

Eupholidoptera kekrops sp. nov. (Orthoptera, Tettigoniidae), new bush-cricket from Greece

SOTIRIS ALEXIOU¹

¹ Korinthian Museum of Natural History, Korinthos, 20100, Greece.

Corresponding author: Sotiris Alexiou (sotirisalexiou@hotmail.com)

Academic editor: Klaus-Gerhard Heller | Received 20 March 2023 | Accepted 27 April 2023 | Published 9 February 2024

<https://zoobank.org/1BBA0A2D-FE71-4DC2-81D5-134A00197AF2>

Citation: Alexiou S (2024) *Eupholidoptera kekrops* sp. nov. (Orthoptera, Tettigoniidae), new bush-cricket from Greece. Journal of Orthoptera Research 33(1): 67–70. <https://doi.org/10.3897/jor.33.103790>

Abstract

Eupholidoptera kekrops sp. nov. belonging to the *E. prasina* group, is described from mainland Greece. The new species is the first known member of this group from mainland Greece and mainland Europe. Differentiating morphological characteristics, mainly of the subgenital plate and titillator, are presented.

Keywords

Attiki, *Eupholidoptera prasina* group, new species, taxonomy

Introduction

The genus *Eupholidoptera* Mařan, 1953 is distributed in the northern and eastern parts of the Mediterranean, with approximately 50 species, most occurring in Greece (23, 19 endemic) and Turkey (21, 19 endemic) (Çiplak et al. 2007, 2009, 2010, Willemse et al. 2018, 2023).

In 2013, during an active search for Orthoptera in the eastern parts of Attiki, a male *Eupholidoptera* was observed deep within a small and dense thorny bush, *Sarcopoterium spinosum* (L.) Spach, a typical plant of dry coastal Mediterranean habitats. As no other member of this genus was known from the area, it was immediately collected. Lacking more specimens, we refrained from dissecting this sole male at the time. The key morphological characters visible under inspection with the naked eye keyed out to *E. kykladica* Heller, Willemse & Willemse, 2009, which it was erroneously reported as (Alexiou 2017, Willemse et al. 2018). As new material was collected from a different locality, the differences in external morphology became obvious, such as the presence of spines at the apical lobes of the subgenital plate. A dissection revealed morphological uniqueness and a spectrum of differences between the collected species and *E. kykladica* as well as similar species. The new specimen, another male, was collected in 2017 at the east foothills of Mt Imittos from under a large marble slab where it appeared to be trying to avoid the high temperatures on an exceptionally hot summer day.

Materials and method

Material is deposited at the Korinthian Museum of Natural History (KMNH, Korinthos, Greece). Specimens were collected using entomological nets and prepared by standard entomological methods. Dissected male genitalia were placed in microtubes together with the specimens. Figures were drawn from photographs taken during the dissection process.

Results

Taxonomy

Family Tettigoniidae Krauss, 1902
Subfamily Tettigoniinae Riek, 1952
Tribe Decticini Herman, 1874
Genus *Eupholidoptera* Mařan, 1953

Eupholidoptera kekrops sp. nov.

<https://zoobank.org/F6CEBB33-A50C-4D0D-9D28-F61D37F914DE>
Figs 1, 2

Type.—**Holotype**: GREECE • ♂; Attiki, Mt. Imittos, Chalidou gorge, yard of chapel of St. Eustathius, under a stone; 37.92737, 23.79734; 443 m; 1 July 2017; S. Alexiou leg; KMNH. **Paratype**: GREECE • 1♂; Attiki, Vravra, wasteland; 37.91960, 23.99979; 11 June 2013; S. Alexiou leg; KMNH.

