

## A new subspecies of *Orthotylus* (*Parapachylops*) *mariagratiae* Carapezza, 1984 outside Crete (Hemiptera: Heteroptera: Miridae)

S. PAGOLA-CARTE<sup>1</sup>, A. MATOCQ<sup>2</sup>

<sup>1</sup>Apdo. 70 P.K.; E-20150 Villabona (Gipuzkoa); E-mail: pagolaxpc@telefonica.net

<sup>2</sup>Muséum national d'Histoire naturelle; Département Adaptation du Vivant, MECADEV, UMR7179 MNHN/CNRS; C.P. 50, Entomologie; 57 Rue Cuvier; F-75231 Paris cedex 05; E-mail: matocq.armand@wanadoo.fr

### Abstract

*Orthotylus* (*Parapachylops*) *mariagratiae* Carapezza, 1984 was described from Crete and since considered as an endemic species to that Mediterranean island. The new subspecies *O. (P.) mariagratiae attilii* n. ssp. is herein described on the basis of two males, from Morocco and continental Greece. It is clearly distinguished from the nominotypical subspecies by its external morphology (greater size) and male genitalia (mainly shape of the left paramere).

**Key words:** *Orthotylus*, *Parapachylops*, *O. (P.) mariagratiae attilii* n. ssp., Heteroptera, Miridae, Orthotylinae.

### Resumen

**Una nueva subespecie de *Orthotylus* (*Parapachylops*) *mariagratiae* Carapezza, 1984 fuera de Creta (Hemiptera: Heteroptera: Miridae)**

*Orthotylus* (*Parapachylops*) *mariagratiae* Carapezza, 1984 fue descrita de Creta y desde entonces considerada una especie endémica de dicha isla mediterránea. Ahora se describe la nueva subespecie *O. (P.) mariagratiae attilii* n. ssp. con base en sendos machos de Marruecos y de Grecia continental. Se distingue claramente de la subespecie nominotípica tanto por su morfología externa (tamaño mayor) como por la genitalia masculina (principalmente, forma del parámero izquierdo).

**Palabras clave:** *Orthotylus*, *Parapachylops*, *O. (P.) mariagratiae attilii* n. ssp., Heteroptera, Miridae, Orthotylinae.

### Laburpena

***Orthotylus* (*Parapachylops*) *mariagratiae* Carapezza, 1984 subespezie berri bat Kretatik kanpo (Hemiptera: Heteroptera: Miridae)**

*Orthotylus* (*Parapachylops*) *mariagratiae* Carapezza, 1984 Kretatik deskribatu zen eta geroztik Mediterraneoko irla horretako espezie endemikotzat jo izan da. Subespezie berri bat, *O. (P.) mariagratiae attilii* n. ssp., deskribatzen da hemen, Marokoko eta Grezia kontinentaleko ale ar banatan oinarrituta. Subespezie nominotipikotik ondo bereizten da bai kanpo-morfologiarengatik (tamaina handiagoa), bai eta arren genitaliarengatik ere (bereziki, ezkerreko parameroaren forma).

**Gako-hitzak:** *Orthotylus*, *Parapachylops*, *O. (P.) mariagratiae attilii* n. ssp., Heteroptera, Miridae, Orthotylinae.

## Introduction

Recently, in a paper describing two new subspecies of *Orthotylus* (*Parapachylops*) *junipericola* Linnavuori, 1965 (Heteroptera: Miridae: Orthotylinae), an updated

checklist of the subgenus *Parapachylops* Ehanno & Matocq, 1990 was provided (Pagola-Carte and Matocq, 2020). *O. (P.) mariagratiae* Carapezza, 1984 was accordingly listed with mention to its distribution as «Crete, Greece», similarly to the Palearctic Catalogue



FIGURE 1. *Orthotylus (Parapachylops) mariagratiae attilioi* n. ssp.: Holotype (Morocco): (a) Habitus; (b) Detail of cuneus, membrane veins and pubescence (Scale bar = 1 mm).

(Aukema, 2018). It should be clarified that the species was described from Crete (Carapezza, 1984) and subsequently only recorded from that Greek island (published records by Heiss *et al.* (1991, 1993) and Heckmann *et al.* (2015)), but not from continental Greece. In this regard, the printed version of that catalogue (Kerzhner and Josifov, 1999) correctly pointed out «GR (Crete)» (B. Aukema, pers. comm.).

A new subspecies of *O. (P.) mariagratiae* is herein described from Morocco and mainland Greece. The discovery of new taxa is certainly not surprising within the highly speciose genus *Orthotylus*, which consists of about 400 species worldwide (Schuh, 1995, 2002-2013). Moreover, a certain proliferation of subspecific entities within *Parapachylops* is also consistent with the high geographic variability shown by other species of this subgenus (see: Carapezza, 1997; Pagola-Carte and Matocq, 2020). What appears to be more interesting is the known distribution of the new subspecies, suggesting a much larger, circum-Mediterranean distribution area for a species until now regarded as part of the endemic fauna of Crete.

