

# LFN-0512 Nematologia

*Helicotylenchus* / *Scutellonema*

Nematoídes da Soja Parte 4 / Inhame



Universidade de São Paulo  
Escola Superior de Agricultura Luiz de Queiroz  
Departamento de Fitopatologia e Nematologia  
Piracicaba 18 Setembro 2020



Sem.	Dia	Assunto LFN-0512
1	21ago	Informações gerais. <i>Meloidogyne</i> . Algodoeiro parte 1
2	28ago	<i>Rotylenchulus</i> . Algodoeiro parte 2
3	4set	<i>Pratylenchus</i> . Algodoeiro parte 3 / Soja parte 1
4	11set	<i>Heterodera</i> . Soja parte 2
5	18set	<i>Helicotylenchus</i> / <i>Scutellonema</i> . Soja parte 3 / Inhame
6	25set	<i>Aphelenchoides</i> . Soja parte 4 / Arroz
7	2out	Nematicidas sintéticos
8	9out	Nematicidas biológicos
9	16out	<b>Prova 1</b> (semanas 1-8)
10	23out	<i>Paratrichodorus</i> . Milho
11	30out	Cana-de-açúcar
12	6nov	<i>Bursaphelenchus</i> . Coqueiro / Dendezeiro (Marcelo Oliveira / Apta)
13	13nov	Ornamentais (Marcelo Oliveira)
14	20nov	Transmissores de viroses. Nematoides quarentenários (Marcelo Oliveira)
15	27nov	<i>Tylenchulus</i> / <i>Radopholus</i> . Banana / Cítricos
16	4dez	<i>Ditylenchus</i> . Alho / Cebola
17	11dez	<b>Prova 2</b> (semanas 10-16)
18	18dez	<b>Repositiva</b>

# Roteiro

- 1 Gênero *Helicotylenchus*
- 2 Gênero *Scutellonema*
- 3 Nematoides da soja 3 – *Helicotylenchus dihystera* e *Scutellonema brachyurum*
- 4 (continuação) *Rotylenchulus reniformis*
- 5 Nematoides do inhame

Gênero *Helicotylenchus*

Classe Secernentea (Chromadorea) - estomatostilete

Ordem Tylenchida

Superfamília Tylenchoidea

4 Tylenchidae

5 Anguinidae

6 Belonolaimidae

7 Dolichodoridae

8 Pratylenchidae

9 Hoplolaimidae

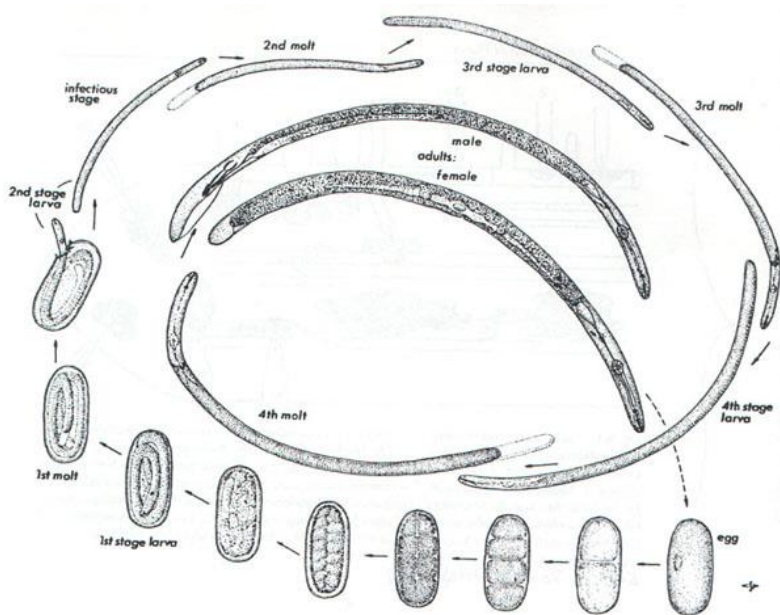
10 Heteroderidae

11 Meloidogynidae

# Família Hoplolaimidae

Maioria das espécies é migradora e ectoparasita

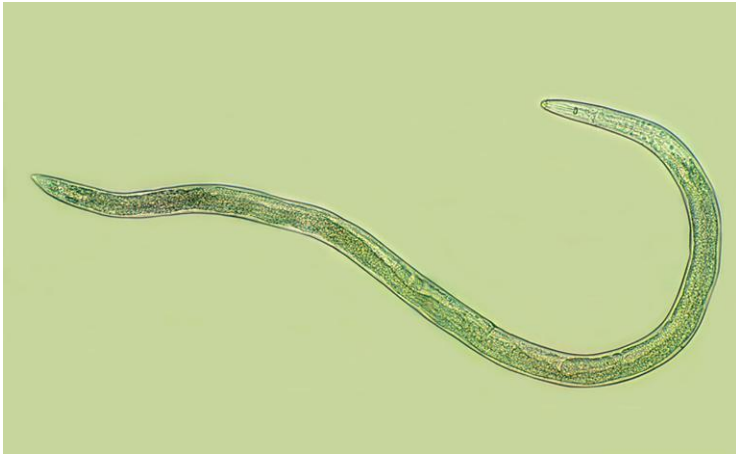
Formato do corpo espiral ou "C" aberto



***Rotylenchus robustus***

<http://nemalex.ucdavis.edu/Taxadata/G117s2.aspx>

Hoplolaiminae	Rotylenchulinae
Migrador	Sedentário
<i>Helicotylenchus</i>	<i>Rotylenchulus</i>
<i>Scutellonema</i>	<i>Acontylus</i>
<i>Hoplolaimus</i>	<i>Senegalonema</i>
<i>Rotylenchus</i>	
<i>Aorolaimus</i>	
<i>Aphasmatylenchus</i>	
<i>Antarctylus</i>	



