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المجلة العراقية لبحوث السوق
وحماية المستهلك

SEASONAL OCCURRENCE OF THE COTTON SEED BUG OXYCARENUS HYALINIPENNIS COSTA ON HIBISCUS SABDARRIFFA L. IN BAGHDAD.

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ABSTRACT

The field study was conducted in Abu Ghraib / Baghdad in the Agricultural Protection Department of the Ministry of Agriculture, for the 2023 agricultural season. Seeds of *Hibiscus sabdarriffa* L., of the two varieties, red and dark red, were planted for the purpose of studying the population density and seasonal presence of the cotton seed bug *Oxycarenus hyalinipennis* on the plant. The results showed that the first appearance of adults was in the third week of July, on the red and dark red varieties, at a rate of 4 and 5.5 adults/one sweep on sweeping net and 1.13 and 1.63 adults/one yellow sticky trap, respectively. The numbers of adults reached their peak on the eighteenth of July. During the month of December, there were an average of 12.44 and 15.88 adults/one sweep on sweeping net, 2.38 and 2.63 adults/yellow sticky trap, and 1.85 and 2.3 adults/fruit, espectively, also for the red and dark red varieties.As for eggs and nymphs, they first appeared in the first and second week of October, at a rate of 1.61 and 1.74 eggs/one fruit, and 1.3 and 1.81 nymphs/one fruit on both the red and dark red varieties, respectively, and their peak was also on the eighteenth of the month. December, at a rate of 5.9 and 8.19 eggs/fruit and 5.55 and 7.76 nymphs/fruit, respectively, for the two varieties.

keywords: *Hibiscus sabdarriffa*, cotton seed bug ,*Oxycarenus hyalinipennis* ,Seasonal occurrence.

الوجود الموسمي لبقة بذور القطن على نبات الكجرات في بغداد.

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الخلاصة

اجريت الدراسة الحقلية في ابي غريب/ بغداد في دائرة وقاية المزروعات التابعة الى وزارة الزراعة وللموسم الزراعي 2023 اذ زرعت بذور نبات الكجرات *Hibiscus sabdarriffa* L. وللصنفين الاحمر المتوسط والاحمر الداكن لغرض دراسة الكثافة العددية والوجود الموسمي لبقة بذور القطن *Oxycarenus hyalinipennis* على النبات اذ اوضحت النتائج ان اول ظهور للبالغات كان في الاسبوع الثالث من شهر تموز وعلى الصنفين الاحمر المتوسط والاحمر الداكن وبمعدل 4 و 5.5 بالغة/ كنسة واحدة و1.13و1.63 بالغة/ مصيدة لاصقة صفراء واحدة على التوالي ووصلت اعداد البالغات الى الذروة في الثامن عشر من شهر كانون الاول وبمعدل 12.44 و 15.88 بالغة/ كنسة واحدة و2.38 و2.63 بالغة/ مصيدة لاصقة صفراء و1.85 و2.3 بالغة/ ثمرة على التوالي ايضا على الصنفين الاحمر المتوسط والاحمر الداكن، اما البيض والحوريات فكان اول ظهور لهما في الاسبوع الاول والثاني من شهر تشرين الاول وبمعدل 1.61 و1.74 بيضة/ ثمرة واحدة و1.3 و1.81 حورية/ ثمرة واحدة على كلا الصنفين الاحمر المتوسط والاحمر الداكن بالتوالي وكانت

ذروتهما ايضا في الثامن عشر من شهر كانون الاول وبمعدل 5.9 و8.19 بيضة/ ثمرة و5.55 و7.76 حورية/ ثمرة بالتوالي على الصنفين.

الكلمات المفتاحية: نبات الكجرات *Hibiscus sabdarriffa*، بقة بذور القطن *Oxycarenus hyalinipennis*، الوجود الموسمي.

