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Infestation of major insect pests and diseases on sweet orange in Marathwada region during 2021-2022

AG Lad, YB Matre and RY Khandare

Abstract

Investigations on Infestation of Major Insect Pests on Sweet Orange In Marathwada region were carried out under field condition during 2021-22 at Aurangabad and Jalna districts of Marathwada region in Maharashtra, Keeping this in view scientific survey of infestation of major insect pests and diseases of sweet orange was carried out during the year 2021-22, in two major Sweet orange growing districts (*viz.* Aurangabad, Jalna) in Marathwada region of Maharashtra under Horticulture Crop Pest Surveillance, Advisory and Management Project (HORTSAP) by using ICT tools and given ETL based advisories were issued twice in a week to monitor the major insect pests and diseases of sweet orange. The peak population of Fruit sucking moth (10.55) and (10.20) was found during 38th MW in Aurangabad and 39th in Jalna Districts. The highest fruit infestation of mites above ETL was observed (2.68) and (2.72) mites in 33rd SMW in Aurangabad and Jalna districts.

Keywords: Sweet orange, mites, *Eudocima materna* phytophthora, citrus psylla, HORTSAP, ETL etc

Introduction

The word “citrus” is derived from the ancient Greek *Kedros* and Latin *Cedrus*. The sweet orange, *Citrus sinensis* is the fruit of the citrus in the family Rutaceae. The fruit of the orange tree can be eaten fresh or processed for its juice or fragrant peel. Citrus is one of the important fruit crops and is grown in more than 52 countries around the world. Citrus industry is the third largest, in the world after mango and banana. Citrus crop is being infested by around 165 species of economically important insect pests in India causing up to 30 per cent yield loss Pruthi and mani (1945) [11]. Citrus fruits are natives of Southeast Asia (Indonesia & China), but they are now extensively grown almost throughout the world under tropical and sub-tropical conditions, where the soil and climatic regimes are quite favorable for its growth Shah (2004) [13]. India occupies sixth position among citrus growing countries in the world. Maximum productivity is obtained in USA (35.11 MT/ha), Spain (19.80 MT/ha) and Italy (17.76 MT/ha). In India citrus ranks second in area with 0.71 million hectare and third in production with 9.0 million tonnes. Lime, Lemon, Sweet orange and Mandarin cover bulk of the area under citrus fruit. Citrus fruits are grown mainly in the states of Maharashtra, Andhra Pradesh, Karnataka, Punjab, Gujarat and N.E. region of India. Kinnow is cultivated commercially in some States of Northern India particularly Punjab, Rajasthan, Haryana and Uttaranchal. Cultivation of grapefruit and pummelo introduced decade back did not catch up commercially Anonymous (2017) [1].

Citrus crop is being infested by around 165 species of economically important insect pests in India causing up to 30 per cent yield loss. In India about 250 species of insects have been found attacking and spoiling various citrus species Pruthi and mani (1945) [11]. In India, so many factors *viz.*, biotic and abiotic are limiting the production of sweet orange per unit area. Among several biotic factors insect pests and diseases caused enormous damage to the particular crop. In India Among various insects citrus fruit sucking moth, *Othris materna*, *Othreis fullonica* and *Achaea janata*, Citrus mites, leaf minor, *Phyllocnistis citrella* (Stainton) Batra *et al.*, (1998) [2]. Blackfly, citrus psylla, thrips, whitefly, bark eating caterpillar and citrus butterfly, *Papilio demoleus* and *Phytophthora gummosis* is a major insect pest and diseases inflicting severe damage in citrus (Kagzi lime) orchard Nayer *et al.*, (1976) [7]. now becoming a major pest of citrus as well as sweet orange in Maharashtra. has a successful dispersal and becoming a major pest of citrus plants throughout Asia *P. demoleus* feeds on the foliage of citrus trees and is regarded as a major citrus pest especially in nurseries the larval forms cause serious damage to citrus family by devouring large quantity of foliage during the later stages of their development, particularly in Southern and Southeast Asia Janvi *et al.*, (2018) [4].

