

**A new species of *Fulgoraria* Schumacher, 1817  
(Gastropoda: Volutidae)  
from the bathyal Taiwanese water**

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**KEYWORDS.** Gastropoda, Volutidae, East China Sea, *Fulgoraria* (*Fulgoraria*) *kaoe* sp. nov.

**ABSTRACT.** A new species from the southern part of the East China Sea is described here and compared with related species of the same subgenus *Fulgoraria* sensu stricto.

## INTRODUCTION

Around the mid 1980s, the start of commercial trawling revealed the high biodiversity of this area. It also brought to light many well-differentiated populations of Fulgorariinae along various parts of the continental slope along the East China Sea as well as the South China Sea.

Since the comprehensive work of Shikama (1967), bathyal trawling in those areas has led to the discovery of seven new species: *Fulgoraria* (*Fulgoraria*) *ericarum* Douté, 1997 from Vietnamese waters; *F.* (*Saotomea*) *minima* Bondarev, 1994, *F.* (*Fulgoraria*) *leviuscula* Rehder, 1969 (= *F. glabra* Habe & Kosuge, 1970) and *F.* (*Musashia*) *allaryi* Bail, 2005 from the South China Sea; *F.* (*Saotomea*) *pratasensis* Lan, 1997 from off Ryukyu Islands; *F.* (*S.*) *solida* Bail & Chino, 2000 and *F.* (*Musashia*) *chinoi* Bail, 2000 from the southwestern waters of Kyushu (Japan). As a byproduct of fisheries, large numbers of various *Fulgoraria* are now offered on the shell markets. Among them, a species so far unnamed is described here.

## Abbreviations

MNHN: Muséum national d'Histoire naturelle, Paris, France.

Family **VOLUTIDAE** Rafinesque, 1815  
Subfamily **FULGORARIINAE** Pilsbry & Olsson, 1954  
Genus *Fulgoraria* Schumacher, 1817  
Subgenus *Fulgoraria* sensu stricto  
Type species *Fulgoraria chinensis* Schumacher, 1817, = *Voluta rupestris* Gmelin, 1791 (by original designation) Recent, Japan.

*Fulgoraria* (*Fulgoraria*) *kaoe* sp. nov.  
Figs 1, 2-16

**Type material.** Holotype length: 72.8 mm, width: 23.9 mm. MNHN 20984. Paratype length: 54,1 mm, width: 17.8 mm, juvenile specimen. MNHN n° 20985.

**Other material.** Three specimens in P. Bail collection: 76.4 mm x 25.2 mm, 79.5 mm, x 25.6 mm, 84.6 mm x 25.8 mm, one in A. Limpus collection: 83.3 mm x 27.3 mm, all from the reported type locality.

**Type locality.** Northern bathyal waters off Taiwan, off Keelung at 60-150 m depth.

**Range.** Northern Taiwan. The exact range is only known by convergent information, fishermen being reluctant to give their exact spots. Since it seems to have been discovered only recently, a restricted distribution is suspected.

**Habitat.** Not given, but most specimens are stained by a black muddy layer.

**Description.** Shell small for the genus, 80-100 mm, light but solid, narrowly fusiform with a high spire. Surface semi-glossy. Protoconch bulbous, of 2.5 smooth whorls deviated at 45° from axis of shell, with an average diameter of 4.2 mm, bearing a raised brown calcarella. Transition protoconch - teleoconch gradually marked by occurrence of faint axial costae. Teleoconch of 4.5 slender shouldered whorls, sculptured by 12-13 almost straight, keel-like axial ribs well marked on first 3 whorls, extending from suture to suture on the spire, becoming obsolete at the middle of body whorl, then disappearing on the last half. Spiral sculpture of close-set faint threads extending onto the whole teleoconch without noticeable variation of interspaces. Suture slightly indented without callus deposit. Aperture narrow, slit-like, forming an average of 65% of total shell length. Columella almost straight, bearing a raised row of 7-8 oblique plaits covered by thick porcelainous callus. Inner lip covered by a thin translucent layer of enamel. Fasciole absent. Siphonal notch very shallow. Background color uniformly flesh-colored overlain by a pattern of rather thin axial brown lines irregularly parallel, sometimes wavy, extending onto the entire teleoconch. Protoconch beige with a brown calcarella, columellar plaits white. Animal unknown.

**Discussion.** By its very specific characters such as small adult size, slim shape, protoconch with a prominent brown calcarella, columellar plaits almost buried beneath thick white callus, *F. kaoae* is easily distinguished.

