

***Peripodisma ceraunii* (Orthoptera, Acrididae, Melanoplinae: Podismini),
a new species of the genus *Peripodisma* from southern Albania**

Michèle Lemonnier-Darcemont & Christian Darcemont

Abstract

The genus *Peripodisma* was previously known only from a single species, *P. tymphii* Willemse, 1972, found in the Epirus region in Greece, especially in the Pindos mountains. In summer 2014, we discovered a new population of *Peripodisma*, morphologically differentiated from *P. tymphii*, in the Gjirokaštër sector of Albania. This led us to describe the new taxon, *P. Ilofizii* (LEMONNIER-DARCEMONT & CHRISTIAN DARCEMONT 2015). In autumn 2014 we found a third population in the Vlora District in southern Albania on Mount Qores. The individuals from this area are morphologically different from *P. tymphii* and more close to *P. Ilofizii*. Nevertheless they show some differences in the colouration of the hind tibia, the shape of the supra-anal-plate and the male penis. These morphological differences and the relative geographic isolation of Mount Qores from the Gjirokaštër massive further east, allow separating *Peripodisma ceraunii* n. sp. from the other two species of this genus.

Zusammenfassung

Aus der Gattung *Peripodisma* war bisher nur eine einzige Art, *P. tymphii* Willemse 1972, aus der Region Epirus in Griechenland, vor allem in den Bergen des Pindos-Gebirges, bekannt. Im Sommer 2014 entdeckten wir in der Gjirokaštër Region Ost-Albaniens eine neue Population von *Peripodisma* und beschrieben sie als neues Taxon, *P. Ilofizii*. Im Herbst fanden wir eine weitere *Peripodisma*-Population im Vlora Bezirk im Süden Albaniens auf dem Berg Qores. Die Tiere unterscheiden sich morphologisch etwas von *P. tymphii* und wenig von *P. Ilofizii*. Sie differenzieren sich durch die Farbe der Hintertibien, die Struktur der Supra-Anal-Platte und die Penisform der Männchen. Diese morphologischen Unterschiede und die relative geographische Isolierung des Qores-Gebirges im Vergleich zu den Berg-Ketten weiter östlich, spricht für eine Trennung von *Peripodisma ceraunii* n. sp. von den beiden anderen Arten dieser Gattung.

Introduction

Until 2014, the genus *Peripodisma* described by Fer Willemse in 1972, was known only by the single type species *P. tymphii* (Willemse, 1972). This species is distributed in the region of Epirus in Greece on the Tymphi and Tomaros mountains (WILLEMSE 1984, LEHMANN et al. 2011, CHINTAUAN-MARQUIER et al. 2014), the Soulion and Khionistra mountains (WILLEMSE 2008), and with a new record from the Albanian-Greek border between Nemerska (Nemërçkë) and Silvit mountains, west of Konitsa, Greece (LEMONNIER-DARCEMONT & DARCEMONT 2015).

In the global red list of threatened species, *P. tymphii* is currently classified Endangered (EN) (IUCN 2014). In July 2014, a second species, *P. llofizii*, is discovered in the northwestern extension of the Pindos massif in Albania (district of Gjirokastrë) on Mount Llofiz at 1700 m (LEMONNIER-DARCEMONT & DARCEMONT 2015). In September 2014, we extended our surveys to the Qores mountain in the region of Vlora, where we discovered a further population of *Peripodisma*. Individuals from this locality differ in some characters from *P. tymphii* and *P. llofizii*. The diagnosis of this new taxon *Peripodisma ceraunii*, is presented in this paper.

Materials and methods

Classification: The taxonomic nomenclature used follows the Orthoptera Species File (OSF) (EADES et al. 2014).

Data and depositories: Material from the private collection of Michèle Lemonnier-Darcemont (Callian, France) has been studied.

Morphology and measurements: Measurements and drawings were made using a binocular microscope fitted with micrometre (WF10x, scale 100/10 mm). Male genitalia are named after HARZ (1975).

Abbreviations: Coll. MLD, collection of Michèle Lemonnier-Darcemont (Callian, Var, France). MNHN, Muséum National d'Histoire Naturelle, Paris

Systematics

Genus *Peripodisma* Willemse, 1972

Type species: *Peripodisma tymphii* Willemse, 1972

Peripodisma ceraunii n. sp.

