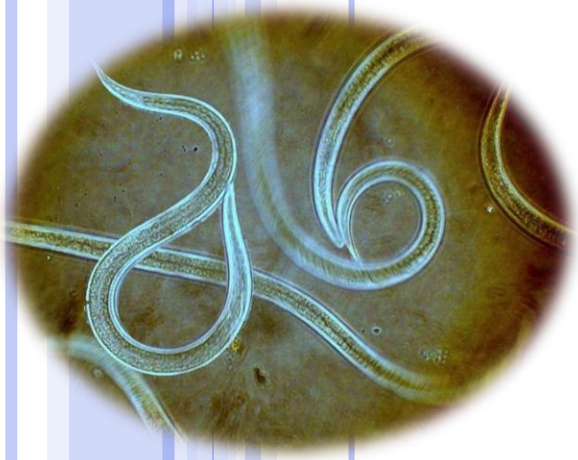

New Approaches to Nematode Control

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2nd year land
1st year land

Current Options

- Fumigate prior to 2nd year.
- If you suspect a problem after 1st year crop you can inject Telone (no tarp) prior to sowing 2nd crop.
- Fertilizer heavily in an effort to over come chlorosis and stunting.

What we've tried and only worked under limited conditions

- Inject Telone using a coulter rig. Telone is registered for this application over turf grass.
- However, this method is limited to too narrow of environmental conditions to be useful in forest nurseries.

A NEW APPROACH…. FOR (FY2011)

- Pasteuria Bioscience, Inc – 2003, Alachua, FL
  - A venture-backed biopesticide company focused on the development and commercialization of biological control of nematodes in agriculture.
  - In July 2010, EPA approved the registration of a liquid formulation of *Pasteuria* for the control of sting nematode on strawberries and turf.
- Over 50 years ago scientist recognized *Pasteuria* as a potential control agent of nematodes. However, culturing the bacteria was a problem.
- I first heard about this company at 2008 Methyl Bromide Alternatives Conference in Orlando, FL.

What is *Pasteuria*?

- It is a group of naturally occurring soil bacteria that specifically attacks plant parasitic nematodes.
- These bacteria are nematode species specific.