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Material and Methods

The present study was carried out at the Aurangabad and Jalna District of Marathwada region of Maharashtra India under Department of Agril. Entomology, VNMKV, Parbhani and Government of Maharashtra, India During 2021-22. five randomly selected plants from farmers fields population of citrus Psylla recorded infested 10 cm twing, mites, whitefly, black fly, leaf minor, thrips counted per five leaves from East, West, South and North direction of plants from farmers fields five randomly selected plants and fruit sucking moths total number of fruits into damaged fruits from 10 selected

location.

Results and Discussion

In Two districts (Aurangabad and Jalna) of Marathwada region for Sweet orange and Jalgaon, Pune, Satara and thane for Okra advisories were issued twice in week after monitoring the pest and disease situation. The agricultural university scientists, District coordinators and Research associates carried out the surveys to monitor the pest and disease situation.

Table 1: Infestation of Major Insect Pests and disease on Sweet orange in Aurangabad District during 2021-22

SMW	Blackfly Population (Avg)	Citrus Psylla Population (Avg)	Fruit Sucking Moth (Total)	Leaf Miner (Avg)	Mite (Infested Fruits) (Avg)	Mite (Infested Leaves) (Avg)	Phytophthora gummosis (Total)	Thrips Population (Avg)	Whitefly Population (Avg)	Bark Eating Caterpillar (Total)
27	0.01	0.00	0.00	1.43	0.00	1.25	0.00	0.00	0.02	0.00
28	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.01	0.01	0.00
29	0.01	0.03	0.03	1.07	0.35	1.02	0.00	0.01	0.01	0.00
30	0.01	0.01	0.00	1.46	0.31	1.47	0.07	0.01	0.02	0.00
31	0.01	0.03	0.04	1.74	0.42	1.48	0.10	0.00	0.02	0.00
32	0.01	0.05	0.09	2.42	2.56	2.22	0.11	0.05	0.01	0.02
33	0.00	0.07	0.15	1.41	2.68	1.34	0.15	0.01	0.01	0.02
34	0.01	0.04	0.70	1.38	0.90	1.51	0.08	0.03	0.01	0.06
35	0.01	0.03	0.97	1.27	0.67	1.34	0.08	0.05	0.01	0.08
36	0.01	0.01	0.63	0.94	2.52	0.85	0.00	0.03	0.01	0.00
37	0.01	0.00	1.09	0.67	0.03	0.17	0.01	0.02	0.01	0.03
38	0.01	0.00	10.55	0.57	0.04	0.27	0.03	0.01	0.01	0.00
39	0.00	0.00	0.20	0.58	0.04	0.08	0.03	0.00	0.01	0.00
40	0.01	0.01	0.70	0.53	0.04	0.11	0.05	0.00	0.01	0.00
41	0.01	0.00	0.87	0.74	0.00	0.01	0.02	0.00	0.01	0.00
42	0.02	0.00	1.51	1.62	0.02	0.09	0.00	0.00	0.02	0.00
43	0.01	0.00	1.58	1.08	0.01	0.12	0.00	0.02	0.02	0.00
44	0.01	0.00	1.97	1.69	0.00	0.09	0.00	0.00	0.02	0.00
45	0.01	0.01	1.00	0.99	0.00	0.11	0.03	0.02	0.01	0.03
46	0.01	0.00	1.34	1.24	1.90	0.17	0.04	0.03	0.01	0.00
47	0.00	0.00	0.65	0.60	0.00	0.13	0.00	0.01	0.01	0.00
48	0.00	0.00	0.00	0.24	0.00	0.16	0.00	0.01	0.01	0.00
49	0.02	0.01	0.20	0.46	0.00	0.20	0.02	0.02	0.03	0.00
50	0.00	0.00	0.60	0.50	0.02	0.03	0.00	0.01	0.01	0.00
51	0.00	0.00	0.21	0.32	0.00	0.02	0.00	0.01	0.01	0.00
52	0.00	0.00	0.23	0.47	0.01	0.02	0.00	0.01	0.01	0.00
1	0.00	0.00	0.00	0.35	0.00	0.14	0.00	0.01	0.01	0.00
2	0.00	0.00	0.00	0.06	0.00	0.08	0.00	0.00	0.01	0.00
3	0.00	0.00	0.10	0.32	0.01	0.01	0.00	0.01	0.01	0.00
4	0.00	0.00	0.00	0.24	0.01	0.01	0.00	0.00	0.01	0.00
5	0.00	0.00	0.00	0.14	0.00	0.01	0.00	0.00	0.01	0.00
6	0.00	0.00	0.00	0.18	0.00	0.02	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.01	0.00
8	0.00	0.00	0.00	0.46	0.00	0.05	0.00	0.00	0.01	0.00
9	0.00	0.00	0.00	0.24	0.00	0.15	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.21	0.00	0.14	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.19	0.00	0.05	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00
Avg	0.01	0.01	0.67	0.74	0.28	0.39	0.02	0.01	0.01	0.01