LSID: urn:lsid:zoobank.org:act:F3008C38-4DA7-4EF5-86D3-44501905DCAC

Examined material: ♂ Holotype: Albania, under the Mount Qores, above Llogara pass, district of Vlorë, 1861 m, N40°12'49.3" E019°36'35.6", 14 September 2014. Leg. Michèle Lemonnier-Darcemont, deposited MNHN.

Paratypes: 6 ♂, 7 ♀, 1 ♀ labelled allotype, same data as for holotype, deposited MNHN; 6 ♂, 6 ♀, same data as for holotype, coll. MLD.

Male holotype description (Fig. 1, 4-6)

The male is typical for the genus, medium-sized and rather stocky, sub-cylindrical (body-length: 22 mm; pronotum-length: 5.5 mm; hind femur-length: 10.5 mm). Integument shiny, sparse hairs cover the whole body and legs. The antennae are not reaching the pronotal hind margin. The head's colouration is dominant beige with beige-green vertex and dark brown to blackish areas behind the eyes. The fastigium verticis is broad and depressed, it has a wide post ocular

space. Pronotum coloured entirely brown, more or less dark, with just a few small elongated yellowish spots, its posterior margin is straight.

The lower part of the paranotum is beige, the prozone longer than the metazone, relatively dented and covered in fine lines and dots, the sulci well marked. The metazone is densely marked with light brown dots and the median keel is marked by an inconspicuous furrow. The mesonotum, metanotum, pleurae and first abdominal segment are mainly dark brown to black, with some yellowish to beige marks on pleurae and mesonotum. The mesosternum and metasternum are both beige.

The fore and median legs are beige, more or less greenish. The hind femurs have three blackish fasciae on the dorsal and inner side, and have the rest of inner area yellow. The knees are black in large part. The lateral and medial parts of the posterior tibia are bluish (emerald green before drying). The tips of the spines are dark brown to black. The tarsi are yellowish; they are widened at their end, as long as the claws, the latter being black at the tip.

First abdominal tergite dark brown with a wide yellow spot. The whitish eardrum is wide open as typical for the genus (cf. LEHMANN et al. 2011). Abdomen with yellow tergites partly covered near the middle with a diffuse grey green, along the midline with a black fascia of increasing wide on T2 to T6. The sternites are uniform yellowish. The posterior margins of the sub-genital plate, of the paraprocts and of the last tergite, are more or less dark brown. The abdomen apex with black furculae, thin and reach half the length of the epiproct (Fig. 4). The epiproct is as long as wide and has a small bump on each side, just after the middle. Its general colour is black, with brown tip, and median ridge of the same colour, larger at the base, crosses it longitudinally. The apex is acute and the elongated subapical tubercles are close, just separated by a narrow space. The cerci are beige at the base and dark-brown at the tip, pointed, laterally compressed and appear conical from the side.

Male genitalia: The dorsal view of epiphallus shows vertical ancorae forming a greater notch with anterior projections (Fig. 5). The pons is short, the lophi are close each other. They are club-shaped with their end proportionally higher than the length between the top of the pons and the apex of ancorae. The posterior projections are wide and taper at the apex. The lateral pons are slightly concave near the middle.

In the phallus complex is the rami of cingulum as wide at its bottom part as in its upper part (Fig. 6). The median projections of both dorsal valves are close together and the shape is similar to the letter « W », with the two valves close at the midline and spatulate at the tip. The tip of the apical penis valves extend beyond the ventral valves, they are long and wide, curved over their entire length, the tip is convex laterally.

Female allotype description (Fig. 2)

The holotype lacks the right antenna and some segments of the left antenna. The whole appearance is sub-cylindrical and quite stocky as the male, but the female is larger and with a slightly more cryptic colouration (body-length: 25 mm; pronotum-length: 5.5 mm; hind femur-length: 12.4 mm). The integument is shiny, sparse hairs cover the whole body and legs. The head is greenish-beige, with two black fascia behind the eyes and a wide post ocular space. On the vertex is drawn a large beige-pink wide letter « H ». Fastigium verticis is wide with a weaker depression compared to the male.

