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Eupholidoptera stelae sp. nov. a new bush-cricket from Cyprus (Orthoptera: Tettigoniidae)

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Abstract

A small, rather secretive new species of *Eupholidoptera, E. stelae* **sp. nov.** (Tettigoniidae, Tettigoniinae, Pholidopterini) from the Troodos Massif in Cyprus is described. The intra- and infra-generic assignment is discussed in detail.

Key words: generic assignment, new species, Pholidopterini, taxonomy

Introduction

The genus *Eupholidoptera* (Tettigoniidae, Tettigoniinae, Pholidopterini) includes 55 known species (Cigliano *et al.* 2025). Its distribution ranges from southern France in the West to Turkey and the Levant in the East. Most species of *Eupholidoptera* have been reported from Greece, 26 species, (Çiplak *et al.*, 2009; Willemse *et al.* 2023; Alexiou, 2024) and Turkey, 21 species, (Çiplak *et al.*, 2009; Ünal 2018, 2019; Ünal & Gorochov, 2024). Speciation in *Eupholidoptera* has been triggered by palaeogeological events in the Tortonian (11–9 Ma), and the Messinian (7–5,5 Ma) followed by the regression of the Aegean area in the Pliocene (ca. 4.5 Ma) and sea level changes in the Pleistocene (Çiplak *et al.*, 2009, 2010). This resulted in a relatively large number of species across the eastern part of the Mediterranean, most of which are restricted to small areas like (part of) islands or mountain ranges, some only known from a single mountain.

Eupholidoptera species are night active, males starting to sing late in the afternoon and throughout its range they are associated with maquis and phrygana vegetation. The spiny vegetation in which they live, and the overall nocturnal activity pattern make it quite challenging to see *Eupholidoptera* during the day let alone to collect them. Because of their secretive behaviour and the restricted distribution areas, the discovery of new *Eupholidoptera* species even in well sampled regions is still possible as proven by the recently described new species from southern Turkey (Ünal 2018, 2019; Ünal & Gorochov, 2024) and the area around Athens in Greece (Alexiou, 2024). Our current knowledge on *Eupholidoptera* is predominantly based on specimens collected by hand. Hand capture is common practice for Orthoptera and in case of *Eupholidoptera* usually a strenuous activity resulting in very few specimens. An alternative way of sampling *Eupholidoptera* proved to be pitfall and baited traps as shown by a trapping program aimed at beetles and spiders carried out in Crete from 1987 onwards (Kaltsas & Simaiakis, 2012; Kaltsas *et al.* 2013). Using these traps *Eupholidoptera* was discovered in many sites across Crete, traps often filled with large numbers of individuals, also including elusive species like *E. cretica* or *E. gemellata* which were previously recorded only once or twice.

Up to now, one species of *Eupholidoptera*, *E. cypria* has been recorded from Cyprus, described in 1951 (Ramme, 1951). The species is quite common across the island inhabiting grassy areas and shrubs in (semi-)natural habitats. Between August and October 2019, using ropes soaked in a solution of wine and sugar, the second author found a bush-cricket, unknown to him, at higher altitudes on Mt. Troodos, an area visited by him many times before. After

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consulting with the first author, a closer examination of the specimens showed they belong to a yet undescribed and rather small dark coloured *Eupholidoptera* species. The species is described here, its assignment to *Eupholidoptera* and diagnostic features separating it from congenerics discussed.

Material and Methods

Baited traps: Some of the first specimens collected were attracted to so called 'wine ropes' which are stretches of rope made from absorbent material soaked in a solution of wine and sugar and loosely draped along shrubs and bushes. Primarily meant to attract moths, they do also attract other invertebrates including bush-crickets (Fig. 1).

Repositories and acronyms where material is stored:

CMC, collection C. Makris, Lemesós, Cyprus;

RMNH, Naturalis Biodiversity Center (formerly Rijksmuseum van Natuurlijke Historie), Leiden, Netherlands;

ZFMK, Zoological Research Museum Alexander Koenig, Bonn, Germany.

Bioacoustic equipment: For studio recordings several devices have been used. MixPre-3 II with Avisoft CM16/ CMPA-P48 microphone at 192kHz sampling frequency and at a temperature of about 20 C° (Recordings CY21: 119–1127; 1143–1145 of specimen RMNH.INS.1452624). A Tascam DR-44WL recorder, with the microphones placed in X-Y position at 16 bits/ 48kHz sampling frequency at higher temperature (Recording CY19: Eupholidoptera Troodos high quality). Echometer Touch 2 pro at 256kHz sampling frequency at higher temperature (Recording: CY21: 20210927_Eupholidoptera stellae: Lefkosia Cedar Valley Forest, 650 m, N 35.024722° E 32.687222° leg. J. Tumbrinck, E. Tzirkalli & K. Siedle, 22.IX.2021, (ZFMK)). Sound recordings reside in the sound Library of the third author and have been analysed using Wavelab Pro software (www.steinberg.net) and Rthoptera by Francisco Riva Fuenzalida (https://github.com/naturewaves/Rthoptera). Oscillograms have been prepared using Praat software (www.praat.org). Bioacoustic terminology follows Baker and Chesmore (2020): calling song—the song produced by an isolated male; syllable—the sound produced by one opening-and-closing movement of the tegmina; hemisyllable—the sound produced by the opening or closing movement of the tegmina; syllable repetition rate—the number of syllables produced per second.

