The Pharma Innovation Journal 2023; 12(6): 3191-3194

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(6): 3191-3194

www.thepharmajournal.com
Received: 25-03-2023
Accepted: 29-04-2023

AV Pawar
Department of Agricultural Entomology, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

Shraddha S Dahivalkar
Department of Agricultural Entomology, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

Priti S Shigwan
Department of Agricultural Entomology, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

SK Mehendale
Department of Agricultural Entomology, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

Corresponding Author:
AV Pawar
Department of Agricultural Entomology, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

Seasonal incidence of pests infesting green gram, *Vigna radiata* (L.) Wilczek

AV Pawar, Shraddha S Dahivalkar, Priti S Shigwan and SK Mehendale

Abstract
The present investigation entitled "seasonal incidence of the pests infesting green gram, *Vigna radiata* (L.) Wilczek was carried out during rabi season of 2018-2019 at Research and Educational Farm, Department of Agricultural Botany, College of Agriculture, Dapoli, Dist. Ratnagiri (M.S.).Seasonal incidence study revealed that the mean percent plant damage by stem fly was first observed from 51st SMW (17 Dec-23 Dec 2018). No stem fly infestation was recorded in 50th SMW (10 Dec-16 Dec) and onwards. As regards correlation with weather parameters, the mean percent damage of stem fly exhibited significant positive correlation with maximum temperature (r=0.725), minimum temperature (r=0.798), Bright Sunshine Hours (B.S.S.) (r=0.799). The aphid population was seen throughout crop period but declined on later stages of green gram. The whitefly infestation was noticed throughout the season but it was negligible.

Keywords: Pests**,** seasonal incidence, green gram, stem fly, meteorological week, correlation

Introduction
Pulse crops have a unique position in sustainable crop production as they provide highly nutritive food and keep the soil alive and productive. These are the richest source of plant protein and they play a vital role in the diet of vegetarians. India is a major pulse growing country of the world, sharing 35 to 36 percent area and 27 to 28 percent production. On an average 2 to 2.1 million tonnes of pulses with a monetary value of nearly Rs. 6000 crores are lost annually due to ravages of insect-pest complex. (Anonymous, 2015-2016) [1].

Green gram, *Vigna radiata* (L.) Wilczek belonging to family Leguminosae and sub-family Papilionaceae, is composed of more than 150 species originating mainly from Africa and Asia where, the Asian tropical regions have the greatest magnitude of genetic diversity. It is one of the most important edible food legumes of South and Southeast Asia including India, Pakistan, Bangladesh, Sri Lanka, Thailand, Cambodia, Vietnam, Indonesia, Malaysia, and South China. India is prime mung bean producer, contributing 75 percent of the world production. It is third most important pulse crop of India after chickpea and pigeon pea and is considered to be hardiest among the pulse crop.

Green gram is grown principally for its protein-rich dry seeds (22-24%). It has two third of the protein content of soybean, twice that of wheat and thrice that of rice. The protein is comparatively rich in lysine, an amino acid that is deficient in cereal grains. Green gram seeds are rich in minerals like calcium, iron, magnesium, phosphorus and potassium and vitamins like ascorbic acid, thiamine, riboflavin, niacin, pantothenic acid and vitamin A. Being a versatile crop, it is grown for green manure, forage and seeds. Its seed contains 24.7% protein, 0.6% fat, 0.9% fiber and 3.7% ash. The major portion of seeds is utilized in making dal, curries, soup, sweets and snacks. The sprouted seeds contain an increased amount of thiamine, niacin and ascorbic acid thus, mung bean sprouts are increasingly becoming popular in certain vegetarian diets. Among pulses, green gram is more preferred for children and the elderly people because of its easy digestibility and low flatulence. Besides their high nutritional value, they have a unique characteristic of maintaining and restoring soil fertility through biological nitrogen fixation which plays a vital role in sustainable agriculture (Asthana, 1998) [2].

In India, 64 species of insect pests known to attack mung bean in the field have been reported (Lal, 2002) [7]. Out of that 64 species major pests are Whitefly (*Bemisia tabaci* Genn.), Leaf hopper (*Empoasca kerri* Pruthi), Black aphid (*Aphis craccivora* Koch), Cutworm (*Agrotis segetum* D and S), Stem fly (*Ophiomyia phaseoli* Tryon), Bihar hairy caterpillar (*Spilactria obliqua* Walker), Tobacco caterpillar, (*Spodoptera litura* F.), Sphinx moth (*Agrius convolvuli* L.), Grey weevil (*Myllocerus discolor* Boheman), Gram caterpillar (*Helicoverpa armigera*,

Hubner), Spotted pod borer (Maruca testulalis Geyer), Blue butterfly (*Lampides boeticus* L.).

