The Pharma Innovation Journal 2022; 11(6): 2403-2405

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(6): 2403-2405

www.thepharmajournal.com
Received: 18-03-2022
Accepted: 22-04-2022

Nareshkumar E Jayewar
Assistant Professor, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India

Corresponding Author:
Nareshkumar E Jayewar
Assistant Professor, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India

Survey on major insect pests of chilli in Marathwada region

Nareshkumar E Jayewar

Abstract
A detailed studies on survey on major insect pests of chilli in Marathwada region was conducted during 2017. Collection of data on pest infestation was done by visiting random fields and those were sampled from each Tahasil of Marathwada region by adopting survey procedure i.e. five random spots in each field were selected and from the same spot five random plant representative of all the cropped area were selected to record sucking pests and fruit borer and in the one season same location was visitied twice. During 2017, thrips population was ranged between 0.48 thrips/ leaf (Sengaon tahasil of Hingoli district) to 9.98 thrips/leaf (Biloli tahasil of Nanded district). The whitefly population across all location was ranged between 1.08 whiteflies/leaf to 5.68 whiteflies/leaf. Aphid incidence was noticed in this region, but was confined to Parbhani, Hingoli and Nanded districts only and in all other region it was completely absent in both season and ranged from 0.00 to 9.98 aphids/leaf. Mites infestation on chilli was uniform in all locations and it was also noticed at later stage of the crop in both the seasons and it was ranged in between 4.42 to 8.96 mites/ leaf, respectively. In case of fruit borer very less infestation 0.00 to 2.40 larvae/ plant during 2016 and 2017 was recorded. This suggests the moderate to high pest infestation on chilli in Marathwada.

Keywords: Chilli, survey, aphids whitefly, thrips, mites, and fruit borer

Introduction
It is bean concordantly recorded in the literature that Chilli, (*Capsicum annuum* L.) has it's origin in Brazil or Bolivia and it is now one of the important Solanaceous crops which is widely cultivated throughout the world, especially in tropical and subtropical regions [1 and 10]. Portuguese towards the end of fifteenth century has brought chilli crop to India from Brazil and its cultivation became popular in the Seventeenth century and since then, it has gained importance as an important spice and vegetable crop and also become a key element in many cuisines [7].

Chilli grate advantage in vegetables due to its excellent taste and pleasant flavour. India has a wide range of chilli cultivars, including heatless and hot variants with varying quality aspects. Heatless chilli are known as "capsicums," whereas hot varieties are known as "chilli"/"chillies," and other species that have a bell form and are fairly hot are known as "bell chillies." Aside from its conventional use in vegetables, spices, condiments, sauces, and pickles, chilli is now employed in medications, cosmetics, and beverages [13]. During 2015–16, 1.93 tonnes per hectare (t/ha) of chilli were produced on an area of 774.9 thousand hectares (ha) [2]. Chilli crops is grown throughout in India and state of AP has the highest area and production this is followed by Telangana, Karnataka, West Bengal, Gujarat, and Maharashtra. Maharashtra State has an area of 99.50 thousand ha with production of 45.60 thousand tonnes with productivity of 0.46 t/ha. The district which has major share in green chilli growing districts are Nagpur, Jalgaon, Nashik, Nanded, Nandurbar, Palghar, Pune, Jalana, Aurangabad, and Amaravati. These districts are listed in decreasing order of area and production In 2017 [6]. Infestation of insect pests and diseases is the primary cause of low chilli yield. In India, over 53 insect and mite species have been documented as chilli pests, including whiteflies, aphids, thrips, fruit borers, cutworms, plant bugs, mites, and other minor pests [12]. Among the several insect pests of chilli, thrips is the most common, causing aroud 50 to 90 percent losses in marketable yield [5, 14, 9]. Fruit borers are also responsible for 90 percent of losses to chilli [11]. The yield of green chilli is also affected by aphid, jassid, whitefly and mite under field conditions [3]. Therefore, present studies were undertaken to know the population dynamics of the pest in Marathwada region, existing and new pest species, to estimate pest population and damage at various crop growth stages, to have a record on changing pest status (Minor to

major), to assess natural enemies and their influence on pests and effect of new cropping pattern and varieties on chilli production.

