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Observations on the genus *Athis* Hübner, [1819] and description of a new species from Peru (Lepidoptera, Castniidae)

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ABSTRACT One new species of the genus *Athis* Hübner, [1819] from Peru (*Athis pirrelloi* n. sp.) is described and illustrated. The male, the preimaginal stages and the host plant are still unknown. Some additional informations about the genus *Athis* Hübner, [1819] and the congeneric species/subspecies are given.

KEY WORDS Lepidoptera, Castniidae, *Athis,* new species, Peru

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INTRODUCTION

The recent studies on Neotropical Castniidae have provided many significant contributions to our knowledge of their eco-ethology, systematics and biogeography. In particular, these in-depth studies have also contributed to extend our knowledge of the Australian genus *Synemon* Doubleday, 1846, with twenty new specific entities currently being described (González et al., 2010), while the data available on the distribution and natural history of the only Asian genus (*Tascinia* Westwood, 1877), made up of four species, remain scant.

The majority of the studies have concerned mainly the distribution of the Neotropical taxa, especially in Venezuela (González, 1998, 1999, 2003; González & Romero, 1997; González et al., 2006), Trinidad and Tobago (González & Cock, 2004), Colombia (González & Salazar, 2003), Mexico (Miller, 2000; González et al., 2008), Peru (Vinciguerra & Racheli, 2006; Vinciguerra, 2008a; 2008b, 2008c), Ecuador (Racheli & Vinciguerra, 2006; Vinciguerra, 2010) and Hispaniola (Vinciguerra, 2008a).

A further contribution has been the description of two interesting endemisms: *Insigniocastnia taisae* Miller, 2007 (Ecuador, Esmeraldas), and *Zegara polymorpha* Miller, 2008, currently known only in Colombia (Otanche). The latter displays a marked polymorphism and is "involved" in complex mimetic chains with *Heliconius wallacei,* the Danaids of the *Lycorea* genus and the heterocera of the *Pericopis* and *Dysschema* genera (*D. unifasciata*, *bivittata*, *formossimia*, and *joiceyi*) (Miller, 2008).

Frequently in the Castniid, in fact, the imago is characterized by bright or aposematic (rarely cryptic) coloration and "mimics" the Lepidoptera of the Papilionidae, Danaidae, Ithomiidae, Hesperiidae, Lycaenidae and Pericopidae families, relationships that would deserve further analyses.

However, the difficulty in locating the Castniid makes it hard to carry out systematic and faunistic studies on them: owing to the behaviours tied to the eco-ethology of the imago (brief flying activity, extreme localization and territoriality, adults only sporadically approaching the ground), the Castniid are in fact heterocera that are notoriously "under-represented" in the museum and private collections (Lamas, 1995; González, 1999; Vinciguerra & Racheli, 2006).

Commenting their capture, Strand wrote (see Seitz, 1913): "*Dans la plupart des cas la capture des Castnies comme papillon est égalem assez difficile; c'est sur les fleurs qu'on la prend le plus facilement. Sur des arbres en fleurs j'ai pris assez*

souvent de bons expl. C. pallasia et quelques decussata. Une fois dans le filet l'insecte se demène si énergiquement que c'est bien rare qu'on russi à rapporter un expl. immaculé".

The *Athis* Hübner, [1819] genus (Figs. 1-10) which the species currently being described is ascribable to includes, according to Lamas (1995), approximately fourteen – fifteen taxa, making it the largest member of the Castniidae family, which includes a total of eighty known species divided into thirty genera (González et al., 2010). The distribution is Neotropical (Mexico, Bolivia, Brazil, Peru, Panama, Venezuela and Trinidad) with three significant endemisms present in the Caraibic area, including *Athis pinchoni* Pierre, 2003 (Martinica), and *Athis axaqua* Fernández-Yépez, 1992 (Margarita Island, Venezuela).

In the Island of Cuba, *Athis* Hübner, [1819], appears to be absent. The *Athis inca orizabensis* (Strand, 1913), specimens preserved at the Field Museum of Natural History (Chicago) as part of the Herman Strecker collection, and labelled as originating from Cuba, were actually introduced accidentally from Mexico with the introduction of vegetable species containing chrysalides (González et al., 2010).

The *Athis* imago has triangular-shaped forewings, with two (or three) hyaline ocelli located in the sub-apical area, the apex is pointed or rounded, while the hindwings are brightly-coloured, in contrast with the forewings, which are, usually, cryptic or dark brown (Figs. 4-10).

