Research Article

A new species of *Proeulia* Clarke (Lepidoptera: Tortricidae) from Central Chile

Nueva especie de *Proeulia* Clarke (Lepidoptera: Tortricidae) de Chile central

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Abstract. *Proeulia uniformata* **sp. nov.**, is described and illustrated from Chacabuco Province, Santiago Metropolitan Region, Chile. Based on the possession of a single cornutus in the phallus, the new species appears to be most closely related to *P. cneca* Obraztsov, 1964, *P. gladiator* Razowski, 1999, and *P. elguetae* Razowski, 1999. The new species brings to 41 the number of species in the genus *Proeulia*, which includes 37 Chilean endemics that occur on the mainland and offshore islands.

Key words: Cochylini, endemics, Neotropical, taxonomy, Tortricinae.

Resumen. Se describe e ilustra una nueva especie de Tortricidae (Lepidoptera) de Chile, *Proeulia uniformata* **nov. sp.**, proveniente de la Provincia de Chacabuco, Región Metropolitana de Santiago. Esta especie presenta un solo cornutus en el phallus y es cercana a *P. cneca* Obraztsov, 1964, *P. gladiator* Razowski, 1999, y *P. elguetae* Razowski, 1999. La nueva especie eleva a 41 el número de especies para el género, donde 37 son endémicas de Chile continental e insular.

Palabras clave: Cochylini, endémicas, Neotropical, taxonomía, Tortricinae.

Introduction

The genus *Proeulia* Clarke, 1962 comprises 40 species: 36 are restricted to Chile, three occur in both Argentina and Chile, and one in known only from Bolivia (Clarke 1965, 1980; Razowski 1988; Brown and Passoa 1998; Gilligan *et al*. 2014; Cepeda and González 2015). Although the immature stages of most species are unknown, the biology of several species that are injurious to grapes and stone fruits and those of quarantine significance have been studied (Cepeda and Cubillos 2011; González 2003). As a result of recent field work in the Central of Chile with ultraviolet light traps, a new species of *Proeulia* was discovered. The purpose of this paper is to describe that species based on morphological features of adults.

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Materials and Methods

Genitalia slides were prepared using the methods proposed by Robinson (1976). The description of adults follows Cepeda and González (2015), but the term phallus is used rather than aedeagus. An EZ4E Leica stereomicroscope was used for observations and photographs of adults. Images were processed using the LAS-EZ 3.2.0 Leica Application Suite software. Forewing length was measured from the forewing base to the apex, including the fringe. Genitalia structures were examined under a DM500 Leica microscope, and photographs were taken with a 14-megapixel resolution HD Movie Fujifilm digital camera. The images were processed with Adobe Photoshop CS5.1. The specimens examined in this study and permanent genitalia slides are deposited in MEUC: Luis Peña Entomological Museum, Department of Plant Protection, College of Agronomic Sciences, University of Chile, Santiago, Chile.

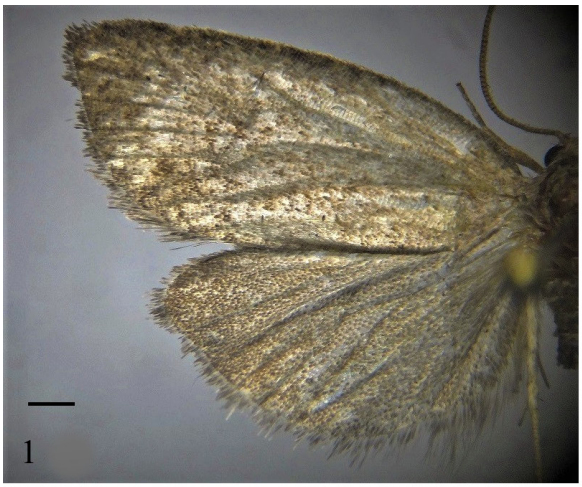
Results

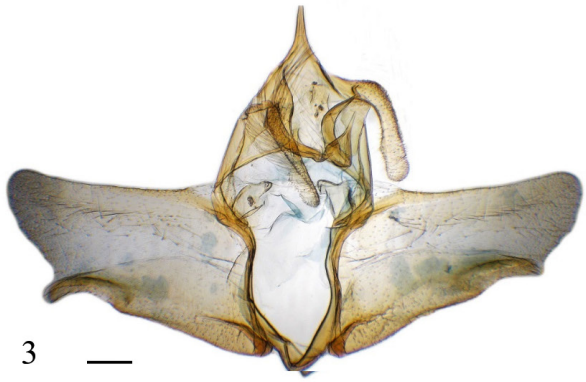
Proeulia uniformata Cepeda, **sp. nov.**
(Figs. 1-10)