The yield losses caused by pest complex in green gram is 54.9 percent (Chhabra and Kooner, 1985) [3]. The study concluded that by providing protection with the effective pesticides against the pod borers infesting green gram, 513.67 kg/ha grain yield loss can be saved. The avoidable yield loss was 36.41 percent.

In view of the immense importance of this crop in the state of Maharashtra and Konkan region in particular availability of limited information on various aspects of its insect pests and their management, the investigation were undertaken with this objective.

Materials and Methods

The present investigation entitled "seasonal incidence of the pests infesting green gram, *Vigna radiata* (L.) Wilczek" was carried out during rabi season of 2018-2019 at Research and Educational Farm, Department of Agricultural Botany, College of Agriculture, Dapoli, Dist. Ratnagiri (M.S.).The details of the material used and methodology adopted during the present investigation are given in this chapter.

A brief account of the methodology adopted during the present studies is given under the following sub headings-

Selection of experimental site

The experiment 'seasonal incidence and management of pests infesting green gram, *Vigna radiata* (L.) Wilczek' was conducted at Research and Educational Farm, Department of Agricultural Botany, College of Agriculture, Dapoli, Dist. Ratnagiri (M.S.) during the rabi season of 2018-2019.

Climate, weather and soil conditions

Geographically, Dapoli is situated in the subtropical region on the 170 45' North latitude and 720 12' East longitude having elevation of 221 meters above the mean sea level with warm and humid climate conditions throughout the year. The mean annual precipitation is 3000-4000 mm generally distributed from June to October. The soil type of experimental site is lateritic. Mean annual maximum and minimum temperature are 36 °C and 13 °C, respectively.

Preparation of experimental plot

The field was ploughed thoroughly and made weed free by spraying pre-emergence herbicide (Paraquat Dichloride 24% SL; 250-300 ml/acre) with help of Knapsack sprayer. Required amount of manure (FYM) was incorporated into the soil before the last ploughing. The experimental plot was divided into three plots i.e. screening plot (15×04 meters); seasonal incidence plot (05×05 meters); management plot (17.90×11 meters) with three replications and eight treatments. The field was irrigated by using sprinkler irrigation method as and when required.

Details of the material used

Seed

The green gram varieties i.e. Vaibhav and other fifteen genotypes were collected from Agronomy Department and Botany Department, College of Agriculture, DBSKKV, Dapoli, respectively.

Manures

8-10 t/ha FYM was applied at the time of land preparation.

Fertilizers

Fertilizers were applied in the form of urea, single super phosphate and murate of potash at the dose of 25:50 kg/ha as the recommended dose. Full dose of N and half dose of P were applied as basal dose. Rest of half of Pwas applied at pod formation stage. All the recommended agronomic practices were conducted during crop season.

To study the seasonal incidence of pests infesting green gram

Table 1: Experimental Details

Location	:	Botany Farm, DBSKKV, Dapoli.
Size of plot	:	05m ×05m
Method of sowing	:	Dibbling
Spacing	:	30cm×30cm
Cultivar	:	Vaibhav
Date of transplanting	:	3rd December, 2018

Method of recording observations

The observations of pests infesting green gram was recorded at weekly interval in a crop season as and when various pests appeared (started from 15 DAS). Twenty five plants were selected randomly for observation. The method of recording observations was same as mentioned in screening of cultivars.

Results and Discussion

Seasonal incidence of pests infesting green gram

A. Seasonal incidence of Stem fly (*O. phaseoli*)

The data on seasonal incidence of stem fly are presented in Table 2.

The study revealed that there were marked differences in stem fly infestation as regard Standard Meteorological Weeks. The mean percent plant damage by stem fly was first observed from 51st SMW (17 Dec-23 Dec 2018). The mean percent damage ranged from 0.00 to 64.00 percent. No stem fly infestation was recorded in 50th SMW (10 Dec-16 Dec).