The following description is based on two males: holotype + paratype. Measurements are given for both

specimens, firstly those of the holotype, then those of the paratype in brackets. Due to the general condition of the paratype, some of its measurements are followed by a question mark. Concerning the genitalia, the parameres of the paratype are perfectly observed and they are identical to those of the holotype; by contrast, its vesica is not enough noticeable, so that the description of the sclerotized appendages is only based on those of the holotype.

## Description

### *Orthotylus (Parapachylops) mariagratiae attilioi* n. ssp.

Only males known. Macropterous. Green, the pigment well preserved in the holotype (Fig. 1a) and faded in the paratype; uniformly coloured except for a pale area on the basis of the cuneus (Fig. 1b). Membrane grey, with whitish veins (Fig. 1b). Rostral

segment IV apically darkened. Tibial spines pale, transparent to amber coloured. Tarsomere III imperceptibly darkened apically. Dorsal pubescence consisting of long, semierect, whitish to slightly brownish setae; in the holotype, some setae appearing more or less dark depending on the light incidence angle.

Total length (mm) = 3.7(3.1). Body elongate to moderately ovate, 3.69(3.10) × longer than pronotum width. Head 0.69(0.56?) × as wide as pronotum. Vertex immarginate. Ocular index = 2.07(2.29?). Rostrum reaching metacoxae. Length of antennal segments (mm) = 0.22(0.25) (I) – 1.25(1.00?) (II) – 0.42 (III) – 0.25 (IV). Ratio antennal segment II / pronotum width = 1.25(1.00?). Pronotum strongly transverse, 2.22(2.22) × as wide as medially long; anterior margin slightly insinuate medially, posterior margin sub-straight; lateral margins gently convex to sub-straight; antero- and postero-lateral angles largely rounded. Hemelytra long, distinctly surpassing abdomen. Ratio metatibia length / pronotum width = 1.63(1.43). Ratio metatibia / metatarsus (lengths) = 4.06(4.07). Tibial spines equal or longer than tibial diameter. Approximate proportions between metatarsomeres = 4–6–8.

**Male genitalia:** Pygophore (Fig. 2) short, truncated cone-shaped, with dorsal margin of genital opening provided to the left with one long, highly sclerotized, horn-like process. Right paramere as in Fig. 3a, elongate and covered by a longitudinal, dense band of teeth along the apical half of the hypophysis, and with sensory lobe perpendicular, smooth and ending in three to four teeth. Left paramere as in Fig. 3b, roughly hammer-shaped, with the hypophysis ending in a hook-like curvature, and the opposite area (including sensory lobe) large, semicircular and forming a spoon-like concavity bordered by more than a dozen prominent teeth. Sclerotized appendages of the vesica (Fig. 3c) consisting of two pieces: an outer one, halfway divided into three elongate branches, of which the median one is subdivided several times into more slender branches or spines in contrast to the other two, undivided and unarmed, one of them turned backwards; an inner one, formed by two long branches of approximately same length but different thickness, the thicker directed apicad and the thinner turned backwards.

#### Type material:

HOLOTYPE (♂): «Maroc : Tadamoute // N 33° 42, 378', W // 4°47,554'; alt. 1453 m. // 11-VI-2013 A. Matocq leg».



FIGURE 2. *Orthotylus (Parapachylops) mariagratiae attilii* n. ssp.: Pygophore of the paratype (Greece) in dorsal view; setae omitted (Scale bar = 0.4 mm).

PARATYPE (♂): «GRECE : ARCADIE : // VITINA ; au sol ; // 17-18-19-VII-1987 ; // A. Matocq leg»

A red label is now added below: «HOLOTYPE [or PARATYPE] ♂ // *Orthotylus (Parapachylops) // mariagratiae attilii* n. ssp. // Pagola-Carte & Matocq, 2021». The specimens are mounted on a white card and their genitalia stored in a microvial pinned below.

Deposited in the Muséum national d'Histoire naturelle (MNHN), Paris (holotype, numbered MNHN(EH) 24851) and Coll. A. Matocq, Paris (paratype).

#### Etymology:

We dedicate the name of the new subspecies to Attilio Carapezza (Palermo), in recognition of his enormous work on Palaearctic Heteroptera and thanking his generosity.

#### Type locality:

Morocco: Region of Draa-Tafilalet: Province of Midelt: Taddamoute.

#### Distribution and biology:

The new subspecies has been collected between June-July in mountain areas of Draa-Tafilalet, Morocco,

and Peloponnese, Greece, in both cases at altitudes higher than 1000 m. The paratype was collected on the ground. No information about host plants is available.