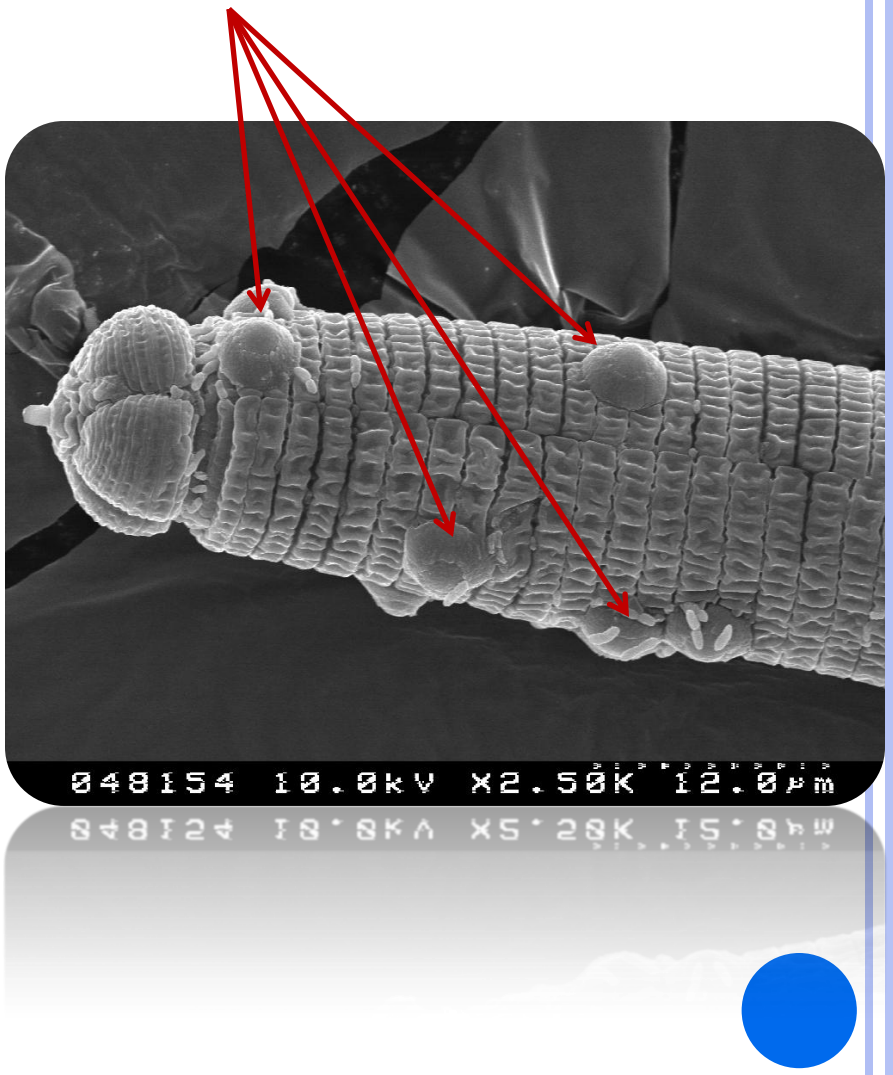
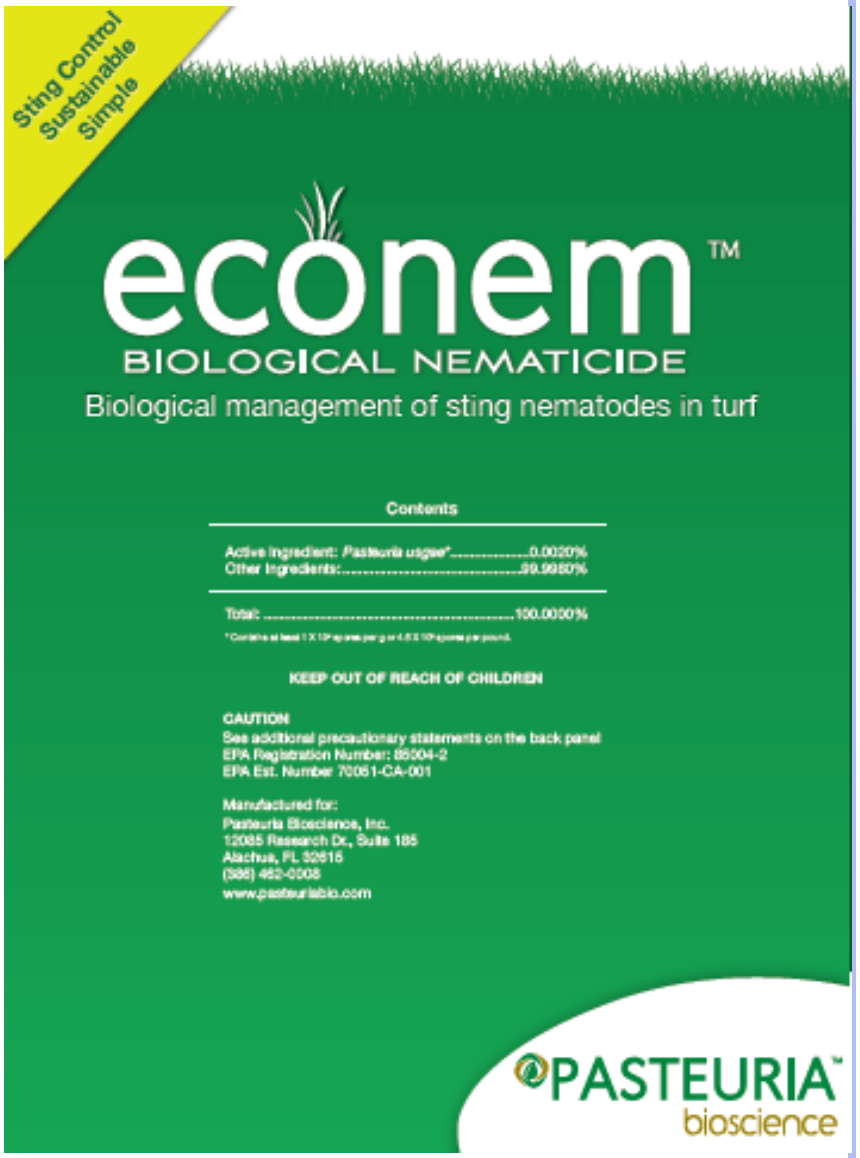