The data revealed that the stem fly infestation started building up from 5st SMW (17 Dec-23 Dec 2018) where the 40.00 percent damaged plants were seen. Later on the infestation progressively increased revealed to its peak stage in 3rd SMW (15 Jan-21 Feb 2019) and there after remain constant on same land of infestation indicating no new infestation of the plant. These also revealed the active period of the pest was from 5st SMW to 3rd SMW i.e. 17 Dec to 21 Jan 2019 and there after the pest was not observed to damage the plants.

The present finding were conformity with the result of Jayappa (2000) [4] who reported that the stem fly was observed both in kharif and summer season and causes 13.10 to 31.90 percent stem tunnelling in soybean.

Correlation between stem fly infestation and different weather parameters:

Data on correlation of mean percent damage of stem fly in relation to different weather parameters are presented in Table 3.

The mean percent damage of stem fly exhibited significant positive correlation with maximum temperature (r=0.725), minimum temperature (r=0.698) and Bright Sunshine Hours (B.S.S.) (r=0.799).

B. Seasonal incidence of aphids (A.craccivora) infesting green gram

The data on seasonal incidence of aphids are present in Table

2.
The study revealed that there were marked difference in aphids population as regard Standard Meteorological Weeks. The mean population of aphids per leaf was 1st observed from 51st SMW (17 Dec-23 Dec). The mean population ranged from 0.00 to 15.45. No aphid population was recorded in 50th SMW (10 Dec-16 Dec 2018) which was slowly increased and reached to peak in 4th SMW (22 Jan-28 Jan) recorded 15.45 mean aphid population. Up to 2nd SMW the aphid population remained at low level.
The data revealed that the aphid infestation started building up from 51st SMW (17 Dec-23 Dec 2018) where the 0.28 mean aphids population per leaf were seen. Later on the infestation progressively increased and reached to its peak stage in 4th SMW (22 Jan-28 Jan2019) and there after aphid population declined upto 6th SMW (05 Feb-11 Feb 2019). Hence, it is concluded that the aphid population was seen throughout crop period but declined on later stages of green gram.
The present findings were conformity with the result of Tamang *et al*., (2017) [6] who revealed that the pest recorded in mung bean field was aphids and there highest population was observed during 2nd week of February to 1st week of March with 14.0 per 10 cm shoot tip during 1st season. Whereas highest population of aphids was observed during 2nd week of April with 14.18 per 10 cm shoot tip during 2nd season.

Correlation between mean population of aphids infesting green gram and weather parameter
The data on mean population of aphids (A. craccivora) in relation to different weather parameters are shown in Table 3.
The data on correlation between mean infestation of aphids infesting green gram and different meteorological parameter revealed that maximum temperature (r=0.820), minimum temperature (r=0.719) and wind speed (r=0.753) were significant positively correlated whereas evening relative humidity (r=-0.908) were significant negatively correlated.
The result of present study are more or less similar with the findings Anandmurthy *et al*. (2018) [8] carried out an experiment on seasonal incidence of major insect pest that attacks the cowpea. The result revealed that the maximum temperature showed a significant positive correlation with aphids population(r=0.712).

C) Seasonal incidence of white fly (B. tabaci) infesting green gram
The data on seasonal incidence of white fly is presented in Table 2.
The study revealed that there were marked difference in whiteflies population as regards to Standard Meteorological Weeks. The whitefly population initiated from 51st SMW (17 Dec-23 Dec).The mean population of white fly ranged from 0.00 to 0.80. No population was recorded in 50th SMW (10Dec-16Dec).The minimum (0.08) incidence was recorded in 51st SMW (17 Dec-23 Dec). The maximum whitefly population (0.80) recorded in 6th SMW (05 Feb-11 Feb) It was evident from result that pest population was gradually increased during crop growing season. However, remained at very low level throughout the season.
The findings are conformity with the results of Tamang *et al*., (2017) [6] revealed that the pest recorded in mung bean field were aphids, whitefly, thrips and the whitefly highest population was observed during 2nd week of February to 1st week of March with 1.68 per compound leaf during 1st season.

Correlation between mean population of white fly infesting green gram and weather parameter
The data on mean population of whitefly (B. tabaci) in relation to different weather parameters are shown in Table 3.
The data on correlation between mean whitefly population infesting green gram and the weather parameters showed negative significant correlation with morning relative humidity (r=-0.712), evening relative humidity(r=-0.773), while maximum temperature(r=0.716), minimum temperature (r=0.850), wind speed(r=0.926) were positively correlated with mean population whiteflies.
The present findings are in conformity with the results of Tamang *et al*., (2017) [6] who reported that the mean whitefly population infesting green gram showed highly significant positive correlation (r=0.62) with maximum temperature (T max) and significant negative correlation with evening relative humidity respectively.

