

**Evaluation of the Lucanoidea and Scarabaeoidea (Coleoptera)
fauna of ecological cherry orchards in İzmir and Manisa provinces
of Turkey**

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Summary

The aim of this study is to verify and assure the presence or absence of lucanoid and scarabaeoid beetles in ecological cherry orchards and hence contribution to the fauna of Turkey. To fulfil this aim, a study was conducted in ecological cherry orchards in Muradiye (Maniŝa-Central province) (38^o 39' N / 27^o 20' E), Ören (İzmir-Kemalpaŝa) (38^o 28' N / 27^o 36' E) and Armutlu (İzmir-Kemalpaŝa) (38^o 25' N / 27^o 32' E), of western Turkey during the years 1998 & 1999. These beetles were collected mainly by bait traps and also pitfall traps as well as knock down methods were evaluated.

A total of 17 species belonging to eight families (Lucanidae, Aphodiidae, Cetoniidae, Euchiridae, Glaphyridae, Melolonthidae, Rutelidae, Scarabaeidae) were determined. Of these, *Propomacrus bimucronatus* Pall. is endemic and *Oxythyrea cinctella* Schm. and *Caccobius histeroides* (Mén.) are more abundant than the others.

Key words: Lucanoidea, Scarabaeoidea, Turkey, ecological cherry

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Introduction

To prevent the side effects of conventional agriculture to human health and environment, ecological agriculture applications have been started all over the world. The application of ecological cherry production methods have been applied in a project in important cherry production areas of western Turkey, Izmir and Manisa, during the years of 1998 and 1999 (1). In this project, different types of traps and different collection methods were used for both monitoring and control purposes of insect pests in those orchards. Lucanoids and Scarabaeoids collected mainly by bait traps and also by pitfall traps as well as by knock down methods were evaluated in this study.

Material and Methods

Experiments were conducted in three ecological cherry orchards namely in Muradiye (Manisa-Central province) (38° 39' N / 27° 20' E), Ören (Izmir-Kemalpaşa) (38° 28' N / 27° 36' E) and Armutlu (Izmir-Kemalpaşa) (38° 25' N / 27° 32' E) of western Turkey. In these orchards there are 550 trees in Muradiye, 160 trees in Ören and 165 trees in Armutlu.

Pitfall traps consisted of 250 ml cups buried in the soil in such a way that the lip of the trap was at ground level. They were half filled with ethylen glycol and water mixture as 1:1 ratio. Three traps were used in each orchards during the period between 1 April 1998 and 20 December 1999. The beetles were collected and the traps were cleared in two weeks intervals from the beginning of April up to the end of October in 1998 and 1999 and in three weeks intervals from the beginning of November 1998 to the end of March 1999.

In each orchard a total of nine bait traps containing 100 ml wine, 900 ml water, 25 gr sugar and 25 ml vinegar per liter (7) were hanged for monitoring the key pest, *Archips rosanus* (L.) (Lepidoptera: Tortricidae) adults. The traps were cleared in two weeks intervals from the mid of April up to the end of December 1998 and 1999.

During checking those traps some Lucanoid and Scarabaeoid beetles captured our attention and they were chosen, counted and included in this study.

In these orchards, insects were sampled also by knock down method in one week interval, and the results of collection by this method were included in this paper. Material were collected by the first author and were determined by the second author and were housed in the Prof. Dr. Niyazi Lodos Museum of Plant Protection Department, Faculty of Agriculture, Ege University, Izmir.

Material were identified on the basis of the previously determined material in the collection of the museum and the relevant literature.

Results and Discussion

A total of 17 species belonging to eight families were collected in the ecological cherry orchards in this study (Table 1). The collection

methods and numbers of 17 species were also given in Table 1. A total of 437 individuals were collected. Among these 285 individuals (65.2 %) of nine species were collected by bait traps, 138 individuals (31.6 %) of six species were collected by pitfall traps and 14 individuals (3.2 %) of five species were collected by knock down method. Their distribution according to collection methods were given in Figure 1 A. Collection by bait trap is the best method for sampling the lucanids, cetoniids and euchirids while pitfall trap is the best method for scarabaeids.

As shown in Table 2 and Figure 1 B, total number of specimens found in 1998 and 1999 in Muradiye is 216 (49.43 %) belonging to nine species; that found in Ören is 79 (18.08 %) belonging to 11 species; that found in Armutlu is 142 (32.49 %) belonging to 10 species.

Among these 11 species belonging to six families are phytophagous while six species belonging to two families are coprophagous. The most abundant are the members of Cetoniidae with 213 specimens (48.7 %) of six species. Members of Scarabaeidae and Euchiridae followed them with 129 (29.5 %) and 75 (17.1 %) specimens and percentages, respectively.

