

Seasonal incidence of *Phyllocnistis citrella* stainton on Nagpur mandarin

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International Journal of Plant Protection (April, 2010), Vol. 3 No. 1 : 77-79

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SUMMARY

Citrus is a globally cultivated fruit crop. Among the citrus group, Nagpur mandarin (*Citrus reticulata* Blanco), the world fame glorious fruit crop. Citrus leaf miner *Phyllocnistis citrella* Stainton is one of the serious sucking pest of all the citrus crops in Maharashtra. Information regarding the seasonal incidence and population dynamics is an important tool for developing pest management strategies against this pest. Two peaks of the incidence were recorded during the year (second week of October 05 and fifth week of March 06) (Table 1). The larval incidence was minimum during fourth week of April 05 (1.50%), and maximum during fifth week of March 06 (19.46%) with peaks during second week of October 05 (19.00%) and fifth week of March 06 (19.46%).

Key words :

Citrus leaf miner,
Incidence,
Correlation

Citrus is a globally cultivated fruit crop, which includes orange, sweet orange, acid lime and other related species of citrus. In India amongst the fruit crop citrus occupies third position with respect to area and production. Among the citrus group, Nagpur mandarin (*Citrus reticulata*) is the world fame glorious fruit crop.

In Maharashtra state, 14 species are reported of which 8 species are of significant importance (Anonymous, 1994). Among these serious pests reported, citrus leaf miner (*Phyllocnistis citrella* Stainton) is one of the important pests of citrus all over the country (Batra, 1990).

The leaf miner creates its incidence on the young developing leaves and forms zig zag mines by the larvae by feeding on the inner green matter of the leaves, particularly during night time. This damage adversely affects the photosynthetic activities of the plant. As a result, plant health, fruit quality and yields are affected. The pest completes its life cycle in 2 to 3 weeks and 9 to 13 generations in a year. Information regarding the seasonal incidence and population dynamics is an important tool for developing pest management strategies against this pest. Periods of no incidence, initiation of incidence, low incidence, peak incidence etc. carry important meaning for deciding the time for adoption of management tactics. Therefore, observations on the seasonal incidence of citrus leaf miner around the year was recorded to assess the critical time of the

pest incidence to adopt management practices. Although the abundance of citrus leaf miner is influenced mainly by temperature and short periods of rains (Katole *et al.*, 1997). This has indicated that the incidence of leaf miner is influenced by the ecological factors. If so, information would be of significant importance in predicting the period of expected incidence which would also serve as prediction model. With this view, correlations between pest incidence and the weather parameters *i.e.* temperature, humidity, rainfall and rainy days, have been worked out. This information would also be useful to inform the citrus growers for the expected incidence based on the ecological conditions and to adopt the management practices in time.

MATERIALS AND METHODS

Grown up trees of Nagpur mandarin were made available in the orchard of All India Co-ordinated Research Project on Tropical Fruits, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. Manures, fertilizers, agricultural equipments, bullock pairs, labourers etc. required for performing horticultural practices were supplied by the said project.

Meteorological data on the minimum and maximum temperature, morning and evening humidity, rainfall, rainy days etc. were obtained from the Department of Meteorology, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, for the period under study. For recording seasonal incidence, weekly observations were

Accepted :
February, 2010

recorded around the year w. e. f. April 2005 to March 2006 on the randomly selected ten trees of Nagpur mandarin. From each tree, four twigs from four sides of the tree were plucked. Total leaves and infested leaves on each twig were counted. Observations, so recorded were pooled for mean incidence from which per cent leaves infested were worked out.

Further, the observations were also recorded to assess the per cent leaves infested with larvae and pupae of citrus leaf miner. For this purpose, out of the total leaves infested by the pest, total number of leaves showing larval infestation and the total number of leaves showing pupal infestation were separately counted. As such, per cent leaves infested with larvae and the pupae were separately worked out.

The incidence of citrus leaf miner *i.e.* per cent leaves infested were correlated with the four weather parameters *viz.*, average temperature, average humidity, rainfall and rainy days. The incidence observed in a specific week is the effect of the weather conditions prevailed during preceding week. Therefore, the pest incidence of specific week was correlated with the weather conditions of the earlier week. The data were subjected to statistical analysis for calculation of “r” values. The “r” values, so worked out, were compared with table values for interpretation of the correlations .

RESULTS AND DISCUSSION

The results obtained from the present investigation are summarized below :

Weekly observations on the incidence :

Per cent leaves infested :

Weekly observations on the per cent leaves infested by citrus leaf miner revealed that the incidence prevailed around the year, except first week of May 05 to July 05, to the extent of 2.00 to 26.30 per cent (Table 1)

Two peaks of the incidence were recorded during the year. First peak was observed during second week of October 05 *i.e.* in 41 MW, when incidence was 26.30 per cent infested leaves. Average influencing temperature of the earlier week was 27.50°C, humidity 61.00 per cent and rainfall of 5.40 mm and one rainy day. Second peak of incidence was observed during fifth week of March 2006 with 25.34 per cent infested leaves (Table 1). Average influencing temperature of earlier week was 27.60°C, humidity 32.50 per cent, no rainfall and rainy day nil.