## Discussion

*Orthotylus (Parapachylops) mariagratiae* Carapezza, 1984 was hitherto catalogued as an endemic species to Crete (see Introduction). Surprisingly, two male specimens of *Orthotylus* subgenus *Parapachylops* collected in Morocco and mainland Greece have revealed to belong to this species, thus representing the first records of *O. (P.) mariagratiae* outside Crete and suggesting a much larger distribution area for it. However, some differences in their genitalia (particularly, the left paramere) have led us to propose a new subspecies in addition to the nominotypical one.

*O. (P.) m. attilioi* n. ssp. undoubtedly belongs to the genus *Orthotylus* and the subgenus *Parapachylops* for sharing the diagnostic characters of external morphology and male genitalia as established and/or discussed by previous authors (Ehanno and Matocq, 1990; Carapezza, 1997). We consider it as a subspecies of *O. (P.) mariagratiae* Carapezza, 1984 following the tendency in this subgenus to distinguish geographic subspecies according to male genitalic characters. Our comparative research is based on the published description and illustrations (Carapezza, 1984 – original description of the species; Carapezza, 1997 – complementary information) as well as on the examination of type specimens kindly provided by Attilio Carapezza himself. The dissimilarities between *O. (P.) m. mariagratiae* and *O. (P.) m. attilioi* n. ssp. are highlighted as follows.

The new subspecies is clearly separated from *O. (P.) m. mariagratiae* by the shape of its left paramere, much more profusely toothed and with a different apex of hypophysis (compare our Fig. 3b with Carapezza, 1984: fig. 6). The process on the genital opening of the pygophore is also distinguishing (Fig. 2 *versus* Carapezza, 1997: fig. 24f). Some other differences exist in the right paramere (Fig. 3a *versus* Carapezza, 1984: fig. 7) and in the sclerotized appendages of the vesica (Fig. 3c *versus* Carapezza, 1997: fig. 23m) although they are less noticeable. As to the external morphology, the new subspecies is distinctly greater (males: 3.10–3.70 *versus* 2.41–2.73 mm long),

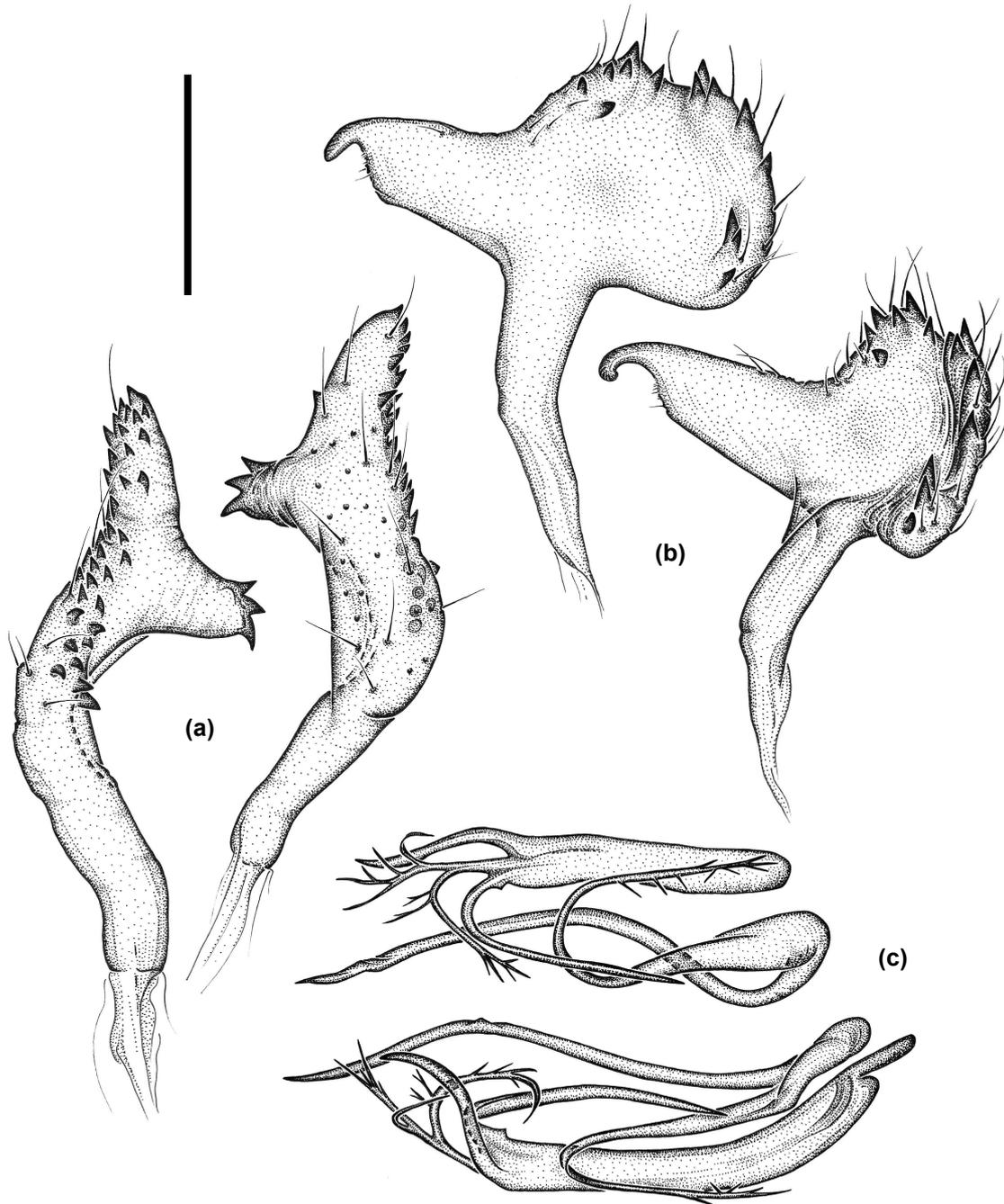
with, for example, longer metatibiae and antennal segment II with respect to pronotum width.

