SEASONAL VARIATION IN THE LARVAL POPULATION OF *NEPHANTIS SERINOPA* MEYRICK IN THE FIELD AS CORRELATED WITH METEOROLOGICAL FACTORS

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ABSTRACT

The seasonal abundance in the population of *Nephantis serinopa* was estimated on 50 young infested plants in the field during the different months for two years by direct count of the larval population at monthly intervals. The two peak periods of infestation were in June and April and the lowest in January. The abundance of the pest was directly correlated with relative humidity and nearly inversely proportional to temperature and sunshine. Rainfall also indirectly influences the decline in population.

INTRODUCTION

INFESTATION by the coconut leaf-eating caterpillar *Nephantis serinopa* occurs in Kerala State, India, in the coastal, backwater belts and also in the interior tracts, particularly near rivers and paddy fields. The pest breaks out in different localities sporadically. The degree of infestation varies between years and also in different months of the same year. Field observations were therefore made during 1967-69 to study the seasonal variation in the population of the pest and to correlate it with the meteorological factors. The results are presented here.

MATERIAL AND METHODS

The observations were taken on 50 young palms of six years age planted on bunds in single rows in the Kayangulam lake (Alleppey District, Kerala). Larval pest population present on each attacked leaflet was recorded *in situ* by 'direct count' at monthly intervals. Data on temperature, sunshine, rainfall, and relative humidity recorded daily at the CPCRI Farm, Kayangulam, were used for correlation studies.

RESULTS AND DISCUSSION

The average larval population for the years 1967–69 is presented in Fig. 2. Maximum population was recorded in June and the lowest in January. April presented another peak period of pest incidence. A rise in population was observed during August whereas the population remained at a medium level during the months of February, March, May, September and October. Population was low in November and December. Figure 1 represents the population for the years 1967–68 and 1968–69. The abundance in the population during the different months of the two years followed generally an identical pattern but for the fluctuations during the months of October, 1968, and March and May, 1969 (the dotted lines in the figures for the population of 1968–69 represent the trend identical to that of the previous year).

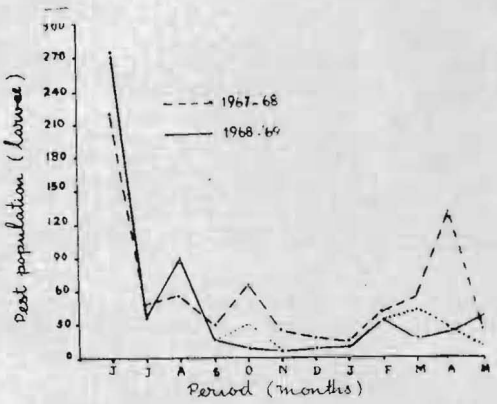

FIG. 1. Population of larvae of *Nephantis serinopa* M (1967–'69).

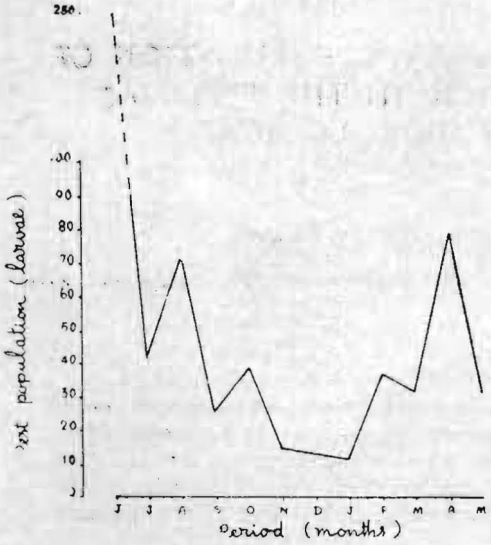

FIG. 2. Average pest population (June 1967–May 1969).

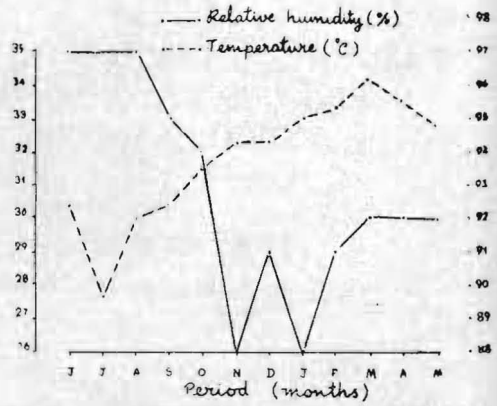

FIG. 3. Average temperature and relative humidity. (June 1967–May 1969).

