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Female and Male Genital Morphology of *Labidostomis decipiens* Faldermann, 1837 (Chrysomelidae: Clytrinae)

Didem CORAL[1*]

ABSTRACT: *Labidostomis decipiens* Faldermann, 1837 specimens collected from Ankara, Konya and Mersin, which were donated to the Nazife Tuatay museum by Prof. Dr. Halil Kasap, were examined. The paper presents morphological features of aedeagus and spermatheca of *Labidostomis decipiens* Faldermann, 1837 (Coleoptera: Chrysomelidae: Clytrinae) from Turkey for the first time. Accordingly, detailed investigations of aedeagus and spermatheca are very important to obtain new diagnostic characters in *Labidostomis*. Photos in stereo microscope are also given in the text.

Keywords: Aedeagus, genital morphology, *Labidostomis decipiens*, Faldermann, 1837, spermatheka, Turkey

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INTRODUCTION

Labidostomis Chevrolat has 4 subgenus in the Paleartic region, including *Aphobera* Warchalowski, 1985, *Chlorostola* Weise, 1881, *Labidostomis* Chevrolat, 1836, *Welleschmiedia* Warchalowski, 1985. Of these, only the species belonging to the subgenus *Labidostomis* Chevrolat, 1836 are found in Turkey. The genus *Labidostomis* is represented with 89 species and the *Labidostomis* subgenus is represented by 77 species in the Palaeartic region (Regalin & Medvedev in Löbl & Smetana, 2010; Audisio & Regalin, 2016). While the total number of this subgenus is 27 in Turkey, *L. atkaracalarica* Özdikmen, Bal & Kıyak, 2016 and *L. leonardii* Bezdek & Regalin, 2017 with new species *L. medvedevi* Warchalowski, with the new record in 1985, this number has increased to 30 (Özdikmen, Bal & Kıyak, 2016; Bezdek and Regalin, 2017). Therefore, while the number of species belonging to the genus *Labidostomis* was 92 in the Palaearctic region, the number of species belonging to the subgenus *Labidostomis* was 80. Approximately 37.5% of the species belonging to the subgenus *Labidostomis* in the Palaearctic region are found in Turkey. These species are given in Table1.

Table 1. Species belonging to *Labidostomis* subspecies in Turkey

***L. atkaracalarica* Özdikmen, Bal and Kıyak, 2016**	***L. leonardii* Bezdek andRegalin, 2017**
***L. asiatica* Faldermann, 1837**	***L. longimana* (Linnaeus, 1760)**
***L. axillaris* Lacordaire, 1848**	***L. lucida* (Germar, 1824)**
***L. basanica* Sahlberg, 1913**	***L.medvedevi* Warchalowski, 1985**
***L. beckeri* Weise, 1881**	***L. mesopotamica* Heyden, 1886**
***L. brevipennis* Faldermann, 1837**	***L. metallica* Lefèvre, 1872 (*L. m. metallica* Lefèvre, 1872)**
***L. cyanicornis* (Germar, 1822)**	***L. maculipennis* Lefèvre, 1870;**
***L. decipiens* Faldermann, 1837**	***L. oertzeni* Weise, 1889**
***L. diversifrons* Lefèvre, 1872**	***L. pallidipennis* (Gebler, 1830)**
***L. elegans* Lefèvre, 1876**	***L. peregrina* Weise, 1900**
***L. hebraea* Lacordaire, 1848**	***L. propinqua* Faldermann, 1837**
***L. humeralis* (Schneider, 1792)**	***L. rufa* (Waltl, 1838)**
***L. karamanica* Weise, 1900**	***L. subfasciata* Weise, 1885**
***L. kaszabi* (Medvedev, 1962)**	***L. sulcicollis* Lacordaire, 1848**
***L. korbi* Weise, 1902**	***L. testaceipes* Pic, 1904**

General morphology of *L. decipiens* was as below:

1–3. basal parts of antennae segments are black in color and apical parts are yellowish-brown, other segments are completely black. 2nd segment round, 3rd and 4th segments are cylindrical, and the 4th segment is slightly larger than the 3rd segment. 5–11. segments are serrated. Short, dense, yellowish-white feathers is found on the head. The head is metallic green except for the mouthparts. In male clypeus has three teeth. Labrum is black. The mandibles are blunt at the tip and quite wide.

