



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; SP2: 320-322

Mamta Paikra
Department of Entomology,
College of Agriculture, IGKV,
Raipur, Chhattisgarh, India

Sonalika Kolhekar
Department of Entomology,
College of Agriculture, IGKV,
Raipur, Chhattisgarh, India

Krishna Gupta
Department of Entomology,
College of Agriculture, IGKV,
Raipur, Chhattisgarh, India

Dr. GK Chandrakar
Department of Entomology,
College of Agriculture, IGKV,
Raipur, Chhattisgarh, India

Prem K Nagvanshi
Department of Entomology,
College of Agriculture, IGKV,
Raipur, Chhattisgarh, India

Screening of fieldbean genotypes for tolerant to aphid (*Aphis craccivora*)

**Mamta Paikra, Sonalika Kolhekar, Krishna Gupta, Dr. GK Chandrakar,
and Prem K Nagvanshi**

Abstract

The present study was made to evaluate fieldbean genotype for tolerant against fieldbean aphids. The experiment was conducted during 2017-18, at college of agriculture, IGKV, Raipur, Chhattisgarh. By growing a total of 118 genotype accessions on July, 2017 in an augmented design. It was found that out of 118 fieldbean genotypes, 5 genotype were recorded as a tolerant with overall mean per cent foliage drying between 21-25 per cent, 39 genotype were observed as a moderately tolerant comprised with overall mean infestation between 26-46 per cent infestation, 48 genotype were observed as a susceptible comprised with overall mean foliage drying per cent infestation between 50-64 per cent infestation and 26 genotype were observed as a highly susceptible comprised with overall mean foliage drying per cent infestation between 77-78 per cent infestation. The aphid population was lowest (6.64/cm length around pod) in the tolerant genotypes IS-37, followed by the genotypes IS-56 (6.92/cm length around pod) and IS-78 (7.48/cm length around pod) against aphids, respectively. Highest population was observed in the genotype IS-12 (18.31/cm length around pod) was highly susceptible, followed by the IS-18 (17.77/cm length around pod) and IS-88 (17.74/cm length around pod) against aphids.

Keywords: *Dolichos lab lab*, Screening, Genotype, *Aphis craccivora*

Introduction

Dolichos lab lab (L.) popularly known as field bean, hyacinth bean, dolichos bean, country bean, butter bean and Poor-man's bean. Indian bean is an important pulse-cum-vegetable crop is cultivated for its fresh tender pods, seeds and also for cattle feed in India. The fresh and dried seeds constitute as major vegetarian source of proteins in the human diet of Indians. The protein content of field bean varies from 20.0 to 28.0 per cent is quite high. (Schaaffhausen, 1963) [5]. It is one of the most ancient cultivated legume crops known for food consumption and fodder (Fuller, 2003) [1]. Insect pests are known to cause damage at all the stages of crop growth. About 56 insects have been recorded in field bean in India (Govindan, 1974) [2]. But only a few of them cause serious and economic damage to different plant parts from the time of sowing to harvesting. The important pests of field bean in the Chhattisgarh include sap sucking pest aphid (*A. craccivora*) and pod borers such as Gram pod borer (*Helicoverpa armigera*) and spotted pod borer (*Maruca vitrata*) etc. (Thippeswamy and Rajagopal, 1998) [6]. The black bean aphids is a major pest of bean with large numbers of aphids cause stunting of the plants. Beans suffer damage to flowers and pods which may not develop properly. The plants are stunted by the removal of sap, the stems are distorted, harmful viruses are transmitted and aphid residues may contaminate the crop. The root grow poorly and the sugar content is reduced.

Materials and Methods

The experiment was conducted during the period of July, 2017 screening trial was laid out with 118 cultivars with the spacing of 2x1 m² of field bean in the Horticulture Farm, IGKV, College of Agriculture, Raipur, Chhattisgarh. The observation aphid was recorded aphid/cm length around pod from the date of aphid appearance to the harvest of the crop. Three plants were randomly selected from each entry. Before maturity of the crop the drying of whole plant due to aphids infestation was recorded one month after peak incidence by visual scoring in 0-4 scale. The aphid infestation index (AII) was calculated on the basis of foliage drying grades. On the basis of all the genotype accessions were grouped into different category (Table 1). Further, the aphid infestation index (AII) was computed by using the formula followed by entomologist of the all India coordinated Research Project on fieldbean.

Correspondence
Mamta Paikra
Department of Entomology,
College of Agriculture, IGKV,
Raipur, Chhattisgarh, India

$$\text{Aphid infestation index} = \frac{1 \times a + 2 \times b + 3 \times c}{a + b + c} \times 100$$

Where, a, b and c are the actual number of plants falling in each of the 5 corresponding foliage drying grades i.e. 0 to 4. Finally the mean of A.I.I. was worked out and the entries were classified as follows:

Category of the entry	A.I.I.
Highly tolerant	0
Tolerant	0.1 to 1.0
Moderately tolerant	1.1 to 2.0
Susceptible	2.1 to 3.0
Highly susceptible	3.1 to 4.0

Table 1: Screening of fieldbean genotype accession against aphids based upon foliage drying

Grade	Category	Per cent foliage drying range	Visible symptoms
0	Highly tolerant	00	Healthy plant with normal pod setting
1	Tolerant	<25	Healthy plant but yellowing and drying of leaves on main stem and branches. Normal pod setting
2	Moderately tolerant	25-50	Drying of 50% leaves on tender shoots of the plant, low pod setting
3	Susceptible	50-75	Drying of leaves and tender shoots, less no. of pod with very poor seed setting
4	Highly susceptible	Above 75	Death of plant before maturity