It belongs to the subgenus *Fulgoraria* defined by globose protoconch, elongate shape sculptured by solid axial ribs, 6 to 9 plaits, pattern of well-defined axial lines (Bail, 2000).

*Fulgoraria kaoae* can be compared with the other species of this subgenus:

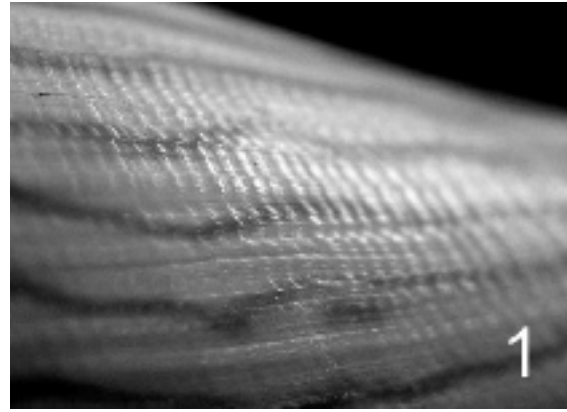
- *Fulgoraria (Fulgoraria) ericarum* Douté, 1997 is a large heavy species, most adults often over 200 mm long, protoconch without calcarella, deeper spiral sculpture close-set below the suture, beige columellar plaits without callus, very open pattern. (Figs 23-24).

- *Fulgoraria (Fulgoraria) hamillei* (Crosse, 1869) is larger, most adults often over 130 mm, strongly shouldered, protoconch rounded, spiral threads prominent, columellar plaits without callus, confused zigzag pattern divided into 3 parts on the body whorl. (Figs 17-18).

- *Fulgoraria (Fulgoraria) humerosa* Rehder, 1969 is larger, often over 170 mm, shoulders very angled, protoconch of variable shape, spiral threads crossed by axial grooves giving a deep cancellate subsutural surface, pattern of wavy close-set axial lines. (Figs 21-22).

- *Fulgoraria (Fulgoraria) leviuscula* Rehder, 1969 is larger, often over 130 mm, surface smooth and glossy, pattern of thick irregular axial lines. (Figs 25-26).

- *Fulgoraria (Fulgoraria) rupestris* (Gmelin, 1791) is the closest to *F. kaoae*. It differs by its larger size, heavier structure, protoconch rounded without calcarella, sculpture of deep spiral grooves becoming wider spaced on the central part of the body whorl, columellar plaits without callus, pattern of axial lines thicker and slightly more wavy. (Figs 19-20).



**Fig. 1.** *Fulgoraria (Fulgoraria) kaoae* sp. nov. Detail of spiral sculpture.

**Remarks.** One could argue that this species may not be a new discovery but remained unnamed because of confusion with juvenile *F. rupestris*. The brown pigmentation of the pattern is very fragile and easily eroded.

**Etymology.** Named in honor of Mrs. Ren Teresa Kao from Taiwan, who provided the material for study and donated the holotype to the MNHN.

#### REFERENCES

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- Bail, P. 2000. Genus *Fulgoraria* Pilsbry & Olsson, 1954 (Gastropoda: Volutidae Rafinesque, 1815). Description of a new species from Southern Japan and subgeneric consideration. *La Conchiglia* 294-295: 19-27.

#### Figures 2-26

**Figures 2-16.** *Fulgoraria (Fulgoraria) kaoae*.

**2-4.** holotype MNHN 20984, length 72.8 mm, width 23.9 mm; **5-6.** length 76.4 mm, width: 25.2 mm; **7-8.** length 83.3 mm, width: 27.3 mm; **9-10.** length 79.5 mm, width: 25.6 mm; **11-12.** paratype MNHN 20985, length: 54.1 mm, width: 17.8 mm; **13-14.** length 84.6 mm, width: 25.8 mm. **15.** protoconch (x3); **16.** columellar plaits.

#### Other species of the subgenus *Fulgoraria*.

**17-18.** *Fulgoraria (Fulgoraria) hamillei hamillei* (Crosse, 1869), 158 mm, East China Sea. **19-20.** *F. (F.) rupestris rupestris* (Gmelin, 1791), 125.6 mm, Taiwan; **21-22.** *F. (F.) humerosa* Rehder, 1969, 182.0mm, South China Sea; **23-24.** *F. (F.) ericarum* Douté, 1997, 184.1 MM, South China Sea; **25-26.** *F. (F.) leviuscula* Rehder, 1969, 132.5 mm, South China Sea.

