



Effect of Dates of Sowing on The Incidence of Pea Stemfly, *Ophiomyia Phaseoli* (Tryon) on Pea In Rajasthan

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ABSTRACT

The research experiment was conducted at Instructional farm, College of Agriculture, Swami Keshwanand Rajasthan Agricultural University, Bikaner (Raj.) during rabi, 2016-17. The crop were sown in five sowing dates the maximum per cent of plant mortality was observed in those plots where sowing was done on 14th October and the lowest per cent plant mortality was observed in the plots sown on 23rd November. The intensity of pea stemfly was high in the early sown crop than the late sown. However, the highest seed yield (16.43 q ha⁻¹) was recorded in crop sown on 3rd November whereas, it was minimum 9.18 q ha⁻¹ in the 23rd November sown crop

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INTRODUCTION

Pea, *pisum sativum* (Lin.) is one of the important crop cultivated throughout the Indian subcontinent, its pods are used as vegetable and other plant parts form palatable fodder for cattle and used as green manure. It is grown as a winter vegetable in the plains of north India and summer vegetable on hills. Major area of garden pea is in temperate and subtropical regions of the country. It is grown in some cooler parts of southern India. Garden pea is cultivated on a large scale in the states like Uttar Pradesh, Madya Pradesh and Jharkhand. It is also grown in Himachal Pradesh, Punjab, West Bengal, Haryana, Bihar, Uttrakhand, Jammu and Kashmir, Orissa, some parts of Rajasthan and Maharashtra. In south it is grown in Karnataka and the hilly regions like Ooty and Kodaikanal of Tamil Nadu.

It provides forage for animal feed and from which pods are harvested for human consumption as a fresh vegetable, veining pea for canning and dried pea for human or animal consumption. Pea plant has a tap root system, vine weak stem, and shallow root system. It is susceptible to drought and heat. It grows best on well-drained loamy and clayey soils [10]. Pea is a reasonably high yield crop and is suitable for either conventional, low input or organically managed cropping system. Including pea in crop rotation helps to increase diversity and provides a source of nitrogen which reduces reliance on nitrogen fertilizer (the crop adds up to 33-246 kg N ha⁻¹). The biological fixation of nitrogen can improve the pea crop productivity during the growing season and it can also benefit the subsequent crop rotation.

The crop is cultivated for its tender and immature pods for use as vegetable and mature dry pods as a pulse. In both cases, seeds are separated and used as vegetable or pulse. Tender seeds are also used in soups. Pea pods have high nutritive value for human consumption and contain 7.2 per cent protein, 19.2 per cent carbohydrate, 0.8 percent mineral matters, 80 per cent phosphorus and 1.8 per cent iron in fresh pea. While in dried pea it contains 19.7 per cent protein, 56.6 per cent carbohydrate, 2.1 per cent mineral matters and 4.4 per cent iron. Besides being a rich source of vitamins A, B, B₂ and C. The average production of pea is 60-70 q ha⁻¹ for fresh and 15-20 q ha⁻¹ for dried pea [3]. Pea crop is subjected to attack by large number of pests in field, viz., pea pod borer, *Etiella zinckenella*, pod borer, *Helicoverpa armigera*, *Lampedes boeticus*, pea stemfly, *Ophiomyia phaseoli*, cotton jassid, *Emrasca devastans*, pea leaf miner, *Phytomyza atricornis*, aphid, *Myzus persicae* and mite, *Tetranychus telarius*.

Pea stem fly, *O. phaseoli* (Tryon) is one of the most serious pest of this crop. The infestation of stem fly maggot occurs at seedling stage. The affected plants in the early stage show thickening or cracking of the stem at or just above the ground level. The heavily infested area can easily be distinguished by the rusty red appearance of the basal portion of the stem. The plant becomes stunted and yellow and finally dries. In most of the cases stem is swollen below the ground level and the plant that can survive, contains small seeds [7]. The date of sowing may affect the incidence of the pest.

MATERIAL AND METHODS

With a view to study the relation between dates of sowing and incidence of pea stemfly, the variety Azad P-1 was used for sowing. An experiment was laid out in *rabi*, 2016-17 in randomized block design with five sowing dates each replicated four times. The seeds of pea (variety Azad P-1) were sown in the plot measuring 3 x 1.8 m² keeping row to row and plant to plant spacing 30 x 30 cm at ten days intervals, starting from 14th October to 23rd November, 2016-17. The incidence of pea stemfly was recorded by counting the damaged and healthy plants in each plot at weekly intervals and the mean incidence of this fly in relation to date of sowing and yield were statistically analyzed.

