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Orijinal araştırma (Original article)

Male genital structures of four click-beetles species from Turkey (Coleoptera: Elateridae)[1]

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Summary

In this study, specimens of four species of the family Elateridae (Coleoptera) were collected from Central Anatolian region during PhD thesis. Male genital structures of these species are examined. So, male genital structure of *Idotarmonides anatolicus* (Candèze, 1881) are examined for the first time and male genital structures of *Cardiophorus* (s.str.) *anticus* Erichson, 1840, *Cardiophorus* (s.str.) *kindermanni* Candèze, 1860 and *Zorochros pilosellus* (Reitter, 1895) are firstly examined in detail with the present work. Description of male genital morphology of *I. anatolicus* and male genital organ drawings of all species were made. Collecting provinces in Turkey and World distributions of species are given. Male genital morphologies of two other species of the genus *Idotarmonides*, which are given in literature, are compared with *I. anatolicus*. Intraspecific variations of male genitalia of *C.* (s.str.) *anticus*, *C*. (s.str.) *kindermanni* and *Z. pilosellus* are discussed with literature.

Key words: Click beetles, male genitalia, morphology, Central Anatolian Region, Turkey

Anahtar sözcükler: Elateridae, erkek genital organ, morfoloji, İç Anadolu Bölgesi, Türkiye

Introduction

The male genital morphology is often used to distinguish insects at the species level. The aedeagus of click beetles consists of basal piece, a pair of parameres, which are connected to basal piece, and median lobe. Median lobe is situated between parameres, bifurcated at basal and carrying hole of sperm channel near the apex (Laibner, 2000). Male genital structure has not been described for *Idotarmonides anatolicus* (Candèze, 1881) until now. Male genital structures of *Cardiophorus* (s.str.) *anticus* Erichson, 1840, *Cardiophorus* (s.str.) *kindermanni* Candèze, 1860, *Zorochros pilosellus* (Reitter, 1895) have not been described in detail until now.

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Material and Methods

Specimens were collected from Central Anatolian region of Turkey. The species were determined by using present diagnostic keys. Male genital organs were prepared by using standard methods. Their morphologies are described and drawn in detail from dorsal view.

Results and Discussion

Subfamily: Elaterinae

Idotarmonides anatolicus (Candèze, 1881)

Collecting province: Ankara

World distribution: Azerbaijan, Georgia, Russia (South European Territory) and Turkey (Cate, 2007).

Male genitalia (in dorsal view) (Figure 1a): Basal piece wide and quadratic, its lateral sides slightly arcuate, anterior margin notched widely 'U' shaped, posterior margin flat, arms of basal part pointed; median lobe clearly longer than parameres, slightly sclerotized, arms of median lobe short, thick, parallel, reaching ventral posterior margins of parameres, median lobe gradually narrowing from basal to medial, parallel sided from medial to apical, lemon shaped at apical, its apex pointedly finger shaped; parameres almost parallel sided from basal to distal teeth, distal teeth slightly pointed, apex of parameres pointed and carrying three pairs of hairs.

Subfamily: Cardiophorinae

Cardiophorus* (s.str.) *anticus Erichson, 1840

Collecting province: Ankara.

World distribution: Bulgaria, France, Greece, Hungary, Italy, Palestine, Slovakia and Turkey (Cate, 2007).

Male genitalia is given in Figure 1b from dorsal view.

Cardiophorus* (s.str.) *kindermanni Candèze, 1860

Collecting province: Karaman.

World distribution: Armenia, Lebanon, Syria and Turkey (Cate, 2007).

Male genitalia is given in Figure 1c from dorsal view.

Subfamily: Negastriinae

Zorochros pilosellus (Reitter, 1895)

Collecting province: Karaman.

World distribution: Armenia, Azerbaijan, Greece, Iran, Turkey and Turkmenistan (Cate, 2007).

Male genitalia is given in Figure 1d from dorsal view.