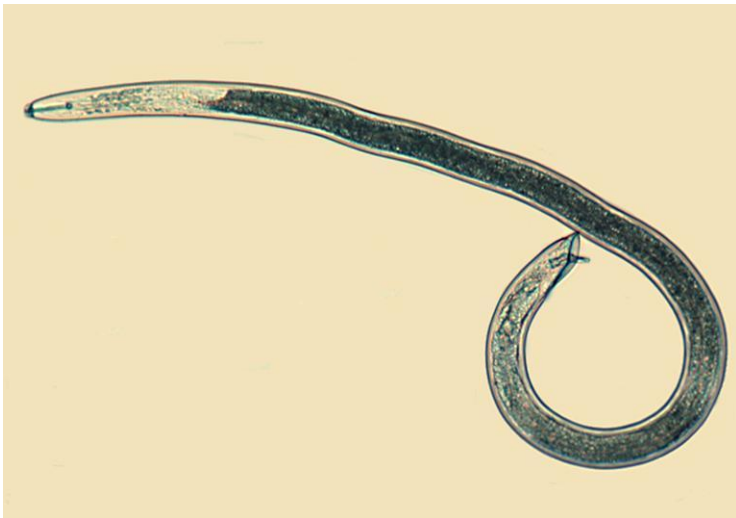
***Rotylenchus buxophilus***

<https://www.invasive.org/browse/detail.cfm?imgnum=5442305>



***Helicotylenchus pseudorobustus***

<https://www.semanticscholar.org/paper/Morphological-and-molecular-characterisation-of-and-Subbotin-Vovlas/d7a95b89eecfea48be11d6b4422aed0c141cec11>

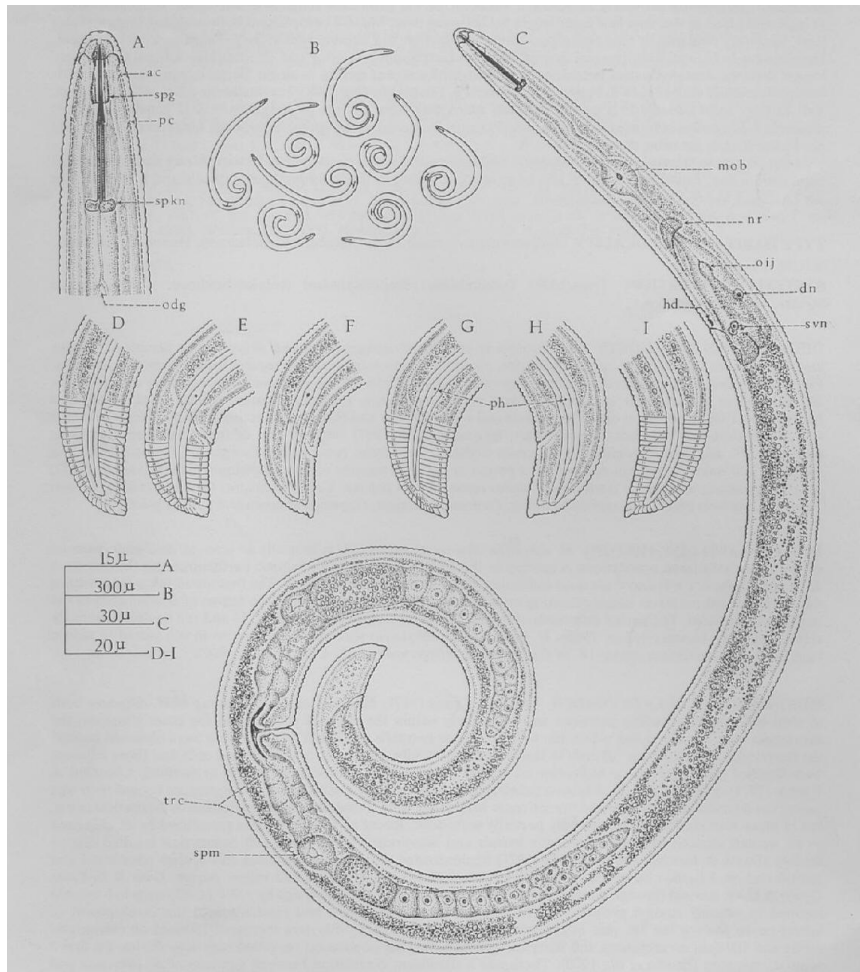


***Hoplolaimus* sp.**

<https://www.invasive.org/browse/detail.cfm?imgnum=5441459>



# *Helicotylenchus dihystera*



Espécie mais importante do gênero

Ocorre em vários países

Muitas plantas hospedeiras  
Várias famílias botânicas



***Aptenia cordifolia***

[https://www.researchgate.net/publication/277658751\\_Ocorrencia\\_de\\_nematoides\\_fitoparasitos\\_em\\_plantas\\_ornamentais\\_nos\\_Estados\\_de\\_Sao\\_Paulo\\_e\\_Minus\\_Gerais\\_Brasil/figures?lo=1](https://www.researchgate.net/publication/277658751_Ocorrencia_de_nematoides_fitoparasitos_em_plantas_ornamentais_nos_Estados_de_Sao_Paulo_e_Minus_Gerais_Brasil/figures?lo=1)