INTRODUCTION

Hibiscus sabdarriffa belongs to the Malvaceae family. It is a shrubby plant with red or green stems. Flowers vary in color depending on the variety. The fruits are nuts with seeds inside **(Fahd, 2009; Ramadan & Jamil, 2010; Rocha *et al.*, 2014; Mohsen, 2019).** There are many uses of the plant, including food, medicinal, and industrial, as the calyx leaves are rich in many organic acids that are important for health. It is also used in food for its distinctive flavor, in addition to its use in the manufacture of sweets and drinks, as its drink has many benefits because it contains a high concentration of vitamin C and is a diuretic, as well as a treatment for high blood pressure. It helps digestion, and the plant is also used in the manufacture of soap and cosmetics **(Al-Tahfi *et al.*, 2015; Singh *et al.*, 2017; Al-Samarrai & Zahwan, 2020).** The plant infects many plant diseases and insect pests, causing damage to flowers, leaves and fruits **(Olaniran *et al.*, 2013; Adebola & Gana, 2016; Koussoubé *et al.*, 2018; Mahunu *et al.*, 2021; Simon *et al.*, 2021).** Many insect pests have been recorded on the plant, including piercing-sucking insects such as the leafhopper *Empoasca spp*., the whitefly *Bemisia tabaci*, the cotton aphid *Aphis gossypii*, the spiny cotton nutworm *Earias insulana*, the cottonseed bug *Oxycarenus hyalinipennis*, and the mealybug Phenacoccus solenopsis.**(Abd El-Moniem & Abd El-Wahab, 2006; Abd El-Moniem *et al.*, 2011; Pitan *et al.*, 2007; El-Zoghby, 2017; Hashem *et al.*, 2017; Tuo *et al.*, 2019; Taylo & Magdalit, 2021; Mailafiya *et al.*, 2022).** Two species of seedbugs, *Oxycarenus gossypinus* and *Oxycarenus hyalinipennis*, have been recorded on Gujarat plants, The insect lays its eggs inside the fruits, causing the fruits to deteriorate and lose their value. The nymphs and adults feed on the plant juices of the seeds, causing the seeds to shrink and become unsuitable for cultivation **(Abd El-Moniem & Abd El-Wahab, 2006; Osman *et al.*, 2017; El-Mogy *et al.*, 2021; Al-saffar & Augul, 2021).**
Therefore, this research aimed to estimate the population density and seasonal presence of the cotton seed bug and study its effect on the plant.

MATERIALS AND METHODS

Insect diagnosis

The adults were placed in a bottle of 70% ethyl alcohol, and all information related to the date and area of collection and the host plant from which they were collected was recorded. These forms were sent to the Natural History Museum/University of Baghdad for the purpose of diagnosis.

Population density of cotton seed bug

The experiment was conducted in the Agricultural Protection Department of the Ministry of Agriculture, located in Abu Ghraib/Baghdad, where *Hibiscus sabdarriffa* seeds of the dark red and red varieties were planted in the 2023 agricultural season. After all agricultural operations had been carried out, a completely randomized block design (RCBD) was used in a factorial experiment that included four replicates in each replicate. Four treatments, samples of the cotton seed bug were collected using several methods:

1-The sweeping net

Samples were taken from the two varieties using the sweeping net every week, with two hits for each treatment as figure (1). The insects were collected from the sweeping net and placed in a plastic bottle labeled with all the details. They were taken to the laboratory and placed in the refrigerator for a quarter of an hour to reduce the movement of insects. Then the numbers of insects were calculated.

Figure (1): The sweeping net to collect cotton seed bug *O. hyalinipennis* on *H. sabdarriffa*.

2- Yellow sticky traps

Traps were set in the field several of treatments, that is, in each treatment, one trap placed on a wooden pole that controlled according to the height of the plant as figure (2), and it was changed weekly. The traps were taken to the laboratory, and the insects were counted microscopically.

Figure (2): The yellow sticky traps to catch cotton seed bug , *O. hyalinipennis* on *H. sabdarriffa*.

3-Fruit samples

Ten plants were randomly selected from each treatment, and two fruits from each plant weekly and placed in a bag with all the details labeled. Laboratory samples were taken and placed in the refrigerator for a quarter of an hour to reduce the movement of insects. After that, the fruits were examined microscopically and the number of adult insects, nymphs, and eggs was counted as shown figure No. (3).

Figure (3): Eggs, Nymphs and Adults of the cotton seed bug *O.hyalinipennis* on the fruits of the *H. sabdarriffa*.

RESULTS AND DISCUSSION

Insect diagnosis

The samples sent to the Natural History Research Center and Museum/University of Baghdad were diagnosed by Professor Dr. Razzaq Shalan Augul as the cotton seed bug, *Oxycarenus hyalinipennis* (Costa, 1847), as shown in Figure No. (4).