In Aurangabad District, the average highest infestation of leaf miner was observed (0.74) among all Pests. The fruit infestation of mite crossed ETL during August and September month. The highest fruit infestation of mites above ETL was observed (2.56, 2.68, 2.52) during 32nd, 33rd, 36th MW. The peak population of Fruit sucking moth (10.55) was found during 38th MW. There was less infestation of bark eating caterpillar, Blackfly, Psylla, Thrips, Whitefly observed on sweet orange. The present findings are in conformity with

Poovizhiraja *et al.*, (2019) ^[10]. The study revealed that the occurrence of sucking pests was noticed throughout the study period 36th (1st week of September) to 35th (4th week of August) standard weeks. The population of *D. citri* attained its first peak during 19th standard week (1st week of May) with 23.20 nymphs/10cm length of twig. Wankhade *et al.*, (2015) ^[14]. The results revealed that the peak nymphal population of citrus psylla was observed in the month of February-March and August-September and it was low in May-June and

December. The reduction in the pest coincided with reduction in new flushes during April to June months and decreased with low temperature in November and December months and increased in temperature from May to June month. Kumar *et al.*, (2021) [6]. The fixed plot survey study revealed that about 7 insect species are predominant in occurrence out of 32 recorded. Among them citrus leaf miner (*Phyllocnistis citrella*) and hemipteran pests were occurred frequently. Lemon butterfly (*Papilio demoleus*) and citrus trunk borer (*Anoplophora versteegi*) are least concern. Rahman *et al.*,

(2005) [12]. The result found that the leaf miner was active throughout the year, and its incidence and extent of damage varied significantly in different months. It was observed that the trend of rising and falling of the pest level occurred twice in a year, with two peak populations in the months of April and September. The minimum incidence was found in January and July. The extent of damage in respect of percentage of leaf infestation, area of leaf infestation and the mine length per leaf were, respectively, 80%, 60% and 12.8 cm in April, and 64.9%, 50.06% and 10.4 cm in September.

