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A NEW ANISE (*Pimpinella anisum* L.) PEST: *Carterus dama* (Rossi, 1792) (COLEOPTERA: CARABIDAE)

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ABSTRACT

Carterus dama (Rossi, 1792) was determined as a new Anise (*Pimpinella anisum* L., Apiaceae) pest in Burdur province from Turkey. In this study, some notes on biology, morphology and damage of this species were presented. The pest visited to anise field with the plants reaching to 5-10 cm height in early May and later the population increased at the flowering and seed ripening stages between mid June and mid July when the adults cut the umbrella-like clusters and transported them out of the anise fields. The reproduction rhythm of *C. dama* and larvae development coincided with the maximum presence of anise seeds in summer.

Keywords: Anise, *Carterus dama*, Carabidae, New pest, *Pimpinella anisum*, Turkey

ANASON (*Pimpinella anisum* L.)'DA YENİ BİR ZARARLI: *Carterus dama* (Rossi, 1792) (COLEOPTERA: CARABIDAE)

ÖZET

Carterus dama (Rossi, 1792) Burdur ili anason (*Pimpinella anisum* L., Apiaceae) alanlarında yeni bir zararlı olarak belirlenmiştir. Bu çalışmada, zararlının biyoloji, morfoloji ve zararı ile ilgili bazı notlar verilmiştir. Zararlı, Mayıs ayı başlarında bitki 5-10 cm boylandığında anason tarlalarında görülmeye başlamaktadır. Daha sonra popülasyon, Haziran - Temmuz aylarında bitkinin çiçeklenme ve tohum olgunlaşma dönemleri arasında iyice yükselmektedir. Erginler bitkinin şemsiye şeklindeki taç kısımlarından dalcıkları keserek tohumları tarla dışına taşımaktadırlar. Zararlının üreme ritmi ve larva gelişimi tarladaki anason tohumlarının bolluğuyla uyum içerisindedir.

Anahtar Kelimeler: Anason, *Carterus dama*, Carabidae, *Pimpinella anisum*, Yeni zararlı, Türkiye

INTRODUCTION

Carabidae or ground beetles form a very large family of about 2.000 genera and 40.000 species (Hurka, 1996). They are very variable in shape and color, but can usually be recognized by the positions of antennal cleaner and antennal insertions, and by the large metatrochanter. Most species are glabrous but some are hairy. All parts of carabids are likely to bear fixed setae of great taxonomic importance (Booth *et al.*, 1990). Adult carabids generally live on the ground, although some climb vegetation in search of their prey, and others live on trees. They are usually nocturnal, hiding in leaf litter or under logs, stones, etc. during the day, but many brightly coloured species are diurnal. They are usually predators on a wide range of invertebrates, but may be omnivorous or seed feeders. The larvae are active and terrestrial, not usually living in burrows, and occur in the same habitats as adults. They are mostly predacious, but some phytophagous, omnivorous, or ectoparasitic, although they are usually more host specific than their adults (Brandmayr, 1990; Booth *et al.*, 1990; Kesdek and Yıldırım, 2003).

Carterus Dejean & Boisduval, 1829 is from tribus Harpalini ground beetles. According to Schremmer, most Harpalini species feed on Apiaceae seeds (Brandmayr and Brandmayr, 1987). *Carterus* (*Sabienus*) *caly-*

donius females on the umbels collect the seeds of *Daucus gigidium*. However, there is no record that the species belonging to genus *Carterus* have damaged on cultivated plants, as a pest. This is the first record about damaging of *Carterus dama* on anise seeds.

Anise is cultivated over 21.000 ha sown areas in Turkey. The most important anise areas are in Burdur province which has 9.609 ha sown area which covers 45.7% of the anise sown areas (Anonymous, 2003). Anise oil getting from the seeds is used to impart the important licorice flavor in beverages, especially in Turkish raki and also in medicine. The anise is a slow growing annual plant which flowers approximately three months after planting. Each plant has from 1-6 umbrella-like clusters with 8-15 flavor nuggets in each. It is ready for harvest about one month after bloom.

Some years, *C. dama* causes a serious damage on the all of the anise fields in Burdur province (Fig. 1). It is recorded that the pest cut the clusters from the bottom and transport the seeds from flowering. Any chemical application can not be performed because of honeybee activation at the flowering period of the plant. The honey producers pay a rent to anise producers in order to utilize their honeybees from the anise flowers. The pest

caused confusion and crop losses. However, the pest population and damage have reduced recently.

There is no literature record about the feeding and damage of any species of *Carterus* on anise in the world. In this article, some topics on the pest were explained. However, detailed studies are needed especially on the biology, bio-ecology and damage of *C. dama*.

MATERIAL AND METHODS

All studies were carried out in Burdur province in Turkey in 2003 (Fig 1). A survey study was carried out in the anise fields after awaiting of the pest damage. Later, some observations on the biology and damage were performed. The material was collected from near of plant roots under soil, and on the ground and plants by hand and stored in the Plant Protection Museum of Ankara Plant Protection Central Research Institute. The material were identified by Mr. Claude Jeanne (France) and Mr. M. Kesdek.

