

Embryogenesis of *Hemicycliophora epicharoides* Loof, 1968 (Nematoda: Hemicycliophorinae), and Description of the Male¹

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The description of *Hemicycliophora epicharoides* Loof, 1968 (4), was based on females only. Males recently collected from sand dunes at Rosa Marina (Brindisi), in

southern Italy, are described herein for the first time. Also described is embryogenesis of this species.

Specimens were extracted from sand by Cobb's decanting and sieving method (2), fixed in hot 4% formalin and 1% propionic acid, and processed to dehydrated glycerin following Seinhorst's method (5).

Eggs were maintained at 20–24 C in cavity slides filled with distilled water. The

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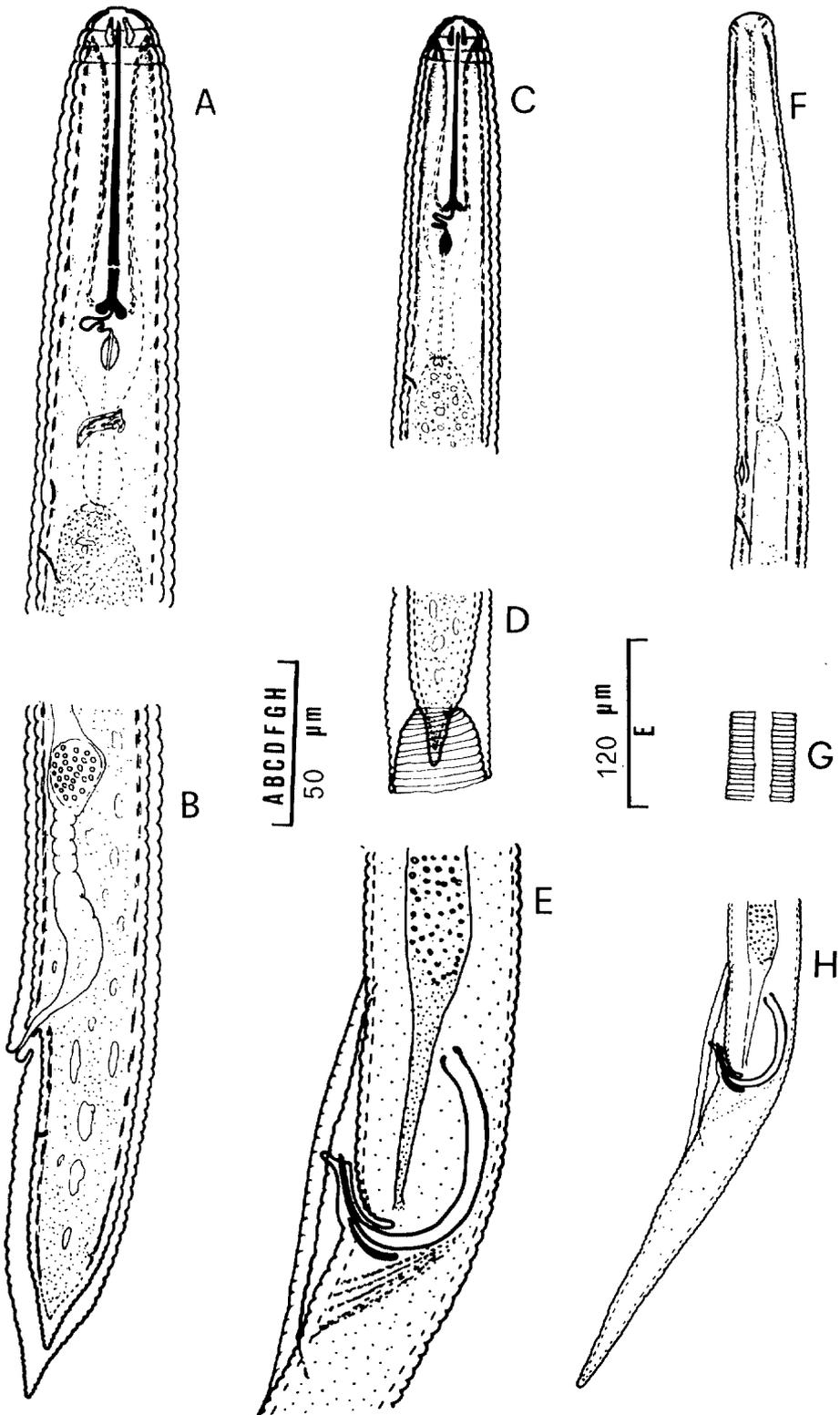