Among phytophagous *Propomacrus bimucronatus* is an endemic species (2). It was collected by bait traps based on boiled grape juice in the chestnut plantations in Tire and Ödemiş in 1984 (3). In this study, it was collected in two localities, Muradiye and Ören by bait traps based on wine and vinegar. Its damage has not been observed in this study.

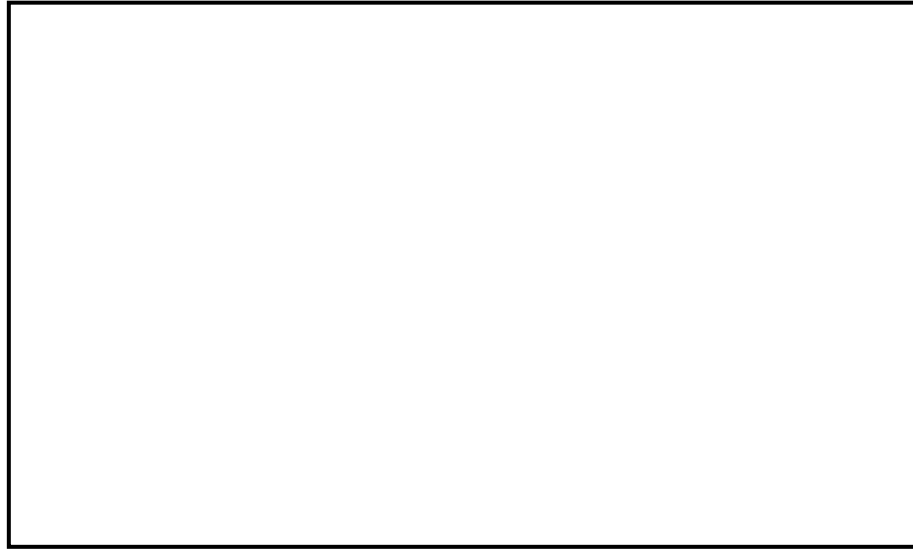


Figure 1. Distribution of the species collected in ecological cherry orchards according to collection methods (A) and localities (B).

Table 1. List of species and their collection methods in ecological cherry orchards in Manisa and İzmir Provinces during 1998 and 1999

Family and species	Collection methods			Total
	Pitfall traps	Bait traps	Knock down	
Phytophagous				
Lucanoidea-Lucanidae				
<i>Dorcus parallellipedus</i> (L.) ***	-	3	-	3
Scarabaeoidea				
Cetoniidae				
<i>Netocia hungarica</i> (Hbst.) ***	-	1	-	1
<i>Oxythyrea cinctella</i> Schm. ***	-	110	3	113
<i>Potosia cuprea</i> (F.) ***	-	56	-	56
<i>Potosia funesta</i> (Mén.) ***	-	34	-	2
<i>Potosia speciosissima</i> Scop. ***	-	2	-	34
<i>Tropinota hirta</i> Poda ***	-	2	5	7
Euchiridae				
<i>Propomacrus bimucronatus</i> Pall. ***	-	75	-	75
Glaphyridae				
<i>Pygopleurus foina</i> Reitt. ***	-	-	1	1
Melolonthidae				
<i>Pseudotrematodes frivaldskyi</i> Mén. *	7	2	-	9
Rutelidae				
<i>Anomala solida</i> Erich. *	-	-	4	4
Coprophagous				
Aphodiidae				
<i>Aphodius granarius</i> (L.) **	2	-	-	2
<i>Aphodius sticticus</i> (Panzer) **	-	-	1	1
Scarabaeidae				
<i>Caccobius histeroides</i> (Mén.) **	109	-	-	109
<i>Sisyphus boschniaki</i> Fisk. **	17	-	-	17
<i>Onthophagus furcatus</i> (F.) **	2	-	-	2
<i>Onthophagus ruficapillus</i> Brul. **	1	-	-	1
Total	138	285	14	437
Percentages (%)	31,6	65,2	3,2	100

* Destructive species
 ** Useful species
 *** Neutral species

Table 2. List of species and their total number of individuals collected in 3 ecological cherry orchards (M:Muradiye; Ö:Ören; A:Armutlu; T:Total) in 1998 and 1999

