Scientific Note: Courtship behavior and other observations on the biology of Escalantiana estherae (J. Y. Miller) (Castniidae: Castniinae) in Mexico

Oscar Galindo¹, Jacqueline Y. Miller² and Jorge M. González²,³,⁴

¹Lago Zempoala 256 Mz.32 Lt.20 Frace, Geovillas de Terranova, CP.55883, Mexico.
²McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, P.O. Box 112710, Gainesville, FL 32611-2710, USA. E-mail: jmiller@flmnh.ufl.edu
³Austin Achieve Public Schools, Austin, Texas, 78723, USA
⁴Corresponding author, E-mail: gonzalez.jorge.m@gmail.com

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Abstract: Escalantiana estherae is a giant butterfly-moth endemic to Mexico that has been reported from the states of Michoacán and Guerrero. Here we comment on the courtship behavior of this species as observed on a site in Guerrero. The host plant, as well as previously unknown bionomic information, is also noted herein.

Key words: Lepidoptera, bionomics, circinata bamboo, Chusquea circinata

The subfamily Castniinae (Castniidae) is a group of Neotropical moths distributed from Mexico to Chile and Argentina, with some species present on a few Caribbean islands (Miller, 2000; González, 2004, 2008; González & Cock, 2004; González et al., 2006, 2008). Many species are rare, endemic and/or have reduced geographic range, which are some of the reasons why specimens tend to be scarce in insect collections worldwide (Miller, 1986; González, 2003; González & Stüning, 2007; Ríos & González, 2011). Even though Brazil contains the highest number of recorded species of these so-called Giant Butterfly-moths, Mexico is certainly associated with a high diversity and the highest number of endemic species in the Castniidae (Miller, 1986, 2000; González, 2008; González & Hernández-Baz, 2012; González et al., 2008, 2019).

The recently described genus Escalantiana J. Y. Miller, 2019, includes three species (E. escalantei (Miller, 1976), E. chelone (Hopffer, 1857) and E. estherae (Miller, 1976)) restricted to Mexico (Miller, 1976, 1986; González et al., 2019). The last species, Esther’s Giant Butterfly-moth, has been collected in a few localities in the states of Michoacán and Guerrero, and there is a possibility that it could be found in the forests of the state of México (Miller, 1976; González et al., 2019). Escalantiana estherae are medium to large moths with males smaller than females. Females are mainly ashen gray with interspersed fuscous scales and wings marked by two prominent semi-hyaline bands with interspersed white and dark gray-fuscous scales, but males are paler (González et al., 2019). Female hindwings are reddish brown with spatulate basal maculation, mainly ashen gray, while males are brown to dark brown with light brown scales and some scattered cream and gray scales (Miller, 1976; González et al., 2019). A clear distinguishing feature of the males is the presence of patches androconial hairs on the dorsal hindwings (González et al., 2019).

Previously, little was known about the behavior of this species, and most of the known biological information was summarized by González et al. (2019). For several years, the first author (OG) has been able to observe a population of E. estherae in the locality of San Roque, Mochitlán, Guerrero, at an elevation of 1228 m. San Roque is an area of transitional xeric tropical forest with a relative abundance of oaks (Quercus spp., Fagaceae), pines (Pinus spp., Pinaceae), and several woody shrubs associated with these deciduous forests (Fig. 1B).

Even though it was previously suspected that the immature stages of E. estherae might have been associated with certain bromeliads (González et al., 2019), OG has been able to observe larvae of the species feeding on Circinata Bamboo, also known as ‘otate’, or ‘otate chino’, Chusquea circinata (Soderstr. & C.E. Calderón (Poaceae) (Fig. 1A), a plant native to central and southern Mexico. It is widely known that the larvae of Castniidae species are borers associated with monocots (Miller, 1986; González & Fernández Yépez, 1993; González & Cock, 2004; González & Stüning, 2007; Ríos & González, 2011; González & Hernández-Baz, 2012). Nevertheless, there are only a few species of Castniidae known to feed on Poaceae, such as Giant Moth Sugarcane Borer (Telchin licus (Drury)) from Central and South America, and several Australian sun moths (Synemon spp.) (Common & Edwards, 1981; Miller, 1986; González & Fernández Yépez, 1993; Edwards, 1996; González & Cock, 2007; Kallies & Edwards, 2018).

Unlike other Castniidae in Mexico, Esther’s Giant Butterfly-moth emerges and flies during the months of March, April, and May, just before the beginning of the rainy season (González et al., 2019). Males and females were active from 11:00-16:00. Males fly and arrive after 11:00 when the temperature reaches about 25°C in forest clearings surrounded by Circinata Bamboo. Males fly rapidly and are very territorial. They perch at about 0.5-0.7 m high on curving, exposed bamboo branches...
around the edges of the clearing. Once perched, males adopt a typical stegopterous posture, with the forewings widely spread to expose the androconial patches whose long, hairy scales are then raised, presumably releasing pheromones (Fig. 1C). Their cryptic coloration makes them difficult to detect in their natural environment (Fig. 1D). Males will interact vigorously with other males in order to perch in apparently more advantageous locations.

The females fly and generally arrive at the places where the males are perching between 12:00 and 13:00, when the ambient temperature reaches approximately 30°C. Once a female approaches close to a male they both leave the perching site

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**Figure 1.** Natural history details of *Escalantiana estherae* (J. Y. Miller) in San Roque, Mochitlán, Guerrero, Mexico. **A.** Circinata Bamboo, *Chusquea circinata* Soderstr. & C.E. Calderón (Poaceae), the host plant of *E. estherae*. **B.** General view of the forest that surrounds the Circinata Bamboo plants in Mochitlán. **C.** Male of *E. estherae* perched on a Circinata Bamboo stem. Note how the hairy androconial scales are raised (red arrow). **D.** Another perching male demonstrating its cryptic appearance. Note the raised androconial hairy scales (red arrow). **E.** Female laying an egg on the stem of Circinata Bamboo (red arrow). **F.** Egg of *E. estherae* attached to the internal side of the leaf that covers the stem (red arrow). The insert shows the egg almost ready to hatch. **G.** Exuvia of *E. estherae*. The abdominal section is still embedded in the Circinata Bamboo stem.
and fly close to the ground until they encounter an open area to land and mate, with the male on top of the female. Mating lasts between 5 and 10 min, then both individuals fly into heavier vegetation.

Females oviposit directly on stems of Cincinata Bamboo plants from 14:00 to 16:00 (Fig 1E). They select plants with stems of a certain width (20-25 mm diameter), presumably since narrower stems do not permit the larva to bore and fully develop within them. It appears that females select oviposition sites that tend to be covered by dried plant foliage, presumably since it might provide some protection for the egg and potential entry site of the newly hatched caterpillar. Once a suitable plant is chosen by the female, oviposition (n=12 observations) takes place from 0.3-0.75 m above ground. Only one oval egg, about 3-3.45 mm long and 2 mm wide (at the widest section takes place from 0.3-0.75 m above ground. Only one oval egg, about 3-3.45 mm long and 2 mm wide (at the widest section

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LITERATURE CITED


V. Castnia Fabricius and Telchin Hübner. Boletín del Centro de Investigaciones Biológicas (Maracaibo) 37(3): 191-201.

VI. The genus Athis. Diagnosis and comments. Caribbean Journal of Science 40(3): 408-413.


