

# Addendum to the Morphology of *Steinernema scapterisci*<sup>1</sup>

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**Abstract:** This paper provides additional information on the morphology of *Steinernema scapterisci*. For females, the amphids are shown for the first time, and clearer scanning electron microscope (SEM) photographs of the six labial and four cephalic papillae are presented. For males, six labial and four cephalic papillae, one or two pairs of additional genital papillae, and the death shape are shown. For infective juveniles, six labial and four cephalic papillae and an elevated oral disc are shown.

**Key words:** amphid, cephalic papilla, epiptygma, labial papilla, genital papilla, morphology, nematode, SEM, *Steinernema scapterisci*.

Since we described *Steinernema scapterisci* Nguyen & Smart, 1990 (1), we have discov-

ered additional information about the species. This short paper augments the original description.

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## MATERIALS AND METHODS

Nematodes were fixed in 3% glutaraldehyde buffered with 0.1 M sodium cacodylate.

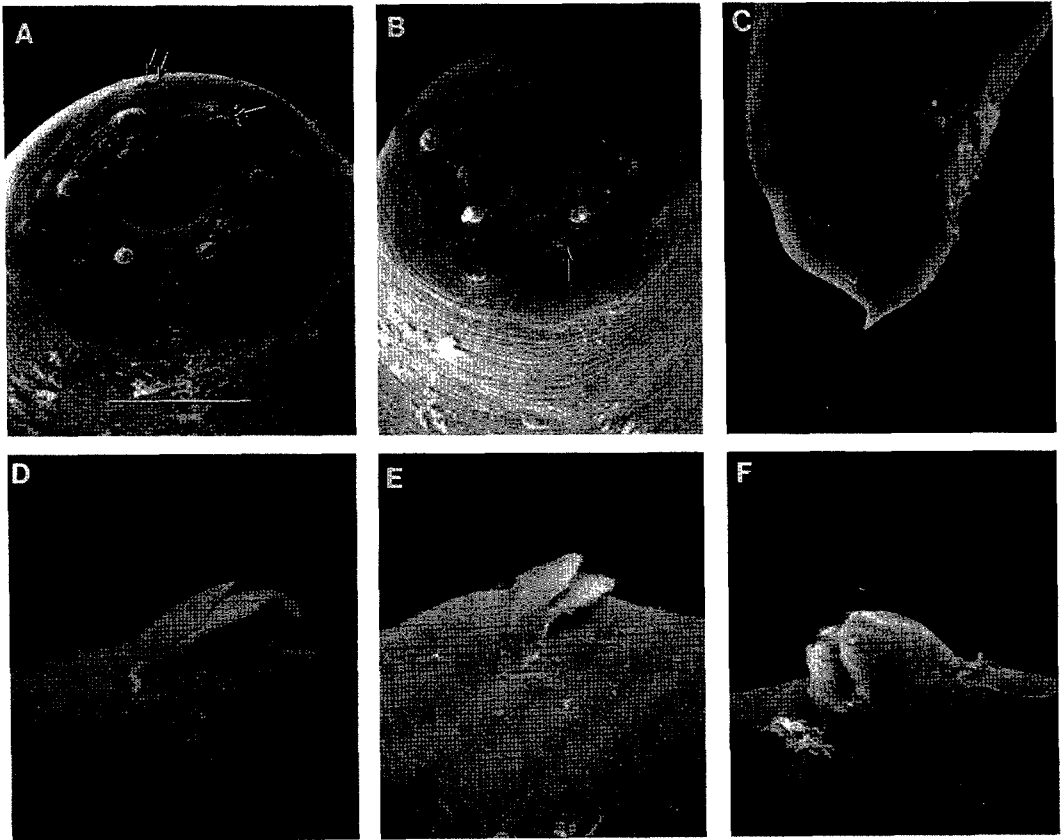


FIG. 1. Female *Steinernema scapterisci*. A) Face view showing six labial papillae (single arrow) and four cephalic papillae (double arrows). B) Face view showing labial papillae, cephalic papillae, and amphid (single arrow). C) Tail. D-F) Variation in shape of the epiptygma. All magnifications are based on the scale bar in A. A, B, D-F = 15  $\mu$ m, C = 38  $\mu$ m.

late at pH 7.2 for 24 hours or longer at 25 C. They were postfixed with osmium tetroxide solution for 12 hours at 25 C and dehydrated in a graded ethanol series. Nematodes were transferred to a mixture of 50% amyl acetate and 50% ethyl alcohol

for 10 minutes and then were transferred to 100% amyl acetate. The specimens were critical point dried with liquid CO<sub>2</sub>, mounted on SEM stubs, and coated with gold. After dissection from nematodes in lactophenol, glycerine, or 40% lactic acid,