***Ficus microcarpa***

<https://www.mdpi.com/2223-7747/9/9/1085/htm>



Foto Fundação ABC

Aveia-branca

Estado Paraná

Reboleira 1.204 Hd / 100 cm<sup>3</sup> solo  
692 Hd / 10 g raízes

# *H. multincinctus*



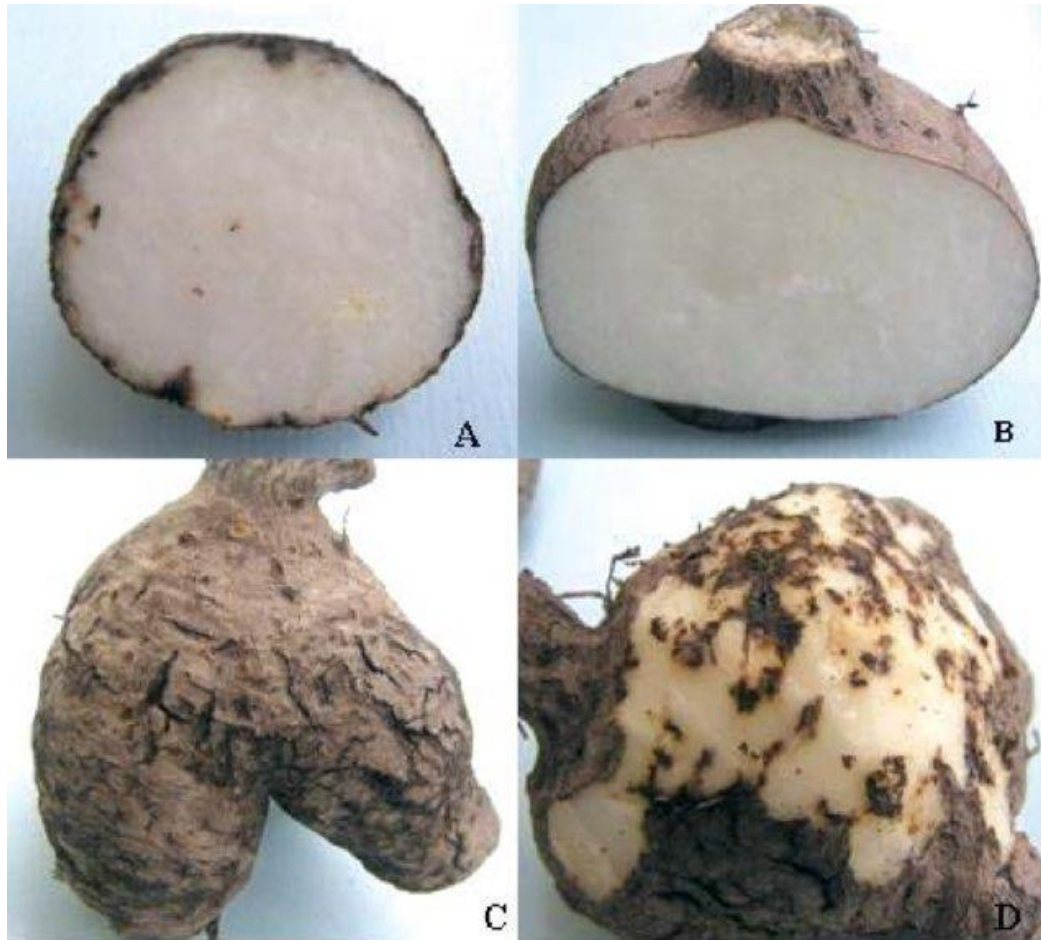
<https://abgc.org.au/2018/09/05/plant-parasitic-nematodes-impacting-australian-banana-production/>



