MORPHOLOGICAL VARIATIONS, LIFE STAGES AND EMENDED DESCRIPTION OF HEMICYCLIOPHORA ZUCKERMANI BRZESKI (NEMATODA, CRICONEMATIDAE) 1)

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Hemicycliophora zuckermani, a species which normally has a convex-conoid tail, may have a rounded tail or a tail shape of some intermediate form. The first stage larva occurs within the egg, as does the first molt. Second stage larvae are differentiated from third stage by having a longer esophageal region in relation to total body length. Third stage larvae have crenate incisures in the lateral fields and no transverse lines, whereas the lateral fields in fourth stage larvae lack incisures and transverse junctions are present in the form of thin lines.

The male of the species is described. Males are extremely rare.

These studies illustrate the need for a revision of the current species concepts in the genus Hemicycliophora.

In a key to the species of Hemicycliophora, Thorne (1955) used tail shape as a primary character for differentiating species. Among several thousand Hemicycliophora females from one location on the experimental cranberry bog, East Wareham, Mass., though most had convex-conoid tails with a sub-acute terminus, a few had rounded tails. The current study was made to determine whether these differences represented variation in a single species or the presence of at least two different species.

H. zuckermani was described by Brzeski (1963) from specimens collected at the same location. Zuckerman, Khera & Pierce (1964) called this nematode H. similis. On the basis of data obtained in the current study, emendations to the description of H. zuckermani are presented.

MATERIALS AND METHODS

Nematodes were collected from the type locality of H. zuckermani. The number of females with abnormally shaped tails was recorded from ten samples each of 50 nematodes in March, 1964, and again in May, 1964. Comparative measurements of seventeen selected morphometric characters were made of ten females with convex-conoid and ten with rounded tails. The structure of the lateral fields, lip region, hemizonid and esophago-intestinal junction was also observed. These data

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were compared with dimensions from the original description of this species. In all cases, when the body length or width was measured, as well as position of excretory pore and anus, the measurements were taken from the sheath. Nematodes were killed by gentle heat and mounted in water for measurement.

To obtain eggs, gravid females were selected from freshly processed field samples and were held for 24 hours in tap water at 24-25°C. The water was changed daily. A solution of 0.125% hibitane diacetate was used in some trials to inhibit the growth of bacteria and fungi. Cranberry root diffusates were tried as a hatching factor. Egg development was observed daily and the freshly laid eggs were measured.

In some cases, eggs contained fully developed second stage larvae but did not hatch. When several of these eggs were placed in a drop of water on a microscope slide, a cover slip placed over a drop and gentle pressure exerted, the egg shell was broken and a living larva obtained.

Body width and position of the excretory pore were measured from the corpus and not from the sheath of freshly-hatched second stage larvae, as well as second, third and fourth stage larvae from field samples, and detailed observations were made on the structure of lateral fields, lip region and esophago-intestinal junction.

Females from field soil were separated according to tail shape and placed in pots containing cranberry cuttings grown in steam sterilized soil. In a series of eight pots up to 25 round-tailed, conical-tailed or convex-conoid tailed females were placed in pots according to tail shape. The object of this test was to determine whether pointed tail progeny would arise from round-tailed parents and vice-versa. In addition, two 10 ml beakers containing cranberry seedlings in steam-sterilized soil were each inoculated separately with round-tailed females. Five nematodes were placed in one beaker and three in the other.

RESULTS

Females with fully rounded tails (Fig. 1, E-F) in March, 1964, comprised 0.8% of the total population, and 0.6% in May, 1964. Females with a conical tail with blunt rounded terminus (Fig. 1, B) comprised 2.2% of the total population in March, and 1.4% in May. Many intermediate shapes of tail (Fig. 1, C-D) from typically convex-conoid (Fig. 1, A) to rounded were observed.

Females always carried a molted cuticle, or sheath, and occasionally two sheaths. In all cases, the shape of the posterior portion of the sheath conformed with that of the posterior portion of the adult (Fig. 1). Similar observations were made from second and third stage larvae. These findings indicate that H. zuckermani maintains the same tail form throughout its development.

Comparative measurements of all of the selected characters gave very close average values and large overlap in the ranges (Table I), except for ratios which involved tail length. The ratio of body length to body width was smaller in the original description, but the type specimens were slightly flattened.

The structure of lateral fields was the same in all females regardless of tail shape.