

# A new etyid crab (Crustacea, Decapoda) from the Cenomanian of France

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## Abstract

A new genus and species of etyid crab, *Rolerithosia lobulata*, is described from the Upper Cenomanian from the Charentes (Western France).

*Key words:* Crab, new taxon, Etyidae, Cenomanian, Charentes, France

## Introduction

Recently Karasawa et al. (2011) recognized eight genera within the Etyidae *sensu stricto* and *Xanthosioides* Breton & Collins, 2009, within the Etyidae *sensu lato*. Schweitzer et al. (2012) transferred *Caloxanthus* A. Milne-Edwards, 1864 and *Feldmannia* Guinot and Tavares, 2001, to a new family Feldmanniidae Schweitzer et al., 2012, to which they added a new genus, *Bretonia* Schweitzer et al., 2012 and added the new genus *Steorrosia* Schweitzer et al., 2012 to the Etyidae. *Xanthosioides* Collins & Breton, 2009 remained unplaced at the familial level. The new genus and species, *Rolerithosia lobulata*, gen. et sp. nov., from the Cenomanian of Charentes, France, described herein, is referable to the Etyidae in having the required diagnostic carapace proportions, the anterolateral margin with four spines, including a prominent lateral (epibranchial) spine and a sinuous posterolateral margin; also, isolated epibranchial lobes and more or less oblique mesogastric lobes, together with the relative distance of the cervical furrow from the front and a finely granulated surface ornament. It differs from all other known members of the family primarily in the lobular arrangement of the regions with the exception of the metabranchial lobes which remain in the sometimes encountered depressed state. Prominent epigastric lobes are reminiscent of those in *Etyxanthosia*.

## Geological context

The type specimen of *Rolerithosia lobulata* gen. et sp. nov. comes from a quarry located at l'Amas, in the southern vicinity of the village Rouillet Saint-Estèphe, Charente, Western France (coordinates 45°33'N 0°01'E). The Lafarge Group extracted clay from this quarry for the production of cement. Excavation stopped in 2001 and the quarry is now rehabilitated, partially as a lake and partially filled in with gravels and covered with vegetation so that the section is no longer accessible. In the best conditions of exposure, the section showed a nearly complete sequence of the Late Cenomanian, organized in 3 lithological units (Néraudeau & Moreau, 1989; Moreau, 1996), from base to top:

–Unit D, also known as "argiles tégulines" (Coquand, 1858), is a 5 meters thick clay level;

–Unit E is a sandstone, more or less lithified by calcareous cement and with abundant *Pycnodonte biauriculata*;

–Unit F is a lithified limestone, with a decreasing fraction of quartz upwards. The rich fossil association is characterized by rudists (*Ichthyosarcolithes triangularis*) and numerous benthic organisms (molluscs, echinoids).

The type specimen of *Rolerithosia lobulata* gen. et sp. nov. was collected on the floor of the quarry in the lowest levels of the Unit D. The sedimentary facies is an unconsolidated, dark blue-gray, silty clay, rich in oyster shells (*Ceratostreon flabellatum*, *Pycnodonte biauriculata* and *Rhynchostreon suborbiculatum*). A diverse suite of both macro- and micro-fossil is listed in the "argiles tégulines" (Bourgueil et al., 1970;

Néraudeau & Moreau, 1989; Moreau, 1996), including foraminifers, ostracods, echinoids, and brachiopods. Pyrite occurs as millimeter-scale nodules and phosphate elements are common, with nodules, vertebrate remains (Rage & Néraudeau, 2004; Vullo et al., 2007) and fragments of crustacean shells. The taphonomic conditions, the oyster's population structure (Videt & Néraudeau, 2003) and microfossil assemblages (Moreau, 1996) suggest a shallow marine, and restricted environment, with often dysoxic conditions and occasional influence of brackish waters. The available paleogeographic maps place the locality on the north-east margin of the Aquitaine Basin. The shore area was bordered by a flat littoral marsh fed by silicoclastic material derived from erosion of the metamorphic basements of the Massif Central (Platel, 1996). The unit D represents the maximum of sand and clay input on the Aquitaine margins and the most restricted conditions for the Late Cenomanian.