Photographic equipment: For stacked images, a Zeiss SteREO Discovery V20 stereomicroscope was used, combined with a Zeiss AxioCam MRc5 microscope camera.

Eupholidoptera stelae Willemse, Makris & Odé sp. nov.

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(Figs 1–24, 29)

Material studied: 7 males (m), 11 females (f)

HOLOTYPE • Cyprus, Lemesos Mt. Troodos Kannoures, 1515 m, N 34.942764° E 32.879097°, leg. C. Makris: holotype: 10.X.2019 RMNH.INS1141834 (m) (**RMNH**), ALLOTYPE as holotype 11.X.2019 RMNH. INS1141835 (f) (**RMNH**), PARATYPES 6m, 10f: as holotype 21.IX.2019 RMNH.INS1124496 (alcohol) (m) (**RMNH**), 23.VIII.2019 RMNH.INS1124497 (alcohol) (f) (**RMNH**), 26.IX.2019 RMNH.5087195 (DNA sample) (m) (**RMNH**), 11.X.2019, RMNH.5087194 (DNA sample, forewing & titillator dissected) (m) (**RMNH**), 06.X.2019 RMNH.INS1124499 (alcohol) (f) (**RMNH**), 10.X.2019 RMNH.INS1124498 (alcohol) (f) (**RMNH**); • Lemesos Mt. Troodos Trooditissa 4 km NNW Pano Platres, 1480 m, N 34.9195°, E 32.8458°, maquis mountain slope in open forest, leg. C. Makris & L. Willemse 16.IX.2021 RMNH.INS.1452620 (f) (**RMNH**); • Lemesos Mt. Troodos Trooditissa 4 km NNW Pano Platres, 1455 m, N 34.9176°, E 32.8470°, maquis mountain slope in open forest, leg. L. Willemse & M. Aristophanous 28.IX.2024 RMNH.INS.1571811 (f) (**RMNH**); • Lefkosia Cedar Valley ca. 10 km NNE Pano Panayia, 1130 m, N 34.990966° E 32.688621°, mountain slope, open forest, maquis, leg. C. Makris & L. Willemse, 17.IX.2021 RMNH.INS.1452624 (m) (**RMNH**), leg. C. Makris, 7.IX.2021 RMN.INS.1452619 (f) (**RMNH**); • Lefkosia Cedar Valley Forest, 650 m, N 35.024722° E 32.687222° leg. J. Tumbrinck, E. Tzirkalli & K. Siedle, 22.IX.2021, 1 (m) 3 (f) (**ZFMK**); • Lefkosia Pafos forest 2 km south of Tripylos peak, 1135 m, N 34.974707° E 32.683484°, leg. C. Makris, 14.VII. 2019 1f (**CMC**); Lefkosia, Pafos forest, Gefyria old forest station, 525 m, N 34.937555° E 32.677136°, leg. C. Makris, 7.IX.2021 1m (**CMC**)

Description

Male (Figs 3–6)—General appearance smaller and darker than type species *E. chabrieri*, predominantly brownish, fore and mid legs with green shades, last tergite only partially dull black.

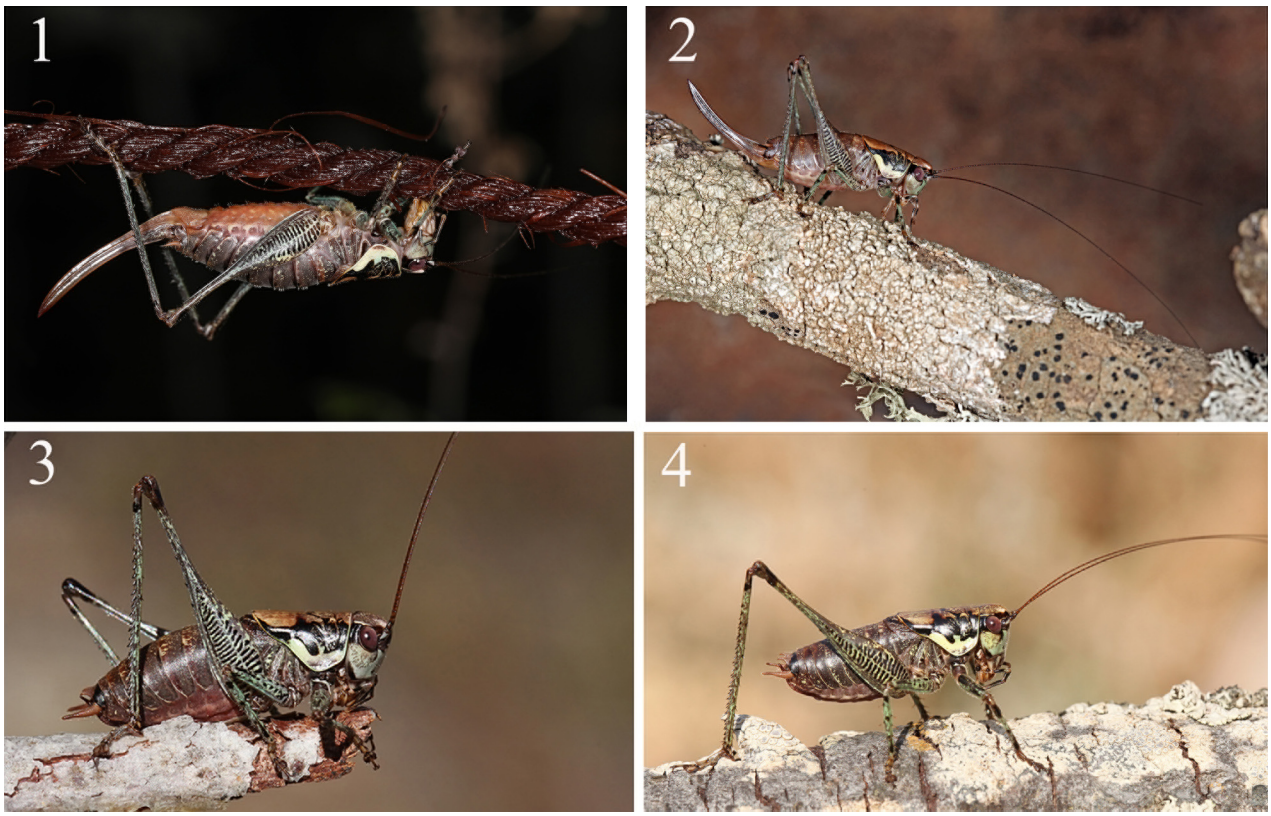
Head. Fastigium of vertex broad, in dorsal view wider than diameter of an eye. Frontal groove narrow (Fig. 9), half as wide as the width of the antennal scape.

