

**Population in Almond Sawfly *Cimbex*
quadrinaculata Müller, *HYMENOPTERA*:
CIMBICIDAE in Two Almond Varieties in
Diyarbakır and Elazığ Provinces, Turkey**
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Abstract

Cimbex quadrinaculata (Müller) (Hymenoptera: Cimbicidae) is an important pest found in cultivated (*Prunus amygdali*) and wild almond (*Prunus dulcis*) trees in Diyarbakır and Elazığ Provinces. This study was conducted to changes in the population of *C. quadrinaculata* in the two almond varieties in 2020 and 2021. The results showed that the pest had a higher population in wild almond species in both provinces. In addition, the pest population reached highest population in the almond orchards of Eğil district of Diyarbakır province than Keban District of Elazığ province. In the study areas, the pest had a high population between the last two weeks of May and the first and second weeks of June. This period coincided with the fruit ripening period. During this period, the pest was heavily fed and causing economic losses.

Keywords: Almond, species, *Cimbex quadrinaculata*, population, Diyarbakır, Elazığ, Turkey

Introduction

About 25 percent of the almond production in Turkey takes place in the Eastern and Southeastern Anatolia Regions (Anonymous, 2018). Maçan (1986) conducted research in almond orchards in Adıyaman, Diyarbakır, Elazığ, Mardin, Malatya, Siirt, and Şanlıurfa. He identified 11 species belonging to the order Coleoptera, 6 species belonging to the order Lepidoptera, 3 species belonging to the order Hymenoptera, and 5 species belonging to the order Hemiptera. Bolu et al. (2005) also recorded 205 species belonging to 11 orders and 56 families in almond orchards in Diyarbakır, Elazığ, and Mardin. The main species was Almond Sawfly, *Cimbex quadrinaculata* Müller (Hymenoptera: Cimbicidae) (51%). *Cimbex quadrinaculata* is a serious pest of almond, cherry, apricot, peach, and pear (Nizamlioğlu, 1961; Bolu, 2016; Özgen et al., 2021 a, b) (Figure 1).

In recent years, it has caused serious damages to East and Southeastern Anatolia almond orchards. It has been densely populated in Ergani, Eğil, Çermik and Çüngüş districts of Diyarbakır and the center of Elazığ and its districts of Keban and Ağın. It causes significant damage, especially to young trees. It causes significant damage to the terminal shoots of almond trees. The severity of the damage depends on the location, canopy and type of tree. This study aimed to determine the population changes of the pest in wild and cultivated almond species between 2020 and 2021.

Materials and Methods

This study was carried out in the Eğil district of Diyarbakır and the Keban district of Elazığ. The sample was collected from wild almond (*Prunus dulcis*) and ten cultivated graft almond (*Prunus amygdali*) (Ferragnes) trees. The trees were beaten on four sides, and the larvae that fell into a Japanese umbrella were counted (Steiner 1962). The larvae were put back on the trees after counting. The

wild almond trees were about 3.5 m high and had a canopy of about 2-2.5 m. The graft almonds were collected from three-year-old trees, which were about 2m high with a crown projection of about 1-1.5. The pest was counted weekly, and the population changes were presented in Figures 2-5.



Figure 1: The habitus of *Cimbex quadrimaculata* (Müller) (Hymenoptera: Cimbicidae)

Results and Discussion

Population changes in *Cimbex quadrimaculata* larvae in the wild and cultivated almonds in Diyarbakır (Eğil) and Elazığ (Keban) were showed in Figures 2-5.

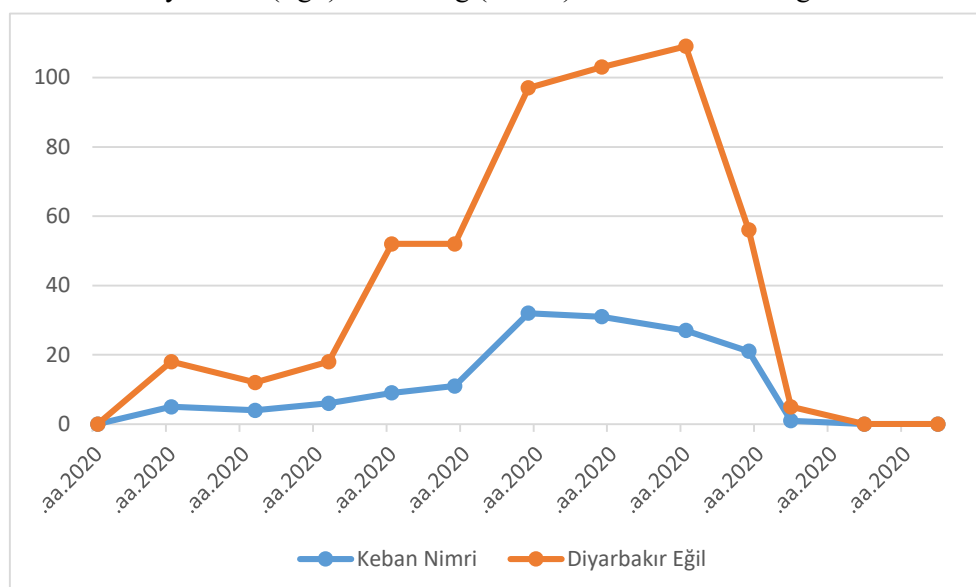


Figure 2: The population of *Cimbex quadrimaculata* (Müller) in wild almonds in 2020

