
**ANATOMICAL DESCRIPTION OF *ANCTUS ANGIOSTOMUS*
(WAGNER, 1827) FROM NORTHEASTERN BAHIA, BRAZIL
(GASTROPODA, PULMONATA, BULIMULIDAE)**

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ABSTRACT

Anctus angiosomus (Wagner, 1827) is herein described anatomically, based on material collected at Queimadas, BA, caatinga habitat. This species is characterized by closed primary and secondary ureters; salivary glands distant from the buccal bulb; a poorly developed stomach; a characteristic mode of emergence of the gonad duct from the annexe glandular sac; very long spermoviduct; a short oviduct and vagina; very long and slender penis and epiphallus and a long flagellum with retractor muscle in the tip.

KEYWORDS: *Anctus angiosomus*, Bulimulidae, anatomy, caatinga habitat, Brazil.

INTRODUCTION

In Brazil, the genus *Anctus* Martens, 1860, is represented by two valid species: *A. angiosomus* (Wagner, 1827) (type species) and *A. laminiferus* (Ancey, 1888) (Pilsbry, 1901–2: 36), but in nature many conchological forms are found. With the present only conchologic knowledge, it is impossible to analyse whether these forms belong to several species, or whether they are only variations of the species cited above. No reference on anatomy of the genus *Anctus* is found in literature, except of a short communication by Coelho & Jurberg (1970).

We received several specimens, doubtlessly identified as *Anctus angiosomus* for examination, collected by Prof. Dr. R. Mello-Silva (Depto. Botânica, Instituto de Biociências da Universidade de São Paulo) at Queimadas, Bahia State (BA), Brazil. The ana-

tomical description of these snails, which will be helpful in future comparisons with other species is presented here.

MATERIALS AND METHODS

The specimens were fixed in 70% ethanol and deposited in the collection of the “Museu de Zoologia da Universidade de São Paulo” (MZUSP). From this lot, 15 specimens were selected for anatomical study and their shells were broken. All drawings were made with the help of a camera lucida. Jaws and radulae were mounted on glass slides with Hoyer’s for examination. The anatomical terminology and systematics are based on Breure (1979). Some shells of the Academy of Natural Sciences of Philadelphia (ANSP) were also examined.

Material examined

BRAZIL, ANSP 26001 (4 shells) (Moricand shells, Swift col.); ANSP 3420 (3 shells) (A.D. Brown col.);

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ABBREVIATIONS

ad = adhered region of gonad duct in spermooviduct	gs = salivary gland
an = anus	he = heart
bb = buccal bulb	in = intestine
bc = bursa copulatrix	ki = kidney
bm = mantle border	mp = penian retractor muscle
ca = anterior oesophageal chamber	mr = radular muscle
cm = mid oesophageal chamber	nr = radular nucleus
cp = posterior oesophageal chamber	ol = free oviduct
cv = collar vessel	pd = penian gland
da = larger collar fold	pe = penis
db = duct of the bursa	pg = genital atrium
dd = duct of the anterior digestive gland	pi = inferior projection of the mantle
de = orifice of the deferent duct in epiphallus	pn = pneumostome
df = deferent duct	pp = pulmonary chamber
dh = gonad duct	ps = upper projection of the mantle
di = third mantle fold	pt = prostate gland
dm = smaller collar fold	rg = gastric region
do = spermooviductic fold	rt = rectum
dp = duct of posterior digestive gland	sg = annexe glandular sac
ds = duct of the salivary gland	so = spermooviduct
ed = spermoduct	ta = talon
ep = epiphallus	ua = ureter aperture
fl = flagellum	up = primary ureter
ft = foot	us = secondary (adretal) ureter
ga = albumen gland	ut = uterus
gd = anterior digestive gland	va = vagina
go = gonad	vp = pulmonary vein
gp = posterior digestive gland	

ANSP 26000 (4 shells) (J.G. Antony col.); *Bahia*, MZUSP 27937 (40 specimens), Queimadas; MZUSP 27955 (3 shells), Paulo Afonso.