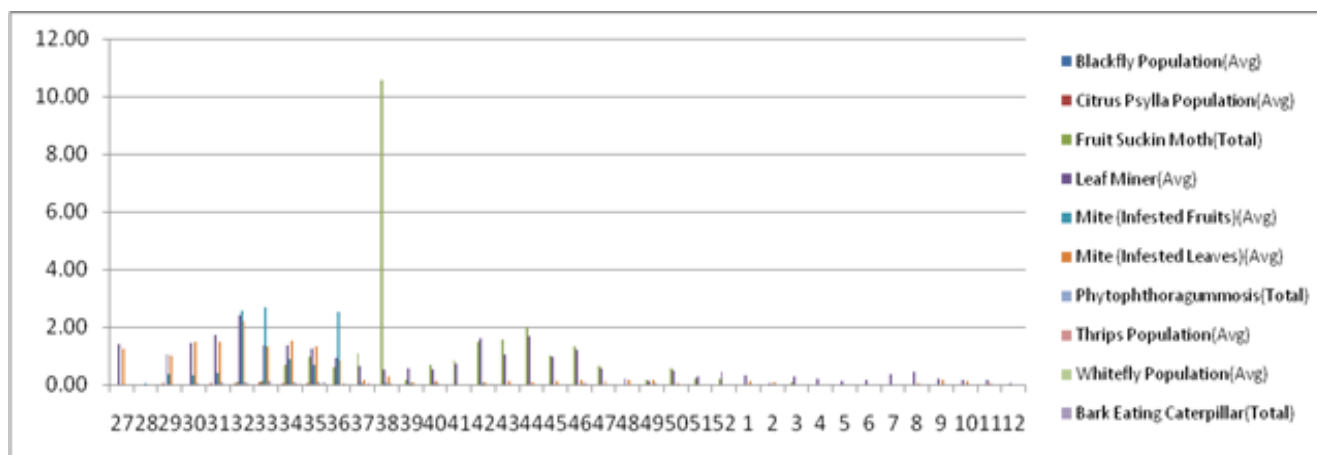


Fig 1: Insect pests and Disease infestation on sweet orange in Aurangabad District 2021-22

Table 2: Infestation of Major Insect Pests and disease on Sweet orange in Jalna District during 2021-22

SMW	Blackfly Population (Avg)	Citrus Psylla Population (Avg)	Fruit Suckin Moth (Total)	Leaf Miner (Avg)	Mite (Infested Fruits) (Avg)	Mite (Infested Leaves) (Avg)	Phytophthoragummosis (Total)	Thrips Population (Avg)	Whitefly Population (Avg)	Bark Eating Caterpillar (Total)
27	0	0	0	4.90	0	1.25	0	0.125	0	0
28	0.00	0.01	0.07	0.71	0.11	0.11	0.11	0.01	0.00	0.64
29	0.16	0.03	0.4	1.32	0.75	1.7	0	0.56	0.01	0
30	0.00	0.02	0.13	0.49	0.26	0.22	0.13	0.01	0.00	0.96
31	0.01	0.01	0.05	1.10	0.08	0.22	0.05	0.01	0.01	0.65
32	0.00	0.02	0.13	0.88	2.55	0.20	0.13	0.01	0.00	0.71
33	0.00	0.01	0.09	0.32	2.72	0.14	0.07	0.00	0.00	0.26
34	0.01	0.00	0.01	0.30	0.06	0.03	0.00	0.00	0.00	0.00
35	0.02	0.00	0.13	0.12	0.02	0.02	0.00	0.00	0.01	0.00
36	0.06	0.00	0.17	0.51	0.24	0.19	0.00	0.00	0.00	0.00
37	0.04	0.00	0.11	0.35	0.03	0.10	0.00	0.00	0.00	0.00
38	0.00	0.00	1.25	0.43	0.17	0.17	0.00	0.00	0.00	0.00
39	0.00	0.00	10.20	1.11	2.60	0.14	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.09	0.01	0.00	0.00	0.00	0.00	0.00
42	0.00	0.01	0.00	0.25	0.00	0.09	0.00	0.00	0.00	0.00
43	0.00	0.00	0.00	0.26	0.15	0.15	0.00	0.01	0.00	0.00
44	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00
45	0.00	0.00	0.00	0.52	0.09	0.20	0.00	0.01	0.00	0.00
46	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00
47	0.02	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00
48	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00
49	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00
50	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00
51	0.00	0.00	0.00	0.22	0.00	0.10	0.00	0.00	0.00	0.00
52	0.00	0.00	0.00	0.12	0.02	0.04	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.15	0.01	0.04	0.00	0.00	0.00	0.21
2	0.00	0.00	0.00	0.33	0.00	0.02	0.00	0.00	0.00	0.17
3	0.00	0.00	0.00	0.23	0.00	0.06	0.00	0.00	0.00	0.12
4	0.00	0.00	0.00	0.25	0.00	0.11	0.00	0.00	0.00	0.07
5	0.00	0.00	0.00	0.12	0.00	0.04	0.00	0.00	0.00	0.05
6	0.00	0.00	0.01	0.18	0.04	0.05	0.01	0.00	0.00	0.12
7	0.00	0.01	0.03	0.25	0.08	0.25	0.08	0.01	0.00	0.05

