The Pharma Innovation Journal 2022; SP-11(3): 748-750

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(3): 748-750

www.thepharmajournal.com
Received: 18-01-2022
Accepted: 20-02-2022

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Effect of sowing dates against pod borer complex infesting dolichos bean, *Lablab purpureus* (L.) sweet

MN Kengare, KV Naik and VN Jalgaonkar

Abstract
A field experiment was carried out to study the effect of sowing dates against pod borer complex infesting dolichos bean, *Lablab purpureus* (L.) Sweet during *rabi* season of 2018-19 at Central Experiment Station, Wakawali, Dist- Ratnagiri. During this experiment total three sowing dates tested viz., 2nd November2018, 22nd November 2018, 12th December, 2018 respectively. Based on overall results of field experiment, it was revealed that minimum (6.36%) aphid infestation was recorded in early sown crop i.e. 2nd November. The minimum (33.41%) pod borers damage was recorded in early sown crop i.e. 2nd November while, maximum (55.67%) pod borer damage was recorded on late sown crop i.e. 12th December.

Keywords: Sowing dates, pod borer complex, dolichos bean

Introduction
The grain legumes occupy a unique position in the world of agriculture by virtue of their high protein content and capacity of fixing atmospheric nitrogen. *Lablab purpureus* (L.) Sweet usually called as Dolichos bean, Hyacinth bean or Field bean is one of the most ancient crops among the cultivated plants. It is a multipurpose crop grown for pulse, vegetable and forage. It is one of the major sources of protein in diets in southern states of India. In India, the total area under beans is 228 thousand hectare with an annual production of 2277 thousand MT while in Maharashtra the total area under beans is 5.50 thousand hectare with an annual production of 55.48 thousand MT (Anon., 2018) [1].
The crop is attacked by a number of insect pests during its life span. Govindan (1974) [4] recorded as many as 55 species of insects and one species of mite feeding on the crop from seedling stage till the harvest of the crop in Karnataka. However, only a few of them such as pod borers were considered to be most destructive and they appeared regularly causing economic loss, whereas others were considered as minor pests.
The larvae of pod borer are known to cause considerable damage to lablab bean attacking various parts viz., buds, flowers, pods and seeds. Its nature of damage is exhibited by weaving unopened buds and flowers. The larva further damages the reproductive parts of flower leading to poor pod setting and pod formation. In the later period of crop growth, it behaves as a pod borer and completes its larval and pupal development inside the pod. This leads to poor pod formation, reduction in grain yield as well as adverse effect on market value of green pods.
Though the crop is economically important, the information on the pest status, crop loss estimation in Konkan region is very much lacking. As the pods are consumed as vegetable, the pest management and especially the pod borer control has to be on organic basis. Considering the importance of dolichos bean and seriousness of the pests cultural practice like effect of sowing dates on pests infesting dolichos bean is carried out.

Materials and Methods
A field experiment was conducted during *rabi* season of 2018-19 to study the effect of sowing dates against pod borer complex infesting dolichos bean.

Experimental details
The details of experiment are given below, while the treatment details are given in Table 1.

Table 1: Experimental details

Location	:	CES, Wakawali, DBSKKV, Dapoli, Dist. Ratnagiri
Period of study	:	November 2018 to April 2019
Variety	:	Konkan Bhushan
Spacing	:	30 cm × 30 cm
Size of treatment plot	:	6m x 1.2m
Total plot size	:	37.8m
Date of sowing	:	2nd November, 2018 22nd Novemver,2018 12th December, 2018
Method of planting	:	On raised beds
Design	:	Randomized Block Design (RBD)
Number of replication	:	Three
Number of treatment	:	Eight

Method of recording observations

During the cropping season three different pod borers *viz.*, *Helicoverpa armigera* (Hubner), *Spodoptera litura* (Fabricius) and *Maruca vitrata* (Fabricius) were observed to infest dolichos bean. The observations of pod borers were recorded on five randomly selected plants per plot at each picking *i.e.* number of healthy and infested pods due to pest.

Per cent pod infestation was calculated by the following formula,

$$\text{Per cent pod infestation} = \frac{\text{Number of infested pods}}{\text{Total number of pods}} \times 100$$

Results and Discussion

Effect of sowing dates against pod borer complex infesting dolichos bean, *Lablab purpureus* (L.) Sweet

Data on per cent pod infestation of pod borer recorded at 8th, 9th, 10th, 11th, 12th, 13th and 14th week after sowing. Data are presented in Table 2. The infestation of the pod borers prior to application of insecticides ranged from 30.50 to 32.65 per cent. The differences among the treatments and replications were non-significant indicating uniform distribution of pest in both treatments and replications.

