

Directorate of Agricultural Research, P.O. Box 15, Rumais, Sultanate of Oman

OCCURRENCE AND DISTRIBUTION OF PLANT PARASITIC NEMATODES IN ASSOCIATION WITH BANANA IN OMAN

by
A. MANI and M. S. AL HINAI

Summary. Surveys of banana plantations in Batinah, Interior, Dhahira, and Sharqia regions in North Oman and Dhofar Governorate in South Oman during 1991-95 revealed the occurrence of sixteen genera of plant parasitic nematodes. *Helicotylenchus multicinctus*, *Meloidogyne incognita*, *M. javanica*, *Rotylenchulus reniformis* and *Tylenchorhynchus coffeae* occurred most frequently and in the highest population densities. *Radopholus similis* was commonly present in Dhofar Governorate in South Oman and was limited to Al Hamra and Nizwa wilayats of Interior region in North Oman.

Banana (*Musa paradisiaca* L.) is a major fruit crop in the Sultanate of Oman, particularly in Dhofar Governorate (Salalah) and Batinah regions. Banana corms and suckers are often exchanged between regions which accounts for the dispersal of pathogenic nematodes. Previously, *Helicotylenchus multicinctus* (Cobb) Golden, *Meloidogyne* spp. and *Radopholus similis* (Cobb) Thorne had been recorded from banana in Salalah of Dhofar Governorate (Waller and Bridge, 1978). A systematic and organised survey was carried out during 1991-95 throughout Oman to identify the nematode parasites of banana.