Description.—**Male**. General appearance: pronotum and elytra as in type species *E. chabrieri* (Charpentier, 1825). Legs relatively short, hind femur twice as long as pronotum, ventral margins of mid femur unarmed, ventral margins of hind femur with a black spine. Last abdominal tergite (Fig. 1B) blackish-brown, wider than long, in the middle with a wide heart-shaped, lighter-colored wrinkled impression divided in its posterior margin by a short median incision with rounded edges. Cercus (Fig. 1A) clearly surpassing last abdominal tergite, simple, cylindrical, slightly curved inwards;

slight protuberance present on inner side of last third, apical part with rounded tip. Subgenital plate (Fig. 1C) slightly longer than wide, divided in half by a median triangular incision, with apical lobes; apical lobes triangular in ventral view, with a median keel, narrowing toward styli, ending in a robust, black-tipped spine, pointing dorso-posteriorly; styli short, approximately 3 times its maximum width, inserted at the side of the apical lobes and slightly surpassing the tip of the spine. Titillator (Fig. 1D) with basal parts extended as usual for the genus; apical parts as long as basal parts, fused over most of their length, incised in apical fifth, almost straight in lateral view.

Coloration: General coloration green. Occiput greenish yellow with black marking anteriorly, frons with a few small black spots, some extended into a short line, head behind black eyes. Pronotum with lower margin of lateral lobes mostly yellow; remaining part of lateral lobe blackish green. Elytra solid black, edges lighter. Abdomen greenish, conspicuously reddish ventrally, red color persists on dry specimens; last abdominal tergite blackish brown. Hind femur green with a few black dots dorsally at base, distal half dorsally black and brown, knees conspicuously black.

Female. Unknown.

Measurements.—(in mm): pronotum length 7, hind femur length 14, body length 17.

Habitat.—The holotype was collected under a large marble slab placed for decorative reasons in the yard of a chapel. The chapel is surrounded by maquis vegetation dominated by *Quercus coccifera* L. The paratype was collected from a wasteland affected by anthropogenic activities and with sparse low prickly shrubs.

Distribution.—Known only from Greece, East Sterea Ellas (Attiki: eastern slopes of Mt. Imittos and the area of Vravra).

Etymology.—The new species is named after Kekrops (Cecrops), *Κέκροψ*, the mythical first king of Attiki and founder of the city of Athens.

Diagnosis

The new species is well defined in morphological terms and easily recognizable. The absence of a tooth at the cerci of the male place it within the *E. prasina* group (Çiplak et al. 2009, 2010). The species of this group are distributed in the Aegean islands as well as west and south Anatolia, usually having a very restricted distribution (Çiplak et al. 2010).

The presence of the styli and spine at the apical lobes of the subgenital plate place the new species close to *E. jacquelineae* Tilmans, 2002, endemic to Gavdos Isl., *E. spinigera* (Ramme, 1930), endem-

