

2016 Pitahaya/Dragon Fruit Production Seminar

Nematode Research in Dragon Fruit Production

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Presentation overview

Nematodes

Biology and Importance

Plant Parasitic Nematodes

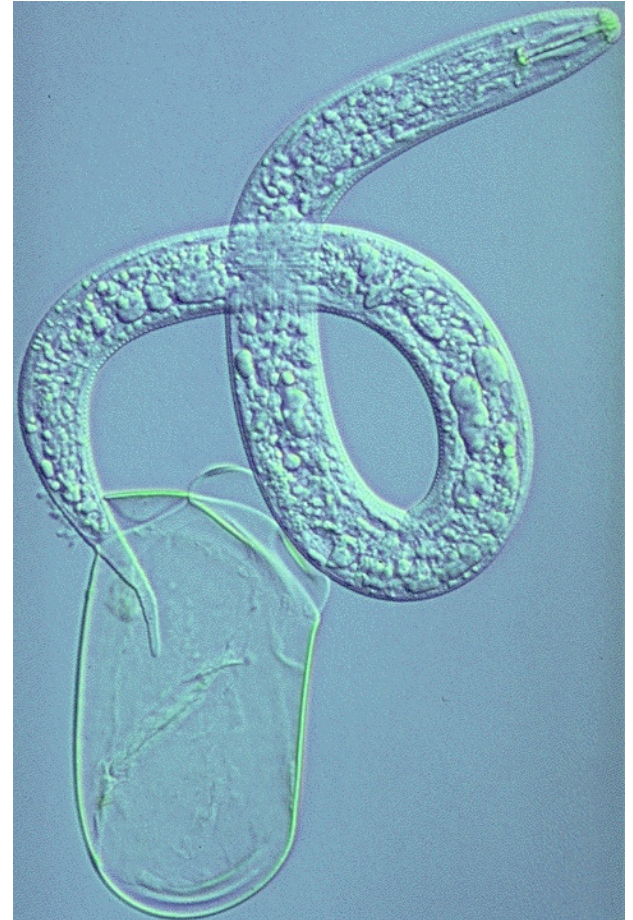
Disease Symptoms

Potential Pathogens in Pitahaya Production

Current Research Project

What are nematodes?

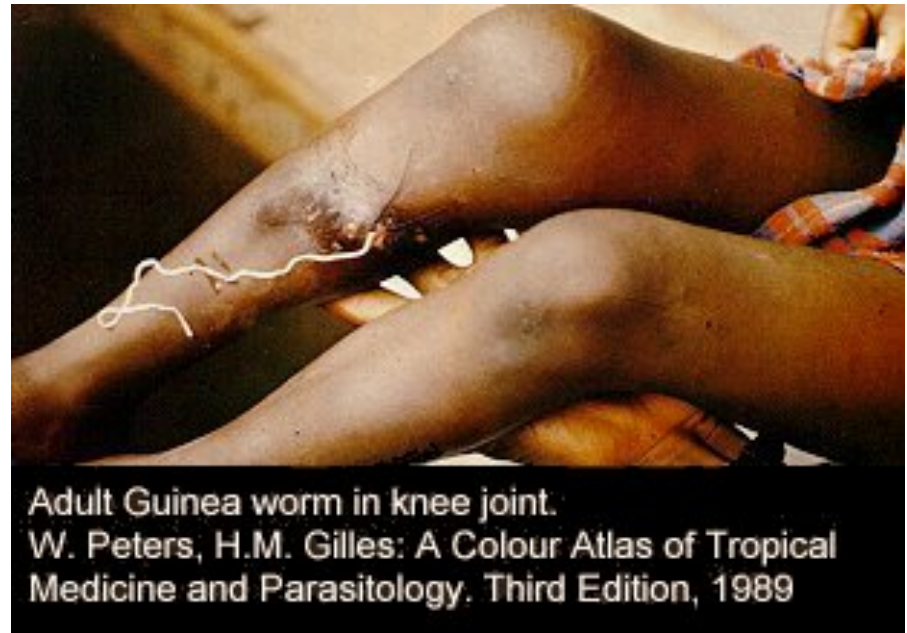
- unsegmented, aquatic roundworms
- possess digestive, nervous, excretory, and reproductive systems; no discrete circulatory or respiratory system
- >500,000 species (?), most abundant multicellular animals; 4 out of 5 animals belong to the phylum Nematoda



