

# A new species of *Iravadia* s.s. (Mollusca, Gastropoda, Iravadiidae) from the late Oligocene of the Aquitaine Basin (southern France). The earliest record of brackish-water Iravadiidae?

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## KEY WORDS

Mollusca,  
Gastropoda,  
Rissooidea,  
*Iravadia* s.s.,  
Oligocene,  
Cenozoic,  
brackish-water,  
mangrove,  
southern France,  
new species.

## ABSTRACT

A new species of the Indo-West Pacific gastropod *Iravadia* s.s. is described from the late Oligocene (Chattian) of southwestern France, the earliest record of the genus. *Iravadia dolini* n. sp. is close to the recent species *I. angulata* (Laseron, 1956) but has a shorter spire and smaller ovate aperture not angled. This discovery suggests that the adaptation of *Iravadia* Blanford, 1867 to brackish waters (mangroves subenvironment?) probably occurred earlier than previously suspected.

## RÉSUMÉ

Une nouvelle espèce d'*Iravadia* s.s. (Mollusca, Gastropoda, Iravadiidae) de l'Oligocène supérieur du bassin d'Aquitaine (Sud de la France). La première occurrence d'Iravadiidae d'eaux saumâtres ?

Une nouvelle espèce du genre Indo-Ouest Pacifique *Iravadia* s.s., la plus ancienne occurrence du genre, est décrite de l'Oligocène supérieur (Chattien) du Sud-Ouest de France. *Iravadia dolini* n. sp. est proche de l'espèce actuelle *I. angulata* (Laseron, 1956) mais s'en distingue par une spire plus courte et une ouverture ovale, plus petite et non anguleuse. L'adaptation d'*Iravadia* Blanford, 1867 aux eaux saumâtres (sub-environnement de mangroves ?) est probablement plus précoce que ne laissaient présumer les données fossiles.

## MOTS CLÉS

Mollusca,  
Gastropoda,  
Rissooidea,  
*Iravadia* s.s.,  
Oligocène,  
Cénozoïque,  
eaux saumâtres,  
mangrove,  
Sud de la France,  
nouvelle espèce.

## INTRODUCTION

The family Iravadiidae Thiele, 1928 includes modern estuarine and marine species of small size (less than 10 mm) with generally a characteristic smooth, depressed protoconch. In the Cenozoic of Europe, a large number of iravadiids species has been recorded from Eocene marine deposits of the Paris Basin (Le Renard 1996), but very few taxa have been described from Oligocene and Miocene stages. However, a number of Oligocene and Miocene gastropods of the family Iravadiidae has been recently collected from the Aquitaine Basin, and most are undescribed. Within the upper Oligocene of the Adour Basin, there are 15 iravadiids. Among these is an undescribed strongly spirally sculptured species that belongs to *Iravadia* s.s., which is the first record of the genus for Europe.

## GEOLOGICAL SETTING AND PALEOECOLOGICAL DATA

The outcrop of Tauziède is located near Tauziède farm, 2 km northwest of Peyrehorade village (Fig. 1). It is one of the numerous, temporarily accessible outcrops in the paleocanyon of Saubrigues. This paleocanyon (Kieken 1973) was probably cut during the mid-Oligocene, a period of major Antarctic glaciation responsible for a large sea-level drop and extensive deep-sea erosion (Prothero 1994). The canyon infill was initiated by late Oligocene marl deposits (Cahuzac *et al.* 1995), which contain rich molluscan assemblages, particularly in some coarser detritic layers. The most common gastropods of the encasing marls are (in systematic order): *Diastoma ultimum* Cossmann & Peyrot, 1922; *Alvania peyreirensis* (Cossmann & Peyrot, 1919); *Benthonellania antepelagica* Lozouet, 1990; *Nassarius aturensis* (Peyrot, 1925); *Ceritoturris fecunda* Lozouet, 1999; *Ringicula semidecorata* Morlet, 1882. For the bivalves, the abundance of *Corbula* cf. *gibba* (Olivi, 1792) is noteworthy, while some outcrops yielded very abundant shells of the minute *Kelliella* cf. *miliaris* Philippi, 1844.

These assemblages reflect circalittoral to upper bathyal environments as inferred by the range of the Recent species of *Benthonellania* from 80 m to the bathyal zone (Lozouet 1990), and *Kelliella miliaris* (Bonnin *et al.* 1987).

