THE POPULATION FLUCTUATIONS OF *LEPIDOSAPHES PISTACIAE* (ARCHANGELSKAYA) (HOMOPTERA: DIASPIDIDAE) PEST OF PISTACHIO TREES IN SIIRT PROVINCE OF TURKEY

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ABSTRACT: The present study was carried out to determine population fluctuations of the pest *Lepidosaphes pistaciae* (Archangelskaya) (Homoptera: Diaspididae) at two different pistachio orchards in 2003 and 2004 in Siirt province. The high population level of *L. pistaciae* was determined on pistachio leaves as compared to pistachio shoots and fruits. Populations on the shoots were found to be mature female and they were found to usually pass through winter on 2-3 year-old shoots. *L. pistaciae* eggs began to hatch in May and made the transition on pistachio leaves and it was determined that they reached the maximum level during the middle and towards the end of July. It was observed that the populations formed on fruits were removed with harvest and that the next year's population was formed of the leaf populations. The pest gave one offspring in the province of Siirt. According to the results of this study, it was determined that the pest reached high population levels from time to time at both orchards on which population monitoring was made and it was concluded that while determining for struggle against pests, especially the leaf population should be taken into consideration.

KEY WORDS: Pistachio, *Lepidosaphes pistaciae*, Population fluctuations.

In Turkey, Coccoidea (Homoptera) higher family has 267 species (Kaydan et al., 2007). Of these species, 97 belong to the Diaspididae family. *Lepidosaphes pistaciae* (Archangelskaya) (Homoptera: Diaspididae) located within this family is registered on *Malus sylvestris*, *Pistaciae lentiscus*, *P. terebinthus* and *P. vera* (Kaydan et al., 2005). *L. pistaciae* can be found in our country in the provinces of Bolu, Adana, Antalya, Aydın, Balıkesir, Çanakkale, İzmir (Buca), Manisa, Muğla, Uşak, Gaziantep, Şanlıurfa and Siirt (İleri & Ayfer, 1954; Ulu et al., 1972; Yaşar, 1990; Bolu, 1999).

Although this pest was named as *Pistaciaspis pistaciae* in the former resources, it is currently named as *L. pistaciae* (Yaşar, 1990; Bolu, 2002). This pest was widely encountered in the pistachio fields in the Southeast Anatolian Region, in the Halfeti and Birecik Districts of Şanlıurfa Province, Merkez and Aydınlar District of Siirt Province, Hasankeyf District of Batman Province, Midyat and Ömerli District of Mardin Province, and especially among these fields, 100% infection rate was determined at Siirt Province (Bolu, 1999). Bolu (2002) reported that this species was among the eight species economically detrimental to the pistachio. This pest is among the important pests of pistachio in our neighbor Iran (Masjedian & Seyedoleslami, 2003). There is no study in our country for the population change of this pest. With this study, it was aimed to determine the population changes of *L. pistaciae'* in the pistachio orchards of Siirt Province.

MATERIALS AND METHODS

The studies were made in 2003-2004 at totally 2 orchards, one in Merkez and one in Aydınlar district of Siirt that was infected with *L. pistaciae*. Both of these selected orchards have an equal amount of infection.

The population monitoring of *L. pistaciae* started at the shoots of March before the wintered matures commenced to give birth and in April at the leaves and fruits together with the awakening of the eyes. At the month of March, first of all, the wintered mature individuals present on totally fifty shoots, being in five shoots per tree and ten different trees in each orchard, were counted on the shoot. The shoot counts were repeated in the period when the pest started to winter; the individuals were again counted on totally fifty shoots, being five shoots per tree and ten different trees. After the commencement of leaf growing, ten compound leaves were taken from each randomly selected ten trees, accounting to totally 100 compound leaves, and five fruits randomly selected from each 5 fruit bunches from ten trees from each orchard, accounting to totally 50 fruits, which were than brought to the laboratory in transparent polyethylene bags, all the biological periods of the pest were counted and recorded. While determining the biological periods of *L. pistaciae*, Yaşar (1990; Yaşar, 1995) was utilized. Preparations were made and compared with the measurements at the relevant sources. Furthermore, the pistachio saplings were infected with wintered females of the pest, the outing of the moving larvae of the pest and transitions to period II were determined. The shell lengths and body lengths of the females were also measured. The male individuals of the pest were measured and compared with the drawings and photographs at the related sources. During orchard selection, the orchards with a surface area of 10-15 decares were selected. The trees in the selected orchards were at the age of 15-20. The heights of the trees in these orchards were selected as approximately 2-2,5 m. In order to ensure homogeneity in the population monitoring, population follow-ups were made at female trees.

