

Observations on *Athis thysanete* (Dyar, 1912) (Lepidoptera, Castniidae) from Mexico and comparative notes to other species in the family

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ABSTRACT General information on distribution, biology, and behavior on a rare species of the family Castniidae, *Athis thysanete* (Dyar, 1912), endemic from Mexico, is provided. Comparative notes are also given of the Chilean *Castnia eudesmia* Gray, 1838, in an attempt to understand the insect-plant relationships of *A. thysanete*. The note ends with additional remarks on the need for conservation of the habitat of the species.

KEY WORDS Lepidoptera, Castniidae, *Athis thysanete*, *Castnia eudesmia*, *Yucca*, *Puya*.

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INTRODUCTION

Even though specimens of this family are highly appreciated by collectors, the Castniidae remains poorly represented in public and private Lepidoptera collections (González et al., 2008, 2010; Vinciguerra, 2008). At the same time knowledge about Biology, Ecology and food plants is limited with the possible exception of those species of economic importance (González & Stünning, 2007; Miller, 2008; González et al., 2008, 2010). Due to modification and alteration of their habitat, some species in the family might have fragmented and restricted distributions, increasing vulnerability of at least a few of them (Lamas, 1993; González & Stünning, 2007; González et al., 2010; Moraes et al., 2011; Ríos & González, 2011).

Among the 33 known genera of Neotropical Castniidae, *Athis* Hübner is the largest with fifteen species which are distributed from Mexico and throughout Central America, some Caribbean countries/islands, Northern South America and down to Peru, Bolivia and Brazil (Lamas, 1995; González, 2004; González et al., 2010; Vinciguerra & González, 2011; González

& Hernández-Baz, in press). Recent publications dealing with two taxa of this genus have enhanced the knowledge about the distribution of *Athis palatinus staudingeri* (H. Druce) (Vinciguerra & González, 2011), while the other (Vinciguerra, 2011) presents the description of the Peruvian *Athis pirrelloi* Vinciguerra.

Very little is known about many aspects of the eco-ethology of the several species in the genus *Athis* (González, 2004). Adults seem to have selectively diurnal habits. Their larval stages are unknown, as are most host plants on which they feed. Imagoes have triangular-shaped forewings, with two (or three) hyaline spots located in the sub-apical area. The apex of the forewing is either pointed or rounded. The hind wings are commonly brightly-coloured, in contrast with the forewings, which are, usually brownish, cryptic (Miller, 1972, 1986; González, 2004). From a morphological point of view, they seem to be close to the genera *Insigniicastnia* Miller, and *Hista* Oiticica (Moraes et al., 2010).

Mexico is the country in the northern hemisphere with the largest number of species in the family Castniidae, and seven taxa are known

in the genus *Athis* (Miller, 2000; González, 2008; González & Hernández-Baz, 2011). Of those species, *Athis thysanete* (Dyar), is possibly one of the less known in the group (Vinciguerra & González, 2011). This species was originally described based on a female deposited at the USNM in Washington (Dyar, 1912). Interestingly, it is one of few Castniidae endemic to Mexico (Miller, 2000; González, 2008).

The main aim of this note is to present novel information about *Athis thysanete* (Dyar) together with comments and comparisons with another Castniidae.

MATERIALS AND METHODS

The information provided herein comes from material personally collected by one of the authors (PLR), as well as the study of specimens deposited in few entomological collections from England, France, Italy, México, and USA. Codes of the collections where specimens of *Athis thysanete* were found, are as follows: BLGC, Bernardo López Godínez Collection, Mexico; CNIABM, Colección Nacional de Insectos "Dr. Alfredo Barrera Marín", Mexico; MGCL, McGuire Center for Lepidoptera and Biodiversity, Gainesville, Florida, US; NHM, Natural History Museum, London; PLRC, Pedro Lozano Rodríguez Collection, Mexico; RVC, Roberto Vinciguerra Collection, Palermo, Italy; USNM, National Museum of Natural History, Smithsonian Institution, Washington D.C., US. A collection whose owner did not authorize us to be mentioned appears as NA.

