

# THE RUDIST *MATHESIA TERTIICOLLOQUIIRUDISTARUM* N. GEN., N. SP. IN THE UPPER APTIAN OF SERRA SBREGAVITELLI, MATESE, SOUTH APENNINES, ITALY

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## ABSTRACT

A new genus and a new species of rudist (*Mathesia tertii colloquii rudistarum*) are described. The specimens were discovered in upper Aptian beds on the top of a limestone sequence in Serra Sbrégavitelli, in northeastern Matese of the southern Apennines, Italy. The new taxon shares characteristics of caprinid and radiolitid rudists, because the shell wall of right valve presents two rows of small pallial canals. The left valve is capuliform and the right valve conical. The ornamentation consists of acute-angle longitudinal ribs, alternating with obtuse-angle ribs; there are two siphonal bands separated by an interband with one rib. Internal ligamental ridge present, without external ligamental groove.

Key words: Rudistae, Caprinidae, Radiolitidae, upper Aptian, Matese, Italy, southern Apennines.

## RESUMEN

Se describe un nuevo género y una nueva especie de rudista (*Mathesia tertii colloquii rudistarum*). Los especímenes fueron encontrados en capas del Aptiano superior en la parte alta de una secuencia de calizas en la Sierra Sbrégavitelli en el noreste de Matese, al sur de los Apeninos, en Italia. El nuevo taxon comparte características de rudista caprinido y radiolitido, porque la pared de la concha de la valva derecha presenta dos hileras de canales paliales pequeños. La valva izquierda es capuliforme y la valva derecha es cónica. La ornamentación consiste en costillas longitudinales en ángulo agudo alternando con costillas en ángulo obtuso. Hay dos bandas sifonales separadas por una interbanda con una costilla. Existe una cresta interna del ligamento, pero no hay surco externo de ligamento.

Palabras clave: Rudistae, Caprinidae, Radiolitidae, Aptiano superior, Matese, Italia, Apeninos del Sur.

## INTRODUCTION

The Aptian limestone sequence, about 200 m thick, of Serra Sbrégavitelli in the southern Apennines of Italy (Map IGM 162, IISO) (Figures 1, 2) is distinguished by a rich fauna of rudists, ostreids and nerineids (D'Argenio *et al.*, 1988, 1989; Accordi and Carbone, 1990; Accordi *et al.*, 1990; Masse *et al.*, 1993). In the top of the Aptian sequence, in the upper Aptian beds, was discovered a reef mostly formed by a myriad of specimens of a small canaliculated rudist that can not be assigned to any known genus and species.

The reef consists of a layer 0.5 to 2 m thick, whose length is not known because the outcrop is covered by vegetable soil. The specimens of the new taxon are predominantly in growth position and associated with rare requienids, gastropods and pelecypods. The matrix is calcarenitic and rarely calcilutitic. The organogenic limestone bearing the new taxon is in part the same mentioned by Parona (1909) as *pietra ad anellini* (little rings limestone), which at that time was considered as lower Cenomanian (Parona, *op. cit.*) but, according to recent research at d'Ocre Mountain in Abruzzo Aquilano of the central Apennines, Italy, it is considered Aptian in age; however, the systematic study does not include specimens of d'Ocre Mountain.

## SYSTEMATIC PALEONTOLOGY

The repository of the studied specimens is the Museum

of Paleontology of the Dipartimento di Scienze della Terra, Università La Sapienza, Roma.

Order Rudistae Lamarck, 1812

Suborder Sinistrodonta Pchelintsev, 1959; Mainelli, 1992

Family Caprinidae d'Orbigny, 1850

*Mathesia* n. gen.

**Type species**—*Mathesia tertii colloquii rudistarum*, by monotype.

**Diagnosis**—Shell very inequivalve, attached valve conical, free valve capuliform. Shell wall of compact inner layer and outer layer ornamented with longitudinal angular ribs. Attached valve with a median layer of two rows of small round canals. In both valves, siphonal bands with one rib in the interband; ligamental ridge without ligamental external groove; body cavity without tabulae.

**Derivation of name**—From Matese Massif, in the southern Apennines, Italy, *Mathesia* in Latin.

*Mathesia tertii colloquii rudistarum* n. sp.

(Figures 3, 4; Plate 1, figures 1-13; Plate 2, figures 1-10; Plate 3, figures 1-4)

**Diagnosis.**—Shell small, highly inequivalve and inequilateral; left valve capuliform, right valve conical with longitudinal

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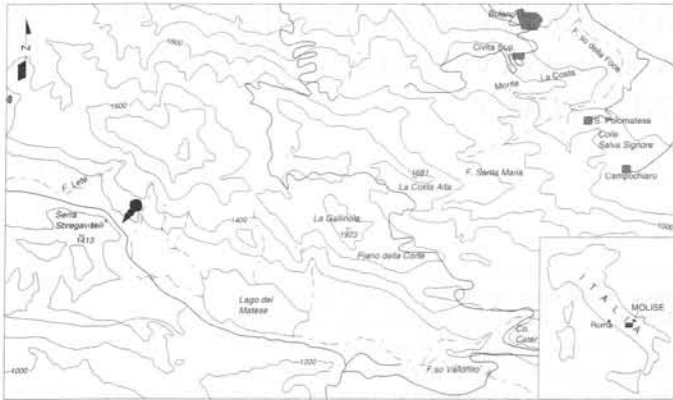


Figure 1. Location of Serra Sbragavitelli in the northeastern Matese Massif, southern Apennines, Italy (Servizio Geologico d'Italia, without year).

acute ribs intercalated with low, obtuse-angle ribs. Siphonal bands in both valves, eb flat, sb concave. Ligamental ridge in internal cavity without ligamental groove.