<https://www.appsnet.org/Publications/potm/pdf/Jul09.pdf>

Gênero *Scutellonema*

# *Scutellonema bradys*



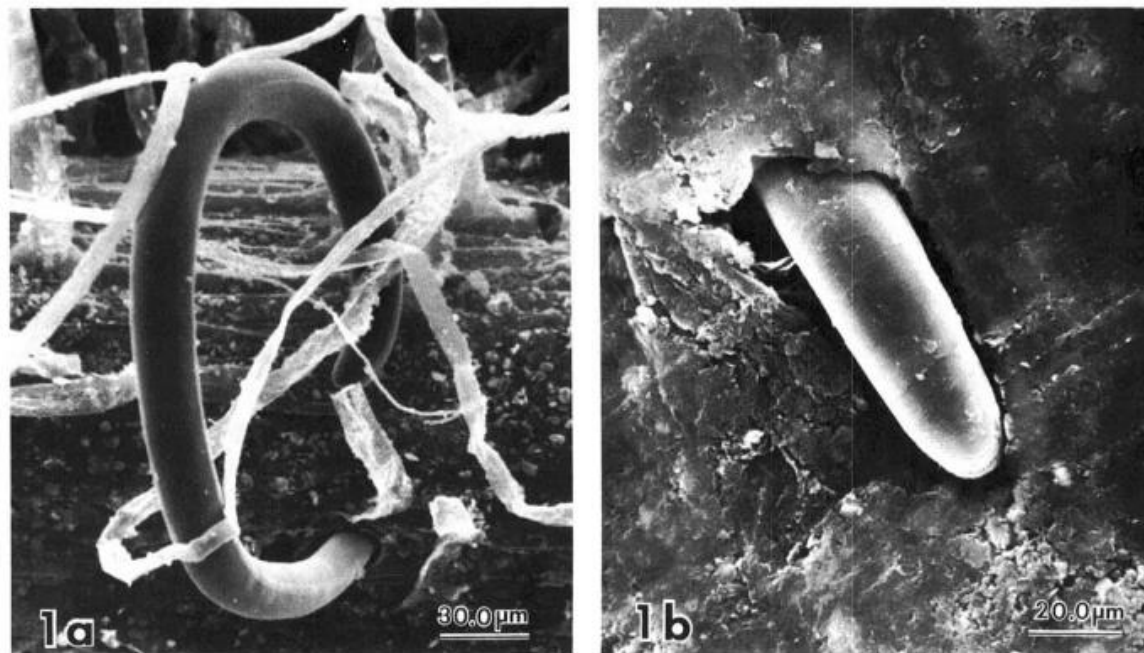
## **Cará-doce (*Dioscorea trifida*)**

file:///C:/Users/User/Downloads/Scutellonema\_bradys\_em\_Cara-Doce\_Dioscorea\_trifida.pdf

**Ultrastructural Changes Induced by *Scutellonema brachyurum*  
in Potato Roots**

Andrew C. Schuerger and Michael A. McClure

Former graduate student and professor, respectively, Department of Plant Pathology, University of Arizona, Tucson 85721.  
Based on an M.S. thesis submitted by the senior author to the University of Arizona. Present address of the senior author: Walt Disney  
World, EPCOT Center, Land Pavillion, P.O. Box 40, Lake Buena Vista, FL 32830.  
Journal Series Paper 3608 of the Arizona Agricultural Experiment Station, Tucson.  
Accepted for publication 28 May 1982.



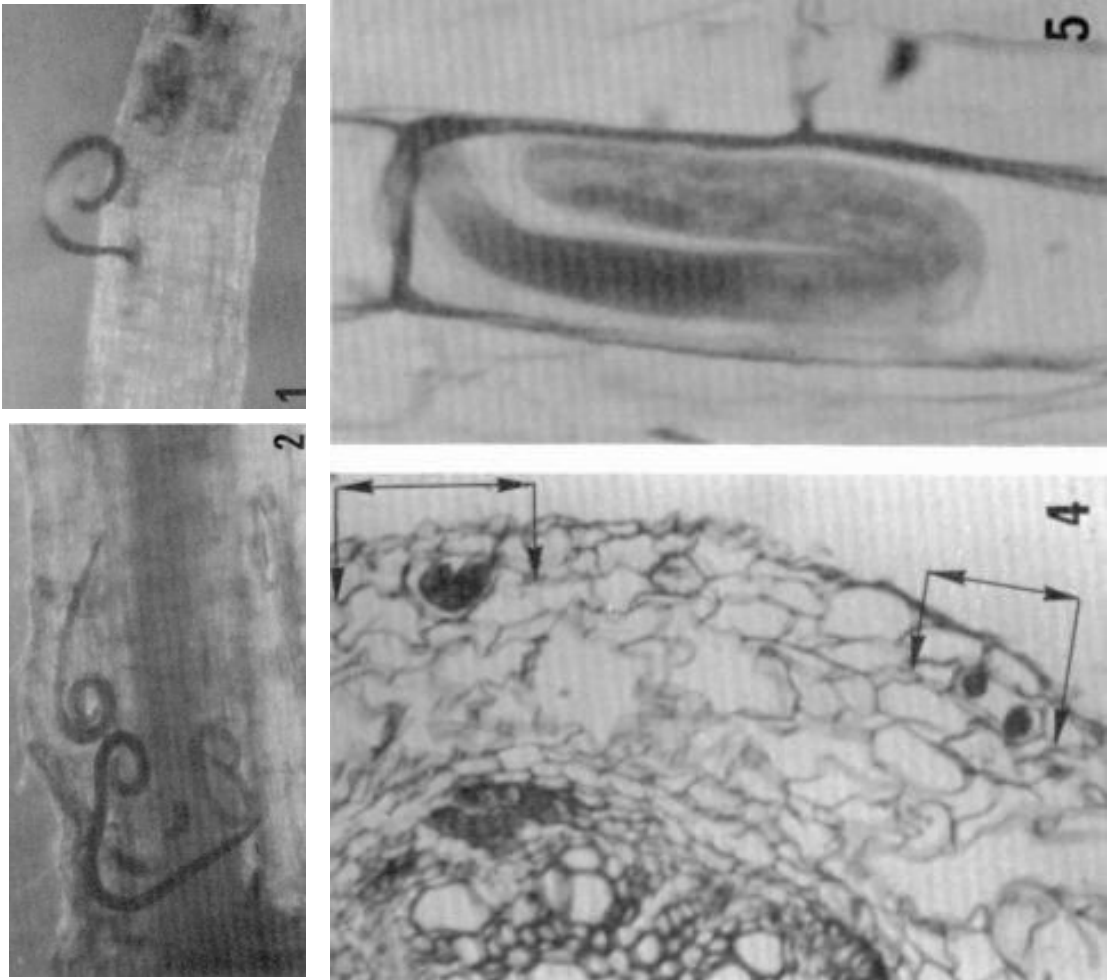
**Fig. 1.** Scanning electron micrographs of *Scutellonema brachyurum* penetrating potato roots. Nematodes generally entered roots only partially (1a), but occasionally were observed entirely within roots (1b).

