Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2582-2845.8314

ISSN: 2582 – 2845

Ind. J. Pure App. Biosci. (2020) *8*(4), 585-588

Indian Journal of Pure & Applied Biosciences

Peer-Reviewed, Refereed, Open Access Journal

Research Article

Pest Population Dynamics of Shoot and Fruit Borer, (*Leucinodes orbonalis)* on Brinjal Varieties as Influenced by Different Planting Windows

Katkar M. G.*, Kharbade S.B., Sthool V. A., Shaikh A.A., Jadhav J. D. and Dahat D.V.

Department of Agricultural Meteorology, Centre For Advanced Faculty Training (CAFT) in Agricultural Meteorology, College of Agriculture, Pune – 411 005 Maharashtra, India

*Corresponding Author E-mail: mkatkar8@gmail.com

Received: 16.07.2020 | Revised: 21.08.2020 | Accepted: 26.08.2020

ABSTRACT

An experiment "Effect of weather parameters on growth, yield and insect pest infestation on brinjal varieties under different planting windows" was carried out at Faculty of Agriculture Department of Agricultural Meteorology Farm, Centre for Advanced Agricultural Meteorology, College of Agriculture, Pune during Kharif seasons of 2014 and 2015.

The infestation activity of shoot damage (weight basis) noticed during the all planting windows with the varieties Phule arjun (V1), Krishana (V2) and Panchganga (V3) the incidence of shoot damage (weight basis) was noticed on (0.11%) and intial stage in first week of August at 32nd MW and reached to its peak infestation (17.6%) during 2014.The end of July (31st MW) that continuously increased till at the end of october (41st MW) and decreased till end of December at 48th MW during 2015. The initial infestation of fruit damage of the pest was noticed on 38th MW to 48th MW on weight basis (7.42%) during reproductive stage in last week of September and reached to its peak infestation in 41st MW (17.7%) during the second week of October. Which further decreased during 48th MW with fruit infestation (4.80%).Among the Brinjal varieties, higher incidence L. orbonalis of was recorded on variety Panchganga (V2) and minimum was recorded on Phule Arjun (V3). Timely sowing on 31th MW (P1) and 32th MW (P2) recorded lower incidence of L. orbonalis whereas, crop sown delay during 34th MW (P4) recorded the maximum incidence.

Keywords: *Leucinodes orbonalis (weight basis), MW, Infestation*

INTRODUCTION

Population dynamics of insect pest, study to know the most susceptible stage (s) of the pest provides a very good alternative. In such study, the life table is the most important technique, which provides a summary description of mortality, survivorship and life expectancy for a specified population. It shows organism's mortality (or survival) and reproduction rate (maternal frequency) as a function of age.

Cite this article: Katkar M.G., Kharbade S.B., Sthool V. A., Shaikh A.A., Jadhav J.D., & Dahat D.V. (2020). Pest Population Dynamics of Shoot and Fruit Borer, (*Leucinodes orbonalis)* on Brinjal Varieties as Influenced by Different Planting Windows, *Ind. J. Pure App. Biosci. 8*(4), 585-588. doi: http://dx.doi.org/10.18782/2582-2845.8314

In nature, such mortality and reproduction rate depends on numerous factors such as temperature, population density, natural enemies, and diseases. Life tables are the most important tools in the pest management revealed the most opportune periods and vulnerable stages of the insect species. Series of life tables of the pest increases the understanding about the pest dynamics and mortality factors such as predators, parasitoids and pathogen infection on the pest and we can use major key mortality factor in management of the pest. The weather parameters which are directly responsible for the crop growth, yield and pest incidence under the climatic variability for the Pune region, Maharashtra, India due to the climate change. The increase in climatic variation associated with weather parameters like uneven rainfall distribution, sudden changes in day and night temperatures, relative humidity during the crop growing season and its impact on pest population dynamics. To avoid the losses caused by the insect pests, various control measures have been designed.

