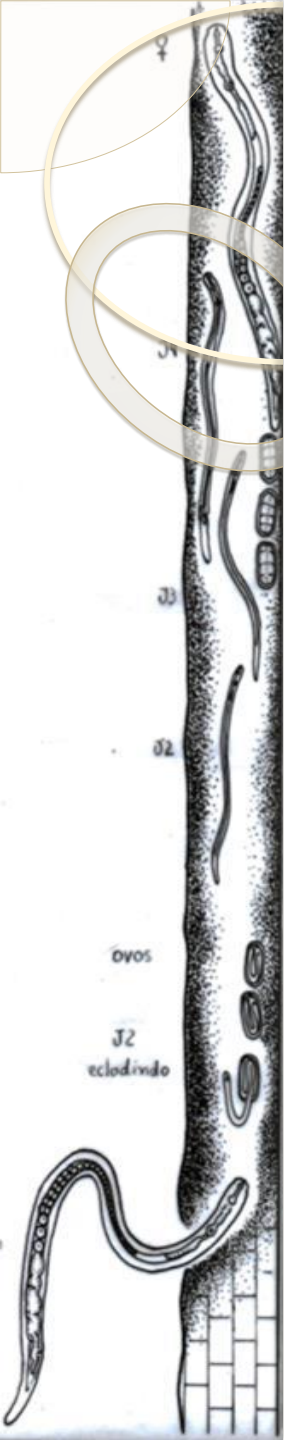


LFN-0512 Nematologia

Gênero *Ditylenchus*. *Ditylenchus dipsaci* em Alho e Cebola



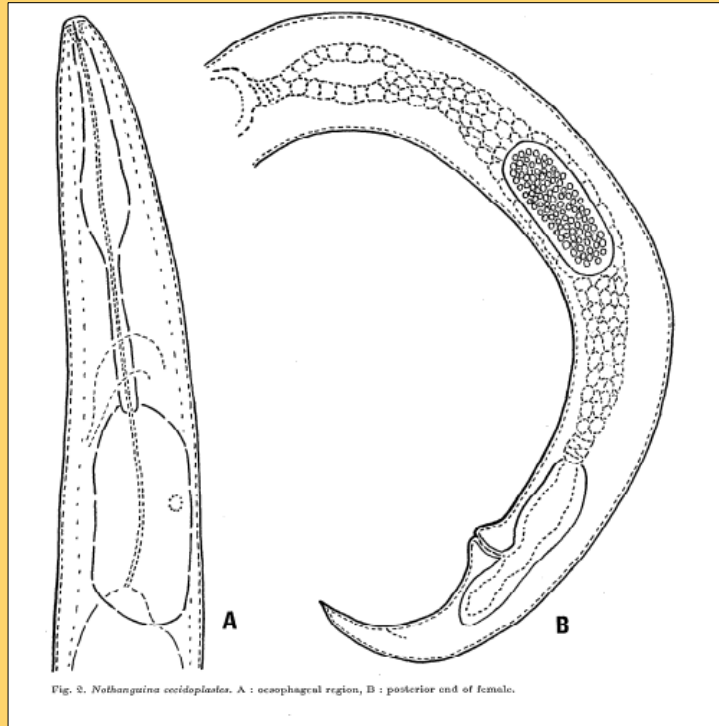
Universidade de São Paulo
Escola Superior de Agricultura Luiz de Queiroz
Departamento de Fitopatologia e Nematologia
Piracicaba 17 Novembro 2023