**Description**—Shell small, very inequivalve, the ratio between left and right valves is 1:14 to 1:18.

The right valve (attached valve) is conical-elongated, slightly arched toward the ventral region; cross section at the commissure circular to oval. The shell wall contains three layers (Figure 5). The inner is very thin and compact, giving rise to the internal structures. The median layer is formed by two rows of very small circular pallial canals. The external layer consists of numerous funnel-shaped lamellae, one on the top of the other, with acute radial undulations on the edge. The undulating edge of these lamellae forms the longitudinal acute-angle ribs and obtuse-angle ribs. The siphonal bands are bound by two very obtuse-angle ribs; the interband presents one acute-angle, very salient, longitudinal rib (Plate 2, figures 1, 3). The band toward the posterior side (sb) is flat and wider than the band toward the ventral side (eb) which is concave and narrow. Ligamental ridge in an internal accessory cavity, without external groove. The cardinal-myophoral structure is of the type: am 1' 2 3' pm.

The cardinal apparatus is formed by a thickening as a platform in the dorsal region of the inner layer. The anterior (am) and posterior (pm) myophores are on the wall of the ventral cavity, separated by the cardinal platform. The median

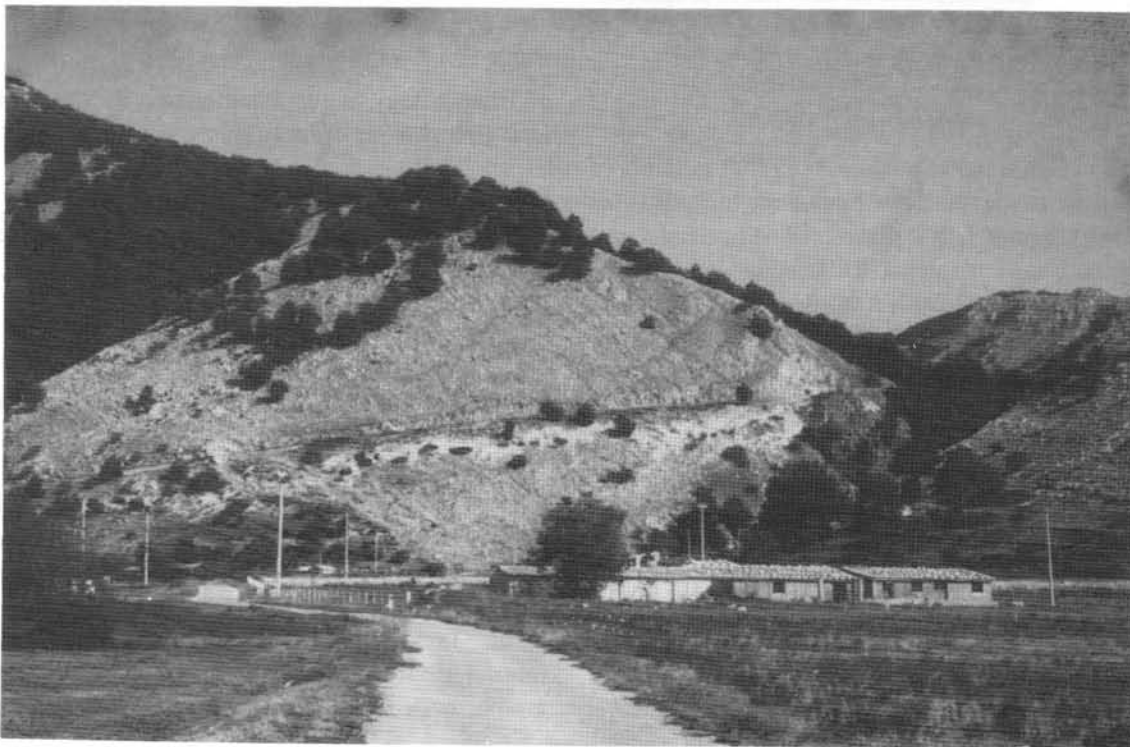


Figure 2. Serra Sbragavitelli shows limestone sequence cropping out along the road.

Plate 1. *Mathesia tertiocolloquirudistarum* n. gen., n. sp. Age: late Aptian. Locality: Serra Sbragavitelli in northeastern Matese, southern Apennines, Italy. Figure 1, a-b—Holotype, x 1. Complete specimen of both valves. The views show very inequivalve, inequilateral shell: AV (RV) conical, lightly curved; FV (LV) capuliform with umbo lightly curved dorsally; ornamentation (ol = outer layer). In a, postero-ventral view of both valves. In b, antero-ventral view of both valves. Figures 2-4—Paratypes, x 1.3. AV = RV: antero-ventral views with ribs. Figure 5—FV = LV, x 1.8. Outer view that shows the ribs and the umbo. Figure 6—Longitudinal section of the valves in closed position, x 1.5. The view shows the hinges 1, 2, 3; sockets 1', 2', 3'. (1' is scantily evident); ventral-cavity, vc, without tabulae. Figures 7-10—Longitudinal sections of LV, x 4, capuliform, with hinges 1-3; socket 2'; ventral-cavity, vc. Figures 11-13—Transversal sections of RV, x 4. The views show, particularly, the ornamentation with obtuse ribs.

