

# DESCRIPTION OF A GYNANDROUS SPECIMEN OF A PSEUDATTERIA SPECIES (LEPIDOPTERA, TORTRICIDAE)<sup>1)</sup>

BY

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Among the material of the Neotropical genera *Atteria* Walker, *Idolatteria* Walsingham, and *Pseudatteria* Walsingham, borrowed for a taxonomic study from the British Museum (Natural History), a series of specimens of the *Pseudatteria cantharopa* relationship attracted the special attention of the author of this paper. In this series two males and two females from Peru (Chachopoyas, Departamento Amazonas, 1889, M. DE MATHAN) showed a close resemblance to *P. cantharopa* (Meyrick), differing only in a few details from the figure of the type-specimen of this species published by CLARKE (1958, pl. 97, fig. 2). A discussion of these specimens does not belong to the scope of the present paper and will be presented in a special revision of the *Pseudatteria* species, now in preparation. One more specimen of the same systematic relationship, also collected in Peru, differed so much from the above mentioned specimens that the present author supposed it to be a new species. The distinction consisted merely in the shape and distribution of the wing markings, whilst the color of these markings and the ground color of the wings were almost the same in all of the examined specimens.

The external examination of this single striking specimen (pl. 8, fig. 2) showed that its antennae and frenulum were typically masculine. Also the abdomen, somewhat shriveled and deformed, seemed to be that of a male. A tuft of long coremata hairs (two such tufts, one on each side of the eighth abdominal sternite, are typical of the males of the genus *Pseudatteria*), situated on a swollen base, was seen at the right side of the caudal portion of the abdomen. The corresponding swelling at the left side was located slightly more cephalad and lacked hairs which might be supposed to be broken off or hidden in a thickened, corrugated fold adjacent to this swelling. Although no valvae were seen, it might be assumed that they were deeply retracted into the abdomen. The dissection of the abdomen, preceded by a two days maceration in sodium hydroxide, showed the inadequacy of the external examination and explained the abnormalities observed. The specimen proved itself to be a gynander with the characters of the two sexes distinctly expressed in the genitalia.

The male characters were found as predominating in this specimen (pl. 7; pl. 8, fig. 1), and it might probably be more correct to call the specimen an intersex than a real gynander. Unfortunately, such important parts of the reproductive system as the gonads and their ducts became destroyed in the process of maceration,

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and it appeared to be impossible to solve this problem definitively. DOBZHANSKY (1953, p. 24) wrote that the intersexes "are not regular constituents of the species populations; their norms of reaction have not become consolidated in the evolutionary development, and their phenotypes are highly variable." Thus, we may assume that the present abnormal *Pseudatteria* specimen also does not correctly reproduce all the characters of the normal specimens of the species to which it belongs. As yet we do not exactly know how far the modification of the genitalia in the Lepidoptera can go in the cases of intersexuality and gynandromorphism, but from several cases described and figured by KUSNEZOV (1916) we may conclude that the "halved" gynandrous genitalia (as in our *Pseudatteria* specimen) mostly show some characters satisfactory for recognition of the species to which the owners of these genitalia belong. The fact that the separate parts of the genitalia of our *Pseudatteria* gynander are distinct from those of all known species of this genus (the above mentioned specimens of the *cantharopa* relationship included) speaks rather in favor of an assumption that the present gynander (or intersex) may belong to a new, not yet described species. It would nevertheless be imprudent to establish a new species on the basis of a gynander. The author has therefore decided to limit himself in this paper to a detailed morphological description of this specimen, leaving the solution of the taxonomic problem to the future.

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#### DESCRIPTION

Specimen examined: Gynander (genitalia on slide No. 6605), Peru (M. DE MATHAN); deposited in the British Museum (Natural History).