Photo courtesy of Pasteuria Bioscience

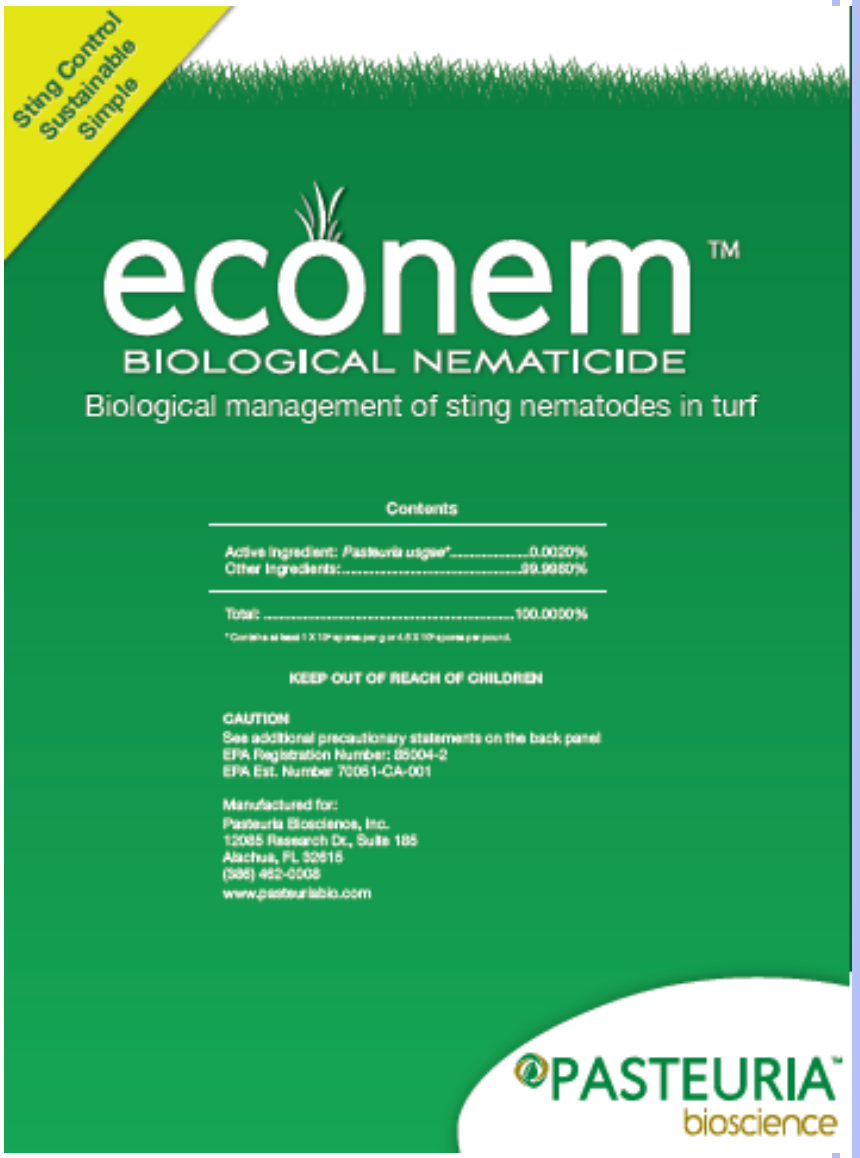
What is Pasteuria?

