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College Code; 11135

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☎: (0253)2555221, 2555224 ✉ - principal-bscagri@kkwagh.edu.in 🌐 <https://agri-bsc.kkwagh.edu.in>

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9TH ACRDN MEETING & INTERNATIONAL CONFERENCE

BOOK OF ABSTRACTS

THEME

"Innovations for a Resilient and Sustainable Cotton Production and Viable Value Chain"

Venue:

**ICAR-CIRCOT, Mumbai
December 06-08, 2023**

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Ninth Asian Cotton Research and Development Network (ACRDN) Meeting

ICAR-CIRCOT, Mumbai, December 06-08, 2023

Theme

"Innovations for a Resilient and Sustainable Cotton Production and Viable Value Chain"

Book of Abstracts

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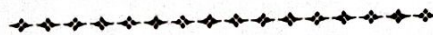
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Cotton (*Gossypium hirsutum* L.) is commonly referred as King of Fibre crops or White gold due to the huge market value and export significance. Several pests like sucking and bollworm complex severely inhibit the potential yield of the crop. Among these, Pink bollworm, *Pectinophora gossypiella* (Saunders) is of major significance in causing significant damage to the crop. Though the transgenic cotton was introduced to mitigate the bollworm complex, pink bollworm has evolved the ability to resist the toxins and survive. Hence the present investigation was formulated to investigate the incidence as well as resistance status of the pest across the major cotton growing zones of the country viz., North, Central and South and map the resistance. Subsequently, the F₁ progeny from these field collected larvae were subjected to diet incorporation bioassay with Cry1Ac and Cry2Ab. Based on the mortality data, the lethal concentrations for respective populations were estimated (POLO PLUS[®]). Among the North, Central and South zone, the highest green boll damage of 100, 90 and 96.67 per cent and locule damage of 91.06, 84.17 and 79.17 per cent were recorded from F₁ populations derived from populations collected from cotton grown in Mansa (Punjab), Yavatmal (Maharashtra) and Guntur (Andhra Pradesh), respectively. For the same locations the median lethal concentrations were found to be 5.036, 4.980 and 5.678 ppm against Cry1Ac and 5.228, 3.109 and 4.705 ppm for Cry2Ab. These results clearly depicted the higher levels of resistance developed by pink bollworm resulting in the increased survival on the transgenic cotton. Non-compliance of refugia, varied sowing window across the zones, cultivation of unapproved *Bt* hybrids, leaving crop as such after harvest were found to be the key factors contributing for the higher incidence and accelerated evolution of resistance against *Bt* toxins.

Keywords: Bioassay, *Bt* cotton, Cry toxins, Pink bollworm, Resistance



Abstract No.: 31

Biology and parasitic efficiency of *Trichogrammatoidea bactrae* Nagaraja on eggs of different bollworms

*Manisha Shivaji Kuyate and Vijay Krishnarao Bhamare

Department of Agricultural Entomology, College of Agriculture, Latur Vasant Rao Naik Marathwada
Krishi Vidyapeeth, Parbhani-431402(M.S.), India.

Email: manishakuyate2013@gmail.com

The investigations on the biology and parasitic efficiency of *Trichogrammatoidea bactrae* Nagaraja on the eggs of *Corcyra cephalonica* (Stainton), *Helicoverpa armigera* (Hubner), *Pectinophora gossypiella* (Saunders) and *Spodoptera frugiperda* (J.E. Smith) revealed that host influences the growth and survival of the developing parasitoid. The overall results on biology of *Tr. Bactrae* revealed that per cent parasitisation (89, 66, 69 and 67 per cent respectively) was noticed on the fifth day after exposure of various host eggs. Egg-larval period was (4.02 ± 0.23, 4.60 ± 0.24, 4.98 ± 0.11 and 4.46 ± 0.11 days respectively), prepupal-pupal period was (2.98 ± 0.13, 3.20 ± 0.16, 3.82 ± 0.08 and 3.34 ± 0.08 days respectively), total developmental period was (7.00 ± 0.14, 7.80 ± 0.17, 8.80 ± 0.07 and 7.80 ± 0.16 days respectively), per cent adult emergence was (91.01, 77.27, 79.71 and 73.13 per cent respectively), sex ratio was female biased on all host eggs (1:1.61, 1:1.83, 1:1.5 and 1:1.88 respectively), adult longevity of male was (1.40 ± 0.07, 1.20 ± 0.07, 1.80 ± 0.07 and 1.14 ± 0.04 days respectively), adult longevity of female was (5.80 ± 0.35, 5.40 ± 0.12, 6.60 ± 0.10 and 4.80 ± 0.16 days respectively), total life-cycle duration of male was (8.40 ± 0.19, 9.00 ± 0.23, 10.60 ± 0.07 and 8.94 ± 0.16 days respectively) and total life-cycle duration of female was (12.80 ± 0.42, 13.20 ± 0.19, 15.40 ± 0.12 and 12.60 ± 0.23 days respectively). The results of parasitic efficiency of *Tr. bactrae* on four different host eggs evidenced noticeable difference found in rate of parasitism. Maximum average parasitism was registered on the eggs of *C. cephalonica* (78.50 ± 4.95 percent) followed by *P. gossypiella* (63.50 ± 9.19 percent), *H. armigera* (61.50 ± 9.19 percent) and *S. frugiperda* (56.50 ± 6.36 percent).

