



E-ISSN: 2320-7078

P-ISSN: 2349-6800

[www.entomoljournal.com](http://www.entomoljournal.com)

JEZS 2020; 8(2): 242-246

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Received: 07-01-2020

Accepted: 09-02-2020

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## Flower chafer beetle (*Oxycetonia versicolor* Fabricius) on the verge of becoming a major pest on cotton in Telangana region of India: A first report

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### Abstract

The insect pest scenario in cotton crop has been very fragile possibly with the commercialization of Bt cotton, intensive monocropping, indiscriminate and continuous use of synthetic pesticides. Accordingly, insect pests which are minor, negligible or sporadic earlier became major and serious pests. The chafer beetle, *Oxycetonia versicolor* Fabricius, commonly known as flower chafer beetle belongs to family Scarabidae, Coleoptera, as a pest on cotton has been reported and documented for the first time from the Telangana and Southern parts of India. Infestation level of flower chafer beetle was 01-07 beetles / 10 plants. The adult beetles were found feeding on pollens, anthers and other reproductive parts inside the flowers and also on tender bolls. This beetle was also noticed on brinjal, sesamum, maize, sorghum and *Parthenium hysterophorus*. The present study pointed out that flower chafer beetle incidence and its host range is widening with a considerable intensity. This report indicates a forewarning signal that flower chafer beetle may attain a status of 'major pest' of cotton in coming years in Telangana and southern parts of India.

**Keywords:** New pest, climate change, insect dynamics, pest host range, DAATTC

### Introduction

Bt Cotton has changed the scenario of cotton production in agrarian India which is reflected in sharp increase in cotton acreage (12 million hectare in 2017-18) and productivity since introduction of Bt cotton in India<sup>[1-3]</sup>. As a cash crop, cotton has improved the livelihood of a huge number of farmers when compared to less remunerative food grain crops in India. However, considerable numbers of cotton farmers have committed suicides owing to various factors, among which abiotic and biotic stress induced crop losses, increased cost of cultivation and low net income are worrisome farming related factors.

The pest scenario in cotton cultivation has been very dynamic since last few years, possibly with the commercialization of Bt cotton, intensive monocropping, indiscriminate and continuous use of synthetic pesticides led multiple resistance, resurgence and secondary pest outbreak. Accordingly, there has been a further change in the status of several insect pests in cotton, insect pests which are minor, negligible or sporadic earlier became major and serious pests such as white flies, thrips, aphids, jassids, mealy bugs, shoot weevil, stem weevil and mirid bugs while declining in the pest status of bollworm complex on Bt cotton ecosystem<sup>[4-6]</sup>. In this context, authors conducted diagnostic field visits to Bt cotton fields affected with a new insect pest devouring economic plant parts *i.e.*, in flowers and tender cotton bolls in Adilabad and Mancherla districts of Telangana State of India. The pest was identified as Flower chafer beetle (*Oxycetonia versicolor*)<sup>[7]</sup>.

The present study reports the infestation level of the beetle and its population dynamics in cotton across the distant 14 locations *viz.*, Waghapur, Vijapur, Kapri, Kamata, Bela, Mendapalli, Hajipur, Jamdapur, Nipani, Bhimpur, Ponnari, Sunkidi, Pochera, Gudihatnoor surveyed by Scientists, District agricultural advisory and transfer of technology (DAATTC), PJTSAU, Hyderabad. The adult beetles were found feeding on pollens, anthers and other reproductive parts inside the flowers and also on tender bolls of cotton. This beetle was also observed chewing the tender shoots of the brinjal crop, feeding in tender maize cobs, ear heads of sorghum, flowers of sesamum and *Parthenium* plants adjacent to surveying areas.

