EFFECT OF NEMATODE-TRAPPING FUNGI, MEDIA, AND TEMPERATURE ON THE MORPHOMETRICS OF APHELENCHUS AVENAE

BY

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The parthenogenic nematode, Aphelenchus avenae, was maintained with four species of nematode-trapping fungi on three different media at four temperatures for 7 days. De Man's procedures were utilized for the measurement of nematodes and the data were analyzed statistically. The data suggested that the culture variables in the study accounted for more of the variability in 'V' than did the other measures. The 'V' values were considered the best taxonomic parameter for identification of A. avenae in the present study.

Aphelenchus avenae Bastian has been considered as either a pathogen on higher plants or a mycophagous nematode of the rhizosphere. Several investigators (Barker, 1964; Christie & Arndt, 1936; Decker, 1962; Steiner, 1936) have reported the limited pathogenicity of the nematode on higher plants. Other workers (Faulkner & Darling, 1961; Mankau & Mankau, 1962; Townshend, 1964) have considered the nematode as a mycophagous member of the soil environment. The latter investigators have studied primarily the effect of fungal host on the reproductive rate of the nematode. Recent studies (Pillai & Taylor, 1967; Evans & Fisher, 1969) have attempted to determine the morphometric relationships of host preference, host suitability, and temperature effects on the nematode. Many of the studies with A. avenae have used non-predaceous fungi.

This paper reports the results of a laboratory study intended to determine the effect of different nematode-trapping fungi, media, and temperatures on the morphometrics of A. avenae.

MATERIALS AND METHODS

The nematode culture of A. avenae used in this study was isolated from soil near Urbana, Illinois and maintained with a non-predaceous host fungus, Pyrenochaeta terrestris (Hansen) Gorenz., Walker & Larsen. Nematode stock cultures were maintained on a one-quarter-strength medium that contained 10 g of Difco Potato Dextrose Agar (PDA) and 15 g of Difco Agar in 1000 ml of water at room temperature.

The predaceous fungi used in this study were either adhesive-network or constricting-ring forming species of nematode-trapping Hyphomycetes. Arthrobotrys oligospora Fres. and A. musiformis Drechs. were the two adhesive-network
formers; *A. dactyloides* Drechs. and *Monacrosporium bembicodes* (Drechs.) Subram. were the two constricting-ring formers. Fungus cultures were maintained on a medium that contained 20 g Difco Corn Meal Agar (CMA) in 1000 ml of water at room temperature. Nematode and fungus stock cultures were subcultured every 7 days.

The three media used in this study were: 2% CMA, one-quarter-strength PDA, and one-fifth-strength V-8 (V-8) that contained 200 ml V-8 juiceR and 20 g Difco Agar in 1000 ml of water at room temperature. Each of the predaceous fungi were transferred to separate plates of the three experimental media one week prior to a treatment. The one-week time-period was considered necessary for the fungi to acclimate themselves to the new medium.

Fungus inoculations for experiments were completed with the use of a sterilized 7 mm-diam cork borer. Agar discs that contained fungus material were cut from the edge of an actively growing colony with the cork borer. The inoculation discs were transferred face down and placed in the center of 9 cm petri plates that contained the same medium as the inoculum.

For the purpose of this study *A. avenae* was grown for 2 weeks on one-quarter-strength PDA with *P. terrestris* and then harvested for inoculation into the nematophagous fungus cultures. Nematode extraction from agar stock cultures was according to the method described by Monoson (1968).

Nematode suspensions from similar replicate treatments were combined and concentrated by decanting. Adult nematodes were heat relaxed, mounted in 5% formalin, and measured. De Man's values for the various nematode morphological categories were determined and analyzed statistically. The statistical methods used were coefficient of determination, analysis of variance, and Neuman-Keul test.

**RESULTS**

The parthenogenic nematode, *A. avenae*, exhibited a high degree of ‘L’ variation between populations reared with the four fungus species (Tables I-III). Average body length of the nematode varied from 332 μ with *A. dactyloides* to 719 μ with *A. musiformis*. Total ‘L’ variations were between 175-859 μ. The largest ‘L’ variations occurred on CMA and V-8; the least on PDA. Slightly larger mean variations were noted for the two adhesive-network forming fungus species. Large mean variations were recorded for the ‘a’ value (16.7-31.9) and these correlated with a large range (12.8-37.0). Significantly higher ‘a’ means were noted on V-8 for each of the fungi used as a food source. Mean ‘b’ values varied the least of the measures used (3.8-6.2). Large variations of means were recorded for ‘c’ values (19.0-30.4) and these correlated once again with a large range (13.1-43.5). “V” value mean percentages were between 72.7-80.0. Considerable overlap of mean data was observed for each of the fungi at the different temperatures and on the various media.