### Systematic palaeontology

Order Decapoda Latreille, 1802

Infraorder Brachyura Linnaeus, 1758

Superfamily Etyoidea Guinot & Tavares, 2001

Family Etyidae Guinot & Tavares, 2001

### Genus *Rolerithosia* gen. nov.

*Derivation of name:* *Roleri-*: latin root for Roulet, Roulet-Saint-Estèphe (Charentes, France) being the *locus typicus* of the type species. *-thosia* is an ending used for etyid genera. Gender feminine.

*Type species:* *Rolerithosia lobulata* sp. nov. by monotypy.

*Diagnosis:* Carapace subhexagonal, length about 60% of the estimated total width (ETW); arc of orbitofrontal margin, in line with anterolateral margins, takes up about 49 % ETW, of this, the poorly preserved front occupies the median third; front probably downturned, concave and sulcate; orbits circular and in line with anterolateral margins; anterolateral margins lined with three blunt nodes; a stout, upturned, posteriorly directed spine at the lateral angle; sinuous posterolateral margins converge to sharp posterior angles; posterior margin straight, a little more than half as wide as front. From a pair of minute gastric pits, cervical furrow crossing midline about 40% distant from the front, broadly V-shaped medially, becoming sinuous and transverse; hepatic furrow short, vertical; branchiocardiac furrows inclined slightly forwards; turning to embrace the urocardiac lobes; epigastric lobes elongate, anteromesogastric process of triangular mesogastric lobe not reaching front; urogastic lobe rectangular, cardiac region lingulate; epibranchial lobe isolated by cervical furrow and branchial groove; mesobranchial lobe oblique; all regions except metabranchial region lobate. Dorsal surface crowded with flattened granules, with few, larger, scattered at random.

*Differences with the other genera:* see above.

### *Rolerithosia lobulata* sp. nov.

(Figs. 1–3)

*Derivation of name:* lobulata: lobulated, a distinct feature of the carapace.

*Diagnosis:* As for genus.

*Material:* Holotype, a carapace from the Upper Cenomanian, unit D,

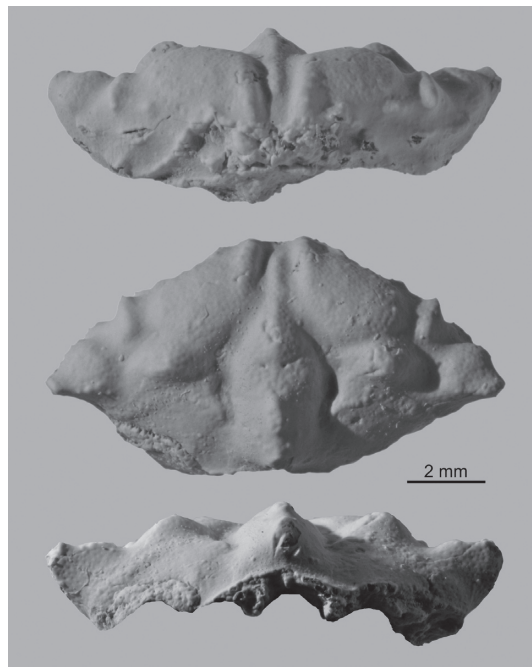


Fig. 1. *Rolerithosia lobulata* gen. nov., sp. nov. Holotype. Upper Cenomanian, unit D, “Argiles tégulines”, Bois de l’Amas quarry, Roulet-Saint-Estèphe (Charente), western France. MHN LM 2010.1.55. Downwards: frontal, dorsal and posterior views. Specimen whitened with MgO<sub>2</sub>.

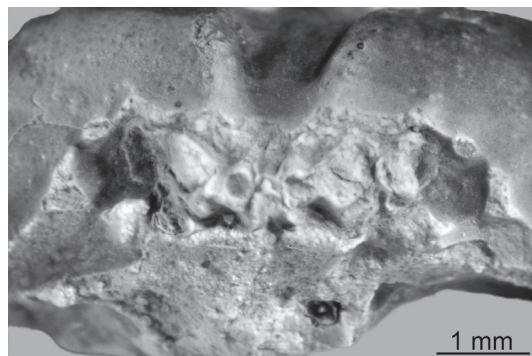


Fig. 2. *Rolerithosia lobulata* gen. nov., sp. nov. Holotype. Upper Cenomanian, unit D, “Argiles tégulines”, Bois de l’Amas quarry, Roulet-Saint-Estèphe (Charente), western France. MHN LM 2010.1.55. Close-up of the orbitofrontal region, exact frontal view. Specimen slightly whitened with MgO<sub>2</sub>.