The anterior margin of the pronotum is straight or slightly indented. Anterior corners are not visible when viewed from above. The pronotum is bulging and inclines from the median to the posterior margin. Pronotum metallic green-black. Pronotum has frequent, small and prominent punctuation. It has long, dense, yellowish-white feathers relative to the head.

The punctuation of the elytra is irregular, almost identical to that of the pronotum features. The elytra are yellow in color with two black shoulder spots. It has small, sparse, yellowish-white hairs. It is the same as the pronotum in terms of punctuation and color. Each elytron has a dark, long vertical strip in the middle in females which is not found in males. The epipleura is yellowish and broad. The legs are completely metallic green with short, sparse, yellowish-white hairs. In male, front tibia is elongated and curved like a bow. It has yellowish-white hairs and is metallic green in color. The body is in between 8.4-9.6 mm in lenght.

In today's systematics, we see many studies emphasizing the importance of genitals in the differentiation of species in different subfamilies within the same family. (Ataş et al., 2009a, 2009b, 2009c, 2009d; Bal et al., 2019a, 2019b; Bal, 2020a, 2020b; Bal and Özdikmen, 2020; Özdikmen and Bal, 2021; Özdikmen et al., 2021).

In 1981, Renato Regalin defined spermateca and aedeagus of 10 *Labidostomis* species in Italy. 6 of these species are distributed in Turkey. *L. axillaris* Lacordaire, 1848, *L. cyanicornis* (Germar, 1822), *L. humeralis* (Schneider, 1792), *L. longimana* (Linnaeus, 1760), *L. lucida* (Germar, 1824) and *L. pallidipennis* (Gebler, 1830). Therefore, this study is one of the most important studies in which the definitions of spermateca and aedeagus of this genus have been made. Highly variable within the genus, Ductus spermateka offers excellent characters for the separation of species and possibly grouping them into phylogenetic groups. Renato recommends a natural group classification based on spermatekaya with his work. There is not much information available about the female and male genital structure of the species, and with this study, the male genital and female genital structure of the species has been studied and presented in detail. In Turkey, there is a single study involving *L. atkaracalarica* Özdikmen, Bal and Mikhail, 2016 new species of *Labidostomis*, examining the genital structure and even the definition of the species in which aedeagus is used in the distinction between species (Özdikmen, Bal and Kıyak, 2016).

Another of the species found in Turkey is *Labidostomis decipiens* Faldermann, 1837. There is not much information available about the female and male genital structure of the species, and with this study, the male genital and female genital structure of the species has been studied and presented in detail.

MATERIALS AND METHODS

A total of 66 specimens of *L. decipiens* in the Chrysomelidae family collection donated by Prof. Dr. Halil Kasap to the Nazife Tuatay museum were studied. *Labidostomis decipiens* Faldermann, 1837 has been registered from Adana, Amasya, Ankara, Antalya, Çankırı, Gaziantep, Hatay, Izmir, Kahramamaraş, Kayseri, Konya, Malatya, Mersin, Niğde, Osmaniye, Sanliurfa provinces (Tomov and Gruev 1975; Gruev and Tomov 1979; Kasap 1987a; Aydın and Kısmalı 1990; Warchałowski 2003; Özdikmen 2011; Ekiz et al., 2013; Özdikmen and Mercan, 2014).

Material Examination: Adana prov.: Yeni Baraj, Leg. A. Bayarslan, 12.V.1978, 2 species; Yeni Baraj, Leg. A. Bayarslan, 13.V.1978, 2 species; **Ankara prov.:**Beytepe, Leg. H. Kasap, 30.V.1978, 24 species; Lalahan, Leg. H. Yılmaz, 7.VI.1978, 2 species; **Konya prov.:**Merkez, Leg. H. Kasap, 15.VI.1980, 31 species; **Mersin prov.:**Çamlıyayla, Leg. Ç. Şengonca, 8.VI.1978, 5 species.

Dissection and Preparation of Aedeagus:

The abdomens of the samples were taken and left for 5 minutes in hot water containing 10% KOH. Under the microscope, the parts outside the genital structure are cleaned. The remaining genital structures were first washed with water and then kept in 70% ethyl alcohol. The removed genital structures were either glued to a separate small cardboard or put in a small plastic tube with glycerin (bim capsule) and pricked next to specimen.