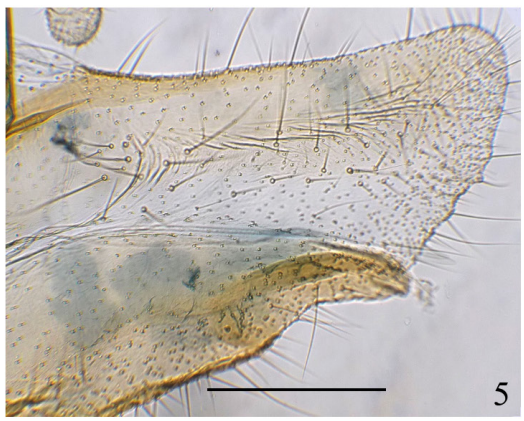
Diagnosis. Based on male genitalia, *Proeulia uniformata* is most closely related to *P. cneca* Obraztsov, 1964, *P. gladiator* Razowski, 1999, and *P. elguetae* Razowski, 1999. All four of these species have a single cornutus in the vesica of the phallus. In *P. uniformata* the forewing wing is uniform brownish gray; in the male genitalia the uncus is simple, the socius is elongate, the gnathos has an acute apex, the transtilla is simple, and the sacculus is moderately developed; and in the female the ductus bursae is partially sclerotized. In contrast, in the *P. cneca* the forewing ground color is ochreus; in the male genitalia the uncus is longer, the socius is longer, the gnathos lacks an acute apex, the transtilla is sclerotized, and the sacculus is strongly developed. In *P. gladiator* the forewing ground color is ochreus yellow; in the male genitalia the uncus is smaller, the socius is broader, the gnathos has lateral prominences, the transtilla is strongly sclerotized, and the sacculus has a small subterminal spine. In *P. elguetae* the forewing ground color ochreous; in the male genitalia the uncus is lobed terminally, the transtilla has two lateral spine-like processes, and sacculus is strongly developed, with an acute, up curved apex. Based on female genitalia, *P. uniformata* presents a digitiform and projected signum, while in *P. elguetae* the signum is small and not projected. The females of *P. cneca* and *P. gladiator* are unknown.

Description. Male. Head: Frons, vertex, and occiput covered by brownish grey scales. Antenna filiform, with scape and flagellomeres dorsally covered by whitish grey scales. Ventrum of flagellomeres with short fine sensory setae. Labial palpus porrect, twice as long as maximum diameter of eye, without scales. Thorax: Tegula and scutellum covered with brownish grey scales. Forewing length 10.0 mm (n = 1); forewing nearly uniform brownish gray, with a few scattered dark black scales. Hindwing, opaque whitish, termen fringe with whitish elongated scales. Abdomen: Male genitalia (Figs. 3-6) with uncus simple, moderately developed, gnathos plate with acute apex, socius elongate, slender, covered with long setae marginally, transtilla weak medially, valva longer than wide, costa with cucullus slightly angled upward, sacculus reaching 3/4 length of valva, terminating in a free rounded process, vinculum slender, longer than wide. Phallus thick with a single strong cornutus, 3/4 length of phallus, juxta stout, 1/3 length of phallus. **Female.** Head and thorax: Essentially as described for male, except forewing length 11.0 mm (n = 1), and hindwing whitish. Abdomen: Female genitalia (Figs. 7-10) with papillae anales simple. Ostium broad, sterigma well sclerotized, ductus bursae short, membranous, partially

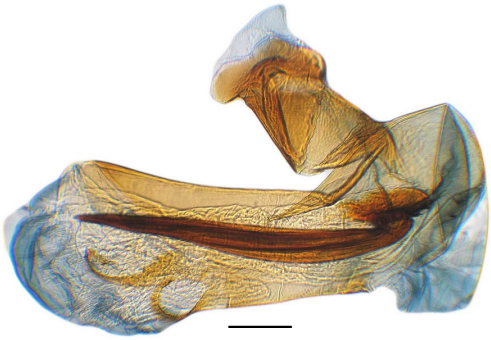
sclerotized, with sclerite anterior to patch of dense spines. Corpus bursae rounded, with dorsum partially sclerotized, covered by dense spines, signum digitiform, strong and projecting.







