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Field observations on the hunting behavior of tiger beetles from the Mediterranean region and Asia Minor (Coleoptera: Cicindelidae)

Jörg Gebert

Zusammenfassung:
Freilandbeobachtungen zum Beutefangverhalten von *Calomera panormitana cypricola* (Mandl, 1981), *Calomera littoralis fiorii* (Grandi, 1909) und *Cephalota* (*Taenidia*) *eiselti eiselti* (Mandl, 1970) in ihrem natürlichen Umfeld werden beschrieben.

Summary:
Field observations on the hunting behavior of *Calomera panormitana cypricola* (Mandl, 1981), *Calomera littoralis fiorii* (Grandi, 1909) and *Cephalota* (*Taenidia*) *eiselti eiselti* (Mandl, 1970) in their natural environment are described.

Key words
Coleoptera, Cicindelidae, prey capture behavior

General

Several studies have described the hunting behavior of some tiger beetle species from various perspectives in great detail (Faasch 1968, Jaskuła 2013, Layne et al. 2006, Rewicz & Jaskuła 2018). Particularly astonishing is the high degree of adaptation of some species to their habitat and the specific prey found there. Many species, especially those that live in dry habitats, prey on ants, which make up the majority of their diet in these habitats. This includes most Central European species. Species living in marine coastal habitats sometimes use completely different strategies to obtain food (Gebert 2013). Here, I describe further observations on the hunting behavior and prey preferences of some so far little studied species.

The nomenclature, which has been changed compared to Löbl & Löbl (2017), follows the findings of Romano and Sparacio (2018) and Wiesner (2021).

Calomera panormitana (Ragusa, 1906)

Calomera panormitana (Ragusa, 1906), a Mediterranean species inhabiting the surf zone of rocky coasts in Italy (Sicily), Greece (Crete, Rhodos), Cyprus, Turkey, Syria, Lebanon, and Israel (Assmann et al. 2018; whether the species still occurs with residual populations in the southern Levant remains to be investigated) has a contrasting hunting behavior than the aforementioned species adapted to dry habitats. The species lays its eggs in neighboring, often small and sheltered areas with sandy surfaces where also its larvae subsequently develop. Such areas require special protection from increasing tourist pressure on even the smallest beach sections in Mediterranean holiday regions (Aydin et al. 2005).

The subspecies *Calomera panormitana cypricola* (Mandl, 1981) (Fig. 1) was observed in detail by the author on Cyprus on various coastal sections while hunting for prey.

Fig. 1: *Calomera panormitana cypricola* (Mandl, 1981) Cyprus: rocky coast west of Paphos

Unlike other species of the genus, it does not rush or jump at its prey, but approaches it with very slow, steady, short steps, as if in slow motion and grabs its prey, the sea slaters *Ligia italica*/*oceanica* (Crustacea, Isopoda),

in a flash when it has closed the distance to it. The *Ligia* species, small isopods with large compound eyes, live around the tidal rock pools of regularly flooded rock formations (Fig. 2) (primary habitat).

Fig. 2: Cyprus: rocky coast west of Paphos, June 2018

When undisturbed, the sea slaters leave the protective pools at the risk of falling prey to predators. To avoid death, their large, highly developed compound eyes ensure good vision. As soon as any disturbance approaches, they quickly jump into the protective water of the rock pools. Nevertheless, freshly molted and not yet hardened individuals are probably the preferred prey of *Calomera panormitana*. After hardening of the exoskeleton, this land isopod would be difficult to overcome for the tiger beetle.

Fig. 3: *Ligia* cf. *italica/oceanica*, Cyprus: rocky coast west of Paphos, June 2018

In addition to *Calomera*, their predators probably include reptiles (Scincicidae: *Chalcides ocellatu*s (FORSKÅL, 1775), which were also observed in the splash zone on Cyprus (Fig. 2). *Calomera panormitana* must also protect itself from other predators, which, in case of danger, it does by jumping into the sea. Even being washed over by a high wave is not necessarily fatal for this species. The author observed that an animal caught by a wave was able to fly directly from the water surface back to the shore after resurfacing.

Fig. 4: *Heremites vittatus* (OLIVIER, 1804) in the splash zone Cyprus: rocky coast west of Paphos June 2018

Calomera littoralis fiorii (GRANDI, 1906)

During a stay in Sardinia in the spring of 2025, the author observed the endemic subspecies *Calomera littoralis fiorii* (Grandi, 1906) (Fig. 5) at the mouth of the Riu Mannu (Buggeru south of Portixeddu) (Fig. 6) in the southwest of the island. The extensive alluvial sand bars, subject to dynamic changes due to waves, tides, and ocean currents, exhibited surfaces with varying degrees of moisture and patina. There, the species preferred to hunt for ants, some of which were comparable in size to the widespread *Formica rufa* (LINNAEUS, 1761). The ants were actively pursued by running or with quick jumps. Some of them defended themselves so vehemently that special measures had to be taken to prevent the prey from escaping. *Calomera littoralis fiorii* ran with the prey in its mandibles to the calm waterline of the river, stood in the water with its long legs and submerged the ant until its resistance was largely broken and it could be consumed. This may be a strategy to neutralise the ants‘ defence secretions. This hunting method was observed twice.

Fig. 5: *Calomera littoralis fiorii* (GRANDI, 1906) Italy: Sardinia, Arbus, Dune di Piscinas

Fig. 6: Italy: Sardinia, Buggeru, Foce Riu Mannu, alluvial sand fan in the estuary

Cephalota (*Taenidia*) *eiselti* (Mandl, 1971)

Cephalota, *eiselti* which occurs in two subspecies in Turkey was observed several times in the early 2000s during study trips to Central Anatolia in the summer-dry salt lakes of Cappadocia between Ankara and Kayseri. Individuals of the nominate form *Cephalota* (*Taenidia*) *eiselti eiselti* (Mandl, 1971) collected up to five small ants the size of a *Myrmica* at once in the intense heat, then killed them and consumed them in a sheltered hiding place in the shade of herbs.

Fig. 7: *Cephalota* (*Taenidia*) *eiselti eiselti* (Mandl, 1971) Turkey: Salt lake Çöl Gölü west of Şeyhşaban

Fig. 8: *Cephalota* (*Taenidia*) *eiselti eiselti* (Mandl, 1971) Salt lake Çöl Gölü west of Şeyhşaban consuming several small ants in a shaded hiding place

Fig. 9: Turkey: Salt lake Çöl Gölü west of Şeyhşaban (Central Anatolia) July 2002

Other *Cephalota* species also showed that they can protect themselves from excessive temperatures in the midday heat by seeking out shaded places, including *Cephalota* (*Taenidia*) *tibialis nuessleri* Gebert 1995 on Cyprus (Fig. 10).

Fig. 10: *Cephalota* (*Taenidia*) *tibialis nuessleri* Gebert 1995 in its hiding place Cyprus: Akrotiri Bay, Ladies Mile Beach 2018

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Address of the Author

JÖRG GEBERT
Karl-Liebknecht-Straße 73
D-01109 Dresden
joerg.gebert@gmx.de