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RESEARCH ARTICLE

SEASONAL ABUNDANCE OF NEEM LOOPER CLEORA CORNARIA GUENEE (LEPIDOPTERA: GEOMETRIDAE) IN TALWANDI SABO, PUNJAB

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ABSTRACT

The present investigations were carried out on seasonal abundance of neem looper, *Cleora cornaria* (Geometridae, Lepidoptera). It was feeding mainly on green leaves and tender branches of neem trees at Talwandi Sabo (Bathinda), Punjab. The results obtained during investigation shown the significant correlation between adult population and maximum-minimum temperatures. The increasein relative humidity and rainfall during June- July leads to decrease in the adult population of *C. cornaria*. Hence, this information will be helpful in development of proper management practices against *C. cornaria*.

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INTRODUCTION

The Neem or Indian lilac (*Azadirachta indica*) is multifarious, omnipotent, deciduous, medicinal tree grown in tropical and sub-tropical climates (Ascher, 1993). It originated in India and the Indian subcontinent including Nepal, Pakistan, Bangladesh and Sri Lanka (Radwenski and Wickens, 1981; Schmutteres, 1990; Paul *et al.,* 2011). The Neem belongs to the family: Meliaceae and Subfamily: Meloideae (Noorul and Gayathri, 2016).Biologically, the neem contains many (around 140) alkaloids, lavonoids, carotenoids, steroids and ketones. Among these azadiractine is the most biologically active, which is a mixture of seven isomeric compounds (Verkerk and Wright, 1993, Charmaine, *et al.,* 2005, Jones *et al*., 1994, Biswas *et al*., 2002). Due to the presence of these biochemicals, the neem plays a vital role in pest management in agriculture as Insecticides, Nematicides and Insect repellents (Joseph *et al.*, 2010; Vethanayagam and Rajendran, 2010; Subapriya and Nagini, 2005). Neem is also utilized as food by human, animals and birds (Schmutterer *et al.,* 1992).

Several pharmaceuticals, cosmetics, rubber, and textile industries are using different parts of neem (Lokandhan *et al*., 2012). Despite its important properties, these wonderful trees are attacked by several pests.

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In which the population of *Cleora cornaria*, neem looper was noticed in large number. It is belongs to family: Geometridae. The loopers feed voraciously on tender leaves of plants (Thakur and Kumar, 2015). Because of feeding behavior and extensive damage it was considered as major pest of neem tree in Talwandi Sabo. Its larvae feeds voraciously feeding on the neem leaf/ foliage. Keeping in view severity of its damage to neem trees and scarcity of research information available on this pest, the present study was, proposed with following objective: To study the seasonal abundance of *Cleora cornaria* (Neem looper) infesting neem trees in Talwandi Sabo.

MATERIALS AND METHODS

The studies were conducted in Talwandi Sabo, Punjab during 2016-2017. The site is located at latitude 29°59'0" N and longitude 75°5'0" East, has semiarid climate. During study period the maximum summer temperature reached 49°C and the winter temperature was recorded as low as 2°C. The rainfall concentrated in July to September month. Talwandi Sabo occupies large area under field crops. The different types of trees such as citrus, guava plantations, *Azadirachta indica* A. Juss, *Melia azedarach* L., Shisham, Kikar, etc. were recorded from Talwandi Sabo.

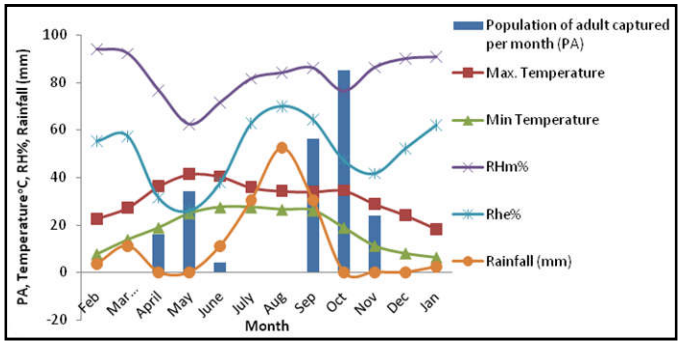
Seasonal abundance of *Cleora cornaria* (neem looper)

For studying the seasonal incidence of *Cleora cornaria* (neem looper) the trees from different selected study sites

(Agriculture fields, Canal side and University Campus area) from Talwandi Sabo were randomly selected. The Light traps were placed at selected site of Talwandi Sabo. The adult of *C. cornaria* collected by light trap was recorded on daily bases. The raw data of all samples from field diary of the year 2016-2017 was transferred in an electronic format in spreadsheet layout of Microsoft Excel. Data so obtained were analyzed statistically and accordingly graphs are produced using Microsoft Excel-2013.

RESULTS AND DISCUSSION

The seasonal abundance studies on *C. cornaria* in relation to meteorological parameters such as maximum-minimum temperatures, morning-evening relative humidity and rainfall were conducted from 5th week of year 2016 to 4th week of year 2017 (Table 1). The infestation was first seen in the first week of April and last till May. Due to monsoon season (June to July) there was sudden drop in adult population of *C. cornaria*. Then again the adult population were observed during August to November (Graph 1).