In general, the relative humidity was directly correlated with the abundance of *Nephantis* caterpillars and temperature and sunshine were inversely proportional to the population (Table I, Figs. 3 and 4). Lowest population was recorded when temperature and sunshine were high (January). High humidity favoured the rise in population to the highest level (June). The peak in April synchronized with medium relative humidity, and a fall in high

TABLE I

Correlation of meteorologicai factors with the population of Naphantis serinopa *M.*
(Avcrage values for 1967–69)

Months	Pest population	Relative humidity	Rain-fall	Tempe-rature	Sun-shine	Remarks
June	VH	H	VH	M	L	Population high when relative humidity is high, temperature medium and sunshine low. Rise in rainfall checks the population.
July	H	H	VH	L	L	
August	H	H	H	M	M	
September	M	H	H	M	M	Upward trend in temperature and sunshine and downward trend in relative humidity bring down population.
October	M	H	M	H	H	
November	L	L	M	H	H	Population low when temperature and suhshine high and relative humidity low.
December	L	M	M	H	H	
January	L	L	L	H	H	
February	M	M	L	H	H	Temperature and sunshine high and relative humidity medium. Population reaches medium level.
March	M	M	L	H	H	
April	H	M	M	H	H	Population high, relative humidity medium followed by a fall in high temperature and sunshine.
May	M	M	M	H	H	Decline in high temperature and sunshine, medium relative humidity and a rise in rainfall population medium.
Correlation		0·419	0·564	−0·234	−0·534	
significance		Yes (5%)	Yes (1%)	No	Yes (1%)	

VH = Very high (Values above 75%)
H = High (Values upto 75%)
M = Medium (Values upto 50%).
L = Low (Values upto 25%).

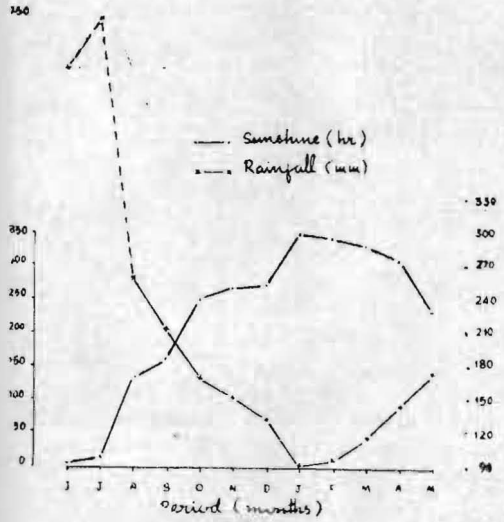

FIG. 4. Average Rainfall and Sunshine (June 1967–May 1969).

temperature and sunshine. In spite of the high relative humidity prevailing during July, September and October, the high rainfall resulted in a decline in the larval population. The fall in the monthly population observed during October, 1968, and March, 1969, was possibly related to the rise in high temperature and sunshine. The rise in population during May, 1969, was probably caused by a rise in relative humidity and the fall in temperature and sunshine.

Biotic factors also play an important role in the multiplication of the pest. The sudden decline in population during July and May was effected by the rise in rainfall particularly during June-July and April-May. Rainfall influences the growth of fungal and bacterial pathogens responsible for the heavy mortality of the caterpillars and this evidently causes the reduction in the pest population (Nirula, 1956). The heavy larval parasitization chiefly by bethylids during September and October (Annual Report, 1971; George *et al.*, 1972) may also have exercised a check on the rise in population.

Nirula (1956), Menon and Pandalai (1960), Antony (1962), and Joy and Joseph (1972) considered temperature as one of the important factors influencing the population. However, in the present study the highest peak was observed in June when relative humidity was high and temperature and sunshine were low. January presented the lowest population when temperature and sunshine were high and relative humidity very low. The abundance in the population of *Nephantis serinopa* would, therefore, appear to be governed more by relative humidity than by temperature and sunshine. The greater prevalence of the pest on the coastal and backwater tracts where relative humidity is comparatively high further lends support to these observations.

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DISCUSSION

PILLAI: Population by 'direct count method' is what you have given. Can you evolve a sampling method for assessment of field populations from this data ?

SATHIAMMA: This is under study.

AMONKAR: During your survey you had observed that bacterial and fungal pathogens bring down the population in certain months. Have you identified them?

SATHIAMMA: Yes, a few, *Serratia marcescens* is an important one.

JONES: It is well known that the ecological factors play a vital role and it is seen that pests are abundant where there are no other alternate hosts. Intensive work on these lines are required.

SATHIAMMA: Yes, the present study is such a one and further studies are planned. The parasites also feed on the nectar of wild flowers.

DASARATHI: *Nephatis* is endemic in coastal areas but in inland areas it is comparatively less.

SATHIAMMA: Yes, this is mainly because of the greater humidity in coastal areas.