## Material and Methods

Cotton crop sown with Bt varieties were infested with flower chafer beetle at different locations. To study the infestation level of the *Oxyctonia versicolor* in cotton, Scientists of District agricultural advisory and transfer of technology (DAATTC), Adilabad conducted diagnostic field visits along with Department of Agriculture officials in the distant 14 villages of Adilabad and Mancherial districts of Telangana State of India (Fig. 1). 'W' pattern of scouting was adopted to record its population in cotton crop in unit area during August-September months, when the crop was at early flowering stage. Weather conditions during the study period are presented in Fig. 2. Observation on number of beetles present on ten plants at each location was recorded. Scouting was conducted during forenoon i.e., 8 AM to 10 AM of the day.

## Results and Discussion

The adult beetles were of size 6.5-15 mm in length having brick red elytra and prothorax. It was revealed that the adults of flower chafer beetle (*Oxyctonia versicolor* Fabricius) were feeding and damaging the flowers and tender bolls of the cotton crop. The chafer beetle, *Oxyctonia versicolor* Fabricius, commonly known as flower chafer beetle (Coleoptera: Scarabidae). The description of the insect under study was identical with the species reported from Northern part of India [7].

This beetle as a pest was reported on groundnut [8], pigeon pea [9], mungbean [10, 7], brinjal [11-12], pearl millet, sorghum, Maize [13], Okra [14], Rose [15] and Jatropa [16]. From India, flower chafer beetle as a pest of cotton was reported from Saurashtra region of Gujarat and wardha regions of Maharashtra i.e. central part of India [17]. Till date, this flower chafer beetle was not yet reported as a pest of cotton from cotton dominating states of Telangana, Andhra Pradesh and Tamil nadu by the researchers.

The infestation of flower chafer beetle was observed on cotton crop. The adult beetles were feeding on pollens, anthers and other reproductive parts inside the flowers at distant 14 locations (Table 1) and also on tender bolls at one location (Mendapalli (19.502N, 79.612E) (Fig. 3 (i to iii)). This resulted into complete damage of infested flower and boll thereby reducing the economic yield of the crop. The atmospheric temperatures, relative humidity recorded during the August and September months were 20.6°C (minimum) to 31.9°C (maximum) and 72 to 80%, respectively. Nevertheless, it must be mentioned with an emphasis that the incidence of flower chafer beetle on cotton was not noticed during the month of October onwards. Generally in Telangana region, during October month the cotton crop exhibits presence of flowers and hardened bolls. The presence of

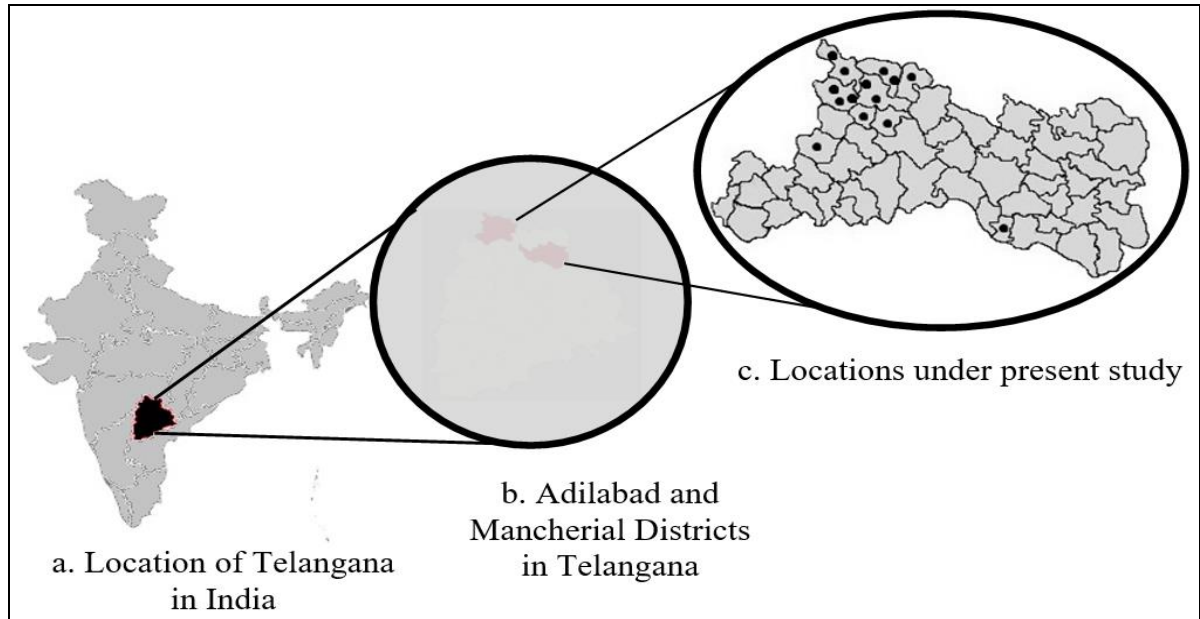
chafer beetle was observed irrespective of farming situation and vicinity to the forest.