RESEARCH FINDINGS AND DISCUSSION

It was determined that *L. pistaciae* generally passed through winter as mature female at 2-3 year old shoots. The population fluctuations of *L. pistaciae* in the years between 2003 and 2004 on the pistachio leaves at Merkez and Aydınlar locations of Siirt province are shown in Figures 1, 2, 3 and 4.

When the population fluctuations of *L. pistaciae* on the pistachio leaves are examined, it is determined that at both sampling fields, the eggs started to hatch as of May and the leaf populations commenced to form. It was observed that as of the end of May and start of June, the 2nd Period larvae started to develop and simultaneously, the young females started to appear as of the beginning of the month of June. It was determined that the mature females generally occurred as of the end of June, and reached maximum levels as of the middle and end of July. As of this period, the new generation larvae were observed to come out from the mature females starting with the end of August and beginning of September, started to create a population mostly towards the young shoots and that they established the mature female form that they would be in on these shoots during the winter. The mature females formed of new generation larvae completing their biological periods on the leaves were removed with the fall out of the leaves. However, it was seen that the larvae moving on to the shoots and completing their biological periods on the shoot, passed through the winter on the shoots as mature females. When the population density of *L. pistaciae* on the leaves of the

pistachio orchards of Merkez and Aydınlar districts were examined, it was observed that the population density at Merkez orchard in 2003 was higher than the population density of the same orchard in 2004. On the other hand, the population densities at the orchards of Aydınlar districts were almost at the same level for both years.

When the population fluctuations of *L. pistaciae* on the pistachio fruits Merkez and Aydınlar districts of Siirt province was examined, it was observed that, in both orchards, with the expansion of the fruit surface areas towards the end of May, the first lava period of the pest started and the mature females formed by the end of July. However, it was observed that the population density in the fruits was lower as compared to the population on the leaves depending on the size of the surface area, and that the pests were isolated from the tree together with the fruit after the fruits were started to be gathered from the trees.

When the populations of *L. pistaciae* on the leaves and fruits were analyzed, it was determined that, parallel to the area of growth, more individuals were present on the leaves, and that most of the active larvae coming out of new generation females were passing on to young shoots and entered wintering for the offspring of the next year. At the end of the season, it was seen that depending on vegetation, the individuals on the leaves and fruits that had not passed on to the shoots were naturally removed with fall out and harvest.

As a result; it was determined that *L. pistaciae* had a high population density in both of the orchards in 2003 and 2004 both on the leaves and fruits; and that the pest population to come about next year in the trees would in general be dominated by the population on the leaves. Furthermore, it was detected that *L. pistaciae* gave 1 offspring in the pistachio orchards of Siirt province.

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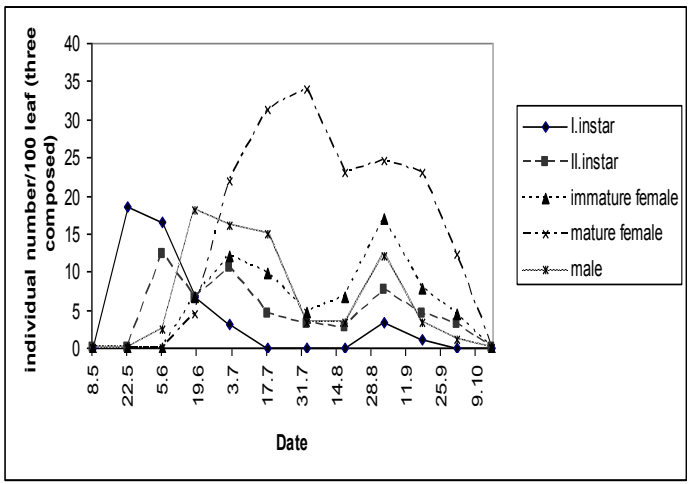

Figure 1. The population Fluctuation of *Lepidosaphes pistaciae* on the pistachio leaves in 2003 at the Merkez (=Central) Orchard of Siirt province.

