NEMATODES FROM AN ENGLISH CHALK GRASSLAND:
SPECIES DISTRIBUTIONS

BY

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A total of 154 nematode species were identified from the chalk grasslands of Porton Down, a Site of Special Scientific Interest in southern England. Twelve soil samples were taken each January and June during 1990 and 1991 at two sites with differing vegetation and topographic position. The abundance of many species differed between the sites. There were also seasonal and probably drought-related changes in the abundance of many species. Some of the species distributions accord with previous records showing preferences by particular species for certain types of soil, others do not. Species are divided into generalist, intermediate and specialist species on the basis of spatial distribution. Seasonal, drought-tolerant, drought-susceptible and temporally stable species are recognized on the basis of temporal distribution. Patchy species are recognized on the basis of spatial land temporal distribution

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INTRODUCTION

Nematode populations from non-agricultural habitats are poorly known compared with those from agricultural areas. However, information on the distribution and abundance of nematode species from natural habitats can improve knowledge of the processes controlling nematode assemblages, and ultimately predicting how the species will respond under different conditions (e.g. Boag et al., 1991). Such information can also be important for systematics, biogeography and, if species become pests following modification of a habitat, for pest management.

In Britain, there have been studies of species composition of nematodes from moorland, fen and regenerating agricultural land (Banage, 1962, 1966; Winslow, 1964; Yuen, 1966; Yeates, 1971). However, most work has concentrated on economically important plant parasitic families (e.g. Taylor & Brown, 1976; Alphey & Boag, 1976; Boag & Orton Williams, 1976). There have been no studies of nematodes from chalk grasslands.

This paper reports part of a study of the nematode fauna from Porton Down Site of Special Scientific Interest, the most extensive chalk grasslands in Britain, and possibly in Europe (Wells et al., 1976). The grasslands are unimproved, having been enclosed in 1916, unlike most similar grasslands. The distribution of the more abundant species is analyzed and discussed, particularly in relation to their putative food sources. Detailed taxonomic descriptions will be pre-
presented elsewhere: the distributions of ecological groups and parameters of the nematode assemblage as a whole will be reported in a companion publication (Hodda & Wanless, 1994).

MATERIALS AND METHODS

Two sites were sampled within Porton Down Site of Special Scientific Interest (51°08' N, 1°45' W). One was in a broad, flat-bottomed valley with steep sides covered by scattered scrub. Altitude was about 110 m. The site had stony soil supporting a short grass sward containing many lichens and low or prostrate herbs interspersed with bare ground, flints and chalk nodules. Common plant species were, in order of decreasing ground cover, Festuca ovina L., Festuca rubra L., Sanguisorba minor Scop., Hieracium pilosella L., Koeleria macrantha (Ledebr.) Schultes and Thymus praecox Opiz.. The lichen Cladonia rangiformis Hoffm. was also abundant.

The other site was on a hill at an altitude of about 160 m. It was less stony than the valley, covered with grassland containing many herbs and mosses interspersed with many ant colonies. F. ovina, F. rubra, Bromus erectus Hudson, T. praecox and Gallium mollugo L. had the greatest ground cover. The mosses Rhytidiadelphus squarrosus (Hedw.) Warnst., Calliergon cuspidatum (Hedw.) Kinb. and Homalothecium lutescens (Hedw.) Robins were also abundant. The site is being invaded by scrub and is surrounded by a plantation of Fagus sylvatica L.

Both sites are grazed by rabbits, but the hill is apparently grazed more heavily. At both sites the soil is “upper chalk” (Welch, 1957), with pH about 7.5.

Within each site 12 plots were sampled. Each of the 12 plots was a 9 m² square separated from adjacent plots by 2 m all around. The central 1 m² of each plot was not sampled because it was being used for a botanical survey. In each plot, five soil cores, each of 10 mm diam and about 100 mm depth, were taken from random locations using an auger. The cores in each plot were pooled and refrigerated until further processing could proceed. Sets of cores were taken on 16 January 1990, 19 June 1990, 15 January 1991 and 4 June 1991.

Shortly after sampling the samples were returned to the laboratory, where the soil was passed through a 2 mm mesh sieve and thoroughly but gently mixed at field moisture. Nematodes were then extracted, as soon as possible, from 100 cm³ of the pooled soil for each plot using Oostenbrink elutriators (Oostenbrink, 1960; 1971). The live nematodes were decanted from the elutriator and the volume of the solution adjusted to 90 ml. Duplicate 9 ml aliquots were removed for counting: the mean of the two counts was multiplied by ten to estimate the total number of nematodes in the sample. This number was used to ascertain the proportion of the sample from which species were identified.