Family and species	Total trapped							
	1998				1999			
	M	Ö	A	T	M	Ö	A	T
Phytophagous								
Lucanoidea Lucanidae								
<i>Dorcus parallellipedus</i> (L.) * **	-	-	-		2	1	-	3
Scarabaeoidea								
Cetoniidae								
<i>Netocia hungarica</i> (Hbst.) * ****	-	-	-		-	-	1	1
<i>Oxythyrea cinctella</i> Schm. ****	6	5	4	15	82	14	2	98
<i>Potosia cuprea</i> (F.) ****	10	1	1	12	14	19	11	44
<i>Potosia funesta</i> (Mén.) * **	5	1	1	7	13	11	3	27
<i>Potosia speciosissima</i> Scop. **	1	-	-	1	1	-	-	1
<i>Tropinota hirta</i> Poda ****	-	-	-		6	1	-	7
Euchiridae								
<i>P.bimucronatus</i> Pall. *** ****	39	7	-	46	28	1	-	29
Glaphyridae								
<i>Pygopleurus foina</i> Reitt.	-	-	-		-	1	-	1
Melolonthidae								
<i>Pseudotrematodes frivaldskyi</i> Mén.	-	3	-	3	-	2	4	6
Rutelidae								
<i>Anomala solida</i> Erich. *	-	-	-		-	4	-	4
Coprophagous								
Aphodiidae								
<i>Aphodius granarius</i> (L.) **	-	-	-		-	-	2	2
<i>Aphodius sticticus</i> (Panzer) *	-	-	1	1	-	-	-	
Scarabaeidae								
<i>Caccobius histeroides</i> (Mén.) * **	-	5	96	101	2	1	5	8
<i>Sisyphus boschniaki</i> Fisck. * **	-	-	2	2	7	-	8	15
<i>Onthophagus furcatus</i> (F.) * ****	-	-	-		-	2	-	2
<i>O. ruficapillus</i> Brul *	-	-	1	1	-	-	-	
Total	61	22	106	189	155	57	36	248

* Determined for the first time in İzmir province
** Determined for the first time in Manisa province
*** Endemic
**** Reported in previous studies (4, 5, 7, 8).

P.frivaldskyi and *Anomala solida* are destructive species and they are pests of vineyards and some agricultural plants (1). However, in this study few specimens were collected and their damages have not been observed in cherry orchards.

Other eight species have neutral characters. Among these it is known that the larvae of *D. parallellipipedus* mine open galleries in the trunks of old trees of *Castanea* sp., *Quercus* sp., *Salix* sp. and *Populus* sp. .

Adults of cetoniiids are known as flower feeders. They are feeders of pollen grains and nectar. They prevent the fruit formation, so they are accepted as destructive species. But we do not have detailed observation on their damages on cherry trees.

Among 17 species, *Aphodius granarius*, *A. sticticus*, *Caccobius histeroides*, *Onthophagus furcatus*, *O. ruficapillus* and *Sisyphus boschniaki* are coprophagous and they are useful insects. They live in dung of animals.

Collection began at the beginning of April and completed mostly at the end of August in both years. Occurrence period of species were given in Figure 2. Information given in Figure 2 may be useful as an indicative of first and last adult appearance period in cherry orchards and also other agroecosystems.

This study is a contribution to Turkish Lucanoidea and Scarabaeoidea fauna. In the previous works (4, 5, 7, 8) have reported five, one, six, and 15 species, respectively. A few of these species have not been observed, but some were reported in this study. Six species cited in this paper have been reported in the previous studies (Table 2), while the rest of them, 11 species have been reported for the first time from cherry orchards in Turkey.

It is obvious that, lucanoids and scarabaeoids like other insects in ecosystems are rich by means of species diversity/ richness and they are found in balanced position as destructive, useful or neutral species in ecological cherry orchards. Perhaps the balanced ecosystem prevented some destructive species being important. In the future, if it is needed, studies on the biology, damage and usefulness etc. of these species of cherry orchards can be conducted in the light of those studies.

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Özet
İzmir ve Manisa İlleri ekolojik kiraz üretim
bahçelerinin faunası üzerinde araştırmalar: Lucanoidea
ve Scarabaeoidea (Coleoptera) türleri üzerinde bir
değerlendirme

1998 ve 1999 yıllarında ekolojik kiraz üretimi yapılan Muradiye (Manisa-Merkez), Ören (İzmir - Kemalpaşa) ve Armutlu (İzmir - Kemalpaşa)'daki bahçelerde yürütülen bu çalışmayla Lucanoidea ve Scarabaeoidea üstfamilyalarına bağlı türlerin ortaya konması amaçlanmıştır. Bu amaçla çukur ve besin tuzaklarının yanı sıra darbe yöntemiyle de örnekler toplanmıştır. Çalışma sonunda Lucanidae familyasından bir, Aphodiidae familyasından iki, Cetoniidae familyasından altı, Euchiridae familyasından bir, Glaphyridae familyasından bir, Melolonthidae familyasından bir, Rutelidae familyasından bir, Scarabaeidae familyasından dört olmak üzere toplam 17 tür saptanmıştır. Bu türlerden *Propomacrus bimucronatus* Pall'un endemik; *Oxythyrea cinctella* Schm. ve *Caccobius histeroides* (Mén.)'in en bol bulunan türler olduğu belirlenmiştir. Elde edilen materyal beslenme rejimleri ve ekonomik önemlerinin yanısıra yakalama yöntemleri ve dönemleri açısından da değerlendirilerek önceki çalışmalar ışığında tartışılmıştır.

Anahtar sözcükler: Lucanoidea, Scarabaeoidea, Türkiye, ekolojik kiraz

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