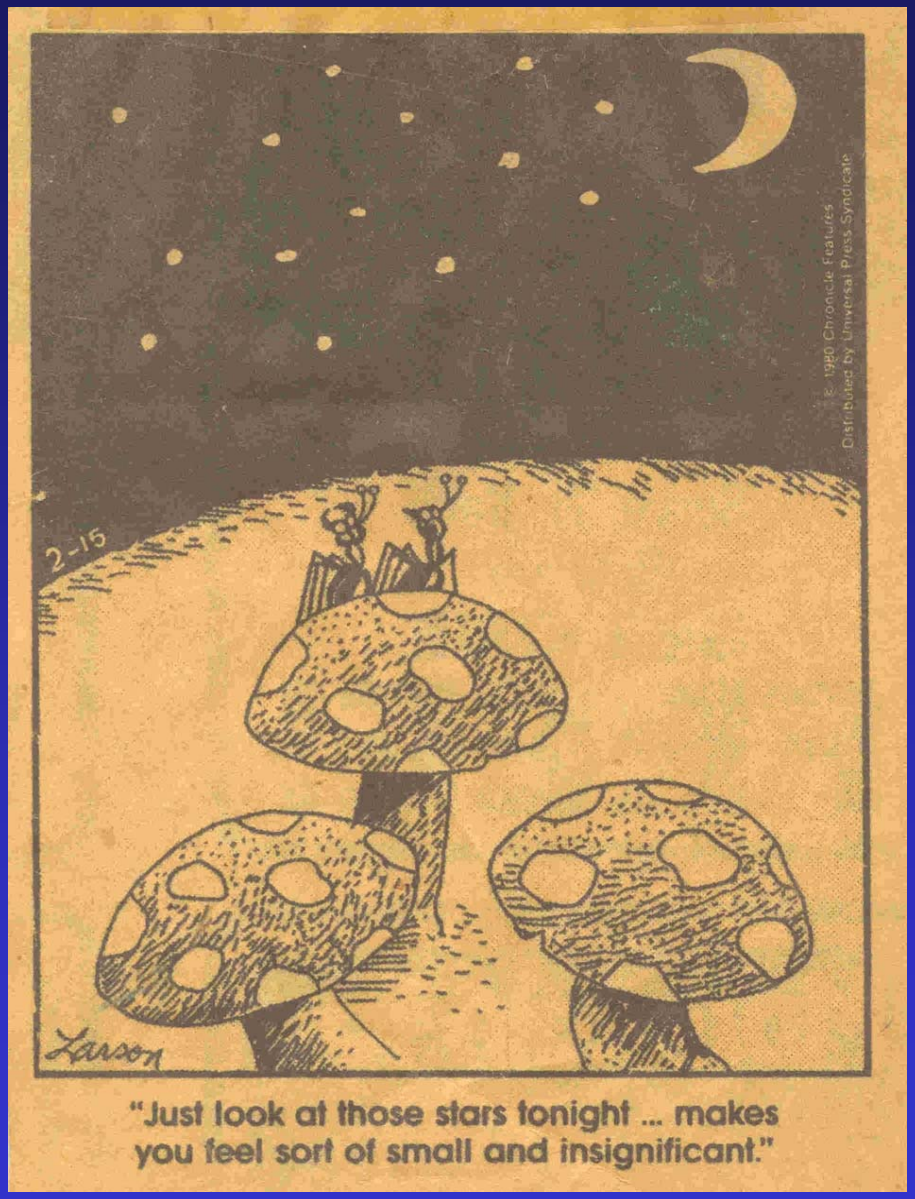
Nursery Diseases



Reference

Forest Nursery Pests

USDA Forest Service Ag Handbook 680

Plant Pathology

– Pathogen:

– Parasite:

– Saprophyte:

– Symbiosis:

- Obligate parasite:

- Facultative parasite:

