

Papéis Avulsos de Zoologia

Museu de Zoologia da Universidade de São Paulo

Volume 50(40):623-633, 2010

www.mz.usp.br/publicacoes

www.revistasusp.sibi.usp.br

www.scielo.br/paz

ISSN impresso: 0031-1049

ISSN on-line: 1807-0205

REDESCRIPTION OF *HANLEYA BRACHYPLAX* (POLYPLACOPHORA, HANLEYIDAE)

FROM THE SOUTH-SOUTHEASTERN BRAZILIAN COAST

JAIME A. JARDIM^{1,2}

LUIZ RICARDO L. SIMONE^{1,3}

ABSTRACT

Hanleya brachyplax Simone & Jardim in Rios, 2009 is described in detail. The species occurs off the southeastern and south coast of Brazil (São Paulo and Santa Catarina states) in depths from 250 to 408 m. It differs from its congeners in having uniform white valves; wide intermediate valves; the tail valve with straight profile in the antemucronal area, and a concave postmucronal surface; and a cream-colored girdle, covered by non-articulated spines. An anatomical investigation was also performed, showing the main muscle groups; the presence of gills in the posterior third of the pallial groove; auricle with six orifices; a very flat kidney, restricted to the posterior half of the animal; and a simple esophageal region. The odontophore has a single pair of long cartilages. The buccal musculature is also described.

KEYWORDS: *Hanleya brachyplax*; Anatomy; Morphology; South and Southeast Brazilian Coast.

INTRODUCTION

Despite the publication of important monographs on Polyplacophora (Pilsbry, 1892-1894; Kaas & Van Belle, 1985a/b, 1987, 1990, 1994, Kaas, Van Belle & Strack, 2006), which include Brazilian species, and the work of some local specialists (e.g., Righi, 1967, 1971, 1973a/b), Brazilian chitons are still poorly understood. Their systematics is confused, and the identification of species is often problematic. This study is part of a larger project to revise the Brazilian Polyplacophora, which resulted in the discovery of some undescribed or poorly known species.

The genus *Hanleya* Gray, 1857 (type species *H. debilis* Gray, 1857, from Europe = *Chiton hanleyi*

Bean in Thorpe, 1844) has not been reported previously in the southwest Atlantic (Kaas & Van Belle, 1985). In the Atlantic Ocean, this genus is represented by the species *H. tropicalis* Dall, 1881 and *H. sinica* Xu, 1990, with records for the North Atlantic and Mediterranean Sea. The genus includes medium- to large-sized animals; girdle covered by randomly organized unarticulated spines; shell valves covered by granules; wide articulation of plates with smooth intermediate valves; and merobranchial gills restricted to the posterior region.

Material belonging to the genus *Hanleya* was collected in deep water off the southeastern and south coast of Brazil, in sampling done for the REVIZEE project (a program to evaluate the sustainable potential

¹ Museu de Zoologia, Universidade de São Paulo, Caixa Postal 42.494, CEP 04218-970, São Paulo, SP, Brasil.

² E-mail: jaimejardim@usp.br

³ E-mail: lrsimone@usp.br

of the living resources of the Brazilian Exclusive Economic Zone), and by MORG (Museu Oceanográfico da Universidade Federal de Rio Grande). Studies of these samples revealed a single, new species, which we briefly described in Rios (2009) as *H. brachyplax* Simone & Jardim. The present paper gives a more detailed and complete description.

MATERIAL AND METHODS

A list of material examined is given in the species description. The sample consisted of specimens preserved in 70% ethanol, deposited in the malacological collection of the Museu de Zoologia da Universidade de São Paulo (MZUSP) (holotype and paratype) and the Museu Oceanográfico de Rio Grande (MORG) (paratype). The specimens were immersed in the ethanol preservative and dissected by standard techniques, under a stereomicroscope, (Simone, 1998). After the study of the external features, the foot was carefully removed. Afterwards, the internal organs were gradually removed, until the ventral surfaces of the plates were exposed. The valves of one specimen were also removed for internal examination, including the insertion plates. All drawings were done with the aid of a drawing tube. Some hard structures, such as the radula and the girdle (after critical-point processes), were examined by the use of SEM in the Laboratório de Microscopia Eletrônica, Museu de Zoologia da Universidade de São Paulo.

In the figures, the following abbreviations are used: **aa**, aorta; **ac**, connection of auricle with ventricle; **ae**, auricular orifices to gill efferent vessel (seen by transparency); **af**, afferent vessel; **an**, anus; **au**, auricle; **bg**, buccal ganglion; **bm**, buccal mass; **br**, subradular membrane; **bv**, blood vessel; **cc**, cerebral commissure; **cg**, cerebral ganglion; **cm**, cephalic muscles; **dc**, dorsal chamber of buccal mass; **dd**, duct to digestive gland; **df**, dorsal folds of buccal mass; **dg**, digestive gland; **dm**, dorsal surface of mantle surrounding valves; **dw**, dorsal wall of buccal mass; **ec**, esophageal complex; **ef**, efferent gill vessel; **es**, esophagus; **gd**, gonoduct; **gi**, gill filaments; **gf**, girdle furrow related to valve projections; **g**, gills; **go**, gonad; **gp**, gonopore; **gr**, girdle; **id**, insertion of longitudinal muscle in anterior region of valve; **in**, intestine; **ki**, kidney; **m1-m11**, odontophore muscles; **ma**, oblique-lateral muscle; **mj**, peribuccal muscles; **ml**, longitudinal muscle; **mo**, mouth; **mr**, transverse muscle; **nv**, nerve; **oc**, odontophore cartilage; **od**, odontophore; **pc**, pericardium; **py**, pallial cavity/furrow; **ra**, radula; **rn**, radular nucleus;

rm, radular muscle (m2); **rs**, radular sac; **rt**, rectum; **sc**, subradular cartilage; **se**, septum between odontophore and esophagus; **sg**, salivary gland; **sn**, labial palp; **ve**, ventricle.

Abbreviations of institutions: **MZUSP**, Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil; **MORG**, Museu Oceanográfico da Fundação Universidade de Rio Grande, Rio Grande do Sul, Brazil.

Systematics

Hanleya brachyplax Simone & Jardim, 2009 (Figs. 1-32)

Hanleya sp. Simone, 2009:446.