EXAMINED MATERIAL. 1 male, México, Puebla, Tehuacán, 27 Mayo 2007, Coll. B. López G. (BLGC); 1 male, idem, 19.VI. 2008, Coll. B. López G. (BLGC); 1 male, idem, 23.V. 2009, Coll. B. López G. (BLGC); 1 male, idem, 15.VII., 2009, Coll. B. López G. (BLGC); 1 male, idem, 18.VI.2010, Coll. B. López G. (BLGC); 1 female, idem, 20.VI.2010, Coll. B. López G. (BLGC); 1 female, idem, 19.V.2010, Coll. B. López G. (BLGC); 1 male, idem, 19.V.2011, Coll. B. López G. (BLGC); 1 male, *thysanete* Dyar, Tehuacán, [Puebla, Mexico], 2438, VI[-1910], CNIABM-2450, Coll R. Müller, (CNIABM); 1 male, *thysanete* Dyar, Tehuacan, [Puebla, Mexico], 9386, VI[-1910], CNIABM-2451, Coll R. Müller, (CNIABM); 1 male, CoahuayaMa[sic]

[Coahuayana], Mich[oacán], México, VIII.1950, Coll. Tarsicio Escalante (MGCL); 1 female, *C. thysanete* ♀, Mexico, Coatepec, [Veracruz], 478, 20.31, Joicey Bequest. Brit. Mus. 1934-120, Type examined by G.T. 1928 belongs to this group (NHM); 3 males, 1 female, México, Puebla, Tehuacán, La Lobera, Altitud: 1678 m, N18° 28.56' W97° 22.34', 25.V.2010 (PLRC); 1 male, Messico, Puebla, Tehuacan, VI.2003, T. Porion leg. (RVC); 1 female, Tehuacán, [Puebla], Mexico, VI.1910, Coll. R. Müller, Type N° 14031, *Castnia thysanete* Type, Dyar (USNM); 1 male, México, Puebla, Tehuacán, VI.2006, Coll. ? (NA); 6 males, idem, 6-8.VI.2008 (NA).

RESULTS AND DISCUSSION

DISTRIBUTION. Most specimens known and mentioned herein, including the type, were collected in the state of Puebla, specifically in the Tehuacán valley region. However, two of the specimens examined were collected in the states of Michoacán (Coahuayana) and Veracruz (Coatepec) respectively (Fig. 1). Males are highly variable in size and females tend to be larger than males (Figs. 2-7).

BIOLOGY AND BEHAVIOR. *Athis thysanete* adults emerge at the beginning of the rainy season and are frequently found between May and June, rarely found in July. Most specimens known to the authors had been collected in *Yucca* tree forests (Izotales) (Fig. 8) found in the xeric shrubland ecoregion of the Tehuacán valley, in the state of Puebla. However, this type of habitat can be also found in the Cuicatlán Valley, and covers other regions of Puebla, Oaxaca, as well as a small section of Veracruz (Miranda & Hernández, 1963; Ramos & González, 1972). The most common plants forming "Izotales" in the Tehuacán valley are *Yucca periculosa* Baker (Asparagaceae). Plant species in the genera *Beaucarnea* and *Nolina* (Asparagaceae) which are phylogenetically close to *Yucca*, can also form groups similar to "Izotales" in Veracruz (Miranda & Hernández, 1963; Ramos & González, 1972). *Hechtia* spp. plants (Bromeliaceae) are frequently found in areas of Izotales.

Here in the Tehuacán valley, adults of *Athis thysanete* fly at mid morning and until early in the afternoon (10:30–13:30), during very sunny and hot days. Males tend to fly fast in straight lines and 1 to 3 meters above ground.