RESULTS

Systematics

Anctus angiostrum (Wagner, 1827)
(Figs. 1–15)

Bulimus angiostrum Wagner, 1827:14, (tab. 13, Fig. 4); Reeve, 1848:48 (Fig. 312)

Stenostoma capueira Spix in Wagner, 1827:14

Bulimus virgatus Spix in Wagner, 1827:14 (tab. 6, Fig. 4)

Bulimus (Anctus) anchiostomus: Martens in Albers, 1860:214

Anctus angiostrum: Ford, 1891:97 (Fig. 2)

Anctus angiostrum: Pilsbry, 1901–2:36 (pl.8, Fig. 86) [Jacobina, BA]; Morretes, 1949:153 [idem]; Oliveira et al., 1981:350 [Canudos, BA]; Parkinson et al., 1987 (pl. 12, Fig. 60) [BA]

Type locality (without precision): “*Sylvis caedulis, Capueira a Brasiliensibus dictis, in Provinciis Septentrionalibus*”.

Description

Shell: matching to the original description, and to those provided by Reeve (1848:48) and Pilsbry (1901–2:36). Shell light beige, with narrow dark-brown axial bands, irregularly spaced. Protoconch

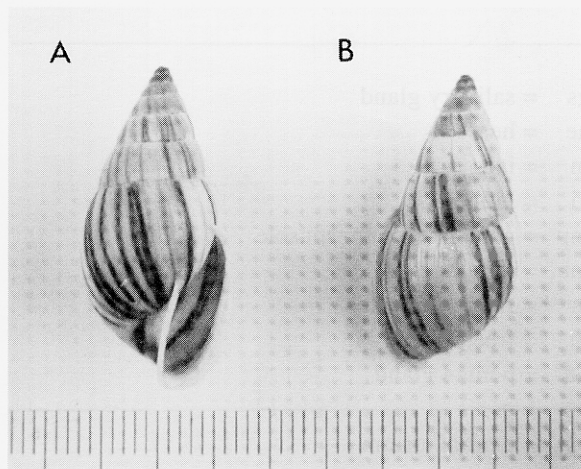


Fig. 1. *Anctus angiosomus*, Frontal (A) and dorsal (B) view of the shell of two specimens from Queimadas, Bahia.

with 1.8 to 2.0 glassy, dark-brown whorls, differing from teleoconch, which has light-beige, opaque whorls. Umbilical region conspicuous, shallow and rather concave. Peristome long without projections nor teeth in all examined specimens (Fig. 1).

Cephalo-Pedal Complex: cream-brown to beige, gradually fading to foot margins. Tentacles varying from a homogeneous light-brown to disordered light and dark brown bands.

Mantle Border (Fig. 9): outer surface dark-brown, inner surface light-brown. Two collar folds, left of pneumostome: an inner short (dm) and an outer longer one (da). A third fold (di) short and parallel to inner lip.

Pneumostome: (Fig. 9: pn) shown in Fig. 14 with inner collar fold (dm) deflected. Anus long, near border, situated externally, aperture of ureter with thick walls, situated near anus, but posteriorly. Pulmonary vein presenting a polytomy in anterior extremity.

Pallial Organs (Fig. 2): arrangement of pallial organs similar to those shown by Breure (1979:14) for *Rhinus ciliatus* and *Leiostracus pileiformis* by having primary and secondary (adretal) ureters (up, us) altogether closed, and by distribution of pulmonary venation. However, in *A. angiosomus* the pulmonary venation is more concentrated near mantle border.