DISEASE = IMPARED PHYSIOLOGY

- Signs and Symptoms of Disease
  - Signs
  - Symptoms

Symptoms of Disease

– Necrosis

– Decay

– Cankers

– Leaf spots

- Wilts

- Blights

- Hypertrophy

- Atrophy

- Physiology

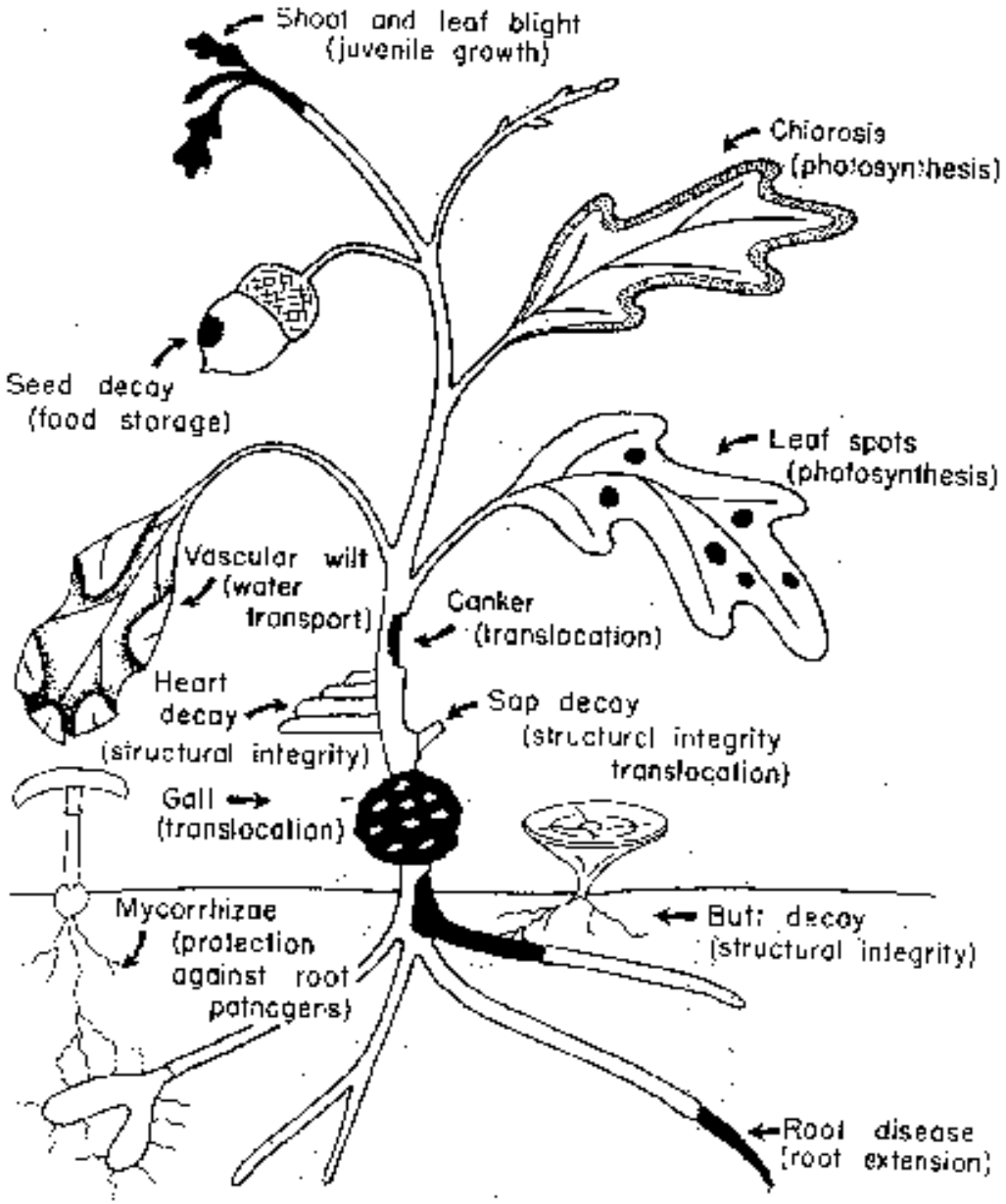


FIGURE 2.3 Schematic representation of the effects of diseases on tree health, showing the vital functions of a tree and their impairment by various types of pathogenic influences.

Principals of Disease Prevention

- Exclusion distribution
- Eradication survival
- Protection barrier
- Resistance compatibility