Antennae sparsely setose, rather thin, black with a blue-violet iridescence. Labial palpi concolorous with antennae, orange at base and on a part of inner surface of second segment. Head orange, prismatic blue at middle. Thorax prismatic blue-green; tegulae with some scattered orange scales. Abdomen brownish black with bluish and violet iridescence, somewhat shrunken and deformed. Wing venation normal of the genus *Pseudatteria*. Forewings orange-yellow with prismatic blue markings edged with black and occupying most of wing surface; their arrangement, slightly asymmetrical at right and left forewing, is as follows: two small spots at extreme wing base, one closer to costa, other to dorsum, both in a blackish area; a larger costal spot slightly externad from wing base; a broad transverse fascia with undulate margins; it starts at basal quarter of costa and reaches dorsum, and is narrower at costa and dorsum; a second similar fascia at about middle of wing, narrower at costa and dilated at dorsum; one costal and one dorsal spot in interspace between these fasciae, the dorsal spot touching both fasciae on left wing, and only the basal fascia on right wing; a large, irregularly shaped spot in external wing area; it narrowly starts at costa, is slightly bent externad on left wing and more round on right wing; a costal spot in interspace between this large spot

and middle fascia; a row of nine spots along external portion of costa, wing apex, termen, and tornus; most of these spots are confluent among themselves, especially on right wing; two (on right wing three) lowest spots of this row touch large spot situated, as already mentioned, in external wing area; a mid-sized spot, on left wing only, situated between this large spot and two of apical spots and touching all of them; cilia orange-yellow, violet-black towards terminal and tornal spots; length of forewings — 14 mm. Hind wings orange-yellow with violet-brown markings, as follows: dark basal area followed by a broad transverse band composed of three spots fused among themselves and basal area, and leaving orange-yellow ground color seen as a short line under base of costa and two larger spots, one before origin of vein  $Cu_2$ , other at dorsum; externad from above transverse band, on left wing, another band consisting of a small spot on costa, a larger spot on disc, and a streak reaching tornus, all of them connected to each other; on right wing, instead of this band, an elongate discal spot connected with a smaller external spot and an oblique, arcuate streak leading from preceding band to tornus and preceded by a spot on dorsum; remaining markings of both hind wings consist of a preapical costal spot, an elongate apical spot slightly separated at its middle from termen, and three spots at tornus; on left wing, these three spots are connected internally among themselves and a small spot corresponding to the above mentioned spot on left wing, connected there to an elongate discal spot at wing middle; on right hind wing, fusion of these three terminal spots is more complete: cilia concolorous with wing ground, brown-violet towards terminal and other marginal spots.

Even before dissection, during the examination of the macerated abdomen, it was detected that the genitalia consist of two separate portions. The caudal portion (pl. 7) was located close to the tip of the abdomen and showed mixed characters of the two sexes. The other portion (pl. 8, fig. 1) was located more cephalad, in the area of the eighth and seventh abdominal segments, and consisted only of some masculine parts of the genitalia. These two portions were connected to each other by means of an intersegmental membrane. A detailed examination of these two portions of the genitalia became possible after the dissection of the abdomen. Much attention was paid to the preservation of the original position of separate parts.

The right side of the caudal portion of the genitalia is typically masculine. It consists of the right half of a vinculum (*b*), quite completely developed and bearing a socius (*e*) and the right half of the gnathos (*d*). The tegumen (*a*) is represented by a rather broad plate with a short, narrow process (?uncus) at the left side. The saccus (*c*) is also completely developed, although distinctly displaced to the right. The right portion of the intersegmental membrane 8—9 is roundly swollen and bears a corema, being a tuft of long, dense hairs seen on pl. 7 as a deeply black area at right side of photograph. The left side of the caudal portion of the genitalia is feminine. It consists of an elongate papilla analis (*f*) with a rather long apophysis posterior (*g*), and a large, hollow body (*h*) which undoubtedly represents a misshaped bursa copulatrix. The caudal margin of this body is formed by a weakly sclerotized ring (*o*), probably around the ostium bursae. Laterad from this ring there are two stronger sclerotized, angularly shaped

pieces (*p*), probably some elements of an underdeveloped sterigma connected to the left apophysis anterior (*i*). The cephalic portion of the hollow body is covered by some unequally strong sclerotization (*q*), looking somewhat mottled. It is situated over the cephalic half of an elongate, sclerotized plate (*r*) which undoubtedly is nothing else than a signum located on the dorsal side of the bursa copulatrix.