RESULTS AND DISCUSSION

All material was collected from anise fields in Altınyayla, Çavdır, Çeltikçi, Central, Gölhisar, Karamanlı, Tefenni and Yeşilova districts of Burdur province (Fig 1). The studies were carried out in field in May-September. The specimens are very swift. The spermophagous (=seed eating) carabids were difficult to catch as other carabids with pitfall traps (Brandmayr and Brandmayr, 1974). *C. dama* was recorded by Jedlicka (1963) and Casale and Taglianti (1999) from southwest Mediterranean part of Turkey.

Several carabids with a predatory life fed on green parts of plants or on fruits for water supplying and food in fresh or rotten fruits. The true spermophagy indicates as a real food specialization the genus *Ophonus* and *Carterus* which had exclusively spermophagous species (Brandmayr and Brandmayr, 1987; Brandmayr *et al.*, 1990; Brandmayr and Brandmayr, 1991). Brandmayr and Brandmayr (1987), reported that the tribus Harpalini ground beetles belonging to subfamily Harpalinae, a group of Carabidae in which the seeds of herbaceous plants form a more or less important part of the food and also the only stock of Adephagan Coleoptera for which true presocial behavior was known. According to Brandmayr (1990), there is an evolutionary pathway. This pathway can be seen in Mediterranean summer-dry climates where natural open land is common enough to allow the many species belonging to the tribus Harpalini. Also, there is an unusual concentration of Apiaceae and spermophagous carabids. Further on, Brandmayr and Brandmayr (1974), determined that spermophagous *Carterus calydonius* Rossi showed a parental behavior as a true presocial behavior. They described the pedotropic nest of it, where a single female rears up to pupation no less than 25 eyeless larvae in underground

chambers. The melolonthid C shaped larvae can not walk, therefore the nests is supplied with seeds collected by the mother on the umbels of *Daucus gigidium*. The authors interpreted this behavior as an evolutionary response to the dry summer of the Mediterranean biome. Later, Brandmayr and Brandmayr (1987), determined also *C. calydonius* nest in which pupal cells and larval burrows placed under a great stone. The authors noted that the umbels of *Daucus* were the most frequently visited by the species belonging to tribus Harpalini at least in the western Mediterranean region and, Apiaceae and the tribus Harpalini share perhaps a common evolutionary history, which involves adaptation to dry soils and dry summer climates in this region.

However, there is no record on being harmful of *Carterus* species in the world. In this study it is recorded that the pest visited to anise field with the plants reach to 5-10 cm height in early May and later the population increases at the flowering and seed ripening stages between mid June and mid July when the adults cut the umbrella-like clusters and transport them out of the anise fields. The reproduction rhythm of *C. dama* and larval development coincide with the maximum presence of anise seeds in summer. Also anise seeds were very solid and can remain intact for a long time. Brandmayr and Brandmayr (1974), informed that *C. calydonius* has a summer reproduction unlike many carabids. They determined that in spring time only one male and female from 24 males and 12 females belonged to previous generation. That's why many authors named them as "Frühlingstier".

The adult morphology of this species is interesting. There is a sexual dimorphism. Males are larger than females and bear bigger horns on the mandibulae and on clypeus (Fig 2). Brandmayr and Brandmayr (1987), claimed that this condition was seldom or never observed in Carabids, where the females were usually larger in size. These structures in males showed a typical positive allometric mode of growth and may be strong combats between males.

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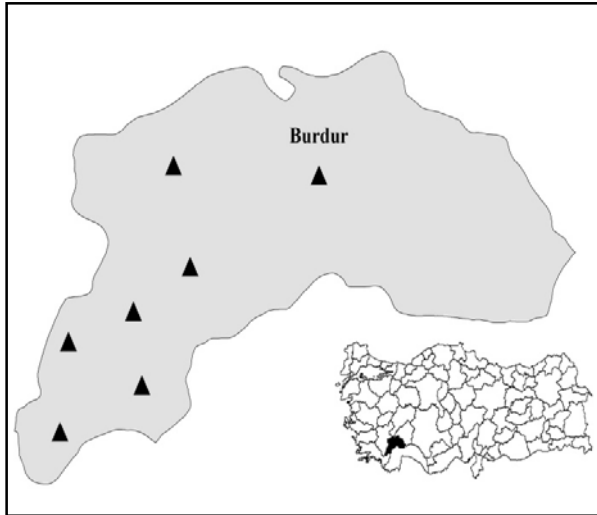


Figure 1. Burdur province area which is determined of *Carterus dama* damage in anise fields.

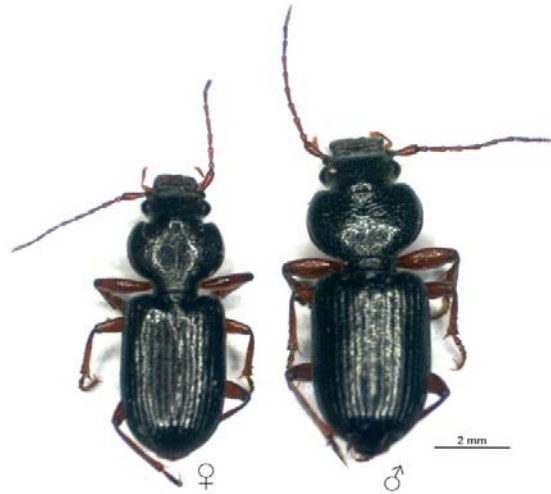


Figure 2. Adults of *Carterus dama*

