

Seasonal Incidences of Major Insect Pests of Cabbage, *Brassica oleracea* var. *capitata* L.

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Received 12 October 2022, Accepted 21 December 2022, Published on 6 March 2023

ABSTRACT

A field experiment was conducted during November 2021- February 2022, to study the seasonal incidence of insect pests of cabbage. *Myzus persicae* and *Pieris canidia* was found to be the major pests and were first observed on 48th SMW and 49th SMW, respectively and their population reached its peak on the 5th SMW (20.62 aphids/leaf) and 6th SMW (1.80 larvae/plant), respectively. Both insect pests were observed until the crop was harvested in 9th SMW. *M. persicae* population showed significant negative correlation with both maximum and minimum temperatures and non-significant positive correlation with mean relative humidity and rainfall. *P. canidia* population showed

significant negative correlation with maximum temperature, non-significant negative correlation with minimum temperature and non-significant positive correlation with mean relative humidity and rainfall.

Keywords *Myzus persicae*, *Pieris canidia*, Seasonal incidence, Cabbage.

INTRODUCTION

Cabbage, *Brassica oleracea* var. *capitata* L., is an important crop in the Indian domestic market as well as the export economy (Department of Agriculture and Farmer's Welfare, Government of India 2022, Pal *et al.* 2015) and yet its yield is under constant attack from several insect pests. In a study, found 12 insect pests to be infesting the Brassicaceae ecosystem (Larinfeli *et al.* 2019). Among these, the major pests were found to be: Large White Cabbage Butterfly (*Pieris brassicae*), Green Peach Aphid (*Myzus persicae*) and Tobacco Caterpillar (*Spodoptera litura*). Finding out the major pests in an area and understanding its seasonal incidence is key to developing an effective pest management schedule. It is also vital to understand the influence of meteorological parameters on the incidence of these pests. The present study was conducted with this in mind.

MATERIALS AND METHODS

Experimental site : The study was carried out in the Experimental Farm, Department of Entomology,

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School of Agricultural Sciences and Rural Development, Nagaland University, Medziphema campus, Nagaland. The geographical location is at 25°45'53" N latitude and 93°53'04" E longitude, at an elevation of 305 meters above mean sea level. Climatic condition and soil of the research area falls in the humid, sub-tropical region with a relative humidity of 70-85% and average temperature of 21-32°C during summer and 10-15°C during the winter. The annual average rainfall ranges from 2000-2500 mm and the soil is acidic. The study area has generally gentle slope topography. The study was carried out during November 2021–February 2022. Plots of size 2.4 m × 4.5 m were replicated thrice. F1 Hybrid Cabbage 'Rare Ball' was planted at a spacing of 60 cm × 45 cm.

Observations : Five plants from each plot were randomly selected and tagged. Weekly observations were taken from pest initiation till harvesting. For the sap sucking insects, number of adults and nymphs per plant was counted from three leaves, one each from the upper, middle and lower part of the plant. For the leaf feeders, the number of larvae per plant was counted from five randomly selected plants in each plot.

Statistical analysis: Pearson's correlation was performed to find out the relationship between the incidence of the insect pests with the weather param-

eters viz. maximum and minimum temperature, mean relative humidity and rainfall. The meteorological data was obtained from the ICAR Research Complex for NEH Region, Jharnapani, Nagaland.

RESULTS AND DISCUSSION

Two major insect pests were observed during November 2021 to February 2022. The largest population was observed in Green Peach Aphid, *M. persicae* followed by Indian Cabbage White, *P. canidia*.

Incidence of Green Peach Aphid, *Myzus persicae*

As apparent from Table 1 and Fig. 1, *M. persicae* was first observed on the 48th Standard Meteorological Week (SMW) with a mean population of 0.38 aphids/leaf. The population increased gradually with a mean population of 0.31, 1.29, 3.09, 7.06, 9.36, 9.27, 12.04, 12.58 aphids/leaf on 49th, 50th, 51st, 52nd, 1st, 2nd, 3rd and 4th SMW, respectively. The peak population was observed at 20.62 aphids/leaf on 5th SMW. Thereafter, a steady decline was seen in the population with 18.82, 18.00, 8.07, 8.91 aphids/leaf on 6th, 7th, 8th, and 9th SMW, respectively. The observations are similar to the findings of Jadhav *et al.* (2012) where, the aphid was first observed in the 47th SMW (0.73 aphids/leaf). The aphid population on cabbage crop lasted throughout the growing season, till 7th SMW (35.10

Table 1. Seasonal incidence of Green Peach Aphid, *Myzus persicae* and Indian Cabbage White, *Pieris canidia* on cabbage recorded during November, 2021 to February 2022.