No data on host plant is available for *O. (P.) m. attilioi* n. ssp. According to Carapezza (1984, 1997), *O. (P.) m. mariagratiae* lives on *Cupressus* sp. and a similar dependence on Cupressaceae might be assumed for the new subspecies. On the other hand, Heckmann *et al.* (2015) collected the nominotypical subspecies beating the low vegetation on the road edge (*«von niedriger Vegetation am Wegrand geklopft»*) and the paratype of *O. (P.) m. attilioi* n. ssp. was collected on the ground (*«au sol»*).

Beyond the strictly formal discussion on taxonomy, morphology and biology (above paragraphs), the description of this new subspecies allows another type of discussion in the field of hypotheses, so more subjective and admittedly conjectural.

The insular, nominotypical subspecies of *O. (P.) mariagratiae* was paradoxically discovered (Carapezza, 1984) before the continental subspecies (present paper) even if the latter, according to the currently available information, is more widely distributed: northern Africa (at least, Morocco) as well as southern Europe (at least, mainland Greece). In our opinion, that could suggest that *O. (P.) mariagratiae* is a circum-Mediterranean species from which *O. (P.) m. mariagratiae* would have originated in a process of insular subspeciation including size reduction and genitalic differentiation, while *O. (P.) m. attilioi* n. ssp. would be the more widely distributed taxon of both. Furthermore, it could also be hypothesized that nowadays *O. (P.) m. mariagratiae* is more common or widespread in Crete than *O. (P.) m. attilioi* n. ssp. is on the continent, given the chronology and intensity of the discoveries (Carapezza, 1984; Heiss *et al.*, 1991, 1993; Heckmann *et al.*, 2015; *versus* present paper (2021) based on only two specimens). Otherwise, a likely requirement of mountain habitats by the continental subspecies could also be the cause of its rareness, which would be hence merely apparent. Not to mention that such a rareness may simply be the result of sampling paucity (or even absence over large areas), as it is usual in miridology.

This is not the first time that puzzling situations are faced concerning distribution ranges in the genus *Parapachylops*. Some taxa are spreading their range or they are being discovered outside the previously known distribution, for instance *O. (P.) caprai* Wagner, 1955 (see: Wagner, 1955; Carapezza, 1997; Rabitsch, 2010; Aukema, 2018) or *O. (P.) j. regularis* Linnavuori, 1965 (see: Carapezza and Cusimano, 2014). Some-



**FIGURE 3.** *Orthotylus (Parapachylops) mariagratae attiloi* n. ssp.: Male genitalia in the holotype (Morocco): (a) Right paramere, two views; (b) Left paramere, two views; (c) Sclerotized appendages of the vesica, two views (Scale bar = 0.2 mm).

times this results in the «meeting» of lineages (species or subspecies) originating from different geographic origins (A. Carapezza, pers. comm. in Pagola-Carte and Matocq, 2020). Only as a further hypothesis, most probably we are witnessing an interesting period of expansion for several lineages of *Parapachylops*, if not a «hot period» of evolutionary radiation. Let us consider the following data: up to 17 species/subspecies belong to this subgenus and all but one have been described later than 1960. The exception is *O. (P.) caprai* Wagner, 1955, for many years considered as endemic to Sardinia and now spreading throughout Europe and Anatolia.

It is more and more obvious that the subgenus *Parapachylops* of *Orthotylus* deserves special taxonomic attention, which is out of the scope of the present contribution. Moreover, we firmly believe that a thorough research on the phylogeography of *Parapachylops* would result in highly interesting discoveries and become a new insight into the diversity of Mediterranean Miridae.

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