The new iravadiid was collected in a very fine detritic layer (5-10 mm thick) included in a marl sequence. Molluscs from this layer are poorly preserved and originate from various environments. This particular assemblage includes numerous subadult marine gastropods of the family Turritellidae Lovén, 1847 (*Turritella raulini* Cossmann & Peyrot, 1922; *Turritella syrtica* Cossmann & Peyrot, 1922) and immature marine bivalves of a species of *Glycymeris* Linnaeus, 1758, mixed with some freshwater to brackish water gastropods of the genera *Theodoxus* Montfort, 1810, *Melanoides* Olivier, 1804, *Melanopsis* Férussac, 1807 and *Granulolabium* Cossmann, 1889. The collection of the new *Iravadia* s.s. only from this special assemblage suggests that it may belong to the same low-salinity environment as the brackish components of the malacofauna; noting that it is from a mixed assemblage.

## SYSTEMATICS

Superfamily RISSOOIDEA J. E. Gray, 1847

Family IRAVADIIDAE Thiele, 1928

Genus *Iravadia* Blanford, 1867

TYPE SPECIES. — *Iravadia ornata* Blanford, 1867, by monotypy; Recent, India.

Ponder (1984) reviewed this family and admitted nine genera. Ponder (1994) described a new genus (*Lantauia*) from Hong Kong, the type species of which (*L. taylori* Ponder, 1994) is unusual among iravadiids by its trochiform shape. Le Renard (1996) discussed the family as part of a revision of the Paris Basin Eocene malacofauna and introduced two new fossil genera. The Iravadiidae comprise 11 genera of which nine are recent: *Iravadia* (with four subgenera: *Iravadia* s.s., *Chevallieria* Cossmann, 1888; *Pseudonoba* Boettger, 1902 and *Fairbankia* Stoliczka, 1868),

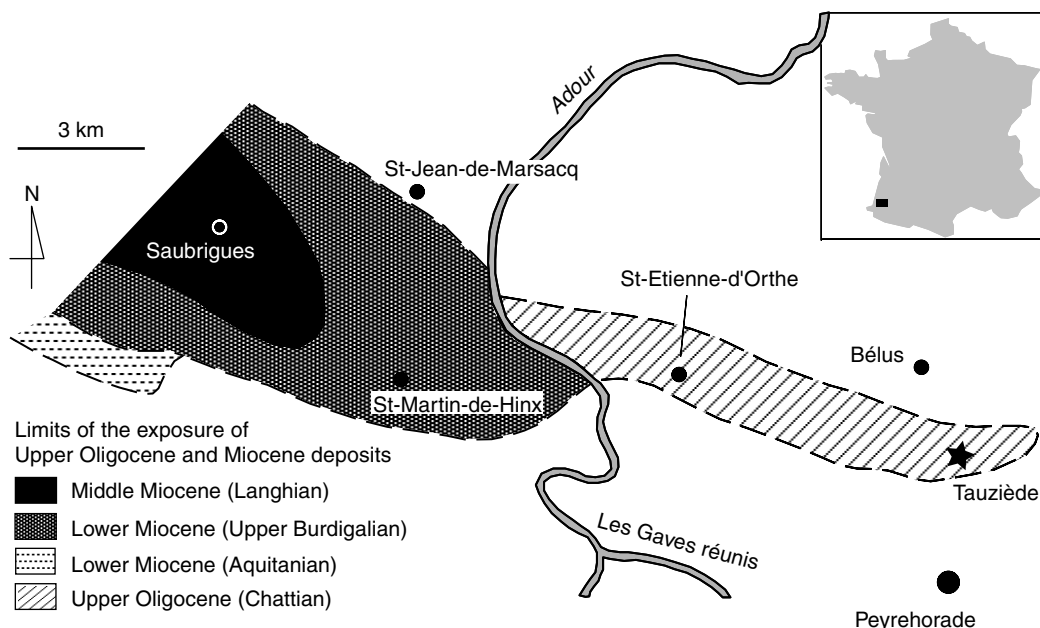


FIG. 1. — Location of the fossil locality (★), with the late Oligocene to mid-Miocene fill of the paleocanyon of Saubrigues (after Kieken 1973; Cahuzac *et al.* 1995).

*Rissopsis* Garrett, 1873, *Hyala* H. & A. Adams, 1852, *Ceratia* H. & A. Adams, 1852, *Liroceratia* Ponder, 1984, *Acliceratia* Ponder, 1984, *Pseudomerelina* Ponder, 1984, *Lantauia* Ponder, 1994; and three exclusively fossil genera, *Rhombostoma* Seguenza, 1876, *Anteplana* Le Renard, 1996, *Styloceratia* Le Renard, 1996.

*Iravadia* (*Iravadia*) *dolini* n. sp.  
(Figs 2; 3)

TYPE MATERIAL. — Holotype and one paratype, Muséum national d'Histoire naturelle de Paris, Département Systématique et Évolution.

