



Cotton shredder bug *Creontiades pallidus* (Rambur, 1839) damage to cotton crop in Surkhandara region of South Uzbekistan

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Abstract

Our research works have been in north and south districts of Surkhandarya region, South Uzbekistan in between 2017-2019. Damage to the cotton crop of cotton shredder bug was carried out in special entomologic cages at different times. The experiments were conducted in the Bukhara-102 cotton variety which was planted in 90 cm rows. Special entomologic cages are 120 cm X 120 cm X 120 cm and it puts to 10 cotton plants Adult cotton shredder bugs were placed at 0 (cultivation time of cotton), 10, 30, 50 (early), and 0 (control), 3, 5, and 10 in cultivation late time of the plant. In experiments, the reduction of cotton yield relative to the control was calculated at each decade of the month. According to the results of the study, *Creontiades pallidus* increased in the number of cotton during early shading caused the reduction of cotton yield by 62.5, 89.6, 94.8% compared to the control, and by 12.5, 26.9, 34.9%. *Creontiades pallidus* is widely multiplied on cotton fields near of the Amu Darya, and in July-August the number ranges from 500 to 1000 insects per 100 plants.

Keywords: Miridae, *Creontiades pallidus*, Cotton, dynamics, Agrobiocenosis, economic loss, entomological cage

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INTRODUCTION

Currently, there are more than 50,000 species of bugs (Hemiptera: Heteroptera) worldwide, of which about 10,000 belong to the 1400 species of the Miridae family. (Schuh, 1995; Wheeler, 2000).

Nowadays, in the cotton-producing countries, the species of *Creontiades pallidus*, *Creontiades biseratense*, *Creontiades dilutus*, *Lygus lineolaris*, *Lygus hesperus*, *Lygus dessinus* from the Miridae family of *Creidai* and *Lygus* genus serious damage to cotton crop. As a result, they cause a 30-50% reduction in cotton yield and up to 80% in common cotton cultivation areas (Stamp, P. A. 1987; Panchal, 2018).

Since the 2000s, the *Creontiades pallidus* has been widespread in the Middle East, causing extensive damage to cotton and other agricultural crops. In recent years, scientists have been doing a lot of research to save cotton from *Creontiades pallidus* in south Adana Province Qukurova Region, Turkey and South Sabzevar, Razavi Khorasan Province, Iran. in particular, *Creontiades pallidus*, which penetrated southern

Surkhandarya and Kashkadarya regions of Uzbekistan from the Middle East through Turkmenistan in 2000-2005, has been harming cotton production for the last 10 years. The analysis of Surkhandarya region in 2016-2019 study reveals that up to 60% of cotton crop was lost in some areas.

Creontiades pallidus spread over 143,714 hectares in 2018 and 78,500 hectares of cotton in 2019, resulting in over 10 billion dollars spent on controlling against it. Today, the development of effective methods to control the bioecology and damaging of cotton shredder bug.

MATERIAL AND METHODS

The research was conducted in 2017-2019 at the Scientific Research Institute of Agrotechnology of Crop Breeding and Breeding in Surkhandarya region. Use of entomological insect net of 38 cm in diameter for determine and distribute of cotton shredder bug in cotton

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and alfalfa fields. In this case, the average number of bugs in 10 pairs of insect net from five areas of the field was calculated. In cotton, 10 places (total 100 plants) were harvested from 10 places on a 1 m white cloth (Beat Sheet method) and the average number of bugs per 100 plants was calculated.

The study of the damage of bug to cotton crop was conducted in 2 ways.

Experience in special entomologic cage

The experiments were conducted in the Bukhara-102 cotton plant which was planted in 90 cm rows. The special entomologic cages are 120cm X 120cm X 120cm and are installed in cotton rows 2 to 5cm (total 10 pairs) to 25- 30cm tall. The special entomologic cages were surrounded by a small poor cloth, and a special entry to put bug to inside was placed on one side to examine the damage. Adult bugs were placed on each bale at a ratio of 0 (control) / 1/3/5. The damage to the cotton crop of *Creontiades pallidus* was calculated as a control.

Experiments on special little entomologic cages (special little cages)

The study of the damage of the *Creontiades pallidus* to the cotton crop elements was carried out on a special little entomologic cages of cloths (special little cages) with a visible diameter of 20x10 cm. Crops of 20 bracts, blossom, bolls (small 1-1.5 cm) were inserted into special little entomologic cages, and each adult bug was put to cages with 1/2/5/7/9 days. For each of the elements of the cotton crops, 10 special little entomologic cages were used as control without a bug.