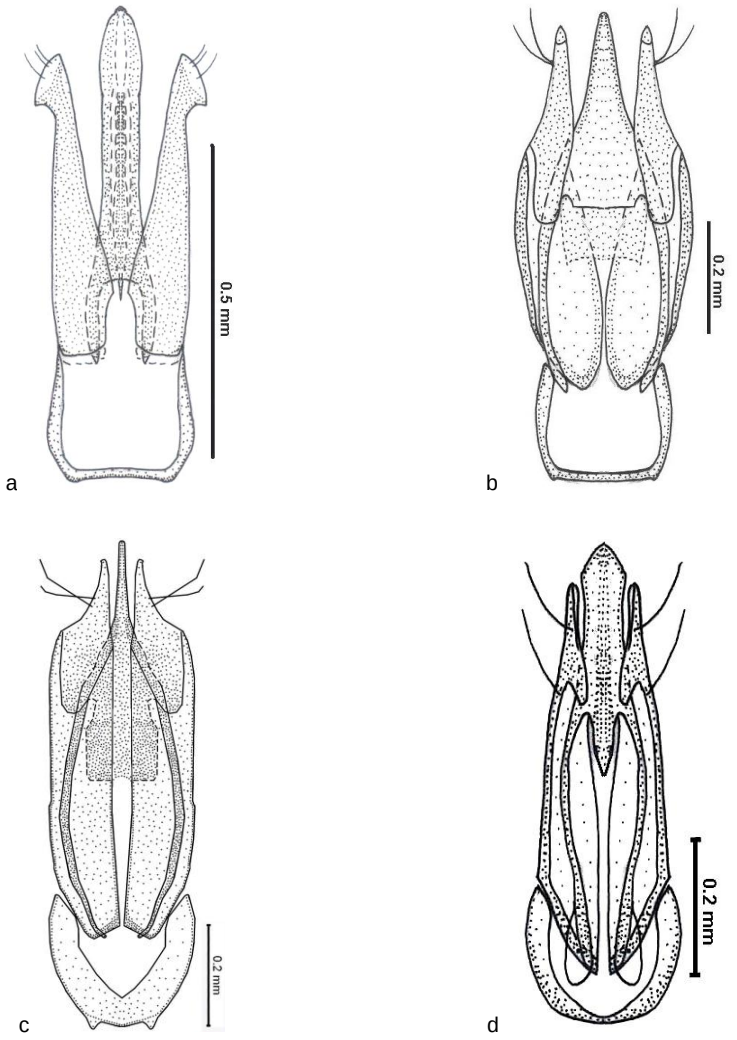

Figure 1. Aedeagus drawings (in dorsal view) a. *Idotarmonides anatolicus* (Candèze, 1881), b. *Cardiophorus* (s.str.) *anticus* Erichson, 1840, c. *Cardiophorus* (s.str.) *kindermanni* Candèze, 1860, d. *Zorochros pilosellus* (Reitter, 1895).

There are a lot of studies including male genital structures of genera *Cardiophorus* Eschscholtz, 1829, *Idotarmonides* Agajev, 1985 and *Zorochros* C. G. Thomson, 1859. However, male genital structure of *I. anatolicus* has not been described until now and male genital structures of *C.* (s.str.) *anticus*, *C.* (s.str.) *kindermanni* and *Z. pilosellus* have been exhibited without detail.

According to Cate (2007), Genus *Idotarmonides* is represented 4 species in Palaearctic region and two of them are present in Turkey. Male genital structure of *I. anatolicus* is compared with *Idotarmonides rydhi* Platia & Schimmel, 1992 and *Idotarmonides bicolor* Platia & Gudenzi, 1999 from literature (Platia & Schimmel, 1992; Platia & Gudenzi, 1999). In *I. anatolicus*, arms of median lobe are short and almost parallel, while arms of median lobe are long and arcuate in *I. rydhi* and short and slightly divergent in *I. bicolor*; distal teeth of parameres are strongly pointed and laterally directed in *I. bicolor* and *I. rydhi*, while those are feebly pointed and directed posteriorly in *I. anatolicus*; lateral margins of median lobe are clearly concave from proximal to distal in *I. bicolor* and feebly concave in *I. rydhi*, while lateral margins of median lobe are almost parallel sided in *I. anatolicus*; basal part is thin in *I. anatolicus* and *I. bicolor*, while it is thick in *I. rydhi*.

Male genital structure of *C.* (s.str.) *anticus* was half drawn by Laibner (2000). Our detailed and complete drawing is compared with Laibner's (2000) findings. In our findings, median lobe is thicker and posterior half of movable parts of parameres are thinner than Laibner's findings.

Cardiophorus (s.str.) *kindermanni*'s male genital structure was only given by Mardjanian (1987) without detailed drawing. With the present study, its detailed drawing is given and compared with Mardjanian's findings. In our findings, there are small apical teeth on parameres and triangular projections on corners of posterior margin of basal piece, arms of median lobe are arcuate, while apical teeth of parameres, arms of median lobe, triangular projections on corners of posterior margin of basal piece were not given in Mardjanian (1987).

Male genital structure of *Z*. *pilosellus* is also examined in detail in present study. Male genital structures of this species was given by Leseigneur (1972), Mardjanian (1987) and Laibner (2000) without in detail. Arms of median lobe are arcuate and broadened at basal, apex of median lobe is slightly pointed, median lobe has triangular projection between arms of median lobe, basal part of parameres are triangular, while arms of median lobe are feebly arcuate and not broadened at basal, apex of median lobe is truncated, median lobe has not triangular projection between arms of median lobe, basal part of parameres are not triangular in Mardjanian (1987).

Özet

Türkiye'den dört Elateridae türüne ait erkek genital yapıları (Coleoptera: Elateridae)

Bu çalışmada, dört Elateridae (Coleoptera) familyası türüne ait örnekler Doktora tezi süresince İç Anadolu Bölgesinden toplanmıştır. Bu türlere ait erkek genital yapıları incelenmiştir. Bunun sonucunda, *Idotarmonides anatolicus* (Candèze, 1881)'un erkek

genital yapısı ilk defa, *Cardiophorus* (s.str.) *anticus* Erichson, 1840, *Cardiophorus* (s.str.) *kindermanni* Candèze, 1860 ve *Zorochros pilosellus* (Reitter, 1895) türlerinin erkek genital yapıları ise ayrıntılı olarak ilk defa bu çalışma ile incelenmiştir. *I. anatolicus*'un erkek genital morfolojisine ait betimleme ve incelenen tüm türlere ait erkek genital organ çizimleri yapılmıştır. Türlerin Türkiye'de toplandıkları iller ve Dünya yayılışları verilmiştir. Literatürde verilmiş olan *Idotarmonides* cinsinin diğer iki türünün erkek genital morfolojileri, *I. anatolicus* ile karşılaştırılmıştır. *C.* (s.str.) *anticus*, *C*. (s.str.) *kindermanni* ve *Z. pilosellus* türlerine ait erkek genital organlarının tür içi farklılıkları literatürle tartışılmıştır.

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