

Nematodes were readily identified when cut obliquely or along their longitudinal axis so that some of their internal organs could be recognised (Fig. 1A). Other nematodes cut in cross section often had their internal organs missing but could still be identified due to the general appearance of the cuticle and its circular form with a diameter corresponding to that of nematodes. In certain situations the width of the nematode annules could be measured and anastomoses observed in the lateral line (Fig. 1D).

This technique could be used to identify the ecological niche occupied by nematodes in different soil types and may help explain why different nematodes species appear to vary in their susceptibility to certain nematicides (Boag, 1979).

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A FURTHER OBSERVATION ON SPERM STRUCTURE IN A *HETERODERA* SP.

John A. Walsh and Audrey M. Shepherd \*

Spermatogenesis and the ultrastructure of sperm in some cyst nematodes has been described by Shepherd, Clark and Kempton (1973). These authors noted differences in the condensation of the nucleus during spermatogenesis between members of the then subgenera *Heterodera* (*Heterodera*) and *H.* (*Globodera*). More recently Behrens (1975) and

Mulvey and Stone (1976) proposed that these subgenera (*Globodera* and *Heterodera*) be raised to generic rank and in support cited the differences in sperm development described by Shepherd, Clark and Kempton (1973), and other ultrastructural studies. During their studies of spermatogenesis in cyst nematodes Shepherd *et al.* (unreported) searched

\* Nematology Department, Rothamsted Experimental Station, Harpenden, Herts., AL5 2JQ, England.

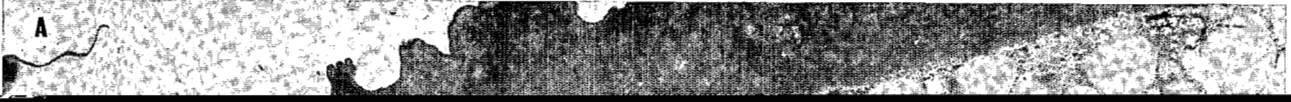


Table 1  
Morphology of nucleus in members of the genus

STAGE OF SPERMATOGENESIS	<i>Globodera</i>	<i>Heterodera</i>
Spermatogonium	membrane-bound ovoid nucleus	membrane-bound ovoid nucleus
Spermatocyte	chromatin in shadowy patches	chromatin in shadowy patches
Spermatid	chromatin homogeneous, electron-dense, no nuclear membrane	chromatin homogeneous, electron-dense, no nuclear membrane
Mature spermatozoon in male	<i>beaded filamentous until near cloaca</i> then homogeneous, electron-dense	<i>homogeneous, electron-dense</i>
Mature spermatozoon in female	electron-dense on entry, changing to <i>coarsely stranded</i>	<i>homogeneous electron-dense</i>

for but were unable to find spermatozoa in the female reproductive tract of the members of the genus *Heterodera* examined.

Whilst studying the intracellular rickettsia-like micro-organisms in cyst nematodes (Walsh, 1979, 1981), spermatozoa were observed in the spermatheca of the pea cyst-nematode, *H. goettingiana*. This note describes these spermatozoa and reveals a further difference between the members of the genera *Globodera* and *Heterodera* studied.

Females of *H. goettingiana* were obtained and prepared for electron microscopy as described by Shepherd, Clark and Dart (1972).

Fig. 1A shows spermatozoa (sp) in the spermatheca (sa) of *H. goettingiana*; 1B is an enlargement of one of these spermatozoa showing the nuclear material (n) in a condensed state. This represents another difference between the members of the genera *Globodera* and *Heterodera* that have been studied because in

*Globodera rostochiensis*. The morphology of the sperm nucleus during the stages of spermatogenesis described by Shepherd (1981) are summarized in Table 1 for the members of the genera *Globodera* and *Heterodera* studied and differences are in italics.

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