RESULTS AND DISCUSSION

Figure 1. General view of *Labidostomis decipiens* Faldermann, 1837 A.) Male B.) Female

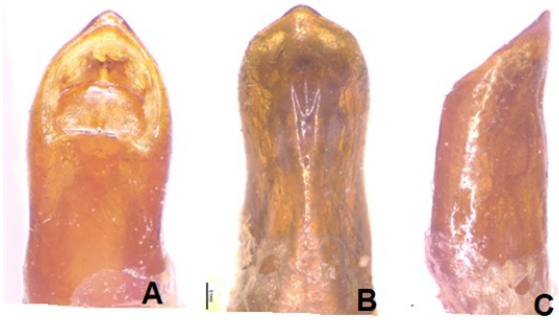

Figure 2. Aedeagus structure of *Labidostomis decipiens* Faldermann, 1837 A.Dorsal view of the aedeagus, B.) Ventral view of the aedeagus, C.) Lateral view of aedeagus

Figure 3. Spermateka structure of *Labidostomis decipiens* Faldermann, 1837

Aedeagus (Fig. 2, 5)

Aedeagus is light brown. In lateral view, the median lobe is parallel to the base to the edge and narrowed sharply in approximately 1/3 of the time. Apical quarter convergent with slightly concave margins, apex rounded. Apex is not very pointed. In dorsal view, dorsal median impression is not very prominent. It is narrowed towards the apex. Apex of aedeagus without inward crooked folds. Operculum trapezoidal with anterior margin not incised in middle. Visible part of non-everted anterior sclerite transverse and thin, with thin, long and finger-shaped. Since the orifice operculum is wide, it takes up less space. In ventral view ventral side of aedeagus moderately convex. Median impression semi-elliptical, distinct, concave. Ventral median impression is deep and elongated, expanding from the base to the tip.

The distinquishing features of *L. decipiens* aedeagus than other *Labidostomis* species are apex is rounded not sharpened as a point, apical margin of aedeagus on dorsal side without teeth, operculum trapezoidal, dorsal median impression is deep, elongated cover half of the aedeagus.

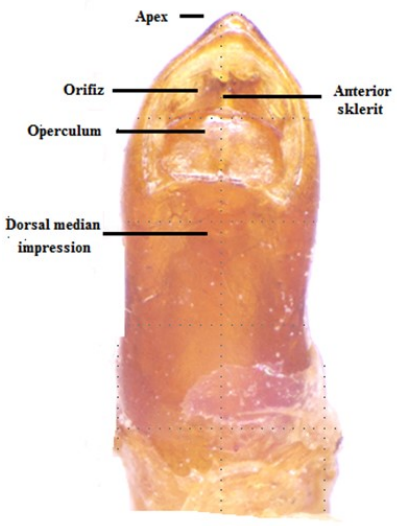

Figure 4. Parts of the aedeagus of *Labidostomis decipiens* Faldermann, 1837

Spermatheca (Fig. 3, 5)

General view of spermatheca symmetrical C-shaped, distinctly curved. Vasculum has an enlarged pear-like basal part and narrow apical part. Cornu not swollen. Cornu gradually narrowed towards to apex and apex of cornu strongly sharpened. Nodulus swollen like a thigh. Bulbus very short and transverse. Ampulla like a mushroom or doorknob in general. Ampulla joined to nodulus beyond the basal end of nodulus and so spermathecae symmetrical C-shaped. Collum + ramus (Ampulla) reduced and hardly visible.Collum like a peduncle, thinner than the basal part of nodulus. Ramus is not clearly visible. Ductus spermatheca short, thin and distinctly spiral.

The distinquishing features of *L. decipiens* spermatheca than other *Labidostomis* species are apex of cornu and nodulus are in the same level forming C shape, ductus is in a thin spiral shape, cornu tip is sharpened.