Nematoides da Soja 3 – *H. dihystrera* e *S.*  
*brachyurum*



**Histopathology of Soybean Roots Infected  
with Helicotylenchus dihystra<sup>1</sup>**

D. P. ORBIN<sup>2</sup>



## *Pratylenchus*, *Paratylenchus*, *Helicotylenchus*, and Other Nematodes on Soybean in Missouri<sup>1</sup>

T. L. NIBLACK<sup>2</sup>

TABLE 2. Effect of nematode infestation and treatment with aldicarb on yields (g/m row) of soybean cultivars at three sites, each infested with lesion (*Pratylenchus hexincisus*), pin (*Paratylenchus projectus*), or spiral (*Helicotylenchus pseudorobustus*) nematodes, respectively, at the Agronomy Research Center near Columbia, Missouri, in 1989.

Cultivar	Lesion		Pin		Spiral	
	T†	NT	T	NT	T	NT
BSR 301	202	180	181	172		
Chamberlain					221	197
Fayette	192	171	197	187	204	172
Peking	54	71	58	59	114	73
Pickett	101	108	107	84	88	117
Sherman	227	228	187	196	201	148
Williams 82	200	189	199	174	215	159
LSD 0.05‡		15		15		33
Treatment mean§	163	158 ns	158	145 ns	174	144*
Site mean*		160		152*		159

† T = treated with aldicarb at 5.43 kg/ha, NT = not treated.

‡ Least significant difference ( $P < 0.05$ ) among cultivar  $\times$  treatment means within sites.

§ Significance of  $F$  test ( $P < 0.05$ ) for treatment within sites is indicated by ns = not significant or \* = significant.

\* Yield mean for the site indicated by \* was significantly lower than the other two sites; however, site variances were heterogeneous ( $P < 0.01$ ), and further comparisons did not pool sites.

RESEARCH ARTICLE

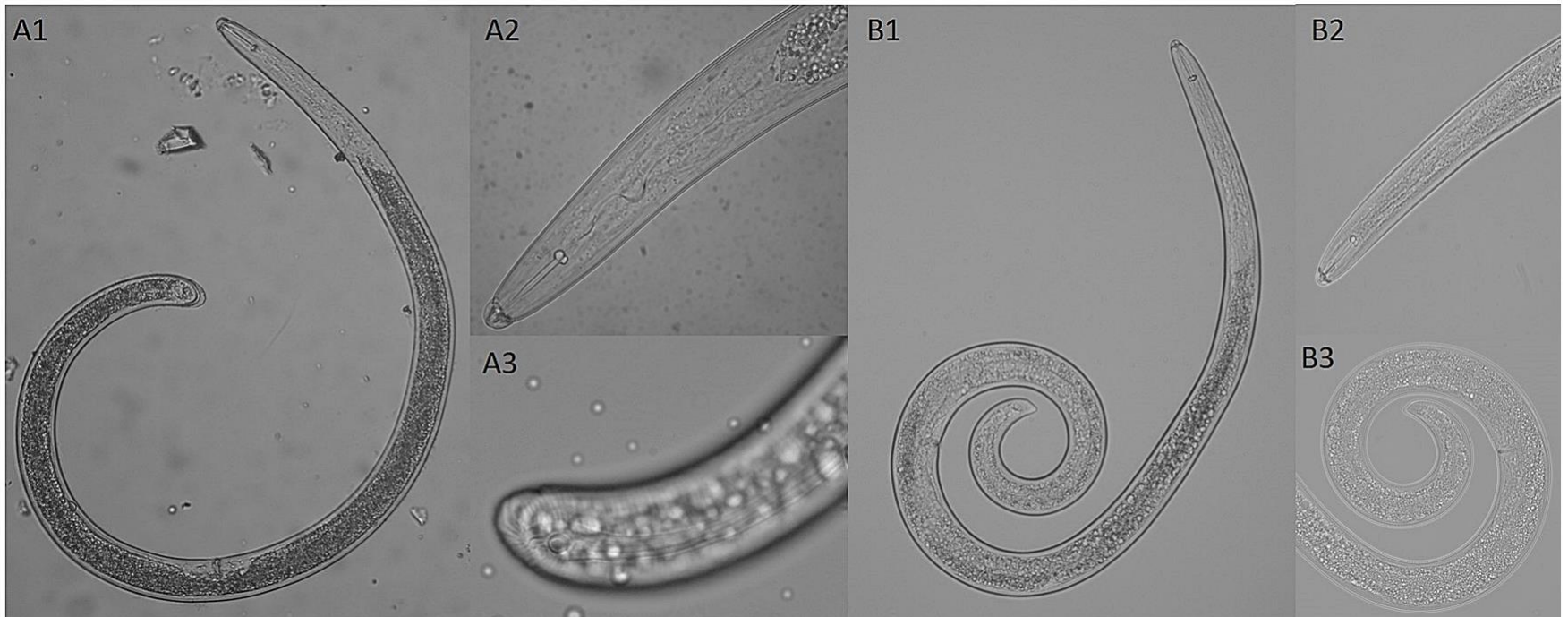
## Two novel potential pathogens for soybean