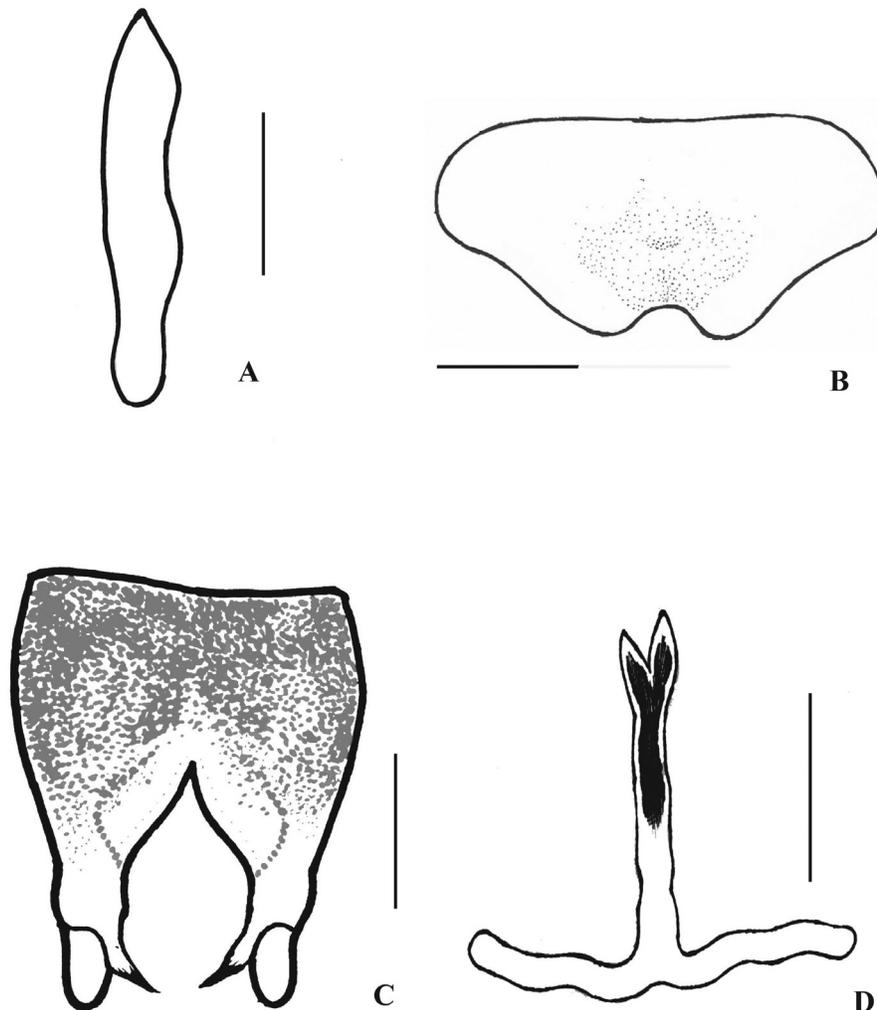


Fig. 1. *Eupholidoptera kekrops* sp. nov. A. Left male cercus, dorsal view; B. Last abdominal tergite, dorsal view; C. Male subgenital plate, ventral view; D. Titillator, dorsal view (scale bar: 1 mm) (drawn by Giorgos Zervos).

ic to Kithira Isl., *E. icariensis* Willemse, 1980, endemic to Ikaria Isl., and *E. prasina* (Brunner von Wattenwyl, 1882), distributed in Chios Isl., Samos Isl., and W Turkey. The same characters are present in a few Anatolian species: *E. femorata* Çiplak, 1999, *E. mersinensis* Salman, 1983, *E. karabagi* Salman, 1983, *E. krueperi* (Ramme, 1930), *E. tasheliensis* Çiplak, 1999, and *E. tucherti* Harz, 1988, all endemic to Anatolia, mainly the western Mediterranean part (Çiplak et al. 2009). Nevertheless, all the above species exhibit strong differences from *E. kekrops* sp. nov. in some or all key morphological characters, including subgenital plate, last abdominal tergite, cerci, and titillator (as presented in Çiplak et al. (2009)). Of all the above species, *E. kekrops* sp. nov. shows some similarity in all key characters to *E. mersinensis*, a species that has a relatively large range in southern Taurus (Çiplak et al. 2009).

If we ignore the presence of spines on the apical lobes of the subgenital plate, *E. kekrops* sp. nov. has a strong resemblance to *E. kykladica*. The latter is endemic to Andros, Tinos, and Kea, three islands just east of Attiki (Çiplak et al. 2009) (Fig. 3). The two species are allopatric and share similar characters in coloration, small size, shape of cerci, subgenital plate, and last abdominal tergite. Despite strong similarities, the two species can readily be distinguished by differences in the titillator and the presence/absence of spines at the apical lobes of the subgenital plate.

