J. Exp. Zool. India Vol. 23, No. 1, pp. 275-277, 2020 | www.connectjournals.com/jez | *ISSN 0972-0030*

OCCURRENCE AND MANAGEMENT OF THE FALL ARMYWORM, *SPODOPTERA FRUGIPERDA* : A NEW INSECT PEST ON MAIZE AT REGIONAL AGRICULTURAL RESEARCH STATION, CHINTAPALLE, VISAKHAPATNAM, ANDHRA PRADESH, INDIA

N. Ramesh Naik, D. Sekhar, Babuji Naidu K. and D. V. Ramana Reddy

Regional Agricultural Research Station, Chntapalle, Vishakhapatnam district - 531 111, India.
e-mail: rameshrathood@gmail.com

(Received 12 July 2019, Revised 29 October 2019, Accepted 8 November 2019)

ABSTRACT : Occurrence of fall armyworm was noticed during August, 2018 in Integrated Crop Management (ICM), Organic Farming (OF) and Plaekar farming (PF) Package plots of Maize with extent of 22.08 to 4.03 per cent plant infestation during 30 DAS of Maize. Per cent infestation of Fall armyworm was declined from 22.08 to 0.61 after whorl application of Carbofuran 3G granules followed with Emamectinbenzoate spray in ICM package. In organic farming package, per cent infestation of fall armyworm was declined from 1.44 to 0.75 after NSKE followed with neem oil sprays. But, in Palekar Package, the treatments *i.e.* Bhramastra and Aganiastra were found ineffective. Per cent cob infestation was found to be 13.33, 4.54 and 35.59 respectively inICM, Organic Farming and Plaekar plots of Maizerespestively. Yield inICM, Organic Farming and Plaekar plots of Maize was 57.6, 13.6 and 25.2 q/ha, respectively.

Key words : Fall armyworm, maize, management, packages.

INTRODUCTION

Fall armyworm, *Spodoptera frugiperda* is a polyphagous pest and native of America, recently in 2016 appeared in African countries (Goergen *et al*, 2016). Larvae feeds on the vegetative and reproductive parts of about 80 plant species preferably Gramineae family including maize, millet, sorghum, sugarcane, rice, wheat (Pogue, 2002). This destructive insect pest has been recently entered in India in 2018 and caused damage to maize fields of South Indian states. Its occurrence was very severe in Karnataka followed by Tamil Nadu and Andhra Pradeshstates that are major growing regions for hybrid maize (Sharanabasappa and Swamy, 2018). It was also observed in Regional Agricultural Research Station, Chintapalle in ICM, Organic and Palekar farming plots of maize during *kharif*, 2018, which is located above 3000 msl and spread of new invasive insect pest was at very quick. Hence, a study was conducted under kharif, 2018 for studying the damage of fall army worm and its management at RARS, Chintapalle.

MATERIALS AND METHODS

Field trial of Integrated Crop Management (ICM), Organic Farming (OF) and Palekar Farming (PF) plots were sown during *kharif*, 2018 on 21st June, 2018 at Regional Agricultural Research Station, Chintapalle, Visakhapatnam with VMH 6474 of maize variety with an area of 1679 m^2 each farming plots, respectively. The maize crop was raised by following the all packages (ICM, Organic and Palekar farming) formulated by ANGRAU, Lam, Guntur. Crop was supervised for pest attack at regular intervals from germination. The new insect pest, *S. frugiperda* was found to be infesting the Maize fields during July month. Specimens were collected and submitted for taxonomic identification at NBAIR, Bangalore. Treatments imposed in Integrated Crop Management (ICM) was Carbofuran granules followed by Emamectinbenzoate spray, Organic Farming (OF) package with NSKE and Neem oil sprays and Palekar Farming (PF) package with Bhramastra and Agnastra sprays. Two treatments were imposed with 20 days interval. Data was recorded on the basis of whole plot technique. At harvest, per cent cob damage and yield data werecalculated.

RESULTS AND DISCUSSION

Specimens collected from Regional Agricultural Research Station, Chintapalle of high altitude and tribal zone were identified as a specimen of Fall armyworm and authenticated by NBAIR, Bangalore. Fall armyworm

Table 1 : Efficacy of certain insecticides in different packages against Fall armyworm.

Packages/Farming	Per cent infestation by fall armyworm									% reduction after 2 sprays	% infestation of Cob	Yield (Q/ha)
	First Spray				Second Spray							
	Before	3 DAS	7 DAS	14 DAS	Mean	Before	3 DAS	7 DAS	14 DAS	Mean		
Integrated Crop Management Farming (ICM)	**22.08**	3.98	4.72	4.76	**4.76**	**10.40**	3.59	2.54	0.61	**2.24**	**78.46**	**13.33**	**57.6**
Organic Farming (OF)	**01.44**	0.36	0.40	0.28	**0.34**	**2.51**	1.07	0.51	**0.75**	**0.77**	**69.32**	**04.54**	**13.6**
Palekar Farming (OF)	**04.03**	5.74	6.74	5.74	**6.07**	**2.84**	2.84	3.31	**2.15**	**2.76**	**2.81**	**35.59**	**25.2**

infestation was found peak in the last week of July, 2018 with 22.08, 1.44 and 4.03 per cent infestation in ICM, Organic and Palekar farming plots, respectively. Per cent infestation in ICM plot was found more compared to other (Organic and Palekar farming) plots, as the plants were so healthy with tender growth. Organic farming plot plants were not found healthy, as the plant were not meeting there nutrient requirements, as the maize is nutritive exhaustive crop and it was third year consecutive crop in same plots.