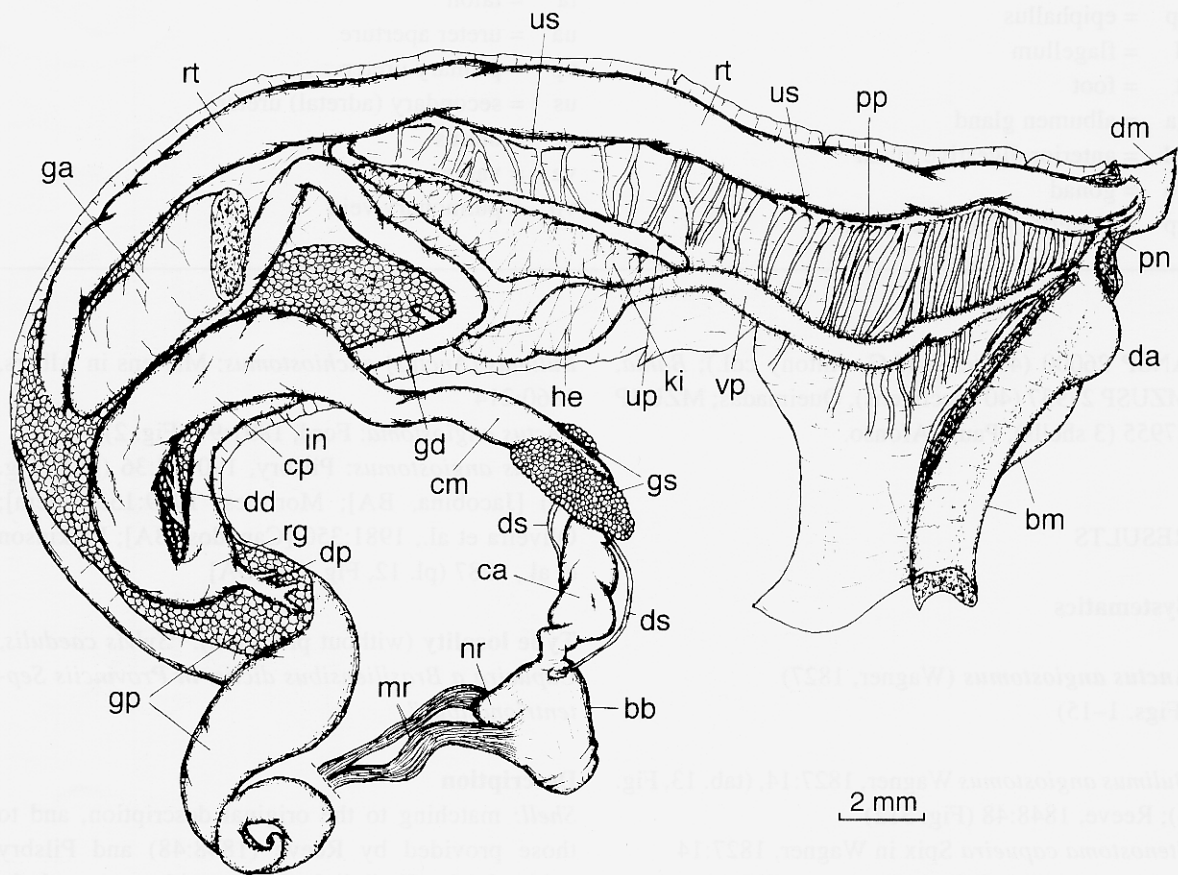
