On the morphology and homology of the “central tooth” in the radulae of *Turrinae* (Conoidea: *Turridae*)

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**ABSTRACT.** Radular morphology was studied in detail in 64 species of 7 genera of *Turrinae*. It is suggested that the so-called “central tooth” is formed by a fusion of 3 teeth: the central one and a pair of lateral. A similar condition was found in some representatives of the subfamilies *Cochlespirinae* and *Crassispirinae* (*Turridae*). The radular morphology, together with the shell characters is still the basis for discriminating the taxa of *Gastropoda* at the family level. For some of the groups, e.g. most of *Caenogastropoda*, the radula is rather conservative in terms of the number of teeth in a transverse row (most of the families possess a taenioglossan radula), while in others it is rather variable. *Neogastropoda* are characterized by 5 to one tooth in the transverse row, while most of them have only 3 teeth in a row.

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The superfamily *Conoidea* is unique among *Neogastropoda*, since the variability of their radulae is comparable to the rest of the *Neogastropoda*. The most “complete” radular segment is found in the family *Drelliiidae*, which have 5 teeth in a row, while representatives of other families have only 2-3 teeth in a row.

Radulae of a number of species of *Turridae* have been illustrated and described recently [Taylor et al., 1993; Kantor, Taylor, 2002; Medinskaya, 2002] with the major emphasis on marginal teeth. In this family the marginal teeth are usually referred as “wishbone”. This ill-defined term was based probably on incorrect interpretation of the tooth as consisting of two separate limbs. It was demonstrated, that despite the obvious morphological variability of “wishbone” teeth it is a single blade-shaped unit with thickened edges and without separation between the two thickened limbs [Kantor, Taylor, 2002]. Contrary, little attention was paid to the central teeth in *Turridae*, and it is usually considered, that they either possess a large central tooth, or the tooth is missing. This strongly opposes *Turridae* to *Drelliiidae*, that always have small central and a pair of comb-like lateral teeth.

Radula in the subfamily *Turrinae* has been illustrated for a number of species, mostly as line drawings, by Powell [1966], while SEM micrographs of several species have recently been published by Medinskaya [2002]. Both authors characterized the radula of the species of the subfamily as consisting of wishbone marginal teeth and with or without a broad unicuspid central tooth with a needle-shaped cusp.


The purpose of this paper is to demonstrate the variability of the “central tooth” of radula of *Turrinae* and to establish its homology.

**Material and methods**

In the current paper I deal with a small selection of the species (9 species illustrated). The radular morphology of these selected species covers the entire observed range of variability of the “central tooth” morphology. The material is stored in the Muséum National d’Histoire Naturelle, Paris, France (MNHN).

Radulae were extracted from dried specimens after re-hydration of the body. Radulae were cleaned in dissolved bleach, mounted on the clean glass slides, air-dried, coated with gold and examined with JEOL JSM 840A Scanning Microscope. The folding of the radular membrane was observed under highest magnification of the stereomicroscope while extending it for the SEM preparation.

Since some of the species mentioned below are not yet described, they are referred to under “working” numbers, which they bear in the collections of MNHN.

“SL” stands for the shell length, “AL” for length of the aperture (excluding siphonal canal).