

Scientific Note

A phenodeviant specimen of the rare moth *Catharisa cerina* Jordan (Lepidoptera: Saturniidae: Hemileucinae) with asymmetrical wing venation

Un ejemplar fenovariante del saturnido *Catharisa cerina* Jordan (Lepidoptera: Saturniidae: Hemileucinae) con venas asimétricas en las alas

Paul Smith^{1,2*} and Leigh McMahon²

¹FAUNA Paraguay, Encarnación, Dpto. Itapúa, Paraguay, www.faunaparaguay.com. E-mail: faunaparaguay@gmail.com

²Para La Tierra, Centro IDEAL, Mariscal Estigarribia 321 c/ Tte. Capurro, Pilar, Dpto. Ñeembucú, Paraguay, www.paralatierra.org. E-mail: leighmh_3@hotmail.com

*Corresponding author

ZooBank: urn:lsid:zoobank.org:pub:B1DC31A8-92C5-461B-8036-E6FDAB51E30C

Abstract. A phenodeviant male of the rare saturniid moth *Catharisa cerina* is described, which shows abnormal wing venation on three of its four wings. The male of this species is illustrated and described for the first time. Morphometrical data that distinguishes both sexes is provided.

Key words: Anomaly, Paraguay, sexual dimorphism.

Resumen. Se describe un ejemplar macho fenovariante del saturnido *Catharisa cerina* con venación anormal en tres de sus cuatro alas. El macho de la especie es ilustrado y descrito por primera vez. Se proveen datos morfométricos que ayudan a distinguir los sexos.

Palabras claves: Anomalía, Paraguay, dimorfismo sexual.

Catharisa cerina Jordan, 1911 is a poorly-known saturniid moth in a monotypic genus. It was described on the basis of three females in the Natural History Museum (London), with the vague locality data of "Paraguay". Lemaire (2002) designated a lectotype and illustrated a paratype. Racheli (2005) then documented the existence of two Argentinian specimens in the Staatliches Museum für Naturkunde, Stuttgart, Germany (SMNS 2607 and SMNS 2613) but the locality data for them is confused.

The first confirmed locality for the species as well as the first images of a live specimen were provided by Smith (2009) from Laguna Blanca, San Pedro department, Paraguay (S 23 48' 45.4", W 56 17' 41.7") on 12 October 2006, representing the first report of the species since 1930. Additional specimens were subsequently collected at this same locality and the phenological data was collated by Smith *et al.* (2011). The species has at least two annual flights, one from mid-September to the beginning of October, and a second during March, possibly associated with the onset of rains.

We are aware of a total of 21 specimens in existence, 3 females in the NHM, 2 females in the SMN and 16 (8 females and 8 males) in the Colección Entomológica de Para La Tierra (CIPLT), one female of which (CIPLT-187) was donated to the Museo Nacional de Historia

Recibed 7 May 2018 / Accepted 5 June 2018 / Published online 15 June 2018

Responsible Editor: José Mondaca E.

Natural del Paraguay (MNHNP). Males have not been previously described and are identical to females in coloration, but they have a significantly smaller forewing costa length. Basic morphometry (forewing costa length and forewing height, and body length) of the Laguna Blanca specimens is provided in table 1 based on measurements of the right wing of each specimen. One of the Laguna Blanca specimens, CIPLT 451 is a phenodeviant specimen (Figs. 1-2, 4) and is described below.

Wing venation terminology follows Wooton (1979) with minor modifications as per Kristensen (2003). A schematic drawing of the typical wing venation of *C. cerina* is illustrated in Fig. 3 (CIPLT 442; Laguna Blanca, 1 October 2011), showing all veins from Rs3 onwards. The schematic drawing (Fig. 4) of the phenovariant (CIPLT 451; Laguna Blanca, 29 September 2011) shows considerable modification to the venation of the medial area of both forewings, with the modification asymmetrical between the left and right wings. The left hind wing is normal, but the right hind wing again shows heavy variation from the norm. The specimen is a male of normal size. The phenovariation may be described as follows:

Left forewing: Rs3 and Rs4 near normal. M1 and M2 converge submarginally and immediately diverge again (or cross?) at the margin. M3, CuA1 and CuA2 are normal. A is diverted to the posterior margin.

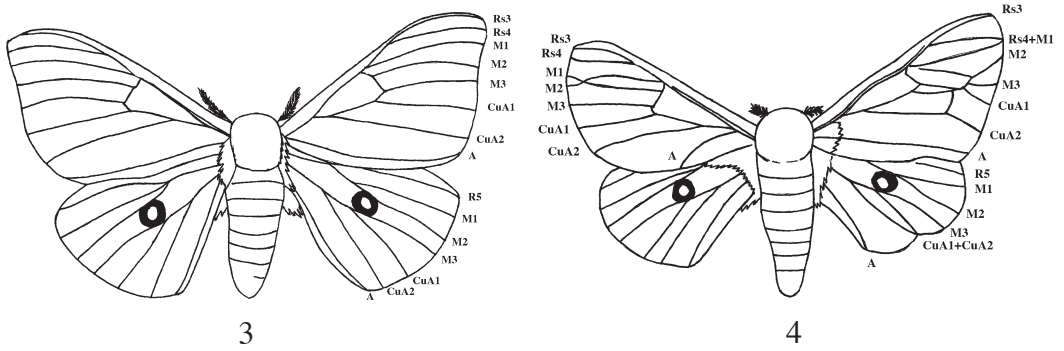
Right forewing: RS4 and M1 converge at the outer margin. M2 and M3 are strongly disrupted with M3 and CuA1 fusing medially and both fusing with M2 postmedially, before diverging again abruptly submarginally with M2 being strongly deflected upwards and CuA1 deflected downwards so that they reach the outer margin at approximately the expected position. CuA2 is joined with CuA1 medially by an extra vein, and then deflects downwards towards the outer margin. A is normal.