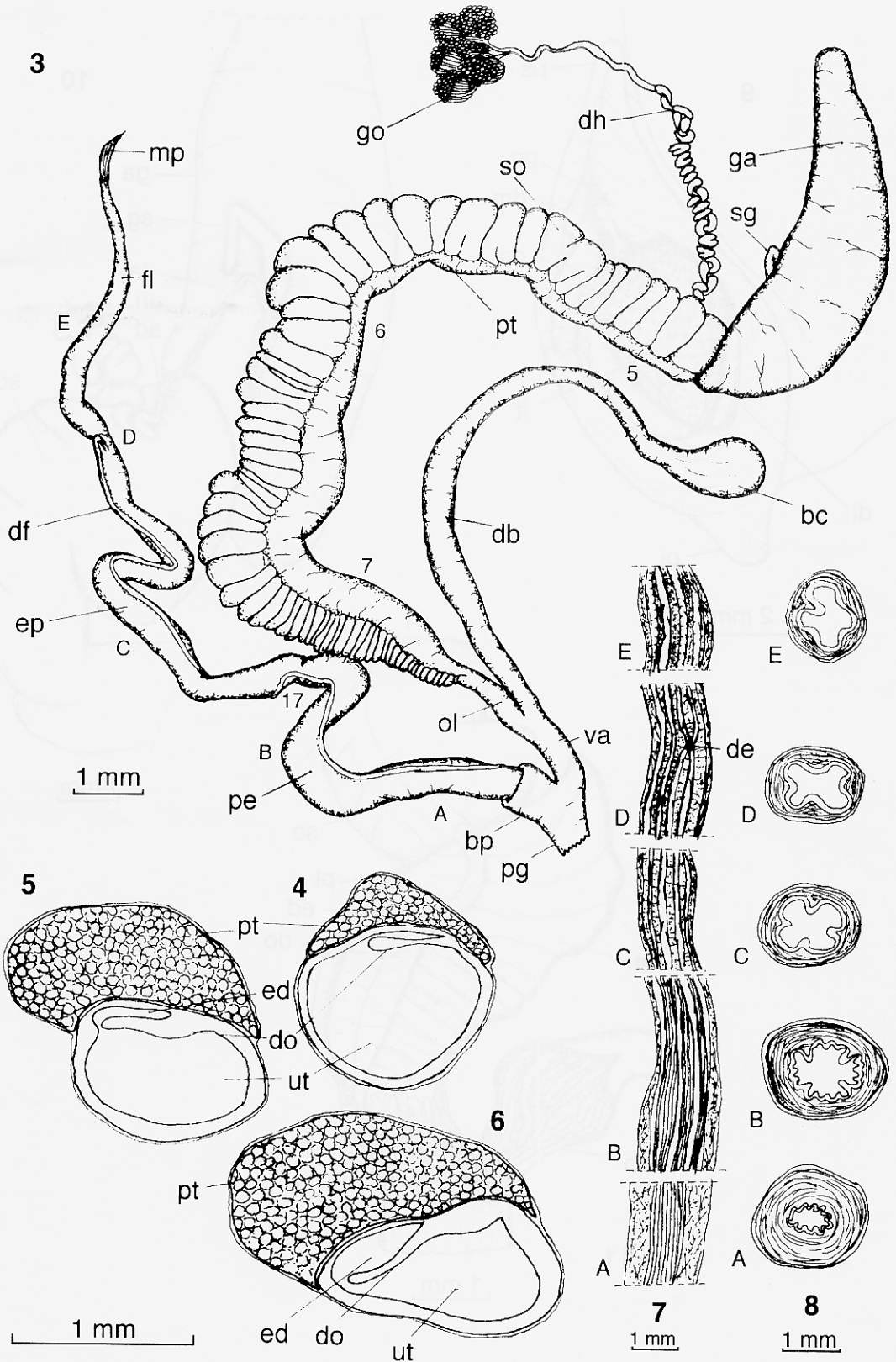