Infestation of flower chafer beetle was highest (04-07 beetles / 10 plants) in Mendapalli village (19.502N, 79.612E) and lowest (01-03 beetles/10 plants) in Hajipur village (18.873N, 79.307E). Flower chafer beetle mouth parts were not adopted for penetration of resistant plant tissue [7]. But in contrast, it was observed that adult beetles were feeding inside the tender bolls having cutting the pericarp. While surveying for infestations of flower chafer beetle on cotton, it was found that this beetle was also observed feeding on crops like Brinjal (Fig. 3 (iv)), Maize (Fig. 3 (v)) Sorghum (Fig. 3 (vi)), Sesamum (Fig. 3 (vii)) and on weed *Parthenium hysterophorus* (Fig. 3 (viii)). This beetle was also observed chewing the tender shoots of the brinjal crop, feeding in tender maize cobs, ear heads of sorghum, flowers of sesamum and *Parthenium* plants adjacent of cotton crop. Similar report of feeding in tender maize cob was also recorded from certain parts of India [11] [12].

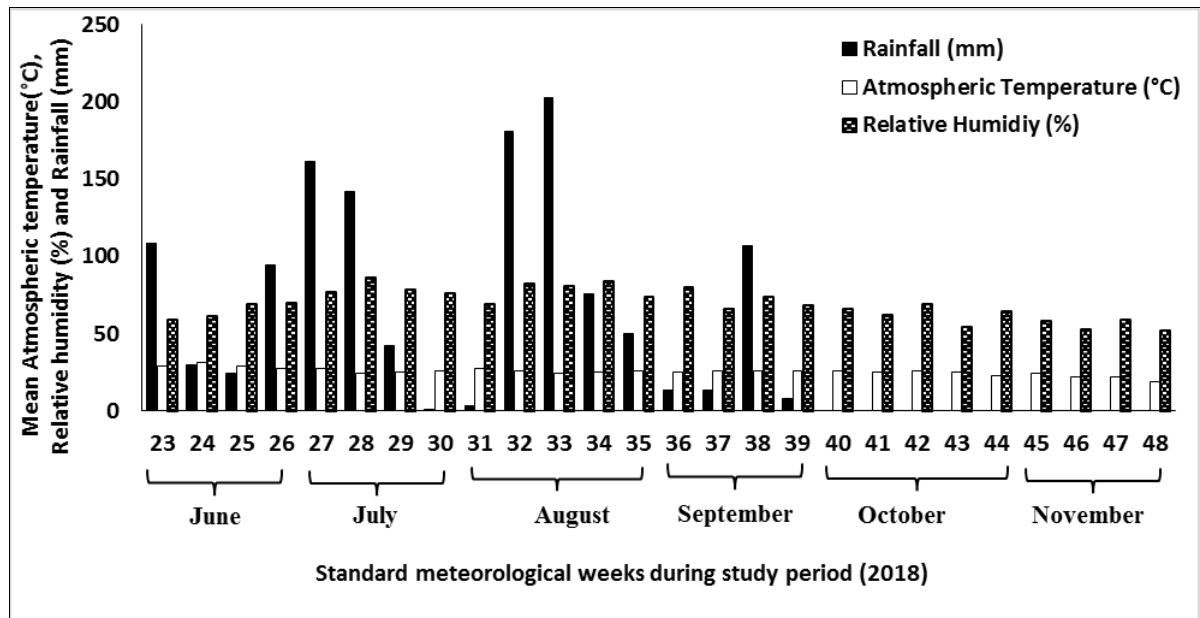
Till date, flower chafer beetle has not been reported as a pest of cotton from Southern India. However, the infestation of *Oxyctonia versicolor* on cotton flowers documented from Rajasthan [18] and Saurashtra region of Gujarat and wardha regions of Maharashtra [19]. This has to be noted here that at the time of field visits not only the cotton crop but also soybean (*Glycine max* L.) plants were at peak flowering stage in the vicinities. However, no infestation of flower chafer beetle was noticed on soybean crop. It indicates that the beetle had preference towards cotton flowers as preferred food rather than the flowers of soybean crop. Since the Indian peninsula is witnessing aggravated climate change, interactions between plant and its environment are changing. Scientific developments in crop improvement sector have given rise to usage of specialised kinds of agrochemical like pesticides targeting particular insect pest. Insect dynamics in the given agro-ecosystem has a considerable dependence on changing climatic conditions like atmospheric temperature and rainfall, increase of CO<sub>2</sub>, availability of native