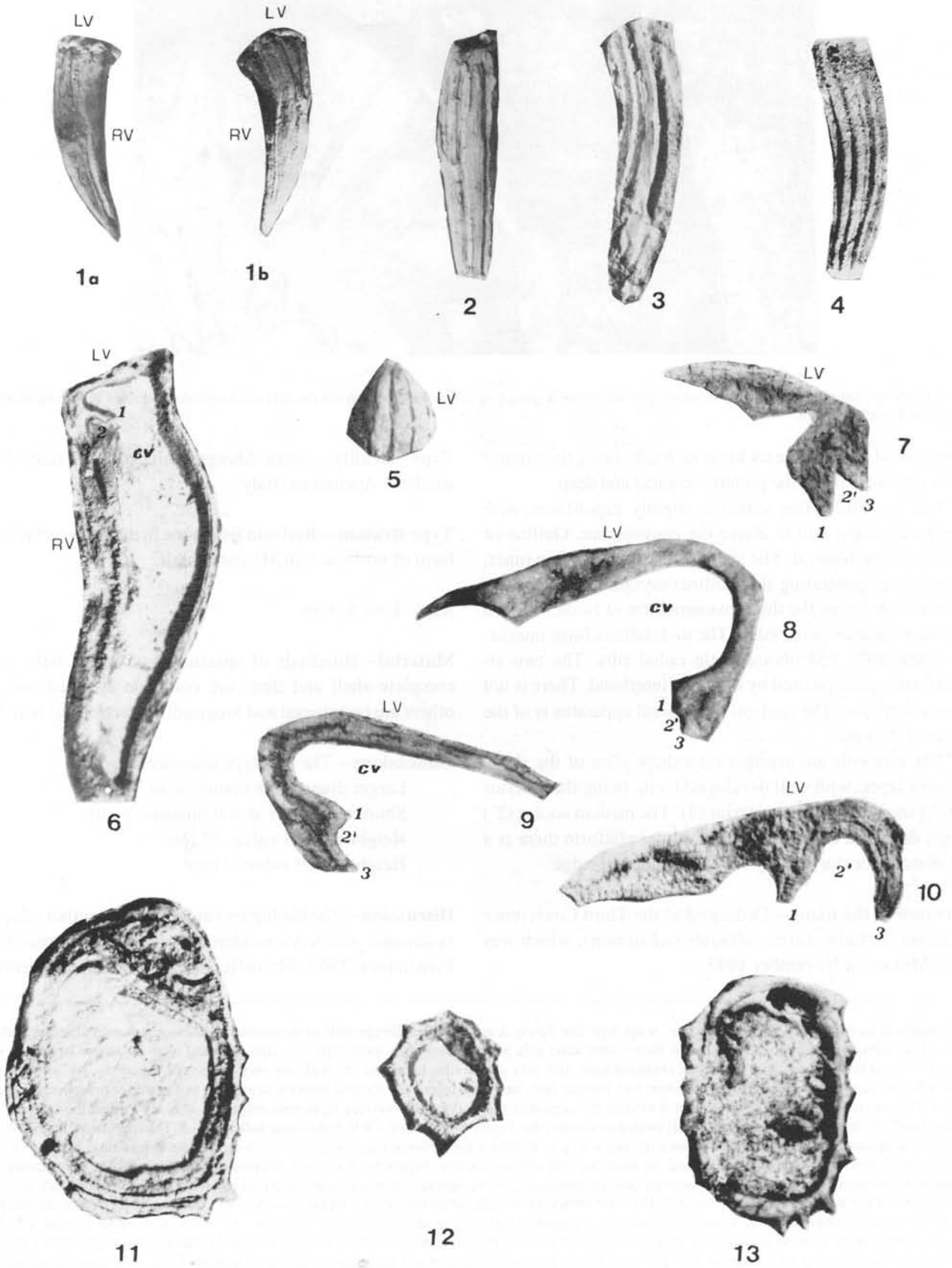




Figure 3. Patch-reef sample with *Mathesia tertii colloquii rudistarum* n. gen., n. sp. Transversal section (on the left) and longitudinal sections (on the right) of specimens in growth position, x 0.8.

tooth is conical (2) with one socket at each side, being the anterior shallow and conical and the posterior conical and deep.

The left valve (free valve) is slightly capuliform, with prosogyrous umbo a little above the commissure. Outline of the commissure suboval. The shell wall is formed of an inner, compact layer generating the cardinal-myophoral structures; the outer layer forms the thin ornamentation of funnel-shaped lamellae, with undulating edge. The undulations form intercalated acute-angle and obtuse-angle radial ribs. The two siphonal bands are separated by a narrow interband. There is not ligamental groove. The cardinal myophoral apparatus is of the type: am 1 2' 3 pm.

