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# The pistachio (*P. vera* L.) pests, their population development and damage state in \_anliurfa province

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**SUMMARY** – The study was carried out to determine the insect pests of pistachio, their population development and damage states in \_anliurfa province. The periodic surveys were conducted in 6 orchards and during March-August 1996-1997. Evaluations was done by controlling of shoots, visual observation and beating umbrella. According to obtained results, the following species were found: *Acrorhinium conspersus* Nh., *Campylomma lindbergi* Hoberlant, *Isometopus intrusus* (Herrich-Schaeffer), *Dolycoris baccarum* (L.), *Lygeus pandurus* (Scop.), *Lygeus equestris* (L.) from Heteroptera; *Idiocerus stali* Fieb., *Suturaspis pistaciae* (Lind.), *Eulecanium rugulosum* Ash., *Anapulvinaria pistaciae* Boden., *Agonoscena pistaciae* Bruck. and Laut. from Homoptera; *Hylesinus vestitus* M.-R., *Carphoborus perrisi* Chap., *Coeliodes* sp., *Capnodis cariosa* (Pall.), *Anthaxia armeniaca* Obenb., *Gynandrophthalma limbata* Stev. from Coleoptera; *Kermania pistaciella* Amsel, *Recurvaria pistaciicola* (Danilewski) from Lepidoptera. Among the identified species *C. cariosa*, *K. pistaciella*, *R. pistaciicola*, *H. vestitus* and *C. perrisi* were determined as important pests in the orchards. In addition to this, *C. lindbergi* which was known as a predator was found as a pest in pistachio in early season.

**Key words:** Pistachio, pest.

**RESUME** – "Les ravageurs du pistachier (*P. vera* L.), le développement de leurs populations et le niveau de dommages dans la province de Sanliurfa". L'étude a été menée pour déterminer les insectes ravageurs des pistachiers, le développement de leurs populations et le niveau de dommages dans la province de Sanliurfa. Des études périodiques ont été menées dans 6 vergers et pendant mars-août 1996-1997. L'évaluation a été faite en contrôlant les pousses, par observation visuelle et par ramassage dans une toile. D'après les résultats obtenus, les espèces suivantes ont été trouvées : *Acrorhinium conspersus* Nh., *Campylomma lindbergi* Hoberlant, *Isometopus intrusus* (Herrich-Schaeffer), *Dolycoris baccarum* (L.), *Lygeus pandurus* (Scop.), *Lygeus equestris* (L.) appartenant aux Heteroptera ; *Idiocerus stali* Fieb., *Suturaspis pistaciae* (Lind.), *Eulecanium rugulosum* Ash., *Anapulvinaria pistaciae* Boden., *Agonoscena pistaciae* Bruck. et Laut. appartenant aux Homoptera ; *Hylesinus vestitus* M.-R., *Carphoborus perrisi* Chap., *Coeliodes* sp., *Capnodis cariosa* (Pall.), *Anthaxia armeniaca* Obenb., *Gynandrophthalma limbata* Stev. appartenant aux Coleoptera ; *Kermania pistaciella* Amsel, *Recurvaria pistaciicola* (Danilewski) appartenant aux Lepidoptera. Parmi les espèces identifiées, *C. cariosa*, *K. pistaciella*, *R. pistaciicola*, *H. vestitus* et *C. perrisi*, furent identifiées comme ravageurs importants dans les vergers. En outre, *C. lindbergi*, qui est un prédateur connu, a été observé comme ravageur des pistachiers pendant la saison précoce.

**Mots-clés :** Pistachier, ravageur.

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## Introduction

Pistachio has been grown in arid conditions in southeastern Anatolia for a long time, occupying an important place in the agricultural structure of the region. Recently, its growing ground has expanded to the lands which are less appropriate or even otherwise completely inappropriate poor soils for agriculture. Parallel to its expansion, pests and diseases have been gaining importance as well. Additionally, changes in agroecosystem due to Southeastern Anatolian Project (GAP), current entomological problems of pistachio nut are expected to be influenced by new ecological states of the region. Appearance of various pest species that are not present at the moment; some native non-pest species turn out to become important pests; or pest status of moderate species increase are some of the most probable outcomes of the ecological changes of the region, in the near future.

In this study, pest species, their population developments and, their damage states have been addressed.

## Material and method

The study was conducted in \_anliurfa province, in 6 orchards, during the months of March through August.