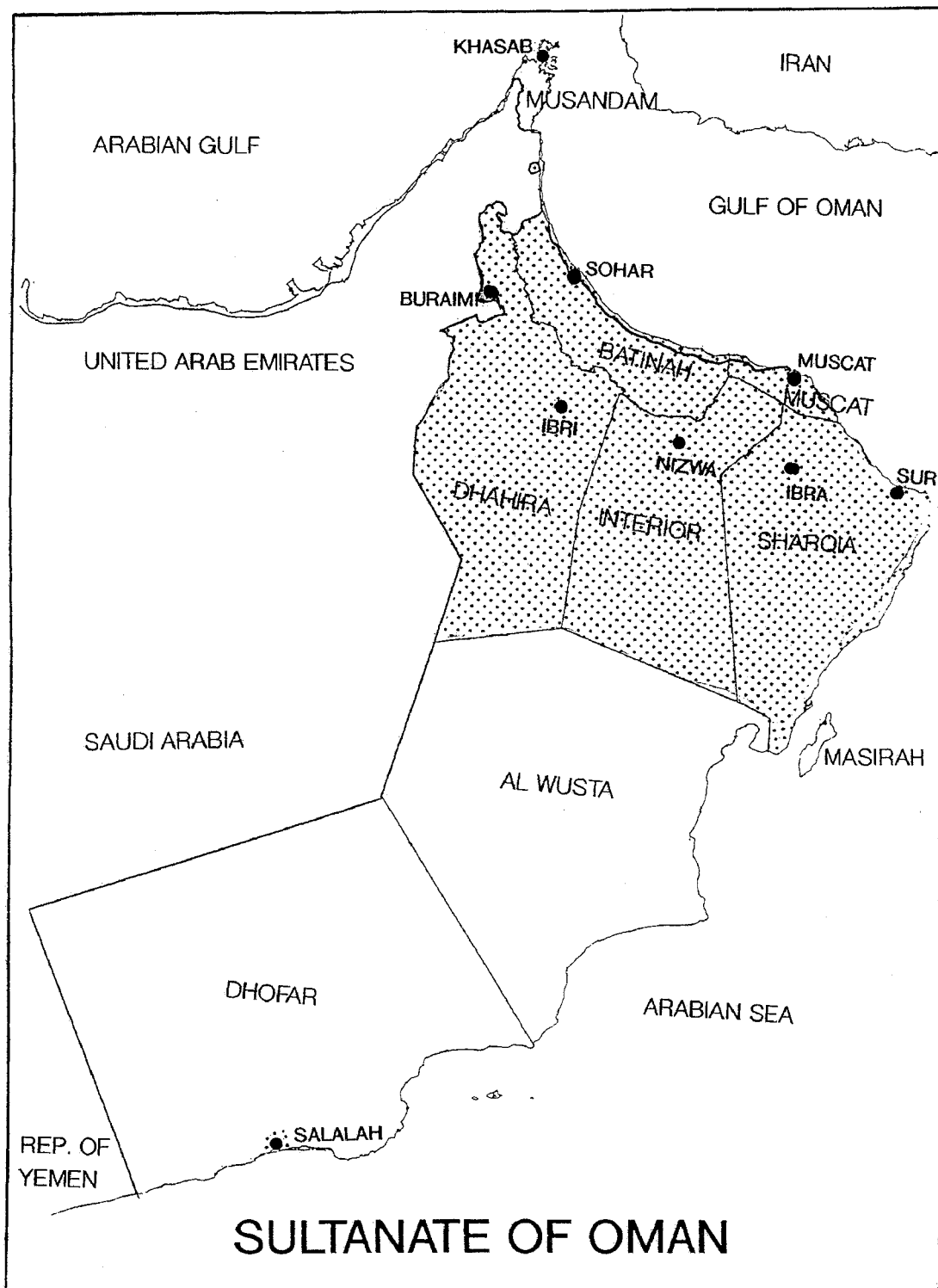
Materials and methods

Surveys were carried out in Batinah, Interior, Dhahira and Sharqia regions in North Oman and Dhofar Governorate (Salalah) in South Oman (Fig. 1) during 1991-95. A total of twelve wilayats (divisions in a region) in Batinah, nine in Interior, seven in Dhahira, six in Sharqia and five in Dhofar Governorate were surveyed. Five

farms were randomly selected in each wilayat and three to five soil sub-samples were collected from each farm and pooled together. Soil and root samples were collected from the rhizosphere at 30 cm from the base of the plant and up to 30 cm depth (Mohanty *et al.*, 1993). In all, 125 soil and root samples were collected from five regions. Nematodes were extracted from a composite sample of 250 cm³ soil by Cobb's sieving and decanting technique with final extraction in a modified Baermann funnel. Nematode populations were estimated in one ml aliquot under a stereo binocular microscope with 100x magnification. Root-knot nematode species were identified on the basis of perineal patterns of adult females as well as characters of the second-stage juveniles (Jepson, 1987).

Results and discussion

Results revealed the occurrence of sixteen genera of plant parasitic nematodes in the rhizosphere of banana in the various regions of



▤ REGIONS SURVEYED

● IMPORTANT TOWNS

Fig. 1 - Map showing the regions surveyed in the Sultanate of Oman during 1991-95.

Oman (Table I). Among them, *H. multicinctus* was the most frequently encountered nematode species with the highest frequency of occurrence of 82.4%, followed by *M. incognita* (Kofoid *et* White) Chitw., *Tylenchorhynchus coffeae* Siddiqi *et* Basir, *Rotylenchulus reniformis* Linford *et* Oliveira, *M. javanica* (Treub) Chitw. and *R. similis*. *Helicotylenchus multicinctus* had the highest mean population density of 600 nematodes per 250 cm³ soil followed by *M. incognita*, *M. javanica*, *R. reniformis*, *T. coffeae* and *R. similis*. These species were widely distributed in all the banana-growing regions of Oman. *R. similis* was commonly observed in Dhofar Gov-

ernorate at high population densities and in Al Hamra and Nizwa wilayats of Interior region at low to medium population densities. It is assumed that *R. similis* has been introduced into North Oman in banana corms obtained from Dhofar Governorate. Observations made earlier revealed the presence of the nematode on Banana in Salalah region (Waller and Bridge, 1978). Similarly, *Pratylenchus coffeae* (Zimmerman) Filipjev *et* Schu. Stekh. and *P. gutierrezi* Golden, Lopez *et* Vilchez were found in a few samples at Mahda, a wilayat close to the border of United Arab Emirates. *Pratylenchus coffeae* has been found to be pathogenic to banana in

TABLE I - Occurrence, population density and distribution of plant parasitic nematodes associated with banana in Oman.