The elements are together on a thick plate of the shell-wall inner layer, with well developed teeth, being the anterior tooth (1) smaller than the posterior (3). The median socket (2') is large, deep and conical. On the cardinal platform there is a large dorsal accessory cavity for the ligamental ridge.

**Derivation of the name**—Dedicated to the Third Conference on Rudists (in Latin *Tertii colloquii rudistarum*), which was held in Mexico in November 1993.

**Type locality**—Serra Sbragavitelli, northeastern Matese, southern Apennines, Italy.

**Type stratum**—Rudistid limestone in the open carbonate platform of northeastern Matese Massif.

**Age**—Late Aptian.

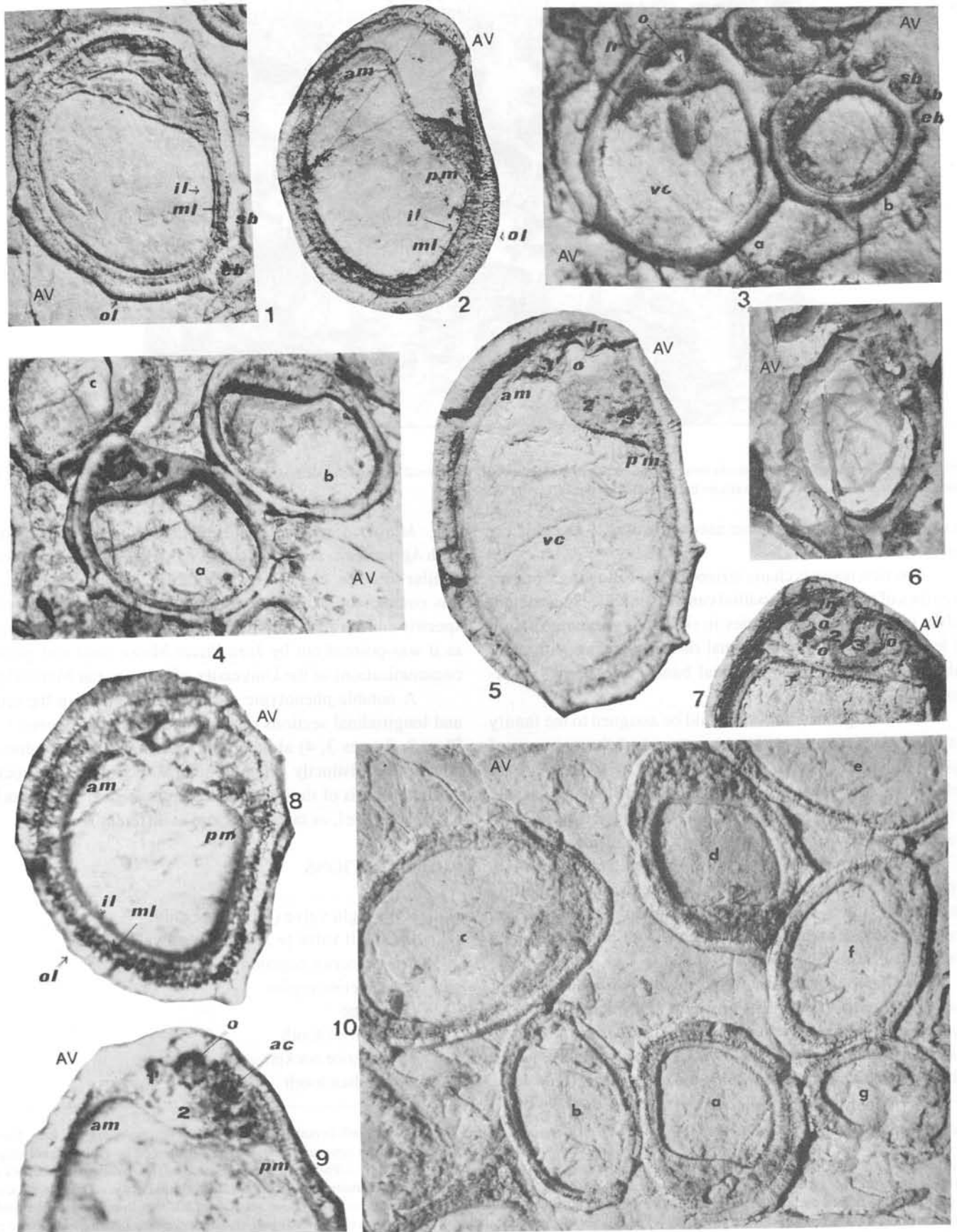
**Material**—Hundreds of specimens of which only one is a complete shell and three are complete attached valves; the others are transversal and longitudinal sections of both valves.