In orchards, under the coverage of the study, firstly a general observation has been made then the following methods were applied.

(i) Shoot examining method: in the orchards where the study was carried out, trees were selected for sampling considering the total tree numbers, in each orchard. Twig samples were taken from several sides of each selected tree and taken to laboratory.

(ii) Visual observation method: different sides of the selected trees were visually observed through out the phenological developmental stages. After the leaf formation, during the visual observations 4 leafs per tree collected and taken to laboratory to count the insects.

(iii) Beating method: one branch at 4 different directions of each selected tree were sampled by beating three times with a rubber covered stick. Fallen insects into beating umbrella were counted and recorded.

## Results and discussion

During the study, 19 injurious species to pistachio from 14 families under 4 orders were found (Table 1).

Table 1. The pistachio pest in \_anliurfa (1996-1997)

| Order         | Family                                       | Species  |
|---------------|--|--|
| Heteroptera   | Miridae                                      | <i>Acrorrhinium conspersus</i> Nh.<br><i>Campylomma lindbergi</i> Hoberlandt |
|               | Isometopidae                                 | <i>Isometopus intrusus</i> (Herrich-Schaeffer)                               |
|               | Pentatomidae                                 | <i>Dolycoris baccarum</i> (L.)   |
|               | Lygaeidae                                    | <i>Lygeus pandurus</i> (Scop.)   |
|               |  | <i>Lygeus equestris</i> (L.)   |
| Homoptera     | Cicadellidae                                 | <i>Idiocerus stali</i> Fieb.   |
|               | Diaspididae                                  | <i>Suturaspis pistaciae</i> (Lind.)  |
|               | Coccidae                                     | <i>Anapulvinaria pistaciae</i> Boden.  |
|               |  | <i>Eulecanium rugulosum</i> Ash.   |
| Psyllidae     | <i>Agonosцена pistaciae</i> Bruck. and Laut. |  |
| Coleoptera    | Scolytidae                                   | <i>Carphoborus perrisi</i> Chap.   |
|               |  | <i>Hylesinus vestitus</i> M.-R.  |
|               | Curculionidae                                | <i>Coeliodes</i> sp.   |
|               | Buprestidae                                  | <i>Anthaxia armeniaca</i> Obenb.   |
|               |  | <i>Capnodis cariosa</i> (Pall.)  |
| Chrysomelidae | <i>Gynandrophthalma limbata</i> Stev.        |  |
| Lepidoptera   | Oinophilidae                                 | <i>Kermania pistaciella</i> Amsel  |
|               | Gelechiidae                                  | <i>Recurvaria pistaciicola</i> (Danilewski)                                  |

### Order Heteroptera

#### *Family Miridae*

(i) Species *Acrorrhinium conspersus* Nh. (Fig. 1). This species was found in all the orchards

examined during the study. The species was seen after the first week of June when the pistachio nuts grown, but before the fruit shell hardened, and right after the end of leaf formation. However, there is not an exact conclusion when the species built a low-level population.

(ii) Species *Campylomma lindbergi* Hoberlandt (Fig. 2). This species was observed April and May during the time after the bud opening until fruit formation. This species was harmful in the early stages of development. In 1996 and 1997, population growth of nymphs and adult were studied (Figs 3 and 4). In the case that nymph density was high at leaf formation stage, leaves were wrinkled, curled and poor leaf development due to suction of the insect were observed. When adult and nymph population was heavy, the other sucking pests of pistachio were not present or appeared with very low densities. A close relationship between the pest population development and the phenological developmental stages of pistachio was obviously identical during the study in 1996 and 1997. Nymphs were seen in newly opened buds and the population reached its highest point when little red fruits formed right after the breeding. Because *C. lindbergi* has zoophytophagous properties, its harmful and beneficial features need to be differentiated in detailed studies.



Fig. 1. *Acrorrhinium conspersus* Nh.

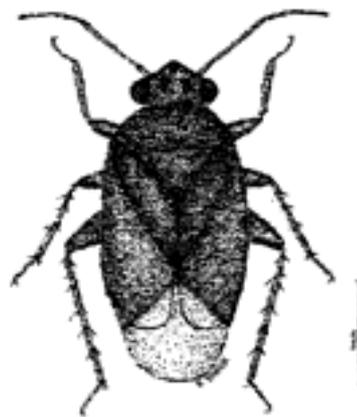


Fig. 2. *Campylomma lindbergi* Hoberlandt.