The adults appear to have selectively diurnal habits.

From a morphological point of view, the most similar genera are the *Insigniocastnia* Miller, 2007 and *Hista* Oiticica, 1955. The latter has been the subject of a recent systematic review (Moraes et al., 2010), and includes two taxa: *Hista fabricii* (Swainson, 1823), and *H. hegemon* (Kollar, 1839). The *Hista* species, in fact, were originally included by Houlbert in the *Athis* genus and subsequently appended to the *Hista* genus by Oiticica (1955), the founder of the genus, who had christened it *Hista* using the anagram of *Athis*, expressly to highlight the similarities between the two.

Little is known about the eco-ethology of *Athis* and the larval stages are virtually unknown, as are the host plants on which the worms evolve, albeit two recent studies have shed light on its distribution and systematic: the first by González (2004) and concerning Venezuela, and the second on the *inca* "group" (Miller, 1972).

González et al. (2008) have also analyzed a probable hybrid between *Athis inca orizabensis* (Strand, 1913) and *Athis inca inca* (Walker, 1854), proof of the hybridization, occurring in nature, of the two sub-specific entities.

New research has been carried out on the distribution of *Athis fuscorubra* (Houlbert, 1917) (Fig. 9), found in the Island of Trinidad (González & Cock, 2004) and of *Athis palatinus staudingeri* (Vinciguerra & González, 2011 currently in press) discovered in Costa Rica and previously known to exist only in Panama. The taxonomic rank of the latter is unclear since Lamas (1995) considers it a sub-specific entity of *A. palatinus*, while Miller (1995), a valid species. The status of *Athis thysanete* (Dyar, 1912) (Fig. 8), endemic to Mexico and only seldomly captured, is equally uncertain.

Owing to some considerable morphological differences, this taxon is presumably not ascribable to *Athis* (González, personal communication).

Athis pirrelloi n. sp.

EXAMINED MATERIAL. Holotypus female (Figs. 1, 2): Peru, Huànuco, Cueva de las Pavas, 21.III.1998, 650 m, local collector legit, in the author's collection.

DESCRIPTION OF THE HOLOTYPUS. Head and thorax, in the dorsal part, are light brown in colour and light yellow in the ventral part. The antennae are dark brown. Abdomen: in the dorsal part, grey-brown in the first three urites, then yellow-ochre; in the ventral part extremely light yellow. Upper surface. Forewings: Length of the forewing: 52 mm, triangular-shaped wings, straight margin and rounded apex. The cost, in proximity of the apical area, is clearly characterized by a "depression" rendering the aforementioned area considerably elongated. Presence of two hyaline ocelli (one of which is larger than the other), whose boundaries are marked in black, and that are located in the sub-apical area. General coloration: light brown, slightly darker in proximity of the costal area (on the internal margin). Two ocelli (joined) are located: one in the discal area and the other in the costal area. Postdiscal band (wavy): scarcely visible, with four darker spots parallel to the edge. Upper surface. Hindwings: dark brown basal area;

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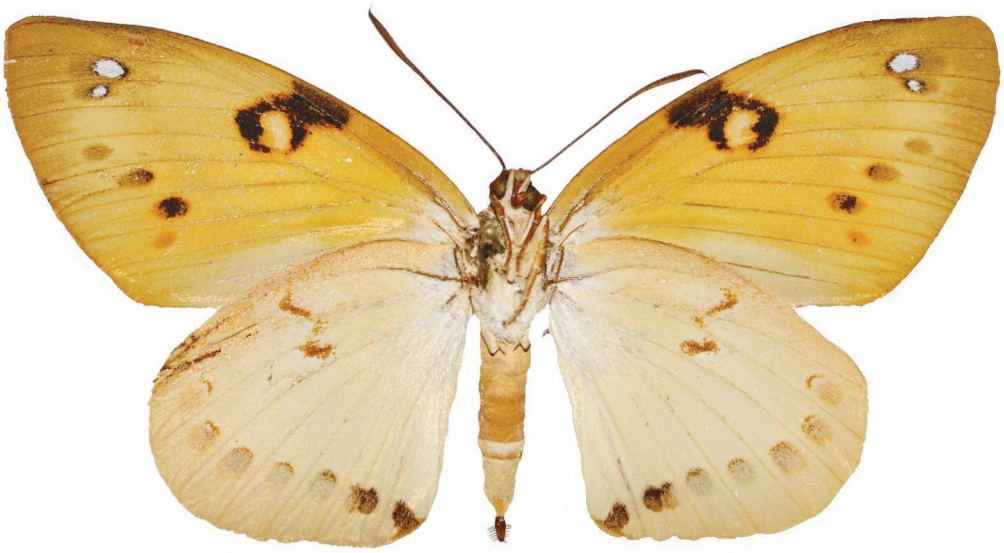