Figure (4): Adults of the cotton seed bug *Oxycarenus hyalinipennis*

Estimating the population density of cotton seed bugs

1- The sweeping net:

The first appearance of cottonseed bug adults was in the third week of July, on the medium red and dark red varieties, at a rate of 8 and 11 adults/two sweep When the maximum temperature was 45.10, the minimum temperature was 23.27, and the relative humidity 20.66%, respectively. Their numbers continued to increase until they reached their peak on the eighteenth of December When the maximum temperature was 17.26 and the minimum temperature was 6.21 and the relative humidity 80.22% their numbers were 24.88 and 31.75 adults/ two sweep in sweeping net, and on the twenty-fifth of December as shown figure No. (6, 7), it disappeared from the field due to the end of the crop season.The average number of adults of *Oxycarenus spp* on three varieties of gujarat plant, *H. sabdariffa* red, green, and *H. cannabinus*, was 7.00 adults/fruit, 5.25 adults/fruit, and 1.99 adults/fruit, respectively **(Saleh *et al*., 2005; Younes. *et al*., 2005; Al-Jassany & Al-Joboory, 2016; Ullah *et al*., 2016; Alamu *et al*., 2017).**

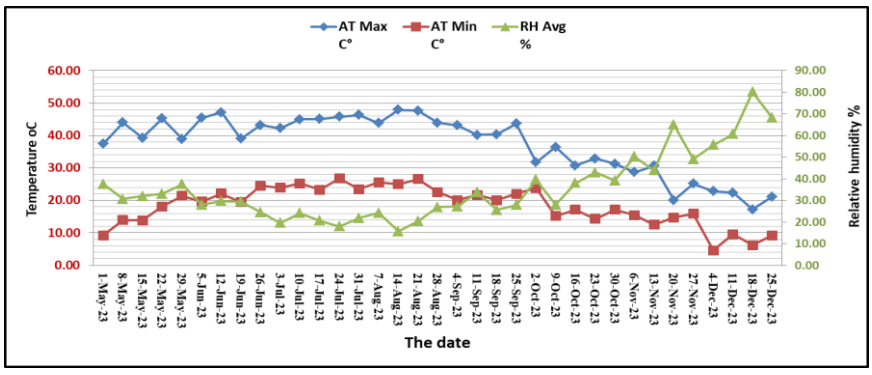

Figure (5): Maximum and minimum temperatures and relative humidity during the gujarat planting season.

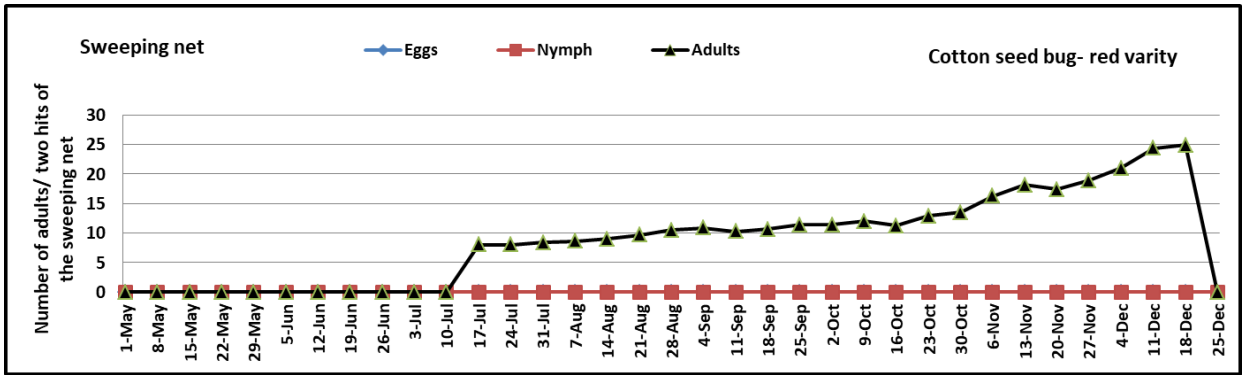

Figure (6): Average number of adults of the cotton seed bug, *O. hyalinipennis*, on the red variety of the *H. sabdariffa* in the sweeping net for 2023 agricultural season.