Source: UC Davis Nematology

Nematodes that cause human diseases

- Guinea Worm
- Lymphatic filariasis (elephantiasis)
- River blindness
- Hookworm



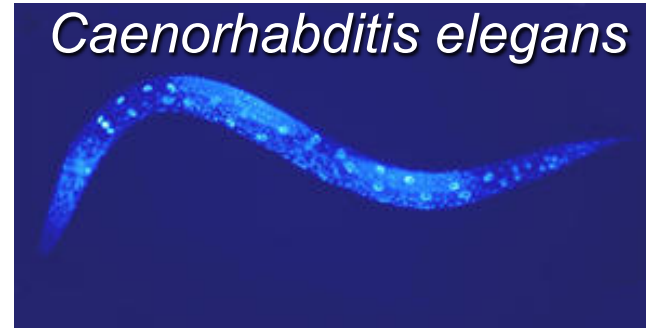
Nematodes as biocontrol agents of insects



Source: BYU



A Nobel Prize for Worms!



Press Release: The 2002 Nobel Prize in Physiology or Medicine

7 October 2002

The Nobel Assembly at Karolinska Institutet has today decided to award The Nobel Prize in Physiology or Medicine for 2002 jointly to

Sydney Brenner, H. Robert Horvitz and John E. Sulston

for their discoveries concerning

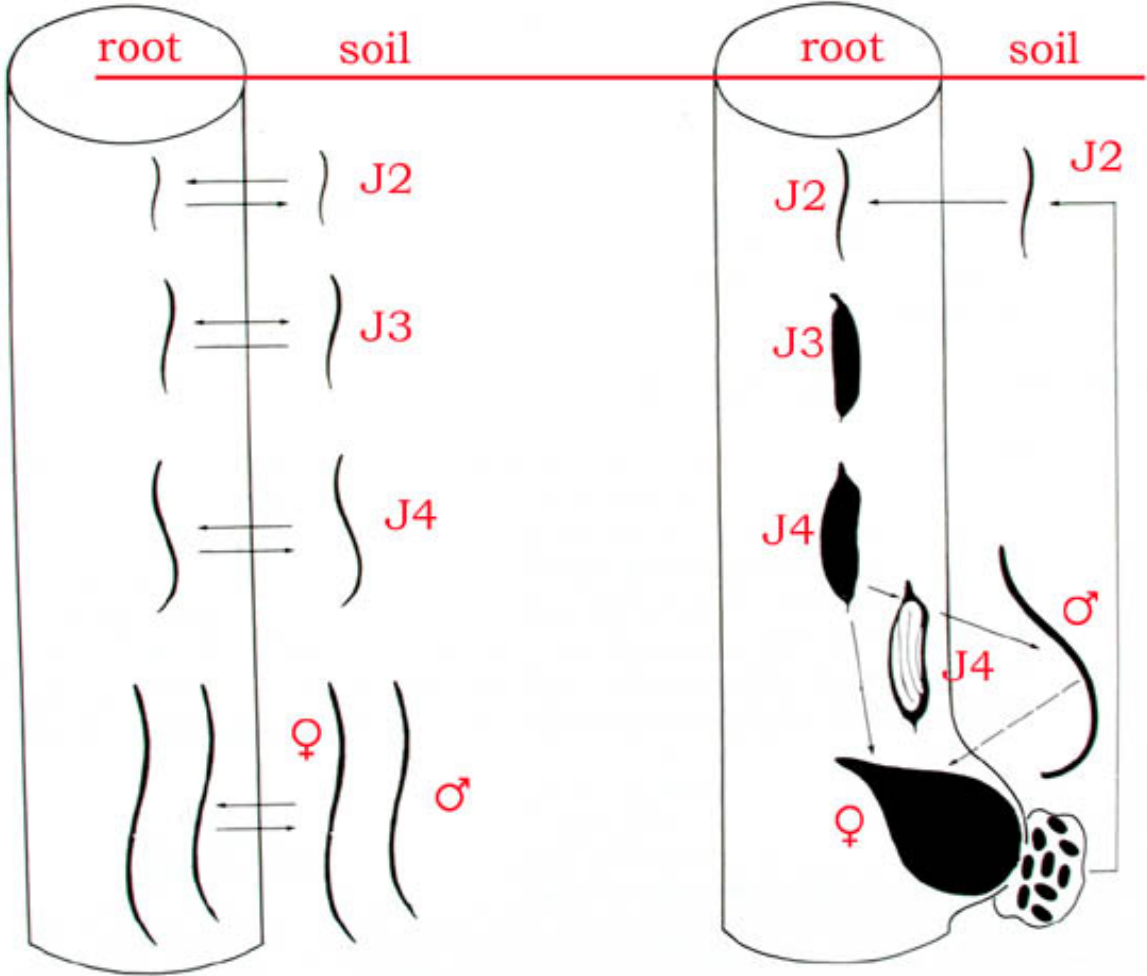
"genetic regulation of organ development and programmed cell death"

