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Opisthobursa josephinae, a new troglobitic planarian from Chiapas, Mexico

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Zoologia. — Opisthobursa josephinae, *a new troglobitic planarian from Chiapas, Mexico* (*). Nota (**) del Socio MARIO BENAZZI.

RIASSUNTO. — Nel corso della 3ª spedizione zoologica Lincea in Messico (1973) è stata raccolta in un pozzo presso S. Cristóbal de Las Casas una planaria oscuricola appartenente al genere *Opisthobursa* Benazzi, 1972, sicuramente distinta da *O. mexicana* Benazzi, 1972; essa viene descritta sotto il nome di *Opisthobursa josephinae* n. sp.

La scoperta di questa nuova specie, che a differenza di *O. mexicana* vive a notevole altitudine, pone un interessante problema in riferimento alla presumibile origine marina del gen. *Opisthobursa*.

INTRODUCTION

The third zoological mission to Mexico, sponsored in 1973 by the "Accademia Nazionale dei Lincei", was also fruitful with regard to planarian collections. My studies on the freshwater species are in progress and will be published in Part III of "Subterranea Fauna of Mexico" edited by our colleague Prof. P. Pasquini.

I think, however, it is useful to anticipate the description of a new hypogeous species belonging to the genus *Opisthobursa*, which is added to *O. mexicana* Benazzi, 1972 collected during the 2° expedition in Mexico [1, 3].

It is necessary to recall that *O. mexicana*, although living in the freshwaters of a cave (Las Grutas de Coconá, state of Tabasco), strongly differs in the morphology of the copulatory system from freshwater triclads (Tricladida Paludicola or Probursalia) whereas it resembles the Maricola. As a matter of fact, the copulatory bursa lies posterior to the penis and opens to the exterior with a ventral pore, and the bursal stalk runs frontwards ventrally. Therefore, Benazzi and Giannini [3] after a complete description of the species, including also karyological and biological data, reach the conclusion that *Opisthobursa mexicana* must be attributed to the Tricladida Maricola and precisely to a new family called Opisthobursidae (1).

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(**) Presentata nella seduta del 15 novembre 1975.

(1) In December 1972 Mitchell and Kawakatsu [4] gave the description of this planarian, collected in the same Mexican cave, and named it *Dimarcus villalobosi* n. gen. n. sp. Also these Authors attributed the planarian to a new family (Dimarcusidae) of the Maricola and admitted that *O. mexicana* may be referable to *D. villalobosi*; however, they maintained that the preliminary description given by me in March 1972 was insufficient to diagnose the species. I have [2] already demonstrated the validity of the name *Opisthobursa mexicana*, therefore *Dimarcus villalobosi* is a synonym.

DESCRIPTION OF *Opisthobursa josephinae* [2] n. sp.

After having recalled the data necessary for the present paper I pass to the description of the new species. The specimens, 12 in all, come from " Pozza Casa Bell ", S. Cristóbal de las Casas (Chiapas); *leg.* Argano, Sbordoni and Zullini, 2nd and 3rd October 1973. Some individuals, which from the external examination appeared sexually ripe, are of considerable size, reaching about 20 mm in length and 2 mm in width. Owing to the lack of live specimens the external morphology cannot be defined precisely, however, the head is not clearly distinct and appears roundish without sensory areas and auricular edges. Histologically, there is evidence of an adhesive slit at the anterior end. The planarian is eyeless and unpigmented, therefore it is a typical troglobit. The mouth opens at about two thirds from the anterior extremity and the gonopore almost in the middle of the last quarter of the animal. Behind the gonopore lies the copulatory bursa, about 2 mm in length and clearly evident even in the specimens *in toto*.

With regard to the internal morphology I must point out that in the specimens examined so far the ovaries have not been found and the testes, represented by a dozen elliptical follicles situated dorsoventrally, are limited to the posterior end of the body: these conditions might depend on the phase of the sexual cycle. Vitellaria are present in the entire length of the body.

The sperm ducts behind the pharynx show a remarkable development and before entering the penial bulb enlarge to form great spermiducal vesicles; they are packed with spermatozoa.

The penis bulb is very large but its shape is not clearly defined; it is mainly formed by large secretory cells and few muscolar fibres; there are many eosinophilous glands. The bulbar cavity is wide and has a triangular outline; its wall consists of a cylindrical epithelium. The penis papilla of conical shape is well developed and protrudes into the genital atrium; therefore the ejaculatory duct is rather long. The genital atrium is lined with a tall, glandular epithelium.

The copulatory bursa, situated just behind the penis (Tav. I, fig. 1), is greatly developed both in length and height, occupying the whole width of the body. The bursal cavity is lined with the usual columnar epithelium with phagocytic cells, which forms many characteristic folds dorsoventrally arranged (Tav. I, fig. 2). Inside the bursa a spermatophora is present. At its posterior extremity the bursa opens to the exterior with a rather large pore ventrally located (Tav. II, fig. 3).

