

First Host Plant Record for *Teriocolias zelia andina* Forbes (Lepidoptera: Pieridae) and Evidence for Local Specialization

HA VARGAS

Depto de Recursos Ambientales, Facultad de Ciencias Agronómicas, Univ de Tarapacá, Arica, Chile

Keywords

Coliadinae, folivorous, monophagy, *Senna birostris*

Correspondence

HA Vargas, Depto de Recursos Ambientales, Facultad de Ciencias Agronómicas, Univ de Tarapacá, Casilla 6-D, Arica, Chile; havargas@uta.cl

Edited by André L Freitas – UNICAMP

Received 26 March 2012 and accepted 9 July 2012

Published online 17 August 2012

© Sociedade Entomológica do Brasil 2012

The Pieridae is a particularly diverse butterfly family with a great number of genera restricted to the Neotropical region (Braby *et al* 2006). Larvae of pierid butterflies are primarily associated with plants of three angiosperm orders: Brassicales, Santalales and Fabales (Braby & Trueman 2006). Knowledge concerning host plant associations of Lepidoptera is important for many reasons. Absence of this information is an impediment to carry out basic studies, such as on the detailed characterization of the morphology and life history of immature stages (Freitas 2006, Kaminski & Freitas 2008). Furthermore, applied projects for the adequate planning of biological conservation may also be negatively affected when host plant associations are unknown.

Outstanding studies dealing with morphology and life histories of immature stages of Neotropical Pieridae have been published from the second half of the last century (e.g., Shapiro 1979, 1991) until recently (e.g., Braby & Nishida 2007, 2011, Freitas 2008). However, the natural history of many Neotropical species remains poorly documented due to the rich diversity of the family in the region (Braby & Nishida 2007) and the difficulty of access to certain habitats (K. Nishida, personal communication).

Abstract

The shrub *Senna birostris* var. *arequipensis* (Fabaceae) is recorded as the first host plant for the little known butterfly *Teriocolias zelia andina* Forbes (Lepidoptera: Pieridae) in the occidental slopes of the Andes, northernmost Chile. Observations on egg-laying and larva-feeding behavior suggest that this butterfly is host specific.

Teriocolias zelia andina Forbes is one of the more conspicuous and regularly observed pierid flying in the arid environments on the occidental slopes of the Andes in northern Chile (Peña & Ugarte 1996); however, information dealing with the life history of this butterfly was unknown until this study. In this paper, the host plant for *T. zelia andina* and some observations on egg-laying and larva-feeding behaviors are presented.

Two caterpillars were collected in August 2007 on the native shrub *Senna birostris* var. *arequipensis* (Fabaceae) in the area around the Socoroma village (18°16' S, 69°35' W), at 3,286 m asl in the occidental slopes of the Andes, Parinacota Province, northern Chile. The larvae were brought to the laboratory of the Facultad de Ciencias Agronómicas, Universidad de Tarapacá, Arica Province, and placed in plastic vials, where fresh leaves of the host plant were supplied periodically until the larvae pupated. Pupae were observed daily until one male and one female were obtained in September 2007. Seven additional larvae were collected in the same locality in May and August 2008. Rearing of these larvae resulted in one male and one female in June 2008 and two males and three females in September of the same year. All of them were identified as *T. zelia andina*. Voucher specimens are deposited in the

“Colección Entomológica de la Universidad de Tarapacá” (IDEA), Arica, Chile, and in the “Museo Nacional de Historia Natural de Santiago,” Santiago, Chile.

The discovery of the immature stages of *T. zelia andina* on *S. birostris* var. *arequipensis* agrees with the pattern of host plant relationships previously known for larvae of Coliadinae, which predominantly feed on Fabales (Braby & Trueman 2006, Wheat *et al* 2007). Furthermore, Hayward (1973) mentioned *Cassia* sp. as the host plant for *Teriocolias riojana* Giacomelli, a synonym of *Teriocolias zelia zelia* (Lucas), from northern Argentina. On the other hand, Freitas (2008) reported *Senna* spp. as host plants for the immature stages of another Neotropical Coliadinae genus, *Leucidia* Doubleday in Brazil. This genus has been recognized as the sister group of *Teriocolias* Roeber based on molecular analysis (Braby *et al* 2006).