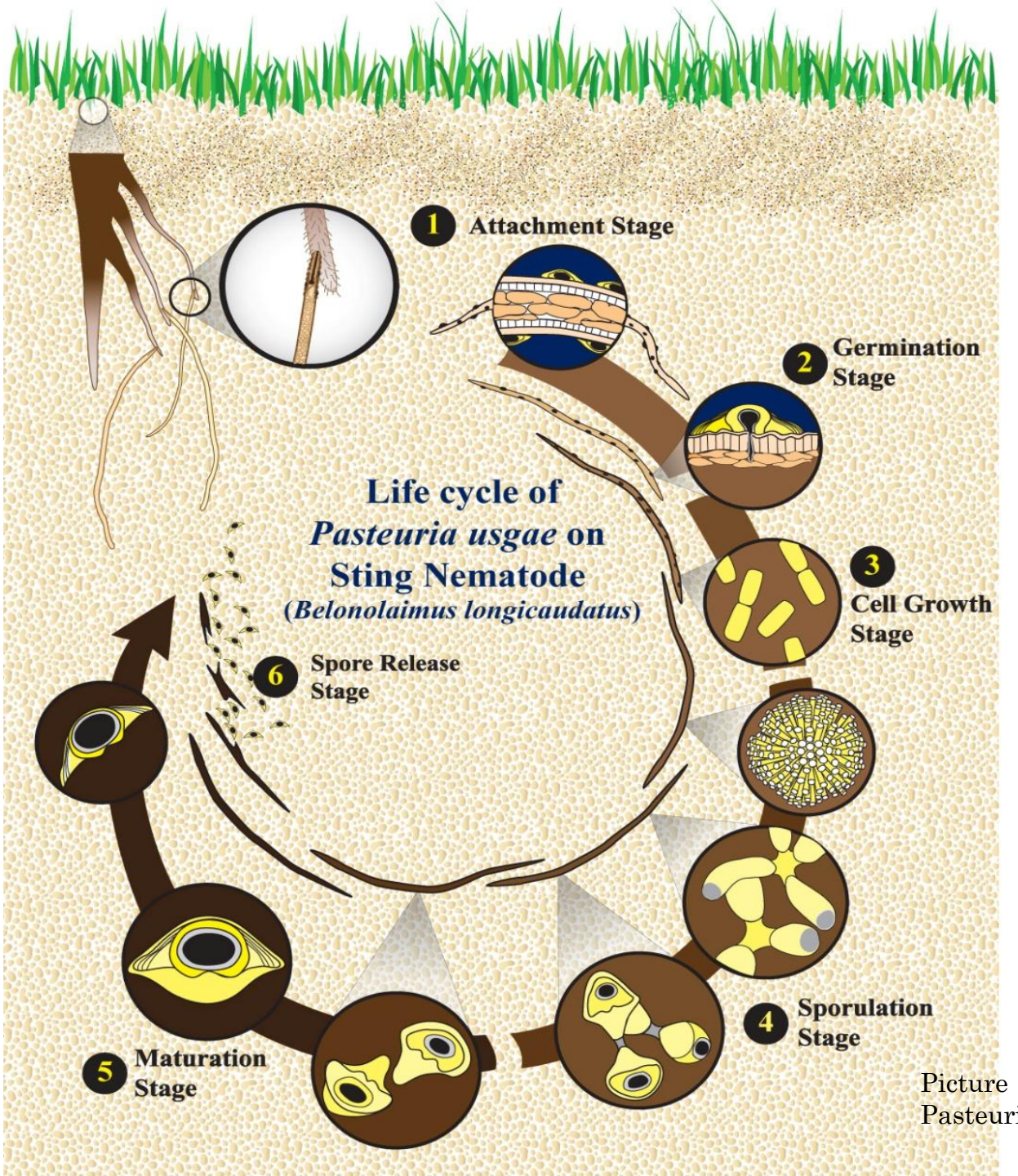
- The currently registered formulation - endopsores which are long lasting spores.
- Minimal PPE
- 4 hr REI
- Apply 0.10” irrigation following application