Thorax. Pronotum (Fig. 10) short, 1.8 times longer than high, slightly longer than the fore femur, hardly widening posteriorly, without median or side keels, almost cylindrical, the central part of the disc somewhat flattened, side flaps forming a wide angle with the disc, visible from above, transverse sulcus in front of the middle, metazona slightly longer than the prozona, fore margin very weakly convex almost straight, hind margin convexly rounded, dorsal surface smooth, shoulder incision distinct, concave and slightly impressed. Prosternum flat, without spines, meso- and metasternum extended into triangular flaps, mesosternum more so, and more pointed than metasternum. Fore tibia with three spines on the outer dorsal margin. Hind femur slender, 5,5 times longer than its largest width, with one or more spines on the inner and outer ventral keel. Hind tibia apically with four spines ventrally, two longer ones at the outside, two shorter ones in the middle.

Tegmina and wings. Elytra brachypterous, hardly extending beyond the pronotum (Fig. 10), reaching or slightly surpassing the first abdominal segment. Stridulatory file left elytron (Fig. 11), shortest distance between proximal and distal end 2 mm, greatest width 0.1 mm; 91 teeth including proximal and distal ones; spacing of teeth in mid two thirds of the file, ca. 50 teeth per mm.

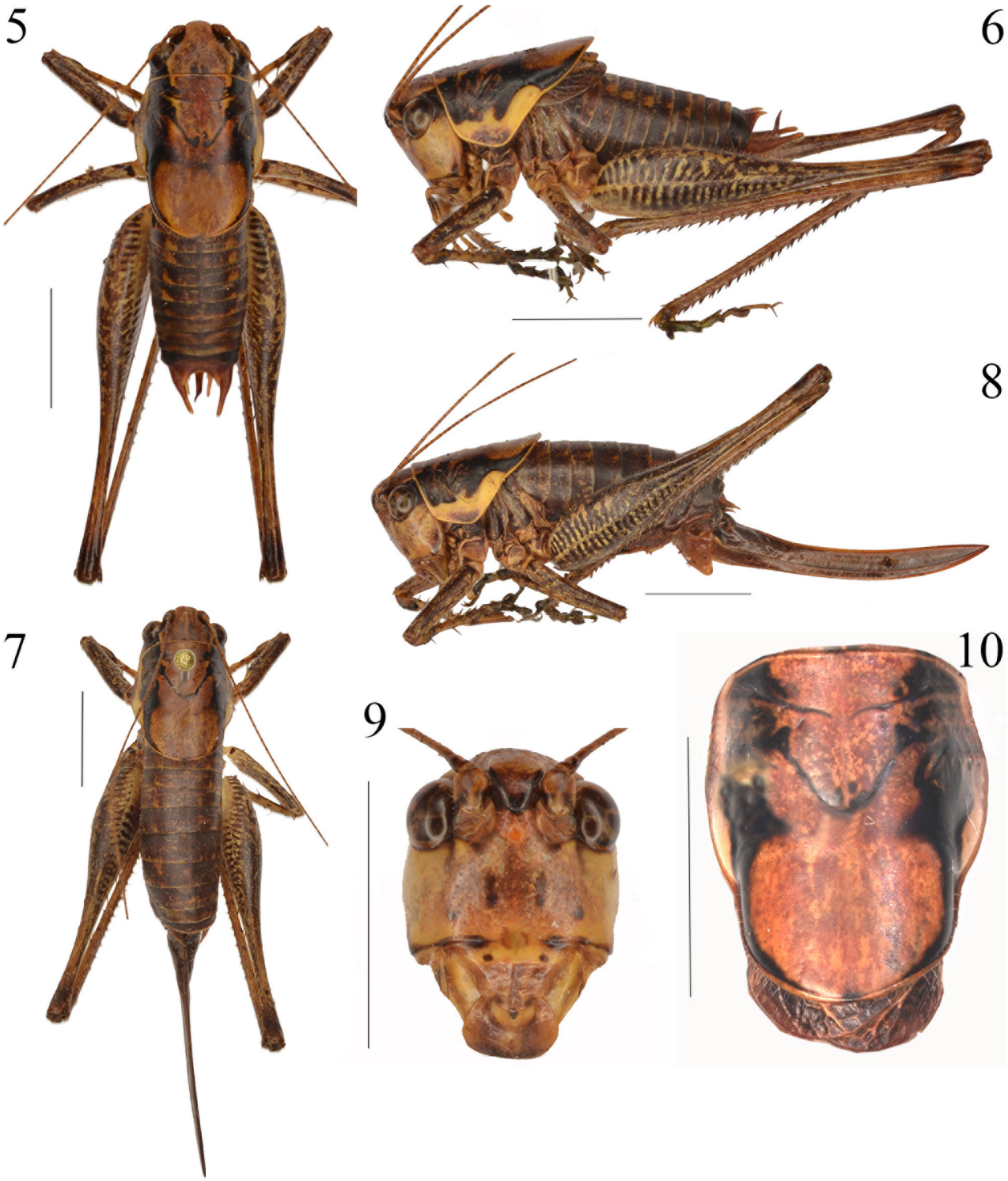
Abdomen. Last abdominal tergite (Figs 12–13) in dorsal view slight convex, toward the middle concave, dull, grainy with a few white hairs, from the sides gradually narrowing, the hind margin forming two strong teeth, pointing distad, separated by wide semi-circular excision; in lateral view triangular, lower edge in proximally straight, with a bend at one third, apically concave, tooth slightly pointing ventrad, dorsal edge concave, in apical third convex.