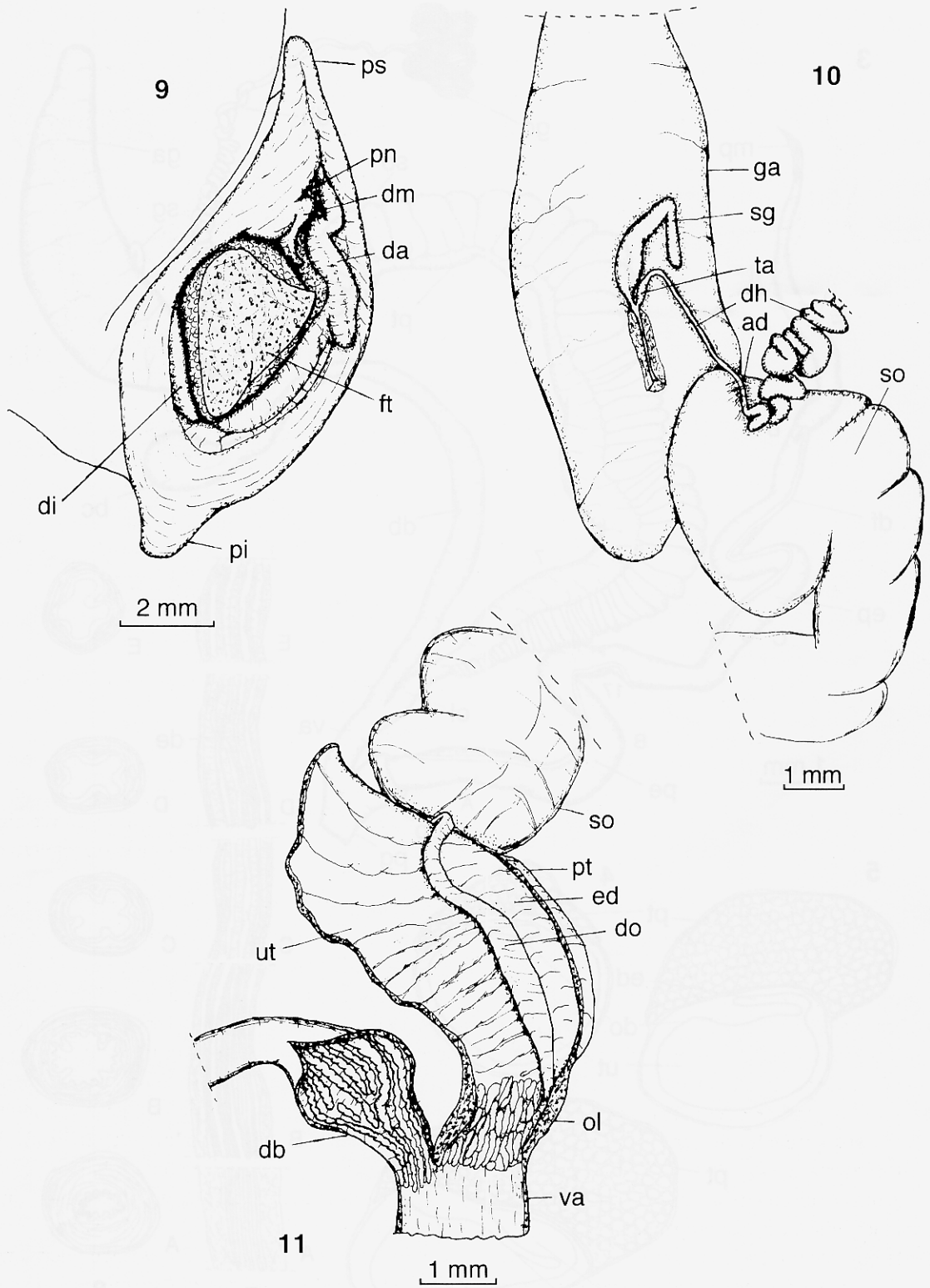


