UNDERPOPULATION IN PLANT PARASITIC NEMATODES

BY

J. W. SEINHORST

Instituut voor Plantenziektenkundig Onderzoek, Wageningen, The Netherlands

In a pot experiment rates of multiplication of *Rotylenchus uniformis* (Thorne) on peas were considerably higher and proportions of adults in the final populations considerably lower at high initial densities than at lower ones. Both observations are in agreement with the hypothesis that at very low initial densities the proportions of adult females that mated were much smaller than at higher initial densities because the chance of a female meeting a male decreased with density below a certain value of the latter.

A habitat is underpopulated with a species if at higher density this species would increase in number at a faster rate. In nematodes underpopulation can only occur in amphimictic species where the rate of multiplication depends on the meeting chances of males and females. Kort (1962) reported a case of under-population of *Heterodera rostochiensis*, which was already noticeable at 0.5 eggs per g of soil. Den Ouden (1966) inoculated pots containing 10 kg of soil with *H. rostochiensis* at rates as low as 0.02 eggs per g of soil. In one experiment he found the following rates of multiplication: 17 × at 0.02 eggs per g of soil and 22 × at 1.3 eggs and in a second 15 × at 0.2 and 21 × at 0.6, 1.7 and 5 eggs per g of soil. If there was an effect of underpopulation it was obscured by the variances of the multiplication factors at the low densities. Experiments by Seinhorst (1966) with densities of *Tylenchorhynchus dubius* as low as 4 nematodes per 500 g of soil, *Pratylenchus penetrans* as low as 4 nematodes per 500 g of soil and of Den Ouden & Seinhorst (1964) with *T. dubius* at densities as low as 10 nematodes per 500 g of soil either did not give any indication of a lower multiplication rate at the lowest initial densities than at higher ones or (as in the latter experiment) the difference was not significant.

A distinct underpopulation effect was obtained in an experiment with *Rotylenchus uniformis* (Thorne) on peas. In this experiment soil was used which had been steam sterilized 6 weeks before the experiment began. The soil for each pot used in the experiment (2 kg) was inoculated separately with the required number of nematodes suspended in 5 ml of water and mixed carefully a few days afterwards. The nematode population used consisted of about 20% adults, about half of which were (usually fertilized) females, and 80% juveniles of all stages. There were 14 nematode densities including a series with uninoculated soil, and 11 replications per density. Pots as described by Seinhorst (1966) were used and 1900 g
Fig. 1. Legend see next page,