RESULTS AND DISCUSSION

Cotton shredder bug

Male is 6,5-7 mm, female 7-7,5 mm. The color is light green and turns brown-brown in late autumn and winter. They lay their eggs in body of the cotton. One female lays more than 100 eggs. The eggs are 1.0-1.5 mm long and 0.4 mm wide. The larvae develop in five instars. Antenna of larvae (1-2 instars) has red rings. In adult larvae (4-5 instars), red rings disappear and a pair of black spots appear in the center of the body (picture 1). Cotton shredder bug get their diapause as an adult. It gives 3-4 generations a year.

C. pallidus occurs in small numbers of alfalfa in the early spring, with an average of 23 units per 10 pairs of entomological nets in April. The dramatic increase in the number of cotton shredder bug starts in July and reaches 150-160 on average in August. In summer, with the increase in the number of *C. pallidus*, there was a dramatic decline in the number of other species of bugs (such as: *Adelphocoris lineolatus*, *Lygus pratensis*) that are common in alfalfa agrobiocenosis.

The migration of cotton shredder bug from the alfalfa to the cotton fields coincides with the formation of the cotton's developments (late April and early May). During

this period, the number of bugs was small, with 5 to 10 bugs in per 100 plants. The number of cotton shredder bug ranged from 20 to 25% during the blossoming period (late May, early June), to 100-150, during the period of cotton harvesting (July-August), to 500-1000 (in desert areas). Up to now, there has been a chemical control of 1-2 times to protect the cotton crop from insects, and now only 3 to 5 times to *Creontiades pallidus*, in the Amudarya, bugs number is more than other countries, therefore the Amudarya river of Muzrobot district in some places, there are Buriev, A. In Nabiev and Berdikobilov, they have to control about 7-8 times in every season. Studies have shown the highest effectiveness (95-98%) in the use of chemicals (BI-58, Nurell-D, Agrafos Extra), which have the effect of *dimethoat* and *cipermethrin* + *chlorpyrifos*, which are effective control to *Creontiades pallidus*.

In the autumn, *C. pallidus* is migrated from cotton to cultured plants. In September, *C. pallidus* was most commonly found in mung bean, alfalfa, peanuts, beans, corn, and millet, with bugs dispersed to near 50 to 100 in caught with each entomological cage.

Damaging to cotton crop

There are 2 main species of phytophagous bugs (*Adelphocoris lineolatus*, *Lygus pratensis*) belonging to the Miridae family in the agrobiocenosis of cotton in Uzbekistan. These bugs were considered economically harmless because they were rare in cotton. However, in recent years in the southern Surkhandarya and Kashkadarya regions, *C. pallidus*, a new species for the fauna of Uzbekistan, has been dispersed, causing serious damage to cotton and other agricultural crops. This species was found in Surkhandarya from 2000 to 2005 and the name of this 0, Surkhandarya region, cotton shredder bug is distributes on early may. It distributes later (June-July) and in smaller numbers in other districts. The severe damage of cotton by *C. pallidus* is determined in Muzrobot district. Based on this, we conducted two different experiments on the entomologic cages.

The size of the entomologic cages are 120 cm X 120 cm X 120 cm and it is set at the time of emergence of elements of 25-30 cm height in 5 rows (10 pairs). Male and female of cotton shredder bugs were released on 10/30/50 in equal put to each 10 plants. Cotton growers under the influence of candlelight, the falling of harvest elements (bracts, blossom, bolls, harvest) were calculated over the days. In the end, the damage of *C. pallidus* to cotton was very high. Decrease in yield relative to control in each 10/10, 10/30, 10/50 ratio is 62.5 / 89.6 / 94.8% and 26.1 / 39.7 /. Caused a growth of 47.3 cm (Fig. 1).

In practice, this large decline in cotton yield was due to the fact that cotton shredder bug was introduced to the cotton in the early term, during the formation of high-yielding elements of cotton. Therefore, we learned this