TYPE LOCALITY AND HORIZON. — Both specimens are from Bélus (Tauziède), Landes, from a detrital layer with *Turritella* Lamarck, 1799 in the late Oligocene (Chattian). Marls with *Miogypsinoides* Yabe & Hanzawa, 1928, calcareous nannofossil zone NP 25 (Cahuzac *et al.* 1995).

ETYMOLOGY. — The species is dedicated to Cyrille Dolin.

MEASUREMENTS (HOLOTYPE). — Height 3 mm; max. width 1.6 mm.

DESCRIPTION (HOLOTYPE)

Small shell, relatively solid, ovate conic, non-umbiculate. Teleoconch consisting of more than 3.5 convex whorls with impressed sutures. Protoconch slightly flat on top, smooth, of about two convex whorls, the first whorl minute, terminating in sharp discontinuity. Teleoconch with strong spiral sculpture; three main cords on each spire whorl, six on last adult whorl; cords separated by large interspaces that are broader than each spiral cord; threads present in the interspaces, notably below the suture, where one spiral thread is slightly larger than the others; all spiral sculpture crossed by numerous axial threads. Last whorl occupying 64.6% of total shell height. Aperture oval with relatively thick peristome; outer lip with heavy, slightly prosocline varix.

DISCUSSION

This is the first species of *Iravadia* s.s. to be recorded from the Tertiary. Previously described Oligocene Iravadiidae (Janssen 1978: *Ceratia*, *Hyala*; Lozouet 1998, 1999: *Pseudonoba*, *Nozeba*

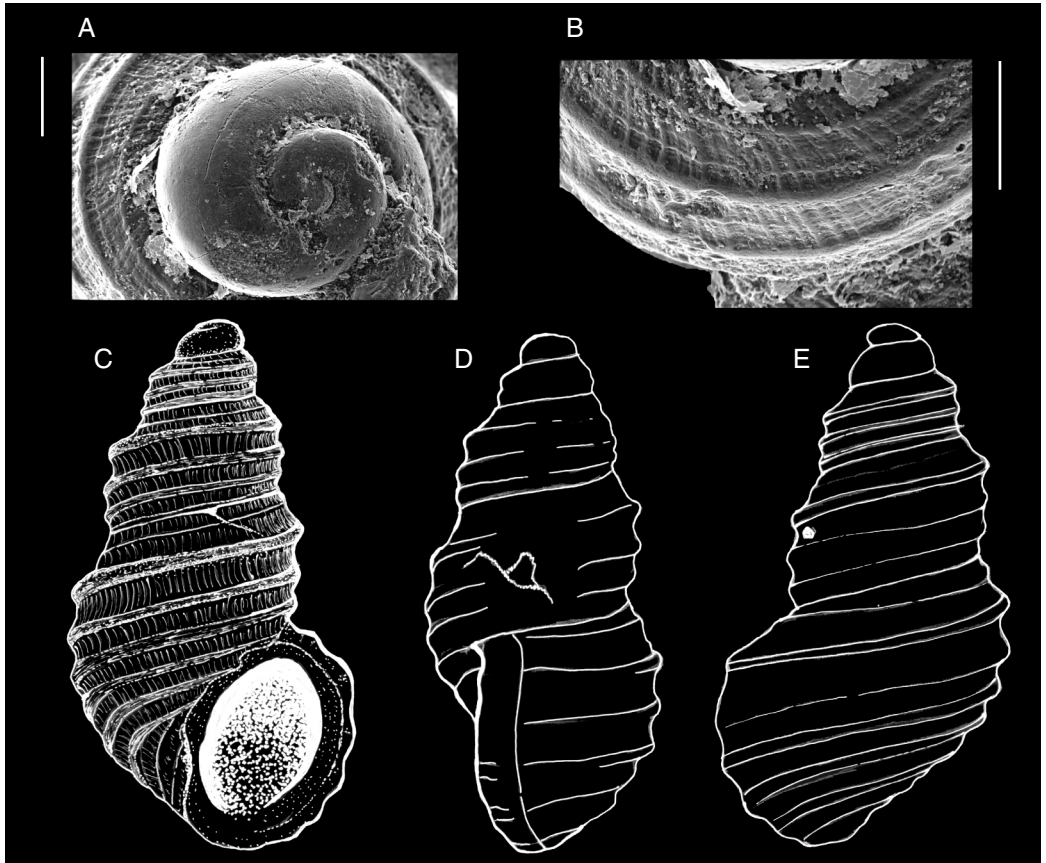


FIG. 2. — *Iravadia (Iravadia) dolini* n. sp.; **A**, protoconch of the paratype; **B**, abapical view of shell whorl sculpture, paratype; **C-E**, holotype, height 3 mm; **C**, apertural view; **D**, **E**, line drawings of the right lateral and abapertural views. Scale bars: **A**, **B**, 100  $\mu$ m.