FIG. 1. A-G) *Hemicycliophora epicharoides*. A-B) Anterior and posterior portion of female body. C-D) Juvenile anterior and posterior region (second stage). E) Male copulatory apparatus. F, H) Male anterior and posterior region. G) Male lateral field.

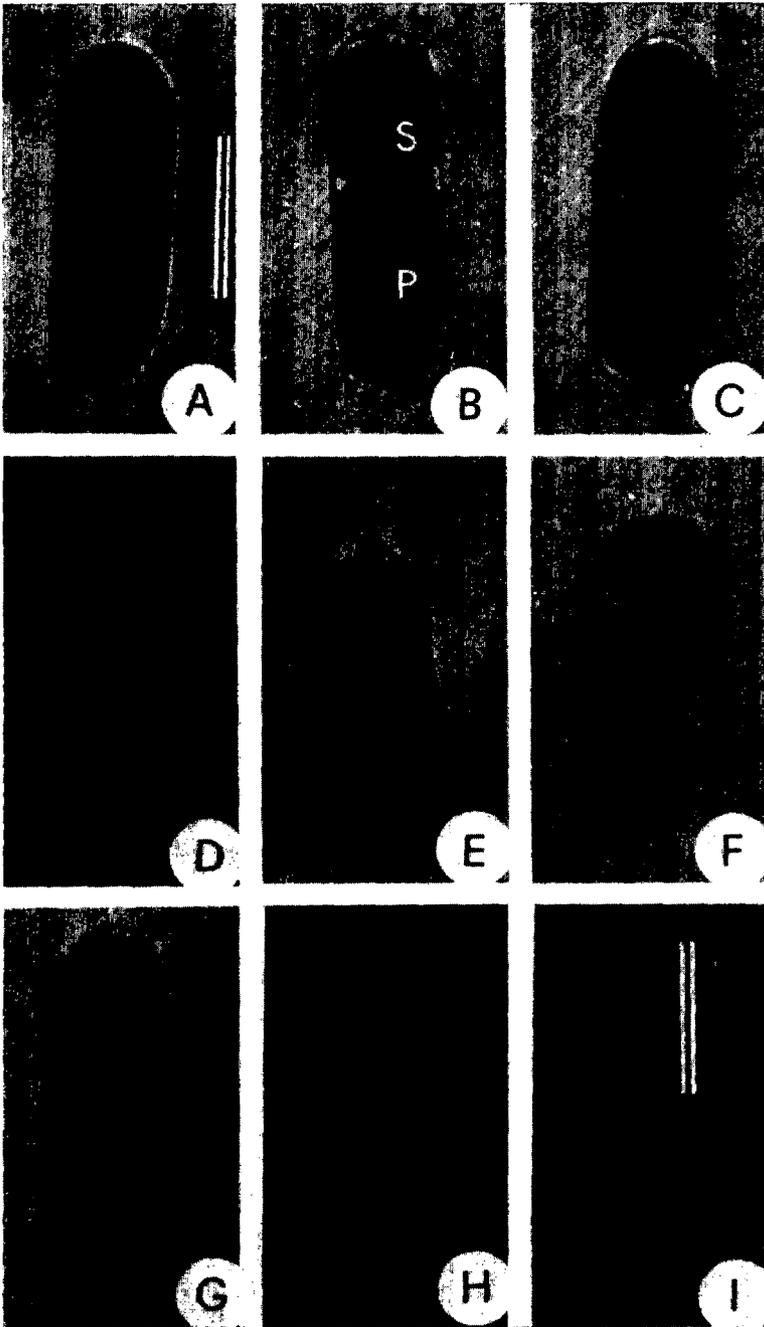


FIG. 2. A-I) Embryogenic development of *H. epicharoides*. A) One-cell stage. B) Two-cell stage; S = anterior cell; P = posterior cell. C) Four-cell stage. D) Multicellular stage. E) Morula stage. F) Gastrula. G) First-stage juvenile. H) Molting first-stage juvenile. I) Second-stage juvenile. (Figs. A-H with the same magnification).

slides were enclosed in Petri dishes lined with moist filter paper to retard evaporation.

