

Molting of *Rotylenchus buxophilus* Golden¹

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Abstract: Molting of *Rotylenchus buxophilus* is similar in all observed post-embryonic stages. During molting the old cuticle and cephalic framework, conus of the old stylet, vestibulum extension, linings of amphids, distal part of the linings of the excretory duct, rectum, and phasmids are shed. The new stylet is formed starting from the conus, which is simultaneously formed in its entirety.

Molting in several genera of tylenchids has been described (1, 2, 3, 4, 6), but none on the spiral nematodes. Roman and Hirschman (4) noted certain details of molting differ between genera. The investigations reported below were undertaken to understand transformations occurring during molting in *Rotylenchus buxophilus*.

MATERIALS AND METHODS

The population of *R. buxophilus* used in this study was obtained from soil associated with roots of boxwoods (*Buxus sempervirens*) growing on the campus of Michigan State University at East Lansing. Molting specimens were observed alive in microchambers (3, 4), or mounted in water, 2% formalin or processed to glycerine by Seinhorst's rapid method (5).

RESULTS

No differences were observed in the molting of successive larval stages of *R. buxophilus*. Prior to molting of larvae motility slowed and body contents become dark and densely granular. The median bulb valve disappeared, and the oesophageal duct lining

was barely perceptible. The stylet shaft disappeared, and a hyaline area developed around the conus and the new head detached from the old cephalic framework. (Fig. 1). The guiding rings became more refractive and conspicuous. The nematode body contracted within the old cuticle. The conus or conical part of the old stylet vestibulum, vestibulum extension, cephalic framework, linings of the amphidial ducts, and a short part of the shaft lining became detached and were shed. When the old cuticle detaches, the new stylet started developing from the conus, the latter formed simultaneously in its entirety. Initially the new conus was broad, with parallel walls except at the blunt tip and the newly-formed head was distinctly offset. Later, the new conus became acutely conical and the head contour continuous with the body. Following conus development, the stylet shaft was formed starting from the conus downward to the knobs (Fig. 2). Knobs were small at first but gradually assumed final shape, filling the hyaline cavity. Stylet muscles were present at all times, and appeared to be attached to the hyaline cavity throughout the entire stylet transformation. Meanwhile, the valve in the median bulb and oesophageal lining were formed, initially appearing very refractive. The cephalic framework was the last structure formed in the anterior portion of the nematode, and here the radial blades extending from the tip region into the body were formed first (Fig. 3).

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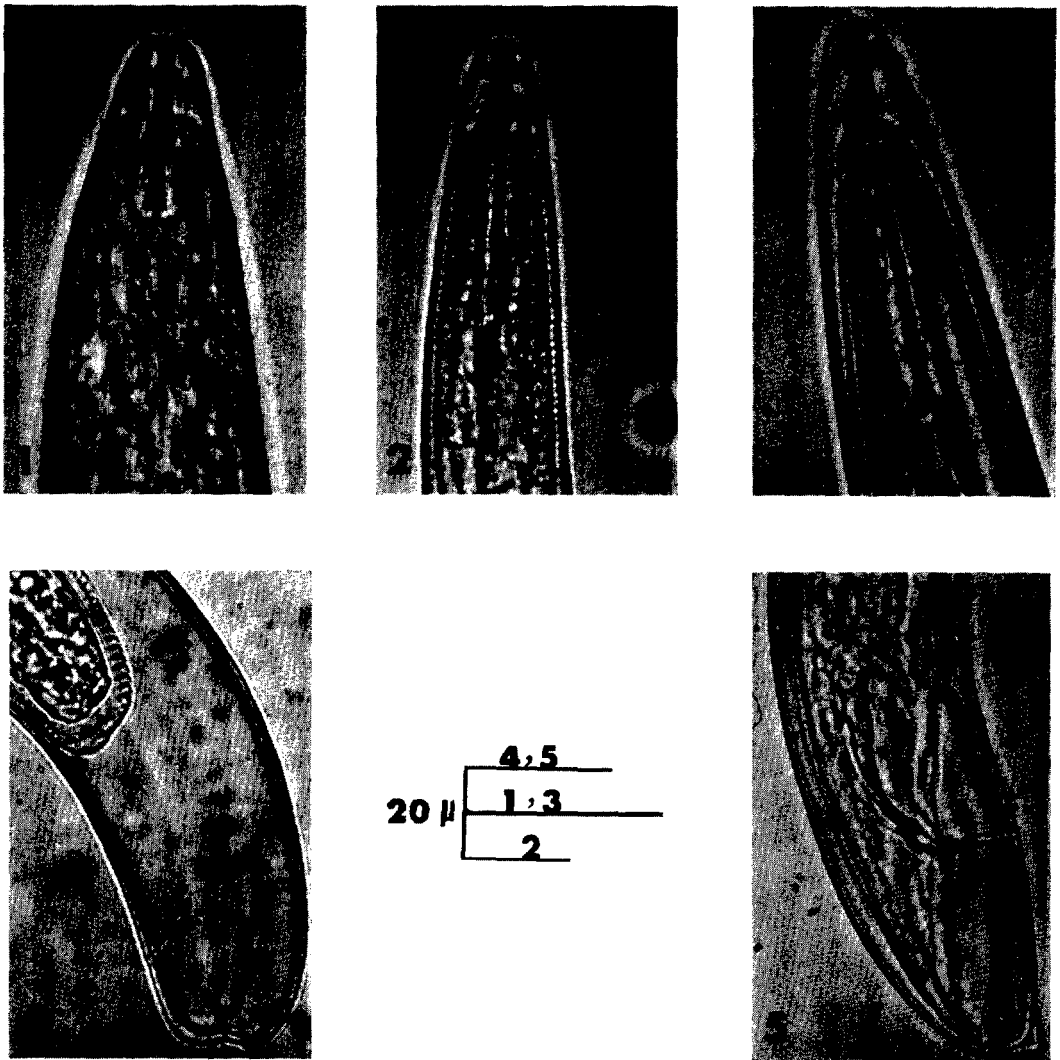


FIG. 1-5. Molting of *Rotylenchus buxophilus*. 1. Early stage of molt with head detached, stylet shaft not visible, and hyaline area formed around conus of old stylet; 2. New conus formed, stylet shaft being formed, lip-region offset; 3. Initiation of cephalic framework sclerotization; 4. Shape of newly formed tail may differ from old one. (Note rectal lining attached to old cuticle); 5. Molting of male.

The anterior portion of the excretory duct was also shed: the posterior part disappeared then was reformed, appearing highly refractive and easily visible.

Posteriorly, the linings of the rectum and

phasmids were also shed. First, the rectal lining detached and a large triangular hyaline cavity appeared briefly in place of the rectum and rectal glands; then the new lining and glands were formed. The tail shape

of the newly developed stage was usually similar to the previous stage, but rare exceptions were observed (Fig. 4).

Formation of a large hyaline area preceded the development of the vulva in the last molt. Copulatory organs of the single male observed were formed during this final molt (Fig. 5). Males had not been previously reported for this species.

DISCUSSION

Among species of *Ditylenchus* (1), *Nacobbus* (2), *Radopholus* (5), *Pratylenchus* (4) and *Seinura* (3), only *Radopholus* and *Pratylenchus*, which are related genera, showed similar molting patterns. The remaining genera differed in the details of head formation. The most striking difference in the molting of *R. buxophilus* is formation of new conus. The change in the shape observed in the newly formed conus may be due to the pressure exerted by the developing vestibulum extension. These observed differences may elucidate the evolution of

the anterior body end, and might be of some taxonomic significance in classification at the subfamily and family levels.

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