**Dimensions**—The holotype measures:

- Larger diameter at commissure: 11 mm
- Shorter diameter at commissure: 9 mm
- Height of right valve: 33 mm
- Height of left valve: 2 mm

**Discussion**—For the higher categories, the author adopted the systematic which is considered more natural (Lamarck, 1812; Pchelintsev, 1959; Mainelli, 1992). The minor categories and

Plate 2. *Mathesia tertii colloquii rudistarum* n. gen., n. sp. Age: late Aptian. Locality: Serra Sbragavitelli in northeastern Matese, southern Apennines, Italy. Figure 1—AV = RV, transversal section, x 6. The view shows outer layer (ol), median layer (ml), inner layer (il); siphonal band in sb flat, more large than eb that is hollow, both separated in the sides by common ornamentation with very obtuse ribs; interband (ib) with one very obtuse rib. Figure 2—AV = RV, transversal section, x 6. The view shows: shell structure in outer (ol), median (ml), and inner layers (il). Parietal position of anterior and posterior myophores. Figure 3—a, b—AV = RV, transversal sections, x 4.5. In a, it is evident the large accessory cavity (o) receiving ligamental ridge (lr). In b, are evident the siphonal bands sb (exhalant band), ib (interband), eb (inhalant band) limited by obtuse ribs. Figure 4—a-c—AV = RV, transversal section, x 3.8. The specimens, in growth position, show siphonal apparatus of each of them oriented in such a way as to ensure the siphonal functionality of the others; some obtuse ribs. In a, it is evident the accessory cavity receiving ligamental ridge, and the posterior and anterior sockets. Figure 5—AV = RV, transversal section, x 8. The view shows: cardinal apparatus in the elements 1', 2, 3'; position of anterior (am) and posterior (pm) myophores; large accessory cavity (o) receiving ligamental ridge (lr); ventral-cavity (vc). Figure 6—AV = RV, transversal section, x 4. The view shows, essentially, some obtuse ribs. Figure 7—AV = RV, transversal section of cardinal platform, x 8. The view shows: elements 1', 2, 3'; accessory cavities; ligamental ridge (lr) in accessory cavity. Figure 8—AV = RV, transversal section, x 8. The view essentially shows layers il-ml-ol; median layer (ml) in two rows of rounded pallial canals; position of anterior (am) and posterior (pm) myophores. Figure 9—AV = RV, transversal section of dorsal region, x 9. The view shows position of anterior and posterior myophores; elements 1', 2, 3' of cardinal apparatus; large accessory cavity receiving ligamental ridge (lr); accessory cavities (ac). Figure 10—AV = RV, transversal sections, x 4.5. In a, two rows of rounded pallial canals. In all the sections is evident the variability in the shape.





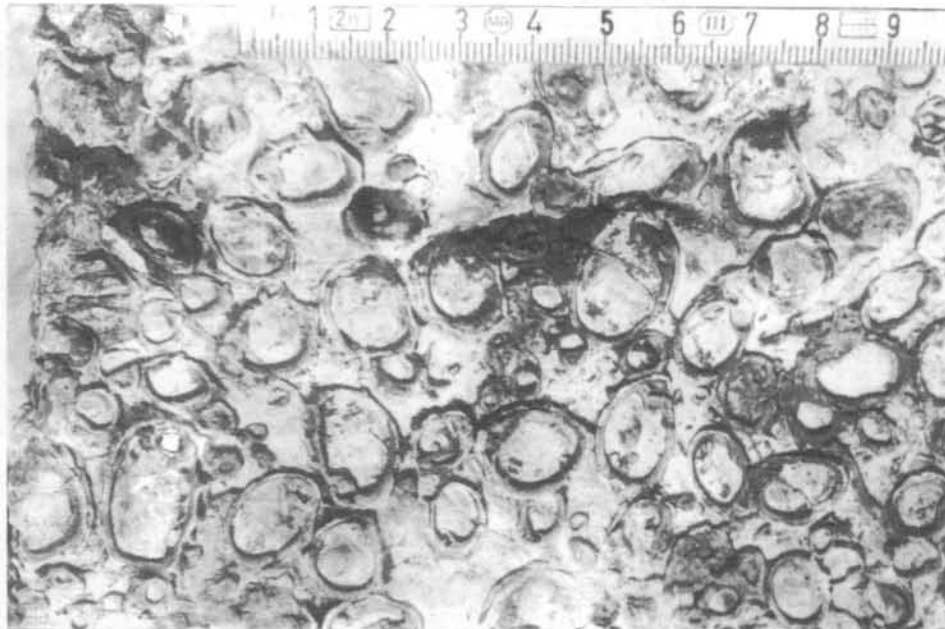


Figure 4. Patch-reef sample with *Mathesia terticolloquiiirudistarum* n. gen., n. sp. Transversal sections of specimens in growth position. Each of them shows the siphonal apparatus oriented in a way to ensure the siphonal functionality of the others.

most of the technical terms are used according to Dechaseaux and coworkers (1969).

The new taxon is characterized by the following features: two rows of small circular pallial canals in middle layer of right valve; a few accessory cavities in right valve; ornamentation of low, obtuse-angle longitudinal ribs, alternating with more salient, acute-angle ribs; siphonal bands with narrow interband.

The new genus *Mathesia* could be assigned to the family Caprinidae d'Orbigny (1850) on account of the presence of pallial canals and accessory cavities, but it more precisely belongs to the "informal group number 3" of Dechaseaux (1969) which comprises those caprinids with some radiolitid features. The new taxon presents the following characteristics of Radiolitidae: right valve bigger and conical, left valve small, almost opercular; ornamentation of longitudinal ribs resulting from radial funnel-shaped lamellae; siphonal bands flat and concave with an interband; teeth fused with myophores on a platform of right valve.

