



Seasonal incidence of red spider mite, *Oligonychus coffeae* Nietner on tea plantation in Assam

Salma Mazid

Research Scholar, Dept. of Zoology, Gauhati University, Guwahati-781014, Assam

R.C.Rajkhowa

Associate Professor, Dept. of Zoology, Cotton College, Guwahati-781001, Assam,

J.C.Kalita

Professor, Dept. of Zoology, Gauhati University, Guwahati-781014, Assam

ABSTRACT

Studies on seasonal incidence of red spider mite, *Oligonychus coffeae* Nietner was carried out in Tongani tea estate of Mangaldai, Assam. The red spider mites were found to be active in the summer season. Highest population of the mite was recorded in 2nd fortnight of June and whereas in December least number of mites were recorded. Mite numbers were considerably low in the winter months. Sudden decline in mite population was observed in July and August with the onset of heavy rainfall. Correlation studies of pest population with weather parameters revealed that there was a significant positive correlation of the population of mites with the increasing temperature and rainfall whereas moderate positive correlation was observed with relative humidity.

KEYWORDS

Oligonychus coffeae, seasonal incidence, weather, correlation

INTRODUCTION:

India is the second largest producer of tea in the world. Assam, West Bengal, Tamil Nadu, Kerala and Karnataka are the major tea producing regions in India out of which Assam produces more than 50% of the total tea in the country (Tea Board of India, 2013). A number of pests are found to attack tea plantation and reduce their productivity. Among the large variety of pests present, red spider mites (*Oligonychus coffeae* Nietner) are one of the damaging tea pests. They cause severe damage to the tea crops and result in huge reduction of tea productivity. Appropriate information on the seasonal abundance was therefore necessary to take effective steps for their proper management. Thus, an investigation was carried out to study the seasonal abundance of this mite pest in relation to the different weather parameters.

MATERIALS AND METHODS:

Studies on the seasonal abundance of red spider mite were carried out in Tongani tea estate of Mangaldai located in the Darrang district of Assam. For the study, an experimental block consisting of 500 tea bushes were selected. This block was further subdivided into 5 sub blocks comprising 100 bushes each (Perumalsamy *et al.*, 2009). Twenty-five leaves were randomly sampled from each block at fortnight interval from January to December, 2011. The collected leaves were placed in individual plastic bags and were brought to the laboratory. They were counted under the microscope at 10x magnification and data was recorded. Average number of the mites recorded fortnightly were then correlated with the weather parameters of temperature, humidity and rainfall.

RESULTS:

Results showed that the number of mites started to increase from the 1st fortnight of March. Mite population continued to increase gradually with the increase in temperature from March to June. Maximum incidence of mites was observed in the 1st and 2nd fortnight of June which recorded 78.6 and 80.5 mites per leaf. However, population started to decline in July and reduced further in August as shown in Figure 1. This was due to the occurrence of extremely heavy rainfall which washed off large number of mites from the surface of the tea leaves. The remaining mites on the leaves again increased in

number in September with the passage of the monsoon season. With the decrease in environmental temperature from October, population of mites started to decrease and this trend continued up to the 2nd fortnight of December. Very low number of mites was recorded to be present on the collected tea leaves in November and December. The population build up of mites was therefore found to be significantly positively correlated to the increasing temperature.

Table 1: Seasonal abundance of red spider mite on tea leaves in 2011 at fortnight interval.

Month	Fortnight	Average no. of mites/leaf	Min. temp. (°C)	Max. Temp.(°C)	Relative humidity (%)	Rainfall (mm)
January	1	1.66±5.66	10.3	23.93	80	3.1
	2	2.3±0.55	12.37	26.75	79.18	4.9
February	1	6.8±0.50	14.92	29.71	70	6.8
	2	8.5±0.53	16.92	29.71	68.14	9.2
March	1	16.2±0.58	18.8	33.6	64.06	125
	2	23.2±0.55	23.0	34.25	74.68	127.4
April	1	28.50±0.67	23.6	35.4	70	78.9
	2	38.2±0.60	23.64	35.2	72.66	86.1
May	1	60.6±0.56	25	35.86	80.4	231
	2	73.4±0.60	25.2	35.25	80.06	241.8
June	1	78.6±0.54	27.4	36.21	90.74	251.4
	2	80.5±0.66	26.33	31.66	85.26	250.6
July	1	61.2±0.56	26.4	33.13	84.93	323.3
	2	40.0±0.56	26.93	33.75	85.47	350.1

August	1	38.0±0.58	26.53	31.33	83.66	370.5
	2	40.0±0.62	26.56	33.62	82.94	365.3
September	1	60.46±0.56	26.2	33.06	82.8	241.0
	2	48.0±0.58	25.8	33.0	85.4	225.2
October	1	23.7±0.54	26.13	35.06	78.06	73.5
	2	16.1±0.51	22.37	34.46	78.54	66.5
November	1	8.5±0.49	19.53	31.53	74.6	1.6
	2	2.60±0.44	17.4	29.93	78	1.2
December	1	1.26±0.58	16.06	28.2	77.6	0.0
	2	1.1±0.49	12.12	25.0	74.6	0.0

Mean±SEM, n=5

Fig 1: Histogram showing the seasonal incidence of red spider mites on tea leaves

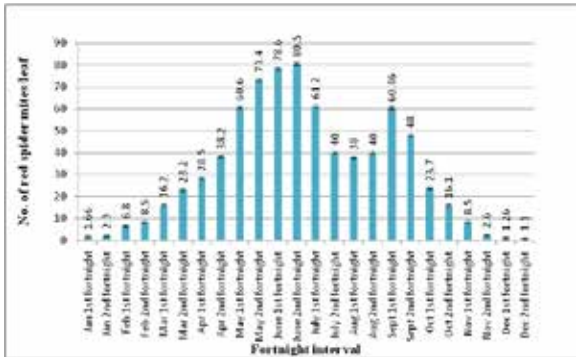


Table 2: Relation between various weather parameters and population of Oligonychus coffeae

Statistical parameter	Weather parameters			
	Maximum temperature (°C)	Minimum temperature (°C)	Relative humidity (%)	Rainfall (mm)
Correlation co-efficient (r)	0.6449**	0.8191***	0.6301**	0.7926***
Regression equation	Y=29.434+0.083x	Y=16.324+0.168x	Y=73.577+0.153x	Y=16.931+3.988x
R ²	0.4159	0.67	0.397	0.62844

*= P<0.05, **=P<0.01, ***=P<0.001

DISCUSSION AND CONCLUSION:

Studies on seasonal abundance of red spider mite, *O.coffeae* on tea plants in Assam revealed that the mites were mostly abundant in the summer season, highest population being recorded in June followed by May. Saikia (1999) and Gogoi (2000) who had earlier worked on red spider mites reported similar results. Excessive rainfall in July and August resulted in mite population decrease. This is supported by the findings of Das (1959) who reported similar results with *O. coffeae*.Margal (1977), Puttaswamy and Channabasavanna (1983) and Chen and Ho (1993) also stated the decrease in mite population with the onset of monsoon season. Red spider mites showed moderate positive correlation with humidity and maximum temperature whereas significant positive correlation with minimum temperature and rainfall.

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