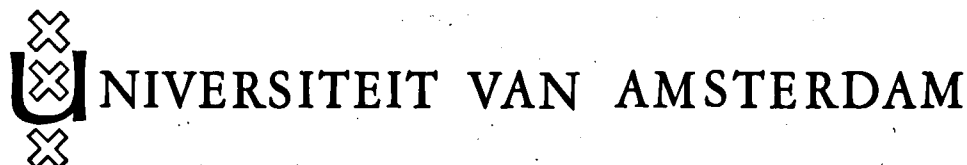


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ABNORMAL SINISTRORSITY IN THE MARGINELLIDAE (GASTROPODA)

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ABSTRACT

Two species of Marginellidae, *Closia angustata* (Sowerby, 1846) and *Hyalina effulgens* (Reeve, 1865), are added to Dance's list (1972) of abnormal sinistral marine gastropods. Including four other records the total number has increased to 70 species. Of these, 29 belong to the Marginellidae, which occur in all tropical and subtropical seas. There is no explanation so far for this very high percentage of sinistral species in a single family. Abnormal sinistrorsity seems to be related to the evolution of the Gastropoda: sinistral specimens are unknown in the primitive order of the Archaeogastropoda, they are rare in the Mesogastropoda (8 species), and less rare in the Neogastropoda (62 species). Within the order of the Neogastropoda, the superfamily Volutacea has the most (43) sinistral species, of which the major part (29 species) belongs to the family Marginellidae.

INTRODUCTION

Dance (1972 a, b) published a list of marine gastropod species with abnormal sinistral shells, of

which the total number was 64 species. Dance asked for more records, so that he would be able to publish later on a definitive annotated list of sinistral marine Gastropoda.

The following six records can be added to the list
Melo aethiopicus (Linnaeus, 1758) - fam. Volutidae. A sinistral specimen without a locality was figured by Platt (1949: 69, fig. 3).

Hydrobia stagnorum (Gmelin, 1790) - fam. Hydrobiidae. One sinistral specimen from the Netherlands (Sliggers, 1971: 81, fig. 1). Although this is a fossil specimen from the Eemien, the species is also known recent.

Murex (Chicoreus) adustus Lamarck, 1822 - fam. Muricidae, and *Oliva vidua* Röding, 1798 - fam. Olividae. Both specimens from the coast of India were figured in "Of Sea and Shore", vol. 3 (1972) no. 1: 49.

Closia (Bullata) angustata (Sowerby, 1846) -

fam. Marginellidae. One sinistral specimen is present in the mollusk collection of the British Museum (Natural History) as *Marginella angustata* Sow., ex coll. Winckworth. Locality unknown, but probably from India, since the label indicates "from a Brahmin of Ramesvaram", which is situated in the Gulf of Manaar between India and Ceylon.

Hyalina (Volvarina) effulgens (Reeve, 1865) - fam. Marginellidae. One sinistral specimen from Bermuda (fig. 1 a) is present in the collection of the Zoologisch Museum Amsterdam.

With these six records the total count of abnormal sinistral marine gastropods comes to 70 species.

SINISTRAL MARGINELLIDAE

Abnormal sinistrorsity occurs relatively often in the family Marginellidae. Tomlin (1917: 246) already mentioned this fact. He knew 19 sinistral marginellids out of 38 sinistral recent marine gastropods; of 9 fossil sinistral gastropods, 3 belonged to the Marginellidae. Dance (1972 a) listed 27 sinistral species of Marginellidae, together with the two records mentioned above, 29 sinistral species are presently known in this family.

Dance placed all Marginellidae into one single genus, *Marginella*. In the following list the sinistral Marginellidae are assigned to their proper genus, and their distribution is indicated. In general lines the classification of Wenz (1938-1944: 1372-1380) is followed. A more extensive classification of the Marginellidae was proposed by Coan (1965), who incorporated all 30 taxa described as new genera in the Marginellidae by Laseron (1957). Because we consider many of Laseron's names synonymous with other taxa or synonyms of each other, the classification of Wenz is used.