The mentioned features are compared with those present in some genera of the family Caprinidae d'Orbigny or subfamily Radiolitinae Gray, particularly with *Ichthyosarcolites* Desmarest and *Agriopleura* Kuhn (1932) (Masse and Philip, 1974), which resemble in some aspects to the new taxon (Table 1).

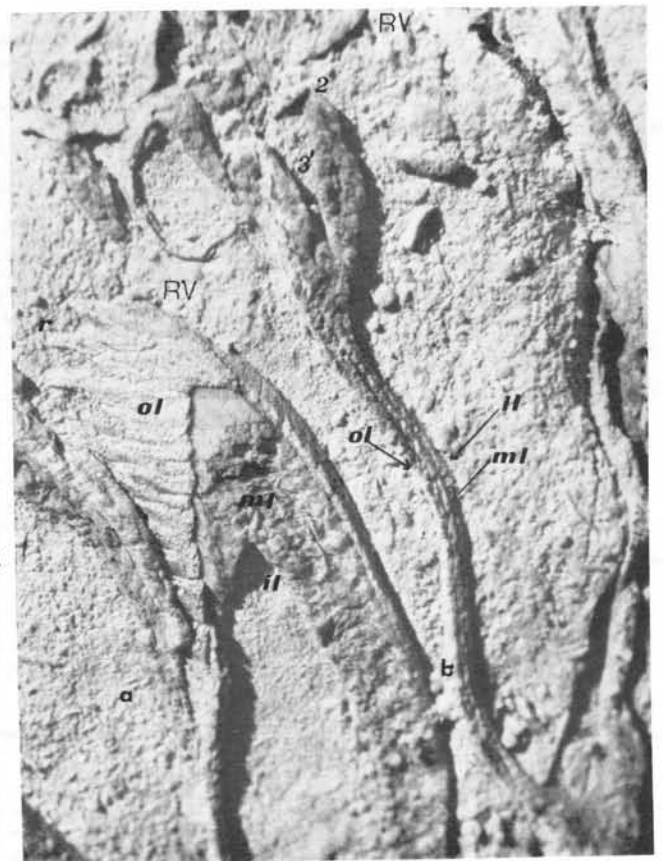
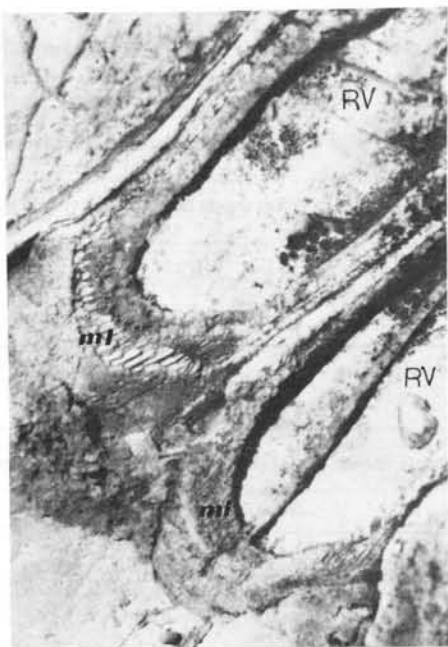
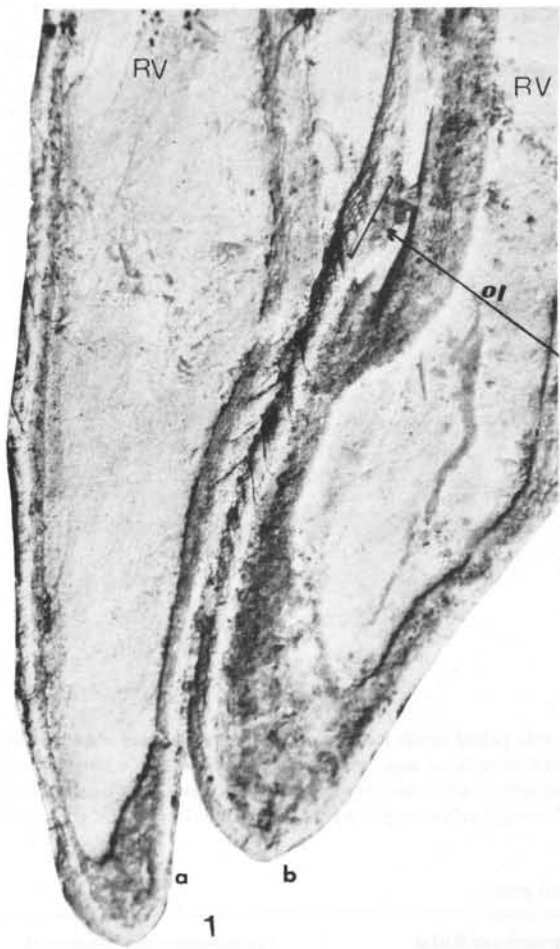
*Mathesia terticolloquiiirudistarum* is also compared with *Agriopleura darderi* Astre (1933, 1957), because they are similar in a few characteristics (Table 2). However, through this comparison, it is evident that these two taxa are no conspecific and hardly could they belong to a possible new genus, as it was pointed out by Jean Pierre Masse (oral and written communication) of the University of Provence at Marseille.

