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Studies on occurrence of major insect-pests of Indian mustard *Brassica juncea* L.

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Abstract

The present investigation was conducted to study the occurrence of major insect-pests of Indian mustard (*Brassica juncea* L.) during Rabi, 2016-2017 at major insect-pests from germination to pre-harvest stage of the crop at three farmers' fields. In the village Pithla, Shivrathpur and Jorium of Narendra University of Agriculture and Technology, Kumarganj Faizabad total of five insects namely mustard sawfly, mustard aphid, painted bug, cabbage butterfly and *Coccinellids* was found associated with mustard crop of these first were found as pests and the *Coccinellids* as the predator of aphids. The mustard sawfly appeared at an early stage of crop growth 48th SW of 2016 and population ranged from 0.20 grubs/10 plants to 4.10 grubs/plant. The 1st occurrence of mustard aphid was recorded during 52nd SW of 2016 which continued up to 11th SW of 2017 with varying population ranging from 2.20 to 82.00 aphids/10cm central twig/10plants. The population of painted bug initiated during 49th SW of 2016 and remained up to 3rd SW of 2017. The bug population ranged from 2.10 to 8.20 bugs/10 plants. The cabbage butterfly made its first appearance during 6th SW of 2017 and continued up to 11th SW of 2017 with population varying from 1.10 to 12.80 insect /10plants. The first appearance of *Coccinella* spp. was recorded during first SW of 2017 which continued up to 11th SW of 2017.

Keywords: Indian mustard, occurrence of mustard sawfly, mustard aphid, painted bug, cabbage butterfly and *Coccinellids*

Introduction

Oilseeds crop play an important role in agriculture economy of India. Constitutes the second largest agriculture product in the country next after food grains 47.80 lakh in country Area under mustard cultivation in India as 36.15million ha with production of 71.09 mt. Rapeseed-mustard oil production increased from 1.94 million MT from 2014-15 to 2.11 million MT in 2015-16 European Union is expected to be top producer followed by China & Canada tonnes and the national productivity Anonymous 2016.

Indian mustard is a major winter (*Rabi*) season oilseed crop grown mainly in Northern parts of India. Farmers generally start sowing during late October which continues till late November In Uttar Pradesh the crop was grown on 0.82 m ha with production of 0.90 MT and productivity of 1262 kg/ha (FAO, 2015).

The crop starts flowering in the months of December to January and harvesting season starts mainly from mid- February to April month. Mustard seed is the third biggest source of vegetable oil in the world after soybean oil and palm oil. Provide reference It is the second largest source of protein meal in the world after soybean meal. Oil content in rapeseed & mustard varies from 33% to 46% and average oil recovery is around 32% to 38%. After oil extraction, the remaining part of the seed is used to produce rapeseed/mustard meal an important component of cattle and poultry feed. Being a winter crop, it requires a temperate climate to prosper. Provide reference.

A dozen of insect-pests have been found associated with the crop out of which mustard sawfly, mustard aphid are the important pests of rapeseed- mustard (Bakhetia and Sachan 1997, Bakhetia and Sekhon 1989) ^[5, 6]. The incidences of insect-pests cause lower production and productivity of mustard due to direct and indirect damage. The present study was under taken to the know association the different association of different insect population.

To record the occurrence of major insect-pests of Indian mustard

Materials and Methods

The mustard crop was regularly monitored for occurrence of major insect-pests from

germination to pre-harvest stage of the crop at three farmers 'fields- In the village Pithla, Shivnathpur and Jorium. The occurrence of insect-pests was recorded on ten randomly

selected from each field from weekly interval and are presented in (Table-1). The mode of observations for different insect-pests and natural enemies has been given below.

Table 1: Mode of observation for insect- pests and predators

S. No.	Insects- pests	Mode of observation
1	Mustard sawfly	No. of grubs/10 plants/ plot
2	Mustard aphid	No. of aphids/10cm central twig on 10 plants/plot
3	Painted bug	No. of bugs (nymph+ Adults)/10 plants/ plot.
4	Cabbage butter fly	No. of caterpillar on 10 randomly selected plants/ plot
Natural enemies (Predator)		
5	<i>Coccinella</i> spp.	No. of grubs and adults/10 plants/ plot

Table 2: Occurrence of major insect-pests of Indian mustard during *Rabi*, 2016-17