The pronotum is brown with the posterior margin straight. The prozone is longer than the metazone, not dented unlike male, almost smooth with just a few lines and perforations. The metazone is more densely marked with light brown dots. The sulci are somewhat faded near the middle and the median keel is a thin furrow, stronger in the metazone. The lower part of paranota is mainly brown, the upper part is crossed with a broad black fascia marked with light brown spots from prozone to behind the eye. The mesonotum and the metanotum are both brown, with beige, dark brown and black pleurae. Mesosternum and metasternum are beige-pink. The fore and median legs are beige, weakly pinkish and greenish. The hind femur similar to the male, with the exception of the inner part of the femurs which are beige-pink. The knees are black in upper part and beige pinkish in the lower part. The lateral and medial parts of the posterior tibia are bluish (emerald green before drying). Tips of the spines are black, the tarsi are light brown. The arolia are light brown and rounded, and do not extend beyond the claws, which are black at the tip.

The first tergite is darkened towards its apical part, the small eardrums located lateral at the S1 marked brown. The colouring of other tergites is an alternation of more or less marked greenish yellowish strips and brown strips. On each side of the midline, regular black dots mark T3 to T7. The sternites are beige-pink. The sub-genital plate is slightly longer than wide and the posterior margin is triangular (Fig. 3). The ventral valves of ovipositor include a low post-basal prominence, the upper margins of dorsal valves are winding and the apex is acute. Bottom view of the anterior part of the ventral valves is longer than wide (Fig. 3).

Differential diagnosis

The habitus of *Peripodisma ceraunii* n. sp. is very close to that of *P. tymphii* and *P. Ilofizii*; we did not notice any major differences in external dimensions although, on average, *P. ceraunii* is slightly smaller than *P. tymphii* or *P. Ilofizii*. The following criteria can be used to discriminate *P. ceraunii* from the two other *Peripodisma*.

Both sexes:

- The lateral and median parts of the posterior tibia are emerald green in live specimens, turning bluish after drying. They are bluish in *P. tymphii* and yellowish in *P. Ilofizii*.

Females (Fig. 3):

- The sub-genital plate is slightly longer than wide, similar to *P. tymphii*, whereas in *P. Ilofizii* it is not longer than wide.
- The anterior part of the ventral valves of the ovipositor is at least as long as wide, in *P. Ilofizii* it is as long as wide, and it is wider than long in *P. tymphii*.

Males (Figs. 4 to 6):

- The furculae are elongated; they are shorter or arrive just at the level of small tubers which are located after the midpoint of each side of the epiproct. In contrast, the furculae projects further than the small tubers in *P. Ilofizii*. In *P. tymphii*, the furculae are very short, conical and tubers are absent (Fig. 4).
- The rami of the cingulum are as wide in the basal part than in the upper part. They are wider in the basal part in *P. Ilofizii*, and wider at the upper part in *P. tymphii*, moreover much rounded (Fig. 5).
- The apex of phallus is significantly extending beyond the open space of the border of the cingular valves, as for *P. Ilofizii*. In *P. tymphii*, the apical tip of the penis valves extend into, but not beyond the open spaces of the border of the cingular valves (Fig. 5).
- The open space of the border of the cingular valves are W shaped, as per *P. Ilofizii*. In *P. tymphii*, they are omega shaped (Fig. 6).
- Cingular valves are long and wide, curved over their entire length with a convex end in side view. In *P. Ilofizii*, they are long and narrow only widened in the upper third, which is rather concave (Fig. 6)
- The epiphalli is fitted with conical posterior projections, short pons and lophi close each other, as per *P. Ilofizii*. In *P. tymphii*, the projections are tubular, pons longer and lophi farther (Fig. 5).
- The apex of lophi is proportionally larger than the length between the top of the pons and the apex of ancorae, as per *P. tymphii*. It is significantly lower in *P. Ilofizii* (Fig. 5).
- The posterior projection is more or less arrow shaped. It is narrow and straight in *P. tymphii* and larger and more rounded in *P. Ilofizii* (Fig. 5).

Etymology

The new species is named after the name of the Latin name of the mountain massif where it was found.

Habitat

Rocky meadow in the lower part of alti-Mediterranean stage (OZENDA 2002), at 1861 m altitude, with *Juniperus sp.* and a few groves of *Pinus heldreichii* (Fig. 7). These mountains overhanging the sea have very specific microclimatic conditions. Some moisture is almost always maintained because of fog banks that cover this area very often, from Llogara pass at 1000 m above sea level up to the summit. During our survey, in September, only the lower parts of the forest and mountains were used by a herd of cattle, it is likely that at that time the altitude meadows no longer offered sufficient pasture for these animals.

