

## First Report of Root-knot Nematode on Yam ‘São Tomé’ in Brazil

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Recebido para publicação em 27 / 05 / 2009. Aceito em 06 / 10 / 2010

Editado por Mário Inomoto

**Resumo** - Moura, R.M., R.M.D.G. Carneiro, S.T. da Silva-Lima, M.B. da Costa & A.R.S. Ribeiro. 2010. Primeiro assinalamento do nematoide-das-galhas em inhame ‘São Tomé’ no Brasil.

O presente trabalho relata a primeira ocorrência da meloidoginose do inhame-são-tomé (*Dioscorea alata*) no Brasil. A sintomatologia observada diferiu da descrita para o inhame-da-costa (*Dioscorea cayenensis*). Associadas à síndrome, foram encontradas duas espécies do nematoide-das-galhas: *Meloidogyne incognita* e *M. arenaria*, diagnosticadas pelos métodos morfológico (configuração da região perineal) e bioquímico (padrão eletroforético de isoenzimas).

**Palavras-chaves:** doenças do inhame, nematoides fitoparasitas, *Meloidogyne incognita*, *Meloidogyne arenaria*.

**Abstract** - Moura, R.M., R.M.D.G. Carneiro, S.T. da Silva-Lima, M.B. da Costa & A.R.S. Ribeiro. 2010. First report of root-knot nematode on yam ‘São Tomé’ in Brazil.

This publication reports the first occurrence of the root-knot nematode disease on water yam (*Dioscorea alata* ‘São Tomé’) in Brazil. The observed symptoms were quite different from those reported for the same disease on yellow yam (*Dioscorea cayenensis* ‘Da Costa’). Two root-knot nematode species were found associated to the disease syndrome: *Meloidogyne incognita* and *M. arenaria*, identified by morphology (perineal pattern) and biochemistry (isoenzyme profile).

**Key words:** yam diseases, plant parasitic nematodes, *Meloidogyne incognita*, *Meloidogyne arenaria*.

### Content

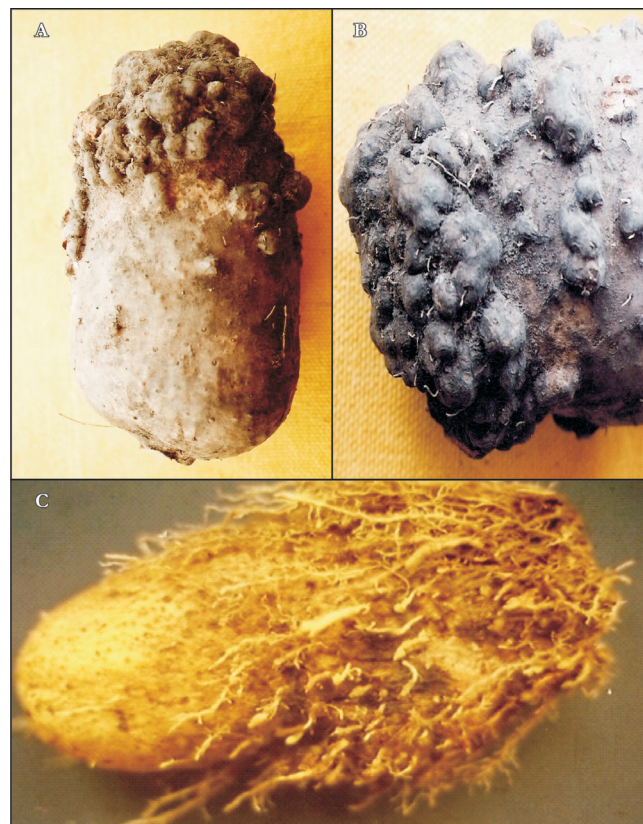
In Brazil, the water yam (*Dioscorea alata*) ‘São Tomé’, together with the yellow yam (*Dioscorea cayenensis*) ‘Da Costa’, is an important staple food for the population and additionally a valuable commodity good. Only the yam ‘Da Costa’ is used for exportation. In the Northeast of Brazil, the main yam producer area of the country, the yam ‘São Tomé’ crops are significantly reduced due to the occurrence of a sporadic, but always highly severe disease of unknown etiology, named sudden blight (*requieima*). Due to this problem, yam ‘São Tomé’ plantations have moved to other regions out of Northeast. In consequence, the majority of the yam ‘São Tomé’ received by the Central Food