Hanleya brachyplax Simone & Jardim *in* Rios, 2009:20 (fig. 39).

Types: Holotype – MZUSP 87263 (Fig. 1-11). Paratypes – BRAZIL; São Paulo; 25°44'S, 45°11'W, 400 m, off Cananéia, MZUSP 87264, 1 specimen (REVIZEE Score Sul); Santa Catarina, off Cape Santa Marta, 250 m depth, MORG 18953, 1 specimen.

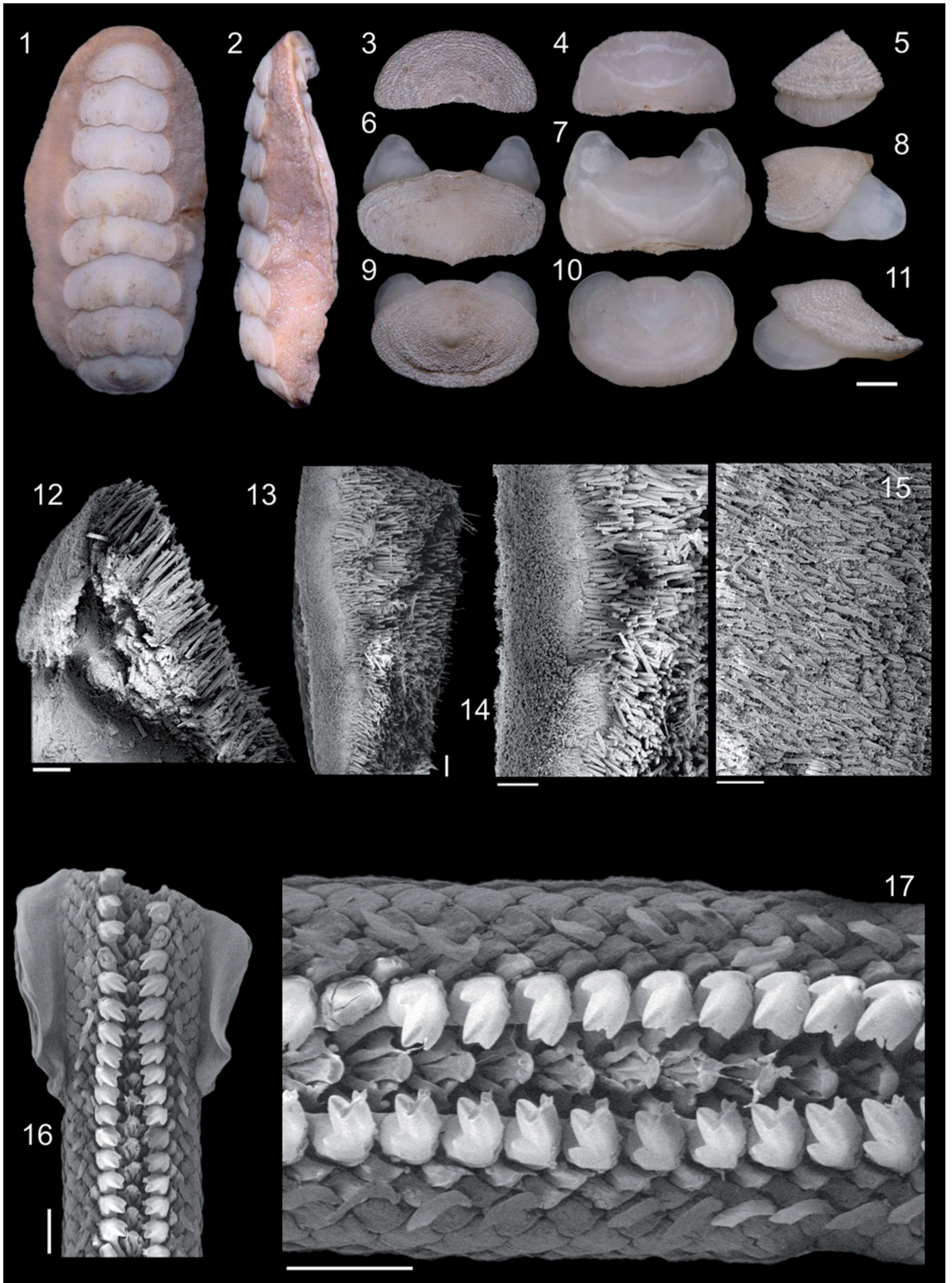
Type locality: BRAZIL; São Paulo; 25°44'S, 45°11'W, off Cananéia, 408 m (sta. #1126, 18/IV/02).