Plant Parasitic Nematodes: Feeding



Source: UCR Nematology

Plant Parasitic Nematodes: Life cycle



modified after Merny, 1972

Plant Parasitic Nematodes: Plant Disease Symptoms

Above ground:

- thin stands
- stunted plants
- uneven plant height
- yellowing, browning
- often circular spots, elongated in direction of soil movement

Below ground:

- root swelling (galls)
- lack of fine roots
- lack of root branching
- necrotic root lesions
- short, stubby roots

Plant Parasitic Nematodes: Plant Disease Symptoms

Root-knot nematodes (*Meloidogyne* spp.)



Disease symptoms on cucumber and carrots

Plant Parasitic Nematodes: Plant Disease Symptoms

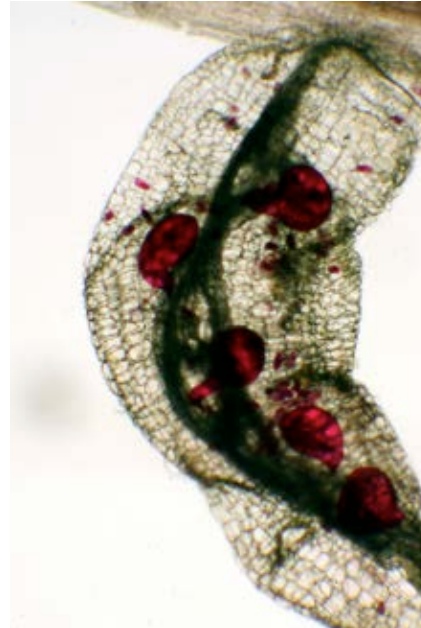
Root-knot nematodes (*Meloidogyne* spp.)



Disease symptoms on tomato and potato

Plant Parasitic Nematodes: Development

Root-knot nematodes (*Meloidogyne* spp.)

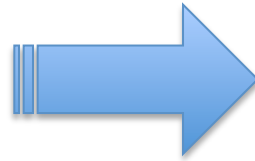


Source: UCR Nematology

Life stages from root invasion to egg production

Plant Parasitic Nematodes: Interactions

Root-knot nematodes (*Meloidogyne* spp.)



Crop damage increased by secondary microbial attack

Plant Parasitic Nematodes: Host status research

Determine suitability for Southern root-knot nematode (*Meloidogyne incognita*) to cause disease and/or reproduce on 8 Pitahaya species.



Pitahaya cuttings

Pitahaya species in rkn test

4 - **Lisa** (*Hylocereus polyrhizus*), Nicaragua

5 - **Sin Espinas/Thornless** (*Hylocereus* sp.) Nicaragua

9 - **Valdivia Roja** (*H. ocamponis*), Mexico

12 - **Delight** (*Hylocereus* sp), USA

13 - **American Beauty** (*H. guatemalensis*), Guatemala

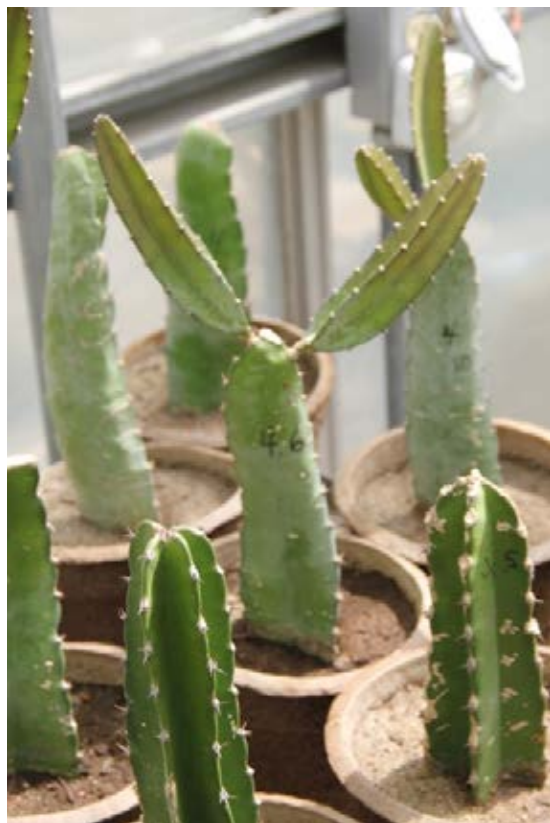
15 - **Physical Graffiti** (*Hylocereus* sp.), US

