

Impact of climatic factors on infestation of leaf eating caterpillar (*Mentrysia hyrtica*) of cashew in Chhattisgarh*

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ABSTRACT

A survey was conducted in randomly selected trees in adult cashew plantation of district Jagdalpur (C. G.) during 2003-04, 2004-05 and 2005-06. The infestation of leaf caterpillar was recorded and correlated with the corresponding weather parameters. The seasonal infestation of leaf eating caterpillar on cashew was recorded throughout the year. The infestation of this insect was found to vary from year to year. The climatic factors minimum temperature, relative humidity (evening) and rainfall positively influenced the variation in leaf caterpillar damages. The multiple regression analysis indicated that maximum temperature negatively contributed 27% towards incidence of leaf caterpillar damages.

Key words : Cashew, leaf caterpillar (LC), weather parameters

Cashew (*Anacardium occidentale* L.) fetches substantial foreign exchange and more than 20 countries are presently cultivating this crop in about 30.62 lakh hectares with a total global production estimated about 20.82 lakh tonnes. India is the major producer, exporter, importer and consumer of cashew and has the annual raw cashew nut processing capacity of above 12 lakh tonnes. But indigenous production is not sufficient to meet the raw nut requirement of the processing industries (Bhat *et al.*, 2007). Area expansion of cashew in non traditional area like Chhattisgarh is only solution to fulfil the raw nut requirement of cashew processing industries. For expansion of cashew it is essential to know the important limiting factors of cashew production in Chhattisgarh. There are various factors limiting the yield of cashew, in which the insect-pest problem is the major one. Cashew crop is attacked by more than 180 species of insects and non-insect-pests in India including insects, mites and vertebrates. Among which the leaf caterpillar (*Mentrysia hyrtica*) is one of the important limiting factor of cashew. The fluctuation in infestation of this insect is influenced by various abiotic factors.

MATERIALS AND METHODS

To study the impact of climatic factors on infestation of leaf eating caterpillar of cashew, a survey was conducted in randomly selected trees in adult cashew plantation of surrounding areas of district Jagdalpur viz., Bakawand, Tokapal, Bastar and Lohandiguda as well as cashew plantation of S. G. College of Agriculture & Research Station, IGKV, Jagdalpur (C. G.) during 2003-04, 2004-05 and 2005-06. The seasonal infestation of leaf eating caterpillar on cashew was observed and the corresponding weekly weather data

were collected from agro-meteorological observatory. The correlation and regression analysis was worked out as per method given by Gomez and Gomez (1984).

RESULTS AND DISCUSSION

The findings of present study are depicted in Tables 1, where infestation of leaf caterpillar of cashew in different years is given; whereas impact of weather parameters as a correlation and regression studies is given in Tables 2 and 3. The leaf damage by leaf caterpillar was noticed almost throughout the year in all the three observing years in 2003-04, 2004-05 and 2005-06. In 2003-04, the peak activity was recorded during the months of October-November with infestation ranging from 0.6 to 44% leaf damage. The minimum temperature, relative humidity (evening) and rainfall were positively correlated ($r=0.520, 0.661$ and 0.651 , respectively) with leaf caterpillar damage. In 2004-05, the peak activity was recorded during the month of July where infestation ranged from 4.15 to 57.72% and the rainy days were positively correlated ($r=0.534$) with leaf damage. In 2005-06, the relatively higher damage was recorded during the months of November-December with infestation ranging from 9.06 to 52.08% and the multiple regression analysis indicated that maximum temperature negatively contributed 27% towards incidence of leaf caterpillar damages. In accordance with present findings, Abraham (1958) reported that the leaf caterpillar was the more important and major insect-pest of cashew. While Misra and Basu Choudhary (1974) recorded in South India the leaf caterpillar, *Lymmatia obfusca* (Lymantidae) as a new defoliator of cashew. Ambethgar and Lakshmanan (1999) reported that leaf caterpillar (*Mentrysia hyrtica*) infesting cashew tree and its epidemic infestation observed during December 1997-February 1998 in

*Papers presented at and reviewed for proceeding of national seminar on "Agrometeorology-Needs, Approaches and Linkages for Rural Development" held at CCSHAU, Hisar during 26-27 November 2009.