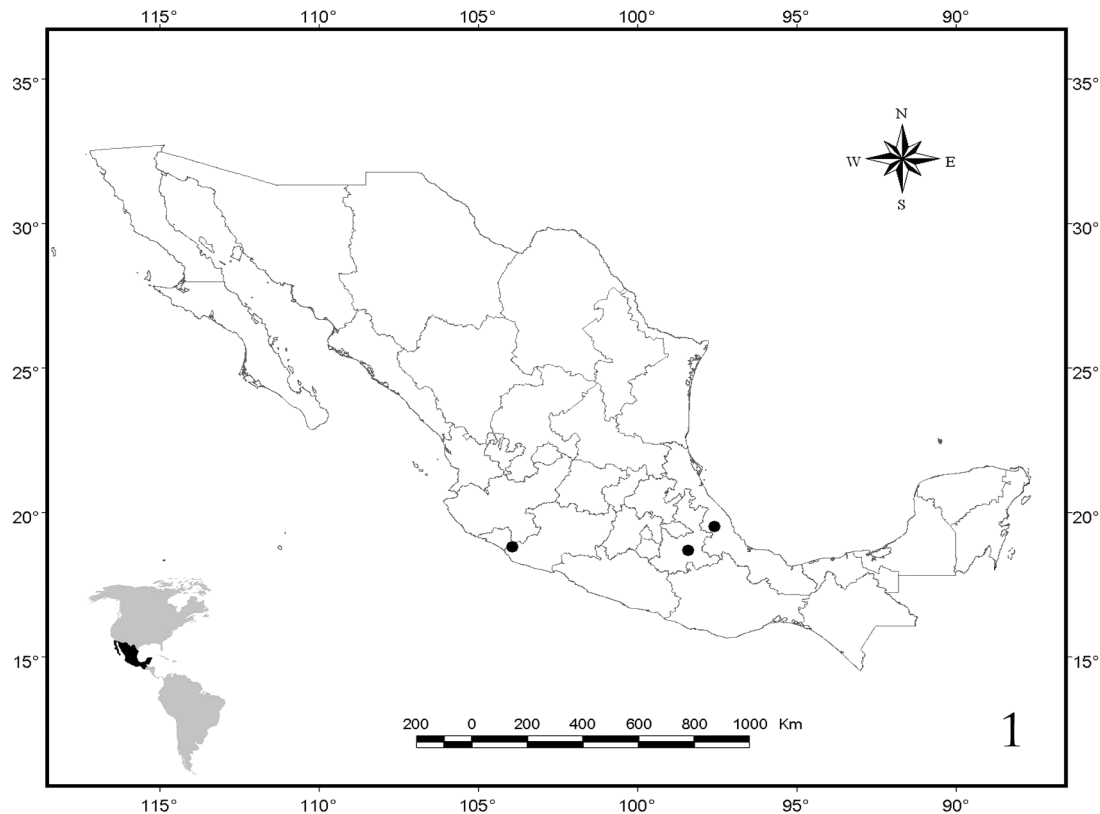


Figure 1. Map of Mexico showing the localities where *Athis thysanete* (Dyar) have been collected.

Curiously enough, we know about an insect-plant relationship found in Chile, South America, which seems to be slightly similar to what we have seen between *Athis thysanete* and *Yucca* plants in Mexico. Larvae of *Castnia eudesmia* Gray, the only Chilean Castniidae, frequently mentioned with the incorrect name “*Castnia psittacus* Molina”, are borers of *Puya* plants (Bromeliaceae) (Reed, 1935; Ureta, 1955; Angulo, 1998; Angulo & Olivares, 1993, 2009; González et al., 2010; Penco, 2011). These plants constitute dense formations (known as Chaguales) in Chile, which are slightly similar to Izotales (*Yucca* tree forests) in Mexico. Adults of the Chilean giant butterfly-moth can be seen from late October to March (since Chile lies deep in the Southern Hemisphere, the seasons fall at opposite times of year from the Northern Hemisphere. Thus, the summer months go from December to March) and they fly during hot and sunny days from mid morning (~10:00) to mid (~15:00) afternoon (Reed, 1935; Angulo & Olivares, 1993; A. Soffia and M. Miranda, pers. comm.). Males are territorial and frequently engage in fights (Reed, 1935). Adults of *C.*

eudesmia feed on flowers of several *Puya* species, as well as plants from different families (Figs. 9-10). They fly zigzagging around *Puya* plants and perch on dry leaves where the cryptic coloration of their forewings allow them to camouflage with the background.

As mentioned for *Castnia eudesmia*, males of *Athis thysanete* seem to be highly territorial and they patrol areas of around 30 m engaging in fights when other males cross their paths. Adults perch on dead branches/leaves of *Yucca* where they wait for passing females to entangle in courtship. Females are not as fast as males but both sexes fly zigzagging around branches/trunks of *Yucca* plants making it difficult to capture them. It appears that the larva of *Athis thysanete* feeds on *Yucca periculosa* Baker plants. One of us (PLR) has collected a few recently emerged specimens among dry leaves of *Yucca* plants where the castniids can easily “hide” thanks to their cryptic forewing color pattern.