MATERIALS AND METHODS

The field experiment was conducted at Department of Agricultural Meteorology Farm, College of Agriculture, Pune during kharif seasons of 2014 and 2015. The experiment was conducted in a split plot design with three replications. The treatments were allotted randomly to each replication by keeping the gross plot size 4.5m x 3.75 m2 and net plot size 2.7 m x 2.7 m2with 90 x 75 cm spacing. There were twelve treatment combinations. The experiment was laid out in split plot design with three replications. The treatment comprised of three brinjal hybrids *viz.*, V_1: Phule Arjun V_2: Krishna, V_3: Panchganga as main plot and four planting windows *viz.*, P_1: 31MW (30 July- 3Aug) ,P_2 :32nd MW (6 Aug- 12 Aug),P_3: 33rd MW (13 Aug- 19 Aug) P_4: 34th MW (20 Aug- 26 Aug) as sub plot treatments.

RESULTS AND DISCUSSION

Seasonal incidence of major pests on Brinjal

The study was conducted during both the years of kharif season of 2014 and 2015. During the course of study the incidence of major pests were recorded on brinjal crop sown at different planting windows with three varieties, three pests, viz., fruit and shoot borer (weight basis and number basis) were recorded as major pests associated with brinjal crop.

Population dynamics of shoot borer of *L. orbonalis* (weight basis)

Population dyanamics of L. *orbonalis* remained active from vegetative stage to the last picking of fruits. The initial infestation of the shoot damage was noticed on (0.11%) during 2014 and intial stage in first week of August at 32MW and reached to its peak infestation (17.6%) during 2014 and the second week of October at 41 MW. The end of July (31st MW) that continuously increased till at the end of October (41st MW) and decreased till end of December at 48 MW. The highest per cent shoot infestation occurred in hybrids Panchganaga while on 34th MW planting windows and the lowest per cent shoot infestation occurred in hybrids Phule Arjun sown in 31st MW planting windows in both the seasons i.e. *kharif* 2014 and 2015.These findings are similar with the findings of Rao and Bhavani (2013),Prabhjot kaur and prasad (2014).

Population dynamics of fruit borer of *L. orbonalis* (number basis)

Population dyanamics of *L. orbonalis* of fruit borer remained active from fruiting to the last picking of fruits. The initial infestation of the pest was noticed on 38th MW to 48th MW fruit damage on number basis (9.58 % to 10.8%) during reproductive stage in last week of September at 39thMW and reached to its peak infestation in 41stMW (18.9 % to 23.0%) during the second week of October at 41st MW. Initial fruit infestation (0.11%) was observed during the last week of septmber at 38thMW and thereafter the infestation level gradually increased and reached to highest infestation (18.4 to 23.3) during last week of October at 41st MW which further decreased during second week of december with fruit infestation (7.26%).These findings are similar

with the findings of Rao and Bhavani (2013), Prabhjot kaur and Pasad (2014).

Population dynamics of fruit damage of *L. orbonalis* (weight basis)

Incidence of *L. orbonalis* remained active from fruiting to the last picking of fruits. The initial infestation of the pest was noticed on 38th MW to 48th MW fruit damage on weight basis (7.42%) during reproductive stage in last week of September and reached to its peak infestation in 41st MW (17.7%) during the second week of october. Mohd *et al*. (2013) and Rashid and Hossain(2008).Which further decreased during 48th MW with fruit infestation (4.80%). The initial infestation of the pest was noticed on 39th MW to 48th MW fruit damage on weight basis (7.72%) during reproductive stage in last week of September and reached to its peak infestation in 41st MW (18.3%) during the second week of october.Which further decreased during 48th MW with fruit infestation (6.72%). The results indicated that L. *orbonalis* infestation on brinjal fruits commenced at (31st MW) that continuously increased till 48th MW. The highest per cent fruit infestation occurred in hybrids Panchganga planted in 34th MW. The lowest per cent shoot infestation occurred in hybrids Phule Arjun planted in 31st MW in both the seasons i.e. *kharif* 2014 and 2015. These findings are similar with the findings of of Rao and Bhavani (2013) and Prabhjot kaur and Prasad (2014).