The bursal stalk is a short narrow duct lined with a cuboidal epithelium: it runs ventrally and enters the genital atrium dorsally to the gonopore (Tav. II, fig. 4).

(2) I have named this species in honor of my wife Giuseppina Lentati.

The two ovovitelline ducts, surrounded by a large mass of eosinophilous cells, join before entering a short dorsal diverticulum of the bursal stalk.

Holotype. A set of serial sagittal sections on 7 slides preserved in Benazzi's collection at the Department of Zoology, University of Pisa, Italy.

SOME FINAL CONSIDERATIONS

There is no doubt that the new species belongs to the genus *Opisthobursa* and that it is closely related to *O. mexicana*, as shown by the morphologic characteristics of the copulatory system. The two species, however, are clearly differentiated. Above all the much larger size of *josephinae* (about 20 mm in length compared with the 7 mm of *mexicana*) certainly cannot be attributed to racial differences. Moreover, in *josephinae* are not evident the sensory areas present at the anterior end of *mexicana*. There are also differences in the penis morphology and in the structural organization of the bursal epithelium. The bursal stalk is relatively shorter in *josephinae* than in *mexicana*. The different distribution of the testes in the two species requires, on the contrary, confirmation as already stated.

The discovery of a new species of *Opisthobursa* poses an interesting question. As recalled in the Introduction, I and my pupil Giannini attributed *Opisthobursa mexicana* to the Maricola, although it is a freshwater animal unable to live even in diluted sea-water. Therefore this planarian would represent a marine relict and this hypothesis is supported by the fact that among the troglobitic species of different animal groups the marine origin of many of them is well documented. Obviously the same hypothesis may be advanced for *O. josephinae*; I must, however, point out that its marine origin implies that the event took place in very different chorological conditions. In fact, Las Grutas de Coconá in which *O. mexicana* lives is located at about 65 m above sea-level in the tropical rain forest area [5] and according to Dr. Sbordoni (*in litt.*) most of the Mexican caves where marine relicts dwell are located at a low elevation. Mitchell and Kawakatsu (*loc. cit.*, p. 14) have expressed the same view: "No problem is posed by the occurrence of a "marine" planarian in the freshwaters of La Grutas de Coconá. This planarian is simply a marine relict, which probably colonized the cave waters directly from marine waters with recession of the sea from this low-lying part of México".

On the contrary, S. Cristóbal de la Casas near which *O. josephinae* has been found is situated at 2,115 m in the temperate Pine–oak forest [5]. The presence of a marine relict at this height cannot but cause some perplexity because it implies geological events which should be adequately documented.

References

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[2] M. Benazzi (1973) - *Priority of the name* Opisthobursa mexicana *Benazzi, 1972 over* Dimarcus villalobosi *Mitchell and Kawakatsu, 1972*, « Rend. Acc. Naz. Lincei », ser. VIII, *54*, 133–134.

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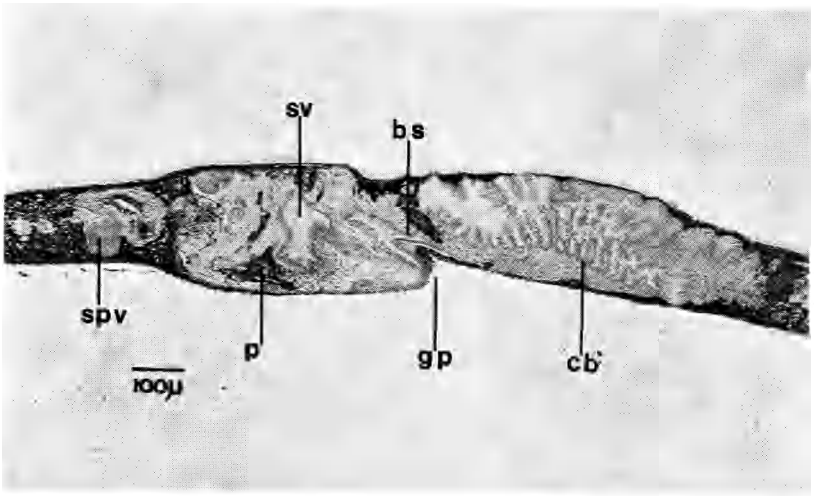

Fig. 1. – Sagittal section of the copulatory system: *bs*, bursal stalk; *cb*, copulatory bursa; *gp*, genital pore; *p*, penis; *spv*, spermiducal vesicle; *sv*, seminal vesicle.