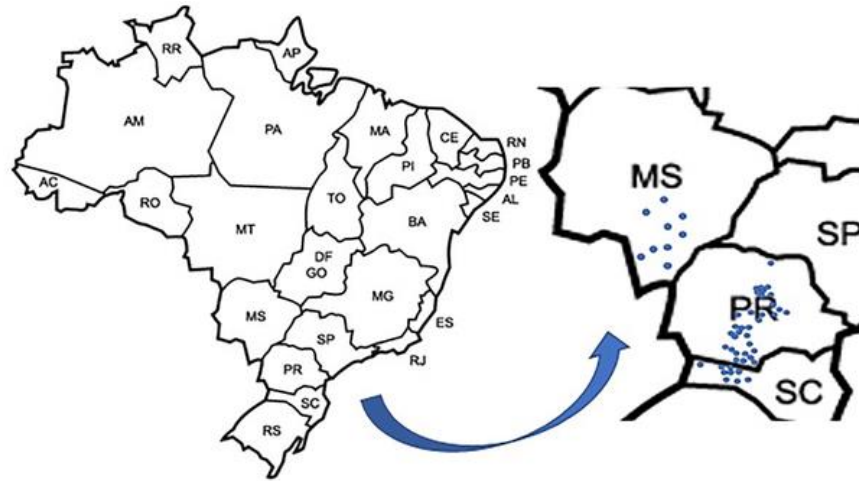
Andressa Cristina Zamboni Machado<sup>1\*</sup>, Priscila Moreira Amaro<sup>1</sup>, Santino Aleandro da Silva<sup>1</sup>

Department of Plant Protection, Instituto Agronômico do Paraná, Londrina, Paraná, Brazil

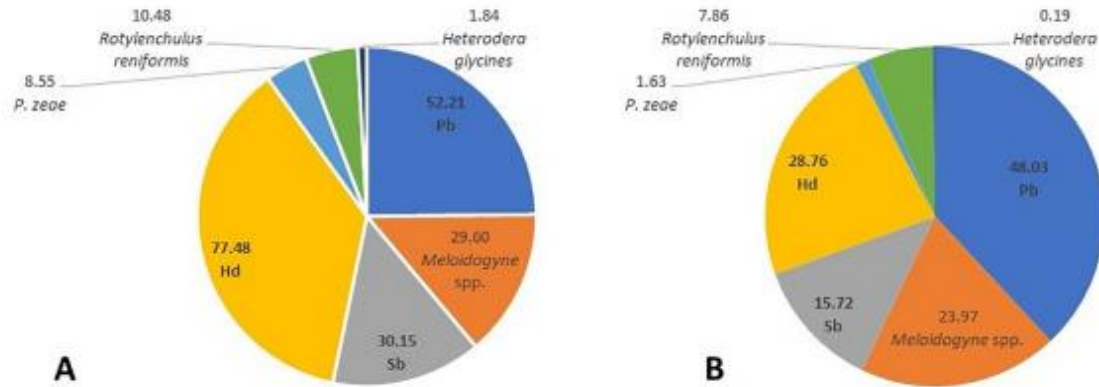
\* These authors contributed equally to this work.

\* [andressaczmachado@hotmail.com](mailto:andressaczmachado@hotmail.com)

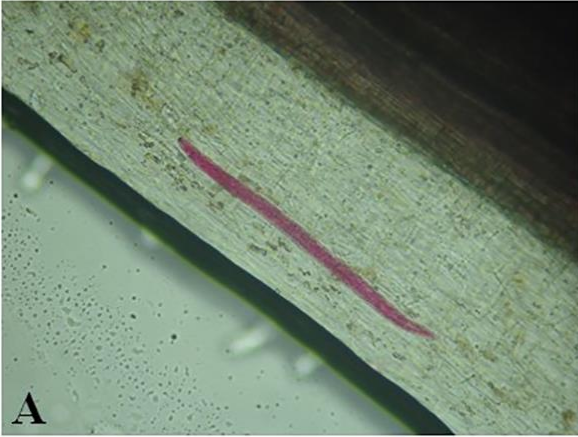




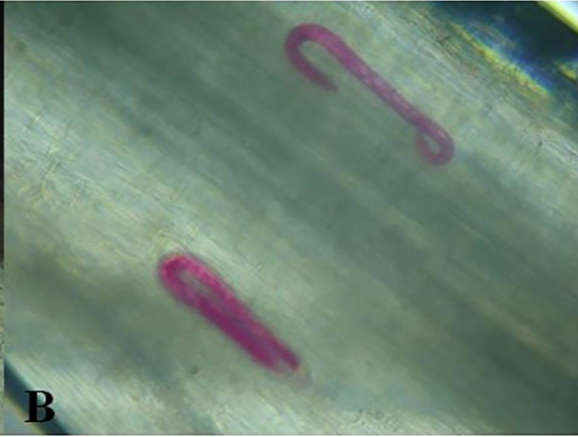
**Fig 1. Locations of soybean fields surveyed to determine the occurrence and distribution of *Pratylenchus brachyurus*, *Helicotylenchus dihystra* and *Scutellonema brachyurus* in South Brazil.**



**Fig 2. Frequency of occurrence of nematode species in the samples, highlighting the frequency of *Pratylenchus brachyurus*, *Helicotylenchus dihystra* and *Scutellonema brachyurus* in soil (A) and root (B) samples.**



A) *Pratylenchus brachyurus*



B) *Helicotylenchus dihystra*



C) *Scutellonema brachyurus*.