Table 2: Seasonal incidence of pests infesting green gram in relation to weather parameters

SMW	Period	Temperature (°C)		Relative humidity (%)		Wind speed (kmph)	BSS *	Stem fly	Aphids	Whitefly
		Tmax	Tmin	RH 1	RH 2			Mean Percent damage	Mean population per leaf	Mean population per leaf
50	10 Dec-16 Dec 2018	32.34	13.23	84.86	62.14	1.77	6.68	0.00	0.00	0.00
51	17 Dec-23 Dec 2018	34.43	12.23	82.83	52.57	1.00	7.00	40.00	0.28	0.08
52	24 Dec-31 Dec 2018	32.91	14.83	80.14	61.43	0.84	8.47	48.00	0.40	0.15
1	01 Jan-07 Jan 2019	34.43	15.40	78.86	54.86	1.81	8.81	52.00	0.55	0.21
2	08 Jan-14 Jan 2019	35.26	16.46	77.00	63.14	2.46	8.40	64.00	1.32	0.34
3	15 Jan-21 Jan 2019	38.77	15.73	88.14	44.57	2.46	8.40	64.00	10.62	0.51
4	22 Jan-28 Jan 2019	36.43	17.69	76.86	41.00	3.16	8.25	64.00	12.45	0.61
5	29 Jan-04 Feb 2019	37.23	19.84	62.43	43.57	3.77	8.19	64.00	9.68	0.74
6	05 Feb-11 Feb 2019	35.14	16.69	67.00	47.14	4.50	8.19	64.0	8.40	0.80
SD								±20.88	±6.42	±0.29

Table 3: Correlation between pests of green gram infestation and different weather parameters

Climatic parameters	Correlation coefficient (r)		
	Stem fly	Aphids	Whitefly
Maximum temperature (T_{max})	0.725*	0.820*	0.716*
Minimum temperature (T_{min})	0.698*	0.719*	0.850*
Morning relative humidity (RH I)	-0.466	-0.373	-0.712*
Evening relative humidity (RH II)	-0.560	-0.908*	-0.773*
Wind speed	0.522	0.753*	0.926*
Bright Sun Shine Hours (BSS)	0.799*	0.326	0.475
*Significant at 5 percent level			r=0.666

Conclusion

From the given investigation it is concluded the stem fly, aphids and whitefly are the pest observed on green gram. In that the stem fly was the major pest. The aphid population was seen throughout crop period but declined on later stages of green gram. The whitefly infestation was noticed throughout the season but it was negligible. Incidence of stem fly, aphids and whitefly had significantly positive correlation with maximum and minimum temperature.

References

1. Anonymous, Directorate of Economics and Statistic Ministry, of Agriculture and Farmers welfare 2015-16; c2016.
2. Asthana AN. Biological nitrogen fixation which plays a vital role in sustainable agriculture. Indian Agri Sci. 1998;68(8):448-452.
3. Chhabra KS, Kooner BS. Problem of flower shedding caused by thrips, Megalurothripsdistalis (Karny) on summer mungbean, *Vigna radiata* (L). Wilczek and its control. Tropical Pest Management. 1985;31(3):186-188.
4. Jayappa AH. Studies on the soybean stem fly, M. sojae with reference to crop loss assessment, screening of varieties and management. M. Sc. (Agri.) Thesis, University of Agricultural Sciences, Bangalore; c2000. p. 198.
5. Lal SS. A review of insect pests of mungbean and their control in India. Tropical Pest Manage. 2008;31(2):105-114.
6. Tamang Sagar P, Venkatarao Moulita Chaterjee, Gautam Chakraborty. Population dynamics of major insect pests Ofmung bean (*Vigna radiata* (L.) Wilczek) and correlation with abiotic factors under Terai Agroclimatic Zone of West Bengal. The Bio scan. 2017;12(2):893-897.
7. Lal R. Soil carbon dynamics in cropland and rangeland. Environmental pollution. 2002 Mar 1;116(3):353-362.
8. Anandmurthy T, Parmar GM, Arvindarajan G. Seasonal incidence of major sucking pests infesting cowpea and their relation to weather parameters. International Journal of Plant Protection. 2018;11(1):35-38.