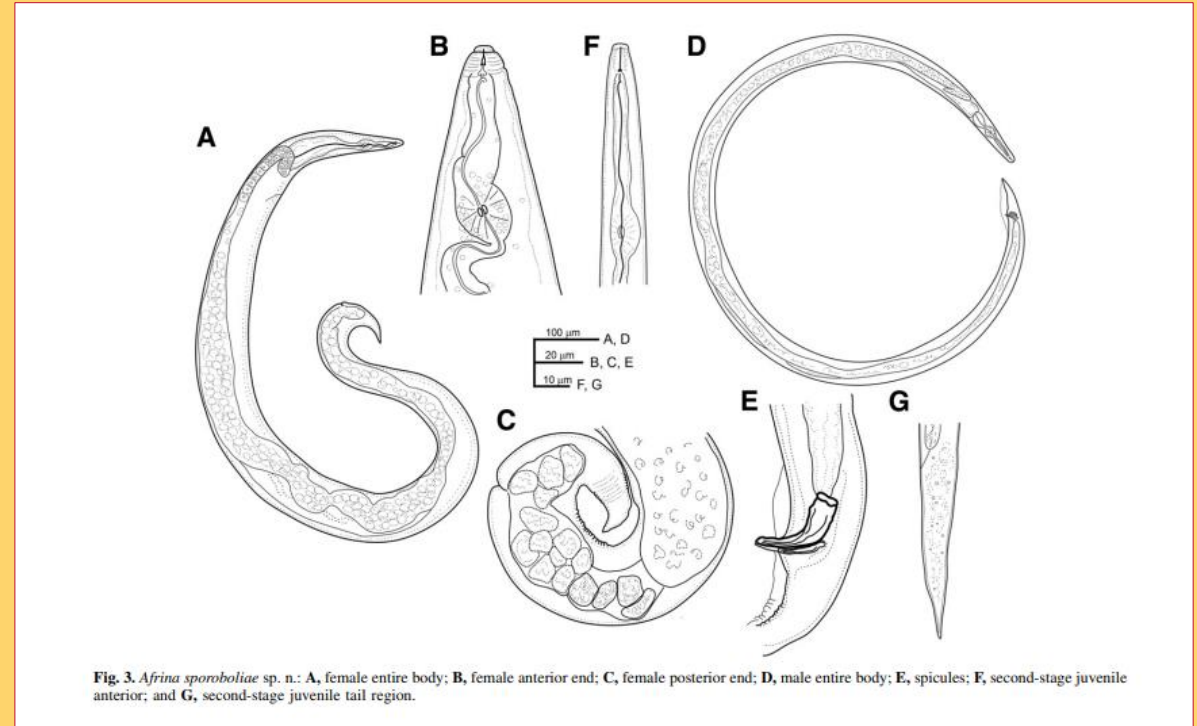
Aula	Dia	Assunto LFN-0512		
1	11 Ago	Informações sobre a disciplina / Diversidade de nematoides / Gênero <i>Meloidogyne</i>	<i>Meloidogyne</i> em cafeeiros	
2	18 Ago	Raças de <i>Meloidogyne</i> / Interações entre nematoides e fungos	<i>Meloidogyne</i> em algodoeiro	
3	25 Ago	<i>Meloidogyne</i> em soja	Gênero <i>Heterodera</i>	Nematoide-de-cisto da soja
4	1 Set	Prova 1	Gênero <i>Tylenchulus</i>	<i>Tylenchulus semipenetrans</i> em citros
5	15 Set	Gênero <i>Rotylenchulus</i>	<i>Rotylenchulus reniformis</i> em algodoeiro	
6	22 Set	Gênero <i>Pratylenchus</i>	<i>Pratylenchus brachyurus</i> em soja	
7	29 Out	Gênero <i>Radopholus</i>	<i>Radopholus similis</i> em bananeira	
8	6 Out	Prova 2	Nematoides espiralados	<i>Helicotylenchus muticinctus</i> em bananeira
9	20 Out	Nematicidas sintéticos	Nematoides em cana-de-açúcar e milho	
10	27 Out	Rotação de cultura	Nematoides em batata e cenoura	
11	10 Nov	Prova 3	Nematicidas biológicos	<i>Mesocriconema xenoplax</i> em pessegueiro
12	17 Nov	Gênero <i>Ditylenchus</i>	<i>Ditylenchus dipsaci</i> em alho e cebola	
13	24 Nov	Gênero <i>Bursaphelenchus</i>	<i>Bursaphelenchus cocophilus</i> em palmáceas e <i>B. xylophilus</i> em <i>Pinus</i>	Nematoides em ornamentais
14	1 Dez	Gênero <i>Aphelenchoides</i>	<i>Aphelenchoides besseyi</i> em soja	<i>Meloidogyne</i> em arroz
15	8 Dez	Prova 4		
16	15 Dez	Prova Repositiva		

Família Anguinidae

Família Anguinidae



Revue Nématol. 4 (1) : 23-34 (1981)



Phytopathology • 2018 • 108:768-779 •
<https://doi.org/10.1094/PHYTO-12-17-0395-R>

Espécies micófagas (fungívoras), parasitas facultativas ou obrigatórias de fanerógamas, musgos e algas marinhas.

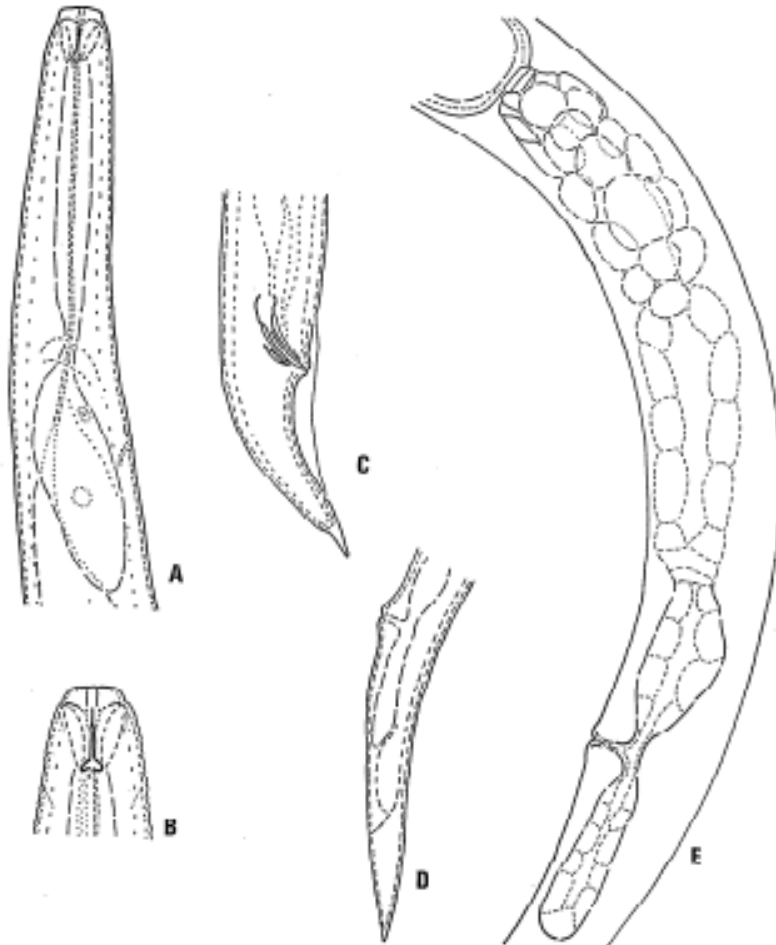


Fig. 4. *Orrina phyllobia*. A : oesophageal region, B : head, C : tail of male, D : posterior end of female, E : part of female reproductive system.