Other Orthoptera species encountered on the site are as follows: *Eupholidoptera schmidtii* (Fieber, 1861); *Platypleis albopunctata* (Goeze, 1778); *Chorthippus mollis mollis* (Charpentier, 1825); *Stenobothrus rubicundulus* Kruseman & Jeekel, 1967 (partial records, as performed by rainy weather).

Discussion

With the discovery in Albania of two new taxa that occupy well differentiated habitats on relatively isolated mountain ranges of each other, our vision of *Peripodisma* evolves. Nevertheless, our knowledge is still very succinct and requires many investigations. The most recent molecular studies (CHINTAUAN-MARQUIER et al. 2014) confirm a closer relationship of the genera *Peripodisma* and *Italopodisma*, composed of several species endemic of the central Apennines, Italy.

This important diversity does also apply to *Peripodisma*? To answer this question, and to better represent this group range, systematic field surveys of more localities are needed, particularly in Albania. It is also necessary to have a holistic approach, including different genetic studies (karyotype, DNA), biological and morphometric. We will then be better able to understand the phylogeny of the genus *Peripodisma* and the various processes that led to its current distribution and its separation into different taxonomic entities.

Authors:

Michèle Lemonnier-Darcemont & Christian Darcemont
Groupement d'Etudes Entomologiques Méditerranée (G.E.E.M.)
Hameau de St Donat
240 chemin du Vignaou
83440 Callian
France
E-Mail: lemonniergeem@free.fr
darcemont@free.fr.

References

- CHINTAUAN-MARQUIER, I.C., AMÉDÉGNATO, C., NICHOLS, R.A., POMPANON, F., GRANDCOLAS, P. & DESUTTER-GRANDCOLAS, L. (2014): Inside the Melanoplineae: New molecular evidence for the evolutionary history of the Eurasian Podismini (Orthoptera: Acrididae). – *Molecular Phylogenetics and Evolution* 71: 224-233.
- EADES, D.C., OTTE, D., CIGLIANO, M.M. & BRAUN, H. (2014): Orthoptera Species File. Version 5.0/5.0. <<http://www.Orthoptera.SpeciesFile.org>>
- HARZ, K. (1975): Die Orthopteren Europas. II. The Hague. W. Junk; 939 p.
- IUCN (2014) Red List of Threatened Species. Version 2014.2. <<http://www.iucnredlist.org/>>
- LEHMANN, G.U.C., BERGER, S., STRAUß, J., LEHMANN, A.W., & PFLÜGER, H.J. (2010): The auditory system of non-calling grasshoppers (Melanoplineae: Podismini) and the evolutionary regression of their tympanal ears. – *Journal of Comparative Physiology A* 196: 807-816.
- LEMONNIER-DARCEMONT, M. & DARCEMONT, C. (2015): Additional data towards the knowledge of European Podismini Jacobson, 1905 (Orthoptera, Acrididae, Melanoplineae) – *Zoosystema* 37 (2): 93-102.
- OZENDA, P. (2002): Perspectives pour une géobiologie des montagnes. – Presses Polytechniques et Universitaires Romandes, Lausanne; 195 pp.
- WILLEMSE, F. (1972): *Peripodisma tymphii*, a new genus and species of the tribe Podismini, from southeast Europe (Orthoptera, Acrididae, Catantopinae). – *Publicaties van het Natuurhistorisch Genootschap in Limburg* 22: 81-85.
- WILLEMSE, F. (1984): Catalogue of the Orthoptera of Greece. – *Fauna Graeciae* 1: i–xii, 1–275; Athens (Hellenic Zoological Society).
- WILLEMSE, F. & WILLEMSE, L. (2008): An annotated checklist of the Orthoptera-Saltatoria from Greece including an updated bibliography. - *Articulata Beiheft* 13: 1-91.



Figure 1. *Peripodisma ceraunii* ♂. Holotype.



Figure 2. *Peripodisma ceraunii* ♀. Allotype (Paratype).



Figure 3. Ventral view of the abdomen of female: *Peripodisma ceraunii* (left), *P. Ilofizii* (middle) and *P. tymphii* (right).



Figure 4. Abdominal apex of male: *Peripodisma ceraunii* (left), *P. Ilofizii* (middle) and *P. tymphii* (right).

