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METHODS & TECHNIQUES

Artifacts Incurred by the Treatment of Acmaeid Radulae with Alkalies

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(1 Text figure)

THE TREATMENT OF RADULAE with alkalies to remove associated tissue or teeth has been described in a number of publications, including: ABBOTT (1954), FRITCHMAN (1960b), GRANT (1937), KNUDSEN (1966), RADWIN (1969), and TURNER (1960). All the techniques are quite similar in methods and materials. The alkali generally used is sodium hydroxide (NaOH) or potassium hydroxide (KOH) and the radula is treated in either a cold or hot solution, the latter being more commonly used.

Reference to artifacts produced by the use of caustic alkalies on chitinous structures was made as early as 1851 by LEUCKART and more recently by RISSO-DOMINGUEZ (1961). The basic problems are: 1) the varying degrees of shrinkage of the radular ribbons and 2) the dissociation of the teeth from the radular ribbon.

In the course of preparing acmaeid radulae, the author used standard techniques as described by the aforementioned authors. As illustrated in Figures 1a and 1b, the resulting radular ribbons of *Collisella scabra* (Gould,

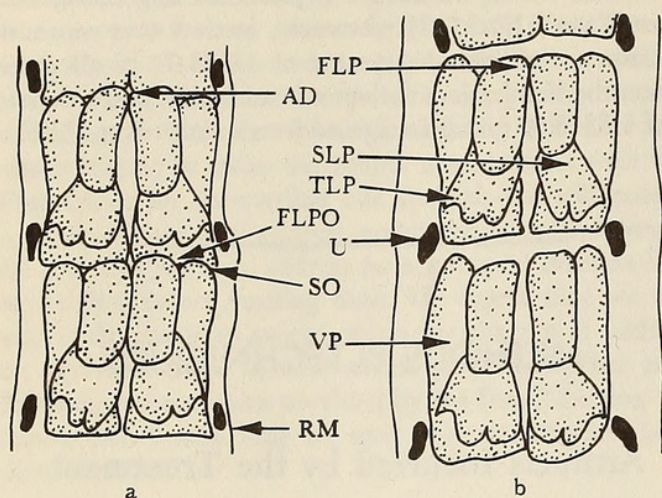


Figure 1

a) Segment of radular ribbon of *Collisella scabra* (Gould, 1846) prepared with "hot" potassium hydroxide (KOH). Artifacts illustrated: Anterior Divergence = AD; First Lateral Plate Overlap = FLPO; Spatulum Overlap = SO; Ribbon Margin = RM.

Width of ribbon approximately 0.25 mm

b) Adjacent segment of radular ribbon prepared with "cold" KOH. General structures of radular ribbon illustrated: First Lateral Plate = FLP; Second Lateral Plate = SLP; Third Lateral Plate = TLP; Uncinus = U; Ventral Plate = VP.

1846) show significant differences. Figure 1a illustrates a section of radula treated with hot KOH as per FRITCHMAN (1960b) and Figure 1b illustrates an adjacent section of the same radula treated with cold KOH. The shrinkage in Figure 1a is evidenced by the crowding of the basal plates and the wavy radula margin from the contraction of the ribbon. Figure 1b shows little or no shrinkage with the basal plates being equally spaced and uncrowded.

In acmaeid radular work the implications of these artifacts are quite important. GRANT (1937) demonstrated the species-specific characters of the acmaeid radula and proposed identification techniques based on the radula. FRITCHMAN (1960a) further defined characters and recognized *Acmaea paradiigitalis* Fritchman, 1960 [= *Collisella strigatella* (Carpenter, 1864)] by its radular characteristics. More recently, McLEAN (1966), MOSKALEV (1970), GOLIKOV & KUSSAKIN (1972) and CHRISTIAENS (1975) have used radular characters to determine species, subgenera, and genera.

It is imperative that characters that may be altered by shrinkage [*i. e.*, degree of overlap of various plates or

divergences created by overlaps (Figure 1a)] be used with caution in taxonomic works. Instead, characters such as lateral plate shapes and tooth shapes (*cf.* McLEAN, 1966: 30) should be given more weight as they appear unaltered by shrinkage of the ribbon.

Currently, the use of warm KOH (not boiling) is preferred by the author for the removal of tissue and teeth as the results are more consistent and predictable. The cold KOH technique has been found to yield poor results, the greatest difficulty being in judging the correct immersion time in KOH. Too long an immersion separates the lateral plates from the ventral plates and too short an immersion time will not separate the teeth from the lateral plates.

A new technique, using alkylene polyamines to isolate the radula has been presented by RISSO-DOMINGUEZ (1961) and may provide for the elimination of the technique artifacts in radular preparation caused by methods using alkalis.

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