The cephalic portion of the genitalia is entirely masculine and consists of two valvae (*m*) and the aedoeagus (*k*) with adjacent parts of a vallum penis. The valvae are shortly ovate, thickened, and probably misshapen, without any noticeable structure on their surface. The aedoeagus seems to be normally developed, and ends into a long, broad distal process (*l*). A semicircular plate (*j*) dorsad from this process is the dorsal covering of the vallum penis. It is remarkable that the membranous portion of the penis consists of a swollen, blind sac (*n*).

### DISCUSSION

In a paper, dealing with some cases of the gynandromorphism in the Lepidoptera, KUSNEZOV (1916) made some interesting morphological conclusions about the possible homology of the separate parts of the male and female genitalia. One of these conclusions concerns the homology of the uncus, in male, and the papillae anales, in female, which evidently replace one the other in the gynandrous genitalia. In our case of the *Pseudatteria* gynander this theory of KUSNEZOV finds its confirmation, but it seems very probable that some elements of the masculine socii (and perhaps also of the tegumen) might have been involved in the formation of the papillae anales, at least of their cephalic portions. The gnathos seems to be homologous to the apophyses posteriores. There is no satisfactory basis for further homologizing, but it is nevertheless important to mention that, in our gynander, the masculine saccus (an invagination of the intersegmental membrane 8—9; cf. KUSNEZOV, 1915, p. CLXIII) has been found almost on the same level as the feminine ostium bursae which in the genus *Pseudatteria* is located between the eighth and the ninth sternites. There are therefore some reasons to believe that bursa copulatrix (at least in its caudal portion) also is an invagination of the same intersegmental membrane (cf. SCHWANWITSCH, 1949, p. 707), and perhaps an organ homologous to the saccus in the male. Intrusion of the ostium bursae into the area normally occupied in the male only by the saccus, caused in our *Pseudatteria* gynander (probably very early in the process of the formation of the genitalia) some expansion of the membrane connecting the valvae with the vinculum. The valvae had thus appeared removed from the zone of the intersexual modification of the genitalia and developed themselves as an independent masculine structure located (together with the aedoeagus) more cephalad than the remaining parts of the genitalia.

### REFERENCES

- CLARKE, J. F. Gates, 1958. Catalogue of the type specimens of Microlepidoptera in the British Museum (Natural History) described by Edward Meyrick. Vol. 3, London, (2) + 600 pp. (incl. 298 pls.).

- DOBZHANSKY, Th., 1953. Genetics and the origin of species. 3rd ed., New York, XI + 364 pp.
- KUSNEZOV, N. J., 1915. Insectes lépidoptères (Insecta Lepidoptera). Vol. 1, fasc. 1. Faune de la Russie, Petrograd, CCCXXXVI pp.
- KUSNEZOV, N. J., 1916. Contributions to the morphology of the genital apparatus in Lepidoptera. Some cases of gyandromorphism. Rev. Russe Ent., vol. 16, p. 151—191.
- SCHWANWITSCH, B. N., 1949. Kurs obshchei entomologii [Textbook of general entomology]. Moscow & Leningrad, 900 pp.

## ABBREVIATIONS TO PLATES 7 AND 8

a — tegumen and uncus; b — vinculum; c — saccus; d — gnathos; e — socius; f — papilla analis; g — apophysis posterior; h — bursa copulatrix; i — apophysis anterior; j — dorsal covering of vallum penis; k — aedoeagus; l — its distal process; m — valvae; n — membranous portion of penis; o — sclerotized ring around ostium bursae; p — supposed elements of sterigma; q — sclerotization of bursa copulatrix; — r signum



Obraztsov, Nikolaus S. 1962. "Description of a gynandrous specimen of a *Pseudatteria* species (Lepidoptera, Tortricidae)." *Tijdschrift voor entomologie* 105, 233–237.

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