Table 1: Seasonal infestation of leaf caterpillar of cashew and corresponding weather parameters during 2003-04 to 2005-06 at Jagdalpur

Season / Months	Temp. (°C)		Relative humidity (%)		Rainfall (mm)	Rainy days	% LC*
	Max.	Min.	I	II			
Season 2003-04							
July 2003	27.4	22.4	92	73	451.6	23	0.0
August	26.6	21.5	88	72	432.9	19	0.0
September	28.3	22.1	90	68	159.2	08	07.60
October	28.4	20.3	93	71	322.6	10	44.00
Novemebr	28	12.8	93	59	0	00	33.00
December	24.7	10.4	94	50	82.8	05	01.50
January 2004	25.2	10.8	94	39	38.3	03	0.60
February	28.1	12.1	92	32	13.6	02	01.03
March	35.0	17.1	89	19	6.4	01	01.50
April	36.0	22.9	84	35	43.5	03	21.00
May	35.6	23.0	73	50	85.6	05	23.01
June	30.0	22.3	84	64	351.8	10	36.78
Season 2004-05							
April 2004	36.0	22.9	84	35	43.5	3	21.00
May	35.6	23.0	73	50	85.6	5	23.01
June	30.0	22.3	84	64	351.8	10	36.78
July	27.6	22.2	91	73	356.3	24	57.72
August	25.9	21.8	93	81	308.6	13	30.91
September	29.6	21.9	93	71	258.2	14	4.15
October	29.3	19.0	93	70	151.4	7	27.60
November	27.1	12.2	93	43	7.6	1	30.12
December	26.8	8.0	94	28	0.0	0	26.03
January 2005	27.2	10.7	95	35	20.6	1	20.42
February	30.2	12.6	92	38	19.4	2	17.79
March	33.5	17.0	82	38	11.4	2	22.89
Season 2005-06							
April 2005	35.5	19.7	77.3	21.1	63.8	5	29.73
May	37.4	20.9	76.0	32.0	90.8	3	25.81
June	32.9	21.5	72.0	53.9	220.8	10	32.56
July	27.8	20.4	91.6	80.5	242.8	19	36.31
August	27.7	20.0	92.0	81.0	284.8	16	37.21
September	28.6	20.1	94.0	85.0	254.8	11	38.78
October	28.8	18.4	92.6	81.7	262.4	7	37.80
November	27.4	9.5	87.4	82.6	1.7	0	46.64
December	26.7	7.2	91.0	76.0	0.0	0	42.27
January 2006	29.1	7.8	93.3	74.8	0.0	0	28.37
February	32.6	11.0	95.7	73.5	0.0	0	30.29
March	32.6	18.1	92.1	74.4	55.6	5	19.92

* (%LC) – Per cent leaf caterpillar damaged leaves.

Table 2: Impact of weather parameters with infestation of leaf caterpillar on cashew at Jagdalpur

Weather parameters	Correlation coefficient values (r) for different years		
	2003-04	2004-05	2005-06
Max. temp. (°C)	0.180	-0.300	-0.465
Min. temp. (°C)	0.520*	0.182	-0.183
R. H. (m) (%)	-0.267	-0.0001	0.167
R. H. (e) (%)	0.661**	0.327	0.331
Rainfall	0.651*	0.475	0.160
Rainy days	0.317	0.534*	0.102

*Value of 'r' significant at P=0.05 level.

**Value of 'r' significant at P=0.01 level.

Vridhachalam and Jayakondam Taluk, Tamil Nadu. While there was no systematic study on impact of weather parameters with infestation of leaf caterpillar on cashew in literatures.

CONCLUSION

The leaf damage by leaf caterpillar was noticed almost throughout the year. The minimum temperature, relative humidity (evening) and rainfall positively influenced, whereas maximum temperature negatively influenced the infestation of this insect-pest on cashew.

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Table 3: Multiple regression equation of climatic factors with leaf caterpillar infestation during 2005-06 at Jagdalpur

Y=	Regression equation	R ²
Leaf caterpillar	$Y=116.55-1.61X_1^{**}-0.075X_2-0.392X_3+0.03X_4+0.009X_5$	0.27

Where, X_1 =Maximum temperature, X_2 =Minimum temperature, X_3 =RH (Morning), X_4 =RH (Evening) and X_5 =Rainfall.

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