Nematode species	Frequency of occurrence (%)	Population range	Mean population in 250 cm ³ soil	Distribution ¹
1. <i>Basirolaimus</i> sp.	2.4	15-42	25	D, I
2. <i>Criconemella</i> sp.	0.8	40	40	DG
3. <i>Bitylenchus</i> sp.	1.6	100-195	145	I
4. <i>Helicotylenchus multicinctus</i> (Cobb) Golden	82.4	40-3546	600	B, D, DG, I, S
5. <i>Helicotylenchus</i> sp.	19.2	40-300	110	B, D, DG, I, S
6. <i>Hemicriconemoides mangiferae</i> Siddiqi	7.2	20-100	56	B, I, S
7. <i>Hemicycliophora</i> spp.	0.8	20	20	DG
8. <i>Hoplolaimus</i> sp.	3.2	35-182	66	B, D
9. <i>Macroposthonia</i> sp.	0.8	30	30	B
10. <i>Meloidogyne incognita</i> (Kofoid <i>et</i> White) Chitw.	60.0	65-3360	525	B, D, DG, I, S
11. <i>M. javanica</i> (Treub) Chitw.	30.4	40-3900	508	B, D, DG, I, S
12. <i>Pratylenchus coffeae</i> (Zimmerman) Filip. <i>et</i> Sch. Ste.	0.8	400	400	D
13. <i>P. gutierrezi</i> Golden, Lopez <i>et</i> Vilchez	0.8	200	200	D
14. <i>P. jordanensis</i> Hashim	0.8	40	40	DG
15. <i>Pratylenchus</i> spp.	11.2	15-120	45	B, D, DG, I, S
16. <i>Rotylenchulus reniformis</i> Linford <i>et</i> Oliveira	35.2	25-2700	360	B, D, DG, I, S
17. <i>Radopholus similis</i> (Cobb) Thorne	25.6	20-1155	220	DG, I
18. <i>Sakia</i> sp.	3.2	60-80	75	DG
19. <i>Trichodorus</i> sp.	0.8	20	20	D
20. <i>Tylenchorhynchus coffeae</i> Siddiqi <i>et</i> Basir	41.6	30-1910	330	B, D, DG, I, S
21. <i>T. nudus</i> Allen	1.6	20-100	60	DG
22. <i>Tylenchorhynchus</i> spp.	15.2	15-360	122	B, D, DG, I, S
23. <i>Xiphinema</i> sp.	1.6	8-12	10	B, I

¹ B-Batinah, D-Dhahira, DG-Dhofar Governorate, I-Interior, S-Sharqia.

other countries (de Guiran and Vilardebo, 1962; Bridge and Page, 1984). However, the present results indicated that the nematode was not widely present and could have been introduced into the country with planting material. Thus, the findings of the survey emphasize the need to limit the movement of banana corms and suckers between regions to prevent the dispersal of pathogenic nematodes. Although *T. coffeae* occurred frequently in high population densities, its economic importance to banana has not been demonstrated so far.

In view of the pathogenic potential of these nematodes to banana (Mani *et al.*, 1984; McSorley and Parrado, 1986; Gowen and Queneherve, 1990), the frequency of occurrence and mean population density, *H. multicinctus*, *M. incognita*, *M. javanica* and *R. reniformis* are considered to be the most important nematode pests widely distributed in all the regions of Oman. *Radopholus similis* is the most important pathogen observed in Dhofar Governorate and Al Hamra and Nizwa wilayats of Interior region.

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