Hemicycliophora epicharoides Loof, 1968

MALE (3 specimens; Fig. 1 E-H).

Measurements: L = 0.79 mm (0.75–0.82); a = 35 (33–38); b = 5.9 (5.5–6.2); c = 7.7 (7–8.7); c' = 5.6 (5.5–5.8); gubernaculum = 10 μ m; spicules = 50 μ m (48–52); anterior-end excretory-pore distance = 152 μ m (146–158).

Description: Body bent ventrally. Annules 1.7 μ m wide; lateral field 5 μ m wide with 2 longitudinal striae. Lip region rounded, offset, annulation indistinct. Esophagus degenerate. Hemizonid distinct, three annules long and five annules (14 μ m) anterior to excretory pore. Testis single, outstretched, occupying about 32% of body. Bursa large, edge crenate. Spicules J-shaped. Gubernaculum linear, proximal end thickened. Anal tubercle 10 μ m long with small mucro posteriorly. Ventral body wall inwardly curved anterior to anal tubercle. Tail terminus annulation irregular.

FEMALE (40 specimens; Fig. 1 A-B): Italian specimens only.

Measurements: L = 0.99 mm (0.89–1.20); a = 20 (18–24); b = 5.7 (5.7–5.9); c = 12 (11–13); V = 87 (86–88); stylet = 96 μ m (87–101); Rex = 36 (33–38); Rst = 19 (18–21); RVan = 12 (11–15); RV = 35 (32–38); Ran = 25 (21–28); R = 180 (178–187); VL/VB = 2.9 (2.6–3.2); VL/anB = 3.4 (3.2–3.6).

The Italian specimens of *H. epicharoides* differ from those described by Loof (1968) (4) and Brzeski (1974) (1) by longer body and stylet. In other characteristics they agree closely with the descriptions by those authors.

Embryogenesis (Fig. 2 A-I): Single-cell *H. epicharoides* eggs measure 107 μ m (103–112) \times 36 μ m (34–38) and are covered with a gelatinous substance which makes them adhere to the substrate. The first egg cleavage is equatorial and completed 10–12 hours after deposition. Two blastomeres of different size (S and P, Fig. 2 B) are produced. The four-cell stage is attained 30–34 hours postdeposition. The third and the following divisions up to the multicellular

egg stage are completed 38–44 hours after egg laying. The morula and gastrula stages are respectively attained 60–66 hours and about 90 hours after deposition. At 114 hours the gastrula differentiates into two zones, a light one which gives rise to the esophagus, and a dark zone giving rise to the intestine. The first-stage juvenile appears at about 138 hours, and molts at 174 hours to the second-stage juvenile. This hatches 222 hours (9–10 days) after egg deposition. The double cuticle of the second-stage juvenile becomes evident shortly after emergence from the egg and is typically infolded posteriorly (Figs. 1 C–D, 2 I). In other characteristics the second-stage juvenile is similar to the adult female.

Van Gundy (6) demonstrated that *H. arenaria* egg development required 3–5 days at 28–30 C, which is half the time recorded in this study. It is probable that higher temperatures speed egg development in *H. arenaria*. Whether the same may happen with *H. epicharoides* at higher temperatures remains to be ascertained.

In Italy, *H. epicharoides* has been found associated with halophilic plants and *Juniperus macrocarpa* (S. & S.) in sand dunes; it has been reported in the rhizosphere of grape (*Vitis vinifera* L.) in France (3).

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