Market (CEASA) in Recife city, Northeast of Brazil, the main food market of the region, comes from other states of Brazil. For a long time, the yam ‘São Tomé’ was considered resistant to the most common nematodes of yam. However, Moura *et al.* (2006) described the dry rot disease on yam ‘São Tomé’ as the first occurrence in Brazil. Dry-rot is a highly severe disease on yam ‘Da Costa’ in all yam producing areas. The causal agent of this disease is the migratory endoparasite *Scutellonema bradys*, known as the yam nematode. In that case, the analyzed material was commercial yam tubers proceeding from the state of São Paulo, Southeast of Brazil.

The root-knot nematode disease occurs on

*Dioscorea* spp. plantations all over the world, including Brazil, and so far had no report on yam 'São Tomé' in Brazil (Moura, 2005). The objective of the present paper is to make the first report of the root-knot nematode disease on yam 'São Tomé' in Brazil. The disease was observed affecting commercial tubers harvested in Paraná state, South of Brazil, and shipped to CEASA of Recife for selling. Malformed tubers were very common in that shipment. Therefore, local sellers submitted samples to the Microbiology and Immunology Laboratory of the Academic Center of Vitória - Federal University of Pernambuco, for diagnosis. Initially, the symptoms pointed out the possibility of root-knot nematode disease, even though the symptoms being quite different from those described for yam 'Da Costa' by Moura & Freitas (1983). In yam 'São Tomé', the main symptoms were many rounded tumors, present only on the surface of the growth region of the tuber (Fig. 1A). In yam 'Da Costa', the tumors occur on the opposite extreme

(Fig. 1C). On those formations, isolated galls ranged from 2 to 5cm in diameter and were scattered or in clusters (Fig.1B). The shape of the entire tuber was not affected as it occurs on most infected yam 'Da Costa', when parasitized by root-knot nematodes. Also, the abnormal roots that grow protruding from the tuber surface of root-knot infected yam 'Da Costa' (Fig. 1C) were not observed on 'São Tomé'. It is important to stress that the root-knot nematode is recognized as a severe yam disease, in most cases inducing significant losses all over areas where yam is produced extensively (Adesian & Odhiran, 1978; Jatala & Bridge, 1990; Moura, 2005). Root-knot affected tubers are rejected by the consumers due to the unpleasant aspect and taste, reduced size, and the popular belief that infected tubers are harmful to humans. Aiming to identify the species of the causal agent and considering the difficulties in obtain uninjured adult females from 'São Tomé' infected tissues, 25-day old tomato plants (*Lycopersicon esculentum*) 'Santa



**Figure 1** - Root-knot disease symptoms on yam. **A, B)** symptoms on white yam (*Dioscorea alata* 'São Tomé'); **C)** symptoms on yellow yam (*Dioscorea cayenensis* 'Da Costa').

Cruz' were inoculated with eggs and juveniles (J<sub>2</sub>) obtained from yam 'São Tomé'. The tomato plants were maintained under screen-house (mean temperature 28 °C) for 45 days. After this period, the tomato roots were carefully removed from the soil, washed in clean water and kept in 0.9 % NaCl, for 24 hours, to be dissected. Adult females were then transferred to a microscope slide, with a drop of 45 % acetic acid for cutting and identification by perineal pattern examination, following Chitwood (1949) procedure. The results indicated the presence of a mix population formed by *Meloidogyne incognita* and *M. arenaria*. The first species was reported on yam in Brazil affecting yam 'Da Costa' by Lordello (1959) in the state of Pernambuco (Northeast of Brazil). Moura *et al.* (1976) reported *M. incognita* and *M. javanica* in the same yam variety and state. Finally, Leal & Ponte (1983) reported *M. arenaria* on yam 'Da Costa', in the state of Ceará (Northeast of Brazil). The identification of the root-knot species was confirmed by electrophoretic profile of isoenzymes, according to Esbenshade & Triantaphyllou (1985). This is the first report of root-knot nematodes on water yam (*D. alata*) 'São Tomé' in Brazil.

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