Diagnosis

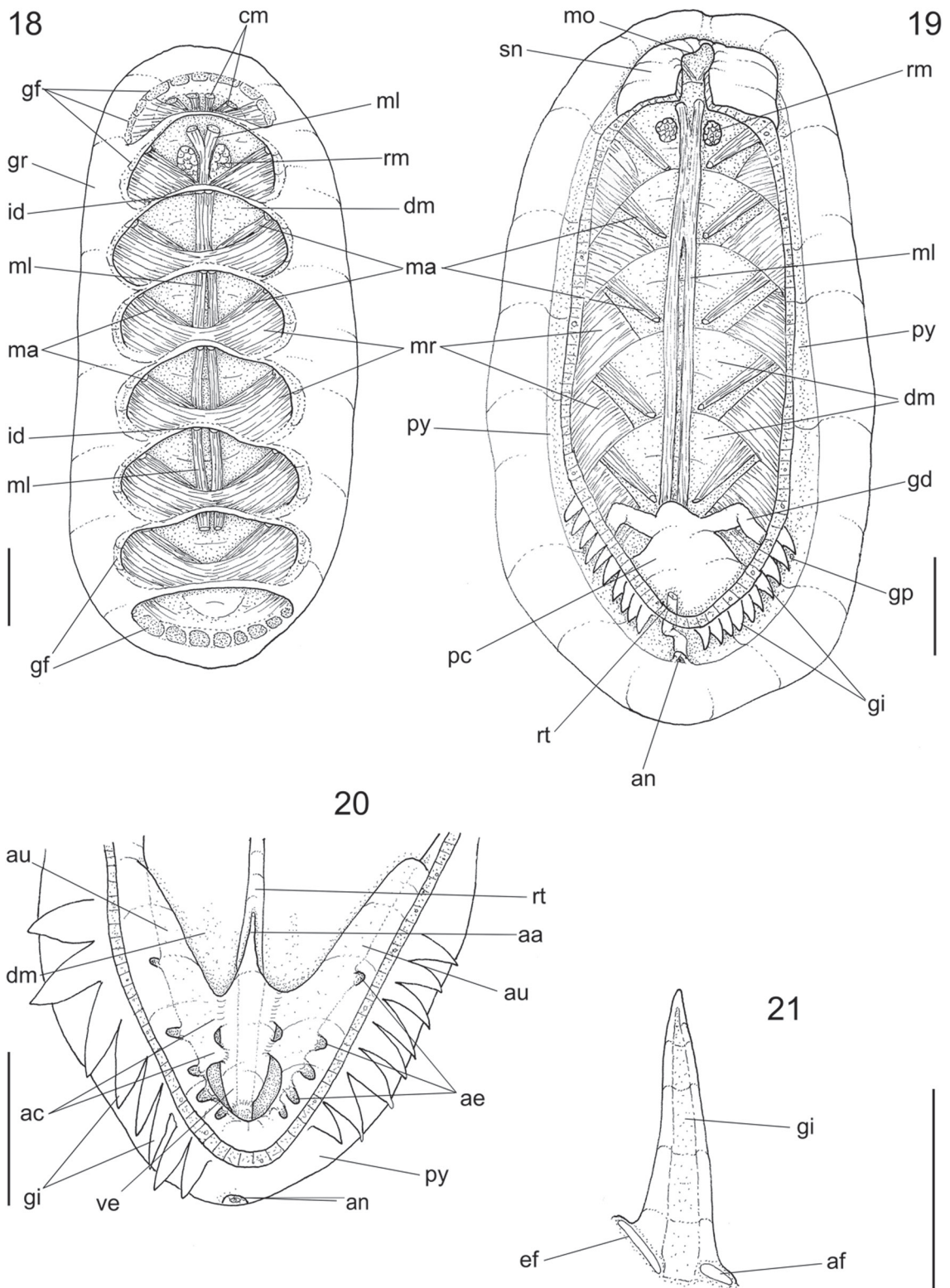
Shell sculptured by randomly organized rounded pustules; diagonal line weakly conspicuous on intermediate valves and inconspicuous on tail valve, jugal and pleural regions indistinct; head valve semi-elliptical, insertion plates with vertical furrows; intermediate valves with evident apex, wide and concave jugal sinus, and triangular apophysis; tail valve with central mucro; insertion plates well developed. Girdle wide, totally covered by solid dorsal spicules; marginal spicules similar to dorsal spicules, though slightly smaller; ventral surface covered by small, overlapping scales.

Description

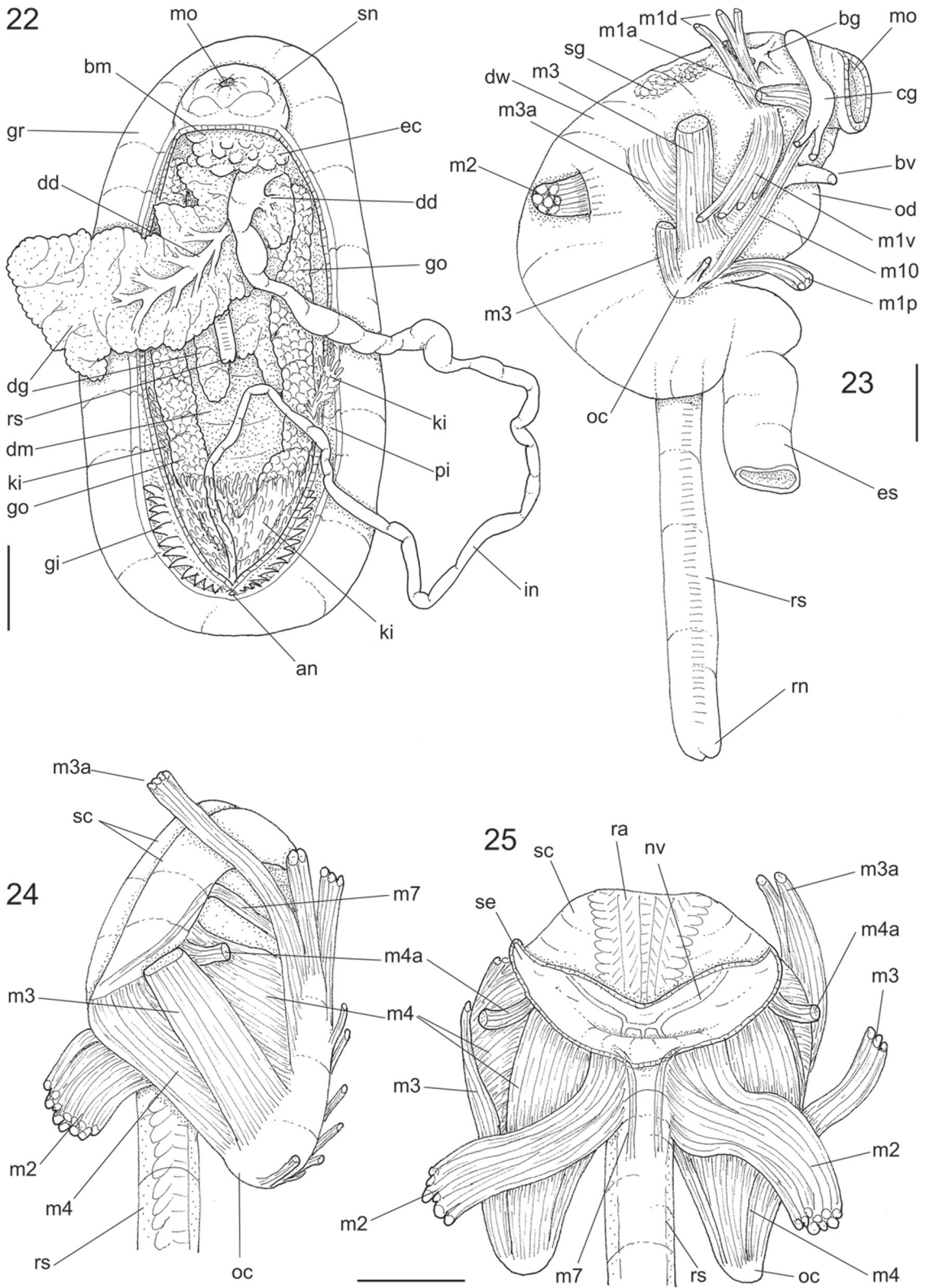
Shell (Figs. 1-11): Occupying about 60% of animal's dorsal surface (Figs. 1-2). Color white. Each valve twice as wide as long, and about twice as wide as tall; lateral edges rounded. All valves inserted laterally in girdle and medially in mantle; apophyses of head



