



Studies on major insect pests of cotton and farmer perceptions in the Ghugus area of District Chandrapur, Maharashtra, India

Sushma Kameshwar Prajapati ✉

Department of Zoology, Sardar Patel Mahavidyalaya, Chandrapur, (M.S.) India

Rajlaxmi Ranrag Kulkarni

Department of Zoology, Sardar Patel Mahavidyalaya, Chandrapur, (M.S.) India

ARTICLE INFO	ABSTRACT
<p>Received : 01 October 2023 Revised : 03 November 2023 Accepted : 11 November 2023</p> <p>Available online: 12 January 2024</p> <p>Key Words: Biological control Cotton Diversity Insect Pests Integrated Pest Management</p>	<p>A crucial crop in the world, cotton (<i>Gossypium hirsutum L.</i>), is frequently harmed by pests and illnesses. Chemical pesticides are frequently effective, but repeated use of these chemicals often results in pests developing greater insecticide resistance, fewer natural enemies, less natural control, and a deteriorated ecosystem. It has been widely used to implement the integrated pest management (IPM) strategy, which heavily emphasizes biological control. The present piece of work was carried out from January 2022 to December 2022 at different sites in the vicinity of the Ghugus area in Chandrapur district. In all, 10 species of insect pests of cotton from 9 families and 3 orders were recorded. The knowledge, perceptions and practices of farmers growing cotton under different pest management regimes were analyzed. The methods used were open and semistructured interviews using questionnaire with groups and individuals. In general, farmers had a poor understanding of the key concepts underlying alternative pest control systems. Pest damage was considered important and farmers were eager to share their knowledge, perceptions and practices in pest management. This study provides the foundation for the creation of a learning platform for future.</p>

Introduction

In India, farmers use all four *Gossypium* species to cultivate cotton crops. Cotton crops are prone to damage by a number of insect pests. There are more than 166 insects recorded as pests on cotton crops. In India, cotton crops are damaged immediately after the seedling stage by a number of pests, such as grasshoppers, thrips, aphids and jassids. Feeders such as bollworms appear in the crop toward the bud-break stage of the cotton crop and can damage the buds, flowers and bolls. Spiny bollworms, spotted bollworms, American bollworms and pink bollworms were the most common bollworms. Like an insect pest, temperature also affects the growth of cotton plants. Even though cotton is a warm weather crop, the ideal temperature for collecting biomass is thought to be between 20 and 30 degrees Celsius (Zafaretal, 2018). Similarly, a temperature range between 23.5 and 32°C is appropriate for metabolism and the accompanying enzyme to

perform at their best. The development and growth of cotton plants are restricted by high temperatures, i.e., temperatures greater than 32°C (Arshad, 2021; Pettigrew, 2007). High temperature and insect pests severely affect cotton production in the region, resulting in poor yields. One of the key constraints to establishing effective pest management approaches for smallholder farmers is the lack of adequate information about pest perceptions and practices in pest management. The diversity of insect pests and the need for integrated pest management with biological control are the main objectives of this study to create an eco-friendly environment. For the development of relevant pest management approaches, an evaluation of farmers' basic socioeconomic characteristics, pest knowledge and perceptions, pest management practices and constraints on effective implementation of pest management practices is needed. Therefore, the present study was undertaken.

Corresponding author E-mail: sushmaprajapati1997@gmail.com

Doi: <https://doi.org/10.36953/EJ.26682646>

This work is licensed under Attribution-Non Commercial 4.0 International (CC BY-NC 4.0)

© ASEA

Materials and Methods

The study area is located at 19.93°N 79.13°E, 26 km toward the west of the District Headquarter Chandrapur. In Ghugus, the wet season is hot, warm, and overcast, and the dry season is sweltering and mostly clears. Over the course of the year, the temperature typically varies from 56°F to 112°F and is rarely less than 50°F or greater than 117°F. The area is well known for its coal industries and cement factories. The area within 2 miles of Ghugus is covered by cropland (56%), artificial surfaces (25%), and grassland (11%) within 10 miles by cropland (73%) and within 50 miles by cropland (69%) and trees (11%). The location of the Ghugus city region is Usgaon (4KM),

Shengaon (4KM), Pandharkawada (6KM) and Mursa (9KM). The study was carried out at two villages in the Ghugus area. The insect pest population's data were recorded on the basis of 20 randomly selected plant leaves considering their upper, middle and lower parts. The insect pests were collected in the early morning from 8:00 am to 1:00 pm and photographed with the help of a camera. A total of 60 farmers and their families were surveyed, and the data were collected with the help of basic structured questionnaires, which included age, education, landholding (acres), area under cotton crop (acres), annual income and farming experience.



Figure 1: Location of the study area

Keys for identification

Major insect pests of cotton were identified with the help of the pertinent literature (Raclendran et al., (2018), Pedigo et al., (2021).

Results and Discussion

The survey for study was carried out in randomly selected cotton fields in nearby areas of the Ghugus region for a period of 12 months from January 2022 to December 2022. The species of major cotton insect pests investigated are presented in Table 1.