Fig. 2. *Anctus angiosomus*, dissected specimen, head-foot and genital system extracted.



Figs. 3-8. *Anctus angioostomus*, genital system, Fig. 3. total dorsal view, Fig. 4-6. transversal sections through spermiduct in positions indicated in Fig. 3: posterior (4), mid (5) and anterior (6). Fig. 7. inner face of the phallus in positions indicated in Fig. 3. Fig. 8. transversal sections of the phallus corresponding to regions of Fig. 7: near penis base (A), near penis apex (B), mid region of epiphallus (C), region between epiphallus and flagellum (D), mid region of flagellum (E).



Figs. 9–11. *Anctus angiostomus*. Fig. 9. exposed part of the mantle border, frontal view, part of the foot and shell removed; Fig. 10. detail of genital system showing the disposition *in situ* from end of the gonad duct to beginning of the spermoviduct; Fig. 11. inner face of the anterior region of the spermoviduct and duct of the bursa opened longitudinally.

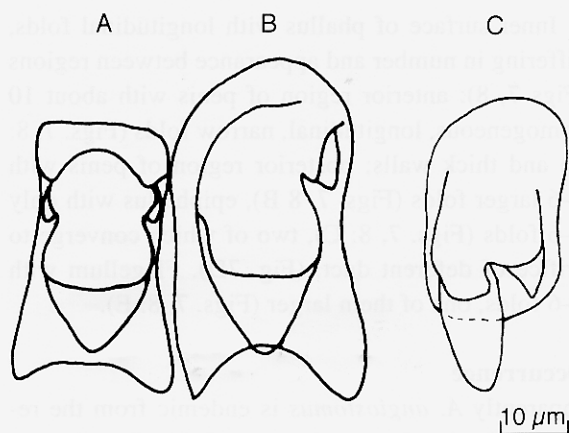


Fig. 12. *Anctus angiostomus*, radula teeth: (A) rachidian, (B) first left lateral tooth, (C) latero-marginal tooth, 35th right of the radula.

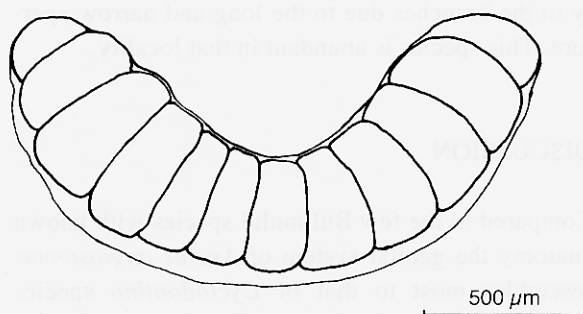


Fig. 13. *Anctus angiostomus*, jaw in ventral view.

Digestive System (Figs. 2, 12, 13): jaw of "group B" type (Fig. 13) [classification: Breure & Schouten, (1985:77)], about 12 conspicuous, trapezoidal, similar plates. Radula (Fig. 12) of type "C7,L2,LM12" (classification: Breure, 1979: 12–13); rachidian tricuspid (Fig. 12a), central cusp larger; about 36 pairs per row of bicuspid lateral teeth (Figs. 12b, c) with medial cusp larger than lateral cusp. This difference between cusps gradually becomes less conspicuous in latero-marginal teeth (Fig. 12c). Pair of salivary glands situated distant from buccal bulb, between anterior and mid third of oesophagus (Fig. 2), connected to buccal bulb by 2 long, thin walled and narrow ducts. Oesophagus with three chambers: the anterior with few low, longitudinal inner folds and thin walls; the median chamber with several, strong, longitudinal folds and thick walls and the posterior chamber dilated, long (about a half of total length of oesophagus), without inner folds and with thin walls.

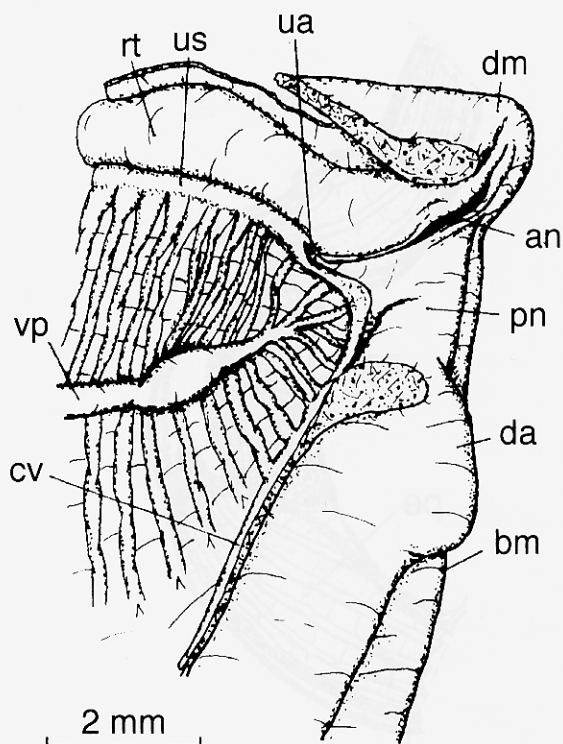


Fig. 14. *Anctus angiostomus*, Pneumostome, inner view, inner collar fold deflected.

Stomach poorly developed, duct for anterior digestive gland (dd) near duct for posterior digestive gland (dp), only discretely more anterior and directed to opposite side (Fig. 2).