Per cent infestation of fall armyworm before imposing treatments in Integrated Crop Management (ICM) was 22.08% after the whorl application of Carbofuran 3G granules the infestation declined to 4.76%, with application of Carbofuran 3G granules in whorls of plant, the caterpillars were found feeding deep in the whorls without coming in contact with granules. Carbofuran granules were not found much effective to fall armyworm as it was very effective for stem borer and cob worm. Ramkumar and Tanweer (2017), Sidar *et al* (2017) and Rani (2018) reported that Carbofuran 3G was found effective for the management of stem borer and found on par with newer molecule insecticide, Chlorantraniliprole 18.5%SC, but its effectiveness for fall armyworm found very low. Followed by spray with Emamectinbenzoate found effective, per cent infestation of fall armyworm declined from 10.40 to 0.61. Emamectinbenzoate insecticide has to be sprayed in the whorls of the plant for effective management of fall armyworm. Emamectinbenzoate 5 SG found effective as reported by Kulkarni (2015). This findings similar with our findings.

Per cent infestation of fall armyworm before imposing treatments in Organic farming (OF) was 1.44, after the spraying with NSKE and Neem oil, infestation declined to 0.77 %. Per cent infestation of fall armyworm before imposing treatments in Palekar farming (PF) was 4.03, after the spraying with Bhramastra and Agnastra the infestation declined to 2.76%.

Per cent cobs infestation at the time of harvesting in ICM, Organic and Palekar farming packages were 13.33, 4.54 and 35.59, respectively. Grain yield recorded in ICM, Organic and Palekar farming packages were 23.84, 3.60 and 2.72 q/ha, respectively. Eventhough, per cent infestation is low in Organic farming, it was recorded with lower yield, as the crop was not met with required nutrients in Organic farming package.

CONCLUSION

Carbofuran granules were not found much effective for the management of new invasive insect pest, fall

armyworm as larvae feeding deep in the whorls, where they wouldn't come in contact with granules. Emamectinbenzoate insecticide has to be sprayed at whorls of the plant for effective management of fall army worm. None of the treated Astra was found effective. Neem based insecticides were found to be effective at initial stages as they are having ovicidal property. There is a need for evaluation of noveland indigenous insecticides for new inavasive insect pest, *Spodoptera frugiperda*.

ACKNOWLEDGEMENT

We are grateful to Dr. N.V. Naidu, Director of Research, Acharya. N.G. Ranga Agricultural University, Lam, Guntur, and Dr. D. V. Ramana Reddy, ADR, Regional Agricultural Research Station, Chintapalle, Visakhapatnam for constant research support and encouragement.

REFERENCES

Anonymous (2016) *Agricultural Statistics at a Glance*. Directorate of Economics & Statistics.

Goergen G, Kumar P L, Sankung S B, Togola A and Tamo M (2016) First report of Out breaks of the Fall Armyworm *Spodoptera frugiperda* (J.E. Smith) (Lepidoptera:Noctuidae), a New Alien Invasive Pest in West and Central Africa. *PLoS ONE* **11**(10), e0165632.

Kulkarni S, Mallapur C P and Balikai R A (2015) Bioefficacy of insecticides against maize stem borers. *J. Exp. Zool. India* **18**(1), 233-236.

Mathur L M L (1991) Genetics of insect resistance in maize. In: Sarkar K R, Singh H N and Sachan J K S (eds). Maize Genetic Perspectives. *Indian Soc. Gen. Plant Breed.,* New Delhi. 238-250.

Pogue M G (2002) A world revision of the genus *Spodoptera*Guenee (Lepidoptera, Noctuidae). *Mem. Amer. Entomol. Soc.* **43**, 1-201.

Ramkumar and Tanweer A (2017) Bio-efficacy of some newer insecticides against maize stem borer, *Chilo partellus* (Swinhoe). *J. Ent. Zool. Stud.* **5**(6), 1347-1351.

Sharanabasappa and Swamy K C M (2018) Presence of Fall Armyworm, *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera: Noctuidae), an Invasive Pest on Maize in University jurisdiction. University of Agricultural and Horticultural Sciences, Shivamogga, Karnataka, India.

Sidar Y K, Nirmal A, Gajbhiye R K, Manmohan S B and Pankaj B (2017) Insect pest succession on hybrid maize and management of pink stem borer, *Sesamia inferens* Walker. *J. Pharmacog. Phytochem.* **1**, 143-150.

Siddiqui K H and Marwaha K K (1994) Pests associated with maize in India. In: *Vistas of Maize Entomology in India*. Kalyani Publishers, Ludhiana, India. 3-16.