Journal of Nematology 25(4):625–627. 1993.

Location of the Phasmids on Infective Juveniles of *Steinernema glaseri*[1]

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Abstract: Scanning electron microscopy revealed the location of the phasmids on infective juveniles of *Steinernema glaseri*. The phasmids are located about 40% of the tail length posterior to the anus and are at or near the same level. Instead of being in the center of the lateral fields, they are located just ventral to the lateral fields, or interrupting the ventral-most lateral ridge. The phasmids were covered often by an exudate.

Key words: infective juvenile, morphology, nematode, phasmid, *Steinernema glaseri*.

Phasmids have been reported on infective juveniles of only three species of *Steinernema* (=*Neoaplectana*). Steiner (7) illustrated the phasmids of *S. glaseri* about 13% of the tail length posterior to the anus. Bovien (1) illustrated the phasmids of *S. feltiae* (=*N. bibionis*) and *S. affinis* about 38% of the tail length posterior to the anus. Wouts (8) redescribed *S. feltiae* (=*N. bibionis*) and illustrated the phasmids about 37% of the tail length posterior to the anus. In the description of other species of *Steinernema*, phasmids were not mentioned. The purpose of this paper is to show the location of phasmids of infective juveniles of *S. glaseri*.

MATERIALS AND METHODS

Steinernema glaseri used in these studies were obtained from Dr. H. K. Kaya, University of California, Davis, and maintained on larvae of the greater wax moth, *Galleria mellonella*. One hundred infective juveniles were collected and processed for scanning electron microscope observation by the method described by Nguyen and Smart (4).

RESULTS AND DISCUSSION

The phasmids are located about 40% of the tail length posterior to the anus, either just ventral to the lateral fields or interrupting the ventral-most lateral ridge (Fig. 1). Both phasmids are located at or near the same level, (Fig. 1B,C) and have a distinct pore at the center (Fig. 1C). In many preparations, the phasmids were covered with an exudate (Fig. 1B). The lateral fields have eight ridges (nine incisures) as reported by Kozodoi and Spiridonov (2) and Mracek and Bednarek (3). The eight ridges are reduced to two large bands (three incisures) at the level of the phasmids (Fig. 1A,D). No annules were observed posterior to the phasmids on the ventral side; the dorsal side had only one or two (Fig. 1C).

Steiner (7) illustrated the phasmids of *S. glaseri*, presumably of the infective juvenile, in his Figure 1F as located about 13% of the tail length posterior to the anus, about equidistant ventrally and dorsally. Our micrographs show that the phasmids are located about 40% of the tail length posterior to the anus. The location is similar to that reported for *S. affinis* and *S. feltiae* by Bovien (1) and for *S. feltiae* by Wouts (8), except that those authors did not mention its location in relation to the lateral field. It is possible that Steiner illustrated a juvenile stage other than the infective stage; however, Bovien (1) did not find phasmids on first- and second-stage juveniles of *S. affinis* and *S. feltiae* but did find them on later developmental stages. Wouts (8) did not observe them on first- or second-stage juveniles and neither mentioned them in the text nor illustrated them on later stages. Circumstantially, it appears that Steiner illustrated the infective juvenile and misplaced the phasmids.

Received for publication 22 April 1993.