Material and Methods

Survey of major pests of chilli in Marathwada region

Collection of data on pest infestation was done by visiting random fields and those were sampled from each Tahasil of Marathwada region by adopting survey procedure i.e. five random spots in each field were selected and from the same spot five random plant representative of all the cropped area were selected to record sucking pests and fruit borer and in the one season same location was visited twice. Data so collected was compiled and then mean population of sucking pests and fruit borer of chilli was workout taking Tahsil as one unit and final figures of Tahsil is calculated by taking mean of two visits and then this value was used as reading which gives pest status in the region.

Table 1: Chilli growing areas of Marathwada surveyed during 2017

Sr. No.	Districts	Tahsils	No. of Fields	Period (SMW)
I Scarcity zone				
1	Aurangabad	Gangapur	5	40&50
		Vaijapur	4	40&50
II Assured Rainfall zone				
1.	Aurangabad	Phulambri	2	40&50
		Sillod	8	42&51
2.	Hingoli	Sengaon	3	42&51
3.	Jalna	Ambad	3	40&50
		Bhokardan	4	40&50
		Ghansawangi	5	40&50
4.	Latur	Ahmadpur	4	43&52
		Renapur	6	43&52
5.	Nanded	Biloli	5	42&51
		Deglur	4	42&51
		Dharmabad	7	42&51
		Naigaon	4	42&51
6.	Parbhani	Gangakhed	4	42&51
		Parbhani	4	42&51
		Purna	5	42&51
1.	Hingoli	Basmat	3	42&51
2.	Nanded	Mudkhed	3	42&51
		Umri	6	42&51

Results and discussion

Survey of major insect pests of chilli was carried out in chilli growing areas of all the meteorological zones of Marathwada region of Maharashtra state. Two visits were made to same field at vegetative and reproductive phase during survey.

During 2017, thrips population was noticed throughout crop growth period but it's incidence in vegetative stage was more as compared to reproductive stage. It was observed as a prominent pest across all the location surveyed as moderate to high thrips infestation on chilli in Marathwada was noticed during survey in both the years. Thrips population during survey was ranged between 0.48 thrips/ leaf (Sengaon tahasil of Hingoli district) and 9.98 thrips/leaf (Biloli tahasil of Nanded district).

Whitefly infestation on chilli crop in Marathwada region was also prominent and more or less uniform at all location but it's presence was noticed only up to sixty days and thereafter it was decreased gradually and in some locations chilli crop was completely free from whitefly infestation during 50th, 51st and 52nd SMW. The whitefly population across all locations was ranged between 1.08 (Vijapur tahasil in Aurangabad District) to 5.86 whiteflies/leaf (Naigaon tahasil in Nanded District).

Aphid infestation on chilli crop also noticed during survey, but it was confined to Parbhani, Hingoli and Nanded districts and there was no infestation was recorded in other districts in both years. The infestation was ranged from 0.00 to 9.98 aphids/leaf in 2017-18. The maximum infestation was observed in the areas of Parbhani tahasil in Parbhani district. Aphid population was not noticed up to first 60 days after transplanting.

Mites infestation was noticed in the range between 4.42 to 8.96 mites/ leaf during 2017-18 on chilli during survey and least intensity of mites was observed in 2016-17 at Bhokardan tahasil of Jalana and Phulambri tahasil of Aurangabad in 2017-18 and maximum infestation was recorded at Dharmabad and Naigaon tahasil of Nanded district, respectively.

The larval infestation of fruit borer was observed ranged between 0.00 to 2.40 larvae/Plant during 2017-18. Infestation of fruit borer was not noticed in Ambad and Bokhardan tahasil of Jalana district and it was maximum in Gangakhed tahasil of Parbhani district during 2017-18.