Agents of Plant Disease in Forest Tree Nurseries

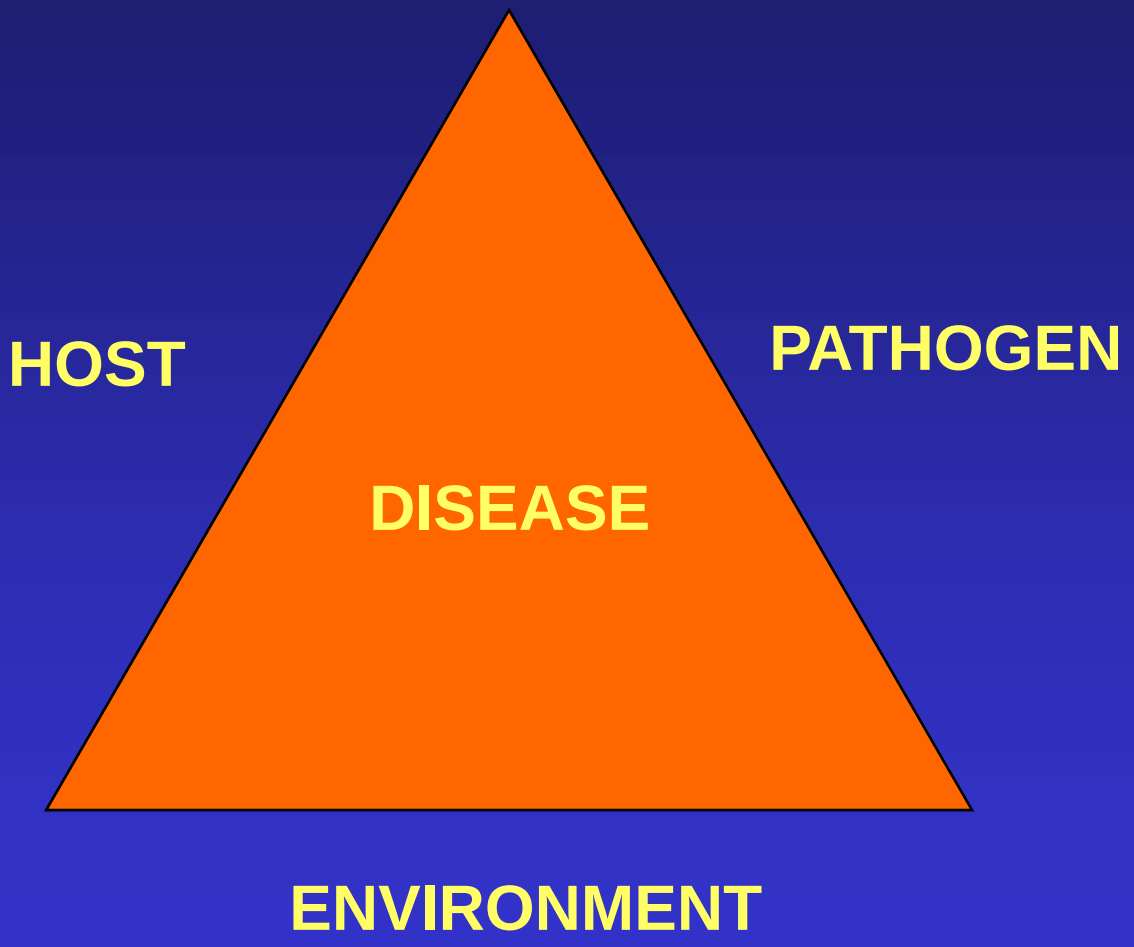
- Fungi are Number 1
- Nematodes; once major now minor. In the future without MBr? They predispose seedlings to fungi.
- Bacteria are minor in nurseries.
- Viruses are even less. More so in seed propagated plants.

Fungi

- Eukaroytic organisms
- Non-chlorophyll
- Vegetative growth is through mycelium
  Singular = mycelia
- Single thread = Hypha