Genus *Marginella* Lamarck, 1799

<i>M. (s.s.) glabella</i> (Linnaeus, 1758)	W. Africa
<i>M. (s.s.) aurantia</i> Lamarck, 1822	W. Africa
<i>M. (s.s.) limbata</i> Lamarck, 1822	W. Africa
<i>M. (s.s.) nebulosa</i> (Röding, 1798)	S. Africa
<i>M. (s.s.) ornata</i> Redfield, 1870	S. Africa
<i>M. (s.s.) piperata</i> Hinds, 1844	S. Africa

Subgenus *Austroginella* Laseron, 1957

<i>M. (A.) muscaria</i> Lamarck, 1822	S. Australia
<i>M. (A.) johnstoni</i> Petterd, 1884	S. Australia
<i>M. (A.) pygmaea</i> Sowerby, 1846	S. Australia New Zealand

Genus *Prunum* Herrmannsen, 1852

<i>P. (s.s.) prunum</i> (Gmelin, 1791)	W. Indies
<i>P. (s.s.) amygdala</i> (Kiener, 1841)	W. Africa
<i>P. (s.s.) curtum</i> (Sowerby, 1832)	E. Pacific

Subgenus *Leptegouana* Woodring, 1928

<i>P. (L.) guttatum</i> (Dillwyn, 1817) syn. <i>longivaricosum</i> (Lamarck, 1822)	W. Indies
<i>P. (L.) apicinum</i> (Menke, 1828)	W. Indies
<i>P. (L.) pellucidum</i> (Pfeiffer, 1840)	W. Indies

Genus *Hyalina* Schumacher, 1817

<i>H. (s.s.) biannullata</i> (Fabricius, 1826) syn. <i>bilineata</i> (Krauss, 1848)	S. Africa
<i>H. (s.s.) capensis</i> (Krauss, 1848)	S. Africa
<i>H. (s.s.) cylindrica</i> (Sowerby, 1846)	S. Africa

Subgenus *Volvarina* Hinds, 1844

<i>H. (V.) mitrella</i> (Risso, 1826)	Mediterranean Sea
<i>H. (V.) effulgens</i> (Reeve, 1865)	W. Indies
<i>H. (V.) gracilis</i> (C.B. Adams, 1850)	W. Indies
<i>H. (V.) obscura</i> (Reeve, 1865)	S. Australia
<i>H. (V.) suavis</i> (Souverbie, 1859)	Pacific Oc.

Genus *Closia* Gray, 1857

<i>C. (s.s.) sarda</i> (Kiener, 1834)	Indian Oc.
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Subgenus *Bullata* Jousseaume, 1875

<i>C. (B.) angustata</i> (Sowerby, 1846)	Indian Oc.
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Genus *Gibberula* Swainson, 1840

<i>G. miliaria</i> (Linnaeus, 1758)	Mediterranean Sea
<i>G. philippii</i> (Monterosato, 1878)	Mediterranean Sea

Genus *Cypraeolina* Cerulli-Irelli, 1911

C. (s.s.) clandestina (Brocchi, 1814)

Mediterranean Sea

This species is often placed into the genus *Gibberulina* Monterosato, 1884; however, *Gibberulina* must be considered a junior synonym of *Bullata*. - Sinistral specimens of *C. clandestina* were described as var. *contraria* (Buquoy, Dautzenberg & Dollfus, 1883), and as monst. *sinistrorsum* (Dautzenberg, 1911).

Subgenus *Microginella* Laseron, 1957

C. (M.) pumilio (Tate & May, 1901) Australia

This list shows that sinistrorsity is known from various genera and subgenera in the Marginellidae. Although the genera *Persicula* Schumacher, 1817, and *Cryptospira* Hinds, 1844, each have a number of common species, no sinistral specimens were recorded so far. The possibility of finding sinistral specimens in other genera of the Marginellidae is almost nil, mainly due to rarity. Two genera, *Marginellona* von Martens, 1903, and *Afrivoluta* Tomlin, 1947, each comprise of only one species, *M. gigas* von Martens, 1903, and *A. pringlei* Tomlin, 1947. These two species are very rare. The genus *Pachyathron* Gaskoin, 1853, contains two rare species (Coomans, 1972), the genus *Rivomarginella* Brandt, 1968, also has two rare species, which are living in freshwater (Coomans & Clover, 1972). The genus *Canalispira* Jousseaume, 1875, has a few species which are not common.

The family Marginellidae contains many species. Wagner & Abbott (1967: 136-172) recognized 580 living species. Since 29 species are known to have sinistral specimens, this makes 5%. According to Boss (1971: 106) the number of recent Marginellidae is 250 species; we feel that this number cannot be accepted, as it is based on an old species list by Tomlin (1917).

The distribution of the sinistral Marginellidae does not lead to any explanation of the high percentage of sinistrorsity within this family. The species with sinistral specimens are living in all tropical and subtropical waters where Margi-

nellidae are found:

Mediterranean Sea	4 species
West Africa	4 species
South Africa	6 species
West Indies	6 species
Eastern Pacific	1 species
Indo-Pacific	3 species
(South) Australia	5 species
New Zealand	1 species

It is not surprising that West and South Africa, the West Indies and Australia have the largest number of sinistral species, as these areas are rich in Marginellidae. The relative high number of sinistral species in the Mediterranean Sea, where only ten species of Marginellidae are found, can be explained by the thorough exploration of this area.