Cercus (Figs 14–15) slender, length 4.3 times the basal width, conical, covered with stiff hairs of variable length, in dorsal view straight, at one quarter of the length at the inner side widened, forming a small side tooth, provided with a small apical spine pointing frontad, in the second third narrowing, apical third hardly narrowing, tip rounded; in lateral view straight, wider in basal third, narrowing in second third and narrow in apical third.



FIGURES 1–4. *Eupholidoptera stelae* **sp. nov.** field images. 1. female Cedar Valley 07/09/2021 on a 'wine rope'; 2. female Kannoures 23/08/2019; 3. male Kannoures 21/09/2019; 4. male Kannoures 21/09/2019. Photos C. Makris.

Genitalia. Subgenital plate (Figs 16–17) compact, slightly wider than long, widest at the base, in proximal half slight convex, apical half flattened; proximal margin straight, lateral margin forming a rim, in ventral view subapically suddenly narrowing and disappearing; posterior margin, above the styli with two, well separated small spines, toward the middle forming a narrow V-shaped median incision along one quarter of the total length, edges concave, near the styli produced into pronounced rounded protuberance pointing inward; in profile slender, lower edge straight, in apical third slightly upturned, narrowing apically. Styli (Fig. 16–17) long, ca. 5 times longer than wide, conical, straight, inserted at the tip pointing distad.



FIGURES 5–10. *Eupholidoptera stelae* **sp. nov.** 5–8 habitus 5. male dorsal, 6. male lateral, 7. female dorsal, 8. female lateral; 9. head frontal; 10. pronotum dorsal (Bar: 5 mm).

FIGURES 11–19. *Eupholidoptera stelae* **sp. nov.** male. 11. stridulatory file ventral, 12. anal tergite dorsal, 13. anal tergite lateral, 14. cercus dorsal, 15. cercus lateral, 16. subgenital plate ventral 17. subgenital plate lateral, 18. titillator dorsal, 19. titillator lateral (Bar: 1 mm).

Titillator (Figs 18–19) subsymmetrical, in dorsal view apical arms in basal third straight, merged, in second third widened and still merged at first, narrowing into two long slender separate adjoining teeth in apical third, pointing strongly upward and slightly sideways, surface wrinkled; in lateral view in proximal half straight, equal in width, in apical half narrowing and strongly curved into a pointed apex.

Coloration. General coloration maroon alternated with some yellowish and blackish parts, a shade of green visible on the legs. Head light coloured, the frontal part below antennae and eyes yellowish with 4 black dots, the two central ones elongated into short vertical stripes, the outer lower corner of the genae, and the border between frons and clypeus also black, upper part head light maroon, lower edge fastigium black, occiput behind the eyes black dorsally bordered by a whitish stripe. Pronotal disc (Fig. 5–6, 10) maroon, halfway with a thin black transverse line forming a wide open "V", ventral half side-flap whitish near the ventral margin smudgy, dorsal half with irregular black marking which reaches the hind margin extending dorsally along the hind margin towards the middle of the disc. Elytra maroon, veins lighter coloured. Legs maroon and yellow, with a shade of green with black dots and stripes. Hind femur mottled maroon and yellow, the dorsal and outer surface with parallel transverse black stripes, pre- and post-genicular part dark coloured. Abdomen maroon mottled with yellowish spots, last tergite black along the sides and proximal margin, remaining part maroon.