16 - **Vietnamese Giant** (*H. undatus*), Vietnam

8/17 - **Colombiana/Yellow Dragon** (*H. megalanthus*), Colombia

Pitahaya species in rkn test

Rooting of cuttings



New growth, frequently with symptoms of Cactus virus X

Pitahaya species in rkn test

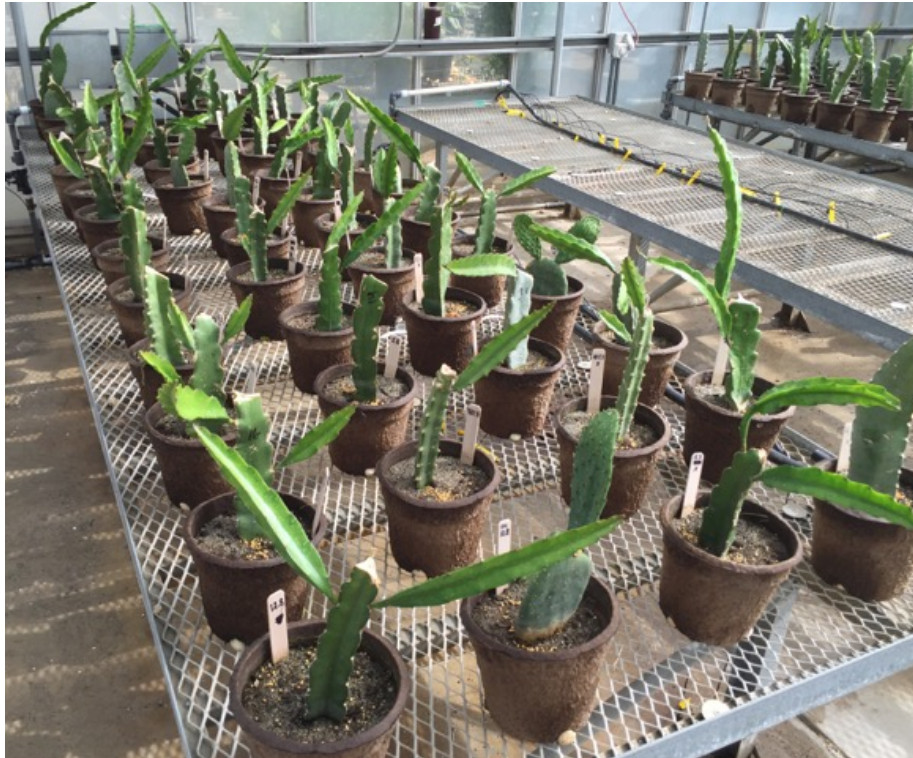
5 months after planting, 5 rooted cuttings from each species were transplanted and infested with root-knot nematodes (*Meloidogyne incognita*)



Trimming back root system before transplanting

Pitahaya species in rkn test

6 wks after soil-infestation with root-knot nematodes
(*Meloidogyne incognita*)



2 trials with 8 Pitahaya species, each with 5 reps
infested and non-infested

Pitahaya species in rkn test

Trials were terminated 8 weeks after nematode infestation to determine nematode population and shoot weight.



Plant Parasitic Nematodes: Plant Disease Symptoms

Galled roots 8 wks after soil infestation



Root galling on Pitahaya (cv. Valdivia Roja)

Summary

Little information available on Pitahaya problems with plant parasitic nematodes.

Root-knot nematodes are parasitic on Pitahaya and may cause disease and crop damage.

Current research revealed host status of 8 *Hylocereus* spp./cultivars to the Southern root-knot nematode.

Growers who have root-knot nematode on dragon fruit plants, please contact the presenter (obecker@ucr.edu).

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