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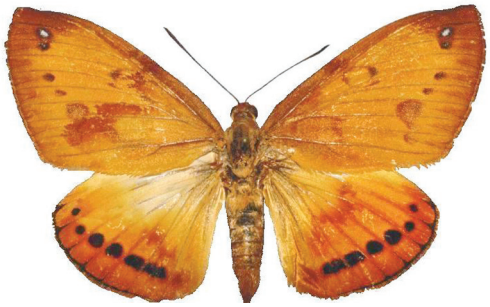
Figure 1. *Athis pirrelloi* holotypus female (recto): Peru, Huánuco, Cueva de las Pavas.
Figure 2. *Athis pirrelloi* holotypus female (verso): Peru, Huánuco, Cueva de las Pavas.



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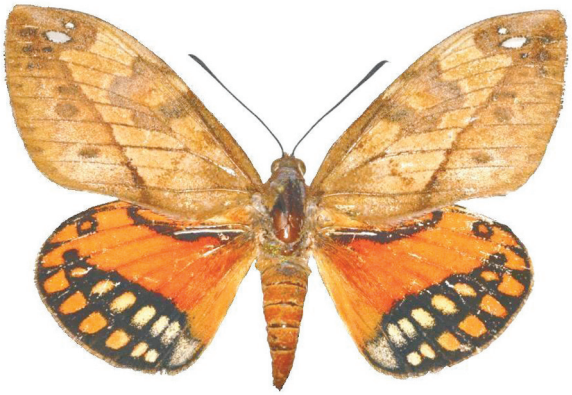

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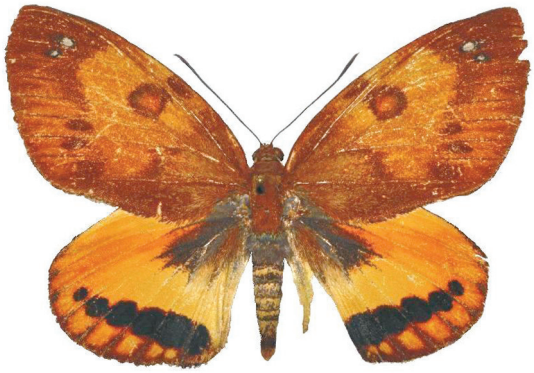

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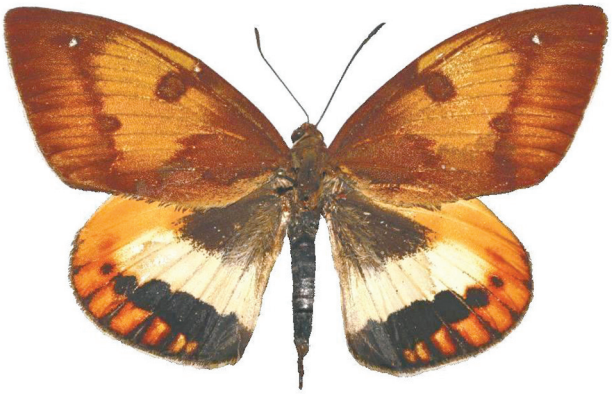

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Figure 3. *Athis rutila* female: Peru, Tingo Maria, Huánuco.
Figure 4. *Athis flavimaculata* male: Mexico, Jalisco, Tuxcacuesco.
Figure 5. *Athis palatinus staudingeri* male: Costa Rica, Corcovado.
Figure 6. *Athis palatinus ferruginosa* female: Peru, Tingo Maria, Huánuco.

extremely light yellow discal and postdiscal areas, marginal and costal areas orange-colored. Eight ocelli (the first two orange and the others dark brown) run parallel to the wing margin.

Lower surface. Forewings: yellow-ochre general coloration, darker compared to the upper surface, one ocellus is located in the discal area and another extends towards the costal area. On the lower surface, the postdiscal band is not visible. Hindwings: Uniform light yellow coloration. The eight ocelli, located on the upper surface, are barely discernible on the lower surface, except for the last two, which are located in proximity of the anal angle.