Identification and phylogenetic analysis of the leaf-galling nematode *Orrina phyllobia* affecting *Solanum elaeagnifolium* Cav. in Guanajuato, Mexico

Identificación y análisis filogenético del nematodo foliar *Orrina phyllobia* afectando *Solanum elaeagnifolium* Cav. en Guanajuato, México

Edgar Medina Gómez, Departamento de Producción Agrícola y Animal, Universidad Autónoma Metropolitana, Calzada del Hueso No. 1100, Col. Villa Quietud, Delegación Coyoacán, Distrito Federal, CP 0496, México; Angel Ramírez Suárez*, Catedrático CONACYT-Centro Nacional de Metrología (CENAM), Km 4.5 Carretera a Los Cués, El Marqués, Querétaro, C.P. 76246, México; Juventino Cuevas Ojeda, Departamento de Parasitología, Universidad Autónoma Chapingo, Km. 38.5 Carretera México-Texcoco, Estado de México, CP 56230, México; Daniel Martínez Gómez, Laboratorio de Microbiología, Universidad Autónoma Metropolitana, Calzada del Hueso No. 1100, Col. Villa Quietud, Delegación Coyoacán, Distrito Federal, CP 0496, México.*Correspondencia: angelrasu75@huskers.unl.edu



Figura 1. Síntomas causados por el nematodo agallador foliar *Orrina phyllobia* en trompillo *Solanum elaeagnifolium*. (A), (B) y (C) distorsión y agallamiento de hojas; (D) Agallamiento en la inflorescencia.

Figure 1. Symptoms caused by the leaf-galling nematode *Orrina phyllobia* in silver-leaf nightshade *Solanum elaeagnifolium*. (A), (B) and (C) leaf distortion and galling; (D) Galling in inflorescence.

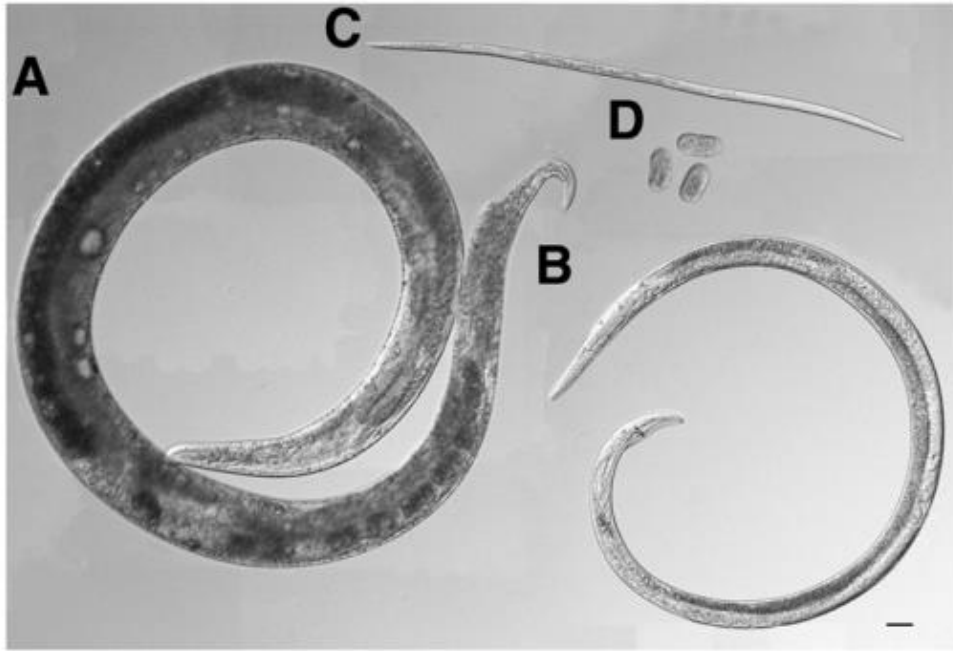


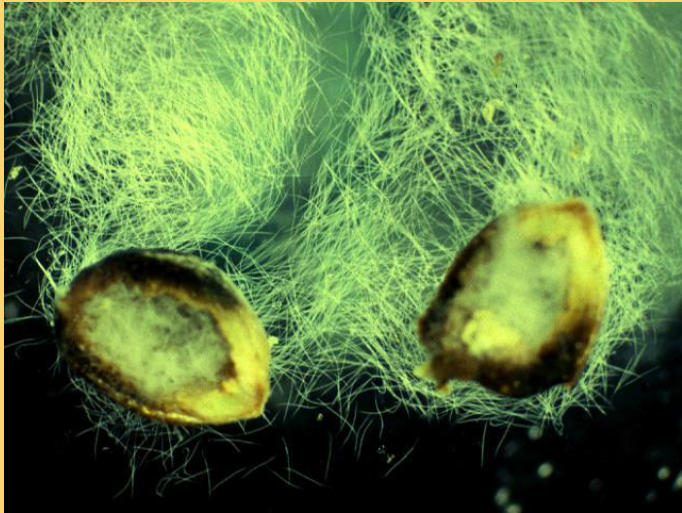
Fig. 4. *Afrina sporoboliae* sp. n.: **A**, female; **B**, male; **C**, second-stage juveniles; and **D**, eggs. Scale bar = 40 μ m.



Fig. 2. Inflorescence of *Sporobolus cryptandrus* with **A**, black and **B**, brown seed galls induced by *Afrina sporoboliae* sp. n. **C**, Black and **D**, brown galls under higher magnification. Scale bars: **A** and **B**, 1 mm; **C** and **D**, 0.15 mm.

