plant, plant height (cm), pod length (cm), seeds/pod, shelling percentage and pods/plant. Pod yield was recorded on plot basis and was converted to tonnes/ha. The data were statistically analyzed as per the standard statistical procedures for split plot design (Gomez and Gomez 1983).

Results and Discussion

Effect of sowing time: Sowing time significantly influenced phenology and growth of pea during both the years (Table 3). Sowing on 31st October took significantly less number of days to flowering in comparison to sowing on 10th and 21st November but took longer days to first picking. Early flowering in early sown crop coincided with chill temperature in December and January which affected fertilization and pod formation and hence delayed picking in early sown crop. Also, early sowing on 31st October resulted in more number of branches/plant and maximum plant height which consecutively led to significant increased number of nodes/plant in comparison to sowing on 10th and 21st November (Table 3). The better performance of these traits was the result of long crop duration of early sown crop which led to the accumulation of more carbohydrates and thereby enhanced vegetative growth of plant. Among the varieties, 'Arkel' was significantly earliest in flowering while, 'Pb-89' gave early first harvest in comparison to other three varieties during both the years and in pooled data. Contrary to this, 'Pb-89' was only one week late in flowering than 'Arkel' but took minimum number of days to first harvest which revealed that it had better tendency to set pods at low temperature. 'Pb-89' and 'Palam Priya' had significantly more number of branches/plant which also resulted in formation of significantly more number of nodes/plant than the other two varieties. Maximum plant height was noticed in 'Azad P-1' and minimum in 'Pb-89'.

Pod yield and its component traits were significantly influenced by different sowing dates during 2007-08, 2008-09 in pooled data (Table 4). Significantly highest pod yield and pods/plant were observed in early sown crop on 31st October as compared to other dates during both the years and in pooled data (Table 4). The performance of yield attributes namely, pod length, seeds/pod and shelling percentage was at par on 31st

Table 1: Analysis of variance (mean sum of squares and CDs) for split plot design based on different sowing dates and varieties for different traits in garden pea

Source	df	Days to Flowering		Days to first picking		Pod length (cm)		Seeds/pod		Shelling (%)		Branches/plant	
		2007-08	2008-09	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09
Replication	2	6.85	28.08	1.33	40.12	0.04	0.11	0.09	0.01	3.46	1.20	0.01	0.22
Dates (D)	2	632.69*	811.00	65.33*	132.87	0.20*	8.00*	1.60*	1.43	13.67*	6.45	0.36*	1.85*
Error (a)	4	5.03	10.71	4.17	28.98	0.03	0.04	0.11	0.42	0.12	2.38	0.05	0.08
Varieties (V)	3	658.77*	501.07	355.11*	417.59*	3.06*	7.11*	10.23*	16.89*	108.78*	102.14*	0.41*	2.47*
D × V	6	8.32*	13.63	14.67*	68.64*	0.77*	0.41*	0.67*	0.58*	2.48	0.89	0.01	0.01
Error (b)	18	2.08	4.06	5.15	16.51	0.10	0.10	0.13	0.19	1.77	1.94	0.05	0.11

Source	df	Internodal distance (cm)		Nodes/plant		Plant height (cm)		Pods/plant		Pod yield (t/ha)	
		2007-08	2008-09	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09
Replication	2	0.13	0.18	18.57	33.67	6.39	20.76	7.93	5.87	0.13	0.31
Dates (D)	2	4.46*	4.51*	371.22*	423.65*	1294.65*	1773.86*	89.88*	230.23*	31.18*	55.12*
Error (a)	4	0.58	0.20	6.64	24.32	3.24	17.56	3.74	8.90	0.05	0.37
Varieties (V)	3	0.24	1.67*	38.46*	75.99*	34.58*	78.25*	130.12*	402.23*	34.72*	88.94*
D × V	6	0.03	0.41	13.49	6.03	35.42*	25.73*	33.48*	12.38*	7.78*	4.17*
Error (b)	18	0.10	0.12	7.76	11.71	10.21	5.37	3.07	2.07	0.12	0.19

Table 2: Analysis of variance (mean sum of squares and CDs) for pooled over years in split plot design based on different sowing dates and varieties for different traits in garden pea