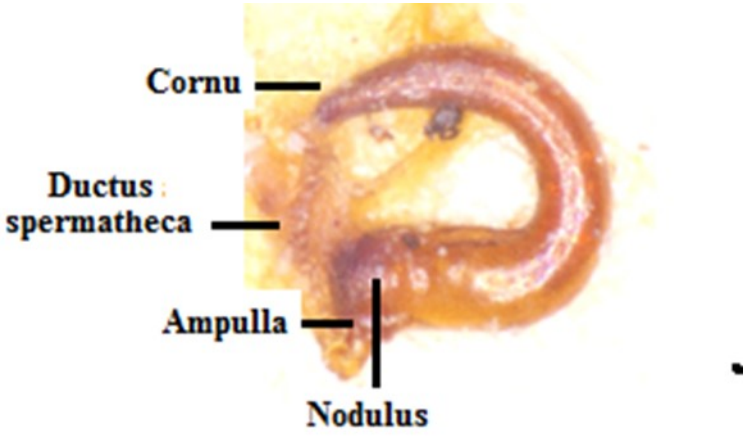

Figure 5. Parts of the spermatheca of *Labidostomis decipiens* Faldermann, 1837

CONCLUSION

In this study, the spermatheca of *L. decipiens* was given and described which is an important diagnostic character for the genus. In addition, the aedegus of the species was described in detail as well. In diagnosis, morphological features allow for the separation of many species, sometimes genitalia should be checked where morphological characteristics are not understood and sufficient in species distinctions. Especially in *Labidostomis* genus the spermatheca is an important and distinctive

character since the morphological features are not enough to distinquish the species among the genus. In most of the cases for *Labidostomis* species, a population should be identified by using both male and female morphological features and their genitalia together to identify the specimens accurately otherwise the morphological similarities among group do not allow identification correctly. In this genus, the characteristic features of spermatheca are; shape of cornu (narrowed or not), apex shape (sharpened or not), nodulus shape, nodulus binding type to bulbus, bulbus shape (big or small), the place of ductus binding to bulbus, the lenght and shape of ductus, spirial of ductus intensity and ramus shape. Therefore, in today's system, male and female genitalia are actively used in diagnosis and unknowing data about genitalia for these kind of species group should be performed for the future studies.

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REFERENCES

Ataş F, Özdikmen, H, Bal, N, Amutkan Mutlu D, Suludere Z 2019a. A SEM Study on Aedeagus and Spermatheca of *Cassida seraphina* Ménétries, 1836 (Coleoptera: Chrysomelidae: Cassidinae) from Turkey. Munis Entomology and Zoology, 14 (2): 395-411.

Ataş F, Özdikmen H, Bal N, Amutkan Mutlu D. Suludere Z, 2019b. A SEM Study on Aedeagus and Spermatheca of *Cassida hablitziae* Motschulsky, 1838 (Coleoptera: Chrysomelidae: Cassidinae) from Turkey. Munis Entomology and Zoology, 14 (2): 519-529.

Ataş F, Özdikmen H, Bal, N, Amutkan Mutlu D, Suludere Z, (2019c). A Morphological Study on Aedeagus and Spermatheca of *Cassida fausti Spaeth and Reitter, 1926* (Coleoptera: Chrysomelidae: Cassidinae) from Turkey. Sözlü Sunum, International Eurasian Conference on Biological and Chemical Sciences, June 28-29,2019, Ankara.

Ataş F, Özdikmen H, Bal N, Amutkan Mutlu D, Suludere Z, (2019d). A Morphological Study on Aedeagus and Spermatheca of *Cassida rubiginosa Müller, 1776* (Coleoptera: Chrysomelidae: Cassidinae) from Turkey. Sözlü Sunum, International Eurasian Conference on Biological and Chemical Sciences, June 28-29,2019 Ankara.

Audisio P, Regalin R, 2016. Fauna Europaea: *Labidostomis*. Fauna Europaean version 2.6.2, http://www.faunaeur.org (accessed 29.01.2016).

Aydın E, Kısmalı S, 1990. Ege Bölgesi Clytrinae (Coleoptera, Chrysomelidae) Altfamilyası Türleri Üzerinde Faunistik Çalışmalar. Türk Entomoloji Dergisi, 14: 23-35.

Bal N, Özdikmen H, 2020. Aedeagus Structure of *Cassida prasina* Illiger, 1798 (Coleoptera: Chrysomelidae: Cassidinae) in Scanning Electrone Microscope (SEM)**,** Kahramanmaraş Sütçü İmam Journal of Agriculture and Nature, cilt.23: 748-753.

Bal N, 2020a. Spermatheca Structure of *Cassida atrata* Fabricius, 1787 (Coleoptera: Chrysomelidae: Cassidinae) in Scanning Electron Microscope (SEM), Kahramanmaraş Sütçü İmam Tarım ve Doga Dergisi- Kahramanmaraş Sütçü İmam Journal of Agriculture and Nature, cilt.23, sa.2: 396-401.