ecosystem, changes in selection pressure in the nature, rapid genetic adaptations of insects to seasonal changes in temperature, atmospheric CO<sub>2</sub> level and utilization of special pesticides [20-23]. Better understanding of direct and indirect interactions between flower chafer beetle and climate change through modelling are very much needed. The present study pointed out that flower chafer beetle (*Oxyctonia versicolor*) incidence and its host range is widening with a considerable intensity. This report raises a forewarning signal that flower chafer beetle (*Oxyctonia versicolor* Fabricius) may attain a status of 'major pest' of cotton in coming years in Telangana and other states of India.

**Table 1:** Level of infestation of flower chafer beetle (*Oxyctonia versicolor* Fabricius) on cotton crop at different locations in Telangana region of India

Sl. No	Village	GPS coordinates	No. of beetle/ 10 plants	Surveyed area (hectare)
1	Waghapur, Vaijapur	19.572N,78.474E	03-05	10
2.	Kapri, Kamata, Bela	19.476N,78.688E	01-04	8
4.	Mendapalli	19.502N,78.612E	04-07	16
5.	Hajipur	18.873N,79.307E	01-03	4
6.	Jamdapur, Nipani, Bhimpur, Ponnari, Sunkidi, Pochera	19.667N,78.416E to 19.682N,78.493E	02-04	14
7.	Gudihatnoor	19.527N,78.520E	03-05	4



**Fig 1:** Locations of Flower chafer beetle incidence in Telangana region of India



**Fig 2:** Weather conditions prevailed during study period (2018)



**Fig 3i & ii:** Chafer beetle devouring reproductive floral part of cotton





**Fig 3iii:** Feeding on tender bolls of cotton



**Fig 3vi:** On sorghum ear head



**Fig 3iv:** Damaging tender shoot of Brinjal



**Fig 3vii:** Feeding on Sesamum



**Fig 3v:** On tender Maize cob



**Fig 3viii:** Beetle feeding on *Parthenium hysterophorus* flowers

**Fig 3:** Incidence of Flower chafer beetle (*Oxycetonia versicolor* Fabricius) on Cotton, other crops and *Parthenium hysterophorus*

### Acknowledgments

The authors are grateful to the progressive farmers of the study area and the Department of agriculture officials for providing necessary information during this investigation and follow up.

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