8	0.00	0.00	0.00	0.31	0.00	0.07	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.09	0.00	0.02	0.00	0.00	0.00	0.00
10	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0
Avr.	0.01	0.00	0.34	0.44	0.33	0.15	0.01	0.02	0.00	0.11

In Jalana District, the average highest infestation of leaf miner was observed (0.44) among all Pests. The highest fruit infestation of mites above ETL was observed (2.55, 2.72, 2.60) during 32nd, 33rd, 39th MW. The peak population of Fruit sucking moth (10.20) was found during 39th MW. There was no Economic Threshold Level of Pests found Except Mite. The present findings are in conformity with Poovizhiraja *et al.*, (2019) [10]. The study revealed that the occurrence of sucking pests was noticed throughout the study period 36th (1st week of September) to 35th (4th week of August) standard weeks. The population of *D. citri* attained its first peak during 19th standard week (1st week of May) with 23.20 nymphs/10cm length of twig. Wankhade *et al.*, (2015) [14]. The results revealed that the peak nymphal population of citrus psylla was observed in the month of February-March and August-September and it was low in May-June and December. The reduction in the pest coincided with reduction in new flushes during April to June months and decreased with low temperature in November and December months and

increased in temperature from May to June month. Kumar *et al.*, (2021) [6]. The fixed plot survey study revealed that about 7 insect species are predominant in occurrence out of 32 recorded. Among them citrus leaf miner (*Phyllocnistis citrella*) and hemipteran pests were occurred frequently. Lemon butterfly (*Papilio demoleus*) and citrus trunk borer (*Anoplophora versteegi*) are least concern. Rahman *et al.*, (2005) [12]. The result found that the leaf miner was active throughout the year, and its incidence and extent of damage varied significantly in different months. It was observed that the trend of rising and falling of the pest level occurred twice in a year, with two peak populations in the months of April and September. Dadmal *et.al* (2000) [3], Patil, (2000) [9]. Jamir, (2015) [5]. The minimum incidence was found in January and July. The extent of damage in respect of percentage of leaf infestation, area of leaf infestation and the mine length per leaf were, respectively, 80%, 60% and 12.8 cm in April, and 64.9%, 50.06% and 10.4 cm in September.