Genital System (Figs. 3–8, 10, 11): gonad with several lobes, acini finger-shaped (Fig. 3). Gonad duct coiled, except in both extremities, dark brown when mature. Anterior region of gonad duct adhered to posterior region of spermoviduct by means of fibrotic connections (Fig. 10: ad); from this region until its insertion, gonad duct lies posteriorly, narrower and not coiled (Fig. 10); inserts in annexe glandular sac by means of a small, fusiform "talon" (ta). Annexe glandular sac (receptaculum seminis) long, narrow, curved and externally smooth. Albumen gland very long and conical (Figs. 2, 3, 10). Spermoviduct very long; prostate with smooth surface; uterus with well developed transversal folds in its posterior region, which gradually become smaller in anterior direction (Fig. 3). Transversal sections of spermoviduct shown in Figs. 4, 5 and 6, respectively in its posterior, mid and anterior regions. Free oviduct relatively short and narrow (about 1/9 of spermoviduct

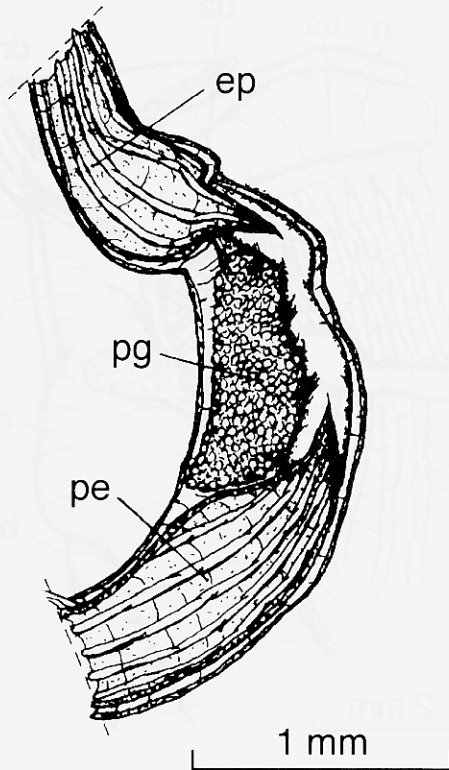


Fig. 15. *Anctus angioostomus*, region between penis and epiphallus opened longitudinally.

length). Bursa copulatrix small and sacciform; duct of bursa long, its muscular wall gradually becoming thicker anteriorly, in this region duct is almost as wide as free oviduct (Fig. 3). Vagina relatively short (about 1/9 of the spermovi duct length).

Penis and vagina inserting side-by-side in short genital atrium. Penian sheath present (bp). Penis long, narrow and cylindrical (Fig. 3: pe). Rather spherical glandular mass located between penis and epiphallus, without external differentiation (Fig. 15). Epiphallus about as long and wide as penis, cylindrical. Posteriorly to insertion of deferent duct (df) there is a cylindrical flagellum (fl), half as long as penis, and as wide as epiphallus (Fig. 3). Penian retractor muscle in tip of flagellum (mp).

Lumen of the spermovi duct with a fold (Figs. 4, 5, 6: do), separating uterus (ut) from spermoduct (ed). Inner surface of the oviduct with paving-shaped, short, somewhat longitudinal folds (Fig. 11). Inner surface of duct of bursa (Fig. 11: db) with 5–8 longitudinal, irregular folds, inner surface of vagina smooth, without folds.

Inner surface of phallus with longitudinal folds, differing in number and appearance between regions (Figs 7, 8): anterior region of penis with about 10 homogeneous, longitudinal, narrow folds (Figs. 7, 8: A) and thick walls; posterior region of penis with 4–6 larger folds (Figs. 7, 8 B), epiphallus with only 4–6 folds (Figs. 7, 8: C), two of which converge to orifice of deferent duct. (Fig. 7D). Flagellum with 4–6 folds, one of them larger (Figs. 7, 8: E).

Occurrence

apparently *A. angioostomus* is endemic from the region of Queimadas, northeastern Bahia, Brazil.