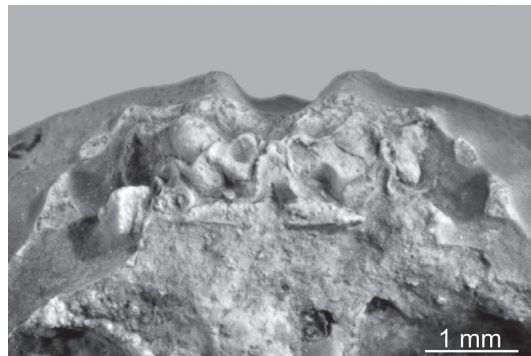


Fig. 3. *Rolerithosia lobulata* gen. nov., sp. nov. Holotype. Upper Cenomanian, unit D, “Argiles tégulines”, Bois de l’Amas quarry, Roulet-Saint-Estèphe (Charente), western France. MHN LM 2010.1.55. Close-up of the orbitofrontal region, oblique (fronto-ventral) view. Specimen slightly whitened with MgO<sub>2</sub>.

“Argiles tégulines”, blue marl with oysters, Bois de l’Amas quarry, 10 km SW Angoulême, Roullet-Saint-Estèphe (Charente), western France. The holotype is deposited in the Natural History Museum of Le Mans (“Musée Vert”), number MHN LM 2010.1.55.

*Description:* Carapace subhexagonal in outline, length about 63% of the estimated total width. In frontal view the carapace is divided into four more or less equal parts, with depressions separating the median from the protogastric lobes and protogastric from mesobranchial lobes; a tubercle on the mesogastric lobe forms the highest part. Despite the lobes, the transverse and longitudinal planes are flat (fig. 1); the longitudinal section is steeply down-turned in front. There are three bluntly rounded nodes, the second the largest, the third depressed on the anterolateral margins before a stout, upturned, posteriorly directed spine at the lateral (epibranchial) angle. Sinuous posterolateral margins, converging to sharp posterior angles before the straight posterior margin, are a little more than half the orbitofrontal width. The orbitofrontal margin occupies about a half (49%) of the ETW and is in line with the curvature of the anterolateral margins. Taking up the median third, the poorly preserved down-turned front is gently concave between protruding ends of elongated epigastric lobes. The orbits are circular with thickened margins, the upper shows the basal scar of a median node before a notch, the lower has a large notch between the basal scar of an outer orbital spine and a marked, triangular inner spine. Fine granules line the broad, straight median portion of the epistome which, terminating in a short pisiform extension one third the width, intrudes between the antennal cavities supporting fusiform basal segments of the antennules. In both, an open, circular orifice marks the articulation with the succeeding segment.

From a pair of gastric pits, the cervical furrow is broadly V-shaped across the midline, about 40% distant from the front; it becomes wider and deeper round the epi- and mesobranchial lobes; short, deep hepatic furrows run straight forward, isolating small, tubercular hepatic lobes. Laterally weak branchiocardiac furrows, bounded behind by a granulated ridge divide, the anterior branch unites with the cervical furrow, deepening, the posterior branch bounds the uro-cardiac region. With the exception of the metabranchial lobes, the lobes are markedly lobate, that on the triangular mesogastric lobe, the largest. Not reaching the front, a narrow, ridged anteromesogastric process is bounded laterally by the epigastric lobes. Epibranchial lobes are isolated by the cervical furrow and branchial groove 1, ovate mesobranchial lobes are oblique. The lingulate cardiac region is barely separated from both the urogastric and intestinal lobes, together they form a rectangle with concave sides and rounded base; the cardiac and intestinal lobes each have a median tubercle, that on the latter, if entire, would just overhang the posterior margin.