Source	df	Days to Flowering	Days to first picking	Pod length (cm)	Seeds/ pod	Shelling (%)	Primary branches/ plant	Internodal distance (cm)	Nodes/ plant	Plant height	Pods/ plant	Pod yield/ plant
Replication	2	17.60	20.72	0.13	0.03	0.41	0.07	0.01	29.85	7.94	13.59	0.17
Year (Y)	1	17.01	0.68	0.88*	3.19*	0.23	13.18*	54.65	338.43	545.88*	142.72*	28.08*
Error (a)	2	17.34	20.72	0.01	0.07	4.25	0.16	0.29	22.39	19.21	0.20	0.26
Dates (D)	2	1433.93*	185.43	5.29*	2.95*	19.17*	1.43*	8.65	793.78	3022.05*	300.91*	82.92*
Y × D	2	9.76	12.76	2.91*	0.08	0.95	0.78*	0.32	1.09	46.46*	19.20	3.38*
Error (b)	8	7.87	16.58	0.03	0.26	1.25	0.06	0.39	15.48	10.40	6.32	0.21
Varieties (V)	3	1152.35*	755.79*	9.71*	26.59*	210.44*	2.39*	1.67	107.55	69.79*	461.21*	114.47*
Y × V	3	7.50	16.90	0.46	0.53*	0.48	0.49*	0.30	6.90	43.04*	71.15*	9.22
D × V	6	11.49*	70.10*	0.29*	1.14*	1.57	0.02	0.16	11.67	31.18	33.44*	6.37*
Y × D × V	6	10.47*	13.21	0.89*	0.12	1.80	0.003	0.285	7.845	29.978*	12.422*	5.57*
Error (c)	36	3.07	10.83	0.10	0.16	1.85	0.08	0.11	9.42	7.79	2.57	0.16
Total	71											

Table 3: Effect of different sowing dates and varieties on phenological and plant growth traits in garden pea

Treatment	Days to flowering			Days to first picking			Internodal length (cm)			Nodes/plant			Branches/plant			Plant height (cm)		
	2007-08	2008-09	Pool	2007-08	2008-09	Pool	2007-08	2008-09	Pool	2007-08	2008-09	Pool	2007-08	2008-09	Pool	2007-08	2008-09	Pool
Date of sowing																		
31st October	61.17	61.17	61.17	117.33	119.00	118.17	4.77	6.70	5.73	29.70	34.32	32.01	1.61	2.72	2.16	76.20	82.17	79.19
10th November	73.17	73.67	73.42	115.00	113.75	114.38	4.67	6.16	5.41	23.80	28.35	26.08	1.27	2.28	1.78	64.48	72.51	68.49
21st November	74.25	76.67	75.46	112.67	112.83	112.75	3.67	5.47	4.57	18.59	22.43	20.51	1.49	1.93	1.71	55.49	58.01	56.75
LSD (P=0.05)	2.54	3.71	1.87	2.31	NS	2.71	0.86	0.51	0.42	2.92	5.59	2.62	0.26	0.31	0.17	2.04	4.75	2.15
Variety																		
Azad P-1	73.22	73.33	73.28	118.89	121.11	120.00	4.42	6.20	5.31	22.04	26.63	24.34	1.42	1.98	1.70	66.60	74.30	70.45
Palam Priya	78.78	79.11	78.94	120.89	119.11	120.00	4.36	6.00	5.18	26.69	31.69	29.19	1.61	2.69	2.15	63.77	72.21	67.99
Arkel	58.78	61.67	60.22	113.33	114.78	114.06	4.13	5.60	4.86	22.81	25.33	24.07	1.17	1.76	1.46	67.52	69.44	68.48
Pb-89	67.33	67.89	67.61	106.89	105.78	106.33	4.56	6.64	5.60	24.57	29.81	27.19	1.62	2.82	2.22	63.68	67.64	65.66
LSD (P=0.05)	1.43	1.99	1.18	2.25	4.02	2.22	NS	0.35	0.23	2.76	3.29	2.07	0.21	0.33	0.19	3.16	2.29	1.89

* NS: Non significant

October and 10th November. Early sowing on 31st October increased the pod yield by 13 and 43% compared with 10th November and 21st November, respectively. Sharma *et al.* (2014) also reported that early sowing resulted in increased seed yield. The significantly better pod yield due to sowing on 31st October was the result of more number of pods/plant and better performance of growth characters like primary branches/plant, nodes/plant and plant height.

There was gradual decrease in primary branches/plant, nodes/plant, plant height and pods/plant with each delayed sowing that in turn adversely affected fresh pod yield as compared to early sowing on 31st October (Table 3 and 4). The poor yield in late sowings may also be the result of low soil and air temperature at seed emergence during mid November which delayed germination. Plant growth further got affected due to chill temperature during December-January. This ultimately resulted in poor crop vigour and little chance of producing high yield indicating the influence of sowing date on yield in pea (Sharma *et al.* 2014). Dass *et al.* (2005) and Yadav *et al.* (2010) also observed better performance of pea crop sown during October for pod yield and its related traits.