Graph1. Population dynamic of adult population of *Cleora cornaria* in selected study habitat in Talwandi Sabo, Punjab

from December to March due to low temperature. When the adult population correlated with different weather parameter the results revealed that there was significant correlation (r= 0.332), (r= 0.203) between adult population and maximum-minimum temperatures. The significant negative correlation was recorded between adult population of *C. cornaria* with evening Relative humidity and Rainfall

Table 1. Seasonal abundance of *Cleora cornaria* in selected study habitat in Talwandi Sabo, Punjab

Standard Week	Mean of Adults Collected	Temperature (°C)		Humidity (%)		Rainfall (mm)
		High	Low	Morning	Evening	
5	0	21.6	7.3	93.0	58.7	0.0
6	0	21.9	6.3	96.4	57.7	0.0
7	0	21.8	6.5	91.9	47.7	0.0
8	0	25.4	10.8	94.6	56.7	14.0
9	0	28.3	12.0	96.6	55.9	0.0
10	0	27.5	13.8	93.6	58.4	8.2
11	0	25.5	14.2	95.1	65.9	31.2
12	0	29.6	15.4	83.3	48.9	5.0
13	0	32.2	15.7	88.3	41.3	0.0
14	0	34.4	19.5	83.4	45.3	0.0
15	0	36.4	18.6	85.3	34.3	0.0
16	8	39.2	22.0	70.6	24.3	0.0
17	10	39.1	18.2	56.1	11.9	0.0
18	9	39.9	21.2	63.9	22.9	0.0
19	8	40.6	24.6	69.4	23.3	0.0
20	9	43.4	27.0	54.0	22.4	0.0
21	5	41.5	26.7	62.3	35.7	0.0
22	4	39.9	25.9	68.4	33.6	34.6
23	0	42.9	28.5	64.6	28.0	0.0
24	0	39.3	26.8	75.1	41.1	4.8
25	0	39.4	28.6	78.3	49.0	5.5
26	0	38.8	28.4	81.9	51.0	23.2
27	0	35.0	27.4	83.7	62.6	21.8
28	0	34.5	27.3	82.6	72.6	88.0
29	0	35.0	26.8	78.0	64.3	18.8
30	0	35.5	27.5	81.4	62.6	0.0
31	0	35.4	26.8	80.7	64.1	3.0
32	0	33.8	26.7	86.0	76.1	90.6
33	0	35.0	26.3	84.9	64.4	49.4
34	0	32.6	25.8	84.7	74.9	66.7
35	1	31.5	23.9	92.0	75.4	152.0
36	8	34.3	24.0	82.7	61.6	0.0
37	12	34.5	23.8	81.3	60.0	0.0
38	26	34.7	24.7	88.0	64.9	0.0
39	16	34.9	23.9	86.3	59.4	0.0
40	20	35.5	24.0	77.9	54.7	0.0
41	19	34.9	19.2	74.1	45.4	0.0
42	22	34.5	16.6	71.0	50.9	0.0
43	16	32.9	15.6	82.3	37.4	0.0
44	13	29.7	13.1	93.3	45.1	0.0
45	5	29.3	11.4	83.7	42.4	0.0
46	6	27.4	10.2	87.0	41.4	0.0
47	1	29.0	10.3	80.9	37.7	0.0
48	0	28.1	9.4	84.7	38.9	0.0
49	0	26.7	8.9	89.0	43.4	0.0
50	0	22.4	9.3	93.6	65.0	0.0
51	0	23.6	5.7	86.3	47.3	0.0
52	0	19.3	7.0	96.0	66.0	0.0
1	0	18.9	9.2	97.3	73.0	0.0
2	0	17.4	3.5	85.3	51.6	0.0
3	0	16.5	4.6	94.4	59.1	2.0
4	0	20.0	8.2	85.6	64.1	7.5
Correlation value (r) for adult abundance		0.337*	0.203*	-0.337$^{\alpha}$	-0.216*	-0.232*

*= Correlation is significant at 0.05 level (P< 0.05), α= Non significant

The highest level of *C. cornaria* adult population was seen in September and October month. The total number of adults capture during these month using light traps was around 56 and 85 adults respectively. Later infestation gradually decreases i.e. (r= -0.216), (r= -0.232) respectively**.** The studies revealed that with the increase of Relative humidity and Rainfall during June- July, the adult population of *C. cornaria* decreased. However the population indicated no significant relationship

with morning relative humidity. Previously *C. cornaria* was found to cause major damage on mangroves in Thailand (Piyakarnchana, 1981). The *C. cornaria* was also reported from UAE and adjacent Omani territories (Legrain and Wiltshire, 1998). In India it was reported from tea garden (Das *et al.,* 2010) and from teak plantation (Nair, 2007). This insect was also reported from conifer forests of Saraj Valley of Himachal Pardesh (Thakur and Kumar, 2015). It was also reported from Western Ghats of India (Goyal, 2010). It was reported on neem trees around Sultanpur, Pratapgarh and Faizabad districts in Uttar Pradesh (Misra and Onkar, 2012). In Talwandi Sabo the biology of *C. cornaria* was studied on Neem (Singh *et al.,* 2017).But none of the research work/ literature was found on seasonal abundance of *C. cornaria* from India. Therefore further studies on this insect shell helpful in developing proper management practices.

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