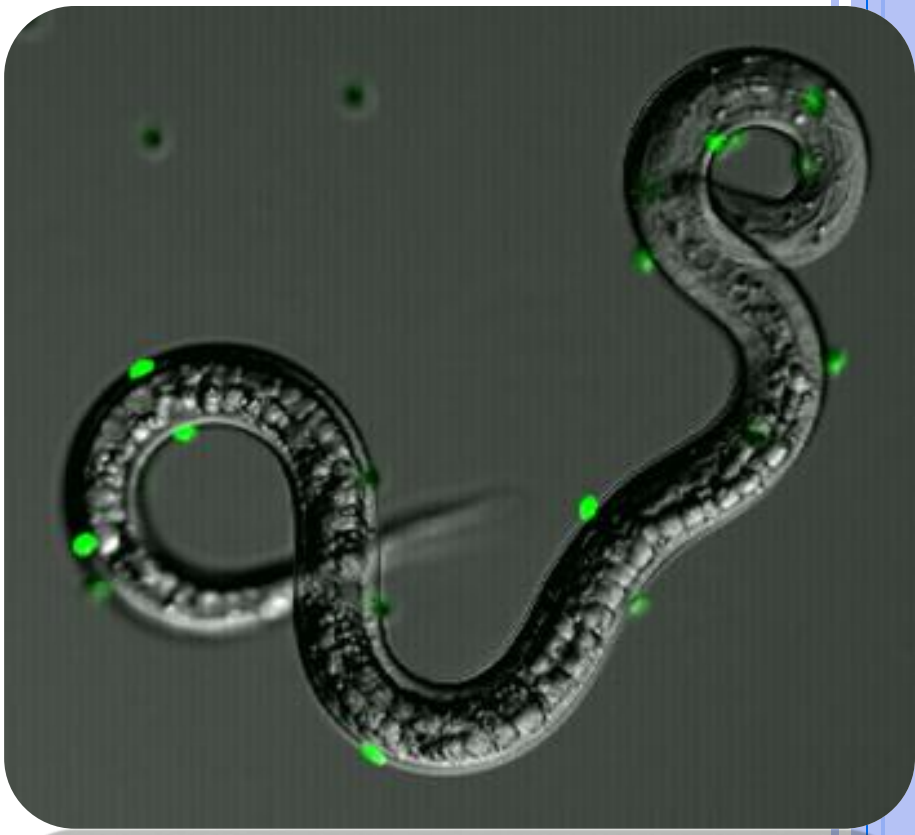
What is Pasteuria?

- Potential limitations - deep sandy soils where endospores may be washed out of nematode zone.