The present results of the study are discussed in the light of scientist who also reported presence of pest over seasons at different locations during survey. Manjunatha *et al.*, (2001) [8] who reported maximum thrips count ranged from 0 to 7.80 / leaf with up to 92 percent upward leaf curling in Hukkeri, Mahalingapur and Mudhol, and other places it was 0 to 5.6 thrips / leaf with up to 68 percent up ward leaf curling. Yellow mite counts ranged from 0 (at Mualkod of Bijapur) to 20.40/leaf (at Eklaspur of Raichur) with 72 percent down ward leaf curling. It was not observed in September - March crop under protected condition, whereas 40 percent incidence was noticed in open field condition. The incidence was low (13.78%) in green house as compared to open field (48.57%).

Asma and Hanumantharaya (2015) [4] conducted the survey in selected talukas of Chikmagalur district (Mudigere, Chikmagalur and Kadur), Karnataka, India during 2013-14 in summer season for major pest and their natural enemies on chilli. Among the insect and mite pests reported, thrips, mites and fruit pests reported in major form under irrigated chilli plots during the survey.

Table 2: Chilli Pest Status of Marathwada (2017)

Sr. No.	Districts	Tahsils	Visit (No.)	Thrips	Whitefly	Aphids	Mites	Fruit borer /Plant	Visit Period (MW)
Scarcity zone				**Per Leaf**	**Per Leaf**	**Per Leaf**	**Per Leaf**		
1	Aurangabad	Gangapur	3	1.24	1.32	0.00	4.32	1.20	43&52
		Vaijapur	2	1.82	1.08	0.00	4.48	1.40	43&52
Mean			2	1.53	1.20		4.40	1.30	
Assured Rainfall zone									
1.	Aurangabad	Phulambri	4	2.42	2.46	0.00	6.02	0.60	43&52
		Sillod	5	2.68	2.08	0.00	8.42	0.20	43&52
2	Hingoli	Sengaon	4	0.48	2.98	0.00	8.00	0.00	42&50
3	Jalna	Ambad	2	1.48	2.86	0.00	8.06	0.00	43&52
		Bhokardan	7	1.42	2.38	0.00	2.02	0.00	43&52
		Ghasawangi	4	4.42	3.18	0.00	2.46	0.80	43&52
4	Latur	Ahmadpur	3	4.68	3.04	0.00	4.84	1.40	44&51
		Renapur	3	5.88	3.42	0.00	5.86	2.00	44&51
5	Nanded	Biloli	8	9.98	3.06	0.00	3.38	1.20	42&50
		Deglur	5	6.82	5.42	0.00	6.56	1.40	42&50
		Dharmabad	5	5.18	5.02	0.00	8.86	1.20	42&50
		Naigaon	3	4.08	5.86	0.00	4.28	1.60	42&50
6	Parbhani	Gangakhed	5	8.42	2.34	9.62	8.80	2.40	42&50
		Parbhani	6	8.08	4.86	9.98	8.04	2.00	42&50
		Purna	4	6.88	4.08	8.62	8.52	1.80	42&50
Mean			4	4.86	3.54	1.88	6.99	1.11	
Moderate rainfall zone									
1.	Hingoli	Basmat	2	8.28	4.48	8.08	6.58	2.20	42&51
2	Nanded	Mudkhed	5	6.86	3.46	8.02	8.62	1.40	42&51
		Umri	4	6.46	3.48	8.42	8.86	1.80	42&51
Mean			4	7.20	3.81	8.17	8.02	1.80	

* Pest population is mean of population recorded during two visits in the region

Conclusion

Bokhardan Tahasil of Jalana district recorded least pest infestation than all other region due to the protected cultivation of chilli. Thrips, aphids, whiteflies, mites and fruit borer were emerged as most important pests in Marathwada on chilli and they were moderate to high during the period of study.

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