

Short communication

Plant parasitic nematodes associated with groundnut in Niger¹

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Abstract. Plant parasitic nematodes belonging to 12 genera were recorded in soil samples collected from 20 different locations in major groundnut producing areas of Niger. *Scutellonema clathri-caudatum*, *Telotylenchus indicus* and *Xiphinema attorodorum* were widespread and were predominant in almost all locations. Plant parasitic nematodes are suspected to be one of the major biotic factors contributing to the crop growth variability of groundnut in Niger.

Introduction

Variation in crop growth is a major limiting factor of groundnut (*Arachis hypogaea* L.) production in Niger. During surveys in 1986 and 1987, large variation in crop growth was observed in farmers' fields, especially in sandy soils, in all major groundnut-producing areas of the country (Subrahmanyam, 1988). The affected plants were usually present in patches surrounded by apparently healthy plants (Subrahmanyam *et al.* 1988). Plants were severely stunted, leaves were small and chlorotic, and roots were stubby and profusely proliferated. In many cases, root tips were swollen and necrotic. These patches were always distributed at random in the fields irrespective of the contour. The symptoms on the affected plants and their distribution in the fields in patches appeared to be one of the characteristic features of invasion by plant-parasitic nematodes. Preliminary analysis of soil samples collected from research farm of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) Sahelian Center, Sadoré (13°, 29'N lat.; 2°, 10' long., 221 m alti.), Niger indicated the presence of large numbers of plant-parasitic nematodes in groundnut fields that were showing variation in the crop growth (Sharma *et al.*, 1988). Hence, a systematic survey of plant-parasitic nematodes associated with groundnut was carried out in Niger.

Materials and methods

Survey of nematodes

Surveys were carried out in August and September 1988 in major groundnut producing areas of Niger to assess the occurrence and distribution of nematodes parasitic on groundnut (Fig. 1). At each location, data on the soil type, cropping systems, and the occurrence and severity of crop

variability were recorded. A total of 20 fields were examined. From each field 4 to 6 soil core were collected at 20 cm-depth using a steel shovel. Plants were uprooted at random from each field and the roots and pods were examined for the presence of lesions and galls. Roots were also collected from each field and were examined for the presence of plant-parasitic nematodes.

Extraction of nematodes

Thoroughly mixed 100 cm³ soil samples were processed by sieving after soaking the soil in water, using 725 µm-pore (20 mesh) and 45 µm-pore (325 mesh) sieves. The residue collected on the 45 µm-pore sieve was placed in a nematode filter supported on steel gauze immersed in water in a collecting tray. After 36 hours, water in the collecting tray was examined under a stereomicroscope for the presence of plant parasitic nematodes. Root samples of approx. 5 g from each field were cut into small pieces and nematodes were extracted using a nematode filter.

Results and discussion

Plant-parasitic nematodes belonging to 12 genera were

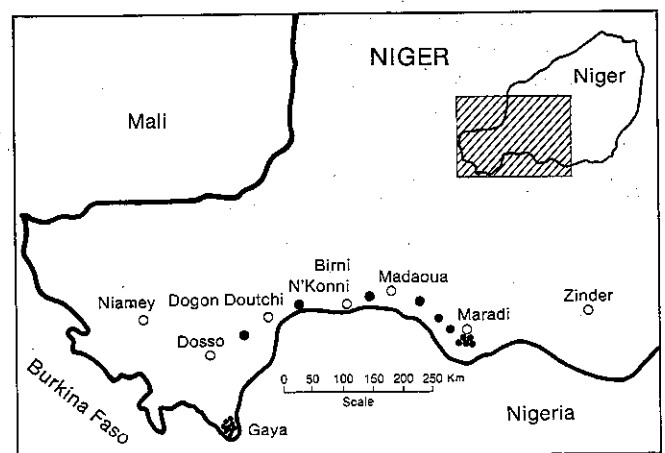


Figure 1. Map of Niger showing the groundnut field location (in black dots) where soil and root samples were collected for estimating the populations of plant parasitic nematodes during the 1988 crop season.

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Table 1. Soil population of plant-parasitic nematodes/100 cm³ soil in different groundnut areas in Niger

Nematode species	Gaya (2)	Bengou (2)	Tara (5)	Kabra (1)	Boureimi (1)	Milo (1)	Yarriddi (1)	Mahamanedi (1)	Maradi (3)	Tarna (2)	Kowakore (1)
<i>Ditylenchus</i> sp	—	0–20	10–20	20	20	—	—	—	0–20	—	—
<i>Helicotylenchus</i> sp	20–30	20–50	060	—	—	—	—	50	—	0–10	—
<i>H. pararobustus</i>	—	—	0–30	10	20	10	20	—	0–10	—	10
<i>M. curvata</i>	—	0–20	—	—	10	10	10	10	0–20	10–20	—
<i>Pratylenchus</i> sp	—	—	—	—	—	—	20	—	—	30–60	—
<i>Siddiqia</i> sp	0–20	—	0–30	20	80	60	—	20	0–40	0–10	20
<i>T. indicus</i>	20–30	30–40	0–30	30	10	—	20	30	10–20	0–20	—
<i>Trichodorus</i> sp	—	—	—	20	—	—	—	—	—	—	—
<i>Xiphinema</i> sp	0–10	20–30	10–30	30	30	20	30	30	0–20	0–40	30
<i>S. clathri caudatum</i>	0–40	20–50	30–250	50	60	80	80	40	20–40	0–30	70

Figures in parentheses indicate the number of location sampled at these areas

recorded in soil samples collected from the various locations in Niger. These included *Aphelenchoides* sp., *Ditylenchus* sp., *Helicotylenchus* sp., *Histotylenchus* sp., *Hoplolaimus pararobustus* Schuurmans Stekhoven and Tuenissen, *Macroposthonia curvata* Raski, *Pratylenchus* sp., *Scutellonema clathricaudatum* whitehead, *Siddiqia* sp., *Telotylenchus indicus* Siddiqui, *Trichodorus* sp., *Xiphinema attorodorum* Luc. and *X. italiae* Meyl. *Scutellonema clathricaudatum*, *X. attorodorum* and *T. indicus* were predominant, being present in almost all the fields sampled (Table 1). Roots and pods were generally free from lesions and galls. Populations of *S. clathricaudatum*, *X.* and *attorodorum*, and *Siddiqia* sp. were also present in root samples. *X. attorodorum* and *Siddiqia* sp. are sedentary ectoparasites as they feed at one place for a long time. *Aphelenchoides* sp. was observed only in samples collected from Bengou, Tara and Maradi. *Trichodorus* sp. was observed in a soil samples from Kabra, *Pratylenchus* sp. in samples from Yarriddi and Maradi, and *Histotylenchus* sp. in samples from Mahamanedi. *X. italiae* was found in samples from Maradi.

Crop growth was highly variable in most of the fields examined during the surveys. In many fields, there were

areas where plant growth was apparently normal, and other areas where plants were severely stunted and chlorotic. In the sandy and infertile soils of Niger where most of the groundnut crop is grown, even low numbers of parasitic nematodes would cause significant damage to root systems affecting nodulation and uptake of nutrients and water. There is a need to establish the pathogenicity of *S. clathricaudatum*, *T. indicus* and *X. attorodorum* on groundnut in Niger to understand their role in crop growth variability.

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