FIRST NOTES ON THE LIFE HISTORY OF EUPITHECIA TARAPACA RINDGE (GEOMETRIDAE) ON THE WESTERN SLOPES OF THE ANDES OF NORTHERN CHILE

Additional key words: Balbisia microphylla, Florivory, Larentiinae, Vivianiaceae, Pupal diapause

The life histories of the Lepidoptera from the Atacama Desert and the Andes of northern Chile are in general poorly studied. However, as already shown for some butterflies inhabiting these arid environments, data dealing with biology and host ranges are essential to understand their abundance and distribution patterns, and also provide useful tools to assess adequately their conservation status (Despland 2014).

Eupithecia tarapaca Rindge (Lepidoptera, Geometridae, Larentiinae) is a little known geometrid moth originally described based only on the holotype male collected in Timar, a narrow ravine situated on the western slopes of the Andes of northern Chile (Rindge 1987, 1989). All aspects of its biology are presently unknown, mostly due to the scarce sampling for geometrid moths in these arid environments. However, some adults of this species were recently reared from larvae collected on a native plant close to the type locality. Accordingly, the objective of this contribution is to provide the first notes on the life history of E. tarapaca, including the first host plant record and the first record of facultative pupal dormancy for this desert moth.

Sampling was performed in the area around Socoroma village (18°16' S, 69°35' W), Parinacota Province, at about 3,300 m elevation on the western slopes of the Andes of northern Chile (Fig. 1). The site is characterized by a tropical xeric bioclimate with a highly seasonal vegetation cover that generally reaches higher levels in March–April after the summer rains (Luebert & Plisoff 2006). The larvae were collected between March 2011 and July 2015 on flower buds of Balbisia microphylla (Phil.) Reiche (Vivianiaceae) (Fig. 2–3). They were placed in plastic vials and kept in the laboratory. Additional flowers of the same plant were provided daily until the larvae finished eating and started to prepare for pupation. Pupae were periodically observed until adult emergence. Adults were pinned, spread, and dissected following standard procedures in order to provide a taxonomic identification. Voucher specimens are deposited in the Colección Entomológica de la Universidad de Tarapacá (IDEA), Arica, Chile.

Seventeen adults of E. tarapaca were reared, twelve males and five females. The identification was based on comparisons with the original description (Rindge 1987) and photographs of the genitalia of the holotype deposited in the American Museum of Natural History (AMNH).

Balbisia microphylla is the first host plant recorded for E. tarapaca. Furthermore, this is the first mention of the association of Eupithecia with Vivianiaceae (Robinson et al. 2010). At the local level, previous host plant records for Eupithecia of northern Chile mostly included Fabaceae, with only one species, E. atacama Vojnits, associated with Chenopodiaceae, and another, E. yubitzae Vargas & Parra, with larvae being able to feed on Anacardiaceae as well as Fabaceae (Vargas et al. 2015).

Detailed knowledge of host ranges of geometrid larvae is useful to understand the ecology of these organisms in these arid environments, either in their role as herbivores or as prey (Méndez-Abarca et al. 2014, Vargas et al. 2014). Although this study did not aim to determine the host specificity of E. tarapaca, it must be noted that other plant species, mostly of the Asteraceae and Fabaceae, have been surveyed for florivorous caterpillars for more than seven years in the study site, but no additional hosts have been detected for E. tarapaca, suggesting a close association with B. microphylla. Monophagy and oligophagy have been reported for other Neotropical representatives of the Larentiinae (Strutzenger et al. 2010, Seifert et al. 2015), including Eupithecia (Parra & Ibarra-Vidal 2002, Bodner et al. 2010). However, polyphagy has been reported for several florivorous Nearctic and Palearctic Eupithecia (Bolte 1990, Mironov 2003, 2014). Further field and laboratory studies are required to assess better the host specificity of E. tarapaca. Since other species of Balbisia have distribution ranges close to B. microphylla both in northern Chile and southern Peru (Weigend 2005, 2011), it should be interesting to survey them for E. tarapaca larvae.

All larvae of E. tarapaca included in this study were collected in flower buds of the host. They mostly fed on the reproductive structures of the floral buds during rearing, eventually also eating the petals. Although leaves were also offered to the larvae, these organs were never consumed, suggesting a florivorous habit. Florivory appears to be the predominant feeding habit of the Eupithecia from the Atacama Desert, although...