Female (Figs 1–2, 7–8)—General appearance as male. Elytra micropterous, hidden by the pronotum, not visible in profile (Figs 7–8). Cercus conical, hairy, straight, narrowing in apical fifth, apex pointed. Subgenital plate (Figs 20–21) smooth, as wide as long, hind margin in ventral view straight, gradually narrowing apically, forming two lobes with rounded tips, separated by a narrow V-shaped incision along one third of the length; in profile triangular with a simple broadly rounded apex. Ventral margin of the 7th and 8th tergite somewhat swollen, the ventral margin of the 8th tergite together with the slightly swollen latero-dorsad margin of the subgenital plate forming an oval, shallow hollow, its frontal half divided by a rim (Fig. 20). Ovipositor (Fig. 22) sturdy, ca. 2 times as long as pronotum, shorter than hind femur, proximal two thirds straight, apical third slightly upcurved.

Coloration as the male; proximal edge last abdominal tergite black.

Measurements (in mm) and ratios

Body male 16.2–19.5, female 17,4–21,4; pronotum male 6.6–7.1, female 6.2–7.2; elytron male 0.3–1.4; hind femur male 16.0–17.4, female 16.0–17.9; ovipositor 13.4–14.8. Ratio hind femur/pronotum male 2.34–2.50, female 2.40–2.58; ovipositor/pronotum 1.86–2.39; length/width hind femur male 4.89–5.94, female 4.65–5.00.

Bioacoustics (Fig. 23)

The song of *E. stelae* **sp. nov.**—as in many species of *Eupholidoptera*—is a repetition of single syllables (Fig. 23). So far, the sound of three specimens has been recorded. In the available sound recordings, the series may last more than 20 minutes. Individual syllables last about 50–70 ms depending on temperature. Closing hemisyllables are always present and last between 33 ms and 56 ms, largely depending on temperature. The opening of the tegmina may be silent (Fig. 23A) or visible as opening hemisyllables (Fig 23B). In each syllable roughly 50 individual tooth impacts may be visible (Fig.23A, lower oscillogram). Syllables are repeated at the rate of about 0,5/s, but frequently at a much lower rate. The peak frequency is 45kHz and maximum frequencies reach above 100kHz.

In *Eupholidoptera cypria*, the only other *Eupholidoptera* species known from Cyprus, the series lasts more than about 20s up to more than a minute. Syllables last about 70–110 ms and are repeated at the rate of about 1,5/s.

Differential diagnosis

In many ways *E. stelae* **sp. nov.** is a peculiar species within *Eupholidoptera*. Its dark appearance lacking the usual shades of green or yellow, the male anal tergite not entirely black (completely body coloured in the female) and the subgenital plate body coloured, lacking any dark patches, separates it in colouration from all other species in *Eupholidoptera*.

In the male subgenital plate—with the quadrangular apical lobes, the presence of a protuberance on the hind margin and the spines at the base of the styli—*E. stelae* **sp. nov.** fits in with species in the *E. chabrieri* group (Çiplak *et al.* 2009) but differs from all species in the *E. prasina* group (Çiplak *et al.* 2009). Within the *E. chabrieri* group, *E. stelae* **sp. nov.** differs from other species by the placement, shape and orientation of the side-tooth of the cercus. Only four other species in the *E. chabrieri* group have a side tooth away from the base. In *E. gemellata* and *E. pallipes* from Crete as well as *E. ledereri* from Lebanon the side tooth is larger and more distinct, quite different from the rather small, gradually shaped side tooth in *E. stelae* **sp. nov.** *E. peneri* has a similarly shaped side tooth but compared to *E. stelae* **sp. nov.**, the cercus itself is more robust, the apical arms of the titillator are differently shaped, the two teeth of anal tergite are not widely separated and its main bodycolour is green.

FIGURES 20–22. *Eupholidoptera stelae* **sp. nov.** female. 20. subgenital plate ventral, 21. subgenital plate lateral, 22. ovipositor lateral (Bar: 1 mm).

