ACTA SCIENTIFIC AGRICULTURE (ISSN: 2581-365X)

Volume 3 Issue 1 January 2019

Research Article

Successful Rearing Procedure of Pink Bollworm (*Pectinophora gossypiella*) Lepidoptera: Gelechiidae on Alternate Host (Okra)

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Received: November 26, 2018; **Published:** December 13, 2018

Abstract

Being a cash crop, it is important to increase the yield of cotton. Cotton crop is attacked by many pests especially bollworms. *Pectinophora gossypiella* is one of the major pests of cotton and larva of *P. gossypiella* damage the boll by eating internal contents of boll. Biology of *P. gossypiella* was studied by rearing on an alternate host okra in controlled conditions (28 ± 1°C temperature and 55 - 60% relative humidity). Both adults of male and female moth were released into a rearing cage and were fed on a proteinex mixture. Eggs were collected from rearing cages, from which larvae emerged. Freshly emerged larvae were shifted on fresh okra pieces. Larvae became pink in third and fourth instar and it took 35 - 40 days to complete its life cycle.

Keywords: *Pectinophora gossypiella*; Cotton; Rearing Cage; Okra

Introduction

Being a cash crop, it is important to increase the production of cotton. But attack of many insect pests (bollworms) is reducing yield of cotton. Cotton is much sensitive crop to the pest attack and chemically intensive among all fields. Pink Bollworm (*Pectinophora gossypiella*) belongs to family Gelechiidae of order Lepidoptera). Chamberlain., *et al.* [1] reported the cotton bollworm (Lepidoptera: Gelechiidae) as the major cause of yield losses in Pakistan whereas Wilson., *et al* [2]. Gilick., *et al*. [3], reported that PBW first time observed in North America (Mexico) in 1911, later on Nobel., *et al*. [4], observed the damage of first instar larva in cotton bowl in India in 1843. Ahmed [5] said that 20 - 30% reduction in cotton crop yield is caused by the attack of bollworms. Ghouri [6] reported that it is of the major pests of cotton and cause up to 20% yield loss. It is native pest of Asia but now it has spread to all over the world where cotton is grown. Attique [7] described the preferred site of PBW for egg laying. It is very difficult to control this pest as its larva remains inside the bolls and insecticide cannot reach there. Its attack results in and overall poor quality of the cotton crop due to staining of the lint [8]. It also causes severe damage to flowers and squares [9].

Eggs are laid singly or in group form of 4 - 6. Freshly laid eggs are 0.4 - 0.6 mm long and whitish in color but later turn into orange color. Larval stage consists of four instars. Larvae are 1 - 2 mm long when hatched and become 12 - 15 mm long when fully matured. First two instars are white in color and it start to change its color to pink in third instar and become fully pinkish in fourth instar. Larval stage is most damaging stage. Larvae enters pupal stage which continue up to 8 - 10 days. Pupae are reddish brown in color and measures 8 - 10 mm in length. Normally it pupates inside soil or in litter on ground. Adult emerges after pupal stage. Adults are small, dark - brown moths measuring about 12 - 20 mm across the wings. The head is reddish brown in color with pale, iridescent scales. Forewings are elongated - oval, pointed at the tips and bearing a wide fringe while hind wings are broader than the fore wings and darker at the base and apex. The male genitalia are broader at the base, tapering to a point and the aedeagus has a hooked tip.

Materials and Methods

First of all, cotton shoots bearing fresh leaves from upper portion of main branch were taken. Shoots were washed with fresh water to make them free from contamination. After that shoots were fitted into plastic vials filled with water to keep shoots fresh. A piece of wool was also wrapped around the base of shoots. An oviposition cage of glass (60 x 60 x 60 cm diameter) was prepared. A polystyrene sheet placed into cage and vials containing cotton shoots were fixed into it (Figure 1). Adults of pink bollworm were

collected from cotton of different regions of country kept in glass cages Adults of pink bollworm were released into oviposition cage (Figure 2). Adults were fed on a mixture of 'Proteinex' (a protein supplement) and honey solution. A cotton ball dipped in distilled water was also placed in each cage. Cotton shoots served as a substratum for adults to rest and oviposit. Oviposition cage was covered with black cloth to avoid from light (Figure 3). Cotton Shoots and diet was changed after every two days. Oviposition cage was kept in controlled conditions (28 ± 1°C Temperature and 55 - 60% Relative Humidity). Female moths laid eggs in leaf axils, and on the ventral surface of the leaves. After two days, these shoots were replaced with new shoots. Old shoots containing eggs were placed into a glass jar (Figure 4). Glass jars were examined on daily basis under microscope (Figure 5) and newly hatched larvae were transferred onto pieces of fresh okra fruit with the help of camel hair brush and reared up to pupation. Okra pieces were changed every 3 days using a fine hair brush.

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Results and Discussion

The life cycle of pink boll worm was studied. Each life stage of pink boll worm was examined carefully on daily basis. Female moths lay eggs singly or more commonly, in small groups. Eggs

hatches within 2 - 4 days. Larval period is normally complete in 15 - 18 days. Pupa does not feed or move during the pupal period. The pupal period is of 7 - 8 days. Adult moths of *P. gossypiella* are small, dark - brown in color. After emergence male and female mates within 3 - 4 days and female lay eggs within 8 - 10 days. The female produces a sex pheromone that attract the male for mating. Adult stage continues up to 13 - 16 days. It takes 35 - 40 days to complete life cycle (Table). Adult mates 3 - 4 days after emergence.

Stage	Avg. ± SE (days)	Range (days)	
		Min.	Max.
Egg	3 ± 0.28	2	4
1st Instar	3.33 ± 0.36	3	5
2nd Instar	3.83 ± 0.34	3	5
3rd Instar	3.83 ± 0.18	3	4
4th Instar	3.66 ± 0.23	3	4
Pupa	8.83 ± 0.44	8	10
Adult	14.33 ± 0.54	13	16

Table

Conclusion

Pink Bollworm (*Pectinophora gossypiella*) spends its life cycle inside the bolls. Its life cycle consists of four stages (Egg, Larva, Pupa, Adult). Larval stage consists of four instars while 3rd and 4th in stars are pink in color that's why called pink bollworm. It completes life cycle in 35 - 40 days.

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Volume 3 Issue 1 January 2019