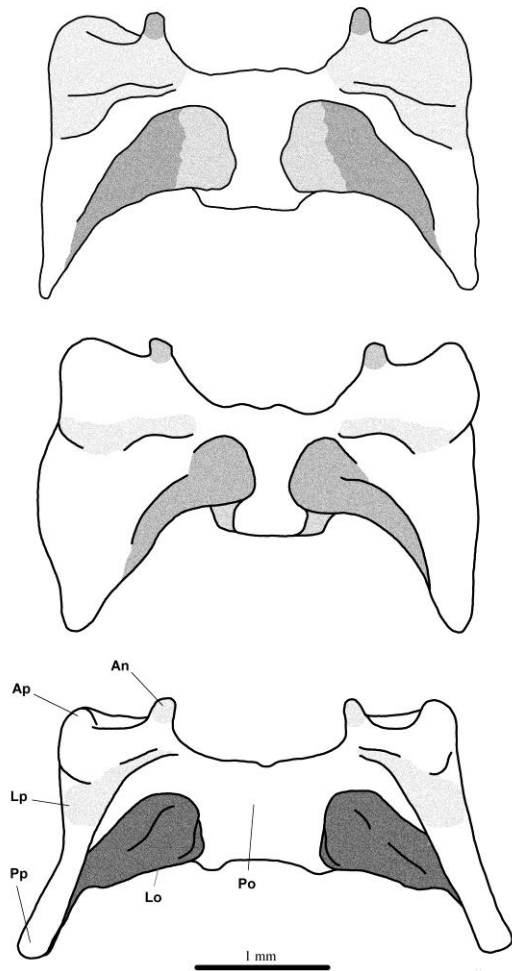


Figure 5.
Epiphallus of male in dorsal view. Ap: Anterior projection. Lp: Lateral pons. Pp: Posterior projection. Lo: Lophus. Po: Pons. An: Ancora. *Peripodisma ceraunii* (top), *P. Ilofizii* (middle) and *P. tymphii* (bottom).

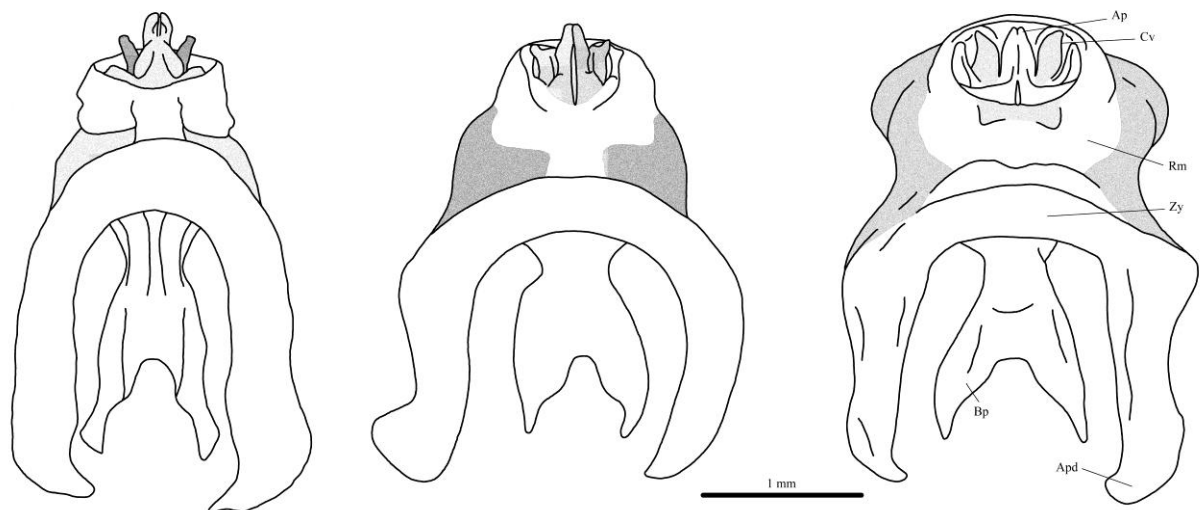


Figure 6. Phallus complex of male in dorsal view. Ap: Apical valves of penis. Cv: Cingular valves. Rm: Rami. Zy: Zygoma. Bp: Basal valves of penis. Apd: Apodeme of cingulum. *Peripodisma ceraunii* (left), *P. Ilofizii* (middle) and *P. tymphii* (right).



Figure 7. Mt Qorres, Albania.



Figure 8.
Peripodisma ceraunii ♂,
between Maja and Mt. Qores,
Albania.



Figure 9.
Peripodisma ceraunii ♀,
between Maja and Mt. Qores,
Albania.