

## RESEARCH NOTE/NOTA INVESTIGATIVA

### INTENSITY OF DRY ROT DISEASE OF YAM IN THE STATE OF ALAGOAS, BRAZIL

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#### ABSTRACT

Muniz, M. F. S., E. J. Silva, J. M. C. Castro, F. S. Rocha, L. M. C. Alencar, and V. Gonzaga. 2012. Intensity of dry rot disease of yam in the state of Alagoas, Brazil. *Nematropica* 42:198-200.

The objective of this study was to conduct a survey on the presence of phytonematodes associated with dry rot disease, to be able to quantify and identify the species being damaged, and to evaluate the disease incidence in the main yam-growing areas in the state of Alagoas, Brazil. Altogether, 39 samples of yam tuber were collected. High population densities of the plant parasitic nematodes *Scutellonema bradys*, *Pratylenchus coffeae* and/or *P. brachyurus* were associated with the decay of the yam tubers. The disease was found to be widespread throughout the production areas. The disease incidence ranged between 0.2 and 85%.

*Keywords:* *Dioscorea*, field survey, *Pratylenchus brachyurus*, *Pratylenchus coffeae*, *Scutellonema bradys*.

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#### RESUMO

Muniz, M. F. S., E. J. Silva, J. M. C. Castro, F. S. Rocha, L. M. C. Alencar e V. Gonzaga. 2012. Intensidade da casca preta do inhame no estado de Alagoas, Brasil. *Nematropica* 42:198-200.

Com o objetivo de identificar e quantificar os fitonematoides associados à casca preta do inhame e avaliar a incidência da doença no estado de Alagoas foi realizado um levantamento nos principais municípios produtores. Em 39 amostras coletadas, foram detectadas elevadas densidades populacionais dos fitonematoides *Scutellonema bradys*, *Pratylenchus coffeae* e/ou *P. brachyurus*. A doença encontra-se amplamente distribuída nas principais áreas produtoras de inhame do estado, com valores de incidência variando de 0,2 a 85%.

*Palavras-chave:* *Dioscorea*, levantamento, *Pratylenchus brachyurus*, *Pratylenchus coffeae*, *Scutellonema bradys*.

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In Brazil, yam (*Dioscorea* spp.) production areas are confined in the Northeast region with greatest production in the states of Paraíba, Pernambuco and Alagoas. In Alagoas, this crop occupies approximately 1,979 hectares of land with average yield, nearly 10,726 kg ha<sup>-1</sup> (IBGE, 2010).

Among the major constraints to yam production, are diseases such as dry rot of tubers. This disease is characterized by the presence of cracks and dry black lesions in the cortex of the tuber (Bridge and Starr, 2007).

In Brazil, it was first reported by Lordello (1959), who described a new species which he called *Scutellonema dioscoreae*. Later, Moura and Teixeira (1980) given the cause for the disease to the known “yam nematode”, *S. bradys* (Steiner and LeHew) Andrassy.

Moura and Moura (1989) report the first occurrence of the lesion nematode *Pratylenchus brachyurus* (Godfrey) Filipjev and Schuurmans Stekhoven on yam tubers in the state of Paraíba, Brazil. Later, Moura and Monteiro (1995) reported that *P. coffeae* (Zimmermann)

Table 1. Number of samples collected, area (ha), number of nematodes (juveniles and adults) per gram of yam tuber peel and dry rot disease incidence in 11 municipalities in the state of Alagoas, Brazil. 2009.

Municipality/ Field sampled	Area (ha)	Nematode number/g tuber peel <sup>z</sup>			Disease incidence (%) <sup>y</sup>
		<i>Scutellonema bradys</i>	<i>Pratylenchus coffae</i>	<i>Pratylenchus brachyurus</i>	
Arapiraca (6)	8.3	117.5 – 695	85 – 2,075	140 – 200	0.8 – 62.5
Atalaia (5)	17	152.5 – 372.5	315 – 5,250	35 – 92.5	1 – 40
Chã Preta (4)	2.9	47.5 – 1,095	222.5 – 4,783	0	5.6 – 50
Cajueiro (1)	0.5	2,775	0	0	20
Joaquim Gomes (3)	1.5	30 – 252.5	282 – 645	45	30 – 50
Mar Vermelho (1)	3	330	515	0	0.5
Paulo Jacinto (2)	42	162.5 – 600	182.5 – 3,840	0	10 – 37
Quebrangulo (3)	0.5	117.5 – 210	947.5	245	1 – 50
São Sebastião (1)	9	407.5	0	75	0.2
Taquarana (6)	11	326.7 – 3,825	0	52.5 – 275	20 – 85
Viçosa (7)	36.4	32.5 – 607.5	955 – 2,017.5	30 – 202.5	0.3 – 52
Total (39)	132.1				

The numbers in parentheses refer to number of farms sampled.