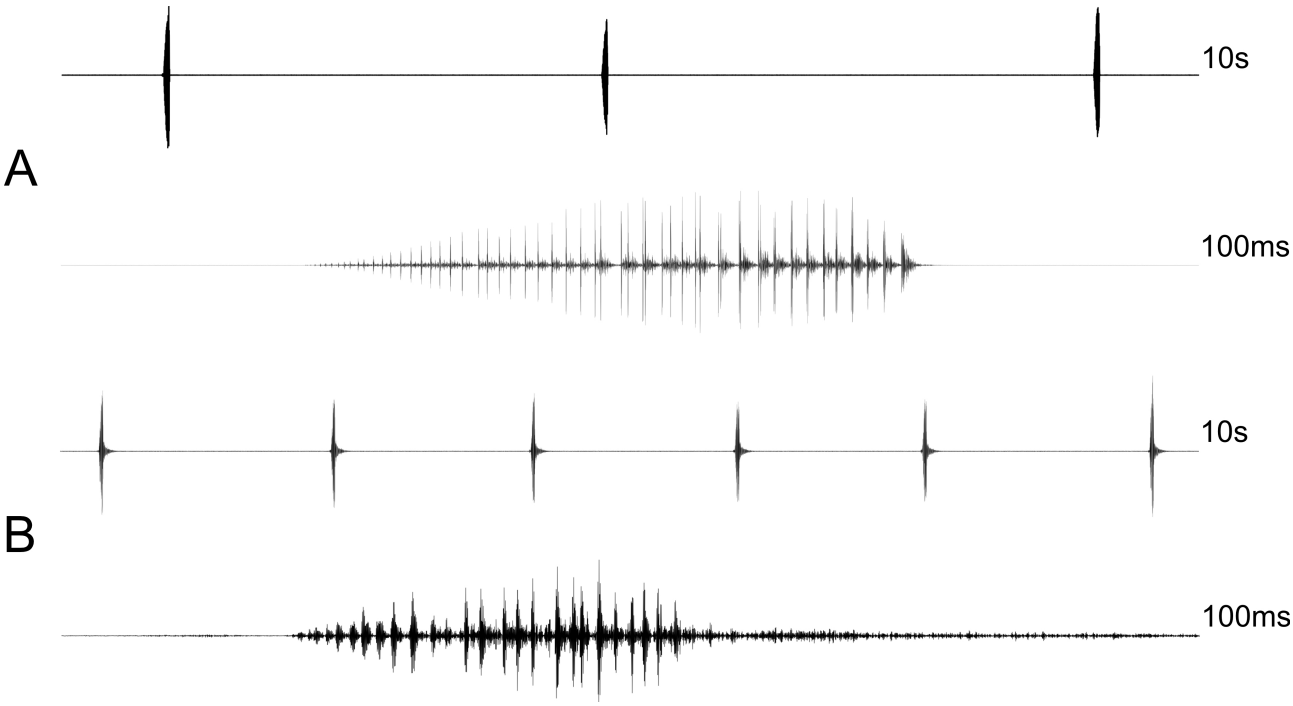


FIGURE 23. Oscillograms of *Eupholidoptera stelae* **sp. nov.** of 10s and 100ms. A. Pano Panagia 2021 (recording CY21: MixPre-1127) B. Troodos 2019 (recording CY19: Eupholidoptera Troodos high quality). In the latter the opening hemisyllable is faintly visible, as well as room reverberation after the closing hemisyllable.

Distribution (Figs 24–25)

The species is restricted to the Troodos massif (Fig. 24) in Cyprus where it has been found from medium to high altitude at several locations in the central and south-western part of the mountain range (Fig. 25).

Habitat (Figs 26–28)

The species is found at mid to high elevations (525 m–1515 m) on Mt. Troodos in Cyprus. At higher elevations the habitat consists of rather open *Pinus nigra* forests with an undergrowth of shrubs dominated by *Quercus*

alnifolia, Sorbus graeca, *Rubus sanctus, Genista fasselata* and *Rosa* spp. (Fig. 26) and *Cedrus brevifolia* forests with *Platanus orientalis, Quercus alnifolia* and *Rubus sanctus* (Fig. 27). At lower altitudes the species was found in *Quercus alnifolia* shrubs in *Pinus brutia* forests (Fig. 28) and in valleys with *Alnus orientalis*, *Platanus orientalis*, *Quercus alnifolia, Acer obtusifolium* and *Hedera pastuchovii* subsp. *cypria.*

Phenology

Adults have been found from mid-July until mid-October.

Etymology

The species is named after the daughter of the second author, Stela Makris.

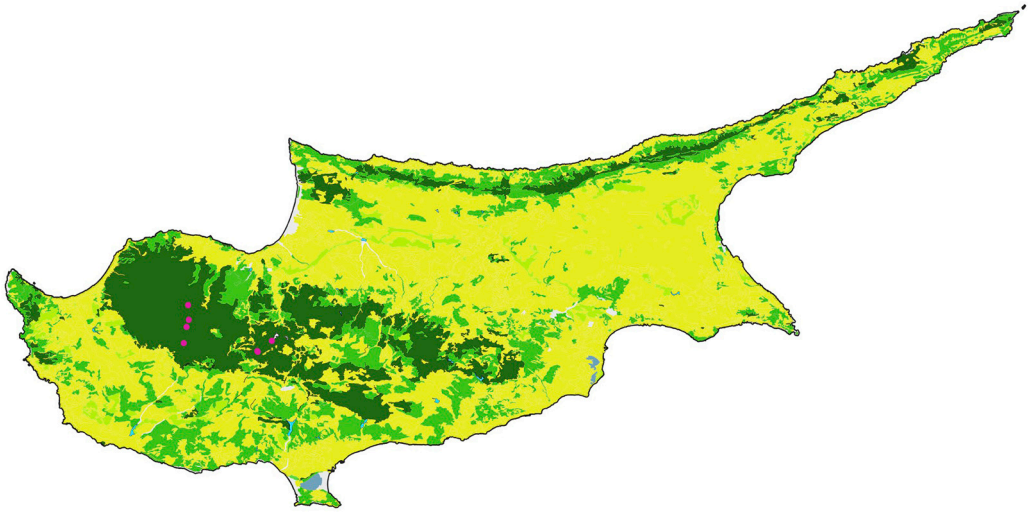
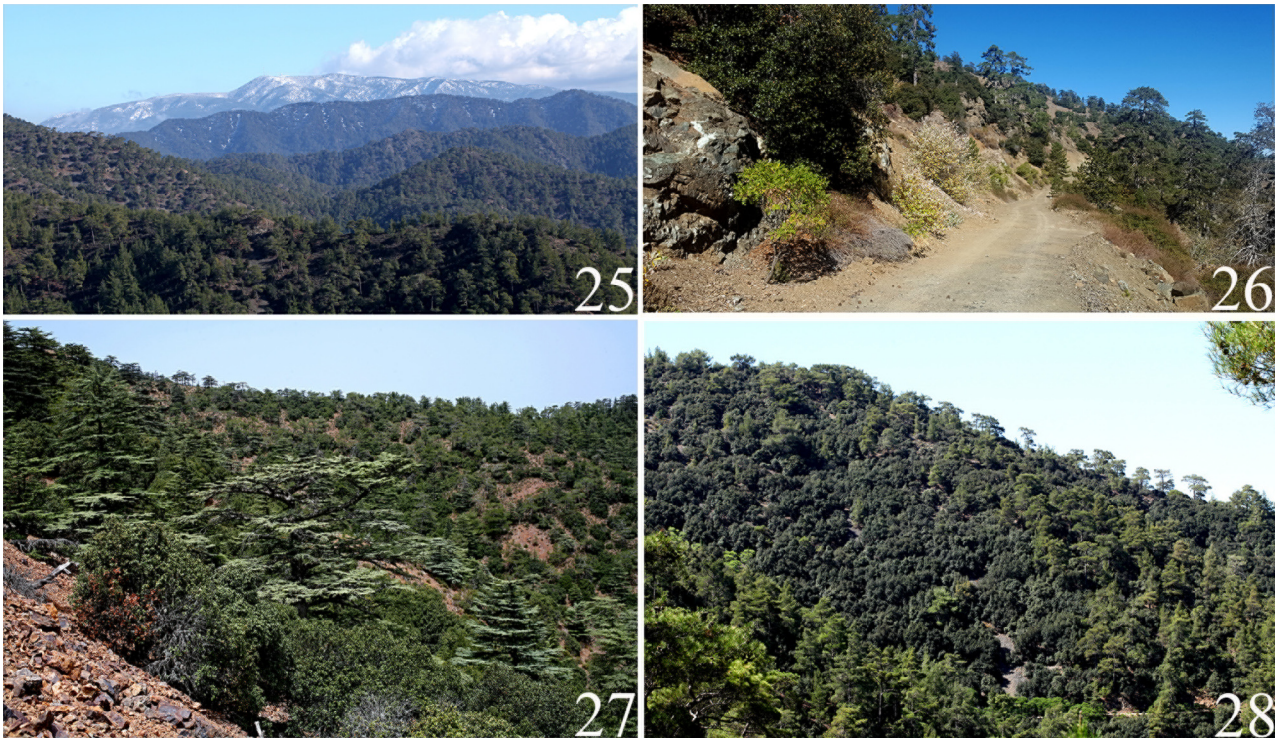