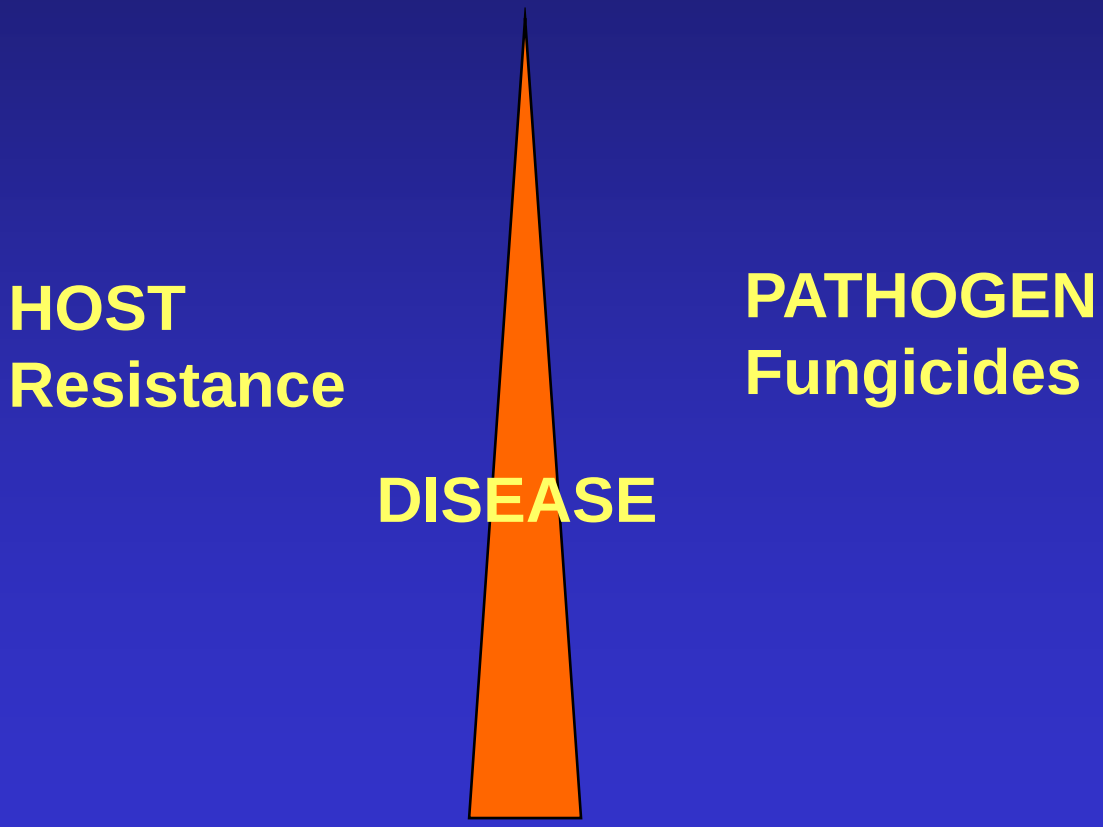
  plural = Hyphae
- Propagate via spores

THE DISEASE TRIANGLE



THE DISEASE TRIANGLE

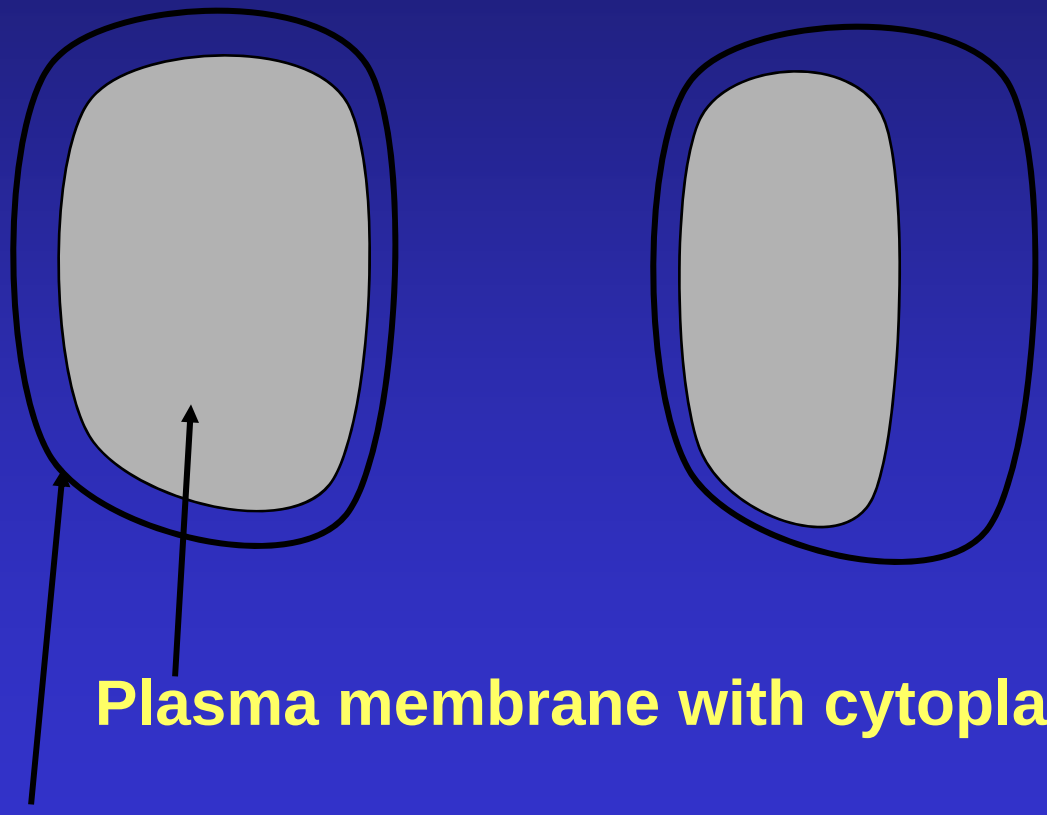
THE DISEASE TRIANGLE FOR A PATHOGEN LIKE A RUST