Minute flattened granules cover the dorsal surface; coarser granules line the epigastric lobes and others are randomly scattered. Small, weak depressions (100 - 150 µm) in diameter are scattered in an hexagonal pattern over the entire carapace, some bear a central seta pit.

*Remarks:* Similar antennular articulation “orifices”, partially infilled, are preserved in a specimen of *Feldmannia wintoni* (Rathbun, 1935), figured by Schweitzer *et al.* (2012, fig. 10. 2).

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## References

- Bourgueil, B., Moreau, P., and Vouvé, J. (1970), Angoulême. Carte géologique à 1/50000. Bureau de Recherche Géologique et Minière, sheet XVII-32.
- Collins, J. S. H. and Breton, G. (2009), New crabs (Crustacea, Decapoda) from the Cenomanian stratotype (Western Paris Basin, France). *Bull. Mizunami Fossil Mus.*, 3, 43–50.
- Coquand, H. (1858), Description physique, géologique, paléontologique et minéralogique du département de la Charente. 1. Imprimerie de Dodiviers & C<sup>e</sup>, Besançon, 542 p.
- Guinot, D. and Tavares, M. (2001), Une nouvelle famille de Crabes du Crétacé, et la notion de Podotremata Guinot, 1977 (Crustacea, Decapoda, Brachyura). *Zoosytema*, 23, 507–549.
- Karasawa, H., Schweitzer, C. E., and Feldmann, R. M. (2011), Phylogenetic analysis and revised classification of podotrematous Brachyura (Decapoda) including extinct and extant families. *Jour. Crust. Biol.* 31, 523–565.
- Latreille, P. A. (1802–1803), Histoire naturelle, générale et particulière, des Crustacés et des Insectes, 3, F. Dufart, Paris, France.
- Linnaeus, C. (1758), *Systema Naturae per Regna Tria Naturae Secundum Classes, Ordines, Genera, Species, cum Characteribus, Differentiis, Synonymis Lotis*. Edition 10, 1, iii+ 1–578 pp. Holmiae.
- Milne-Edwards, A. (1862–1865), Monographie des crustacés de la famille des Cancériens. *Ann. Sci. Nat. Zool. Sér.* 4, 18 (1862), 1–85; 20 (1863), 273–324; Sér. 5, 1(1854), 31–88; 3 (1865), 297–391.
- Moreau, P. (1996), Analyse de la transgression cenomanienne sur la bordure nord-occidentale du bassin d'Aquitaine. *Géologie de la France*, 1, 3–16.
- Néraudeau, D. and Moreau, P. (1989), Paléocécologie et paléobiogéographie des faunes d'échinides du Cénomanien nord-aquitain (Charente-Maritime, France), *Geobios*, 22, 293–324.
- Platel, J.-P. (1996), Stratigraphie, sédimentologie et évolution géodynamique de la plate-forme carbonatée du Crétacé supérieur du nord du bassin d'Aquitaine. *Géologie de la France*, 4, 33–58.
- Rage, J. C. and Néraudeau, D. (2004), A new pachyostotic squamate reptile from the Cenomanian of France. *Palaeontology*, 47, 1195–1210.
- Rathbun, M. J. (1935), Fossil Crustacea of the Atlantic and Gulf Coastal Plain. *Spec. Pap. Geol. Soc. America*, 2, I–vii+ 1–160.
- Schweitzer, C. E., Feldmann, R. M., Frantescu, O. D., and Klompmaker, A. (2012), Revision of Etyidae Guinot and Tavares, 2001 (Crustacea, Brachyura). *J. Paleontol.*, 86, 129–155.
- Videt, B. and Néraudeau, D. (2003), Variabilité et hétérochronies chez l'exogyre *Rhynchostreon suborbiculatum* (Lamarck, 1801) (Bivalvia : Ostreoidae : Gryphaeidae) du Cénomanien et du Turonien inférieur des Charentes (SW France). *Comptes Rendus Palevol*, 2, 563–576.
- Vullo, R., Cappetta, H., and Néraudeau, D. (2007), New sharks and rays from the Cenomanian and Turonian of Charentes, France. *Acta Palaeontologica Polonica*, 52, 99–116.