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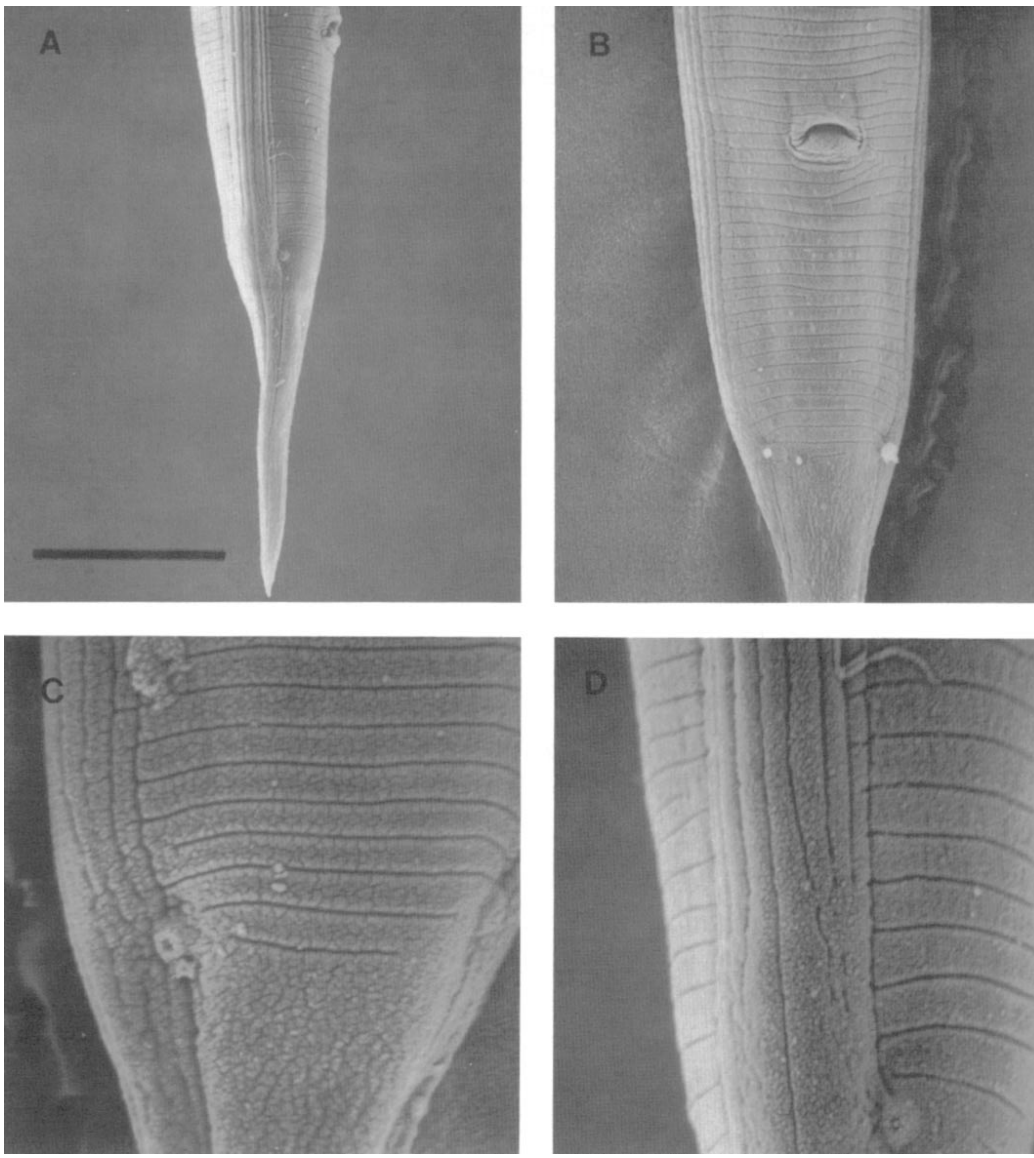

FIG. 1. Tail of infective juveniles of *Steinernema glaseri.* A) Lateral view showing the phasmid, lateral field, and anus. At the level of the phasmids, the eight ridges in the lateral field become two large ridges. B) Ventral view showing both phasmids (covered with an exudate), the anus, and lack of annulation posterior to the phasmids. C) Ventral view showing the phasmids with a central pore, and lack of annulation posterior to the phasmids. The phasmid interrupts the ventral-most lateral ridge. D) Lateral view showing that the eight ridges of the lateral field become two large ridges near the phasmid. The pore of the phasmid contains a small amount of exudate. Scale (in A): A = 25 μm, B = 17.6 μm, C = 6 μm, D = 6.1 μm.

We have not searched for phasmids on other development stages of *S. glaseri,* but we could see the phasmids of the infective juvenile by light microscopy after we detected them by SEM.

The anus of *S. glaseri* is reported to be closed (5), but it is shown to be open on our micrographs. This is possibly an artifact in fixation or it may be that it is not possible to determine whether the anus is open or closed by light microscopy.

This is the first report of off-centered phasmids in the genus *Steinernema,* but is not the first report in Nematoda. Siddiqi (6) reported that phasmids of eight genera in the family Tylenchidae were located just dorsal to the lateral fields in the postmedian region of the body.

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