At the 8th WAS, the minimum (21.90%) infestation of pod borers was recorded in first date of sowing (2-11-2018). The second sowing date (22-11-2018) recorded 40.46 per cent pod damage. The maximum (60%) infestation of pod borers was observed in third date of sowing (12-12-2018).

Observations recorded at the 9th WAS indicated that the first date of sowing (2-11-2018) recorded the lowest (30.97%) pod borers infestation. The second sowing date (22-11-2018) recorded 41.55 per cent infestation of pod borers. The third date of sowing (12-12-2018) recorded the highest (60.46%) infestation of pod borers.

At the 10th WAS, first date of sowing (2-11-2018) recorded the minimum (31.94%) pod infestation while, second sowing date (22-11-2018) recorded 42.13 per cent pod infestation. The maximum (57.50%) pod infestation recorded in third date of sowing (12-12-2018).

At the 11th WAS, data indicated that the minimum (32.69%) pod infestation was observed in first date of sowing (2-11-2018). The second sowing date (22-11-2018) recorded 39.06 per cent pod infestation. While, the maximum (57.18%) pod infestation was observed in third date of sowing (12-12-2018).

Observations recorded at the 12th WAS revealed that the first date of sowing (2-11-2018) recorded minimum (34.99%) pod infestation and it was at par with the second sowing date (22-11-2018) which recorded 39.45 per cent pod infestation. The maximum (56.28%) pod infestation was observed in third date of sowing (12-12-2018).

At the 13th WAS, data indicated that the first date of sowing (2-11-2018) and second date of sowing (22-11-2018) were at par with each other which recorded 40.34 per cent and 41.69 per cent mean pod infestation, respectively. The third date of sowing (12-12-2018) recorded 48.55 per cent infestation of pod borers

Observations recorded at the 14th WAS revealed that the minimum 41.05 and 41.43 per cent infestation of pod borers was observed in the sowing dates 2-11-2018 and 22-11-2018, respectively. Both the sowing dates were at par with each other. The maximum (49.73%) pod infestation was recorded in third date of sowing (12-12-2018)

During the cropping season, the pod damage varied from 33.41 to 55.67 per cent on number basis. The minimum (33.41%) pod damage was recorded in early sown crop *i.e.* 2nd November, 2018. while, maximum (55.67%) pod damage was recorded on late sown crop *i.e.* 12th December, 2018. The results indicated that, pod borer incidence increased gradually with the advancement of cropping season.

Table 2: Effects of sowing dates against pod borers infesting dolichos bean

	Per cent pod infestation per five plants							
Date of sowing	**8WAS**	**9WAS**	**10WAS**	**11WAS**	**12WAS**	**13WAS**	**14WAS**	**Overall Mean**
02-11-2018	21.90	30.97	31.94	32.69	34.99	40.34	41.05	33.41
	(27.83)*	(33.76)	(34.36)	(34.82)	(36.23)	(39.41)	(39.84)	(35.17)
22-11-2018	40.46	41.55	42.13	39.06	39.45	41.69	41.43	40.82
	(39.49)	(40.13)	(40.47)	(38.68)	(38.90)	(40.21)	(40.06)	(39.70)
12-12-2018	60.00	60.46	57.50	57.18	56.28	48.55	49.73	55.67
	(50.80)	(51.20)	(49.32)	(49.14)	(48.75)	(41.26)	(44.84)	(47.90)
S.Em. ±	0.91	1.27	0.82	0.83	1.19	0.82	0.95	0.97
CD (p = 0.05)	2.75	3.84	2.48	2.53	3.60	2.50	2.88	2.94

*Figures in parentheses are arcsine transformed values

WAS: Week After Sowing

Conclusion

The minimum (33.41%) pod borers damage was recorded in early sown crop i.e. 2nd November while, maximum (55.67%) pod borer damage was recorded on late sown crop i.e. 12th December. It was evident from the result that in dolichos bean, pest infestation increased gradually with the advancement of cropping season.

Acknowledgements

The researchers would like to express their gratitude to the Department of Agricultural Entomology, Dr. Balasaheb Sawnat Konkan Krishi Vidyapeeth, Dapoli for the support of labour cost, experimental land and research facility support.

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