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ESTIMATION OF LOSSES IN *VIGNA RADIATA* (L.) WILCZEK DUE TO INSECT PESTS

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ABSTRACT

Losses caused by insect pests of greengram *Vigna radiata* (L.) Wilczek was estimated in a paired plot experiment during *kharif* 2001 and 2002. The plants under treated plots were relatively taller than plants of untreated plots by 7.82 and 8.03 cm. There were significantly lesser number of primary branches in the plants from unprotected plots with an estimated loss of 68.13 and 83.42 per cent for the seasons 2001 and 2002, respectively. The plants when protected had 20.18 and 18.89 more pods per plant, 1.24 and 1.10 cm longer pod size, 190.89 and 192.90 more grains per plant and resultantly, 3.80 and 3.45 quintals per hectare more yield. The estimated yield loss due to insect pests was 48.11 and 38.80 per cent during 2001 and 2002, respectively.

Keywords: Losses, *Vigna radiata,* insect pests.

Greengram [*Vigna radiata* (L.) Wilczek], commonly known as mung bean is the third most important pulse crop in India, covering an area of 2.92 million hectares with total production of 1.42 million tonnes. The average productivity is 486 kg per hectare (Anonymous, 2005). The low yield of greengram in India, especially in transitional belt may be attributed to number of factors; among them the ravage of insect pest is important. A number of insect pests belonging to different orders have been recorded in various parts of the world. In India, 64 species have been reported attacking greengram right from seedling stage up to pod formation stage (Lal, 1985). The major insect pests are aphids, jassids, white flies and the pod borer complex (*Lampides boeticus* Linnaeus and *Maruca testulalis* Geyar). Available literature indicates that few attempts were made by earlier workers on the estimation of losses caused by these pests to greengram; hence, this study was undertaken.

MATERIALS AND METHODS

To assess the losses caused by insect pests of greengram, *Vigna radiata* (L.) Wilczek, a paired plot experiment (Leclerg, 1971) was conducted at the Agronomy Farm of Rajasthan College of Agriculture, Udaipur. There were two sets of plots, each set containing 13 plots, each measuring 4m × 3m, and separated by a buffer strip of one meter. One set of plots was kept protected from insect infestation by regular need-based application of recommended insecticides, acephate 0.075 per cent, phosphamidon 0.04 per cent and endosulfan 0.07 per cent, alternatively. The other set of plots was exposed to natural infestation and was called as unprotected. The crop was sown on 18-07-2001 and 22-07-2002.

Observations on the plant growth characteristics like height, number of primary branches, pod length, per cent pod and grain damage, were recorded from five plants, selected at random, from each plot at maturity. The loss in yield (%) was calculated by comparing the yield obtained from protected and unprotected plots using the formula:

$$\text{Loss in yield (\%)} = \frac{X_1 - X_2}{X_1} \times 100$$

Where X_1 = Yield in treated plot

X_2 = Yield in untreated plot

The yield data were subjected to statistical analysis and significance was tested by "t" test.

RESULTS AN DISCUSSION

The loss estimation based on various parameters (plant height, number of primary branches, pod length, number of pods per plant, per cent damaged pods per plant, per cent damaged grains per plant, number of grains per plant, weight of grains per plant and weight of grains per plot) indicated a more or less similar pattern during both the seasons. The plants under treated plots were relatively taller than plants of untreated plots by 7.82 and 8.03 cm during 2001 and 2002, respectively.

The major insect pests in a sequential manner as per crop phenology included jassids (*Empoasca kerri* Pruthi), whitefly (*Bemisia tabaci* Gen.), aphid (*Aphis craccivora*),

Table 1: Comparative loss due to insect pest complex of greengram for different plant characteristics during 2001 and 2002

S. No.	Parameters	Mean values under Treated condition		Mean values under Untreated condition		Mean difference		Estimated loss (%)	
		2001	2002	2001	2002	2001	2002	2001	2002
1.	Plant height (cm)	57.42	56.74	49.60	48.70	7.82	8.03	13.61	14.15
2.	Primary branches (numbers per plant)	2.46	2.01	0.78	0.31	1.67	1.70	68.13	83.42
3.	Pod length (cm)	7.05	6.56	5.80	5.45	1.24	1.10	17.58	16.77
4.	Pods (numbers per plant)	33.53	33.00	13.35	14.11	20.18	18.89	60.29	57.24
5.	Damage to grain per plant	-	-	-	-	-	-	28.14	30.59
6.	Damage to grain per plant	-	-	-	-	-	-	14.86	13.31
7.	Grain loss (numbers per plant)	310.27	320.9	119.38	127.95	190.89	192.90	61.47	60.11
8.	Weight loss (grams per plant)	9.545	9.869	3.255	3.414	6.290	6.454	65.89	65.45
9.	Weight loss (grams per pot)	948.230	1068.076	492.000	653.615	456.230	414.461	48.11	38.80
10.	Loss (quintals per hectare)	7.90	8.90	4.10	5.44	3.80	3.45	0.40	0.32

and the pod borers (*Maruca testulalis* Geyer and *Lampides boeticus* Linnaeus). The reduction in plant height was due to initial infestation of sucking pests especially, jassids (26.58 per 5 plants), whiteflies (12.85 per 5 plants) and aphids (21.91 per 5 plants).

The effect of plant height was manifested by significantly lesser number of primary branches in the plants from unprotected plots with an estimated reduction of 68.13 and 83.42 per cent in the number of primary branches for the *kharif* season 2001 and 2002, respectively. Critical analysis of the reproductive stage plant characteristics showed significantly higher values for pod length, pods per plant, grains per plant, yield per plant and per plot, when the plants were protected. Accordingly, the plants when protected had 20.18 and 18.89 more pods per plant, 1.24 and 1.10 cm longer pod size, 190.89 and 192.90 more grains per plant and resultantly, 456.230g (3.8 q/ha) and 414.460 g (3.45 q/ha) more yield per plot for the *kharif* seasons of 2001 and 2002, respectively. The estimated yield loss was 48.11 and 38.80 per cent during 2001 and 2002, respectively. The pod borer insect pest complex (*M. testulalis* and *L. boeticus*) of greengram was responsible for 28.14 and 30.59 per cent pod damage for the two successive years (2001 and 2002). Similarly, during the two years, study, the per cent grain damage per plant was 61.47 and 60.11, respectively (Table-1).

Vyas and Saxena (1988) recorded the loss caused by insect pest complex (aphids, jassids and borer) of summer greengram to be 15.87 per cent. Hussain and Saharia (1994) recorded a linear relationship between pod borer infestation and seed loss in greengram with the rate of seed loss being greater for the bugs *Riptortus linearis* and *Nezara viridula* Linnaeus than for the spotted pod borer (*M. testulalis*).

REFERENCES

Anonymous (2005). *Annual kharif group meet Report for 2005*. Indian Institute of Pulse Research, Kanpur, India.

Hussain, S. and Saharia, D. (1994a). Linear model for predicting seed loss in green gram due to pod feeders. *Journal of the Agricultural Science Society of North-East India*, **7**: 1,98-99.

Lal, S. S. (1985). A review of insect pests of mungbean and their control in India. *Tropical Pest Management,* **31**: 105-117.

Leclerg, E.L. (1971). Field experiments for a assessment of crop losses. *In*: *Crop loss assessment methods FAO manual on the evaluation and prevention of losses by pests, diseases and weeds*. Edited by Chirappa, L. 2.1/1.2. 1/11.

Vyas, A.K. and Saxena, R.C. (1988). Loss caused by insect pests in summer mung bean. *Indian Journal of Applied Entomology*, **2**: 70-71.