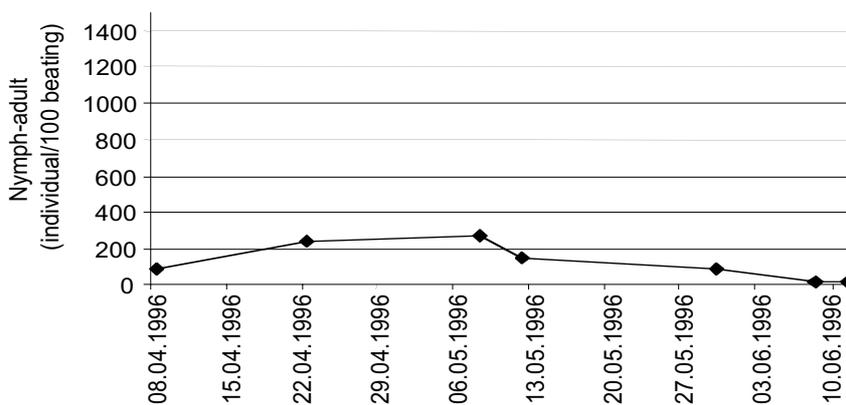


Fig. 3. Population growth of adult-nymph *Campylomma lindbergi* in \_anliurfa (1996).

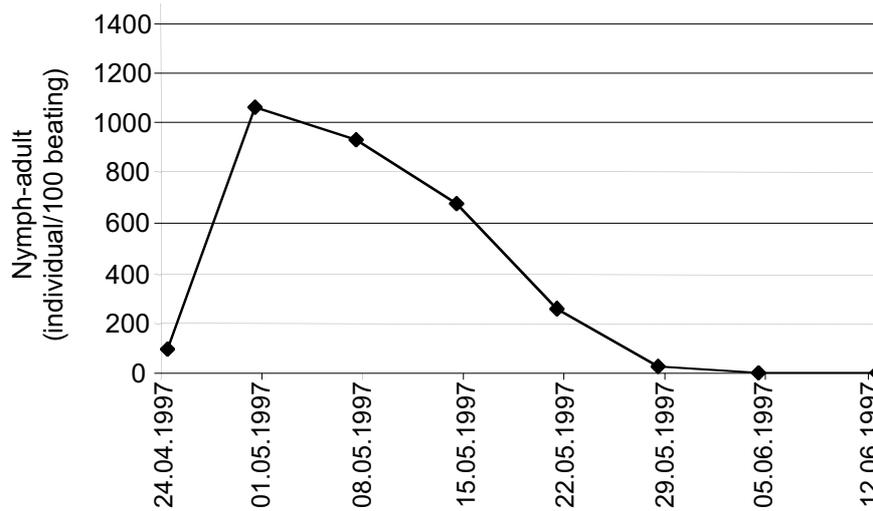


Fig. 4. Population growth of adult-nymph *Campyloomma lindbergi* in \_anliurfa (1997).

#### Family Isometopidae

Species *Isometopus intrusus* (Herrich-Schaeffer) (Fig. 5). Nymphs of this species were seen after the second week of May in all the locations in 1996 and 1997. In 1996, the highest nymph density was observed in the second half of the May. On the other hand, adults began to appear after the first week of the June and non of the individuals of this species were seen after the second half of the June. We could not draw exact conclusions on its pest status due to low population.

#### Family Pentatomidae

Species *Dolycoris baccarum* (L.) (Fig. 6). Adults of this species caused great damages to pistachio orchards in Bozova region, in 1996. In the first half of the June, the injury caused by *D. baccarum* adults suction from the immature green fruits, and from the panicle bases that lead to fruit fall and production of dark sticky substances on the fruits followed by the fruit dryings.



Fig. 5. *Isometopus intrusus* (Herrich-Schaeffer).

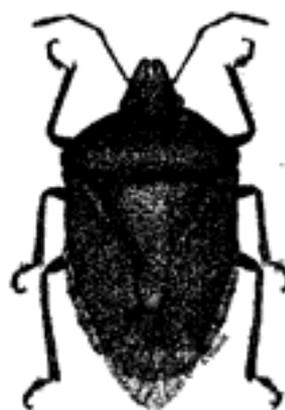


Fig. 6. *Dolycoris baccarum* (L.).