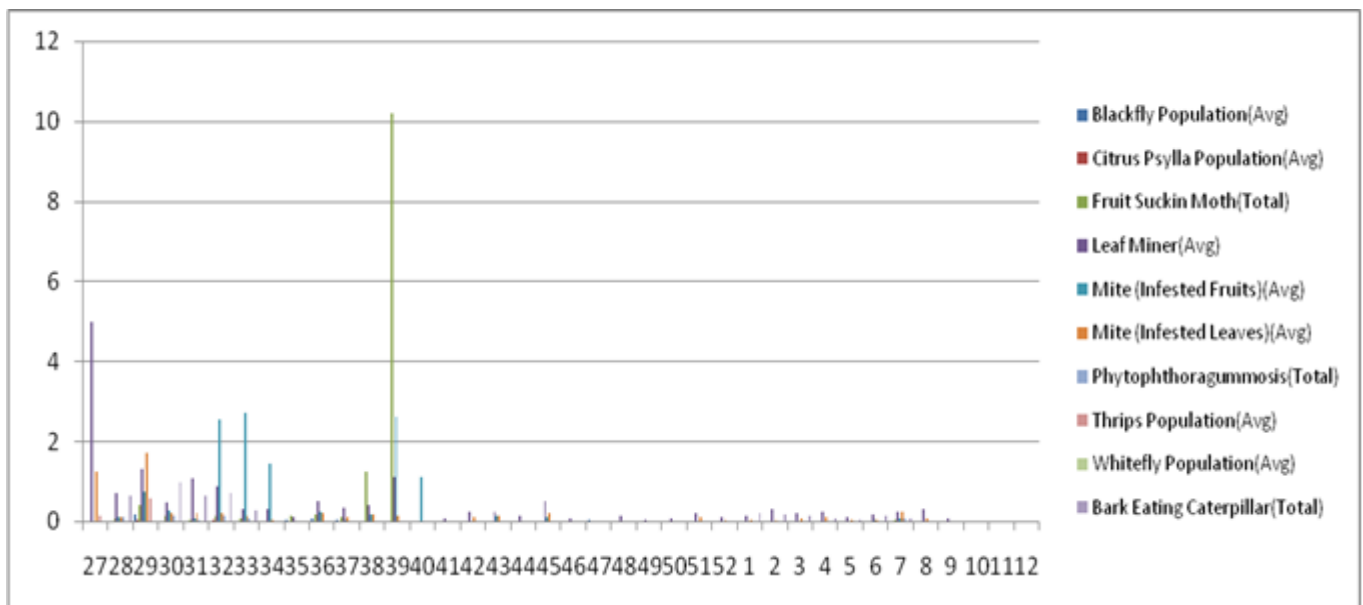


Fig 2: Insect pests and Disease infestation on sweet orange in Jalna District 2021-22

Pests of Sweet Orange Crossed ETL in following villages Sweet Orange

Mite (Infested Fruits) (Avg) above 2

District	Taluku	Villages
Aurangabad	Paitha	kadethan bu (11), Adul KH (8), Rajapur (2), Adul bu (11), Georai BK (7), Devgaon (3), Ektuni (1), Dabharul (1), Dawarwadi (2), Dera (2), Chankwadi (2), Ghari (2), Shrungarwadi (2), Apegaon (1), Shillegaon (1), Anandpur (1)
Jalna	Ambad	Sahapur (1), Bhamberi (1)
	Badnapur	Malewdi (4)

Fruit sucking moth

District	Taluku	Villages
Aurangabad	Paithan	Shrungarwadi (1), Apegaon (1), Dalwadi (2), Ghari (3), Katpur (1), Chankwadi (1)
Jalna		No ETL Found

Leaf minor (Avg) (Above 10)

District	Taluks	Villages
Aurangabad	Paithan	Devgaon (1), Wadvali (1)
Jalna		No ETL Found

Advisory issued by VNMKV, Parbhani during 2021-22

The advisory were issued two times weekly i.e. on Monday and Thursday during 2021-22

Crop	Duration	No. of Advisories
Sweet Orange	12.07.2021 to 16.02.2022	64



Citrus black fly



Fruit Sucking moth



Citrus Psylla



Thrips infestation



Lemon butterfly



Whiteflies

Photos from research experiments

Conclusion

In all the pests and diseases infestation of sweet orange was found throughout the year with two district Aurangabad and Jalna District. In Aurangabad district the fruit infestation of mite crossed ETL during August and September month. The highest fruit infestation of mites above ETL was observed (2.56, 2.68, 2.52) during 32nd, 33rd, 36th MW. In Jalna district the highest fruit infestation of mites above ETL was observed (2.55, 2.72, 2.60) during 32nd, 33rd, 39th MW. The peak population of Fruit sucking moth (10.20) was found during 39th MW.

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