Keywords: Biology, Parasitic efficiency, *Trichogrammatoidea bactrae*, Bollworms

Abstract No.: 32

Potential efficacy of public sector *Bt* cotton hybrids against an invasive pest, *Spodoptera frugiperda* (J.E. Smith)

*B.A. Thakre and V.K. Bhamare

Department of Agricultural Entomology, College of Agriculture, Latur (Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani) - 431 402 (M.S), India.

Email: tbhushan50@gmail.com

The fall armyworm [*Spodoptera frugiperda* (J. E. Smith)] (Noctuidae; Lepidoptera), an invasive polyphagous pest, feigns a potential threat to cotton cultivation in India. Therefore, the laboratory investigation was conducted with different public sector *Bt* cotton hybrids (NHH-44 BG II, PKV Hy-2 BG II, PDKV-JKAL-116 BG II, G. COT-10 Hy. BG II, G. COT-08 Hy. BG II and NHH-44 non-*Bt* as control) to investigate the survival and development of the pest. The pest exhibited varied range of comparative efficacy on different public sector *Bt* cotton hybrids with respect to survival and developmental parameters such as larval mortality, larval weight, pupation, pupal weight, adult emergence, growth and survival indices of the survived larvae after releasing on different plant parts at pre determined intervals. The results confirmed significantly ($p \leq 0.05$) higher per cent mortality of early larval instars, than the later. The surviving larvae showed adverse effects on the growth and developmental biology of insects, such as reduced larval weight, prolonged duration for larval development, decrease in pupation, formation of small pupae exhibiting lower weight, reduction in per cent adult emergence along with lower growth and survival indices. *S. frugiperda* reared on leaves (60-80 days old crop) and squares (90-110 days old crop) showed low growth and survival indices values, compared to those reared on young bolls (120-140 days old crop) and mature bolls (150-170 days old crop). Among the different public sector *Bt* cotton hybrids, significantly superior results were exhibited by the PKV Hy-2 BG II when larvae fed on leaves and squares, and the NHH-44 BG II when fed on young and mature bolls. Our findings demonstrated the potential to elude damage by this pest as well as season long control efficacy of different public sector *Bt* cotton hybrids under semi-arid region of Maharashtra (India).

Keywords: *Bacillus thuringiensis*, cotton hybrids, fall armyworm, invasive pest, potential pest, public sector, *Spodoptera frugiperda*

Abstract No.: 33

Fenprothrin-a new tool in cotton pink bollworm, *Pectinophora gossypiella* management

*G. Annie Diana Grace., N. Venkata Lakshmi and B. Sree Lakshmi.

Regional Agricultural Research Station, Lam, ANGRAU, Guntur-522 034, Andhra Pradesh India

Email: anniedianagrace@angrau.ac.in

Efficacy of different group of insecticides viz., Synthetic pyrethroids, bifenthrin 10% EC @ 800 ml/acre, cypermethrin 25 EC @ 200 ml/ha, fenprothrin 30% EC @ 750 ml/ha, deltamethrin 11% EC @ 500 ml/ha, Organophosphorus compound: Profenophs 50% EC @ 1500 ml/ha, diamides: chlorantraniliprole 18.5% SC @ 150 ml/ha, flubendiamide 39.5% SC @ 100 ml/ha, oxadiazine: indoxacarb 14.5% SC @ 500 ml/ha, Spinosyns: Spinetoram



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This is to certify that

Dr./Mr./Ms. Manisha Shivaji Kuyate

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