DISCUSSION

Compared with abnormal sinistral species known from other marine gastropod families, the Marginellidae are exceptional. The 29 sinistral marginellid species form 41.4 % out of the 70 known species of sinistral marine gastropods. The numbers of abnormal sinistral species in several taxa of the Prosobranchia are summarized in table I, in which the special status of the Marginellidae is shown.

Sinistrorsity is more common to the Volutacea than to the other three superfamilies of the Neogastropoda. At order level the Neogastropoda have a far higher (62 species = 88.6 %) sinistrorsity than the Mesogastropoda (8 species = 11.4 %), whereas the Archaeogastropoda have none. This seems to indicate that abnormal sinistrorsity is related to a higher development in the marine Prosobranchia. Abnormal sinistral specimens are not recorded from the subclass Opisthobranchia.

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Table I. Numbers of known abnormal sinistral species in several taxa of marine Gastropoda.

<u>Subclass</u>	<u>Order</u>	<u>Superfamily</u>	<u>Family</u>
Prosobranchia - 70	Archaeogastropoda - 0		
	Mesogastropoda - 8		
	Neogastropoda - 62	Muricea - 7	
		Buccinacea - 9	
		Conacea - 3	
		Volutacea - 43	Olividae - 2
			Mitridae - 2
			Vasidae - 3
			Harpidae - 0
			Volutidae - 7
			Cancellariidae - 0
			Marginellidae - 29

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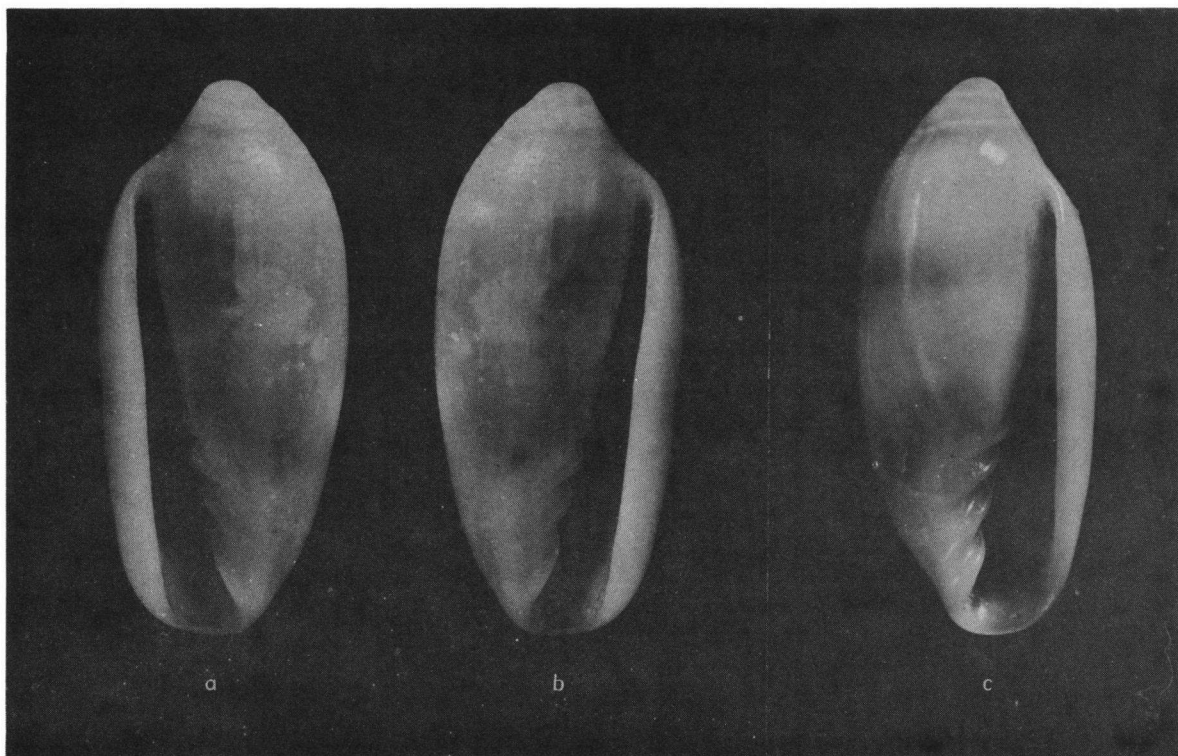


Fig. 1. *Hyalina (Volvarina) effulgens* (Reeve, 1865) from Bermuda.

a, Sinistral specimen, length 9.0 mm;

b, the same specimen as a, figured as a dextral shell;

c, normal specimen, length 10.0 mm.

Specimens in coll. Zoölogisch Museum Amsterdam.

Photographs L.A. van der Laan.