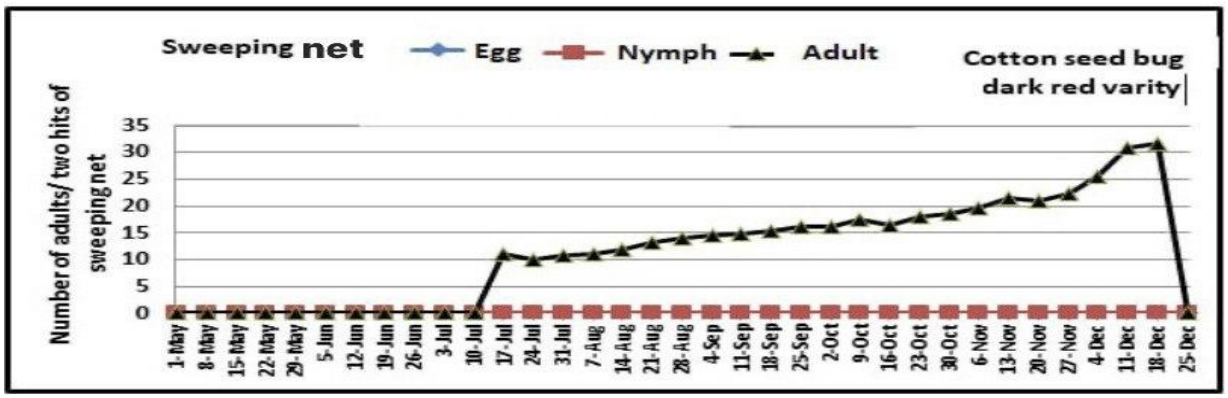

Figure (7): Average number of adults of the cottonseed bug, *O. hyalinipennis*, on the dark red variety of the *H. sabdariffa* in the sweeping net for 2023 agricultural season.

2- yellow sticky traps:

The first appearance of adults of the cottonseed bug, *O. hyalinipennis*, was on the seventeenth of July When the maximum temperature was 45.10, the minimum temperature was 23.27, and the relative humidity 20.66% on the red and dark red varieties as shown in Figures (8, 9), at a rate of 1.13 and 1.63 adults/one yellow sticky trap, and the numbers began to increase until they reached their peak on the eighteenth. of December When the maximum temperature was 17.26 and the minimum temperature was 6.21 and the relative humidity 80.22% at a rate of 2.38 and 2.63 adults/one yellow sticky trap, then their numbers began to decline until they disappeared from the field on the twenty-fifth of December as shown figure No (8, 9).

Cotton seed bug on okra plants had two peaks. The first peak was on the twentieth of July, when insect numbers reached 236 insects/5 okra fruits, and the second peak was on the

seventeenth of August, at 422.5 insects/5 okra fruits, for the 2009 agricultural season. As for the agricultural season in 2010, a single peak was recorded on the seventeenth of August, when insect numbers reached 546.9 insects/5 okra fruits. (**Sewify & Semeada, 1993; Srinivas & Patil, 2004; El-Rahim *et al.*, 2015; Al-Jassany & Al-Juboory, 2019; Al-gbori & Abd, 2022).**

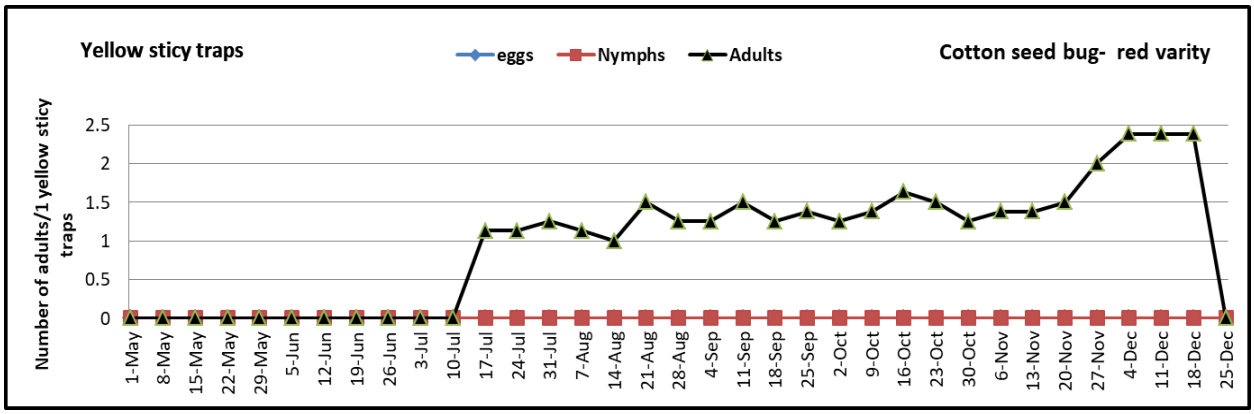

Figure (8): Average number of adults of the cotton seed bug, *O. hyalinipennis*, on the red variety of the *H. sabdariffa* in yellow sticky traps for 2023 agricultural season.