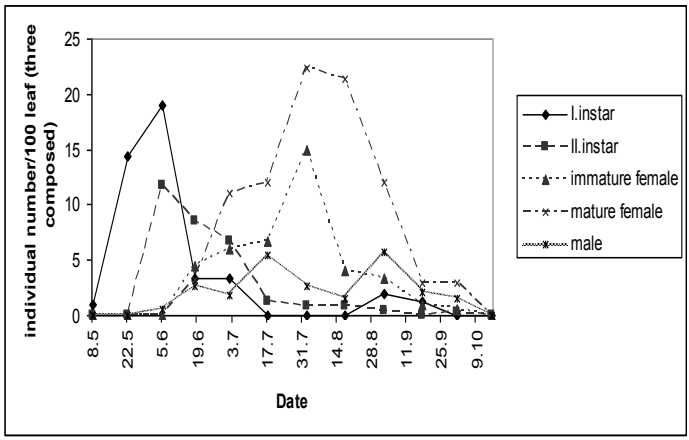

Figure 2. The population Fluctuation of *Lepidosaphes pistaciae* on the pistachio leaves in 2003 at the Aydınlı Orchard of Siirt province.

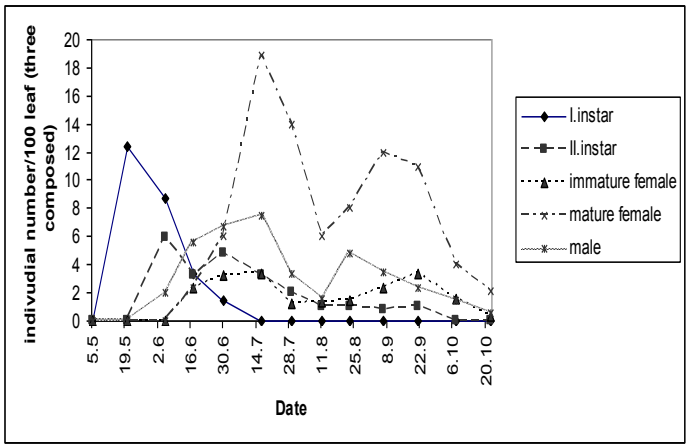

Figure 3. The population Fluctuation of *Lepidosaphes pistaciae* on the pistachio leaves in 2004 at the Merkez (=Central) Orchard of Siirt province.

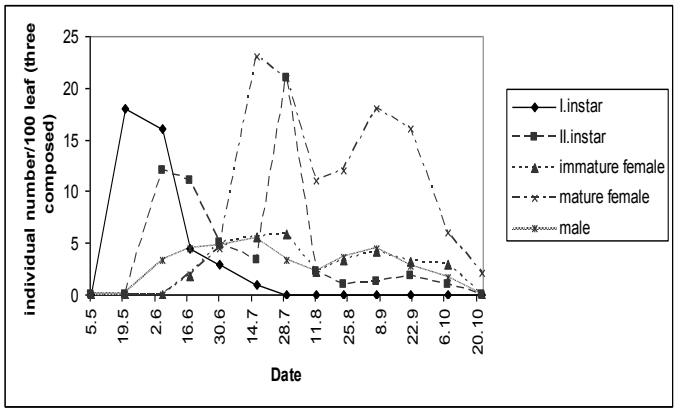

Figure 4. The population Fluctuation of *Lepidosaphes pistaciae* on the pistachio leaves in 2004 at the Aydınlar Orchard of Siirt province.