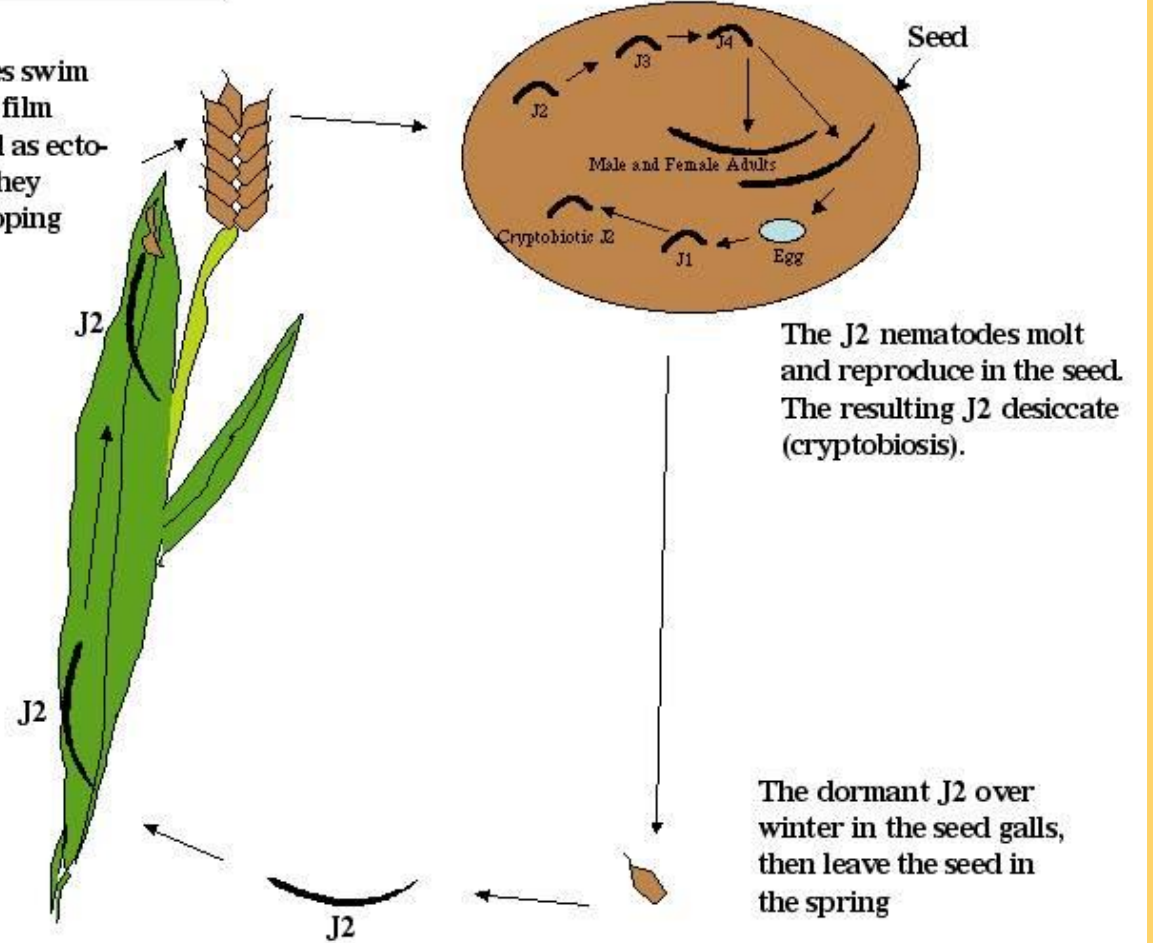
Anguina tritici

Nematoide-do-Trigo



Seed Gall Nematodes

The J2 nematodes swim up the plant in a film of water and feed as ectoparasites. Then they invade the developing seeds.





<http://bugwoodcloud.org/images/384x256/1493005.jpg>



<https://bugwoodcloud.org/images/768x512/1356100.jpg>



http://www.agroes.es/index.php?option=com_joomgallery&view=image&format=raw&id=21788&type=img



<https://bugwoodcloud.org/images/768x512/1356153.jpg>



https://upload.wikimedia.org/wikipedia/en/thumb/f/fd/Earcockle_in_screenings.jpg/800px-Earcockle_in_screenings.jpg

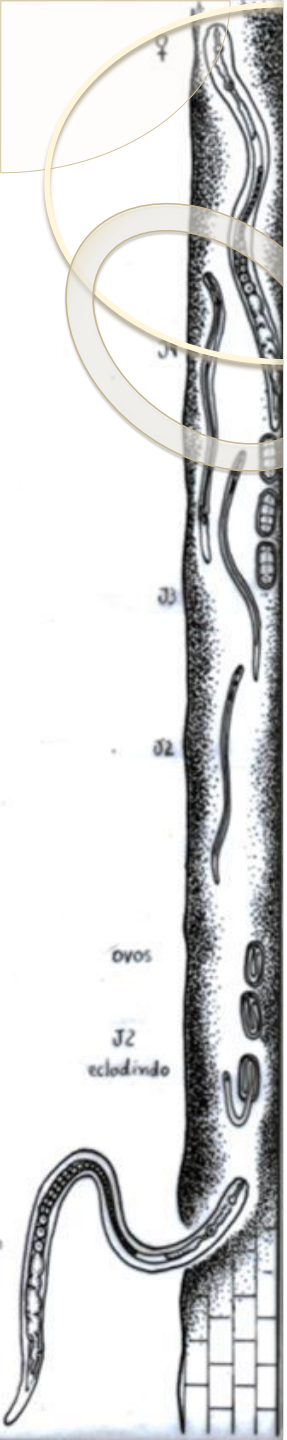
Nematoides Quarentenários

Fiscalização e controle de materiais vegetais

Reino Unido: 5-20% das espécies introduzidas efetivamente se estabelecem

Legislação / Literatura

Identificação da espécie



Exotic Nematode Plant Pests of Agricultural
and Environmental Significance to the United States

the **Society
of Nematologists**

[Nematode Pest Site Home](#)

[Pest Lists](#)

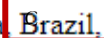
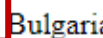
[Pest Table 1](#)

[Pest Description](#)

ANGUINA TRITICI

IDENTITY: Scientific name *Anguina tritici*
(Steinbuch, 1799) Chitwood, 1935
Common name: Wheat seed gall nematode