Não inoculada

*P. brachyurus*

*S. brachyurus*

*H. dihystra*

(continuação) *R. reniformis*

*R. reniformis*  
Massas de Ovos



**Foto** Rosana Bessi (2011)





**Foto** Guilherme L. Asmus



**Foto** Guilherme L. Asmus

# Controle

Controle retardado pela  
diagnose incorreta ou tardia

1ª. abordagem Calagem +  
adubação

Nenhum nematicida sintético  
1 única nematicida biológico

Preocupação ainda muito  
pequena

Cultivares resistentes

Principal opção

Controle integrado com a cultura do  
algodão

Alqueive  
Rotação de cultura  
Sucessão de cultura

Limitações Sobrevivência de *R. reniformis*  
Decisão econômica  
Poáceas são resistentes a *R. reniformis*

# Nematicida Biológico

## Tratamento de Sementes

Ministério da Agricultura,  
Pecuária e Abastecimento

# Agricultura

Pragas | Ingredientes Ativos cons | Produtos Formulados | Produtos Técnicos | Relatórios

## AGROFIT

Sistema de Análises Fitossanitárias

► Consulta de Praga/Doença

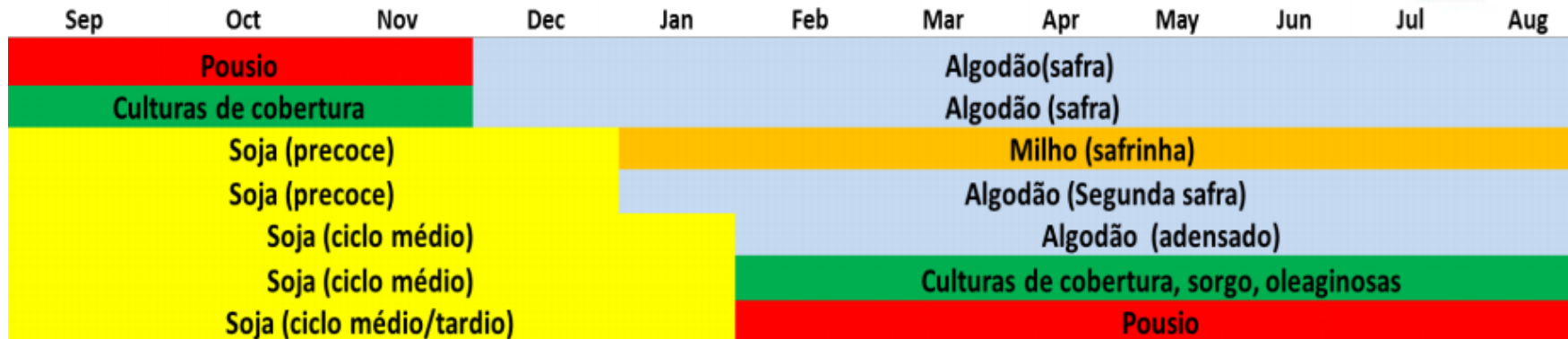
► Dados da Praga

Dados Gerais | Sobre a Praga | Fotografias | Produtos Indicados

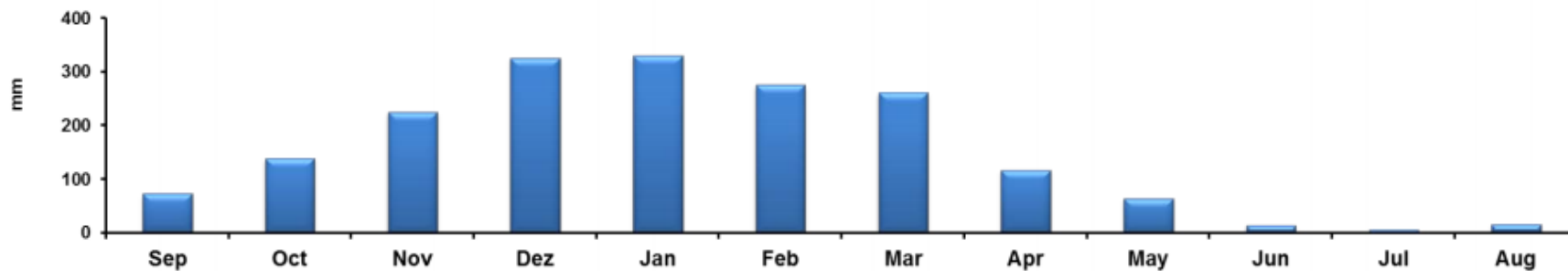
Produto	Ingrediente Ativo(Grupo Químico)	Titular de Registro
<a href="#">Trunemco</a>	<a href="#">Bacillus amyloliquefaciens (Produto Microbiológico)</a>	<a href="#">Sumitomo Chemical Brasil Indústria Química S.A. - Ma</a>