FINAL REMARKS. It is unfortunate that so little is known about *A. thysanete*. The information

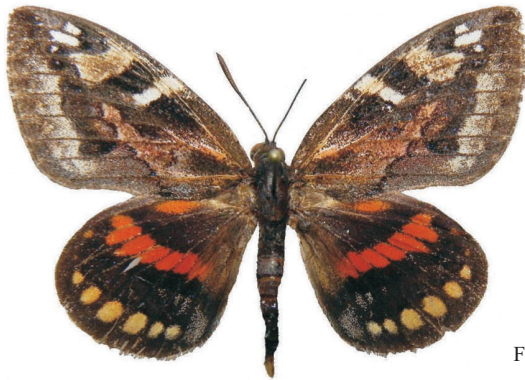


Fig. 2

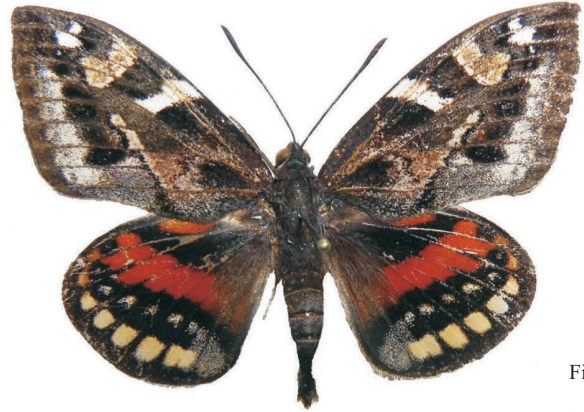


Fig. 3



Fig. 4



Fig. 5



Fig. 6



Fig. 7

Figures 2-7. *Athis thysanete* (Dyar) (Castniidae). All specimens collected in Tehuacán, Puebla, México. Sex of the specimen, collecting date and insect collection where they are deposited (between parentheses) appear after each figure number. Specimens are shown at scale from each other. Fig. 2: female, 19.VI.2008 (BLGC). Fig. 3: female, 23.V.2009 (BLGC). Fig. 4: male, VI.2003 (RVC). Fig. 5: male, 25.V.2010 (PLRC); Fig. 6: male, 20.VI.2010, (BLGC). Fig. 7: male, 29.V.2010 (BLGC).

provided herein suggests that the distribution of the species is larger than originally thought and that the species is highly dependent of the plant formations known as Izotales (*Yucca* tree forests). Thus an effort should be made not only to promote the protection and conservation of such habitat, but to study the relation between such plant formation and this interesting castniid.

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Fig. 8

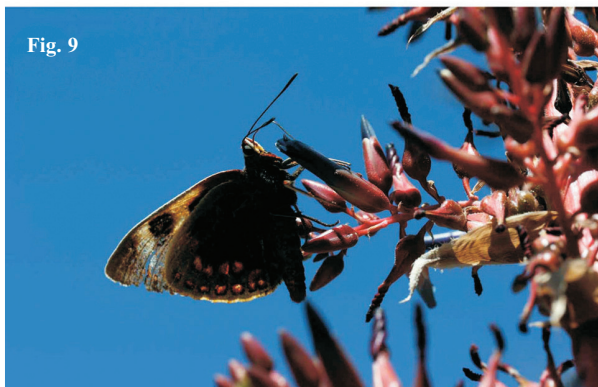


Fig. 9



Fig. 10

Figure 8. Izotal (*Yucca* tree forest) formed by *Yucca periculosa* Baker (Asparagaceae) in Tehuacán, Puebla, México. These plants seem to be the host of *Athis thysanete* (Dyar) (Castniidae) (picture Fernando Hernández-Baz).
Figures 9,10. *Castnia eudesmia* Gray sucking nectar. Fig. 9: from flowers of *Puya venusta* Phil. ex Baker (Bromeliaceae), El Trebol, Santiago Metropolitan region, Chile, December, 2007 (picture Alejandro Soffia). Fig. 10: from flowers of *Cynara cardunculus* L. (Asteraceae), Punta del Lacho, Las Cruces, Chile, December, 2009 (picture Marcela Miranda).

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