<sup>z</sup>Mean nematode count per three replications. Nematodes were extracted by maceration-centrifugal flotation method.

<sup>y</sup>Percentage of tubers sampled with dry rot symptoms.

Filipjev and Schuurmans Stekhoven had caused severe damage on this crop.

Although dry rot of yams has been reported in the state of Alagoas to be caused by *S. bradys* (Moura *et al.*, 1978), it is necessary to survey the situation in the field to determine the relative importance of *Scutellonema* and *Pratylenchus* species. Identifying nematodes in crop areas is the first step to determine if nematode management is needed. Therefore, considering the importance of yam in the state of Alagoas as well as the lack of research on nematodes in this crop, the objective of this study was to conduct a survey on the presence of phytonematodes associated with the dry rot disease, quantify and identify the damaging species, and determine the disease incidence.

The survey of phytonematodes in yam crop areas was carried out from January to February 2009 consisting of 11 municipalities which represented the main yam-growing areas in the state of Alagoas, Brazil, which were Paulo Jacinto, Chã Preta, Viçosa, Atalaia, Quebrangulo, Mar Vermelho, Cajueiro, Joaquim Gomes, Taquarana, São Sebastião and Arapiraca. Sample areas were randomly selected in farms with a history of the presence of dry rot disease on yam tubers.

Disease incidence (percentage of tubers exhibiting symptoms of dry rot) was evaluated at harvest or from recently harvested and stored yam tubers. Each composite sample of damaged tubers was made up of between 3 and 10 subsamples depending on the availability of infected tubers. The samples were placed in plastic bags labeled with information on the area, date, name of farm and cultural practices adopted by

the farmers and were brought to the Phytopathology Laboratory of the Federal University of Alagoas for processing.

The tubers were washed, peeled, cut into slices, and 100 g subsamples of decayed tuber peel were processed according to Coolen and D'Herde (1972) to extract the nematodes. After extraction, the nematodes were killed and fixed in hot 4% formalin. The population densities of the nematode suspensions were assessed from triplicate 1 ml aliquots with the aid of Peter's counting slides under a light microscope. Temporary slides were also prepared for further observations, based upon morphological characters of mature females. The data was compared to Loof (1991), Castillo and Vovlas (2007) and Germani *et al.* (1985) descriptions.

*Scutellonema bradys*, *P. coffeae* and/or *P. brachyurus* (Table 1) were found among the 39 yam tuber samples showing symptoms of dry rot disease. Following the data presented by Loof (1991) and Castillo and Vovlas (2007), the morphometric data used for *P. coffeae* populations were labial region with two distinct annuli, stylet 15 µm in length, vulva position at 79% of body length, female tail tip truncate or hemispherical and abundant males. *P. brachyurus* had an angular labial region with two annuli, the basal one narrower than the first annulus of the body, stylet with basal knobs rounded, vulva at 82-89% of body length, a nonfunctional spermatheca, and a smooth and broadly rounded tail; no males were found.

The highest populations of *P. coffeae* and *P. brachyurus* were found primarily in the municipalities of Atalaia and Taquarana, with up to 5,250 and 275

individuals per gram of yam peels, respectively. The municipality of Taquarana also had the highest number of *S. bradys* (3,825 nematodes per gram of yam peels extracted) (Table 1). The highest number of *S. bradys* recorded was 6,200 nematodes/g fresh tuber (Lebot, 2009). According to Bridge *et al.* (2005), *S. bradys* population density greater than 20 nematodes/g of tuber peelings are necessary to produce observable, external symptoms of damage.

In the Northeast region of Brazil, there were reports of the occurrence of *P. brachyurus* and *P. coffeae* as causal agents of dry rot on yams (Moura and Moura, 1989; Moura and Monteiro, 1995). Although these nematodes have a wide host range and are widespread in Brazil (Castillo and Vovlas, 2007), no published research was found on the occurrence of these phytonematodes on yams in the state of Alagoas. An important observation in the present study is that *S. bradys* and *P. coffeae* and/or *P. brachyurus* occur in mixed populations in infected tubers (Table 1). According to Castagnone-Sereno and Kermarrec (1988), the occurrence of *S. bradys* and *P. coffeae* together in the same tuber was uncommon in the French West Indies, and the establishment of one species prevents concomitant infection of the tuber by the other species.

The incidence of the dry rot reached values of up to 85% (Table 1), which indicates a high economic importance of the disease in yam crop areas in Alagoas. Therefore, prevention methods of nematodes management should be used where the disease has not been detected.

The present study revealed that dry rot on yams in Alagoas is caused by *S. bradys*, *P. coffeae* and/or *P. brachyurus*. This research provides information principally for further studies about dry rot disease management in the state of Alagoas. Dry rot is associated with reduced marketability and the disease can be considered a serious problem of yams crop in the state of Alagoas based on widespread distribution, high disease incidence, and level of nematodes associated with tubers.

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