Table 1: Per cent Shoot damage (%) of *L. orbonalis* as influenced by different treatments in 2014

Treatment	31 MW	32 MW	33 MW	34 MW	35 MW	36 MW	37 MW	38 MW	39 MW	40 MW	41 MW	42 MW	43 MW	44 MW	45 MW	46 MW	47 MW	48 MW	Mean
A)Hybrids																			
V_1:Phule Arjun	0.0	0.11	0.29	0.45	0.58	1.22	3.27	7.47	9.32	10.8	12.3	8.92	7.99	5.08	3.55	2.93	2.61	1.31	4.34
V_2:Krishna	0.0	0.15	0.58	0.85	1.24	1.41	3.82	9.81	11.6	12.4	14.7	10.0	15.0	6.90	4.91	3.28	3.81	1.91	5.68
V_3:Panchganga	0.0	0.25	0.69	0.87	1.45	1.75	4.16	10.4	12.3	15.6	17.6	11.1	16.2	7.76	5.47	4.21	4.79	2.40	6.5
B) Planting windows																			
P_1:31 MW	0.0	0.17	0.25	0.41	0.12	1.27	3.27	7.57	10.2	10.8	11.7	11.2	9.61	5.23	4.56	0.00	0.00	0.00	4.24
P_2:32 MW	0.0	0.0	0.28	0.49	0.14	3.16	4.16	10.4	11.7	12.0	12.3	9.45	12.0	11.1	8.21	7.89	0.00	0.00	5.75
P_3:33 MW	0.0	0.0	0.00	0.56	0.20	2.82	3.82	9.81	12.6	12.9	17.6	12.6	11.9	10.0	9.02	7.90	6.63	0.00	6.53
P_4:34 MW	0.0	0.0	0.00	0.00	0.23	3.91	4.91	8.56	13.2	12.5	14.7	13.2	12.2	10.8	9.45	8.56	8.92	8.29	7.19
Mean	0.0	0.09	0.21	0.61	0.56	2.22	3.92	9.16	11.6	12.4	14.4	10.9	12.1	8.67	7.81	6.09	3.89	2.07	5.93

Table 2: Per cent Shoot damage (%) of *L. orbonalis* as influenced by different treatments in 2015

Treatment	31 MW	32 MW	33 MW	34 MW	35 MW	36 MW	37 MW	38 MW	39 MW	40 MW	41 MW	42 MW	43 MW	44 MW	45 MW	46 MW	47 MW	48 MW	Mean
A) Hybrids																			
V_1:Phule Arjun	0	0.05	0.21	1.01	1.45	1.64	3.37	7.61	9.65	9.80	12.6	9.12	8.13	5.21	3.60	3.25	2.73	2.71	4.56
V_2:Krishna	0	0.19	0.36	1.15	1.69	1.83	3.91	10.3	12.8	13.6	15.2	10.2	15.3	7.24	5.61	3.31	3.87	3.94	6.13
V_3:Panchganga	0	0.33	0.45	1.21	1.75	2.31	4.22	10.6	15.8	12.6	18.2	11.3	16.5	7.94	5.64	4.34	4.24	4.91	6.79
B) Planting windows																			
P_1:31 MW	0	0.09	0.23	1.05	1.24	1.35	3.36	7.60	7.76	11.3	12.1	10.9	10.7	5.11	4.63	0.00	0.00	0.00	4.30
P_2:32 MW	0	0.00	0.36	1.23	1.36	3.24	4.27	11.5	11.6	9.84	12.7	11.4	11.2	8.54	7.63	5.21	0.00	0.00	5.56
P_3-:33 MW	0	0.00	0.00	1.29	1.43	2.86	3.84	9.81	10.3	12.7	18.2	16.4	16.1	14.3	12.9	9.24	8.30	0.00	7.64
P_4:34 MW	0	0.00	0.00	0.00	1.59	3.94	4.94	8.65	8.74	13.2	15.2	13.7	13.4	11.9	10.7	9.74	8.64	7.26	7.31
Mean	0	0.02	0.15	1.18	1.50	2.41	3.94	9.39	10.7	11.6	14.8	11.8	13.0	9.40	8.97	6.05	4.24	1.82	6.16