Discussion

Eupholidoptera kekrops sp. nov. is the sole member of the *E. prasina* group on the Greek and European mainland (Fig. 3) (Çiplak et al. 2009). In their phylogenetic analysis of the genus *Eupholidoptera*, Çiplak et al. (2010) suggested a relationship between *E. kykladica*, *E. spinigera*, and *E. icariensis* and the species of the mainly Anatolian *E. karabagi* group. The species of this clade seems to derive from an ancestral population present at the central Aegean area during the Messinian Salinity Crisis when the area was largely dry. At the end of the Miocene, when water again flooded the area, fragmentation and subsequent speciation were promoted mainly by eustatic events (water-level barriers) (Çiplak et al. 2010). The isolation of an ancestral *Eupholidoptera* population in the present-day lowland Attiki and its evolution into an independent biological unit after the Cyclades archipelago was disconnected from the mainland fits this scenario.

The center of diversification of the genus *Eupholidoptera* is suggested to be the south Aegean area where a common ancestor was present in the Mid-Miocene (Çiplak et al. 2010, Willemse et al. 2023). Thus, the discovery of yet another bush-cricket from Greece—especially from the Aegean area (Willemse and Heller 2001, Willemse et al. 2023)—is not surprising. However, the fact



Fig. 2. *Eupholidoptera kekrops*, paratype, just before collection, 11.vi.2013, Vravra, Attiki, Greece.