NOTES ON TAXONOMY AND BIOLOGY: *Anguina tritici* female show a well developed anterior branch of the ovary which is folded in two or more flexures and a conoid tail, tapered to an obtuse or round tip (Southey, 1972). This species is closely related to *A. funesta* and *Subanguina wevelli*. The morphological separation of these three species is difficult. Recent molecular diagnostic techniques have facilitated the separation of these three species (Riley et. al., 1988; Powers et al., 2001). J2 emerge from the seed galls in the soil and crawl onto the newly germinated seedlings. They establish infection sites between young leaves where they feed as an ectoparasite causing leaf distortion and crinkling. Later, they penetrate the flower buds at the time of flower bud initiation. J2 stimulate the formation of galls in floral tissues in place of seed development. Juvenile development is completed inside the galls. Newly formed females deposit eggs, which hatch producing J2, which remain, encased in the galls (cockle) and perpetuate plant infection in following years. Dried cockles are harvested with developed seeds. *Anguina tritici* vectors a bacterium *Clavibacter tritici*, which is the causal agent of yellow ear rot or tondu of wheat. Freshly harvested infected wheat cockles containing the bacterium are toxic to cattle and sheep (Anwar et al., 2001).

GEOGRAPHICAL DISTRIBUTION: Reported from Afghanistan, Australia, Brazil, Bulgaria, China, Egypt, Ethiopia, Hungary, India, Iran, Iraq, Israel, Lithuania, New Zealand, Pakistan, Poland, Romania, Russian Federation, Russian Far East, Syria, Switzerland, Turkey, and Yugoslavia. Early records of nematode detection in the US include California, Georgia, Maryland, New York, North and South Carolina, Virginia and West Virginia. Recent surveys of the wheat seed gal nematode in stored grain harvested from states with records of this nematode have not provided any evidence that nematodes are still occurring in the US (CAB International, 2001).

**Reconhecimento oficial de
área livre do nematóide
Anguina tritici (Steinbuch,
1799) Chitwood, 1935,
no estado de Virginia; EUA,
para exportação de trigo
para o Brasil**

Renata C.V. Tenente¹

Wilmar C. da Luz²

Ilto A. Morandinir³

Principal hospedeira **Trigo**

Outras hospedeiras **Centeio**,
espelta (*Triticum spelta*),
"emmer" (*T. monococcum*)

Aveia, cevada, outras
poáceas

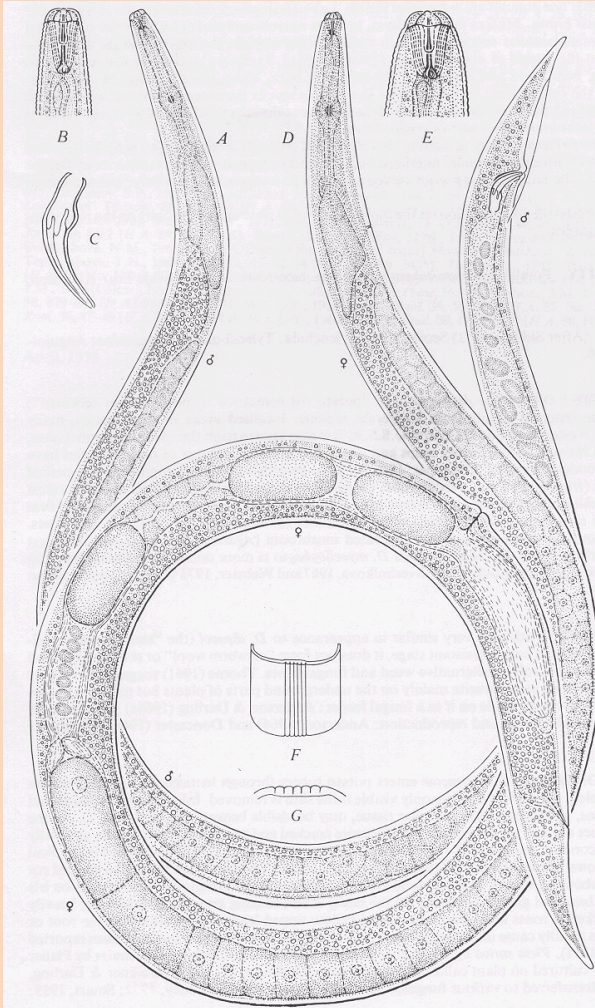


Cevada <http://www.navarra.es/NR/rdonlyres/9AAB1FC4-EF2F-43F9-A119-7901E1D95DFE/194980/090811dr60b1.JPG>

Dúvidas???