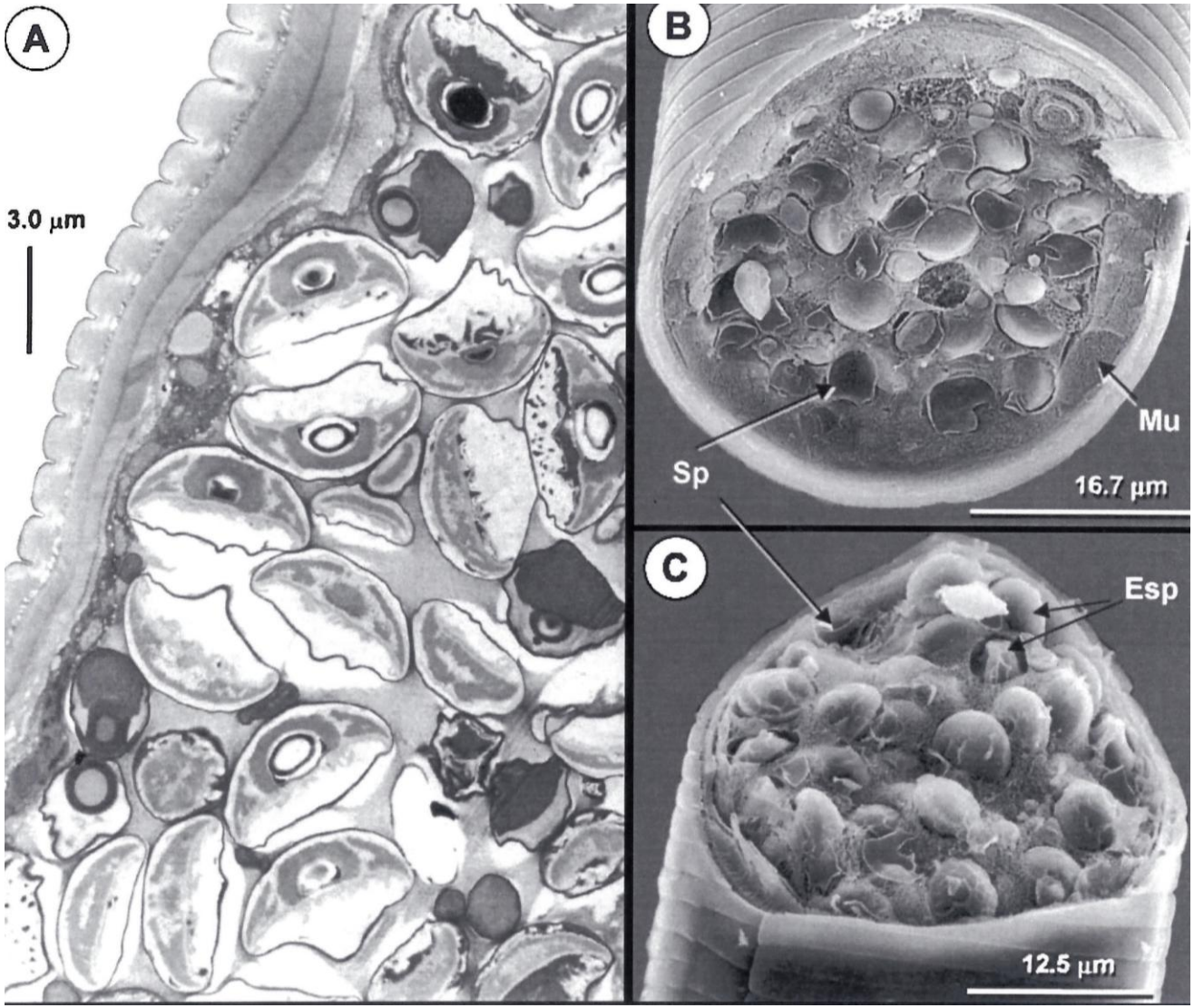




Picture courtesy of Pasteuria Bioscience



Photos courtesy of Pasteuria Bioscience



Sporulation of *Pasteuria* sp. S-1 in *Belonolaimus longicaudatus* hosts. A) TEM photomicrograph of a longitudinal section showing various stages of sporogenesis. B&C) LTSEM photomicrographs of two nematode cross-sections showing mostly mature endospores, each within an exosporium and fractured sporangial wall. Giblin-Davis et al., 2001.

Plan of action for FY 2011

- Focus on stunt nematode.
- Collect nematode infested soil for PBI to isolate *Pasteuria* from nematodes.
  - Done and bacteria initially identified from sample
- Bring nursery soil back to AU and begin growing pines in soil as a food source for stunt nematode. (Oct 2010)
- Once PBI has the proper *Pasteuria* strain(s), bacteria can be cultured for a small study
- Initial studies will be in greenhouse to test efficacy and develop dosage curves. (Jan 2011).
- Aim for next spring/early summer for a nursery trial.

