S. D. PANCHBHAI, B. K. VARMA and CH. RAVINDER REDDY[1]): *Presence of* Panagrolaimus *sp. (Nematoda: Panagrolaimidae) in seeds of pearl millet* (Pennisetum americanum (*L.*) *Leeke*)[2]).

During routine phytosanitary examination of pearl millet seeds at the Plant Quarantine Unit of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, Andhra Pradesh, India, we discovered a common soil nematode belonging to the genus *Panagrolaimus* inside seeds of some of the breeding lines. To date *Panagrolaimus* spp. have been reported as free living microphagous nematodes, occurring in soil and fresh water (Goodey, 1963), as dyssaprobes (Paramonov, 1962) occurring in roots, stems and leaves also in spikelets (Baranovskaya, 1958) and in rice grains (Panwar & Rao, 1977). Some are endoparasites of insects (Poinar, 1972; Poinar & Geetha Bai, 1979). This is the first record of a seedborne nematode in pearl millet seeds which is significant in plant quarantine terms.

Nematode-infested seeds are elongated, with a longitudinal fissure approximately 2/3 the length of one side. There is a small slit on the micropyle of the hilum region (Fig. 1). Infested seeds are shrivelled, dark grey or greyish-black and weigh less than healthy seeds; the average 100-seed mass was 324 mg for infested seeds compared with 517 mg for normal ones. Infested seeds moistened for germination tests had distorted embryos, sometimes without radicles, and partially or completely destroyed plumules; they did not germinate.

After soaking representative seed samples of three breeding lines in water for 24 h we found that there were between ten to 84 live nematodes per seed. They were mainly juveniles but there were a few eggs near the embryos of some seeds which shows that the nematodes reproduced. We also recovered live nematodes from a seed lot that had been in store for more than 4 years. Lehmann (1963) noted that *P. rigidus* revived from twigs kept dry for 28 months.

Seeds of a range of pearl millet genotypes were collected from normal standing plants, lodged plants touching the soil surface, and fallen earheads in three fields at the ICRISAT farm, and examined for the presence of nematodes. Forty earheads of each category were subsampled. All stages of the nematode, except eggs, were found in seeds of earheads that had been in contact with soil. The earheads of erect plants in the same field, however, did not show the presence of nematodes. Since there were no nematodes in irrigation water used in the sampled fields, it is assumed that the nematodes infested the seeds through the soil. The presence of *Panagrolaimus* in soil samples was confirmed by Baermann funnel extraction.

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[2]) Submitted as J.A. No. 567 by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).

Fig 1. Pearl millet seeds showing infestation of *Panagrolaimus* sp. (left); clean healthy seeds (right).

The pearl millet seeds harbouring nematodes were invariably found to be also infected with bacteria. This association and its role in the pathogenic process needs to be investigated.

Panagrolaimus sp. seems to undergo anhydrobiosis, enabling it to remain alive for long periods during storage. Fumigating dry seeds with methyl bromide under vacuum at the standard rate of 32 g/m^3 for 4 h did not kill the nematodes. However, nematodes in wet seeds, or those released in water by soaking infested seeds for half an hour were killed by the same dose of methyl bromide.

The presence of nematodes inside pearl millet seeds and the associated bacteria render the seeds unviable. Until a suitable method is found to control the nematode-bacteria complex, it would be desirable to avoid collection of seeds from pearl millet earheads which come in contact with the soil surface and thresh healthy earheads in clean unsoiled bags or on a cement floor.

The Commonwealth Institute of Parasitology, St. Albans, Herts AL4 OXU UK, identified the nematode as *Panagrolaimus* sp.

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