Gênero *Ditylenchus*

Ditylenchus dipsaci



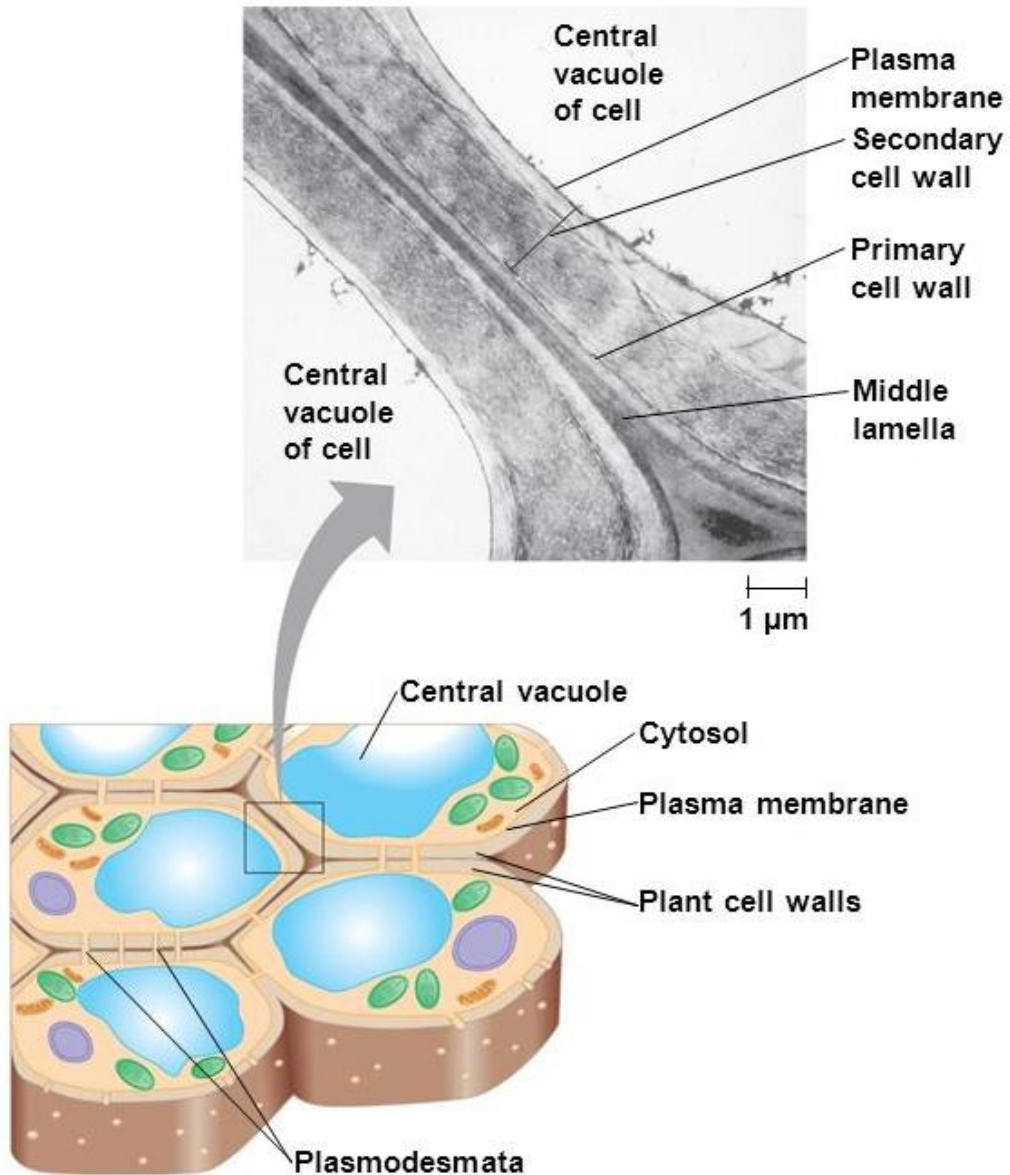
<http://greencommons.de/images/thumb/f/f4/Ddipsaci-Weibchen-1986-UIpach.jpg/662px-Ddipsaci-Weibchen-1986-UIpach.jpg>

Ditylenchus dipsaci é endoparasita migrador de tecidos da parte aérea e raízes

Colapso da lamela média

Separação das células

Desorganização do tecido







Alfafa Encrespamento das
folhas, encurtamento e inchaço
do caule



<http://plpnemweb.ucdavis.edu/nemaplex/images/G042S1RKlee.jpg>

Trevo-vermelho *Trifolium pratense*
Encrespamento e redução da folha

Ditylenchus dipsaci
=Nematoide dos Caules e Bulbos?



https://upload.wikimedia.org/wikipedia/commons/5/5b/Narcissus_Geranium.jpg

Narciso
Narcissus sp.



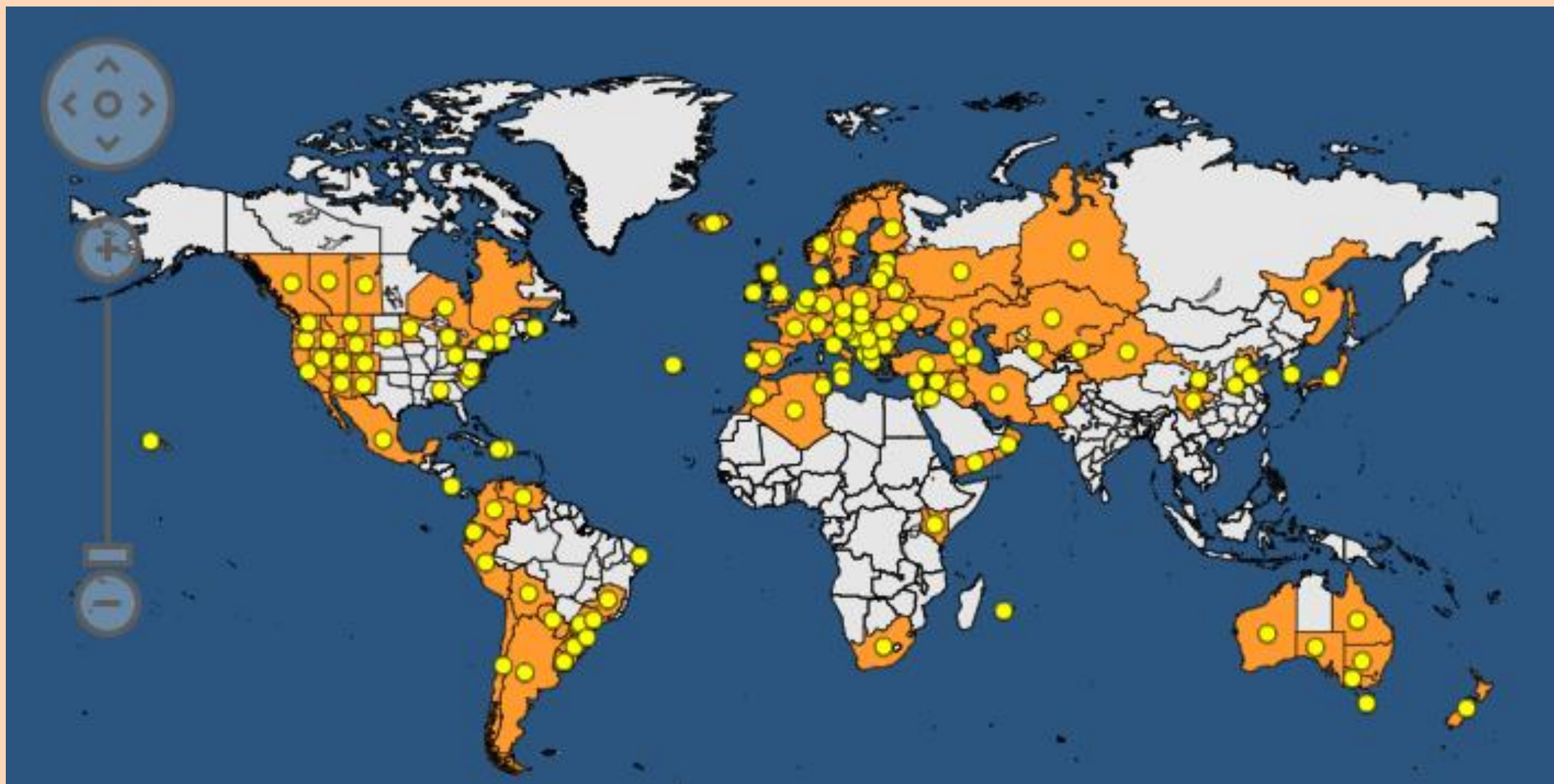
http://www.eppo.int/QUARANTINE/nematores/Ditylenchus_dipsaci/DITYDI_02.jpg