Table 2: Reaction of fieldbean genotype accessions to aphids

Grade	Category	No. of aphids/cm length around pod	Per cent foliage drying	Aphid infestation index (AII)	No. of accessions	Name of genotypes
0	Highly tolerant	00	00	00	00	-
1	Tolerant	5-8	21-25	0.0-1.0	5	IS-37, IS-47, IS-56, IS-109 and IS-78
2	Moderately tolerant	9-11	26-46	1.1-2.0	39	IS-1, IS-2, IS-4, IS-6, IS-7, IS-13, IS-14, IS-16, IS-20, IS-21, IS-23, IS-30, IS-32, IS-34, IS-36, IS-39, IS-42, IS-46, IS-50, IS-52, IS-55, IS-60, IS-61, IS-64, IS-67, IS-68, IS-71, IS-79, IS-73, IS-83, IS-87, IS-88, IS-102, IS-107, IS-112, IS-113, IS-116, IS-95, IS-84
3	Susceptible	12-14	50-64	2.1-3.0	48	IS-3, IS-5, IS-8, IS-11, IS-15, IS-17, IS-19, IS-22, IS-25, IS-26, IS-27, IS-28, IS-33, IS-38, IS-40, IS-41, IS-45, IS-48, IS-51, IS-53, IS-57, IS-58, IS-62, IS-65, IS-66, IS-69, IS-70, IS-72, IS-80, IS-81, IS-86, IS-89, IS-90, IS-92, IS-96, IS-99, IS-100, IS-103, IS-105, IS-106, IS-108, IS-110, IS-114, IS-118, IS-74, IS-82, IS-93 and IS-94
4	Highly susceptible		75-78	3.1-4.0	26	IS-9, IS-10, IS-12, IS-18, IS-24, IS-29, IS-31, IS-35, IS-43, IS-44, IS-49, IS-54, IS-59, IS-63, IS-77, IS-97, IS-85, IS-95, IS-91, IS-98, IS-101, IS-104, IS-111, IS-115, IS-117, IS-75 and IS-76

The aphid population was lowest (6.64/cm length around pod) in the genotype IS-37 considered under the class of tolerant, followed by the genotype IS-56 (6.92/cm length around pod) tolerant and IS-78 (7.48/cm length around pod) tolerant against aphids. Highest population was observed in the genotype IS-12 (18.31/cm length around pod) was highly susceptible, followed by the highly susceptible IS-18 (17.77/cm length around pod) and IS-88 (17.74/cm length around pod) was highly susceptible against aphids.

Similar, observation were reported by Hanifa *et al.* (1973) [4] that on an average aphid population 2.5/cm length of terminal shoot and pod of fieldbean and varieties viz. MS-9508, PLS-127, MS-9507 and PLS-121 were resistant against *A. craccivora*.

Present finding also confirms the finding of Gupta *et al.*

Result and Discussion

The result presented on table no. 1 and 2 among the genotype, 5 genotype were recorded as a tolerant with overall mean per cent foliage drying between 21-25 per cent, 39 genotype were observed as a moderately tolerant comprised with overall mean infestation between 26-46 per cent infestation, 48 genotype were observed as a susceptible comprised with overall mean foliage drying per cent infestation between 50-64 per cent infestation and 26 genotype were observed as a highly susceptible comprised with overall mean foliage drying per cent infestation between 77-78 per cent infestation. The genotype were classified into four classes viz. tolerant (0.0 -1.0), moderately tolerant (1.1-2.0), susceptible (2.1-3.0) and highly susceptible (3.1-4.0) to establish their reaction in relation to various morphological characterization.

(1985) [3] screened thirty high potential Indian bean, genotype against *A. craccivora* in three successive years and observed that on the basis of percentage infested inflorescence, the genotypes 7006, 7004 and 7010 were found moderately resistant, while 7015, 7013, 7005 and 6701 were moderately susceptible to the pests.

Conclusion

It was found that out of 118 fieldbean genotypes, 5 genotype were recorded as a tolerant (21-25 per cent), 39 genotype were observed as a moderately tolerant (26-46 per cent), 48 genotypes were observed as a susceptible (50-64 per cent) and 26 genotype were observed as a highly susceptible (77-78 per cent), respectively.

References

1. Fuller DQ. African crops in prehistoric South Asia: A critical review. In: Neumann, K., Butler, A., Kahlheher, S., (eds). Food, Fields-Progress in African archaeobotany, Heinrich –Barth-Institut, Koln, Germany. Africa Prehistorica. 2003; 15:239-271.
2. Govindan R. Insects of the field bean with special to the biology and ecology of the pod borer, *Abisura atkinsoni* moore (Lepidoptera: Noctuidae). M.Sc (Ag.), Thesis, University of Agricultural Science, Bangalore, 1974.
3. Gupta RN, Pandey RC, Katiyar RR. Relative susceptibility of some bean genotypes to aphid, *Aphis craccivora* Koch. Indian Journal Entomol. 1985; 47(3):247-277.
4. Hanifa AM, Balasubramanian G, Leela David, Subramanian TR. Screening of field bean varieties for resistance to black bean aphid, *Aphis craccivora* Koch. South Indian Hort, 1973, 131-133.
5. Schaaffhausen RV. *Dolichos lablab* or Hyacinth bean its use for feed, food and soil improvement, Economic Botany. 1963; 17:146-153.
6. Tippeswamy C, Rajagopal BK. Incidence of heteropteran bugs on field bean, Karnataka. Journal of Agricultural Science. 1998; 11(4):1085-1087.