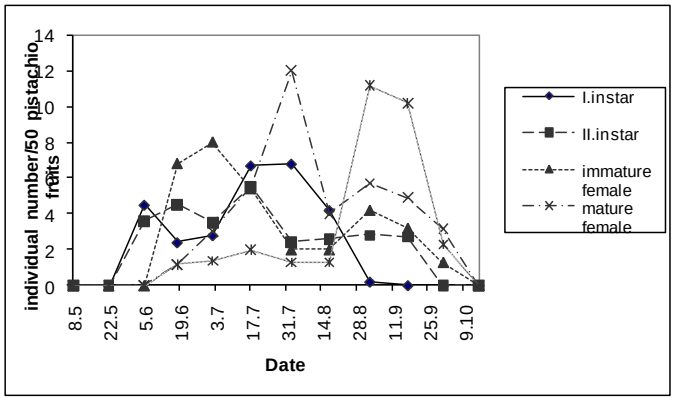

Figure 5. The population Fluctuation of *Lepidosaphes pistaciae* on the fruits in 2003 at the Merkez (=Central) Orchard of Siirt province.

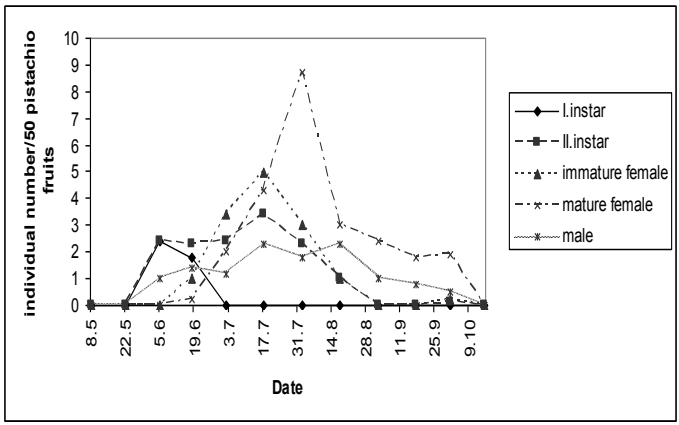

Figure 6. The population Fluctuation of *Lepidosaphes pistaciae* on the fruits in 2003 at the Aydınlar Orchard of Siirt province.

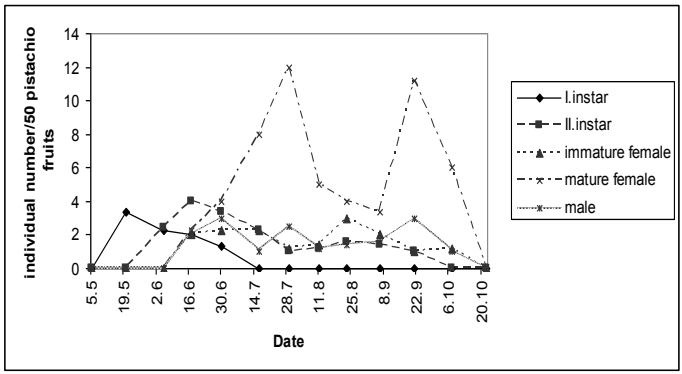

Figure 7. The population Fluctuation of *Lepidosaphes pistaciae* on the fruits in 2004 at the Merkez (=Central) Orchard of Siirt province.

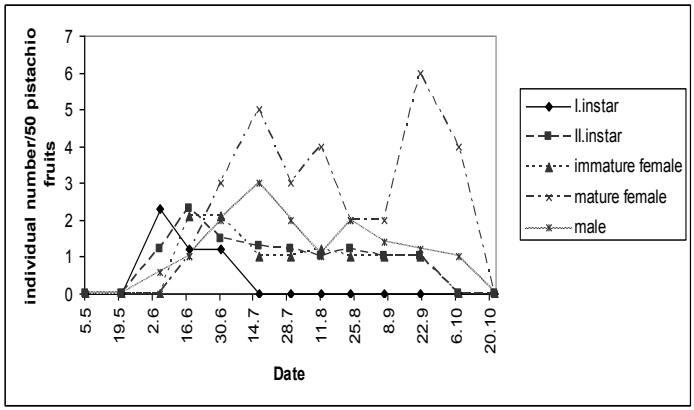

Figure 8. The population Fluctuation of *Lepidosaphes pistaciae* on the fruits in 2004 at the Aydınlar Orchard of Siirt province.