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Abnormalities in the Radula of
Drymaeus virgulatus (Fér.)

by

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Very few references concerning abnormal radulae are to be found in the literature on non-marine mollusca, and these deal only with abnormalities in the number and form of the teeth.

A very interesting deformation in the position and appearance of the transverse rows of teeth, of which we could find no other recorded instance was found in a number of *Drymaeus virgulatus* (Fér.).

During 1948, one of us (L.V.) received nine living specimens of this species collected on April 11th, 1948, in the „Boven Prinsenkwartier” on the isle of St. Martin, one of the northern Dutch Lesser Antilles group.

One of us (B.V.) made microscopical preparations of the jaws (Plate 2 Fig. 1) and radulae. The latter, on examination all showed the interesting deformation to be described. The posterior part of the radula contains two rows of quite small abnormal teeth (vide, Plate 1 Fig. 1, and Plate 2 Fig. 2). The rows before and after these two contain identical normal teeth but they differ from each other in their horizontal arrangement. The rows in front of the two abnormal rows are zic-zac thus $\vee\vee$ (vide, Plate 2 Fig. 2), the angle supported by the two limbs of which the central tooth is the junction, being about 118° .

This appears to be normal for the radula of *D. virgulatus*. At the two rows of small abnormal teeth, however, this angle disappears, and subsequent rows are more or less straight and parallel to the abnormal rows. The odontoblasts which had been so arranged as to lay down zic-zac rows of teeth, for some unknown reason suddenly underwent a change. The old rows of odontoblasts become shorter and shorter until only a few cells in the middle were left. The last \wedge row before the change is very short. The change in orientation then suddenly takes place, and the two rows of teeth laid down during the change itself are quite abnormal and shapeless. Then the straight rows of normal teeth commence. It is also noteworthy that the central teeth of the latter rows are not exactly in the same longitudinal plane as those of the earlier rows.

The arrangement described above is illustrated in the diagram (textfig. 1).

The figures by the lines indicate the number of teeth in that part of the row and C indicates the central tooth.

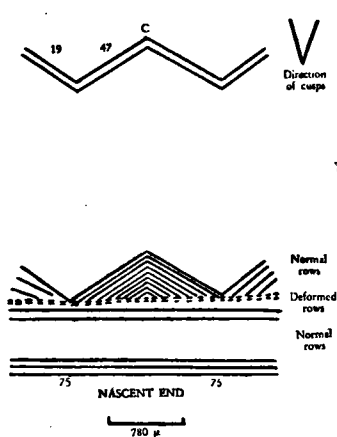


Diagram of the form of the transverse rows of the anterior part (above) and of the posterior part (below) of the radula of *Drymaeus virgulatus* (Fér.).

B. Verdcourt del.

Since all the specimens in the collection showed the same deformation, it seemed possible that it might prove to be part of the normal development of the radula of *D. virgulatus*. This did not prove to be the case, however, since a number of specimens of this species collected in Port Marie and Hato in Curaçao on Jan. 19th, 1948, did not show the abnormality in their radulae.

We wondered whether or not a similar abnormality was to be found in any other *Drymaeus* species and one of us (B.V.) examined the slides of radulae of this genus in the Gwatkin collection, British Museum (Natural History). It was found that the abnormality was shown by several other species of *Drymaeus* and also of *Bulimulus*. In some cases, however, both the rows in front of, and behind the abnormal rows are straight. The shape of the transverse

rows is not constant in a given species e.g. in some specimens of *D. virgulatus* the rows are zic-zac, but are all straight in others. It is always possible of course that the change had occurred in the latter specimens and that the abnormal teeth had worn away.

This remark also applies to all the radulae examined, so that even those radulae which did not show the abnormality, might have done so in the early life of the animal or perhaps would have done so had the animal continued to live.

Abnormalities were not observed in the radulae of *D. costaricensis* (Pfeiffer), *multilineatus* (Say), *papyraceus* (Mawe), *felix* (Pfeiffer), *curionianus* Reeve, *mossi* (E. A. Smith), *koppeli* (Sowerby), *multifasciatus* (Lam.), *interruptus* (Pfeiffer), *interpunctus* (Martens), *hegewischi* (Pfeiffer), *binominis* (E. A. Smith), *depictus* (Reeve), *dissimularis* (Preston), *dominicus* (Reeve), *scitulus* (Reeve), *broadwayi* (E. A. Smith).

The abnormality was shown in *D. vincentianus* var. *straminea* (Gülding) from Trinidad, and *vincentianus* (Pfeiffer), and *vexillum* (Wood) from Peru, and more markedly in *vespertinus* (Pfeiffer)

from Peru, *brachystoma* Orb. from Bolivia, *poecilus* Orb. from the Argentine, *oreades* (Orbigny) and some specimens of *virgulatus* (Fér.).

In the majority of these all the transverse rows are straight. In a few slides of *D. poecilus* Orb. two separate groups of deformed rows occurred in the one radula. Some radulae of *Bulimulus infundibulus* Pfeiffer and *B. constrictus* Pfeiffer, showed a somewhat similar deformity to the *Drymaeus* species. We may therefore assume that this type of deformity is of frequent occurrence in *Drymaeus* and *Bulimulus* though not always of quite the same form.

H. B. Baker in his „Land and Freshwater Mollusks of the Dutch Leeward Islands” (Occ. Papers Mus. Zool. Univ. Michigan Nr. 152, Aug. 12th, 1924) discusses the radula of a specimen of *D. virgulatus* (Fér.) from Seroe Papaja, Curaçao (p. 84) and gives figures of the teeth (Plate XIV fig. 52). He says that the transverse rows run obliquely backwards to the 54th tooth, and that with the 55th, the rows curve abruptly forward so that the entire row has the shape of a broad ∇ . It is evident that the number of the teeth in various parts of the zic-zac row is very variable. Baker collected the species in Curaçao, and also in Aruba and Bonaire but does not mention any deformities in the radulae he examined.