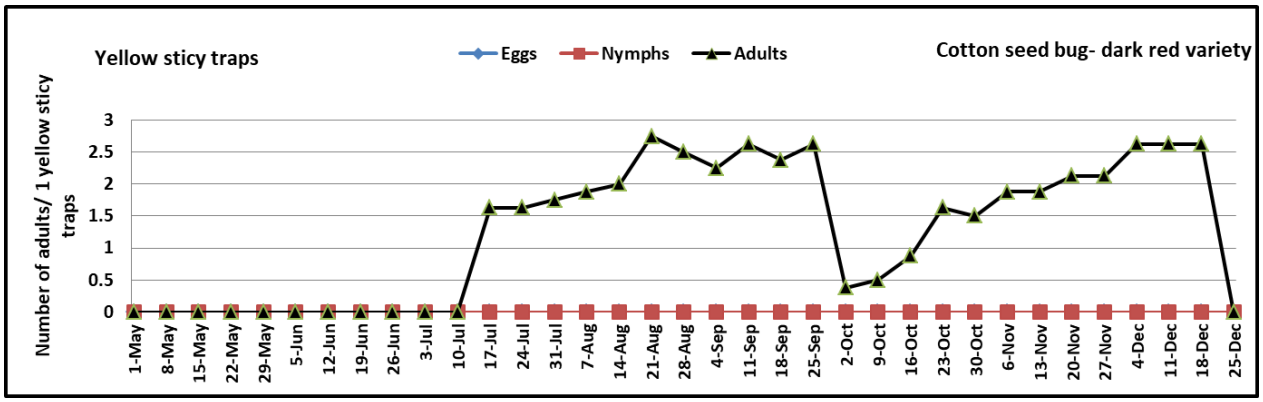

Figure (9): Average number of adults of the cotton seed bug *O. hyalinipennis* on the dark red variety of the *H. sabdariffa* in yellow sticky traps for 2023 agricultural season.

3-The Fruits:

The first appearance of cotton seed bug eggs, *O. hyalinipennis*, was in the first week of October, on the red and dark red varieties When the maximum temperature was 31.77 and the minimum temperature was 23.85 and the relative humidity 39.56%, at a rate of 32.25 and 34.75 egg\ 20 fruit for both varieties respectively. The number of eggs reached its peak in the third week of December When the maximum temperature was 17.26 and the minimum temperature

was 6.21 and the relative humidity 80.22%, the number of eggs reached 118 and 163.75 eggs\ fruit on both varieties respectively and remained until the end of the crop season. As for the nymphs, their first appearance inside the fruits was in the second week of October, on both varieties as we When the maximum temperature was 36.45 and the minimum temperature was 15.19 and the relative humidity 28% at a rate of 26 and 36.25 nymphs\ two fruit for both varieties respectively, and the nymphs reached their peak on the eighteenth. From the month of December When the maximum temperature was 17.26 and the minimum temperature was 6.21 and the relative humidity 80.22% at a rate of 111 and 155.12 nymphs\ fruit on the medium red and dark red varieties, and in the following week they disappeared due to the end of the crop season and harvesting of fruits. Adults also appeared inside the fruits for the two varieties in the first week of October When the maximum temperature was 31.77 and the minimum temperature was 23.85 and the relative humidity 39.56% at a rate of 6.38 and 9 adults\ fruit, and reached their peak also on the eighteenth of December When the maximum temperature was 17.26 and the minimum temperature was 6.21 and the relative humidity 80.22% at a rate of 37 and 46 adults/fruit on both varieties respectively after which it disappeared from the field due to the end of the crop season as shown figure No (10, 11) .

The first appearance of the cotton seed bug, *O. hyalinipennis*, on the cotton crop was in the third week of July, when the numbers of nymphs and adults reached 10-15 nymphs and adults, or both, per plant in August, and their numbers began to increase until they reached their peak in October with the appearance of Large numbers in the months of November and December **(Smith & Brambila, 2008; Al-khazraji *et al*., 2018; Iqbal *et al*., 2018; Al-Fatlawi *et al*., 2021; Wazir & Shad, 2022; Al-Mtrafi & Al-Shammary, 2023).** The average number of cotton seed bugs on cotton plants was 5.24 insects/fruit, on okra plants was 5.99 insects/fruit, and on Hibiscus sp., the number of insects was 7.87 insects/fruit **(Hermize *et al*., 2016; Shah *et al*., 2016; Ullah *et al*., 2017; Bilal *et al*., 2018; Issa & Jabbar, 2019; Banazeer *et al*., 2020).**