FIGURES 1-17: *Hanleya brachyplax*, holotype, photos and SEM. **1**, dorsal view, length = 416 mm; **2**, right view; **3-5**, head valve, dorsal, ventral, and right views; **6-8**, fourth valve, dorsal, ventral, and right views; **9-11**, tail valve, dorsal, ventral, and left views, scale = 5 mm; view **12**, girdle, middle portion of right side, profile (ventral region at left); **13**, same, view from edge; **14**, same, higher magnification; **15**, same, detail of ventral surface; **16**, radula, anterior region; **17**, radula, detail of a portion preceding buccal mass. Scales = 500 μ m, except 4 = 200 μ m.



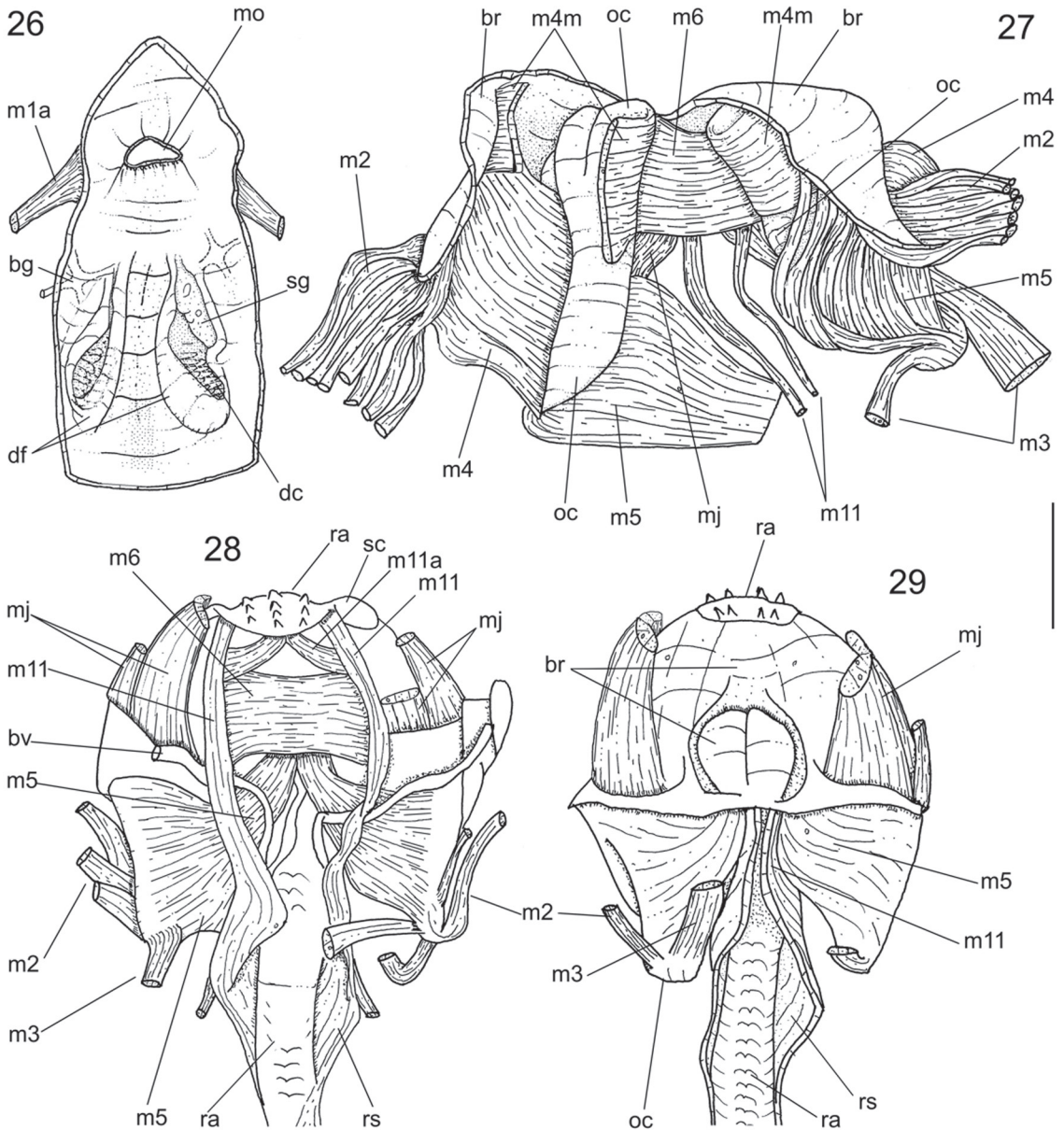
FIGURES 18-21: *Hanleya brachyplax*, anatomy. **18**, whole dorsal view, valves removed, showing main muscle groups, scale = 10 mm; **19**, whole ventral view, foot and visceral structures mostly removed, showing main muscle groups, scale = 10 mm; **20**, pericardial region, ventral view, ventral wall of pericardium and adjacent structures removed, topology of some associated organs shown, scale = 5 mm; **21**, isolated gill filament as in situ, scale = 2 mm.



FIGURES 22-25: *Hanleya brachyplax*, anatomy. **22**, whole ventral view, foot removed, visceral structures deflected, scale = 10 mm; **23**, buccal mass, right view; **24**, odontophore, right view, superficial layer of muscles and membranes removed; **25**, same, dorsal view, most structures slightly deflected; scales (23-25) = 2 mm.

valve striated on outer surface (Fig. 5), apophyses of remaining valves smooth (Figs. 8, 11). Head valve (Figs. 3-5) with pustules roughly arranged in rows in marginal region; inner surface glossy; muscle scar occupying about 60% of valve inner surface, flanking lateral and posterior edges (Fig. 4). Insertion tooth of head valve about half as high as valve, located in anterior and lateral edges, shorter near median line; irregular longitudinal furrows on outer surface (Fig. 5).