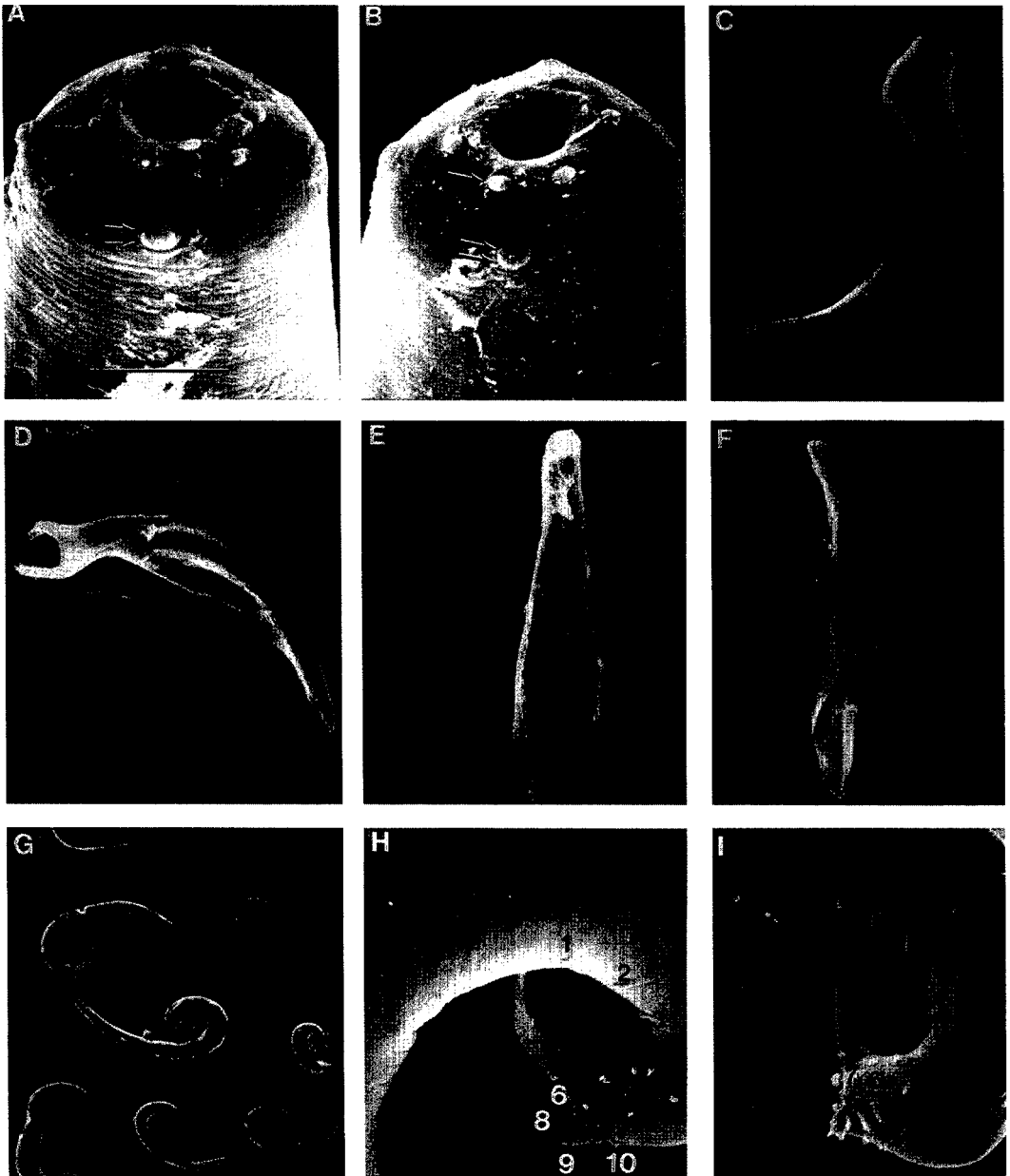


FIG. 2. Male *Steinernema scapterisci*. A,B) Anterior region showing six labial papillae (single arrow) and four cephalic papillae (double arrows). C,D) Spicules. E,F) Gubernacula, ventral and lateral view, respectively. G) Body shape when dead. H,I) Posterior portion showing genital papillae and protruding spicules; the numbers 1 to 12 designate the paired papillae. All magnifications are based on the scale bar in A. A,B = 10  $\mu$ m; C,D = 25  $\mu$ m; E,F = 20  $\mu$ m; G = 600  $\mu$ m; H,I = 43  $\mu$ m.

spicules and gubernacula were transferred to a drop of water on a coverglass (12-mm-d) on a glass slide. Spicules and gubernacula were arranged at the center of the coverglass or near a hair used as a marker. Excess water was removed with strips of filter paper. The coverglass was transferred to an SEM stub previously sprayed with metallic enamel. After one hour, the specimens were coated with gold and examined with a Hitachi S-570 SEM at 15 kV.

### RESULTS AND DISCUSSION

In the female there are six prominent labial papillae and four cephalic papillae (Fig. 1A,B). Small amphids are shown for

the first time and are present in proximity to the lateral labial papillae (Fig. 1B). The female tail is shorter than the body width at the anus. Phasmids and lateral fields are absent (Fig. 1C). The prominent double-flapped epiptygma is variable in shape (Fig. 1D-F). The elliptically shaped structure formed by the excretory duct in the female becomes indistinct when the nematode is cultured *in vitro* repeatedly but remains evident if cultured in mole crickets.

