An Outer Layer on Eggs of Dolichodorus heterocephalus (Tylenchida)

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A "protein coat" (3) or uterine layer (1) is known to occur on the eggs of certain nematodes (for example Ascaris spp.). This outermost layer has not been reported to occur on eggs of nematodes of the order Tylenchida, although Sturhan and Friedman (6) reported that eggs of Ditylenchus convallariae Sturhan and Friedman were covered with "small protuberances."

We (5) discovered that the eggs of *Dolichodorus heterocephalus* Cobb also are covered with protuberances, but they are considerably larger than those depicted by Sturhan and Friedman. In both cases, we are convinced that the covering on these eggs is comparable to the "protein coat" or outer layer described by several workers and reviewed by Christenson (3).

Dolichodorus heterocephalus used in our studies were collected from bermudagrass near Gainesville, Florida. Eggs used were obtained from adult females which oviposited when left overnight either in water or streptomycin sulfate solution (10 μ g/ml). Eggs were recovered from soil by a centrifugation sugar-flotation technique (2) using a sugar solution with a specific gravity of 1.31. Twenty five eggs in water and 14 in glycerin were measured.

Protuberances of the "protein coat" varied in shape and thickness. They were mammillate, scalloped, clavate, long and flat, or thin and sinuate [Fig. 1-(D, E)]. The surface of this outer layer contained scattered pits (unknown structure or function) about 1 μ m diam (Fig. 1-D).

Protuberances at the ends of eggs were 0.5-13 μ m long (most 2-6 μ m) and 0.5-20 μ m wide (most 2-10 μ m), whereas along the sides they were 2-4 μ m long and 4-7 μ m wide; infrequently protuberances were up to 14 μ m wide.

We believe the outer layer is deposited by the crustiformeria (7) while the egg is in that structure [Fig. 1-(A to C)]. We observed, in toto mounts from eggs dissected from nematodes, that no outer layer was present on eggs before they entered the crustiformeria and immediately after entering it (Fig. 1-B). But, after eggs had been in the crustiformeria for a while and after passing through it, they had an outer layer. We did not attempt to determine how long it took for the layer to be deposited on the eggs.

The outer layer is obscured, except at high magnification, by small particles adhering to eggs extracted from soil. In the soil, the outer layer becomes tough, resilient and turns pale yellow.

The egg, excluding the outer layer, is 101-139 μ m long (most 115-127) and 31-34 μ m wide (39 eggs measured).

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FIG. 1-(A to E). Dolichodorus heterocephalus. A) Egg in uterus. Outer layer (arrow) present on the egg. B) Egg in uterus. Outer layer not yet formed (arrow). C) Crustiformeria (arrow), the region of the uterus where the outer layer is formed. D) Egg, photomicrograph composite (Literature Cited Reference 4) of three focal planes taken at random to show the sculpturing (mammillation) of the outer layer. E) Egg in the two-cell stage showing mammillation. Usually protuberances are large on and near the ends of eggs and small elsewhere. (Materials for Fig. 1-A, B, C, and D were mounted in glycerin, and eggs for Fig. 1-E.