Right hind wing: M1 merges with M2 distal to the ocellus. M3 and CuA1 normal, but CuA2 fuses with CuA1 at the margin, where the margin is distinctly pinched. A is normal.

We refrain from speculating on the potential causes of the phenodeviance in this specimen, but note that previous studies have shown that environmental stresses can result in shape changes in at least some species of Lepidoptera (Balazuc 1956; Hoffman *et al.* 2002), whilst inbreeding has been suggested as a cause of similar malformations in Diptera (Rasmuson 1960). Given the high levels of habitat disturbance in the buffer zone of the reserve area and the highly localised distribution and rarity of this poorly known moth, both of these factors must be considered possible contributors to the malformation observed in this case.



Figures 1-2. 1. Dorsal side of phenodeviant specimen of *Catharisa cerina* CIPLT 451. 2. Ventral side of phenodeviant specimen of *Catharisa cerina* CIPLT 451. Scale: 2 cm.



Figures 3-4. 3. Schematic drawing of CIPLT 442 collected at the same locality, showing normal wing venation of the species. 4. Schematic drawing of CIPLT 451 showing phenodeviant wing venation.

Table 1. Morphometrics of sexed *Catharisa cerina* specimens from Laguna Blanca, San Pedro department Paraguay in the Colección Entomológica de Para La Tierra (CIPLT).

Specimen number	Sex	Forewing costa (mm)	Forewing height (mm)	Head and body length (mm)
CIPLT-E 443	M	25	14	19
CIPLT-E 450	M	22	16	17
CIPLT-E 451	M	27	18	22
CIPLT-E 748	M	28	18	23
CIPLT-E 1753	M	29	15	23
CIPLT-E 1764	M	27	17	20
CIPLT-E 1881	M	23	14	20
CIPLT-E 4826	M	29	18	23
Mean (SD)	M	26.1 (+/- 2.5)	16.3 (+/- 1.8)	20.9 (+/- 2.2)
CIPLT-E 170	F	31	20	18
CIPLT-E 188	F	33	18	23
CIPLT-E 189	F	34	18	28
CIPLT-E 442	F	33	21	22
CIPLT-E 452	F	35	19	Damaged
CIPLT-E 2444	F	33	19	23
CIPLT-E 3207	F	32	23	21
Mean (SD)	F	33 (+/- 1.3)	19.7 (+/- 1.8)	22.5 (+/- 3.3)

Acknowledgements

Many thanks to the director of PLT Karina Atkinson and her museum curator Jeremy Dickens for access to the collection and assistance with specimens. Ian Kitching (NHM) was as usual very generous in sharing his expert knowledge. PS is grateful to the PRONII program of CONACYT for support.

Literature Cited

- Balazuc, J. (1956)** Observations tératologiques chez les Lépidoptères. *Bulletin de la Société Entomologique de France*, 61: 67-74.
- Hoffmann, A.A., Collins, E. and Woods, R. (2002)** Wing shape and wing size changes as indicators of environmental stress in *Helicoverpa punctigera* (Lepidoptera: Noctuidae) moths: Comparing shifts in means, variances, and asymmetries. *Environmental Entomology*, 31: 965-971.
- Jordan, K. (1911)** Descriptions of new Saturniidae. *Novitates Zoologicae*, 18: 129-134.
- Kristensen, N.P. (2003)** Skeleton and muscles: adults. In: Kristensen, N.P. (Ed.), Lepidoptera, Moths and Butterflies. Vol. 2. Morphology, physiology, and development. *Handbook of Zoology, Vol. IV. Arthropoda: Insecta. Part 36*. Walter de Gruyter, Berlin & New York, pp 39-131.
- Lemaire, C. (2002)** The Saturniidae of America: Les Saturniidae Américains (=Attacidae). Hemileucinae. Goecke and Evers, Keltern, Germany. 688 pp.
- Racheli, L. (2005)** Notes on further female specimens of *Catharisa cerina* Jordan 1911 (Lepidoptera: Saturniidae: Hemileucinae). *Entomologische Zeitschrift*, 115: 209.
- Rasmuson, M. (1960)** Frequency of morphological deviants as a criterion of developmental stability. *Hereditas*, 46: 511-535.
- Smith, P. (2009)** Finding Cath. *Southern Lepidopterists News*, 31: 23-25.
- Smith, P., Rios, S., Atkinson, K., Mielke, O. and Casagrande, M. (2013)** New Paraguayan specimens and first confirmed phenological data for *Catharisa cerina* Jordan 1911 (Lepidoptera: Saturniidae). *Revista Brasileira de Biociencias*, 11: 349-351.
- Wooton, R.J. (1979)** Function, homology and terminology in insect wings. *Systematic Entomology*, 4: 81-93.