Calendar Week	Standard Week	Sawfly (No. of grubs/10 plants)	Mustard aphid (No. of aphids/10 cm Central twig/10plants)	Painted bug (No. of bugs/10plants)	Cabbage butter fly(No. of caterpillar/10plants)	<i>Coccinella</i> spp. (No. of grubs & adults /10plants)	Temperature (°C)		Rainfall (mm)	RH (%)	Sunshine (hrs.)
							Min.	Max.			
22/11/16	47	0.00	0.00	0.00	0.00	0.00	11.8	27.3	0	67.4	2.4
29.11.16	48	0.60	0.00	0.00	0.00	0.00	12.2	25.8	0	79.9	1.1
06/12/16	49	1.80	0.00	2.80	0.00	0.00	11.7	19.2	0	86.6	1.7
13/12/16	50	2.60	0.00	4.40	0.00	0.00	9.0	19.5	0	86.9	1.5
20/12/16	51	4.10	0.00	6.00	0.00	0.00	7.5	23.2	0	74.0	2.3
27/12/16	52	1.80	11.20	8.20	0.00	0.00	10.6	20.1	0	84.1	1.5
03/01/17	1	0.20	36.20	5.00	0.00	1.00	10.2	18.0	0	88.2	1.0
10/01/17	2	0.00	42.00	3.20	0.0	2.40	4.9	20.1	0	66.3	2.2
17/01/17	3	0.00	57.20	2.10	0.00	5.00	9.9	22.4	0	68.0	2.5
24/01/17	4	0.00	65.10	0.00	0.00	5.10	9.1	23.7	16.8	76.0	2.0
31/01/17	5	0.00	70.50	0.00	0.00	7.20	8.2	21.9	0	80.0	2.7
07/02/17	6	0.00	72.00	0.00	3.00	10.00	8.4	24.5	0	69.3	5.2
14/02/17	7	0.00	82.00	0.00	7.80	12.40	9.9	25.7	16.8	70.3	5.5
21/02/17	8	0.00	56.00	0.00	12.80	9.50	11.1	27.3	0	63.9	5.3
28/02/17	9	0.00	48.40	0.00	8.10	7.00	11.5	28.8	0	57.8	6.4
07/03/17	10	0.00	22.00	0.00	2.00	6.30	12.3	27.8	0	62.4	4.4
14/03/17	11	0.00	2.20	0.00	1.10	2.20	10.0	29.4	0	56.8	7.9
21/03/17	12	0.00	0.00	0.00	0.00	0.00	15.5	33.4	0	50.9	8.4
28/03/17	13	0.00	0.00	0.00	0.00	0.00	18.8	37.8	0	52.0	9.5

Results and Discussion

Studies on occurrence of major insect-pests of Indian mustard revealed the association of 5 insects with this crop of which four namely mustard sawfly, mustard aphid, painted bug and cabbage butter fly were the pests while the *Coccinellids* were recorded as the natural enemies. The mustard sawfly appeared at early stage of crop and its population ranged from 0.60 to 4.10 grubs/10plants. This is in partial agreement with the findings of Chowdhury (2009) [9] who recorded the highest sawfly population of 0.26 larvae/plant and lowest population 1.20/plant. This also in accordance with the findings Singh *et al.*, (2015) who found mustard sawfly attacking the rapeseed - mustard crop at an early stage. The present finding is also supported by Singh and Lal (2011) [10] who recorded the incidence of sawfly on *Brassica* oil seed crop in U.P.

Occurrence of mustard aphid was recorded for the first time during 52 SW of 2016 which continued till 11th SW of 2017 with varying aphid population of 2.20 to 82.00 aphids/10 cm twig/10 plants. This is accordance with findings of Ahuja (1990) who found the aphid appearance in late December which reached at peak level between 26 January and 1st February 1986 and between 22nd to 26th February 1987. This in also in agreement with findings of Sahoo (2012) [11] who recorded the appearance of aphid from 52nd SW of 2001-10 and 2010-11 with the peak population during 6th SW the aphid appearance after 10th SW.

In the present studies also the last aphid appearance was recorded during 11th SW of 2017. The present study is also

supported by Manzar *et al.*, (1998) [12] who found the incidence of mustard aphid from the last week of December last week of March.

The population initiation of painted bug was recorded during 49th SW of 2016 which continued up to 5th SW of 2017 and Painted bug population ranged from 2.10 to 8.20 bug/10 plants and the peak population was observed during 5th SW of 2017. The present study are in an agreement of findings of Singh and Lal (2012) [13] who recoded the incidence of the painted bug on *Brassica* oil seed during same period. The record of the occurrence of painted bug on rapeseed mustard crop by Bhati *et al.* (2015) [14] during the same period is also in accordance with the present study.

The occurrence of cabbage butterfly was recorded from 6th SW of 2017 up to 11th SW of 2017 and the population ranged 1.10 to 12.80 insects/plant during different SW the maximum population was recorded during 8th SW of 2017. The present findings are also in accordance with the findings of Ram and Pathak (1987) [10] and Bhati *et al* (2015) [15] who found cabbage butterfly attacking the mustard crop.

The occurrence of *Coccinella* spp. in the present study was recorded from 1st SW of 2017 up to 11th SW of 2017 and the population ranged from 1.00 to 12.40 grubs/adults/10plants during whole observation period. The present findings are in accordance with the findings of Ali *et al.*, (2010) [16] who recorded the predator activities on the mustard varieties having maximum pest activities in the starting the predator population was found but when reached the peak level the

pest aphid population reduced and was found to be positive correlation with the pest population.

The population buildup of mustard aphid showed significant negative correlation with minimum temperature and non-significant negative correlation maximum temperature and sunshine hours. The populations build up showed significant positive correlation with relative humidity and non-significant positive correlation with rainfall. The present findings are in partial agreement with the findings of Rana *et al.*, (1993) who found significant negative correlation with temperature, relative humidity and rainfall.

The findings Gour and Pareek (2003a) ^[17] observing a negative correlation the maximum and minimum temperature and relative humidity in case of aphid population build up is an accordance with the present findings. This is also supported by Singh *et al.*, (2007) ^[18] who found that aphid population had significant negative correlation with minimum and maximum temperature. However their finding of negative correlation of RH and rainfall with aphid population is in contrary with the present findings.

Conclusion

The recorded on studies on occurrence of major insect-pests of Indian mustard during *Rabi*, 2016-17 have been present in table-1 and table-2. It is evident from the data was started since the vegetative stage and continued up to maturity of the crop. The lowest population 0.20 per cent was during 1st SW of 2017 at the min temp. Of 10.2 °c RH 88.2 and rainfall recorded whereas maximum.

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