<http://www7.inra.fr/hyppz/IMAGES/7031625.jpg>



<https://gd.eppo.int/taxon/DITYDI/photos>



<https://gd.eppo.int/taxon/DITYDI/distribution>

Ditylenchus dipsaci ocorre no Brasil!

Porém, não ocorre em milho, trevo, alfafa e narciso

Seinhorst 1957 11 raças
Winslow 1960 12
Kirjanova & Krall 1971 15
Ladygina 1982 30

Raça "teasel" (cardo) Morango, cebola, tabaco, *Phaseolus* spp., pepino Europa, N África, EUA

Raça centeio Aveia, milho, beterraba, girassol, ervilha, pepino, cebola, tabaco, várias plantas não cultivadas Europa

Raça beterraba Centeio, aveia, milho, girassol, cebola, ervilha, pepino, várias plantas não cultivadas Europa e EUA

Raça batata Cebola, ervilha, centeio, aveia Europa

Raça cebola Alho, *Allium* spp., feijão, ervilha, soja, *V. faba*, beterraba Europa, América do Sul, Ásia

Raça aveia Cebola, *Vicia faba*, feijão, ervilha, beterraba, várias plantas não cultivadas Europa

Brasil (Pimentel 1984) Alho, cebolinha, cebola, alho-poró, *Phlox subulata*, *V. faba*, caupi

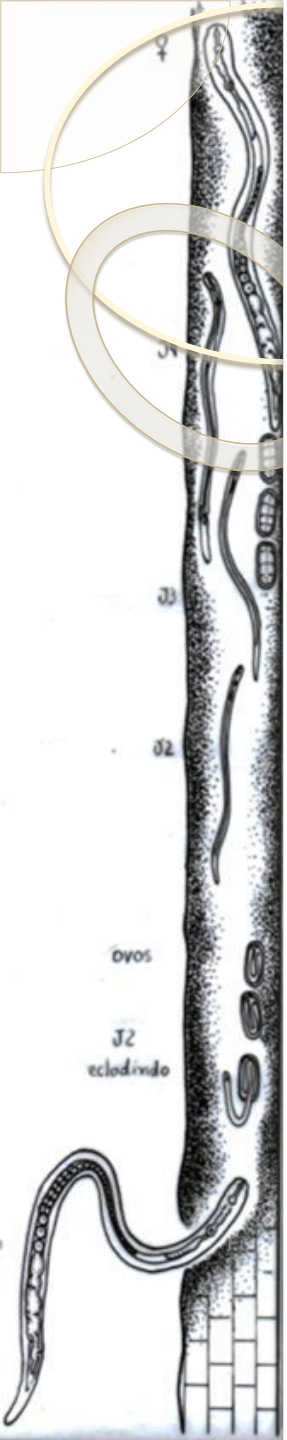
Não em soja, feijão, ervilha, alfafa, beterraba, milho, cenoura, aveia, centeio

Raça cebola???

Feijão????!!!

Ervilha????!!!

Beterraba????!!!



"Teasel" = Cardo
Dipsacus sativus

Ditylenchus dipsaci
= *Ditylenchus do Dipsacus*



<http://3.bp.blogspot.com/-ztSsyT9eAY4/Uo0OUHKImrI/AAAAAAAAAOE/F6dKWgdq0yg/s1600/DSCF7844.JPG>



https://upload.wikimedia.org/wikipedia/commons/thumb/5/5a/Dipsacus_sativus-26.jpg/450px-Dipsacus_sativus-26.jpg



Cardeador

“Teasel Carder”

<https://s-media-cache-ak0.pinimg.com/736x/2d/d3/1d/2dd31d6787767f46ae1511a60e27ba20.jpg>



http://1.bp.blogspot.com/-0s6rNXrZuGk/UW8TGOIUaNI/AAAAAAAOE/pj6qfnTQ-Y0/s320/Mendel_Hausbuch_Carder.jpg

c.1425



<https://s-media-cache-ak0.pinimg.com/736x/2d/d3/1d/2dd31d6787767f46ae1511a60e27ba20.jpg>

D. dipsaci (Kuhn, 1857)



http://3.bp.blogspot.com/-1BGGc0dTMVs/UYLBr825tXI/AAAAAAAAGo/-BZVbLTV2sc/s400/Teasel_card_maker.jpg

c.1545

Ciclo 19-23 dias / 15 °C

200-500 ovos/♀

Sobrevivência solo
2 anos fungo?