Performance of varieties: The varieties also differed significantly for pod yield/plant and component traits during both the years in 2007, 2008 and in pooled mean data (Table 1 and 2). Nodes/plant, plant height, primary branches, pods/plant has a direct influence on the total production and productivity of pea crop. In the present investigation, variety 'Pb-89' and 'Palam Priya' were at par and significantly out performed 'Azad P-1' and 'Arkel' for pod yield/plant and number of pods/plant (Table 4). This increase in yield was the result of more number of primary branches, nodes/plant and number of pods/plant. In garden pea, consumer's preference for long pods, more seeds/pod and high shelling percentage play a very crucial role in determining the choice of a variety to be adopted by the growers. Interestingly, 'Pb-89' had significantly better performance for these traits in comparison to other three varieties and as such can be a better choice for the growers. The pod yield of 'Pb-89' was increased by 11 and 52, 38 and 107 and 23 and 75 per cent over 'Azad P-1' and 'Arkel' during 2007, 2008 and pooled over years, respectively.

Interaction effects of sowing times and varieties: The interaction effects of sowing dates on the performance of varieties *viz*., 'Azad P-1', 'Palam Priya', 'Arkel' and 'Pb-89' were found to be significant for

Table 4: Effect of different sowing dates and varieties on yield attributes and pod yield of garden pea

Treatment	Pod length (cm)			Seeds/pod			Shelling percentage			Pods/plant			Pod yield (t/ha)		
	2007-08	2008-09	Pool	2007-08	2008-09	Pool	2007-08	2008-09	Pool	2007-08	2008-09	Pool	2007-08	2008-09	Pool
Date of sowing															
31st October	9.01	9.19	9.10	7.83	7.32	7.58	44.77	44.20	44.49	25.19	23.09	24.14	12.86	11.73	12.30
10th November	8.92	9.11	9.02	7.43	7.14	7.29	43.76	43.84	43.80	22.31	19.52	20.92	11.19	10.63	10.91
21st November	8.76	7.73	8.25	7.10	6.65	6.88	42.63	42.79	42.71	19.80	14.95	17.38	9.64	7.59	8.62
LSD (P=0.05)	0.18	0.21	0.12	0.37	NS	0.34	0.40	NS	0.75	2.19	3.38	1.67	0.25	0.69	0.30
Variety															
Azad P-1	8.80	8.51	8.66	7.29	6.90	7.10	42.26	42.21	42.24	23.03	14.96	19.00	11.48	8.96	10.22
Palam Priya	8.42	8.09	8.25	6.92	6.56	6.74	45.40	44.82	45.11	25.76	25.53	25.65	12.30	12.60	12.45
Arkel	8.63	8.13	8.38	6.61	5.73	6.17	39.66	39.79	39.72	16.76	12.06	14.52	8.39	5.99	7.19
Pb-89	9.74	9.98	9.86	9.00	8.96	8.98	47.56	47.61	47.59	23.96	24.19	24.08	12.76	12.38	12.57
LSD (P=0.05)	0.32	0.31	0.21	0.36	0.43	0.27	1.32	1.38	0.92	1.73	1.42	1.08	0.35	0.43	0.27

pod yield and all other traits (Tables 5 and 6). A better understanding of pea phenology is necessary in order to adopt crop management practices like sowing date, choice of cultivar for specific locations and to predict yield. As the market prices are invariably high early in the season, earliness is a highly desirable attribute in garden pea. The days to flowering and first picking of a particular variety are the only indicators of earliness. The variety 'Arkel' took minimum days to flowering irrespective of date of sowing while early picking was obtained from 'Pb-89' from 31st October and 10th November sowing during both the years and pooled over years (Table 5). However, 'Arkel' and 'Pb-89' took statistically same days to first picking from 21st November sowing. Each variety sown on 10th and 21st November took almost same number of days to flowering and first picking on account of rise in temperature during January end onwards. Further, plant height of each variety gradually decreased with each delay of sowing irrespective of years. This indicates that in the early sowing on 31st October, optimum temperature during early November resulted in good germination and better initial plant growth while low temperature during mid November onwards affected the germination and checked the early growth in late sowings and the affect was more drastic on 21st November sowing. Less accumulation of photosynthates also led to poor plant growth. In addition, growth was very rapid from February onwards due to rising temperature and longer photoperiods. These conditions are congenial for flowering and pod formation as a result, the length of all developmental stages decreased in the late sowing alongwith reduction in pod yield.

