

Detection and Ultrastructural Description of a Larval Moulting in the Egg of *Orrina phyllobia*

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Considerable work has now been done on the nematode *Orrina phyllobia* (Thorne, 1934) Brzeski, 1981, syn: *Nothanguina phyllobia* (Thorne, 1934) Thorne, 1961, because of its potential as a biological control agent of the cosmopolitan weed, silver leaf nightshade (*Solanum elaeagnifolium*) Cav. (5,6). Detailed information on the nematode's pathological effects (7) and host range (5) is available.

There are, however, some aspects of this nematode's life history which are not completely understood. One of these is if a larval moult occurs within the egg.

It is not always easy to determine if a moult has taken place within an egg, particularly if embryogenesis is rapid. Preliminary observations at Lubbock, Texas, (Orr, unpublished observations) have shown that embryogenesis in *O. phyllobia* takes about 36 h from single-celled eggs to hatch-

ing. This is particularly rapid when compared with some other plant parasitic nematodes. For instance, it is at least six times more rapid than *Meloidogyne javanica* (1) and *Anguina agrostis* (4) at their respective optima.

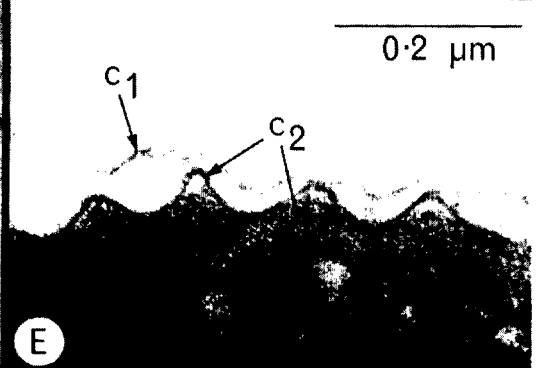
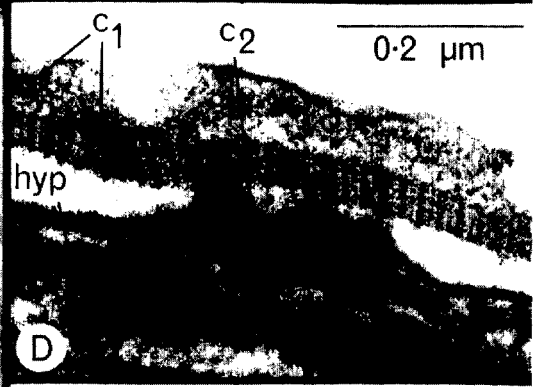
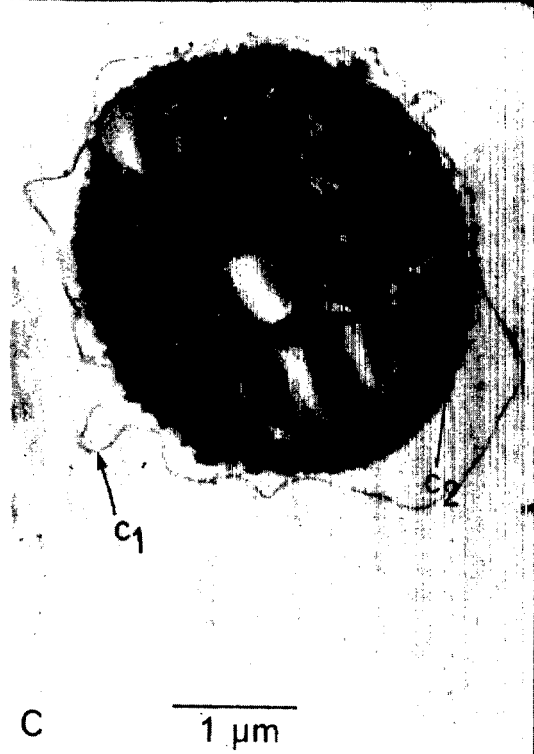
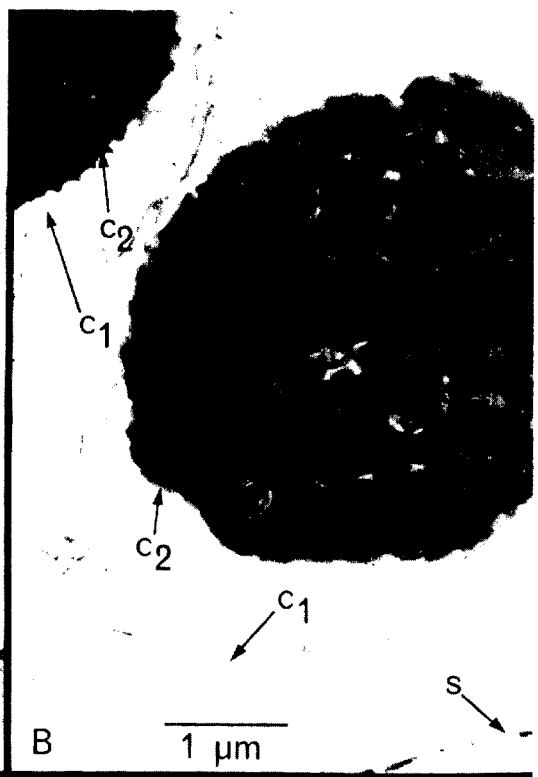
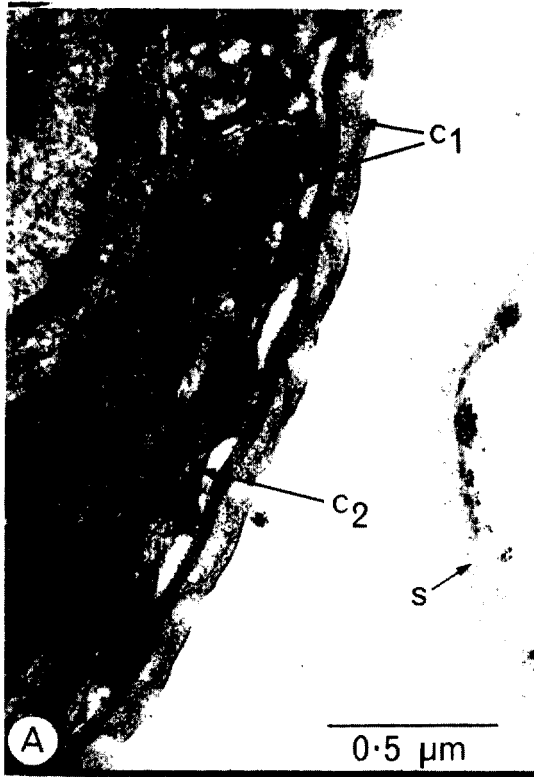