Sobrevivência "J4 wool"
3-5 anos
23 anos em laboratório

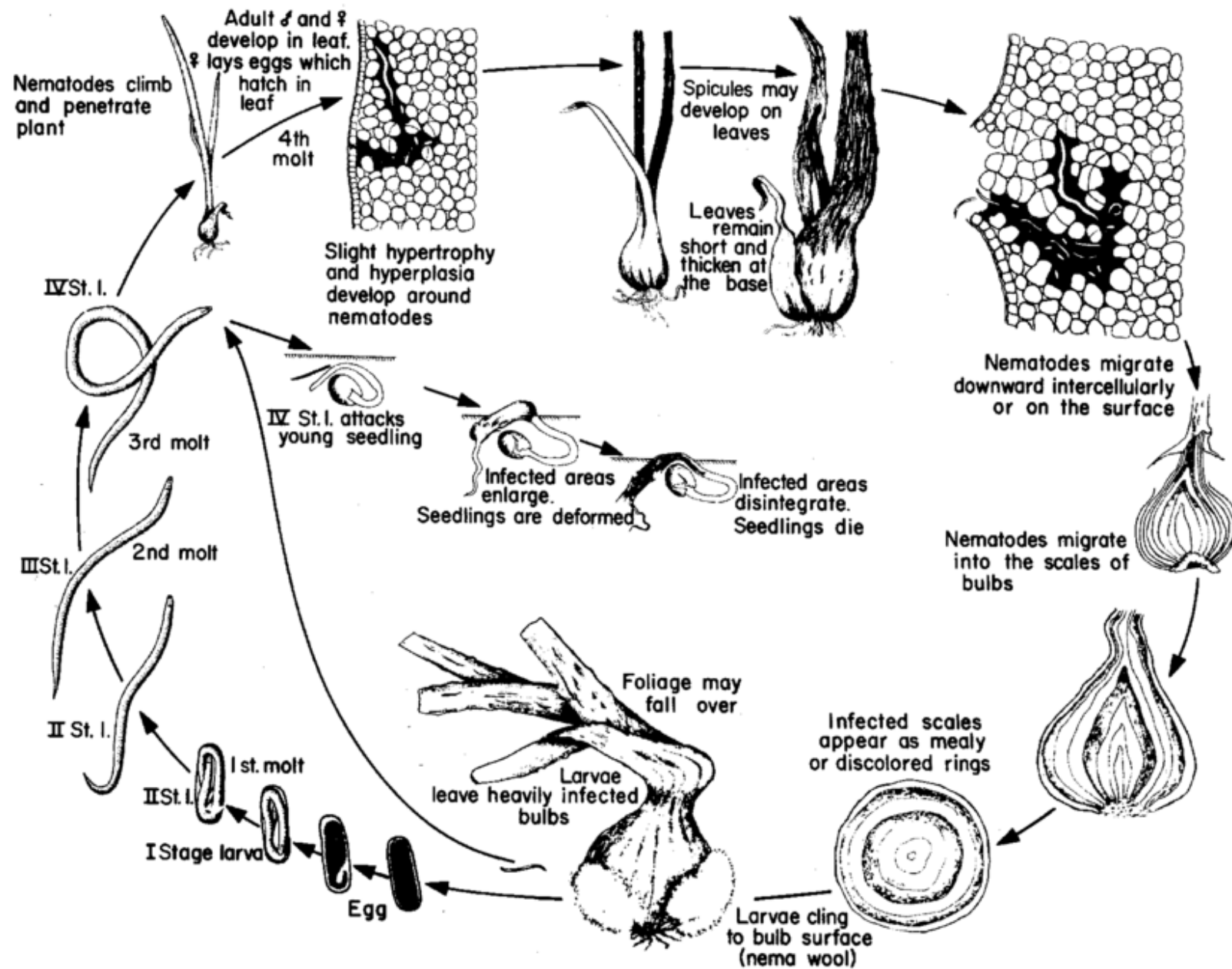
Hospedeiras
450 spp. nas diferentes
raças



<http://bugwoodcloud.org/images/3072x2048/0162061.jpg>



<https://gd.eppo.int/media/data/taxon/D/DITYDI/pics/1024x0/562.jpg>



Brasil

Ditylenchus dipsaci
=nematoide-do-alho



<https://ag.umass.edu/vegetable/fact-sheets/garlic-bloat-nematode>

Dúvidas???

***Ditylenchus dipsaci* em Alho e
Cebola**

Ditylenchus dipsaci em Alho



<http://ail.quebec/wp-content/uploads/2018/02/8.Mimee-D.-dipsaci-ail-30jan18.pdf>



<https://apsjournals.apsnet.org/doi/10.1094/PHP-12-16-0069-BR>



Local Rio Paranaíba (MG) 2008



Local Rio Paranaíba (MG) 2007

Ditylenchus dipsaci em Cebola



Ditylenchus dipsaci (DITYDI) - <https://gd.eppo.int>



https://www.researchgate.net/publication/356510589_Integrated_nematode_management_of_Ditylenchus_dipsaci_in_onion_a_nematode_in_a_world_all_on_its_own



<https://revistacultivar.com.br/artigos/podridao-perversa>



<http://ephytia.inra.fr/fr/C/22527/Vigi-Semences-Ditylenchus-dipsaci-Nematode-des-tiges-des-Allium>

Ditylenchus destructor



https://www.flickr.com/photos/ian_riley/2100545390



<https://www.mdpi.com/2075-1729/11/12/1303>

Dúvidas???

Bom Almoço!!!