

BIPHALLY IN *BIOMPHALARIA GLABRATA* (SAY, 1818) (PULMONATA, PLANORBIDAE)

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We describe a biphallic specimen of Biomphalaria glabrata (Say, 1818) from the municipality of Caeté, State of Minas Gerais, Brazil. The conformation of the two penial complexes, with a common genital pore on the left side, suggests that both have copulatory capacity. Based on a review of the literature this type of biphally appears to be reported for the first time in planorbids.

Key words: *Biomphalaria glabrata* Planorbidae biphally

While anesthetizing and fixing planorbids collected from the field for species identification by dissection, we encountered a biphallic specimen of *Biomphalaria glabrata* (Say, 1818).

Besides those of the shell, the most frequently described anomalies in planorbids are those of tentacles and eyes (Richards, 1969), and aphally (Larambergue, 1939; Paraense & Deslandes, 1957; Magalhães, 1965; Brisson, 1972; Paraense, 1984).

The biphallic specimen described here originates from a group of 25 *B. glabrata*, of diameter between five and 12 mm, collected on 10 March, 1992, in the Carrapato stream in the suburb of Campestre, municipality of Caeté, State of Minas Gerais, Brazil.

DESCRIPTION OF THE BIPHALLIC PLANORBID

The specimen exhibited eversion of the double prepuce when anesthetized in a 1:125 solution of sodium pentobarbital in water. After three hours in the anesthetic the specimen was fixed according to the technique of Paraense (1981). Fig. 1 shows the cephalopodal mass with double prepuce everted.

Dissection under the stereomicroscope permitted identification of the specimen as *B. glabrata* according to Paraense (1975).

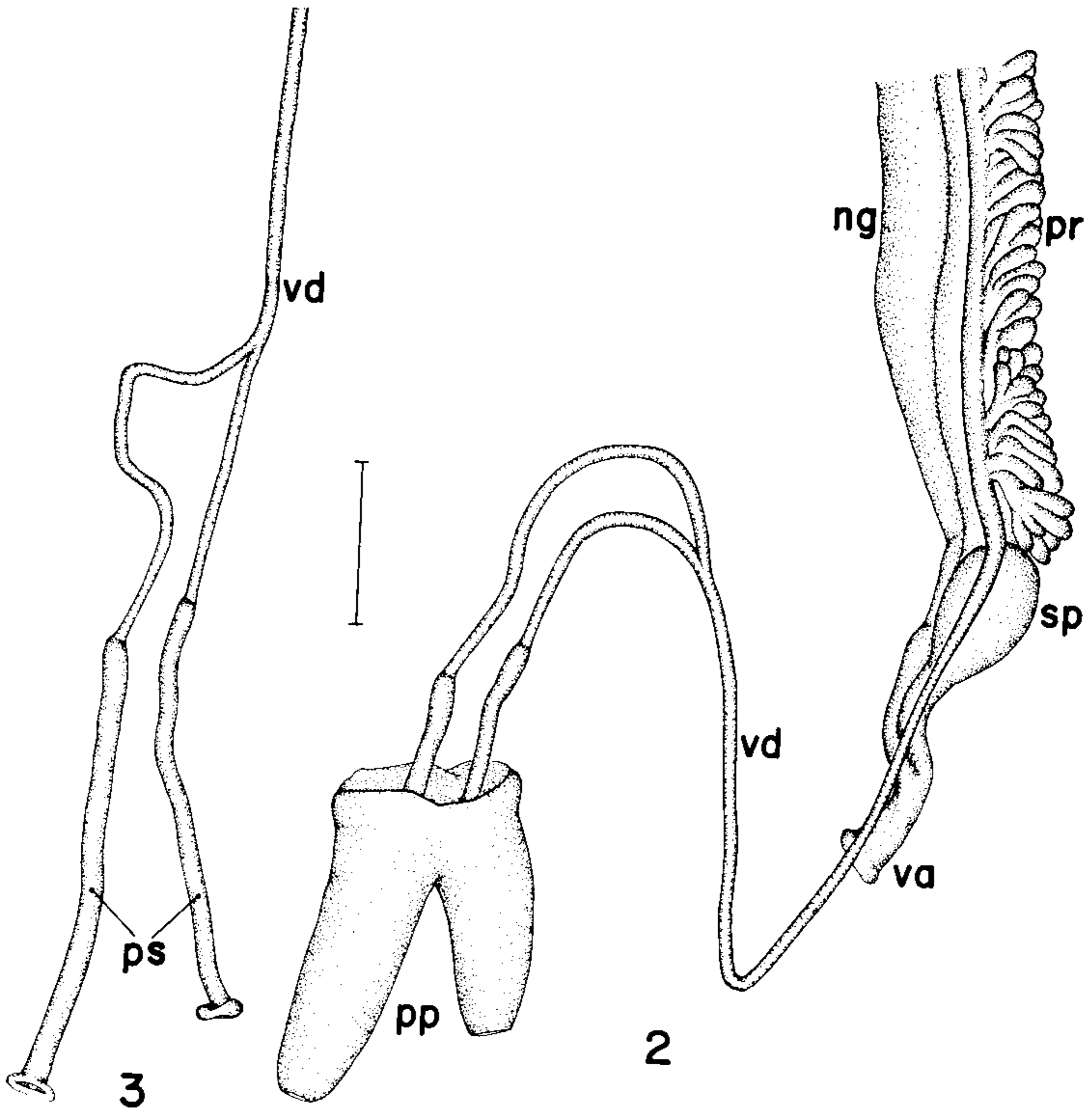
The reproductive system of this specimen was morphologically normal in its hermaphroditic part and in the female branch. The male branch was normal from the carrefour to a

distance of 6.5 mm along the vas deferens. The distal portion of this structure was bifurcated into segments of 2.9 and 1.7 mm terminating in penises of 3.0 and 2.7 mm respectively, the latter being thinner. Each penis was found inserted into one of the bifurcations of the double prepuce everted, one of which was approximately one and a half times the size of the other (Figs 1-3). The remaining systems and organs did not present abnormalities.

