

***Graphosoma italicum* (O. F. Müller, 1766) (Hemiptera: Pentatomidae) Observed on *Smyrniium cordifolium* (Apiaceae) in Eastern Anatolia, Türkiye**

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ABSTRACT: *Graphosoma italicum*, is an aposematic species associated with Apiaceae. During field surveys conducted in Arapkir (Malatya Province, Eastern Anatolia), 130 adults of *G. italicum* were recorded on *Smyrniium cordifolium* Boissier, 1846, a rare and localized medicinal Apiacea. This is the first documented interaction between *G. italicum* and *S. cordifolium*.

KEYWORDS: *Graphosoma italicum*, *Smyrniium cordifolium*, host plant, Heteroptera, Podopinae, Apiaceae, Eastern Anatolia, Türkiye

INTRODUCTION

Graphosoma italicum (O. F. Müller, 1766) is widely distributed across continental Europe and the eastern Mediterranean. It occurs from Spain, France to Germany, throughout mainland Italy, Sardinia, Greece, and Crete, extending eastward into Türkiye, Armenia, and Lebanon (Unlike *Graphosoma lineatum* (Linnaeus, 1758) which is restricted to North Africa and Sicily. In contrast, *G. lineatum* is restricted to North Africa and Sicily. Molecular analyses support its presence across these

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regions, with minimal genetic variation among distant populations, indicating frequent gene flow or recent expansion (Lupoli, 2017). According to the checklist by Fent & Dursun (2022), *G. italicum* (Müller, 1766) is widely distributed in Türkiye, with confirmed records from both European Türkiye (Thrace: Edirne, Kırklareli, Tekirdağ) and numerous provinces across Anatolia, including regions such as Central Anatolia, Aegean, Mediterranean, Black Sea, Eastern and Southeastern Anatolia. *G. italicum* has also been reported from the province of Iğdır, confirming its presence in Eastern Anatolia as stated by the authors (Çerçi & Gözüaçık, 2019). It shows a strong trophic affinity for the Apiaceae, such as *Daucus*, *Heracleum*, *Anthriscus*, and *Foeniculum* which are themselves chemically defended (Putshkov, 1961, 1965. J. 2010; Péricart, 2010; Anonymous, 2025).

There is currently no available information in the literature regarding the host plants of *Graphosoma italicum* in Türkiye. However, field observations and data collected during this study revealed a high density of the species on *Smyrniium cordifolium* Boiss., 1846. This prompted the need to document and analyze this association, especially since no prior records mention this plant as a host.

G. italicum was previously recorded under the name *Graphosoma lineatum*, and there are numerous known host plants for this species both in Türkiye and worldwide. These hosts include: *Pimpinella anisum* (anise), *Foeniculum vulgare* (fennel), *Daucus carota* (carrot), *Apium graveolens* (celery), *Petroselinum crispum* (parsley), *Anthriscus sylvestris*, *Angelica sylvestris*, *Angelica archangelica*, *Myrrhis odorata*, *Heracleum platytaenium* Boiss., *Conium maculatum* L., *Falcaria vulgaris* L., and *Astrodaucus orientalis* L. (Karsavuran, 1996; Fent ve Aktaç 1999; Tarla & Doğanlar, 1999; Karsavuran & Çetin, 2002; Birgitta et al., 2007; Koçak et al., 2009). This host list may be extended further with future research. To date, there are no known records in the literature documenting the presence of *G. italicum* on *Smyrniium cordifolium*, making this new observation noteworthy.



Figure 1. Adult of *Graphosoma italicum* feeding on the seeds of *Smyrniium cordifolium* and *S. cordifolium* in its natural habitat.

Smyrniium cordifolium Boissier, 1846 is a rare medicinal Apiacea found in Eastern Anatolia and parts of Iran and Iraq, typically growing in moist, shaded habitats at mid to high elevations. To date, no insect-host associations have been reported for this plant species. The present study provides the first record of *G. italicum* feeding and mating on *S. cordifolium*.

MATERIALS AND METHODS

Material examined: Türkiye, Arapkir (Malatya Province, Eastern Anatolia, 1250 m, [39.0428349, 38.488364. Altitude: 1165 meters.], 6.09.2025, 130 specimens (75 females, 55 males) on 10 *S. cordifolium* in a moist riparian habitat (Figure 1). Ten individuals of were examined for insect associations. All plants harbored multiple individuals. Adults were observed feeding on mature black seeds inside the capsules by piercing and sucking them with their stylets. Mating pairs were also observed, with an estimated number ranging between 5 to 10 pairs during the observation period. This indicates that *S. cordifolium* provides food resources and a mating site for *G. italicum*, although no eggs or nymphs were observed during the study.

RESULTS

A total of 130 adult individuals of *G. italicum* were recorded on 10 plants of *S. cordifolium*. Among them, 75 were females and 55 were males. "No nymphal stages were detected in the study area. All plants harbored multiple individuals. Adults were observed feeding on the mature black seeds inside the capsules by piercing and sucking with their stylets. Mating pairs were also documented. This indicates that *S. cordifolium* serves as a food source for *G. italicum*, although no evidence of reproductive activity was observed.

DISCUSSION

Our observations confirm the strong association of *G. italicum* with Apiaceae. In this study, feeding directly on the seeds was frequently observed, whereas most previous reports refer to floral and vegetative feeding. This observation may indicate a broader range of feeding behavior. Seed feeding may impact the reproductive success of *S. cordifolium*, potentially reducing both seed dispersal and germination rates, thereby limiting its ability to colonize new areas. Such interactions highlight the ecological significance of *G. italicum* beyond its conspicuous coloration and defensive traits. This record also emphasizes the importance of local biodiversity surveys in Anatolia, where plant-insect associations are often underdocumented. The abundance (average 13 individuals per plant) and balanced sex ratio suggest that *S. cordifolium* is a suitable host supporting both feeding and reproduction.

From an applied entomology perspective, the observation of *G. italicum* feeding directly on the seeds of *S. cordifolium* is noteworthy. Although *G. italicum* is generally not regarded as a major agricultural pest, historical records indicate that it can cause damage to cultivated Apiaceae crops. Vodolagin (1936) reported its harmful activity on anise, coriander, and cumin, suggesting a potential for occasional spillover onto economically important species such as fennel (*Foeniculum vulgare*), cumin (*Cuminum cyminum*), coriander (*Coriandrum sativum*), and celery (*Apium graveolens*). Seed predation by large aggregations of adults may reduce seed viability and market quality, especially in crops where seed yield is the primary product. Therefore, documenting host associations on wild Apiaceae not only enriches faunistic knowledge but also provides an early warning for potential risks in agroecosystems. In regions like Eastern Anatolia, where traditional spice and medicinal plants are cultivated

alongside diverse native flora, such records may guide integrated pest management strategies by identifying possible reservoir hosts for seed-feeding pentatomids.

CONCLUSION

This study reports the first record of *G. italicum* feeding and mating on *Smyrniium cordifolium* in Eastern Anatolia, extending the known host range of the species. The presence of numerous adults on a limited number of plants confirms the importance of *S. cordifolium* as a feeding resource. These findings highlight the ecological flexibility of *G. italicum* and suggest a potential risk for seed-producing Apiaceae crops. The study also underlines the value of local biodiversity surveys in Anatolia for improving knowledge of insect-plant associations.

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