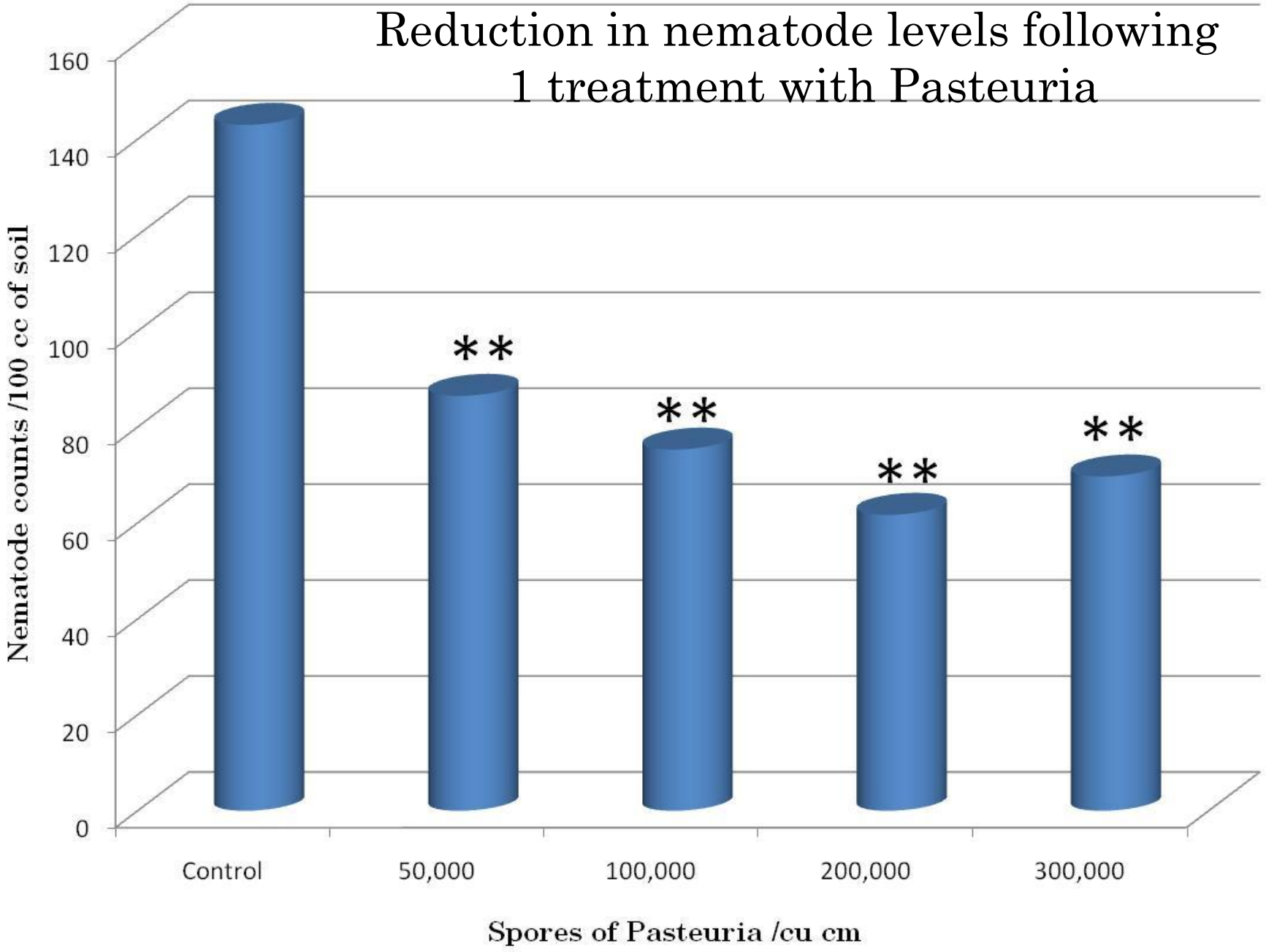
Other tidbits

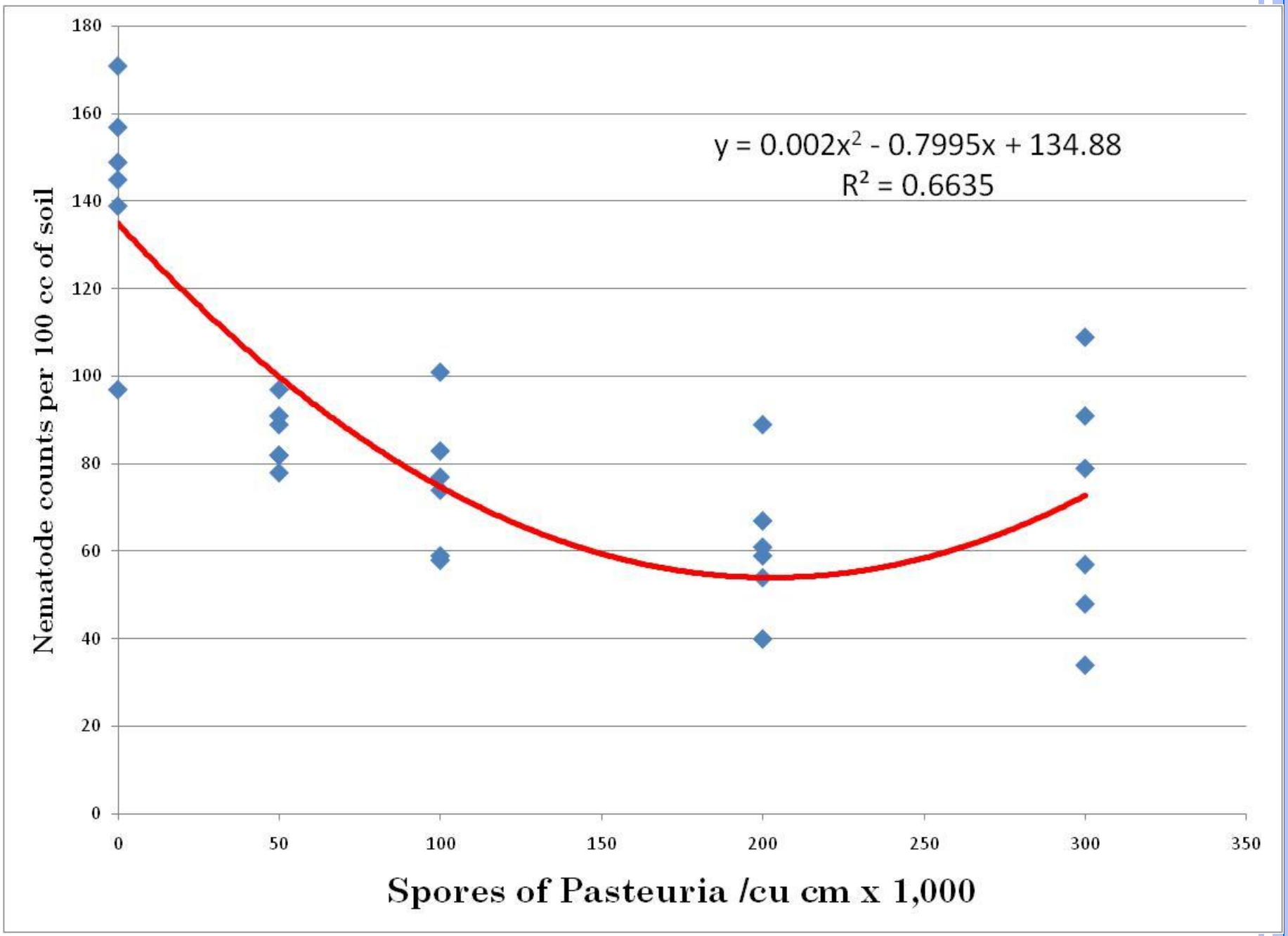
- Cost – "it will be comparable to Telone applications " ($300 - $500/a)
  - Difference will be in how many acres you must treat
    - Telone, 2nd year – up to 20 acres
    - Pasteuria– just where problem exists.
- Number of applications per year limited with Telone due to cropping.
- Nematode egg production stops once infected.
- Infection to death – 7 days for sting, 28 days for root knot nematode.
- The number of endospores continue to increase in soil if not washed through zone of nematodes

AU GREENHOUSE DOSAGE STUDY – JAN. 2011

- 5 treatments X 6 replications using PVC pots (10 cm-diameter, 10 cm-deep) with screen bottoms.
  1. Non treated
  2. 50,000 spores/cm^3 of soil
  3. 100,000 spores/cm^3 of soil
  4. 200,000 spores/$cm^3$of soil
  5. 300,000 spores/cm^3 of soil
- Soil naturally infested with stunt nematode (*Tylenchorhynchus claytoni*). Approximately 1 kg of soil will be placed in each pot.
- Oil-dry granule containing 2.0 x 10^8 spores/g specifically designed to control the stunt nematode was applied to the surface at the initiation of the experiment

Reduction in nematode levels following 1 treatment with Pasteuria




y = 0.002x² - 0.7995x + 134.88
R² = 0.6635
Nematode counts per 100 cc of soil
Spores of Pasteuria /cu cm x 1,000
0
20
40
60
80
100
120
140
160
180
0
50
100
150
200
250
300
350