Figures 1-5. *Proeulia uniformata* **sp. nov.** 1. Male holotype. 2. Female paratype. Scale: 1.0 mm. 3. Genitalia without phallus. 4. Uncus, gnathos, socis. 5. Valva. Scale: 0.25 mm.



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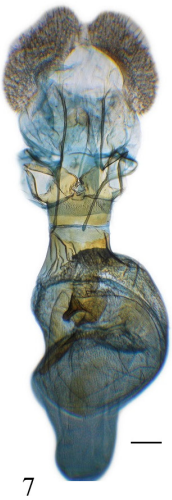

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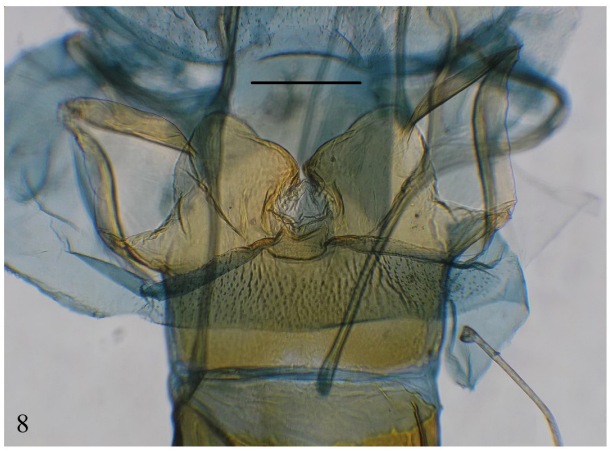

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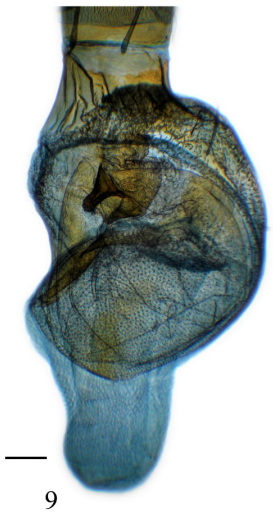

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Figures 6-10. *Proeulia uniformata* **sp. nov.** 6. Phallus. 7. Female genitalia. 8. Sterigma. 9. Corpus bursae. 10. Signum. Scale: 0.25 mm.

Host plant. Unknown.

Etymology. The specific epithet is from the Latin *uniformis* and refers to the uniform color of the forewing.

Distribution. *P. uniformata* is known from a single locality in Chacabuco Province, Santiago Metropolitan Region. It is associated with sclerophyllous forest and scrublands. According

to Morrone (2015), this distribution belongs in the Central Chilean Subregion, Province of Coquimbo.

Remarks. *Proeulia uniformata* is included in this genus based on the following features: antennae with short cilia, labial palpi porrect in both sexes, hindwing with R and M1 stalked for over 1/2 their lengths, M3 with CuA1 connate; male genitalia with uncus simple, gnathos plate simple, valva wide at base, sacculus longer than wide, and phallus stout with a single large, strongly developed, elongate cornutus. In the female genitalia, the area near the ostium is sclerotized, the ductus bursae is short, with a sclerite from the anterior surface of the corpus bursae, and a signum is present.

Material examined. Male holotype from: Chile, Cerro Vizcachas, Provincia de Chacabuco, Región Metropolitana de Santiago, 8-9.XII.2017, leg. J.F. Campodonico, trampa UV (MEUC). 1 female paratype from: Chile, Cerro Vizcachas, Provincia de Chacabuco, Región Metropolitana de Santiago, 8-9.XII.2017, leg. J.F. Campodonico, trampa UV (MEUC).