RESULTS AND DISCUSSION

To determine the effect of sowing time on the incidence of pea stemfly, *O. phaseoli* (Tryon) the data on plant mortality were recorded in the crop sown at different dates. Data thus obtained revealed that the infestation progressively decrease with the increased in sowing dates (Table No. 1).

Cumulative plant mortality were recorded 43.25, 34.53, 24.89, 21.21 and 12.31. per cent in the crop sown on 14th October, 24th October, 3rd November, 13th November and 23rd November, respectively. The result obtained on plant mortality due to pea stemfly, *O. phaseoli* in acute different treatments (sowing dates) were significant. The data pertaining to temperature as plotted in indicates that the infestation of pea stemfly was gradually decline with the decrease in both maximum and minimum temperature. It is, therefore quite evident that during early sown period, when the maximum and minimum temperature were higher, encouraged the activity of *O. phaseoli* as compared to low temperature during late sown crop.

The grain yield data revealed that the maximum yield of 16.43 q ha⁻¹ was obtained in the crop sown on 3rd November followed by 24th October (15.75 q ha⁻¹), 13th November (14.21 q ha⁻¹) and 15 October (11.24 q ha⁻¹). However, minimum yield (9.18 q ha⁻¹) was recorded from the crop sown on 23rd November.

The present findings are in confirmation of Kooner *et al.* 1977, who also found less damage in later part of November and early December as compare to October. However, these findings are further confirmed by Brar *et al.* [2] and Singh *et al.* [12] who also reported that early sown crop suffered more as compared to late sown crop against stemfly. However, present findings are contradicted by the findings of Nderitu *et al.* [6] who found more infestation in late season crop as compared to early season crop. Likewise, Prodhhan *et al.* [8] also reported that the incidence of pea stemfly in black gram increased with the progress of season.

On the contrary to present findings Abul-Nasar and Assem [5] reported that the dates of sowing did not influence the degree of infestation or yield in Egypt. The major cause for the apparent low pest population in late sown crop is due to maximum and minimum temperature in the month of December (late sown period).

Bali and Qureshi [1] observed lesser infestation in late sown crop and obtained higher pea yield against stemfly. These results are in agreement with the present findings. Similarly, Sharma (1997) also recorded maximum plant mortality on earliest sowing date and lowest plant mortality on the last sowing date (24th November) in pea against stemfly. These finding conforms the present results where maximum plant mortality was observed in early sown crop.

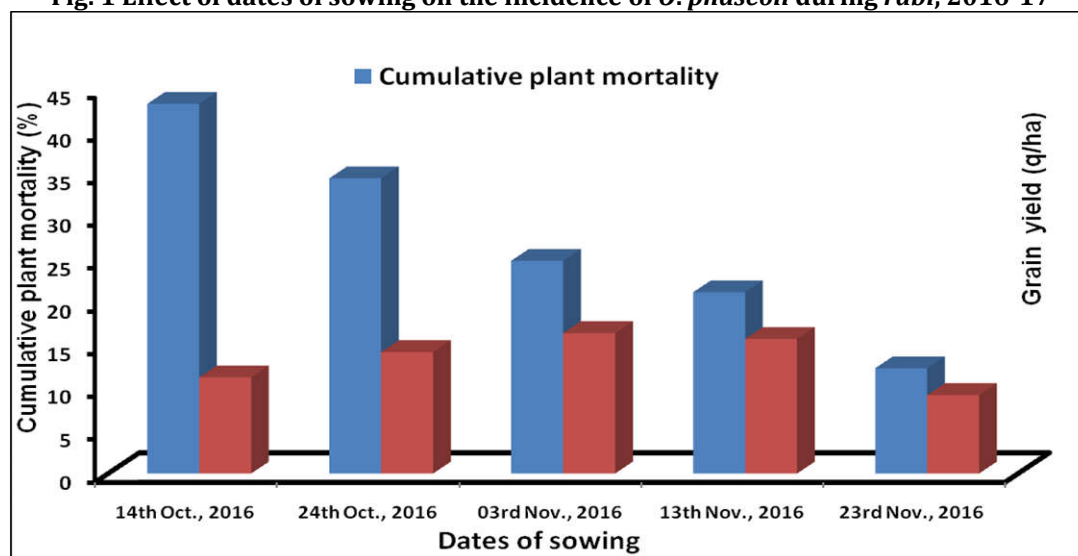
Prodhhan *et al.* [9] worked on incidence of stemfly on black gram at different dates of sowing from August 7th to September 11th 2007, at an interval of 7 days and found 100 per cent infestation of stemfly in early sown crop. The damage was gradually decreased when observed on late sown crops. These findings are of *kharif* crops, but the trend depicts that early timely sown crop suffers more by stemfly as compare to late sown crop. Here the similar trend was observed that early sown pea crop suffered more as compared to late sown crop.