#### Family Lygaeidae

(i) Species *Lygeus pandurus* (Scop.) (Fig. 7.). This species adults were collected in June when the

fruits developing with their shells becoming rigid. Suctions of the insect from the fruits leaded fruit fall but its population density remained quite low.

(ii) Species *Lygeus equestris* (L.). This species was only found in an orchard during the June-July period with a density of 2-3 individual/50 beatings which was fairly low.



Fig. 7. *Lygeus pandurus* (Scop.).

## Order Homoptera

### *Family Cicadellidae*

Species: *Idiocerus stali* Fieb. Overwintered adults were collected within a period beginning from the first week of the March until the buds opened, especially in sunny days. Nymphs were observed following the second week of the May, then nymph population increased till the end of the May and first generation adults appeared in the first week of the June. The insect is widespread in the region, but it can not usually reach to the economic injury level. Nevertheless it sometimes become problem in Birecik region.

### *Family Diaspididae*

Species *Suturaspis pistaciae* (Lind.). This species was found on the branches and on the leaves in orchards. Their appearance on the leaves was observed toward the end of June, then moved to the fruits. There was not sufficient information about its damage.

### *Family Coccidae*

(i) Species *Anapulvinaria pistaciae* Boden. This species was not widespread and dense in the orchards. Females were seen after the second half the May, then egg laying took place toward the end of May. Egg hatches and consequently nymph emergence occurred after the middle of June. It did not cause economical damage.

(ii) Species *Eulecanium rugulosum* Ash. This species was found ranging 5 to 50 (individuals/40 branches) in all the sampled orchards. Females of *E. rugulosum* were seen on the branches toward the middle of May then nymphs appeared at the end of May. It especially appears as an important problem in the orchards where the inappropriate insecticide applications occurred.

### *Family Psyllidae*

Species *Agonosceca pistaciae* Bruck. and Laut. This species appears time to time as an important pest in the studied area and in the other regions. Overwintered adults emerged toward the end of April and the first generation nymphs were observed on newly formed leaves after the first week of

May and first generation nymph population reached its highest point during mid May. The population of over wintered adults decreased toward the middle of May, and new generation adults were seen at the end of May (Figs. 8 and 9). This insect had 5-6 generations in the region.

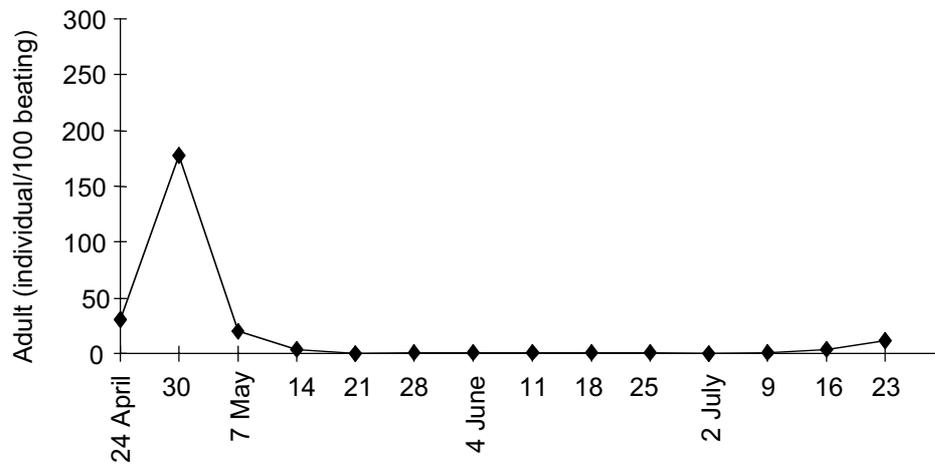


Fig. 8. Adult population growth of *Agonoscena pistaciae* in \_anliurfa (1997).