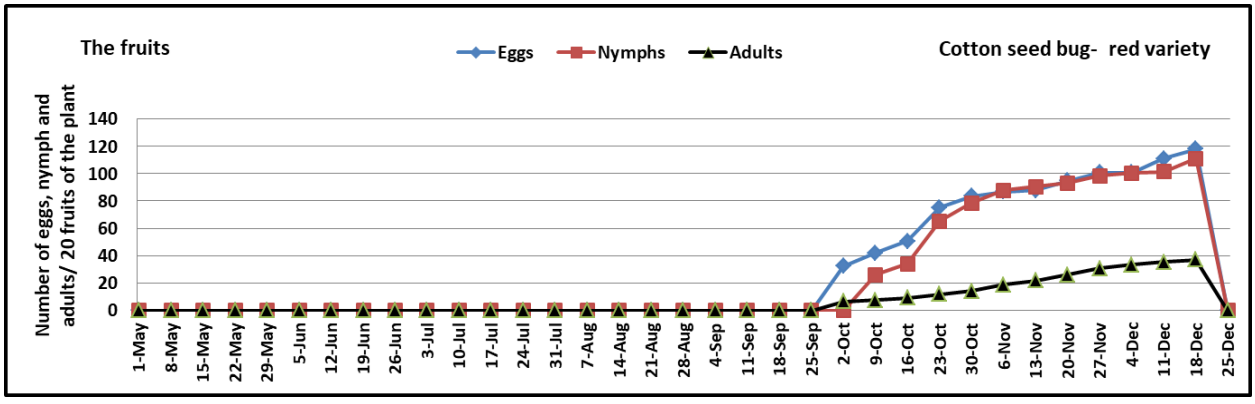

Figure (10): Average number of eggs, nymphs and adults of the cotton seed bug *O. hyalinipennis* on the red variety of the *H. sabdariffa* in fruits for 2023 agricultural season.

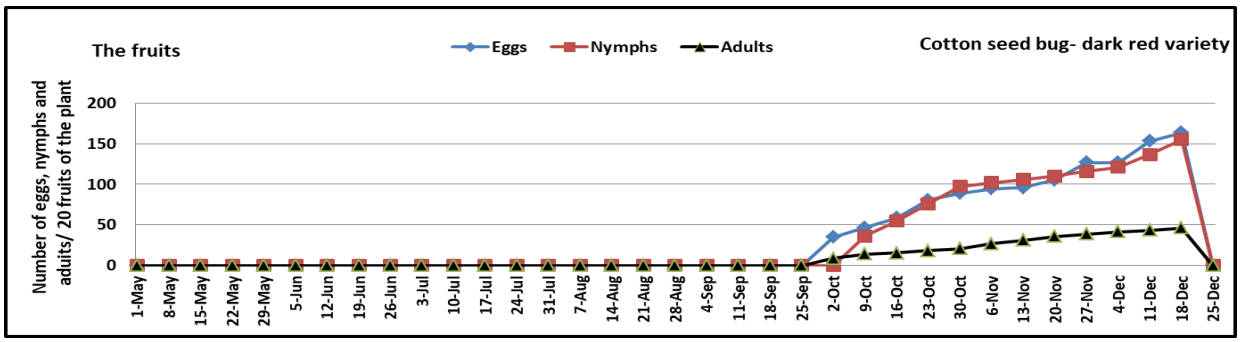

Figure (11): Average number of eggs, nymphs and adults of the cotton seed bug *O. hyalinipennis* on the dark red variety of the *H. sabdariffa* in fruits for 2023 agricultural season.

CONCLUSION

The results of the experiment showed that the cotton seed bug caused harm to the Gujarat plant because it laid eggs inside the fruit and the nymphs also hatched inside it, which led to damage to the fruits and loss of their value. They also fed on the seeds by absorbing their juice, which led to the seeds shrinking, making them small and making them unsuitable for cultivation. Therefore, a comprehensive survey must be conducted in Cultivation areas of Gujarat in Iraq to know the family range and areas of spread of the cotton seed bug *Oxycarenus hyalinipennis*, applying integrated management programs to prevent the insect because of the damage it causes and damage to plant fruits, as well as damage to the seeds and their unsuitability for cultivation.

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