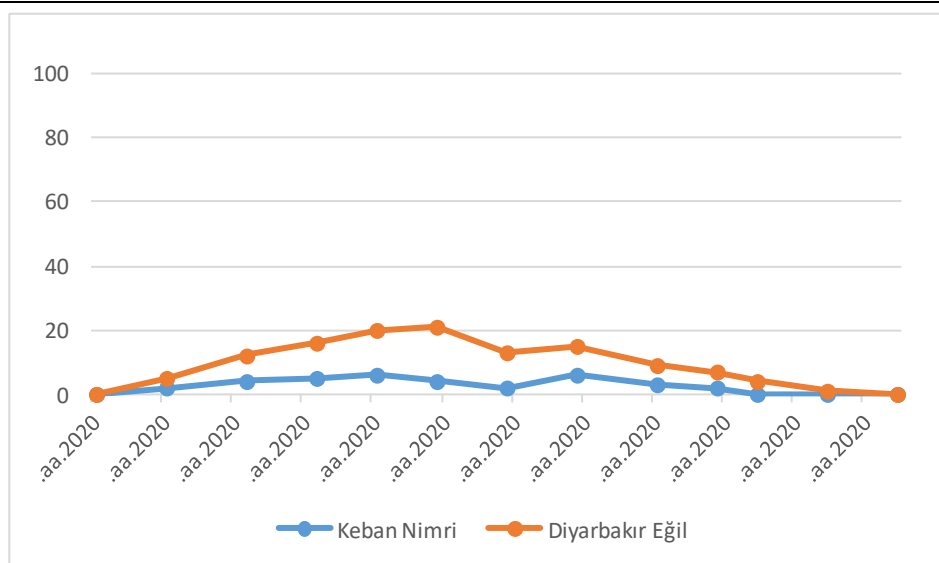


Figure 3: The population of *Cimbex quadrimaculata* (Müller) in cultivated almonds in 2020

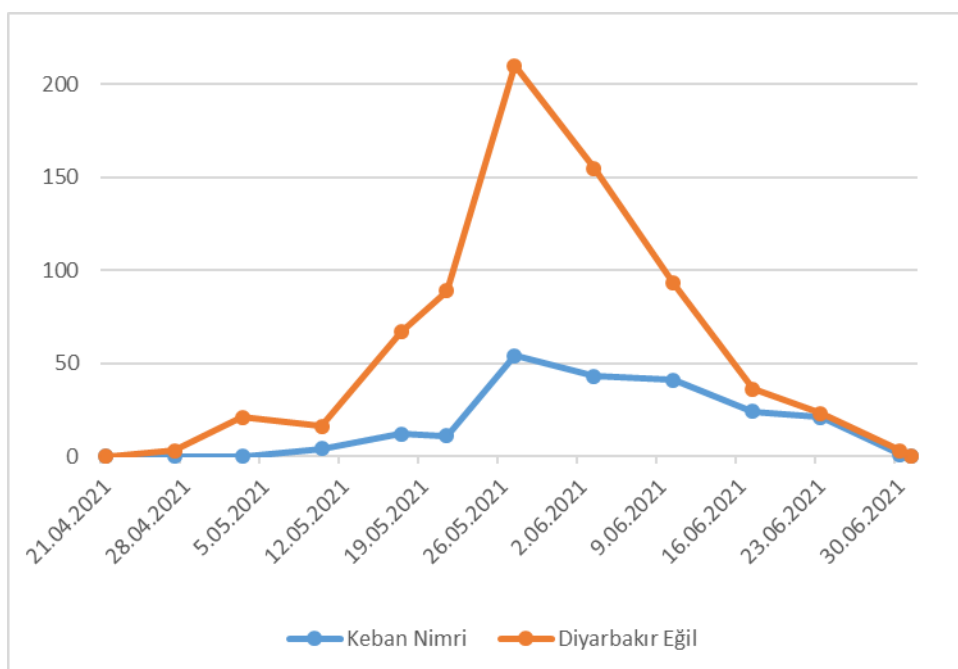


Figure 4: The population of *Cimbex quadrimaculata* (Müller) in wild almonds in 2021