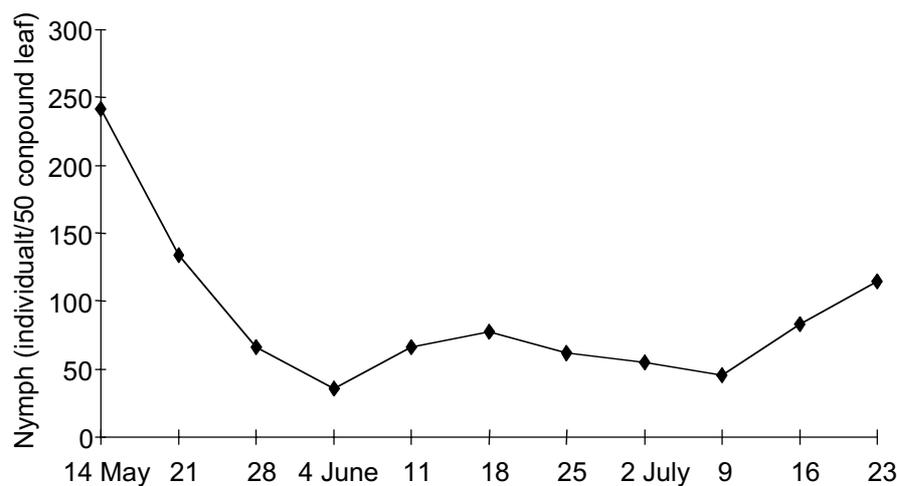


Fig. 9. Nymph population growth of *Agonoscena pistaciae* in \_anliurfa (1997).

## Order Coleoptera

### *Family Scolytidae*

(i) Species *Carphoborus perrisi* Chap. (Fig. 10). This species was found in all the orchards under the coverage of the study. The pest especially preferred drying and weak trees. The fruits and the leaves of the damaged trees turned to brown, then died. Despite its commonness, it was not an important pest.

(ii) Species *Hylesinus vestitus* M.-R. (Fig. 11). This species was the most widespread one in the study orchards and the other sites of the region and also was an important problem. Adults were seen following the beginning of April. The presence of the insect was determined by visual observation and beating method in all the orchards where the surveys conducted. Dense occurrence and importance

of this pest can be related to the pruned branches left in or near the orchards. Additionally, farmers usually did not remove drying trees or already dried materials from the orchards. The pest was found denser in the orchards near the dwelling areas where storage of pruned dry branches kept for fuel.

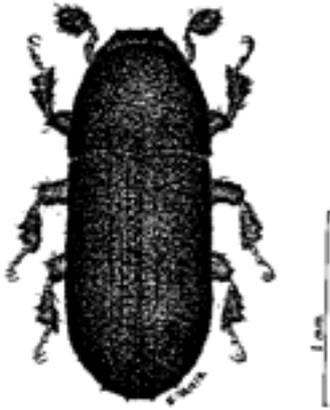


Fig. 10. *Carphoborus perrisi* Chap.



Fig. 11. *Hylesinus vestitus* M.-R.

#### *Family Curculionidae*

Species *Coeliodes* sp. This species was injurious to the newly formed leaves of the male trees by opening little but well arranged circles on the sides. It is not an economically important pest.

#### *Family Buprestidae*

(i) Species *Anthaxia armeniaca* Obenb. This species was seen during the June with a low density in study areas. It is not an important pest.

(ii) Species *Capnodis cariosa* (Pall.) (Fig. 12). This species is one of the most important pests of pistachio trees. The density and the distribution of the pest varied among the orchards. Besides causing damage within the root and the tree trunk, adults also gnaw and eat the young shoots. Field collected adults were cultured in the laboratory around mid May. Each female laid average 250 eggs. Newly emerged active spiny larva enters between the bark and wooden tissues of young trees, feeds there moving toward the collar then near this area enters into wooden tissues, ultimately moves into main roots and branches making galleries inside. *C. cariosa* is an economically important pest of the pistachio in this region.



Fig. 12. *Capnodis cariosa* (Pall.).

*Family Chrysomelidae*

Species *Gynandrophthalma limbata* Stev. (Fig. 13). The adults appeared when the buds opened but before the breeding occurred. The adults fed on newly formed fruiting buds. Later, adults caused damage by feeding on the sides of the leaves. This insect did not show a homogenous distribution with in an orchard, while being present on a tree, not present on the other one.

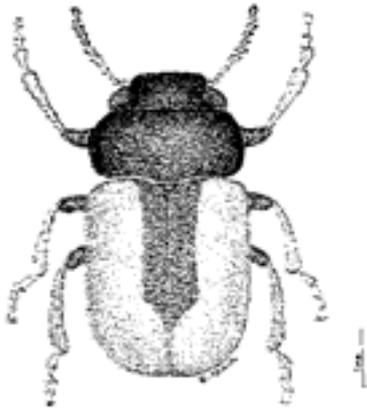


Fig. 13. *Gynandrophthalma limbata* Stev.