A notable phenotypic variability is shown in the cross and longitudinal sections of the valves (Plate 2, figures 3, 4; Plate 3, figures 3, 4) although this fluctuation can be due, in part, to the distinctly oriented natural sections in the rocks, cutting the axis of the valves at different angles, which can be normal, parallel, or tangential, and at different levels.

#### ABBREVIATIONS

- RV = right valve (= FV, free valve)
- LV = left valve (= AV, attached valve)
- pr = posterior region
- ar = anterior region
- c = carine
- 1 = anterior tooth
- 1' = anterior socket
- 2 = median tooth

Plate 3. *Mathesia terticolloquiiirudistarum* n. gen., n. sp. Age: late Aptian. Locality: Serra Sbragavitelli in northeastern Matese, southern Apennines, Italy. Figure 1—*a, b*, Longitudinal sections of AV = RV, x 5. The views show ventral-cavity lacking tabulae; ornamental outer layer, *ol*, formed by radial funnel-shaped lamellae. In *b*, the cellulo-prismatic structure of a portion of ornamentation is evident. Figure 1, *b'*—Portion of ornamentation in 1, *b*, enlarged, that shows the cellulo-prismatic structure among the lamellae. Figure 2—AV = RV, x 5. The inferior portion in longitudinal section shows the ventral-cavity, *vc*, and the thickness of the shell. The higher portion, on the right, shows the ornamentation with obtuse ribs. Figure 3—Two oblique sections of RV that show the pallial rounded canals, x 6. Figure 4, *a, b*. In *a*, oblique section of RV, x 5 that shows ornamentation of the outer layer, *ol*, in a funnel-shaped undulating lamella with obtuse ribs on the edge; median layer, *ml*, area of the pallial canals; inner layer, *il*. In *b*, longitudinal section of RV, x 5, that shows compact, thin inner layer, *il*; canaliculate median layer, *ml*; ornamental outer layer, *ol*; elements 3', posterior socket, 2, median tooth of the cardinal apparatus; ventral-cavity, *vc*, lacking of tabulae.