Maximum per cent of plant mortality was recorded in those plots where sowing was done on 14th October (earlier sowing) while the lowest per cent of plant mortality was observed in the plots sown on 23rd November (last sowing). The per cent infestation recorded at weekly intervals were significantly differ with respect to different dates of sowing (Table 1 and Fig. 1) and also showed that during the five sowing dates, the intensity of pea stemfly was high in the early sown crop than the last sown.

Table 1 Effect of dates of sowing on the incidence of pea stemfly, *O. phaseoli* during rabi, 2016-17

S.No.	Dates of Sowing	1		2		3		4		5		S.E.m. +	CD (5%)
		Grain yield (q ha-1)	Cumulative mortality (%)	Grain yield (q ha-1)	Cumulative mortality (%)	Grain yield (q ha-1)	Cumulative mortality (%)	Grain yield (q ha-1)	Cumulative mortality (%)	Grain yield (q ha-1)	Cumulative mortality (%)		
		11.24	43.25	15.75	34.53	16.43	24.89	14.21	21.21	9.18	12.31	0.88	2.72
			(41.12)		(35.60)		(29.87)		(27.42)		(20.53)	2.30	7.10
		6.217	1.25	0.83	0.83	0.42	0.42	0.83	0.42	0.42	0.42	0.28	0.86
			(6.42)		(5.13)		(3.69)		(5.24)		(3.70)	0.28	0.86
		30.1.17	1.67	1.25	1.25	1.25	1.25	1.67	1.67	0.83	0.83	0.36	1.10
			(7.42)		(6.29)		(6.41)		(7.42)		(5.22)	0.36	1.10
		23.1.17	2.08	2.50	2.50	1.67	1.67	1.67	1.67	0.83	0.83	0.44	1.36
			(8.30)		(8.92)		(7.42)		(7.42)		(5.22)	0.44	1.36
		16.1.17	2.50	2.92	2.92	1.98	1.98	2.92	2.92	1.25	1.25	0.48	1.47
			(9.10)		(9.65)		(8.09)		(9.83)		(6.42)	0.48	1.47
		Mean per cent	2.90	3.33	2.08	2.08	2.08	2.08	2.08	1.67	1.67	0.61	1.87
			(9.80)		(10.23)		(8.29)		(8.30)		(7.42)	0.61	1.87
		2.1.17	2.92	3.70	2.50	2.50	2.50	2.46	2.46	1.90	1.90	0.68	2.11
			(9.83)		(10.75)		(9.09)		(9.02)		(7.92)	0.68	2.11
		26.12.16	3.68	3.75	3.33	3.33	3.33	2.50	2.50	2.50	2.50	0.69	2.12
			(11.06)		(10.83)		(10.51)		(9.10)		(9.09)	0.69	2.12
		19.12.16	3.75	3.33	2.92	2.92	2.92	3.33	3.33	2.92	2.92	0.50	1.56
			(11.16)		(10.32)		(9.83)		(10.51)		(9.83)	0.50	1.56
		12.12.16	5.83	5.00	4.17	4.17	4.17	3.75	3.75				
			(13.97)		(12.58)		(11.77)		(11.16)				
		5.12.16	5.42	4.17	4.58	4.58	4.58						
			(13.46)		(11.42)		(12.36)						
		28.11.16	5.00	3.75									
			(12.92)		(10.83)								
		21.11.16	6.25										
			(14.48)										

* Values in parentheses are the angular transformed values.

Fig. 1 Effect of dates of sowing on the incidence of *O. phaseoli* during rabi, 2016-17**REFERENCES**

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