From an ecological perspective, the host range is a key aspect in the field biology of phytophagous insects. Thus, two trials were conducted to determine the host specificity of *T. zelia andina* at the same study site between September and December 2010.

First, eggs of *T. zelia andina* were carefully searched for on native and exotic fabaceous plants growing in the study area to estimate the range of plants used by females for egg laying. The native species surveyed were *Adesmia spinosissima*, *Adesmia verrucosa*, *Caesalpinia spinosa*, *Dalea pennellii* var. *chilensis*, *Lupinus oreophilis*, and *S. birostris* var. *arequipensis*. The exotic species surveyed were *Medicago sativa* and *Melilotus* sp. A minimum of 20 plants of each species were carefully examined in each month, except for *C. spinosa* because only one plant of this species was found in the study area, which was also examined monthly. Eggs were found only on *S. birostris* var. *arequipensis*: 122 eggs on 300 plants. This suggests that females of *T. zelia andina* are highly selective when choosing their oviposition site.

Secondly, the acceptance of the same above-mentioned plants was determined for recently hatched first instars of *T. zelia andina*. In one test, leaves of all plant species were placed at once in one rearing plastic vial and given to five first instars. In another test, each plastic vial was supplied with a single plant species and given to five first instars. Larval feeding and development to the adult stage occurred only on *S. birostris* var. *arequipensis*; larvae were

not able to feed on the remaining fabaceous plants and died, suggesting a high specialization for the diet.

These data suggest that *T. zelia andina* is highly specific to *S. birostris* var. *arequipensis* in the study site. Additional field observations are necessary in order to verify if this close host plant relationship is observed throughout the range of this butterfly.

Acknowledgments The author would like to thank Gerardo Lamas for taxonomic remarks about *Teriocolias zelia andina*, to Kenji Nishida and one anonymous referee for useful comments and suggestions on a preliminary version of this manuscript, to Lafayette Eaton for kindly checking the English version, and to Darli Massardo and André Victor Lucci Freitas for providing literature. Financial support was obtained from Project DIEXA-UTA 9710-10, from Universidad de Tarapacá.

References

- Braby MF, Nishida K (2007) The immature stages, larval food plants and biology of Neotropical mistletoe butterflies. I. The *Hesperocharis* group (Pieridae: Anthocharidini). *J Lepid Soc* 61:181–195
- Braby MF, Nishida K (2011) The immature stages, larval food plants and biology of Neotropical mistletoe butterflies. II. The *Catastica* group (Pierini: Aporiina). *J Nat Hist* 44:1831–1928
- Braby MF, Trueman JWH (2006) Evolution of larval host plants associations and adaptative radiation in pierid butterflies. *J Evol Biol* 19:1677–1690
- Braby MF, Vila R, Pierce NE (2006) Molecular phylogeny and systematics of the Pieridae (Lepidoptera: Papilionoidea): higher classification and biogeography. *Zool J Linnean Soc* 147:239–275
- Freitas AVL (2006) Immature stages of *Adelpha malea goyama* Schaus (Lepidoptera: Nymphalidae, Limenitidinae). *Neotrop Entomol* 35:625–628
- Freitas AVL (2008) Description of the early stages of *Leucidia* (Lepidoptera: Pieridae). *Trop Lepid Res* 18:30–31
- Hayward KJ (1973) Catálogo de los ropalóceros argentinos. *Opera Lilloana* 23:1–318
- Kaminski LA, Freitas AVL (2008) Immature stages of the butterfly *Magneuptychia libye* (L.) (Lepidoptera: Nymphalidae, Satyrinae). *Neotrop Entomol* 37:169–172
- Peña LE, Ugarte AJ (1996) Las mariposas de Chile. Editorial Universitaria, Santiago, Chile, 359p
- Shapiro AM (1979) The life history of *autodice* and *sterodice* species-group of *Tatochila* (Lepidoptera: Pieridae). *J N Y Entomol Soc* 87:236–255
- Shapiro AM (1991) The biology and biogeography of the legume-feeding Patagonian-Fuegian white butterfly *Tatochila theodice* (Lepidoptera: Pieridae). *J N Y Entomol Soc* 99:251–260
- Wheat CW, Vogel H, Wittstock W, Braby MF, Underwood D, Mitchell-Olds T (2007) The genetic basis of a plant-insect coevolutionary key innovation. *Proc Natl Acad Sci USA* 104:20427–20431