FIGURE 24. Known localities of *Eupholidoptera stelae* **sp. nov.** in Cyprus.



FIGURES 25–28. Habitats of *Eupholidoptera stelae* **sp. nov.** 25. the central and south-western part of Troodos massif. 26. open *Pinus nigra* forest with an undergrowth of *Quercus alnifolia, Sorbus graeca* and *Rubus sanctus* at Kannoures area on Troodos mountains, 27. Cedar forest with the endemics *Cedrus brevifolia* and *Quercus alnifolia* at Tripilos area in Pafos Forest, 28. Shrubs including the endemic *Quercus alnifolia* in *Pinus brutia* forest. Photos C. Makris.

IUCN Red List Status

The locations where *E. stelae* **sp. nov.** has been found up to now are situated in the central and south-western part of Mt. Troodos between 525 m and 1515 m above sea level. The habitat preferred by the species belongs to the predominant vegetation across Mt. Troodos. Based on the present distribution data the extent of occurrence of this species (EOO) (IUCN Standards and Petitions Committee, 2024) is 120 km^2 . However, if the species is also distributed across similar forested areas on Troodos, the extent of occurrence could easily cover more than 1000 km^2. The current area of occupancy (AOO) (IUCN Standards and Petitions Committee, 2024) based on the currently available information is 24 km^2. Yet again, as the species is not easily detected this may very well also be an underestimate of the habitat area occupied by the species. Based on the male calling song, the species is quite common at the locations where it was found. A large part of Mt. Troodos is protected as National Forest Park or Nature Reserve, and substantial parts have been designated Natura 2000 areas. Although Troodos Mountain is a tourist attraction all year round for hiking and a small area at the summit of Troodos during winter for skiing, any development (buildings or roads) is prohibited throughout the entire distribution area of the new species. The only possible threat to the habitat of the species in Cyprus is bushfires. Therefore, it seems unlikely that this species categorizes under one of the threatened categories of the IUCN Red List. It most likely resides in the category Least Concern (LC). Yet, further research is needed to provide more information on the conservation status of *E. stelae* **sp. nov.**

Discussion

Orthoptera of Cyprus—The insect fauna of Cyprus is quite well studied. In 2016 an extensive overview of the wildlife of Cyprus was published (Sparrow & John, 2016) including a chapter on the Orthoptera of Cyprus (Tumbrinck *et al.*, 2016). This chapter provided an update from previous Orthoptera checklists published by Georghiou (1977) and Tumbrinck (2006). In 2017 a new ant-loving cricket was described from Cyprus (Stalling, 2017) bringing the total species of Orthoptera reported from Cyprus to 72. From these 72 species 13 species are endemic to Cyprus and another five are represented by endemic subspecies. With the new species described here, the total number of Orthoptera species for Cyprus becomes 73, 14 of which are endemic.