A further collection of planorbids was made in the same breeding place on 25 May, 1992. Thirty six more specimens were captured, with diameters between four and 12 mm, which were identified as *B. glabrata* and were normal when dissected.



Biomphalaria glabrata from Caeté, Minas Gerais – Fig. 1: biphallic specimen with everted prepuces. Bar = 1 mm.



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Biomphalaria glabrata, same specimen of Fig. 1, dissected - Fig. 2: bifurcation of vas deferens, resulting in double penial complex. Fig. 3: penial sheaths exposed after removal of prepuces. ng = nidamental gland, pp = prepuce, pr = prostate, ps = penial sheath, sp = spermatheca, va = vagina, vd = vas deferens. Bar = 1 mm.

COMMENTS

In the literature on gastropod abnormalities, other than those cited earlier in planorbis we found several cases of the absence or reduction of parts of the male reproductive system, for example: Bietrix (1886), Geigy (1925), Larambergue (1937) and Alaphilippe et al. (1965). In relation to biphally, we found few cases, including *Helix aspersa* (Alaphilippe et al., 1960), *Lymnaea limosa* (Alaphilippe et al., 1965), *Veronicella laevis* (Thomé, 1986) and *B. glabrata* (Richards & Minchella, 1986). However, according to the last-mentioned au-

thors, their case of biphally in *B. glabrata* showed penial complexes on the left and right sides, with the right vas deferens without connection with the rest of the reproductive system.

Richards & Minchella (1986) suggested that the biphallid condition is a mutant and, through crossing experiments, that it may be regulated by a dominant factor with low penetrance.

According to Alaphilippe et al. (1965), the reproductive system of the Basommatophora develops from three distinct embryonic tissues:

gonads, vas deferens and copulatory apparatus. The latter appears as an ectodermic invagination. In the case of biphally, morphogenesis would be from a double ectodermic invagination.

As judged by the conformation of the two penial complexes, as shown in Figs 2 and 3, both should have copulatory capacity.

Based on our review of the literature, we believe this to be first report of this type of biphally in planorbids.

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REFERENCES

- ALAPHILIPPE, F.; REGONDAUD, J. & TARDY, J., 1960. Sur un cas de diphallie symétrique chez *Helix aspersa* Müller. *J. Conchyliol.*, 100: 163-167.
- ALAPHILIPPE, F.; REGONDAUD, J. & TIFFON, Y., 1965. Sur deux anomalies de l'appareil copulateur chez *Lymnaea*. *J. Conchyliol.*, 104: 169-175.
- BIÉTRIX, M. E., 1886. Observation sur un cas de monstruosité de l'appareil génital chez l'*Helix pomatia*. *Ann. Sc. Nat., Zool.*, 1: 95-100.
- BRISSON, P., 1972. Anomalies de l'appareil génital mâle chez quelques Planorbides (Pulmonés Basommatophores). *Bull. Soc. Zool. France*, suppl., 97: 101-107.
- GEIGY, R., 1925. Anomalies de l'appareil génital chez *Helix pomatia*. *Rev. Suisse Zool.*, 32: 207-213.
- LARAMBERGUE, M. de, 1937. Absence ou réduction des parties mâles de l'appareil génital hermaphrodite de quelques gastropodes pulmonés. *70^o Cong. Soc. Savantes*, p. 235-239.
- LARAMBERGUE, M. de, 1939. Étude de l'autofécondation chez les Gastéropodes Pulmonés. Recherches sur l'aphallie et la fécondation chez *Bulinus (Isidora) contortus* Michaud. *Bull. Biol. France et Belgique*, 73: 19-231.
- MAGALHÃES, L. A., 1965. Afalia em *Drepanotrema anatinum* (Orbigny, 1835) (Pulmonata, Planorbidae). *Rev. Bras. Biol.*, 25: 93-96.
- PARAENSE, W. L., 1975. Estado atual da sistemática dos planorbídeos brasileiros (Mollusca, Gastropoda). *Arq. Mus. Nac.*, Rio de Janeiro, 55: 105-128.
- PARAENSE, W. L., 1981. *Biomphalaria occidentalis* sp. n. from South America (Mollusca Basommatophora Pulmonata). *Mem. Inst. Oswaldo Cruz*, 76: 199-211.
- PARAENSE, W. L., 1984. *Biomphalaria tenagophila guaibensis* ssp. n. from southern Brazil and Uruguay (Pulmonata: Planorbidae). I. Morphology. *Mem. Inst. Oswaldo Cruz*, 79: 465-469.
- PARAENSE, W. L. & DESLANDES, N., 1957. The type species of the genus *Tropicorbis* (Pulmonata, Planorbidae). *Rev. Brasil. Biol.*, 17: 427-434.
- RICHARDS, C. S., 1969. Genetic studies on *Biomphalaria glabrata*: tentacle and eye variations. *Malacologia*, 9: 327-338.
- RICHARDS, C. S. & MINCHELLA, D. J., 1986. Genetic studies of biphallid *Biomphalaria glabrata*. *Malacologia*, 27: 243-247.
- THOMÉ, J. W., 1985. Uma estranha anomalia em *Veronicella laevis* Blainville, 1817 (Gastropoda, Veronicellidae): bifalia aparentemente funcional. *Ci. e Cult.*, 38: 517-522.