Order Lepidoptera

*Family Oinophilidae*

Species *Kermania pistaciella* Amsel. This species was found wide-spread in the study area and in the region, causing considerable damages. Because adults could not be sampled, pupa were collected (Fig. 14) and taken to laboratory to observe both adult and parasitoid emergence. The results showed that adult emergence was picked on the last week of April and the first week of May with in an 8 to 10 days period (Fig. 15). This period is important because pesticide application toward the adults is determined based on this duration.

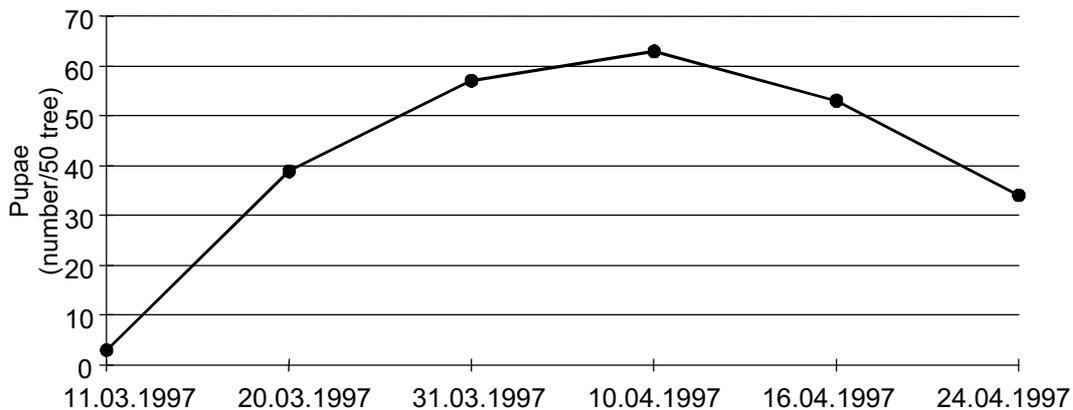


Fig. 14. The duration of *Kermania pistaciella* pupation.

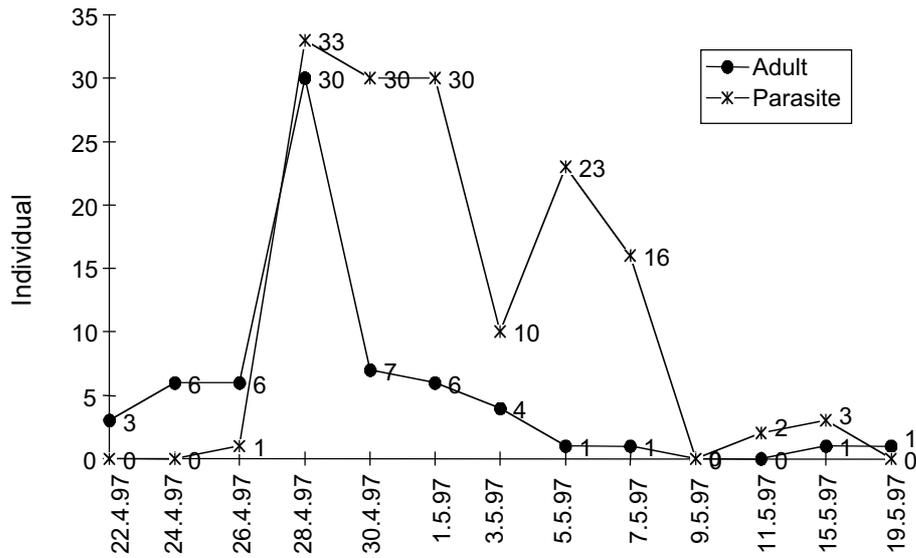


Fig. 15. Adult and parasite emergence from *Kermania pistaciella* pupae's in laboratory (1997).

#### Family Gelechiidae

Species *Recurvaria pistaciicola* (Danilewski). This species feeds in the fruits, entering inside just before the shell hardening. This species was found in all the orchards. In case, the dense occurrence of the pest, the damage was estimated as high as 14.22%. Therefore, this is an economically important pest in the region.

### Results

The result of this study among the identified species *C. lindbergi* from Heteroptera; *H. vestitus*, *C. cariosa* from Coleoptera; *K. pistaciella* and *R. pistaciicola* from Lepidoptera were determined as dense and important pest in orchards.

### Acknowledgments

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