Bal N, 2020b. A SEM Study of the Aedeagus and Spermatheca of *Cassida viridis* Linnaeus, 1758 (Coleoptera: Chrysomelidae: Cassidinae) from Turkey. Türkiye Entomoloji Dergisi, 44(3):355-364.

Bal N, Özdikmen H, Ataş, F, Amutkan Mutlu D, Suludere Z, 2019a. A SEM Study on Aedeagus and Spermatheca of *Cassida vibex Linnaeus, 1767* (Coleoptera: Chrysomelidae: Cassidinae) from Turkey. Sözlü Sunum, International Eurasian Conference on Biological and Chemical Sciences, Ankara.

Bal N, Özdikmen H, Ataş F, Amutkan Mutlu D, Suludere Z, (2019b). A SEM study on Aedeagus and Spermatheca of *Cassida pannonica Suffrian, 1844* (Coleoptera: Chrysomelidae: Cassidinae) from Turkey. Sözlü Sunum, International Eurasian Conference on Biological and Chemical Sciences, June 28-29,2019, Ankara.

Bezděk J, Regalin R, 2017. A Review of *Labidostomis* Species Similar to *L. longimana* from Southeastern Europe with Descriptions of Two New Species from Greece and Turkey (Coleoptera: Chrysomelidae: Cryptocephalinae: Clytrini). Zootaxa, 4317(2): 321-337.

Ekiz A N, Şen İ, Aslan E G, Gök A, 2013. Checklist of Leaf Beetles (Coleoptera: Chrysomelidae) of Turkey, Excluding Bruchinae. Journal of Natural History, 47: 2213-2287.

Gruev B, Tomov V, 1979. Zur Kenntnis einiger in der Türkei, Jugoslawien und Griechenland vorkommender Arten der Familie Chrysomelidae (Coleoptera) aus der Zoologischen Staatssammlung München. Spixiana, 2: 259-267.

Kasap H, 1987. A list of some Clytrinae (Coleoptera: Chrysomelidae) from Turkey. *Labidostomis*, *Lahnaea*, *Antipa*, *Coptocephala* (Part I). Türkiye Entomoloji Dergisi, 11: 41-52.

Özdikmen H, Mercan N, 2014. Chorotype Identification for Turkish Chrysomeloidea (Coleoptera) Part II – Chrysomelidae: Clytrinae. Munis Entomology & Zoology, 9: 89-102.

Özdikmen H, Bal N, 2021. The Structure of Spermatheca in the Subgenus *Cassida* (*Cassida)* Linnaeus, 1758 (Coleoptera: Chrysomelidae: Cassidinae) and its Taxonomic Significance, Fresenius Environmental Bulletin, cilt.30, sa.5: 5270-5291.

Özdikmen H, 2011. A Comprehensive Contribution for Leaf Beetles of Turkey with a Zoogeographical Evaluation for all Turkish Fauna (Coleoptera: Chrysomelidae). Munis Entomology & Zoology, 6: 540-638.

Özdikmen H, Bal N, Kıyak S, 2016. The Genus *Labidostomis* Germar of Turkey with a New Species and a New Record (Coleoptera: Chrysomelidae: Clytrinae). Munis Entomology & Zoology, 11(2): 515-538.

Özdikmen H, Bal N, Amutkan Mutlu D, Suludere Z. (2021). Comparative Ultrastructural Analysis of Six Subgenera of *Cassida* Linnaeus, 1758 (Coleoptera: Chrysomelidae: Cassidinae) Based on Spermatheca of the Type Species and its Taxonomic Significance, Transactions of the American Entomological Society, cilt.147, sa.1, ss.67-99.

Regalin R, 1981. Le Specie Italiane del Genere *Labidostomis* Redtenbacher (Coleoptera Chrysomelidae Clitrini). Memorie della Società entomologica italiana, 1980, 59: 37-48.

Regalin R, Medvedev L N, 2010. Tribe Clytrini. In: Löbl, I. & Smetana, A. editors. Catalogue of Palearctic Coleoptera (Vol. 6). Stenstrup: Apollo Books, p. 564-580.

Tomov V, Gruev B, 1975. Chrysomelidae (Coleoptera) Collected by K. M. Guichard in Turkey, Greece and Yugoslavia. Travaux Scientifiques des Universite d'Plovdiv – Biology, 13: 133-151.

Warchałowski A, 2003. Chrysomelidae: The leaf beetles of Europe and the Mediterranean Area. Warszawa: Natura optima dux Foundation; 600 p.