Sculpturing of intermediate valves (Figs. 6-8) similar to head valve; with rows of pustules parallel to anterior edge; anterior edge rounded, with small straight median edge between apophyses; posterior edge almost straight, with small projected apex; muscle scars occupying about half of interior surface, located close to lateral and posterior edges (Fig. 7); apophyses flat, triangular, approximately same length as valve (Figs. 6-8). Sculpture of tail valve (Figs. 9-11) similar



FIGURES 26-29: *Hanleya brachyplax*, anatomy. **26**, dorsal wall of buccal mass, ventral-inner view; **27**, odontophore, dorsal view, both cartilages deflected, most left muscles also deflected, left m4m sectioned longitudinally; **28**, odontophore, ventral view, superficial layer of membranes mostly removed, radular sac longitudinally sectioned; **29**, same, superficial layer of membranes and muscles as in situ. Scale = 2 mm.

to head valve, except for concentric rows of pustules on central apex; mucro prominent, weakly projected posteriorly; muscle scars occupying about half of inner surface, more concentrated in lateral and middle regions (Figs. 10); apophyses similar to those of intermediate valves, except about 30% shorter.

Girdle (Figs. 1, 2, 12-15): Color cream. Dorsal surface totally covered by long cylindrical spines (measurements: 500 to 650 μm), 10-15 times longer than wide, apex pointed. Marginal spines shorter (measurements: 350 to 400 μm) (Figs. 13, 14). Ventral surface with similar but much shorter spines (measurements: 90 to 260 μm) (Figs. 12, 15).

Main muscle system (Figs. 18, 19): Pair of straight muscles (**ml**), originating on second valve, in its anterior-ventral region at some distance from anterior edge and from median line, each scar equivalent to 0.5% of inner surface of valve; extending towards posterior flanking mantle surface, somewhat flattened dorso-ventrally, each muscle occupying about 0.5% of body width; after anterior insertion, in distance equivalent to 16% of second valve length, both muscles united with each other along median line; in anterior level of fourth valve, gradually both muscles diverge from each other, extending close to median line; insertion scar in anterior third of seventh valve, similar to origin scar; secondary insertions all along these muscles in anterior extremity of each valve (**id**), from third to seventh valves. Eight pairs of transverse muscles (**mr**), somewhat thick; each one originating in lateral region of foot, extending towards dorsal and medial valve surface, bordering dorsal surface of visceral mass; intermediate insertion along lateral edge of each valve; afterwards becoming oblique and triangular, with fibers directed medially and posteriorly; final insertion along anterior edge of middle portion of tail valve; these muscles relatively small in head valve and very narrow in tail valve. Muscles of head valve (**cm**) consisting of 4 bundles, originating from anterior edge of foot, running dorsally and anteriorly, aligned transversely in middle level of head valve. Seven pairs of lateral muscles (**ma**), with approximately same thickness as dorsal muscles; each muscle originating on lateral-anterior edge of each valve (except tail valve), just anterior to secondary insertion of transverse muscles, in an area equivalent to 0.33% of valve inner surface; running medially and posteriorly, narrowing gradually, in their anterior 1.5% edging inner border of transverse muscles, gradually crossing ventrally to this in posterior 3%; inserting on immediately posterior valve, close to median line, adjacent

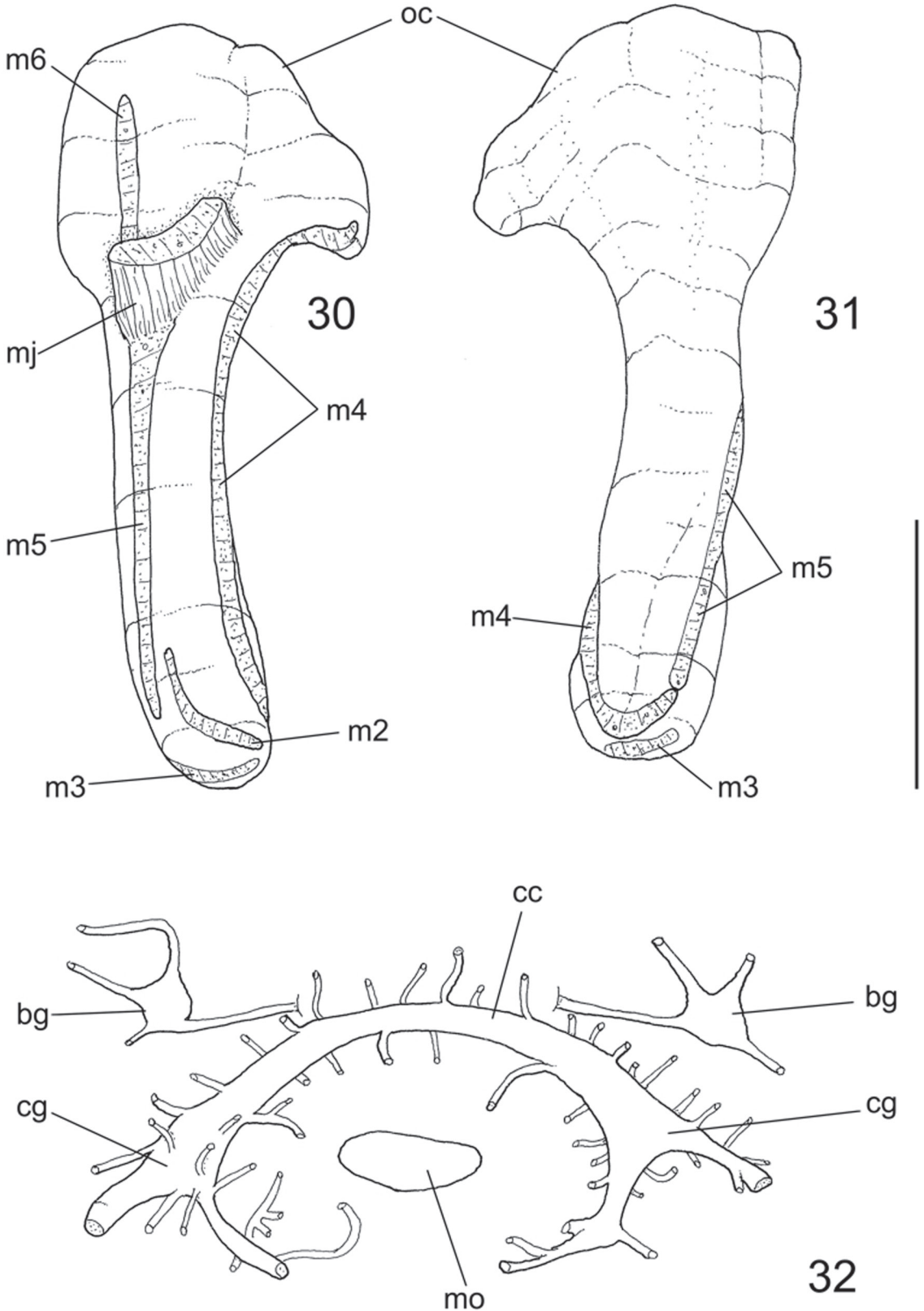
to secondary insertions of longitudinal muscles in an area equivalent to 1.5% of their origins. Insertion of lateral muscles (**ma**) and longitudinal muscles (**ml**) just posterior to insertion of transverse muscles (**mr**) on anterior edge of each valve.