Occurrence of a larval moult within an egg is best detected when specimens, at the appropriate stage of development, are sectioned and viewed with the electron microscope. Therefore, eggs of *O. phyllobia* were collected and fixed in 4% buffered paraformaldehyde solution at Lubbock. The fixed eggs were shipped and examined in Adelaide, Australia. Eggs containing larvae were cracked, dehydrated, embedded, sectioned, and stained according to previously described techniques (3). Several eggs treated in this manner were sectioned and examined with a Philips EM 400 transmission electron microscope at 80 kV.

Two different stages of a moult within the egg are shown (Fig. 1). The cuticle of the first stage larva (L₁) of *O. phyllobia* appears to be thicker than that of *M. javanica* at this stage (2), although it is of similar

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thickness to that of *A. agrostis* (4). However, this may merely be a reflection of the extent to which the cuticle has been reabsorbed at the time of fixation since the cuticles of all these L_1 s are partially reabsorbed during moulting. Also, the cuticle of the L_1 of *O. phyllobia* appears to be structurally more complex than that of *A. agrostis* since it has a distinct striated basal layer (Fig. 1A, D) which is reabsorbed at a later stage so that the cuticle which surrounds the second-stage larva (L_2) consists mostly of epicuticle (Fig. 1B, C, E). The life of the L_1 cuticle is short in all the nematodes mentioned above, and it is possible that striations in the basal layer may have been present for a brief period prior to their reabsorption in *A. agrostis*, although they were never observed.

It is clear from our observations that *O. phyllobia* does moult once in its egg; therefore, the larva that emerges on hatching is an L_2 .

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