Discussion

Proeulia was proposed by Clarke (1962) to accommodate two endemic species from the Juan Fernández Islands, *P. robinsoni* (Aurivillius, 1922) and *P. griseiceps* (Aurivillius, 1922). Clarke (1962) defined the genus based on external characters and features of the male and female genitalia. He distinguished *Proeulia* from *Eulia* Hübner by its porrect labial palpus, the hindwing with vein 6 and 7 stalked, an unmodified transtilla, and the absence of a signum. Obraztsov (1964) added nine species to the genus (five new species and four new combinations) and based on these species he modified the diagnosis of the genus to include several additional characters. According Obraztsov (1964), *Proeulia* was defined by the following: hindwing R and M_1 stalked, long-stalked, connate, or even slightly separate; and M_3 and CuA_1 connate or slightly separate. He also noted that in the female genitalia there is a process that projects from the ventral surface of the corpus bursae that varies in development; that a cestum is present; and that the area near the ostium is sclerotized. Razowski (1988) described a new species from Bolivia, expanding the distribution of the genus beyond Chile and Argentina. However, based on the male genitalia, *P. boliviae* is unlikely congeneric with all other *Proeulia*, as suggested by Brown (1989). The male genitalia differ in the uncus being broad submedially with bristled setae, and the phallus being wide, very short, and with two large cornuti. However, this possible new genus, perhaps corresponds to a species formed by allopatry (only know type locality, Cochabamba, Bolivia). Brown (1989) mentioned the following characters for *Proeulia*: valva broad, with an upturned costa, narrow sacculus, short antenna cilia, phallus stout, with several cornuti, and foreleg hairpencil. In the female, the ductus bursae short, and the signum is formed by a circular sclerotized patch. Razowski (1995) summarized all the previous contributions and redescribed the genus; he also described five new species and transferred to the genus three unassigned species. He defined the genus by the following male characters: simple uncus, socius with length variable, gnathos simple or with process arms, vinculum slender often with apical prominence, transtilla simple and sclerotized, valva large, phallus with coecum rounded, several cornuti strong and unequally sized, juxta variable in shape; and the following female characters: ductus bursae membranous or with anterior sclerite, extending towards the middle of corpus bursae and accessory bursae absent. Subsequently, Razowski (1999), Razowski and González (2003), and Razowski and Pelz (2010) have increased the number of species described from Chile.

Brown and Passoa (1998) summarized the older literature on host plants, and the immature stages of three species of economic importance were described by Cepeda and

Cubillos (2011). The most recently described species of *Proeulia* is *P. filigranae* Cepeda and González, 2015, which was reared from *Lobelia excelsa* (Campanulaceae).

It would be extremely useful to have a phylogenetic analysis for all species of *Proeulia* and data on their ecological relations. Owing to a high degree of phenotypical variability, it is often impossible to identify species by external characters alone. In some species (e.g., *P. auraria, P. leonina, P. chrommaffinis* and *P. chrysopteris*) golden color predominates the forewing, and in several other species (e.g., *P. lentescens, P. onerata, P. rucapillana, P. sublentescens* and *P. limaria*) there is a brownish fascia or pale fascia (*P. longula*). In the male genitalia there are differences in the shape of the uncus (simple to bilobed), socius (from short to elongated), gnathos (simple or with prominences), transtilla (simple or strongly sclerotized), sacculus (simple to acutely elongated), phallus (stout with cornutus and/or cornuti), and juxta (small to large). In female genitalia, the ductus bursae is membranous with a variably developed sclerite, with an oval ventral sclerite that is also highly variable.

Also, last instar larvae exhibit differences. For example, in *P. triquetra* segment A9 has the D1 and SD1 setae on separate pinaculum (typical of Tortricinae), whereas in *P. auraria* and *P. chrysopteris* D1 and SD1 setae are on the same pinaculum (typical of Olethreutinae). It should be noted that the vast majority of the host records for *Proeulia* are for only three species which are widely distributed in Chile. Cumulative host records for genus include 37 families: Rosaceae, Asteraceae, Simmondsiaceae, Pinaceae, Fabaceae, Myrtaceae, Nothofagaceae, among others (Cepeda and Cubillos 2011; Cepeda and González 2015). Therefore, host plants appear to provide no evidence for natural groupings. Recently, sex pheromones for two species, *P. auraria* and *P. triquetra*, have been examined (Reyes-García *et al*. 2014; Bergman *et al*. 2016). Although there are no molecular analysis to support it, the new species is convincingly assigned to *Proeulia* based on facies and genital morphology.

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