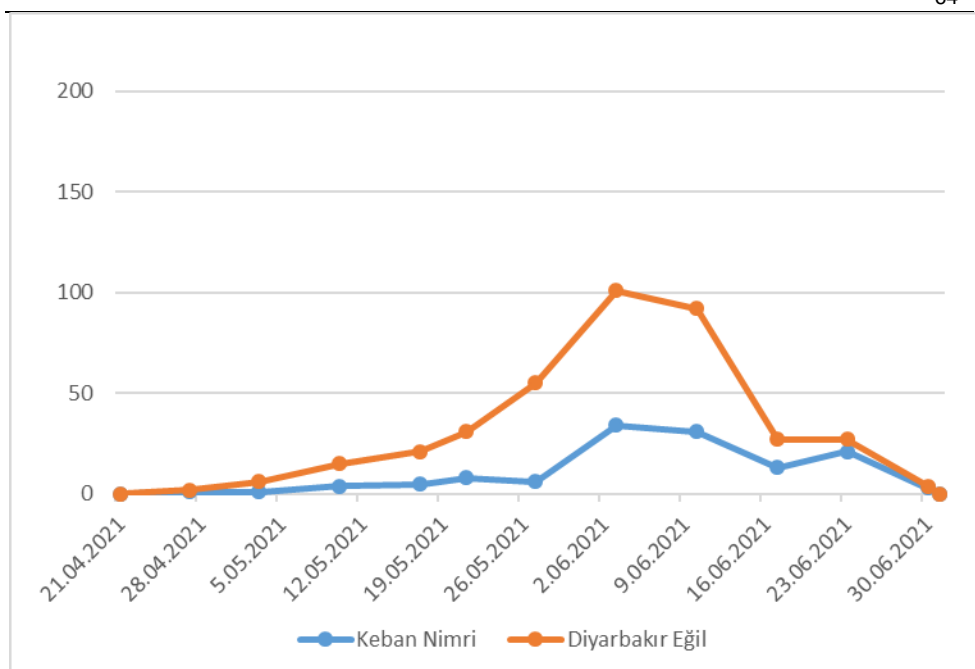
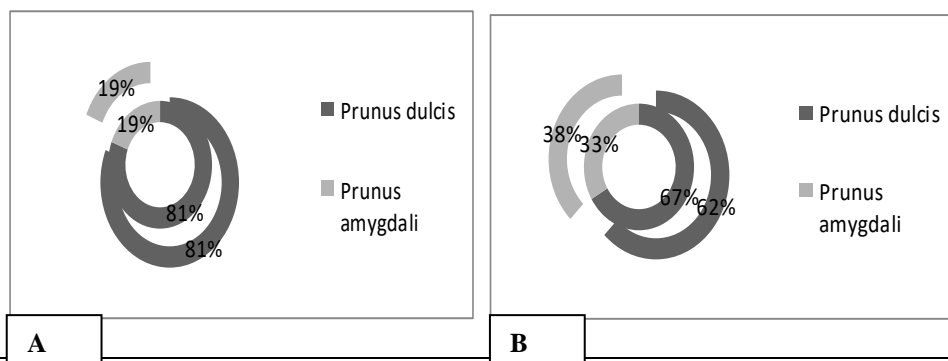


Figure 5: The population of *Cimbex quadrimaculata* (Müller) in cultivated almonds in 2021

The results showed that *Cimbex quadrimaculata* was more densely populated in the wild almond trees than in the cultivated almond trees in localities and years *Cimbex quadrimaculata* was more densely populated in 2021 than in 2020. The population of *Cimbex quadrimaculata* was found to be higher in Eğil district of Diyarbakır than in Keban district of Elazığ. The pest was found in nature between the end of April and the third week of June. The pest population reached its peak (n=156) on 27.05.2021 in the Eğil district of Diyarbakır.

The orchards in Eğil and Keban were 850 m and 950 m elevation, respectively. The temperature was 3 C° higher in Eğil than in Keban between 2020 and 2021. This temperature difference may have affected the biological stages and number of the pest. Figure 6 shows the population rates (%) of the pest in the wild and cultivated almond trees.

Figure 6: Population ratio (%) of the *Cimbex quadrimaculata* in wild and cultivated almond trees in 2020 (A) and 2021 (B).



The pest was more densely populated in the wild trees than in the cultivated trees in both years, which is believed to be directly proportional to the size and canopy of the trees. In addition, the biochemical content of the leaves of both types of trees might be related to why the pest preferred one type over the other.

In conclusion, there was an increase in the pest population between the last week of May and the third week of June in two different locations and tree types. This numerical change may be because the larvae can be easily hidden between the leaves. Therefore, researchers should use the visual inspection method in addition to the beating method to better understand the population changes of the pest in almond trees.

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