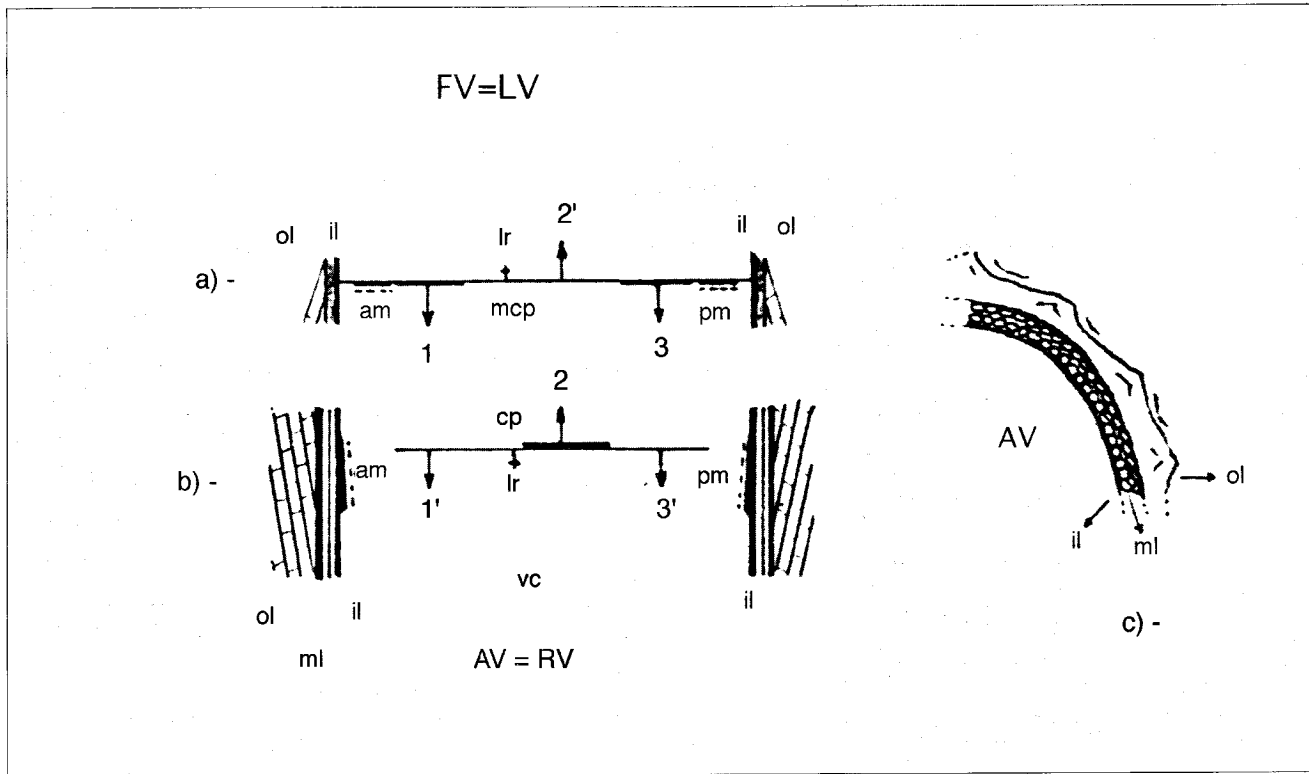


Figure 5. *a, b, c*, Structures in diagram. In *a, b, c*, Shell layers: il = thin, compact, inner layer; ml= pallial canals in two rows (canaliculate layer = median layer); ol = ornamental funnel-shaped lamellae (outer layer). In *a, b*, longitudinal sections. Cardinal-myophoral apparatus: 1 = anterior tooth, 1' = anterior socket, 2 = median tooth, 2' = median socket, 3 = posterior tooth, 3' = posterior socket, pm = posterior myophore, am = anterior myophore, lr = ligamental ridge. Ligamental groove lacking. Other symbology: FV = free valve, LV = left valve, AV = attached valve, RV = right valve, mcp = myophoral-cardinal apparatus, cp = cardinal apparatus, vc = ventral cavity.

Table 1. Distinction among compared genera.

Characters considered	<i>Mathesia</i> n.g.	<i>Agriopleura</i> Kuhn	<i>Ichthyosarcolites</i> Desmarest
Attached valve=right valve (AV=RV)	Conical, conical elongate	Conical, conical elongate	Curved or loosely coiled, carinated
Shell structure in median layer	Canaliculate		Canaliculate
Accessory cavities	One or few	One	
Ornamentation	Longitudinally ribbed or with few very obtuse ribs intercalated	Longitudinally ribbed	Longitudinally very minutely ribbed
Siphonal bands	Flat <i>sb</i> hollow <i>eb</i> or both lightly hollow	Smooth, in furrows	
Cardinal apparatus	On platform separated by <i>vc</i> with septum	On platform separated by <i>vc</i> with septum	On thin tickness of dorsal ventral cavity wall
Myophoral apparatus	<i>Pm am</i> on ticknesses of ventral-cavity wall	<i>Pm am</i> on ticknesses of ventral-cavity wall	<i>Pm am</i> on ticknesses of ventral cavity wall
Ligamental apparatus	Ligamental ridge in one large accessory cavity; no ligamental groove	Ligamental ridge in one large accessory cavity; ligamental groove	
Ventral-cavity tabulae	Absent	Absent	Present
Free valve=left valve (FV=LV)	Capuliform or operculiform	Operculiform or lightly concave	Curved, carinated
Accessory cavity	One	One	
Ornamentation	Longitudinally minutely ribbed or with few obtuse ribs intercalated	Longitudinally minutely ribbed	Longitudinally very minutely ribbed
Siphonal bands	Flat <i>sb</i> hollow <i>eb</i> or both lightly hollow	In furrows	
Cardinal-myophoral apparatus	Elements fused on platform or with myophores on light apophyses	Elements fused on platform or with myophores on light apophyses	Elements fused on platform
Ligamental apparatus	Ligamental ridge in one large accessory cavity; no ligamental groove	Ligamental ridge in one large accessory cavity; no ligamental groove	
Ventral-cavity tabulae	Absent	Absent	Present



Table 2. Distinction among the compared species deduced from specimens discovered in La Costa mountain, in northeastern Matese Massif.

Characters considered	<i>Mathesia terticolloquii</i> n. sp.	<i>Agriopleura darderi</i> Astre
Attached valve = right valve (AV = RV)	Conical, elongate	Conical, elongate
Pallial canals in transversal section	Small, rounded in two rows	Lanceolated, arrow shaped, ovoidal in one row, formed by invagination of median layer
Accessory cavities	Three small on posterior cardinal platform, one large dorsally receiving ligamental ridge	One large dorsally receiving ligamental ridge
Ornamentation	Longitudinally ribbed with very obtuse ribs intercalated	Longitudinally ribbed
Siphonal apparatus	Flat sb, hollow eb	Sb eb lightly hollows
Cardinal apparatus	Conical median tooth between two sockets on platform separated by <i>vc</i> with septum	Conical median tooth between two sockets on platform separated by <i>vc</i> with septum
Myophoral apparatus	On thick areas of ventral cavity wall	On thick areas of ventral cavity wall
Ligament	Ligamental ridge in one large accessory cavity; no ligamental groove	Ligamental ridge in one large accessory cavity; ligamental groove
Free valve = left valve (FV = LV)	Capuliform	Operculiform
Accessory cavity	One large dorsally receiving ligamental ridge	One large dorsally receiving ligamental ridge
Ornamentation	Longitudinally minutely ribbed with few obtuse ribs intercalated	Longitudinally minutely ribbed
Siphonal bands	Flat sb, hollow eb	Eb sb lightly hollow
Cardinal apparatus	Elements fused on platform; 1-3 well-developed, 2' deep, conical; pm am on platform	Elements fused on platform; 1-3 highly equally developed, 2' deep, oblique; pm am on external face of light apophyses
Ligament	Ligamental ridge in dorsal large accessory cavity; no ligamental groove	Ligamental ridge in one large accessory cavity; ligamental groove

2' = median socket  
 3 = posterior tooth  
 3' = posterior socket  
 am = anterior myophore  
 pm = posterior myophore  
 cm = commissural plane

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