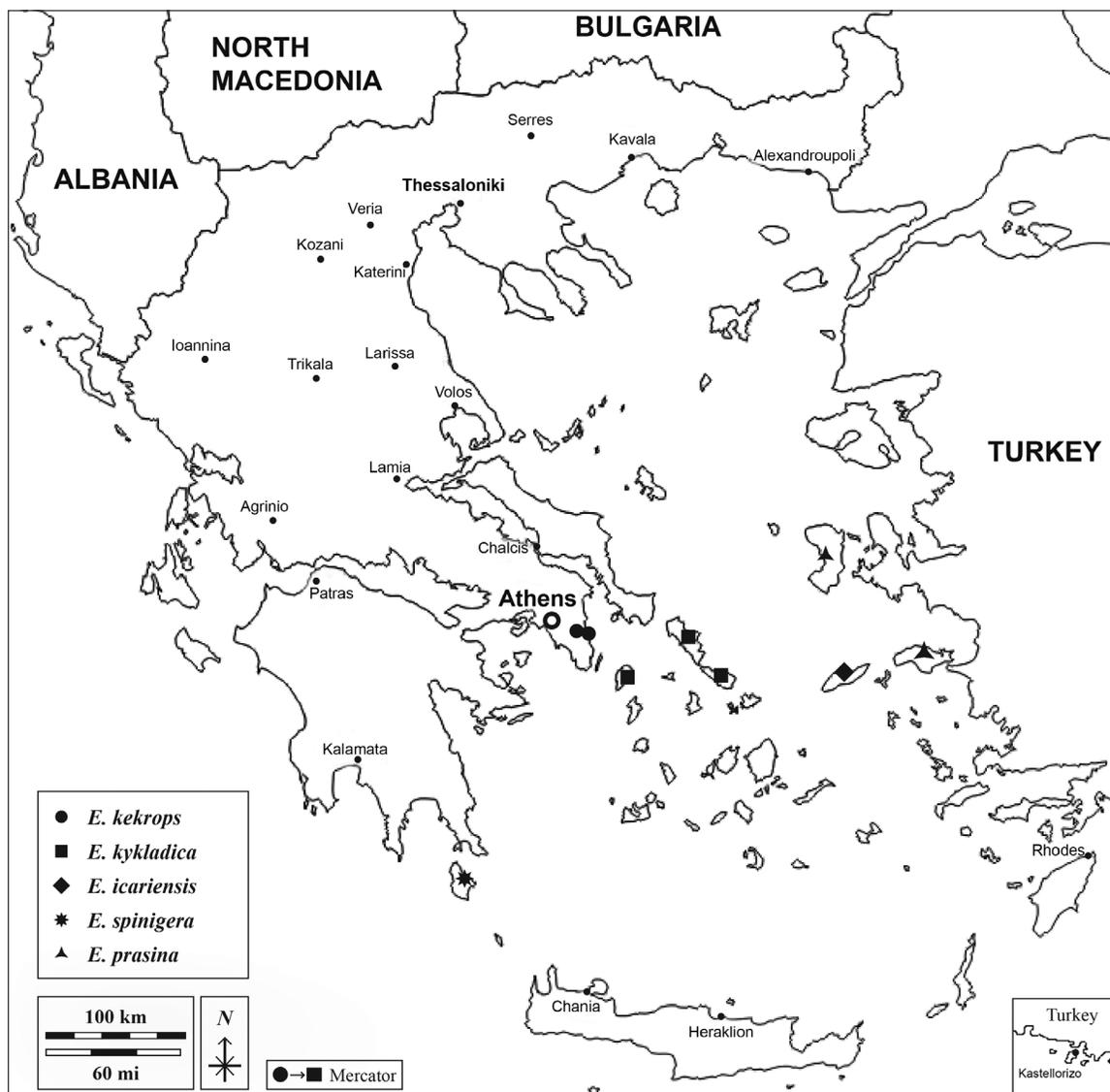


Fig. 3. Distribution of *E. kekrops* sp. nov. and members of the *E. prasina* group in Central Aegean islands.

that a population of bush-cricket proven to belong to an undescribed species remained elusive just at the outskirts of a modern European capital, Athens, is surprising, and it highlights the necessity for more intense field work in this country, even in areas considered well explored.

Acknowledgements

Luc Willemse, always very helpful and inspirational, provided useful comments on an earlier version of the manuscript. Dimitrios Alexiou provided technical assistance, and Giorgos Zervos prepared the drawings.

References

- Alexiou S (2017) New distribution records of Orthoptera of Greece. *Journal of Orthoptera Research* 26: 53–61. <https://doi.org/10.3897/jor.26.14541>
- Ciplak B, Willemse F, Chobanov D, Heller K-G (2007) Systematic status and distribution of *Eupholidoptera* (Orthoptera: Tettigoniidae) in the Balkans (north of Central Greece). *Articulata* 22: 33–46.
- Ciplak B, Heller K-G, Willemse F (2009) Review of the genus *Eupholidoptera* (Orthoptera, Tettigoniidae): different genitalia, uniform song. *Zootaxa* 2156: 1–75. <https://doi.org/10.11646/zootaxa.2156.1.1>
- Ciplak B, Heller K-G, Willemse F (2010) Phylogeny and biogeography *Eupholidoptera* Mařan (Orthoptera, Tettigoniidae): morphological speciation in correlation with the geographical evolution of the eastern Mediterranean. *Systematic Entomology* 35: 722–738. <https://doi.org/10.1111/j.1365-3113.2010.00529.x>
- Mařan J (1953) Contribution to the knowledge of the genus *Pholidoptera* Wesm. *Acta Entomologica Musei Nationalis Pragae* 27: 209–221.
- Willemse F, Heller K-G (2001) Two new species of *Eupholidoptera* Maran (Orthoptera, Tettigoniidae) from Crete with a checklist and key to the species. *Tijdschrift voor Entomologie* 144: 329–343. <https://doi.org/10.1163/22119434-900000092>
- Willemse LPM, Kleukers RMJ, Odé B (2018) The grasshoppers of Greece. EIS Kenniscentrum Insecten & Naturalis Biodiversity Center, Leiden, 439 pp.
- Willemse L, Tilmans J, Kotitsa N, Trichas A, Heller K-G, Chobanov D, Odé B (2023) A review of *Eupholidoptera* (Orthoptera, Tettigoniidae) from Crete, Gavdos, Gavdopoula, and Andikithira. *Zookeys* 1151: 67–158. <https://doi.org/10.3897/zookeys.1151.97514>