VARIABILITY. Male and other females are unknown, at present.

ETIMOLOGY. The species is dedicated to Roberto Pirrello (Trapani, December 24th, 1963), eminent surgeon, a Plastic and Reconstructive Surgery specialist, and a researcher and lecturer at the Faculty of Medicine and Surgery of the University of Palermo.

DISTRIBUTION AND ECOLOGY. Found only in its typical locality. The preimaginal stages and the host plant are still unknown.

COMPARATIVE NOTES. *Athis pirrelloi* n. sp. shares morphological and wing pattern similarities with the species of the *palatinus* "group" (Figs. 5-6). Clear analogies can be established with *Athis palatinus staudingeri* (Druce, 1896) (Panama and

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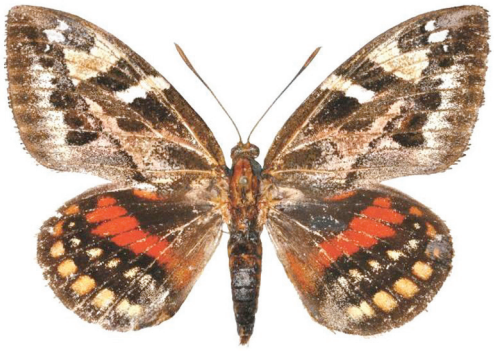

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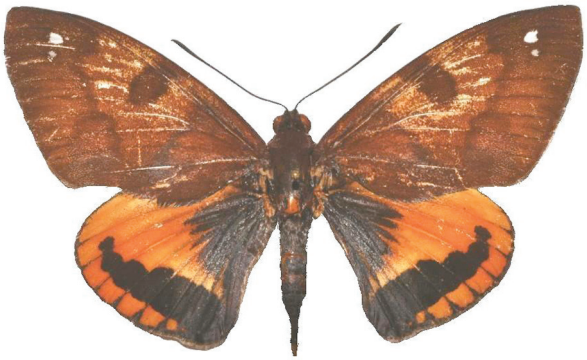

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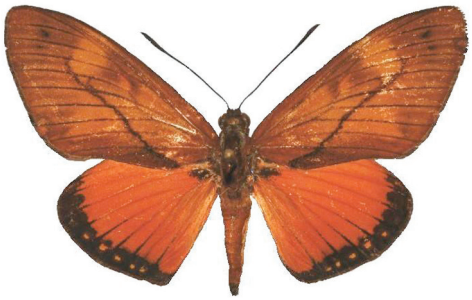

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Figure 7. *Athis superba* female: Peru, Tingo Maria, Huánuco.
Figure 8. *Athis thysanete* male: Mexico, Puebla, Teuacan.
Figure 9. *Athis fuscorubra* male: Peru, Satipo, Prov. Junin.
Figure 10. *Athis therapon* male: Brazil, Santa Catarina, Joinville.

Costa Rica), which it differentiates itself from in terms of colouring and forewing shape.

The cost of *A. pirrelloi* n. sp., in proximity of the apical area, is clearly characterized by a "depression" considerably elongated, a peculiarity distinguishing it from all the other congeneric species and relating it to the female *Athis rutila* (Felder, 1874) (Fig. 3), which displays the same morphological characteristic.

In contrast with the other congeneric taxa, *Athis pirrelloi* has a considerably "elongated" forewing shape, a peculiarity it "shares" with *Athis therapon* (Kollar, 1839) (Fig. 10).

Kollar (1839) highlighted said peculiarity in the description of the *therapon* holotype, writing: "*Alis superioribus elongatis, supra flavescenti - rufis [.....]",* and also: *"Alae superiores haud consuetae plurimarum Castniarum formae, sed magis elongatae ...*".

There are no other taxa with which to establish further comparisons, however, the hairs of the forewings and the study of the wing venation lead us to classify the species under the aforementioned genus.

CONCLUSIONS

Athis pirrelloi constitutes an important naturalistic find worthy of further in-depth studies, which we intend to carry out when other specimens will be made available (extraction of DNA sequences, analysis of the genital

apparatus, study of the biogeographical distribution and of the variability of the species).

The holotype described and depicted below, and the specimens of the *Athis* genus shown, derive entirely from the author's collection.

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