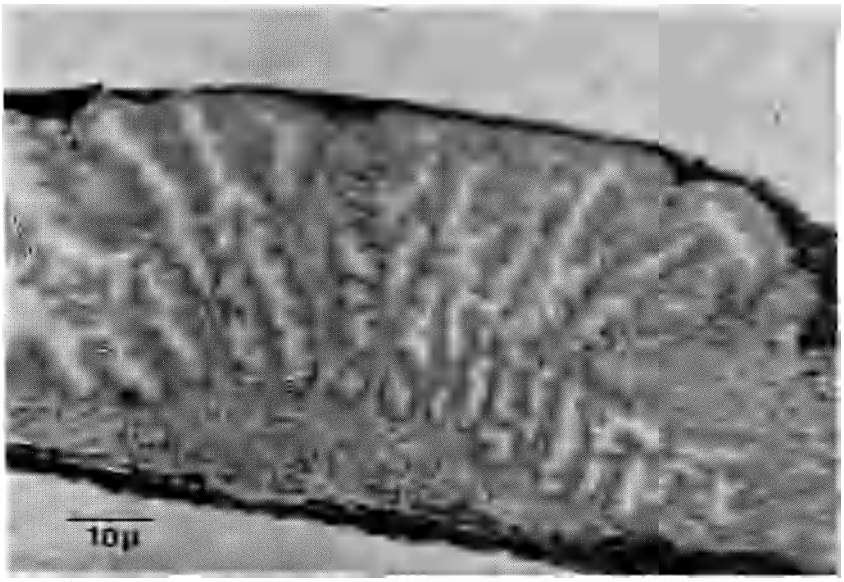

Fig. 2. – Copulatory bursa showing the peculiar epithelial folds.

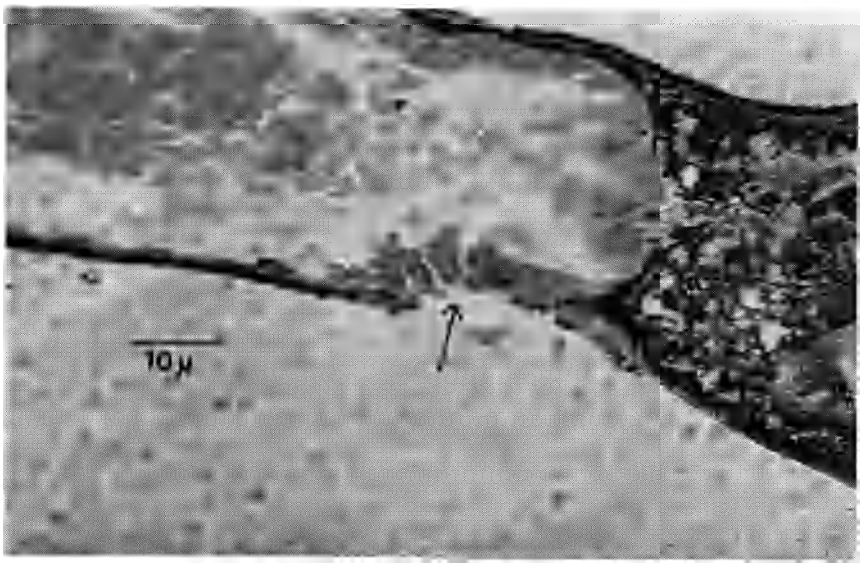

Fig. 3. – Copulatory bursa showing the bursal pore (arrow).

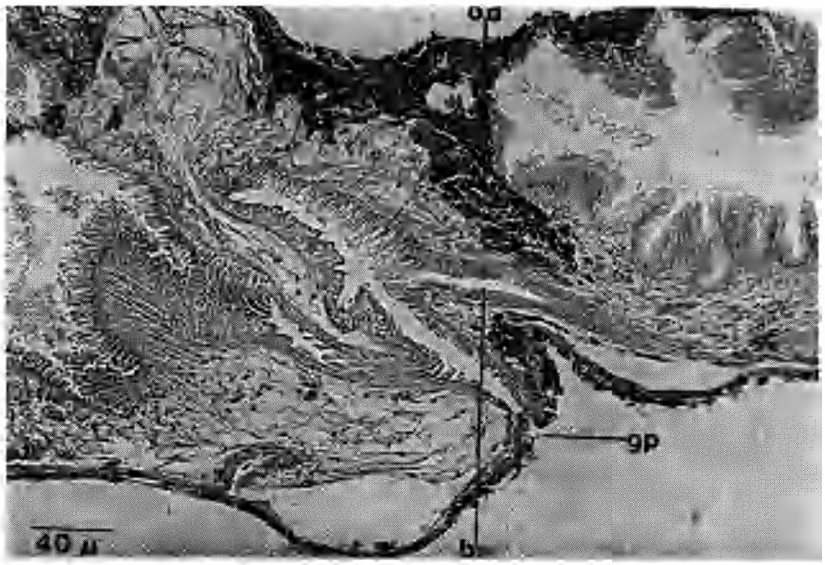

Fig. 4. – Sagittal section showing especially the bursal stalk (*bs*), its opening into the genital atrium and its dorsal diverticulum; *gp*, genital pore; *od*, ovovitelline duct.