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Population dynamics of whitefly of mung bean (*Vigna radiata* (L.) Wilczek) during *summer* 2018

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Abstract
The investigation was carried out at Research Farm of Birsa Agricultural University Kanke, Ranchi during summer 2018. The population of whitefly were commenced from 4th week after sowing i.e. 15th standard meteorological week of April 2018, Which increased during each successive week and reached to its peak (3.7 whitefly/cage) at 8th week after sowing when maximum temperature (39.0°C), minimum temperature (22.7°C), relative humidity maximum (84.7%) and minimum (40.9%) and rainfall (5.3mm). thereafter, whitefly population gradually declined and finally negligible at the time of harvest. The correlation co-efficient analysis exhibited that temperature (maximum and minimum) showed positively significant, while the relative humidity and rainfall did not show any significant correlation.

Keywords: Population dynamics, whitefly, Mung bean, *Vigna radiata*

Introduction
Mung bean or green gram (*Vigna radiata* L. wilczek) is the third most important pulse crop after chickpea and red gram in India [8]. The native of mung bean is believed to be India and central Asia. It is under cultivation since prehistoric time in India. It is commonly known as moong, mung, mungo, golden gram and green gram [2]. Mung beans are a healthful source of protein, fibres and rich in vitamins and minerals. It is an important legume crop that fixes the atmospheric nitrogen which enhances the soil fertility [3]. After chickpea, mung bean is also known as poor people diet due to its protein nature and is filling the major protein requirement of the people [6]. Mung bean cultivation is spreaded over various countries, especially in tropical and subtropical region of Asia. The important mung bean growing countries in the world are India, China, Philippines, Burma, Bangladesh and Pakistan. Though India has the largest producer of pulses in the world, but the average productivity is low because of the biotic and abiotic stresses. The present investigation undertaken to study their effects of weather parameters like temperature (°C), relative humidity (%) and rainfall (mm), influenced the infestation and stabilization of thrips in mung bean. Therefore, attempts were made to find out the relationships between thrips population and the abiotic factors, thus immensely helpful in formulating the management strategy against them.

Materials and Methods
In order to study the population dynamics of whitefly an important insect pest of mung bean in relation to abiotic factors, the experimental plot survey was conducted at the research farm of Birsa Agricultural University Kanke, Ranchi (Jharkhand) during *summer* crop season 2018. The genotype SML 668 of mung bean was grown as test variety which was sown in plot size 10 × 10 m, keeping 30 cm × 10 cm spacing between row to row and plant to plant during third week of March. The experiment was replicated thrice in a randomized block design (RBD). All the other agronomical practices were adopted as per the scientific recommendation. Weekly meteorological data were collected from agro-meteorological observatory of the university. The crop was sown on 20th March 2018 and kept free from insecticide spray throughout the cropping season. The population of whitefly were recorded at weekly interval by using split cage (Kooner cage) and correlated with weather parameters. Split cage (Kooner cage) method is used for recording observation of number of adult whiteflies. The cage comprises of a wooden frame 60 cm high and 45 cm in diameter. It is covered with black cloth on all sides except one side where a rectangular glass pane (28.5 cm x 58.5 cm) is fitted. The cage is open from the lower side. For taking observations, the cage is opened and wrapped around the crop plants and the glass pane side is kept facing the sun so that whiteflies, being

photo tactic congregate on the glass and are easily counted (Kooner and Cheema, 2007) [4]. Further mean population of whitefly was worked out.

Results and Discussion

Whiteflies are tiny, sap sucking insects and have with white or smoke coloured wings. Both adult and their small, oval nymph resides on the undersides of leaves and cause the leaves to become sticky with honeydew and also it transmit mung bean yellow mosaic virus (MYMV). The numbers of whitefly were recorded by cage, the mean population of whitefly recorded during summer 2018, acquainted in Table-1. The recorded data showed that the number of whitefly population varied from 0.0 - 3.7 whiteflies per cage during the period of experiment. The highest number of whitefly 3.7/cage observed in 19th standard meteorological week followed by 3.0 and 2.0 whiteflies/cage in 18th and 20th standard meteorological week respectively. the data Table-1 showed that the whitefly population reached to its peak (3.7 whiteflies/cage) when the temperature maximum 39°C, minimum 22.7°C, relative humidity maximum 84.7% and minimum 40.9% and rainfall 5.3 mm. correlation co-efficient between whitefly population and weather parameters showed that temperature maximum (r=0.618*) and minimum (r=0.697*) positively affect the whitefly population while the other factors relative humidity and rainfall did not show any significant impact on the incidence of whitefly. The present study is found in close proximity with results of Bharadwaj and Kushwaha (1984) [1], Rote and Puri (1991) [7], Kumar *et al*. (2004) [5], Yadav and Singh (2006) [10], Yadav and Singh (2013) [11] reported that whitefly had a positive correlation with both minimum and maximum temperature and sunshine hours, while a negative correlation with relative humidity. Singh and Yadav (2013) [9], studies on seasonal abundance of insect pests on mung bean and observed that the mean population of whitefly ranged from 0.2- 7.4/cage.

Table 1: Population dynamics of insect pest on mung bean during *summer*, 2018

-*Date of observation	WAS	SMW	Whitefly/cage	Meteorological parameters				
				Temperature (°C)		Relative humidity (%)		Rainfall
				Max.	Min.	Max.	Min.	(mm)
20-03-2018	1	12	0.0	31.7	16.2	85.7	33.7	0.0
27-03-2018	2	13	0.0	34.2	15.7	84.9	36.3	0.0
03-04-2018	3	14	0.0	29.1	14.1	85.6	36.0	8.5
10-04-2018	4	15	1.0	29.2	15.5	86.3	37.7	18.6
17-04-2018	5	16	1.3	35.2	19.7	84.1	35.4	0.0
24-04-2018	6	17	2.0	37.4	21.1	85.4	39.0	0.0
01-05-2018	7	18	3.0	33.9	20.2	85.0	41.4	17.4
08-05-2018	8	19	3.7	39	22.7	84.7	40.9	5.3
15-05-2018	9	20	2.3	37.6	22.9	84.4	39.7	0.0
22-05-2018	10	21	2.0	39	22.7	85.6	45.0	4.3
29-05-2018	11	22	1.6	35.3	21.6	86.9	36.9	59.6
05-06-2018	12	23	0.0	35.7	21.8	86.0	58.4	32.4
Correlation co-efficient with mean whitefly population (r)				0.618*	0.697*	-0.343^{NS}	-0.018^{NS}	-0.051^{NS}

SMW: Standard Meteorological Week
WAS: Week after Sowing
* Indicate significance of value at P=0.05

Conclusion

The abiotic factors *viz.*, temperature (°C), relative humidity (%) and rainfall (mm) were affected the fluctuation in infestation of thrips population on mung bean. In correlation studies the average number of whiteflies/cage was significantly positively correlated with maximum and minimum temperature, while the other weather variables did not correlated significantly

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