Iredale, 1915) have smooth shells or are weakly sculptured and are strongly dissimilar. Since *I. dolini* n. sp. has strong spiral sculpture, it seems clear that it is related to Indo-West Pacific species of *Iravadia*: *Iravadia* s.s. and *Iravadia* (*Fairbankia*). According to Ponder (1984), the species of *Fairbankia* have slender spires and are more weakly sculptured. *Iravadia (Iravadia)* comprises species with predominantly spiral sculpture, but species such as *Iravadia quadrasi* (Boettger, 1893) also have pronounced axial sculpture. The Recent species *I. angulata* (Laseron, 1956) from Australia, included with little doubt in *Iravadia* s.s. by Ponder (1984), is especially close to *I. dolini* n. sp. Shared characters between *I. angulata* and *I. dolini* n. sp. are

the protoconchs (slightly flattened summit of the protoconch rather than the classic depressed planorbiform protoconch of the Iravadiidae) and the sculpture of three primary spiral cords on the spire. *Iravadia dolini* n. sp. differs from *I. angulata* in its shorter spire and the smaller, more ovate aperture which is not angled.

#### REMARKS AND CONCLUSION

In Indo-West Pacific and adjacent regions (e.g., South Japan), iravadiids are typically found in brackish water often associated with mangroves (Ponder & De Keyser 1998). In New Caledonia, *Iravadia (Iravadia)* cf. *quadrasi* (Boettger, 1893)

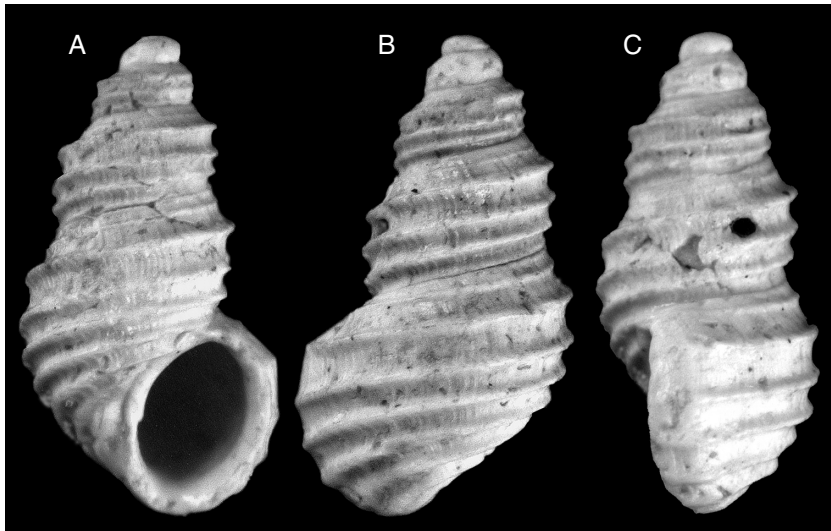


FIG. 3. — *Iravadia (Iravadia) dolini* n. sp., holotype; A, apertural view; B, abapertural view; C, right lateral view, height 3 mm.

was collected from the roots of *Rhizophora* mangroves (Koumac, station 1280, 20°34'S, 164°16'E, Montrouzier Expedition). This species lives especially on the algal turf of *Bostrichietum*, which is considered as a mangal subenvironment that grows as a sheath around the roots of intertidal mangroves. *Iravadia angulata*, which is very similar to *I. dolini* n. sp., also lives among mangroves (Ponder 1974). On the other hand, in European seas, the recent Iravadiidae are open-marine in ecology as are presumably most of the previously described fossil species.

In his evolutionary sketch of the Iravadiidae, Ponder (1984) hypothesised that some marine species of the *Pseudonoba* (a subgenus of *Iravadia* sensu Ponder) migrated into brackish water and gave rise to the other subgenera within *Iravadia* which live exclusively in brackish environments. The subgenus *Iravadia* (*Chevallieria*), which has mid-Eocene representatives, is assumed to have given rise to *Pseudonoba* (Ponder 1984); the earliest record of an undoubtedly *Pseudonoba* species is lower Miocene in age (*Pseudonoba peculiaris* Boettger, 1902 from the upper Burdigalian marls of the Aquitaine Basin). Le Renard (1996) and Lozouet (1998) have referred, but with doubt, several species from the mid-Eocene and

Oligocene to *Pseudonoba*. Thus there is no clear fossil evidence that *Chevallieria* is older than *Pseudonoba*. Finally, the fossil record of *Iravadia* s.s. in the late Oligocene suggests that the movement of the ancestral stock of *Iravadia* into brackish water and particularly into mangrove habitats is much more older than previously suspected.

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