Qtd. Produtos: 1

Consulta 26 agosto 2020



Distribuição de chuvas – Primavera do Leste



Jean L. Belot

*R. reniformis* é importante na sucessão soja-algodão

Mais perdas no algodão que na soja

# Managing Nematodes in Cotton and Soybean

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Travis Faske, PhD

Extension Plant Pathologist  
Lonoke Extension Center  
Lonoke, Arkansas

## Nematode Thresholds

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**Fall** nematode population density damage thresholds

Nematode	Cotton	Soybean
Southern root-knot	50-100 <sup>a</sup>	60 <sup>a</sup>
Reniform	250-500	1000

<sup>a</sup> individuals per 100cm<sup>3</sup> soil

# Cultivares Resistentes

É a base do controle de *R. reniformis* em soja

Sojas resistentes a *H. glycines* derivadas de Peking são resistentes a *R. reniformis*

Soja resistente *H. glycines* derivadas de PI88788 não são resistentes a *R. reniformis*

**Exemplos** Peking, Dyer, Custer, Pickett, Mack, Forrest, Centennial

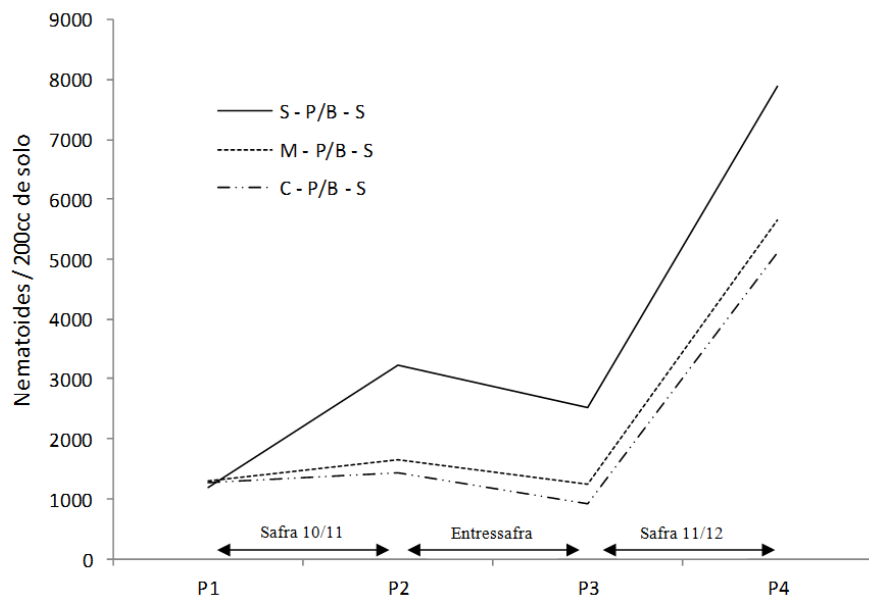
**Brasil** BRSMG 250 (Nobreza), BRS Jiripoca, TMG 115RR - 121RR - 113RR – 123 RR - 4182, Monsoy 8336 RR – 7639 RR – 77390 IPRO



[https://www.apsnet.org/publications/phytopathology/back issues/Documents/1970Articles/Phyto60n04\\_695.PDF](https://www.apsnet.org/publications/phytopathology/back%20issues/Documents/1970Articles/Phyto60n04_695.PDF)



# Rotação + Pousio



Soja – Pousio/Braquiária - Soja

Milho – Pousio/Braquiária - Soja

Crotalaria – Pousio/Braquiária - Soja

Tratamento

Nem/g

2ª. safra soja  
(kg/ha)

Soja-P/B-Soja	129 a	1.633 b
Milho-P/B-Soja	147 a	1.746 b
<i>C. ochroleuca</i> -P/B-Soja	94 a	2.309 a



**Fotos** Guilherme L. Asmus

# Resistência x Rotação



Resistência  $\equiv$  Rotação

**Efeito Aditivo**  
Resistência + Rotação

**Foto** Guilherme L. Asmus (2009)

# Nematoides do Inhame

# Inhame x Cará



***Colocasia esculenta***

<https://www.amazon.com/Bulbs-Colocasia-esculenta-cocoyam-Elephant/dp/B01IFDSVOK>



***Dioscorea* spp.**

<http://www.rotamogiana.com/2013/02/o-inhame-popular-do-nordeste-nao-e-o.html>



<https://nutraceuticals.imedpub.com/postharvest-management-practices-of-yam-and-farmers-information-needs-in-the-northcentral-of-nigeria.php?aid=21199>



<https://www.tes.com/lessons/QOJJrSzPyJce6Q/copy-of-storage-of-farm-produce>

Fotos: Marrisônia de A. Noronha



Figura 4. Sintomas de casca-preta caracterizados pela presença de áreas enegrecidas e pequenos pontos de coloração amarela que se projetam por toda a circunferência das túberas de inhame.

Fotos: Edyvo Jacob da Silva



Figura 5. Túberas de inhame com proliferação de raízes secundárias e formação de tumores, sintomas causados por *Meloidogyne* sp.

<https://ainfo.cnptia.embrapa.br/digital/bitstream/item/125430/1/Cot-150.pdf>

*Scutellonema bradys*  
*Pratylenchus coffeae*  
*P. brachyurus*

Casca-preta-do-inhame

*Meloidogyne javanica*  
*M. incognita*  
*M. arenaria*

Galhas

Raízes secundárias (cabeleira)

*Rotylenchulus reniformis*

*BOM FINAL DE SEMANA*