Standard meteorological week	Temperature (°C)		Mean Relative humidity (%)	Rainfall (mm)	<i>Myzus persicae</i> per leaf	<i>Pieris canidia</i> per leaf
	Max	Min				
48	26.90	11.40	71	0.00	0.38	0.00
49	26.40	15.20	76.5	8.50	0.31	0.40
50	25.30	11.60	73.5	0.00	1.29	0.20
51	24.90	8.90	71	4.70	3.09	0.40
52	23.40	9.70	73.5	3.20	7.60	0.60
1	24.20	8.50	71	0.00	9.36	0.80
2	24.90	10.30	75	14.80	9.27	0.80
3	22.40	10.60	74.5	3.40	12.04	1.00
4	20.70	11.40	82	16.40	12.58	1.40
5	19.80	9.50	76.5	2.10	20.62	1.60
6	21.50	9.70	73.5	30.20	18.82	1.80
7	24.70	7.20	67	0.00	18.00	0.80
8	24.10	10.60	71	18.90	8.07	0.60
9	26.90	12.70	69.5	5.40	8.91	0.40

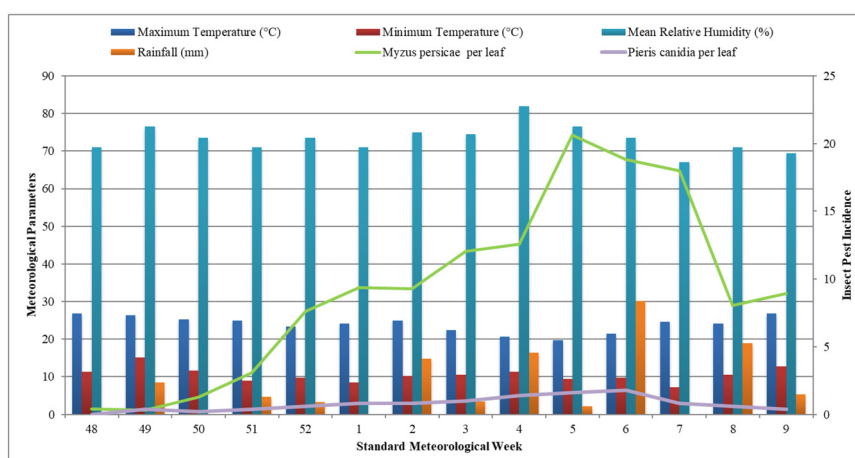


Fig. 1. Seasonal incidence of Green Peach Aphid, *Myzus persicae* and Indian Cabbage White, *Pieris canidia* on cabbage recorded during November 2021 to February 2022.

aphids/leaf). The population peaked in 6th SMW (52.13 aphids/leaf). Kumar (2013) and Das (2020) observed peak *M. persicae* population in January to February. On the contrary, Sekhon (1999) observed that *L. erysimi* and *M. persicae* appearance in the first week of January (5 SMW) and the population peaked between the end of February to middle of March. Sarwar (2013) reported *M. persicae* during mid-February and peak incidence in March.

The results of the correlation study (Table 2) revealed that aphid population correlated negatively with both maximum and minimum temperatures ($r = -0.747$ and $r = -0.550$) and was significant at 1% and 5% level of significance, respectively. The aphid population showed positive non-significant correlation

with the mean relative humidity ($r = 0.073$). Rainfall showed positive non-significant correlation ($r = 0.299$) with the mean aphid population. The present findings are in conformity with the works of Kumar and Paul (2017), who reported significant negative correlation of aphid population with maximum temperature. Sain *et al.* (2017) observed positive relationship of *L. erysimi* population with temperature and relative humidity.

Incidence of Indian Cabbage White, *Pieris canidia*

The *P. canidia* incidence was first observed in the 49th SMW with a mean larval population of 0.40 larvae/plant (Table 1, Fig. 1). The mean larval population was observed to be 0.20, 0.40, 0.60, 0.80, 0.80, 1.00, 1.40, 1.60 larvae/plant in the 50th, 51st, 52nd, 1st, 2nd, 3rd, 4th, and 5th SMW, respectively. The population peaked at 1.80 larvae/plant in the 6th SMW. The population gradually declined with 0.80, 0.60 and 0.40 larvae/plant in the 7th, 8th and 9th SMW, respectively.

The results are similar to the findings of Ahmed (2016), who reported that *P. canidia* incidence started from the third week of December (51 SMW) and reached peak populations in the second week of February (6 SMW). Waluniba and Ao (2018) also reported *P. canidia* incidences on late planted cabbages during January and the highest incidence during April.

Table 2. Correlation coefficient (r) of Green Peach Aphid, *Myzus persicae* and Indian Cabbage White, *Pieris canidia* on cabbage recorded during November, 2021 to February, 2022.

Insect pests	Pearson's correlation coefficient			
	Temperature (°C) Max	Temperature (°C) Min	Mean relative humidity (%)	Rainfall (mm)
<i>Myzus persicae</i>	-0.747**	-0.550*	0.073 ^{NS}	0.299 ^{NS}
<i>Pieris canidia</i>	-0.881**	-0.306 ^{NS}	0.430 ^{NS}	0.497 ^{NS}

Note: * = Significant at 5% level of significance,
 ** = Significant at 1% level of significance,
 NS = Non-significant at 5% level of significance.

As presented in Table 2, the *P. canidia* population showed significant negative correlation with maximum temperature ($r = -0.881$) and non-significant negative correlation with minimum temperature ($r = -0.306$). The pest population showed positive non-significant correlation with relative humidity ($r = 0.430$) and rainfall ($r = 0.497$).

During the period of the study, it was observed that *Brevicoryne brassicae* was infesting cabbage at the early vegetative stages in very low numbers and their population was not observed again. Diamond-back Moth, *Plutella xylostella* and Large Cabbage White, *Pieris brassicae* was observed after the head formation stage and caused more or less no significant damage. The findings of the current study will add to the current data-base of the seasonal incidences of *M. persicae* and *P. canidia* on cabbage, whose data is highly scarce.

ACKNOWLEDGMENT

The authors acknowledge the School of Agricultural Sciences and Rural Development (Nagaland University), Medziphema Campus, Nagaland for providing all the necessary facilities required to carry out the study.

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