Generic assignment—Being small, dark coloured with the anal tergite in the male only partly black, the subgenital plate body coloured, the cercus with a side tooth in the basal fourth and the anal tergite with two strong teeth separated by wide semi-circular excision, the generic assignment within the Pholidopterini is not straightforward. Recently, Çiplak *et al.* (2021) summarized twenty characters (Table 2, p. 234) showing different character states that can be used to differentiate genera currently assigned to the Pholidopterini. Besides *Psorodonotus* from which the specimens from Mt. Troodos in Cyprus clearly differ in many characters (a.o. shape of the pronotum, titillator and subgenital plate), differences with other genera in the Pholidopterini are more subtle. The specimens from Cyprus differ from *Pholidoptera, Parapholidoptera, Spinopholidoptera* or *Exopholidoptera* in the titillator not being covered by spines or denticles and the subgenital plate carrying a protuberance on the hind margin and two spines at the base of the styli. They clearly can also not be assigned to *Uvarovistia* because for instance by differences in the colouration of the last tergites and the shape of the ovipositor. Characters and character states displayed by specimens from Cyprus partly resemble those found in *Apholidoptera* and A*parapholidoptera*. Species in these two genera also display cerci with a side-tooth in the basal fourth and a male anal tergum with two processes with a wide incision. However, *Apholidoptera* and A*parapholidoptera* (sensu Yahyaoğlu *et al.*, 2022) differ from the specimens found in Cyprus in the shape of the male subgenital plate, the color of the anal tergite and hind femur and in *Aparapholidoptera* the apical arms of the titillator carry denticles. From the known genera of Pholidopterini, the population on Mt. Troodos in Cyprus best fits into *Eupholidoptera* especially because of the unique shape of the male subgenital plate which it has in common with the species in the *Eupholidoptera chabrieri* group. The assignment to *Eupholidoptera* is further strengthened by the greenish shades on the fore and mid legs, the coloration on the outside of the hind femur which is similar to the pattern found in species belonging to the *E. megastyla* subgroup of species and by character states mentioned in Table 2 (Çiplak *et al.*, 2021) that also match *Eupholidoptera*. Two additional characters not mentioned in Table 2 in Çiplak *et al.* (2021) further substantiate the assignment to *Eupholidoptera*. Firstly, the male calling song which in the Cyprus population consists of a repetition of single syllables. This fits in with the calling song of other *Eupholidoptera* species but differs from the calling song so far known from other genera of

Pholidopterini which comprise of multisyllablic echemes (Çiplak *et al.*, 2009 p. 69). Secondly the specimens from Cyprus carry small spines on the inner keel on the underside of the hind femur. Such spines are for instance absent in *Exopholidoptera* (Ünal, 1998) whereas in *Eupholidoptera* there are species with and without spines. Still the population on Mt. Troodos forms an outgroup in *Eupholidoptera* because of the shape of the cercus and colour of the male anal tergite which is only partly (dull) black. Besides, results from DNA samples taken from specimens collected in 2019 and analysed in the MEDOR project (Raggazini *et al.* 2025 in press), based solely on COI, also point to a separate status for *E. stelae* **sp. nov.**, next to a cluster containing 7 other *Eupholidoptera* species including 4 species belonging to the *E. chabrieri* species group (*E. bimucronata, E. chabrieri, E. schmidti* and *E. smyrnensis*) and 2 species belonging to the *E. prasina* group (*E. prasina* and *E. forcipata*). As similarities with *Eupholidoptera* outweigh the above-mentioned differences the species has been assigned to *Eupholidoptera*.

Placement within *Eupholidoptera*—Based on the morphology of the male subgenital plate (quadrangular lobes in the apical half with a deep arrow-head shaped incision, protuberance on the margin of this incision and two small spines at the base of the styli) *E. stelae* **sp. nov.** belongs to the *Eupholidoptera chabrieri* group (Çiplak *et al.* 2009). Within the *E. chabrieri* group, based on the presence of side tooth of the cercus being inserted away from the base, *E. stelae* **sp. nov.** fits in with a clade with three other species (Çiplak *et al.*, 2009): *E. peneri* (known from Israel) and *E. gemellata* and *E. pallipes* (both restricted to mountains in Crete). However, based on the shape of the male anal tergite, the titillator, the widely separated placement of the two spines at the base of the styli (Fig. 29) and the atypical color pattern, *E. stelae* **sp. nov.** also shows clear differences with these three species. Further molecular studies are needed to clarify the position of *E. stelae* **sp. nov.** in the phylogenetic tree of *Eupholidoptera*. A first sign of a separate status of *E. stelae* **sp. nov.** is suggested by the results found in the MEDOR project (Raggazini *et al.* 2025 in press), based solely on COI, which however did not include any species of the *E. peneri* clade.

Phylogeography—Cyprus adds unique elements to the phylogeographic analysis of *Eupholidoptera* (Çiplak *et al.*, 2010) as it has not been part of the Aegeid plate, its uplift caused by the collision of the southern margin of the Anatolian Plate. Besides as it turns out Cyprus harbors two species from the *Eupholidoptera chabrieri* group. This, in combination with other recent finding like the presence of *E. smyrnensis* on Crete (Willemse *et al.*, 2023) may help to further unravel the phylogeography of *Eupholidoptera* (Çiplak *et al.*, 2010).

FIGURE 29. *Eupholidoptera stelae* **sp. nov.** detail of the spines at the base of the stylus of male subgenital plate.

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