Mouth and foot (Figs. 2, 19, 22): Mouth wide, a transverse central slit in shape of inverted "U", occupying about 16% of ventral surface. Anterior pair of folds flanking entire anterior region of mouth, narrow in median line, widening laterally; posterior-lateral end rounded. Posterior pair of folds elliptical, flanking almost entire posterior edge of mouth, except for short area on median line. Foot occupying about 80% of entire ventral surface; lateral edges of sole planar and uniform, extending slightly beyond its dorsal region, covering ventral region of pallial furrow; sole relatively thin along median line, thickening towards borders.

Pallial cavity (Figs. 19, 22): Pallial furrow extending along a narrow space between girdle and foot; particularly narrow around labial palp. Anterior and middle thirds about 25% as wide as girdle. Gradually and slightly widening posteriorly. Gills with about ten filaments restricted to posterior quarter, slightly longer laterally. Anterior and posterior filaments slightly shorter than middle filaments, ending at short distance from anus. Gill filaments triangular, relatively elongated, about three times larger than their base (Fig. 21). Both edges relatively thicker on middle surface. Efferent vessel broader than afferent vessel. Pair of very small pores (nephridial and genital) in anterior level of gills, closer to outer edge. Anus located in medial line, near outer edge of mantle furrow.

Visceral mass (Fig. 22): Buccal mass restricted to anterior region, about 16% of visceral mass. Digestive gland brown, occupying about 60% of inner space; intestinal loops immersed in digestive gland. Pair of gonads cream-colored, extending dorsally and laterally, occupying about 15% of visceral mass; pericardium and kidney confined to posterior quarter, pericardium dorsal and kidney ventral, with a flat portion of gonad and rectum between them.

Circulatory and excretory systems (Figs. 19, 20, 22): Pericardium lozenge-shaped, dorso-ventrally flattened, located in posterior and dorsal ends. Pericardial membrane thin, translucent. Efferent gill vessel and auricle separated by thick muscle wall; five relatively wide orifices connecting both chambers; one orifice isolated in anterior half, other four orifices more concentrated posteriorly. Pair of auricles symmetrical,



FIGURES 30-32: *Hanleya brachyplax*, anatomy. **30**, right odontophore cartilage, medial view, muscle origins shown; **31**, same, lateral view; **32**, central nervous system, frontal-anterior view, topology of mouth shown. Scale = 2 mm.

walls thin, transparent; external region almost as long as gill, abruptly narrowing to ventricle. Two pairs of connections to ventricle, both restricted to anterior half of ventricle; one connection anterior and the other posterior in same horizontal line; anterior end of both auricles somewhat bulging, rounded. Ventricle surrounding subterminal region of intestine, about half as long as auricles, ending at short distance from posterior haemocoel wall. Anterior aorta running along ventral surface of intestine. Kidney very flat, restricted to posterior half of haemocoel, constituted of branched, dark-brown nephridia flanking outer and dorsal inner surface of haemocoel. Gradually becoming more concentrated posteriorly and ventrally, covering ~2% of entire ventral surface of visceral organs. Pair of final nephroducts not seen in detail, but possibly as a pair of whitish tubes running obliquely through anterior edges of pericardium. Renal orifices in each side in anterior level of gill, between bases of first and second gill filaments.

Digestive system (Figs. 22-31): Mouth wide, located ventrally at mid-region of labial palp. Oral tube thin-walled, connecting mouth to lateral and ventral regions of odontophore and to dorsal region of oral cavity (Fig. 23). Pair of lateral buccal dilators (**m1a**) originating in lateral inner surface of haemocoel, at posterior level of labial palp; passing anteriorly and medially through nerve ring; inserting in lateral and slightly ventral sides of oral tube, close to mouth. Buccal sphincter narrow and inconspicuous, immersed in walls of oral tube, except for lateral thick muscle bundles (Figs. 27, 28: **mj**) inserted in outer surface of cartilages, between anterior and middle thirds (Fig. 30: **mj**). Pairs of dorsal retractor muscles of buccal mass (**m1d**) originating in 2-3 small portions of dorsal wall of haemocoel on each side, just dorsal to oral tube and close to median line; running ventrally and posteriorly, sometimes coalescent, at about same length as oral tube; inserting in lateral side of transition between oral tube and dorsal wall of buccal mass. Pair of ventral retractors of buccal mass (**m1v**) originating in lateral region of haemocoel, in mid-level of oral tube, from 3-4 small points on each side; running anteriorly and dorsally; inserting on lateral side of posterior region of oral tube (Fig. 23). Odontophore occupying about 75% of buccal mass. Odontophore muscles: **m2**, pair of radular muscles or retractor muscles of odontophore, thick and strong, composed by several separate bundles; originating in second valve, each origin circular, occupying about 2% of valve inner surface, located close to median line, separated from each other by straight