Between two peaks of the incidence, minimum incidence was noticed during first week of January, 2006

Table 1 : Incidence of citrus leaf miner during the year (2005-06)

MW	Dates	Week	Per cent leaves infested
14	2-8 April 05	I	11.14
15	9-15	II	5.23
16	16-22	III	3.70
17	23-29	IV	2.00
18	30- 6 May 05	I	0.00
19	7-13	II	0.00
20	14-20	III	0.00
21	21-27	IV	0.00
22	28-3 June 05	I	0.00
23	4-10	II	0.00
24	11-17	III	0.00
25	18-24	IV	0.00
26	25-1 July 05	V	0.00
27	2-8	I	0.00
28	9-15	II	0.00
29	16-22	III	0.00
30	23-29	IV	0.00
31	30-5 Aug. 05	I	7.07
32	6-12	II	8.59
33	13-19	III	9.76
34	20-26	IV	10.00
35	27-2 Sep. 05	V	12.24
36	3-9	I	13.04
37	10-16	II	17.18
38	17-23	III	20.83
39	24-30	IV	22.49
40	1-7 Oct. 05	I	24.39
41	8-14	II	26.30
42	15-21	III	26.26
43	22-28	IV	24.52
44	29-4 Nov. 05	I	23.92
45	5-11	II	23.01
46	12-18	III	22.61
47	19-25	IV	22.12
48	26-2 Dec. 05	V	21.13
49	3-9	I	20.87
50	10-16	II	19.32
51	17-23	III	19.20
52	24-31	IV	18.37
1	1-7 Jan. 06	I	17.01
2	8-14	II	18.22
3	15-21	III	18.63
4	22-28	IV	18.66
5	29-4 Feb. 06	I	19.36
6	5-11	II	20.71
7	12-18	III	21.25
8	19-25	IV	22.14
9	26-04 Mar. 06	I	22.15
10	5-11	II	22.97
11	12-18	III	23.16
12	19-25	IV	24.54
13	26-1 April 06	V	25.34

to the extent of 17.01 per cent infested leaves. Influencing temperature of the earlier week was also the minimum temperature of the year *i.e.* 18.10 °C, humidity was 50.50 per cent with no rainfall.

There was no incidence during May to last week of July 2005, when average temperature was ranging from 26.40 to 37.60°C, humidity with the vast range of 24.00 to 82.50 per cent, total rainfall 227.5 mm obtained during 15 rainy days out of 42 days from fourth week of June, to last week of July 2005.

After the zero level of incidence, it was initiated during first week of August 2005, with 7.07 per cent infested leaves. As regards influencing ecological conditions of the earlier week (fourth week of July), temperature was 26.40°C, humidity 82.50 per cent and the total rainfall was 89.70 mm received during five rainy days .

Leaves infested by larvae :

The trend of pest incidence recorded as larvae infested leaves was similar to per cent infested leaves. This incidence was minimum during the fourth week of April 2005 (1.50%) and maximum during fifth week of March 2006 (19.46%) with peaks during second week of October 2005 (19.00%) and fifth week of March 2006 (19.46%). Incidence was less at the ceasing and initiation of incidence, 1.50 per cent and 4.87 per cent, respectively (Table 1).

Leaves observed with pupae :

Leaf miner incidence on citrus recorded as pupae infested leaves also registered the similar trend of incidence. It was minimum during fourth week of April 2005 (0.50%) and maximum during fifth week of March 2006 (8.37%), with its peaks during second week of October 2005 (8.35%) and fifth week of March 2006 (8.37%). Incidence was less at the ceasing and initiation *i.e.* fourth week of April 2005 (0.50%) and first week of August 2005 (2.43%) (Table 1).

Correlation between incidence and weather conditions:

Average temperature of the preceding week indicated the strong negatively significant correlation with the leaf miner incidence both at 5 per cent and 1 per cent levels. Average humidity showed non significant correlation with the pest incidence. Similarly both the parameters *viz.*, rainfall and rainy days indicated non-

Table 2 : Correlation between leaf miner incidence and weather parameters

Weather parameters	“r” values	Correlation	At levels of
Temperature (°C)	(-) 0.715	Negatively significant	5% and 1%
Humidity (%)	0.079	Non-significant	-
Rainfall (mm)	(-) 0.137	Non-significant	-
Rainy days	(-) 0.222	Non-significant	-

(Table “r” value 0.273 at 5% and 0.230 at 1%.)

significant correlation with the pest incidence (Table 2).

The data indicated that there was significant correlation (-) between temperature and pest incidence. It was followed by rainfall and rainy days which were not having significant influence on the pest incidence. These results are in agreement with the results reported by Saadanny *et al.* (2002).

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