Table 3: Per cent fruit damage (%) of *L. orbonalis* (on weight basis) as influenced by different treatments 2014

Treatments	31 MW	32 MW	33 MW	34 MW	35 MW	36 MW	37 MW	38 MW	39 MW	40 MW	41 MW	42 MW	43 MW	44 MW	45 MW	46 MW	47 MW	48 MW	Mean
A) Hybrids																			
V_1:Phule Arjun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.42	10.2	11.4	14.0	12.7	10.8	9.20	7.82	6.65	5.65	4.80	5.59
V_2:Krishna	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.91	12.2	13.8	14.9	14.7	12.5	10.6	9.06	7.70	6.55	5.57	6.41
V_3:Panchganga	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.41	14.1	14.4	17.7	17.6	15.0	12.7	10.8	9.22	7.84	6.66	7.46
B) Planting windows																			
P_1:31 MW	0.0	0.0	0.0	0.0	0.0	0.0	11.2	12.0	14.1	12.0	10.2	8.71	7.41	5.35	4.55	9.84	8.36	7.13	6.15
P_2:32 MW	0.0	0.0	0.0	0.0	0.0	0.0	8.42	12.5	13.4	15.7	13.4	11.4	9.76	7.06	5.99	9.64	8.28	6.91	6.80
P_3:33 MW	0.0	0.0	0.0	0.0	0.0	0.0	0	9.43	14.0	15.0	17.6	15.0	12.7	9.30	7.90	9.73	8.25	7.02	6.99
P_4:34 MW	0.0	0.0	0.0	0.0	0.0	0.0	0	0	10.5	15.7	16.8	19.8	16.8	12.2	10.4	10.1	8.64	7.32	7.12
Mean	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	8.24	12.0	17.3	13.8	14.4	13.4	11.5	9.84	8.35	7.15	6.44

Table 4: Per cent fruit damage (%) of *L. orbonalis* (on weight basis) as influenced by different treatments in 2015

Treatment	31 MW	32 MW	33 MW	34 MW	35 MW	36 MW	37 MW	38 MW	39 MW	40 MW	41 MW	42 MW	43 MW	44 MW	45 MW	46 MW	47 MW	48 MW	Mean
A) Hybrids																			
V_1:Phule Arjun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	7.72	10.5	16.2	12.6	13.0	12.9	10.9	9.34	7.95	6.72	5.99
V_2:Krishna	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	8.22	12.4	18.3	14.1	14.0	13.6	11.5	9.84	8.34	7.14	6.53
V_3:Panchganga	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	8.75	13.1	16.2	14.7	15.6	14.5	12.3	10.5	8.92	7.64	6.79
B) Planting windows																			
P_1:31 MW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.84	11.6	16.8	13.3	13.5	12.3	11.5	9.84	8.36	7.13	6.23
P_2:32 MW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.94	13.5	18.4	15.2	14.6	13.3	11.3	9.64	8.28	6.91	6.67
P_3:33 MW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	8.05	10.0	19.0	11.8	14.7	13.4	11.4	9.73	8.25	7.02	6.30
P_4 :34 MW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	8.12	13.0	16.2	14.9	15.3	14.0	11.9	10.1	8.64	7.32	6.64
Mean	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	8.24	12.0	17.3	13.8	14.4	13.4	11.5	9.84	8.35	7.15	6.44

REFERENCES

Mohd, R. Z., Che Salmah, M. R., & Abu, H. A. (2013). Effect of nutrient and pre-infested brinjal, *Solanum melongena* by whitefly and jassid on population dynamics of whitefly, *Bemisia Tabaci*. *J. Agriculture, Forestry and Fisheries. 2*(1), 1-10.

Kaur, P., & Prasad, S. (2014). Population dynamics of brinjal shoot and fruit borer under agroclimatic condition of Hissar. *J. Ecoscan. 8*(1&2), 1-5.

Rao, V. R., & Bhavani, B. (2013). Climate change – Likely effects on the population dynamics of brinjal shoot and fruit borer (*Leucinodes orbonalis* Guen.) Scientist (Ento), Regl. Agril. Resarch Station, Anakapalle-531 00.