muscle (Figs. 18, 19: **rm**); extending in sigmoid fashion anteroventrally (Figs. 25, 27), flanking median line along half of buccal mass; inserting partly in posterior region of cartilages, in arched, narrow region (Fig. 30), and partly in median-ventral surface of radular sac (Fig. 25). Pair of dorsal protractor muscles of buccal mass (**m3**), somewhat thick and cylindrical, originating in latero-dorsal region of haemocoel, in posterior level of oral tube; extending posteriorly along entire length of buccal mass; inserting in lateral region of posterior end of cartilages (Figs. 23-25, 29). Pair of dorsolateral circular muscles (**m3a**), extending superficially covering dorsal wall of buccal mass, in its posterolateral region (Fig. 23); inserting in posterolateral region of cartilages, just internally to insertion of **m3**. Main pair of dorsal tensor muscles of radula (**m4**) thick; originating in ventrolateral edge of cartilages (Figs. 30, 31), along almost their entire edge; extending medially and dorsally, covering internal surface of cartilages (Figs. 25, 27); inserting in subradular cartilage along its entire portion crossing through odontophore, close to median line. Pair of secondary dorsal tensor muscles (**m4a**), small and short; originating in inner lateral surface of membrane covering odontophore; extending a short distance dorsally and medially; inserting in lateral region of subradular cartilage, in its middle level in odontophore (Figs. 24, 25). Pair of medial dorsal tensor muscles of radula (**m4m**) flattened and wide, about 33% as long as odontophore; originating in ventral edge of cartilages (Fig. 27); extending dorsally over anteromedial surface of cartilages; inserting in subradular membrane, in its anterodorsal region. Pair of auxiliary tensor muscles of radula (**m5**) thickened; originating along dorsolateral edge of cartilages (Figs. 30, 31), on nearly opposite side to **m4** origin; extending towards median region, covering **m4** pair (Figs. 27, 28), becoming gradually narrower; inserting in subradular cartilage in anterolateral level of **m4** insertion. Horizontal muscle (**m6**) connecting both cartilages along their anterior portion, occupying about 65%; inserting in both cartilages close to centrolateral surface (Fig. 30), about as wide as long (Figs. 28, 29). Pair of very narrow, long muscles (**m7**); originating in lateral and middle region of cartilages, extending superficially towards dorsal region, and after a distance equivalent to 33% of its length extending posteriorly, covered by expansions of subradular cartilage (Fig. 24); inserting in subradular cartilage just posterior to its expanded region. Pair of protractor muscles of buccal mass (**m10**); originating ventrally at middle level of oral tube, close to median line; diverging from each other posteriorly and slightly dorsally; inserting on lateral side of posterior

end of each cartilage (Fig. 23). Pair of ventral tensor muscles of radula (**m11**) long and thin; originating on ventral surface of haemocoel, just posteriorly to buccal mass; extending towards dorsal region, penetrating into odontophore laterally at radular sac at a distance equivalent to odontophore length; inserting in subradular cartilage on its ventrolateral edge (Figs. 27, 28). Pair of secondary ventral tensor muscles of radula (**m11a**) short, slightly thicker than m11; originating in anteroventral region of cartilages; extending medially and slightly anteriorly; inserting on ventral end of subradular cartilage, close to median line (Fig. 28). Subradular cartilage extending along ventral surface of radula; with pair of wide rounded expansions in buccal cavity (Fig. 16); each expansion half width of radula. Pair of cartilages claviform and flattened (Figs. 27, 30, 31); anterior third wide, half as wide as odontophore, with a blunt ventral projection; abruptly narrowing between anterior and middle thirds, middle and posterior thirds about half as wide as anterior third, length uniform, thickness about 33% of width; posterior end rounded. Dorsal wall of buccal mass (Figs. 23, 26) with pair of small chambers (**dc**) filled by mucus; each chamber about half as long and one-fourth as wide as buccal mass; medial edge with relatively tall, longitudinal fold (**df**); anterolateral edge bearing salivary gland (**sg**); remaining surface of dorsal wall and esophagus smooth. **Esophagus** short, wide and simple, about 33% as long as buccal mass (Fig. 23). **Stomach** inconspicuous, marked only by wide duct to digestive gland (Fig. 22: **dd**); duct to digestive gland successively branched, with branches immersed in digestive gland. Digestive gland occupying about 60% of haemocoel, along its central region (Fig. 22: **dg**). **Intestine** initially as wide as esophagus, gradually narrowing distally (Fig. 22: **in**); with single loop surrounding digestive gland; inner surface simple, smooth. Rectum simple, very narrow, crossing through posterior chamber of kidney. Anus simple, short and with low papilla.

Genital system (Figs. 20, 22): Pair of gonads described above (visceral mass), connected posteriorly to each other, dorsally to kidney. Genital pores in pallial furrow visible as pair of very small orifices located near anterior end of gill (Fig. 19: **gp**), preceded by pair of genital ducts located anteriorly and dorsally to pericardium (Fig. 19: **gd**).

Central nervous system (Fig. 32): Pair of cerebral ganglia weakly defined, about as wide as anterior region of oral tube. Cerebral commissure about half as wide as buccal mass; narrower region close to median line,

about half as wide as cerebral ganglion; several pairs of secondary nerves along anterior and posterior edges of ganglia and commissure. Pair of buccal ganglia about half size of cerebral ganglia; located between oral tube and dorsal wall of buccal mass (Fig. 26: **bg**).

Measurements (respectively antero-posterior length, dorso-ventral height, and maximum lateral inflation, in mm): Holotype (MZUSP 87263): 41.5 by 10.0 by 2.5; paratypes: MZUSP 87264: 51.0 by 14.0 by 27.7; MORG 18953: 73.0 by 12.2 by 26.0.

Distribution: SE and S Brazilian coast, from São Paulo to Santa Catarina.

Habitat: From 250 to 408 m depth, substrate unknown.

DISCUSSION

Hanleya brachyplax Simone & Jardim in Rios (2009) is a typical member of Hanleyidae, mainly because of the elongated outline and the randomly organized granular sculpture of the valves. Other characteristics are also important to this attribution, such as the well-developed insertion plates in the head valve (despite being smaller in valves II to VII); well-developed apophysis on all valves; and the girdle covered by dorsal spines (Kaas & Van Belle, 1985:192).