Interaction effects were more pronounced on the performance of each variety for fresh pod yield on different dates of sowings (Table 6). Significantly highest pod yield was recorded in 'Pb-89' on 31st October sowing

Table 5: Interaction effect of sowing dates and varieties on phenological traits in garden pea

Date of sowing	Days to 50 % flowering				Days to first picking				Plant height (cm)			
	Azad P-1	Palam Priya	Arkel	Pb-89	Azad P-1	Palam Priya	Arkel	Pb-89	Azad P-1	Palam Priya	Arkel	Pb-89
First year (2007-08)												
31st October	63.33	70.00	52.67	58.67	122.00	122.67	117.33	107.33	75.38	72.81	82.27	74.35
10th November	78.00	82.67	60.00	72.00	118.67	122.00	114.00	105.33	65.91	61.60	68.19	62.20
21st November	78.33	83.67	63.67	71.33	116.00	118.00	108.67	108.00	58.50	56.90	52.08	54.48
LSD (P=0.05)												
At same level				2.47				3.89				5.48
At same or different level				3.29				4.06				5.14
Second year (2008-09)												
31st October	64.00	72.33	52.00	56.33	124.67	124.67	121.67	105.00	84.56	81.70	84.37	78.05
10th November	77.33	82.33	63.67	71.33	119.00	117.67	116.33	102.00	77.19	76.84	66.62	69.38
21st November	78.67	82.67	69.33	76.00	119.67	115.00	106.33	110.33	61.15	58.10	57.33	55.48
LSD (P=0.05)												
At same level				3.45				6.97				3.97
At same or different level				4.72				8.50				5.81
Pooled over years												
31st October	63.67	71.17	52.33	57.50	123.33	123.67	119.50	106.17	79.97	77.26	83.32	76.20
10th November	77.67	82.50	61.83	71.67	118.83	119.83	115.17	103.67	71.55	69.22	67.41	65.79
21st November	78.50	83.17	66.50	73.67	117.83	116.50	107.50	109.17	59.83	57.50	54.71	54.98
LSD (P=0.05)												
At same level				2.05				3.85				3.27
At same or different level				2.57				4.29				3.55

Table 6: Interaction effect of sowing dates and varieties on pod yield and yield attributes in garden pea

Date of sowing	Pod length (cm)				Seeds/pod				Pods /plant				Pod yield (t/ha)			
	Azad P-1	Palam Priya	Arkel	Pb-89	Azad P-1	Palam Priya	Arkel	Pb-89	Azad P-1	Palam Priya	Arkel	Pb-89	Azad P-1	Palam Priya	Arkel	Pb-89
First year (2007-08)																
31st October	8.77	8.60	8.64	10.05	7.67	6.90	7.10	9.67	25.13	28.21	19.72	27.70	12.31	13.28	10.11	15.76
10th November	8.47	8.94	8.31	9.97	7.27	7.20	6.00	9.27	20.88	29.93	13.98	24.45	10.63	14.15	7.24	12.76
21st November	9.16	7.72	8.95	9.21	6.95	6.67	6.73	8.07	23.08	19.13	17.27	19.72	11.50	9.46	7.83	9.77
LSD (P=0.05)																
At same level				0.55				0.62				3.00				0.60
At same or different level				0.51				0.65				3.37				0.93
Second year (2008-09)																
31st October	9.06	8.48	8.86	10.34	7.17	6.43	5.83	9.83	18.33	31.03	13.33	29.67	10.10	15.59	6.11	15.11
10th November	8.95	8.65	8.81	10.03	6.93	6.90	5.67	9.07	14.37	26.10	13.17	24.43	9.86	12.57	7.61	12.48
21st November	7.54	7.12	6.71	9.57	6.60	6.33	5.70	7.97	12.17	19.47	9.67	18.48	6.91	9.66	4.24	9.55
LSD (P=0.05)																
At same level				0.54				0.74				2.46				0.75
At same or different level				0.52				0.97				3.96				0.41
Pooled over years																
31st October	8.91	8.54	8.75	10.20	7.42	6.67	6.47	9.75	21.73	29.62	16.53	28.68	11.21	14.43	8.11	15.44
10th November	8.71	8.80	8.56	10.03	7.10	7.05	5.83	9.17	17.63	28.02	13.58	24.44	10.25	13.36	7.43	12.62
21st November	8.35	7.42	7.83	9.39	6.78	6.50	6.22	8.02	17.63	19.30	13.47	19.10	9.20	9.56	6.04	9.66
LSD (P=0.05)																
At same level				0.37				0.46				1.88				0.46
At same or different level				0.34				0.53				2.32				0.50