During the survey, a total of 10 species from 09 families and 03 orders of insect pests were recorded. Similarly, in the study areas of Punjab, Raza Taqi *et al.* (2019) reported 490 insect species belonging to three classes of 12 orders with 25 families. Fakhra *et al.* (2022) collected 896 insect specimens, 12 of which belonged to 09 families and 05 orders. Cotton farmers mostly employ chemical pesticides, but most producers lack the expertise to apply these chemicals wisely since they do not know much about pest control. Furthermore, locals who work in the

pesticide industry typically take advantage of farmers' ignorance to encourage overuse of pesticides above suggested dosages. One of the main factors influencing the use of pesticides is farmers' perceptions about insect pests and how to handle them. According to the research, farmers' incorrect perceptions about the relationship between

pesticides and pest control were found to be strongly correlated with excessive pesticide use, which in turn led to the failure of pest management strategies. It is imperative that growers receive IPM education (Shahrajabian, *et al.*, 2020). The socioeconomic characteristics and the respondent profile are shown in Table 2.

Table 1: The species of major cotton insect pests found near the Ghugus area during the investigation

SN	Name of the pests	Scientific Names	Family	Order
[A]	Borers American bollworm Pink bollworm Spiny bollworm Spotted bollworm	<i>Helicoverpa Armigera Pectinophor</i> <i>agossypiella Earias Insulana</i> <i>Earias vittella</i>	<i>Noctuidae</i> <i>Gelechiidae</i> <i>Nolidae</i> <i>Nolidae</i>	Lepidoptera Lepidoptera Lepidoptera Lepidoptera
[B]	Foliage Feeders Leaf roller	<i>Syleptederrogata</i>	<i>Pyralidae</i>	Lepidoptera
[C]	Sap Feeders <i>Aphids</i> <i>White fly</i> <i>Jassids</i> <i>Thrips</i> <i>Red cotton bug</i>	<i>Aphis gossypii glover Bemisiata baci</i> <i>Amrasca biguttula biguttula Thrip</i> <i>stabacilinderman Dysderus cingulatus</i>	<i>Aphididae Aleyrodidae</i> <i>Cicadellidae Thripidae</i> <i>Pyrrhocoridae</i>	<i>Hemiptera</i> <i>Hemiptera</i> <i>Hemiptera Thysanoptera</i> <i>Hemiptera</i>

Table 2: Information about the respondents

SN	Profile	Number of farmers	Percent
[1]	Age Young age (Up to 30 years) Middle age (31 to 50 years) Old age (Above 50 years)	10 40 10	16.67 66.67 16.67
[2]	Education Illiterate Primary school Middle school SSC College and above	0 5 15 35 5	0.00 8.4 25 58.34 8.4
[3]	Land holding (Acres) 2 to 4 4 to 10 10 and above	10 45 5	16.67 75 8.4
[4]	Area under cotton crop (acres) 2 to 4 4 to 10 10 and above	10 45 5	16.67 75 8.4
[5]	Annual Income (Rs.) Upto 40,000/- 40,001 to 80,000/- 80,001 to 1,20,000/- 1,20,001 and above	5 10 15 20	8.4 16.67 25 33.34

The majority of cotton growers were in the middle age group (66.67%) and had matriculation-level education (58.34%), landholding size, area under cotton crop in acres (75%), and annual income (33.34%). Similar information about the respondents was recorded by Shambharkar et al. (2018) and Hein Aung Zaw (2023).

Conclusion

Intercropping plays a major role in cotton production. In the cotton intercropping strategy, the pests that are most damaging to the cotton crop will ultimately damage the other crops that are grown in the cotton field area, through which the minimization of insect pests on the cotton plant

can be controlled. In the present investigation, a total of 10 species of major insect pests from 9 families and 3 orders of cotton were recorded. The diversity of insect pests and the need for integrated pest management with biological control will be the main

objectives of this study to create an eco-friendly environment.

Conflict of interest

The authors declare that they have no conflicts of interest.

References

- Arshad & Adnan (2021). "Impact of climate warming on cotton growth and yields in China and Pakistan: A regional perspective. *Agriculture* 11.2: 97.
- Soomro & Aqsa Ansari (2022). Diversity and abundance of insects in cotton field from Khairpur and its adjoining areas, *University of Sindh Journal of Animal Sciences* vol.6, Issue 1, Pp: (29-36).
- Hein Aung Zaw, Shew Mar Than, Kyi Moe & Yee Phyo Mon (2023). Farmers' perceptions and adaptation of recommended cotton cultivation practices in Yamethin township. *FFTC, E-journal*.
- Pettigrew, W.T., & Gerik, T.J. (2007). "Cotton leaf photosynthesis and carbon metabolism" *Advances in agronomy* 94: 209-236.
- Raza Taqi, Rehman Talha, Nawaz Ahmad, Javed Muhammad Umar & Ullah Sami (2019). Diversity and abundance of insects in cotton crop land of Punjab, Pakistan, *GSC Biological and Pharmaceutical Sciences*- 9, 2
- Shahrajabian, Mohamad Hesam, Wenli Sun, I Qi Cheng. (2020). "Considering white gold, cotton, for its fiber, seed oil, traditional and modern health benefits" *Journal of Biological and Environmental Sciences* 14(40),25-39
- Shambharkar, Y.B. Bhopale P.P. & Sarnaik S.D. (2018): Impact of Integrated Pest Management Technology on Cotton Growers *International Journal of Current Microbiology and Applied Sciences Special Issue-6*. 2731-2736
- Zafar & Syed Adeel (2018). Temperature extremes in cotton production and mitigation strategies: Past, present and future trends in cotton breeding. *Agricultural Economics* 65-91.

Publisher's Note: The ASEA remains neutral with regard to jurisdictional claims in published maps and figures.