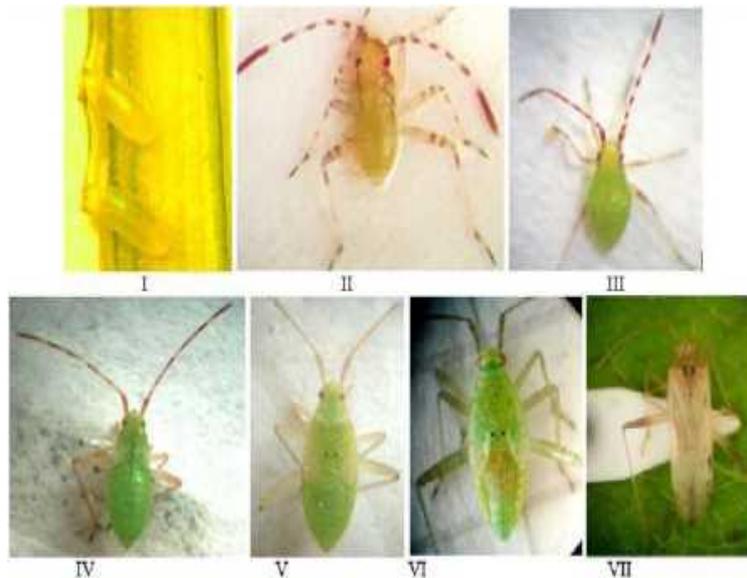


Fig. 1. I-eggs., II, III, IV, V, VI- larvae., VII- adults of *Creontiades pallidus*



Fig. 2. Experience on the little entomological cages



Fig. 3. Experience on the entomological cages

experience at a relatively late time when the elements of the cotton crop were sufficiently formed and in a small number of 10/2, 10/3, 10/5, 10/10. As a result, there was a decrease in yield by 4.7 / 7.8 / 9.5 / 18.9% in the ratio of 10/2, 10/3, 10/5, 10/10, respectively.

Experience on the little entomological cages

The study of the damage of the *Creontiades pallidus* to the cotton crop elements was carried out on a special little entomological cages with a visible diameter of 20X10 cm. 20 bracts, blossom, bollsof cotton (small 1-



Fig. 4. Experience on the entomological cages

Table 1. The result of cotton shredder bugs influence to cotton, it determined by little entomological cages

Variants	Repetition of experiments with number	Ratio of bugs influence to cotton harvest elements	Cotton harvest elements falling each, %				
			1	3	5	7	9
Bracts							
Experience	20	1:1	0	17	44	72	100
Control (without bug)	10	1:0	0	0	10	10	10
Blossom							
Experience	20	1:1	0	16	58	89	100
Control (without bug)	10	1:0	0	0	0	10	10
Carpel							
Experience	20	1:1	0	65	85	90	100
Control (without bug)	10	1:0	0	0	10	20	30

1.5cm) were attached to adult cotton shredder bug put to inside of little entomological cages, and the underside of it was tied with a rope to keep it away. Damaging of cotton shredder bug to cotton was calculated every 1/3/5/7/9. Each of cotton harvest elements for entomological cages put for control.

The results obtained

The falling of the bracts of the cotton crop under the influence of cotton shredder bug began to appear on the 3rd day. Compared to the control, spillage of cotton bracts reached 17% on day 3, 44% on day 5, 72% on day 7, and 100% on day 9. In the control variant, 10% of the yield was affected by natural factors (influenced by external factors).

Cotton blossom shedding reached 16% on day 3, 58% on day 5, 89% on day 7, and 100% on day 9. In the control variant, 10% of the yield was affected by natural factors (influenced by external factors). The falling of cotton bolls (1-1,5 cm) reached 65% on 3 day, 85% on 5 day, 90% on 7 day, and 100% on 9 day. In the control

variant, 30% of the yield was influenced by natural factors (table). Under the influence of cotton shredder bug, large bolls (4-5 cm) did not fall.

The results of the research can be summarized as follows. If *C. pallidus* (Cotton shredder bug) fed on cotton from the early bracting period and weighs 1/3/5 of a each plant but if you did not control from bug, cotton

harvest might be lost by 50% to 90%. In the case of cotton, the cotton starts to fall after the formation of 50-60% of the cotton elemental harvest (bracts, blossom, carpel) and results in a 5% to 20% decreasing unseccfully.

CONCLUSION

The occurrence of cotton shredder bug in cotton in early May. During this period, the number of cotton shredder bug is small, 5-10 per 100 cotton plant. The number of cotton shredder bugs 500-1000 during the cotton squaring (July-August). In the fall, cannabis

migrates from cotton mainly to mung bean, alfalfa, peanut, bean, corn, and millet. In the experience, the yield was 62.5-89.6-94.8% from the period of early white blooming (early June), 10-30-50 number of cotton shredder bug per 10 ripening bolls, when the elements

of late cotton yield were sufficiently formed (late July) and a small number of 10 cotton shredder bug accounted for 2-3-5-10 seeds, while the harvest decreased in 4.7-7.8-9.5-18.9%.

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