The male has six labial papillae and four larger cephalic papillae (Fig. 2A,B). These papillae have not been shown or described for males of other *Steinernema*. The spicules and gubernaculum are as described previously but are more distinct here (Fig. 2C-F). There are 11 pairs (Fig. 2H) or 12

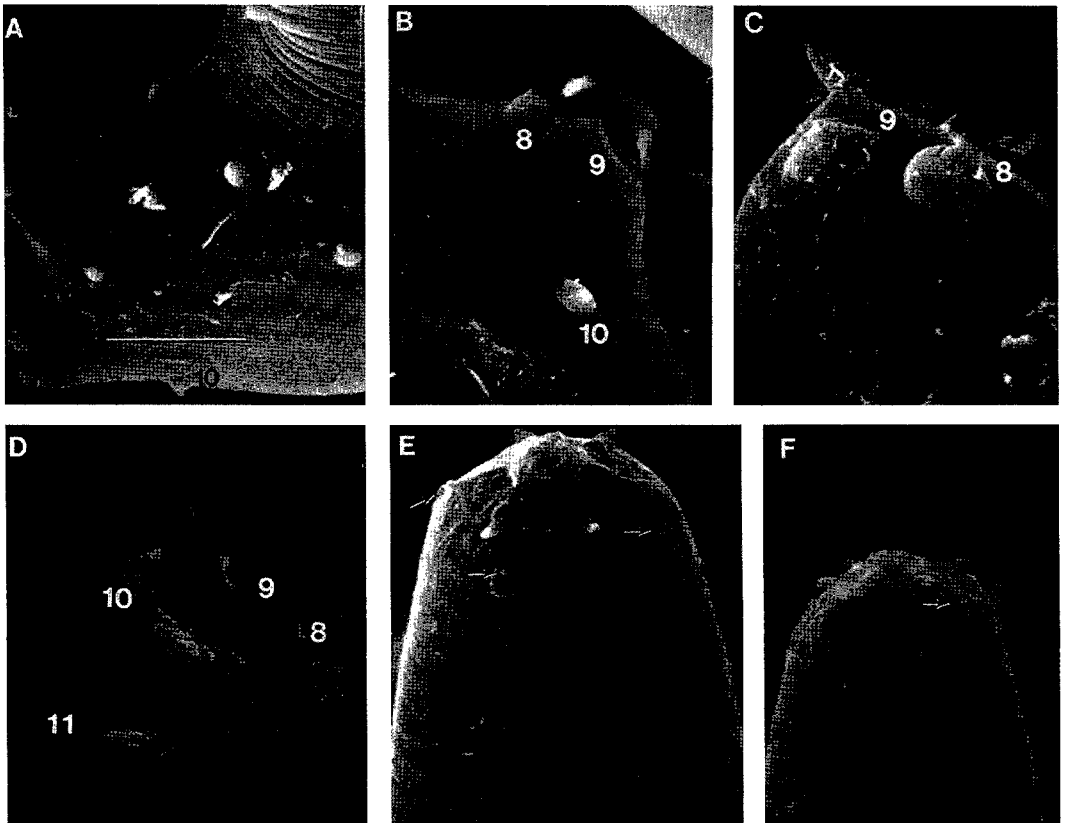


FIG. 3. *Steinernema scapterisci*. A) Enlargement of posterior region of Figure 2H showing position of genital papillae 4-11 and the single papilla just anterior to the cloaca. B) Posterior region showing paired papillae 8-10. C) Enlargement of Figure 3A showing paired genital papillae 8 and 9. D) Enlargement of Figure 2I showing genital papillae 8-11. E) Anterior region of infective juvenile showing six prominent labial papillae, three of the four cephalic papillae (arrows), and the elevated oral disc. F) Anterior region of infective juvenile showing five of the six labial papillae and one cephalic papilla (arrow). All magnifications are based on the scale bar in A. A = 15  $\mu\text{m}$ ; B = 8.6  $\mu\text{m}$ ; C = 4.3  $\mu\text{m}$ ; D = 6  $\mu\text{m}$ ; E = 3.8  $\mu\text{m}$ ; F = 4.3  $\mu\text{m}$ .

pairs (Fig. 2I) of genital papillae, plus one single genital papilla just anterior to the cloaca. Pairs 11 and 12 (if present) were not reported in the original description. Distribution of pairs 4–11 and the single papilla are shown in Figure 3A. Figure 3B–D contains enlargements showing certain papillae more distinctly. In death, the posterior of males spirals characteristically (Fig. 2G).

Third-stage infective juveniles have a smooth head, annulated body, six pronounced labial papillae, four cephalic papillae, and an elevated oral disc (Fig. 3E,F).

#### LITERATURE CITED

1. Nguyen, K. B., and G. C. Smart, Jr. 1990. *Steinernema scapterisci* n. sp. (Rhabditida: Steinernematidae). *Journal of Nematology* 22:187–199.