date during 2007-08 and pooled over years while its performance was at par with 'Palam Priya' during 2008-09. Further it was observed that each delay in sowing significantly reduced the pod yield during both the years and pooled over years with few exceptions *e.g.* 'Palam Priya' performed significantly better on 10th November than early sowing during 2007-08 and similar yield of 'Azad P-1' on 31st October and 10th November during 2008-09. The reduction in yield with each delay in sowing might be due to high temperature which induced flowering before the plants had grown sufficiently to bear a good crop (Siddique *et al*., 2002). In late sowings, 'Palam Priya' and 'Azad P-1' significantly outperformed the other varieties for pod yield on 10th November and 21st November sowing dates, respectively during 2007-2008 whereas statistically similar yields were obtained from 'Pb-89' and 'Palam Priya' on these dates during 2008-2009 and pooled over years. Sharma et al (2014) also reported higher seed yield in Palam Priya and Pb-89. The variation in yield and related traits among these varieties may be due to heterogeneity in their genetical constitution. For pod attributes, 'Pb-89' had significantly longest pods and maximum number of seeds/pod on each date of sowing in comparison to other varieties during both the years and pooled over years though these traits exhibited their better potential on first two dates of sowing (Table 6). The exceptionally good performance of 'Pb-89' in terms of pod yield can be attributed to the longer pods, more number of seeds/pod and pods/plant. Bozoglu *et al*. (2007) also observed differences in the performance of different varieties on different sowing dates for seed yield and component traits.

Conclusion

It can be concluded that appropriate sowing date along with superior genotypes/varieties are the key factors to enhance the total production and productivity of garden pea. The maximum pod yield of garden pea can be obtained from variety 'Pb-89' by carrying out sowing on 31st October under sub humid temperate conditions of north-western Himalayas.

सारांश

मटर में लगातार 2 वर्षों 2007–2008 एवं 2008–09 तक तीन प्रतिकृतियों को समाहित कर स्पिलट प्लाट डिजाइन में प्रयोग किया गया। तीन तिथियों में 10 दिन के अन्तराल पर 31 अक्टूबर को मुख्य प्रखण्ड तथा 4 प्रजातियों (आजाद पी–1, पालम प्रिया, अर्केल एवं पंजाब 89) को उपखण्डों में कुल 12 संयोजकों का मूल्यांकन किया गया। उपज एवं एपज घटकों पर बुआई की तिथि तथा प्रजातियों का सार्थक प्रभाव देखा गया। अगेती बुआई अर्थात 31 अक्टूबर को करने पर 13 प्रतिशत एवं 10 नवम्बर तथा 21 नवम्बर को करने पर 43 प्रतिशत की सार्थक वृद्धि हुई। प्रजातियों में पंजाब–89 कुल ताजे उपज हेतु आजाद प्री–1 व आर्केल पर अध्ययन वर्षों में 23 प्रतिशत तथा 75 प्रतिशत की क्रमशः बढ़ोतरी हुई। सार्थक रूप से उत्तम निष्पादन प्राथामिक शाखा/पौध, पार्श्व गाँठ/पौध तथा फली/पौध इसी प्रजाति में पायी गयी। बुआई की तिथि एवं प्रजाति की आपसी सम्पर्क से स्पष्ट हुआ कि ताजे फली की उपज कमी प्रत्येक प्रजाति की देर से बुआई करने पर होती है। वर्ष 2007–08 में 31 अक्टूबर को प्रजाति पंजाब–89 की बुआई करने पर सबसे अधिक ताजे फली की प्राप्ति हुई जबकि समुहिकृत आँकड़ा के अनुसार 2008–09 में प्रजाति पालम प्रिया सममूल्य पर पाया गया। बुआई की तिथियों के भिन्नता के बावजूद प्रजाति पंजाब–89 में बीज/फली अधिक पायी गयी। इस प्रकार सब्जी मटर की 31 अक्टूबर अगेती बुआई तथा प्रजाति पंजाब–89 अधिक फली उपज की दृष्टि से उप आर्द्र समशीतोष्ण वातावरण के लिए उपयुक्त है।

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