Habitat

the snails were collected from dry branches in the Caatinga habitat. They were inactive and fitted closely to the branches due to the long and narrow aperture. This species is abundant in that locality.

DISCUSSION

Compared to the few Bulimulid species with known anatomy the genital system of *Anctus angioostomus* resembles most to that of *Cyclodontina* species (Breure & Schouten, 1985: 6–9), such as *C. tudiculatus* (Martens) and *C. rhodinostoma* (Orbigny). *A. angioostomus* differs from these species by its longer flagellum and by insertion of the gonad duct.

In the communication by Coelho & Jurberg (1970) anatomical data in resume are missing. Coelho (pers. comm.) studied specimens with intermediary conchological characters between the known species of *Anctus*. Based on the data presented here comparisons with the lot studied by Coelho & Jurberg, and also several other lots must be performed in the future.

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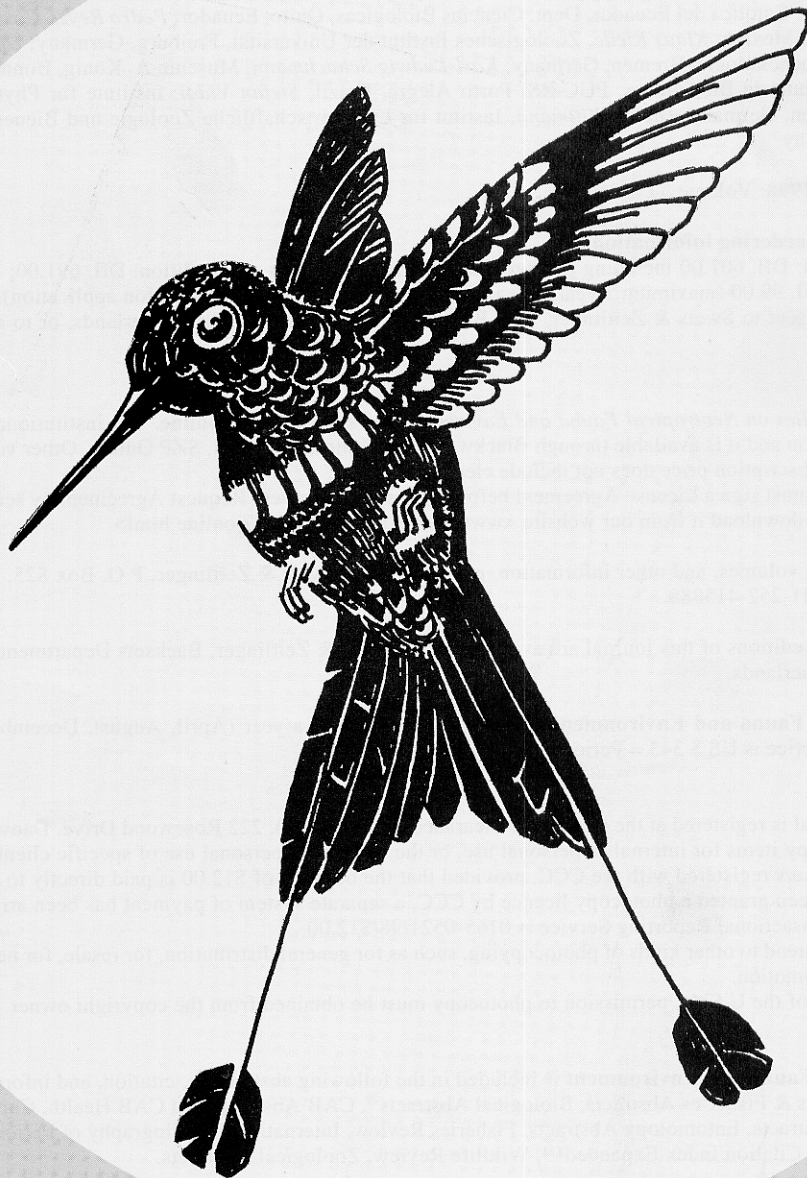
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