Hanleya brachyplax differs from the European *H. hanleyi* (Bean in Thorpe, 1844) because it has randomly distributed pustules in the different regions of all valves, with the pleural and jugal areas equally sculptured; head valves have longer insertion plates; shell apex is lower; valves II to VII have weak marked diagonal lines and a slightly elevated lateral area; and similar-sized spines on the girdle. The radula of *H. brachyplax* differs from *H. hanleyi* in having bifurcated minor lateral teeth; part of this bifurcation is situated anteriorly to the central tooth, with a hook-shaped indentation (facing the anterior region), and the other part of the bifurcation dorsally recurved.

Hanleya brachyplax differs from *H. nagelfar* (Lovén, 1846) (*sensu* Kaas & Van Belle, 1985:196), from Norway, in having valves with a more anteroposteriorly elongated contour; head valve with insertion plates ornamented with deeper furrows; valves II-VII with a triangular and longer apophysis, lateral area visible; tail valve with straight postmucronal region and angulate marginal area. The radula differs in having bifurcated minor lateral teeth.

Hanleya brachyplax differs from *H. tropicalis* (*sensu* Kaas & Van Belle, 1985:199, fig. 93) because it is larger; has lower shell valves, sculptured mainly by pustules; and has a proportionally wider girdle, with uniformly sized spines. The head valve has larger insertion plates, with deeper furrows; valves II-VII are uniformly sculptured, with inconspicuous diagonal lines and lateral areas, a well-developed apophysis, and a concave jugal sinus; the tail valve is more rounded, with a low mucro, straight postmucronal slope, and well-developed apophysis.

Hanleya brachyplax differs from *H. sinica* (*sensu* Kaas & Van Belle, 1994:29, fig. 10) in having the intermediate valves with a lower, less-prominent apex, and inconspicuous diagonal lines and lateral areas; a more developed triangular apophysis; randomly distributed sculpturing; the tail valve with a slightly convex antemucronal area, a straight postmucronal area with an angulated margin, weak diagonal line, and a narrow and concave jugal sinus. Additionally, *H. brachyplax* has a wider girdle.

RESUMO

Hanleya brachyplax Simone & Jardim in Rios, 2009 é descrita em detalhes. A espécie ocorre entre as costas Sul e Sudeste do Brasil (Estados de São Paulo e Santa Catarina) em profundidades de 250 a 408 m. Se diferenciando das espécies do mesmo gênero por apresentar valvas uniformemente brancas; valvas intermediárias largas; valva anal com a região antemucronal reta e região postmucronal suavemente concava; cinturão creme, revestido de espinhos não articulados. Um estudo anatômico foi realizado, evidenciando os principais grupos musculares; restrição dos filamentos branquiais à região posterior da cavidade palial; aurículas com seis orifícios; rim achatado e restrito a porção posterior do animal; região esofágica simples. O odontóforo composto por um par de cartilagens simples. Musculatura da massa bucal é também descrita.

PALAVRAS-CHAVE: *Hanleya brachyplax*; Anatomia; Morfologia; Costa brasileira Sul e Sudeste.

AGRADECIMENTOS

The authors wish to thank Eliézer C. Rios, Paula Spotorno, and Dr. Gustavo A.S. Melo by sending biological material herein studied. For Janet Reid and Daniel Cavallari by English revision and Lara Guimarães by SEM images.

REFERENCES

- KAAS, P. & VAN BELLE, R.A. 1985. *Monograph of living chitons (Mollusca: Polyplacophora)*. Brill, E.J., Vinderup, London, v.1, 240p.
- KAAS, P. & VAN BELLE, R.A. 1987. *Monograph of living chitons (Mollusca: Polyplacophora)*. Brill, E.J., Vinderup, London, v.3, 302p.
- KAAS, P. & VAN BELLE, R.A. 1990. *Monograph of living chitons (Mollusca: Polyplacophora)*. Brill, E.J., Vinderup, London, v.4, 298p.
- KAAS, P. & VAN BELLE, R.A. 1994. *Monograph of living chitons (Mollusca: Polyplacophora)*. Brill, E.J., Vinderup, London, v.5, 402p.
- KAAS, P.; VAN BELLE, R.A. & STRACK, H. 2006. *Monograph of living chitons (Mollusca: Polyplacophora)*. Brill, E.J., Vinderup, London, v.6, 463p.
- PILSBRY, H.A. 1892-94. *Monograph of the Polyplacophora*. In: Tryon, G.W. *Manual of Conchology*, 14:1-128, pls. 1-30 (1892); i-xxxiv, 129-350, pls. 31-68 (1893); 15:1-64, pls. 1-10 (1893); 65-133, pls. 11-17 (1894).
- RIGHI, G. 1967. Sobre Polyplacophora do litoral brasileiro. *Papéis Avulsos de Zoologia*, 20(9):85-98.
- RIGHI, G. 1971. Moluscos polioplacóforos do Brasil. *Papéis Avulsos de Zoologia*, 24(9):123-146.
- RIGHI, G. 1973a. Adições aos Polyplacophoros brasileiros (Mollusca). *Papéis Avulsos de Zoologia*, 26(22):259-273.
- RIGHI, G. 1973b. Moluscos da Baía da Ilha Grande, Rio de Janeiro, Brasil. II. Polyplacophora. *Papéis Avulsos de Zoologia*, 26(19):237-245.
- RIOS, E.C. 2009. *Compendium of Brazilian sea shells, Rio Grande, Brasil*. Evangraf, Rio Grande, 676p.
- SIMONE, L.R.L. & JARDIM, J. 2009. *Hanleya brachyplax* Simone & Jardim. In: Rios, E.C. (Org.). *Compendium of Brazilian Sea Shells*. Evangraf, Rio Grande, p. 20.
- SIMONE, L.R.L. 1998. Morphological study on *Littorina flava* (King & Broderip) from Brazil (Caenogastropoda, Littorinidae). *Revista Brasileira de Zoologia*, 15(4):875-887.
- SIMONE, L.R.L. 2009. Comparative morphology among representatives of main taxa of Scaphopoda and basal protobranch Bivalvia (Mollusca). *Papéis Avulsos de Zoologia*, 49(32):405-457.

Recebido em: 20.08.2010

Aceito em: 14.09.2010

Impresso em: 10.12.2010