Water Relations & Disease: Walking a fine line

Healthy / full turgor

Plasmalized

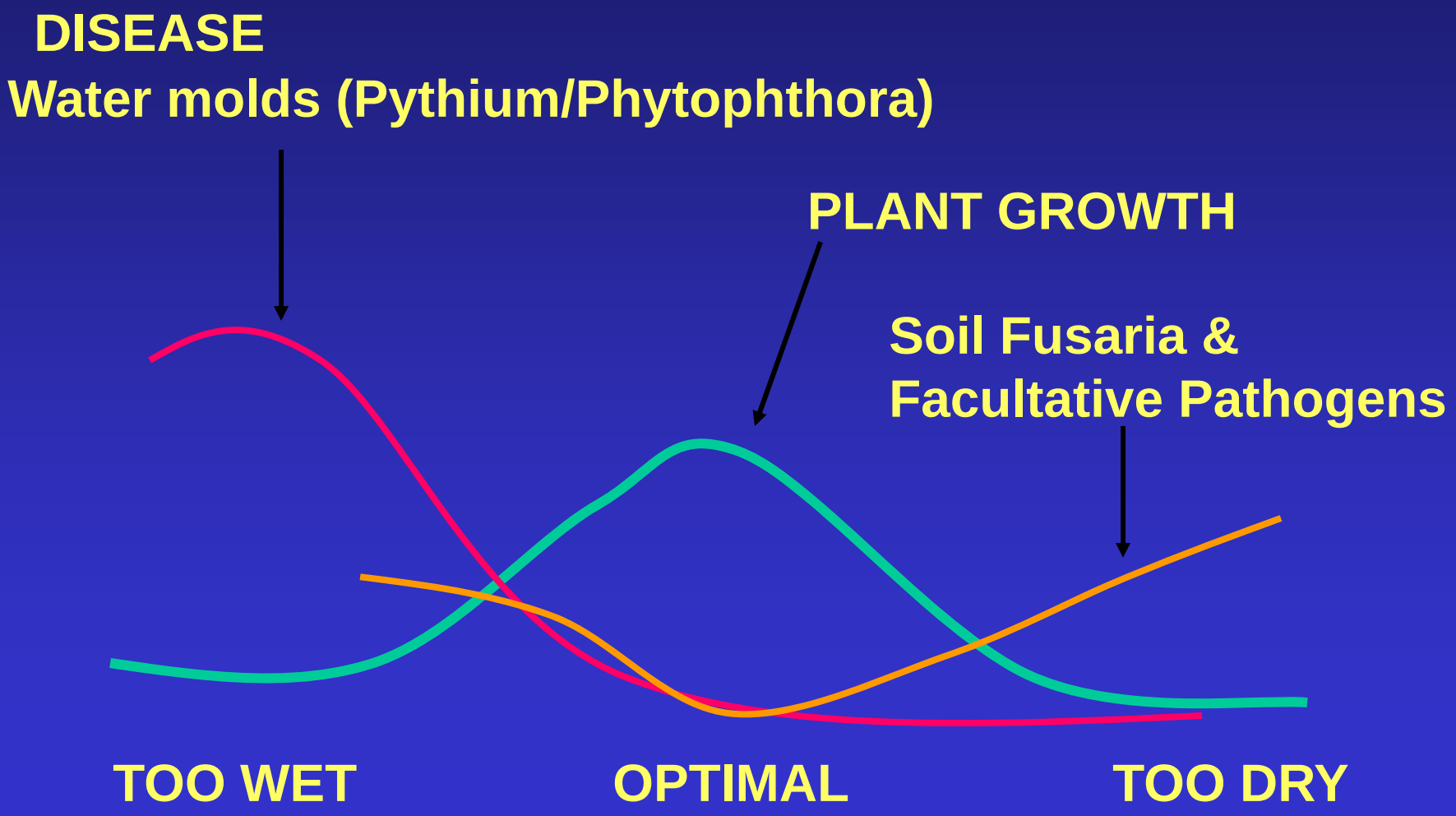


The plasmalized cell is predisposed to penetration by fungi

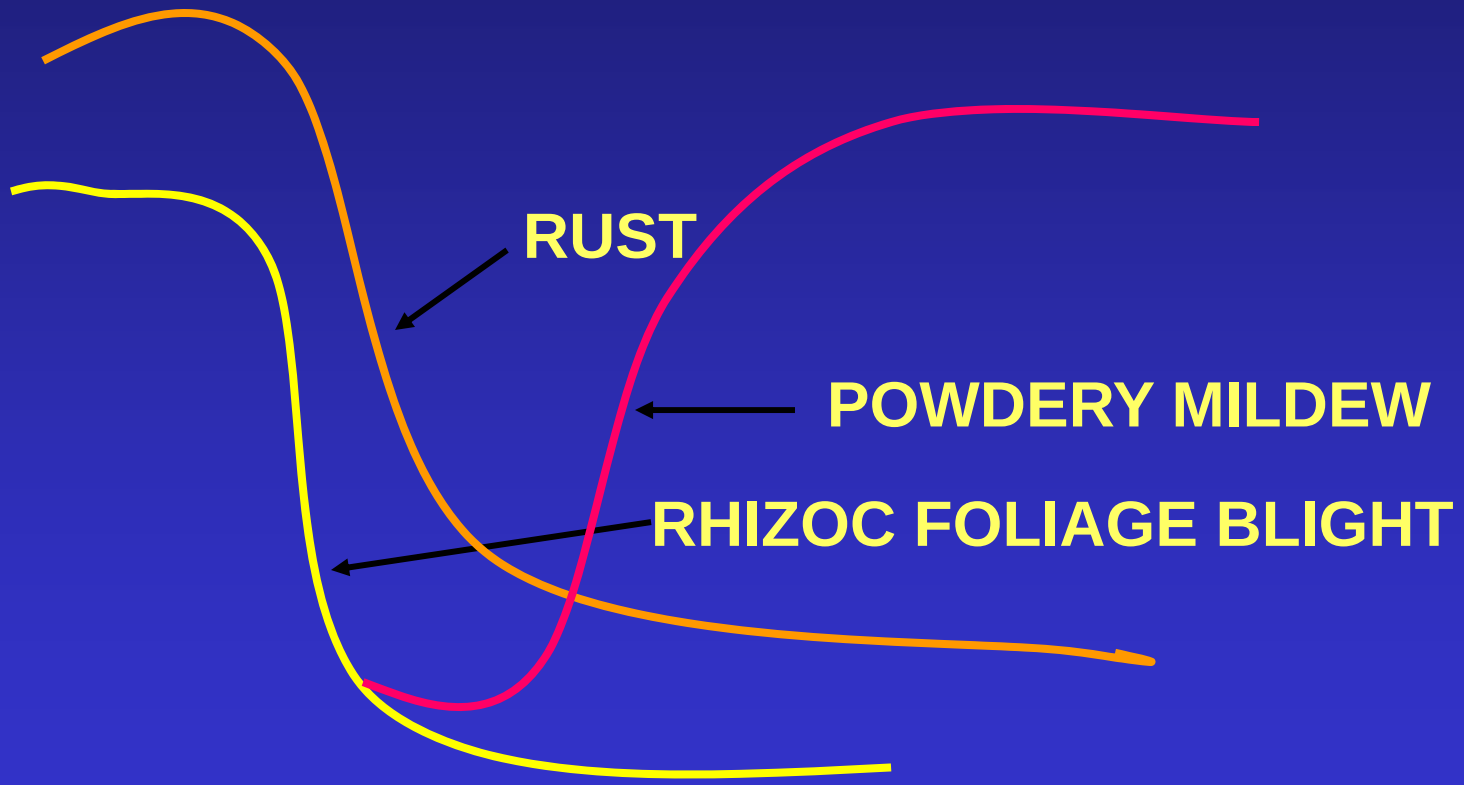
Plasma membrane with cytoplasm inside

Primary cell wall

EFFECTS OF SOIL MOISTURE ON DISEASE POTENTIAL and PLANT GROWTH



EFFECTS OF FOLIAGE MOISTURE ON DISEASE POTENTIAL OF THREE PATHOGENS



Trichoderma's affect on soil born pathogens

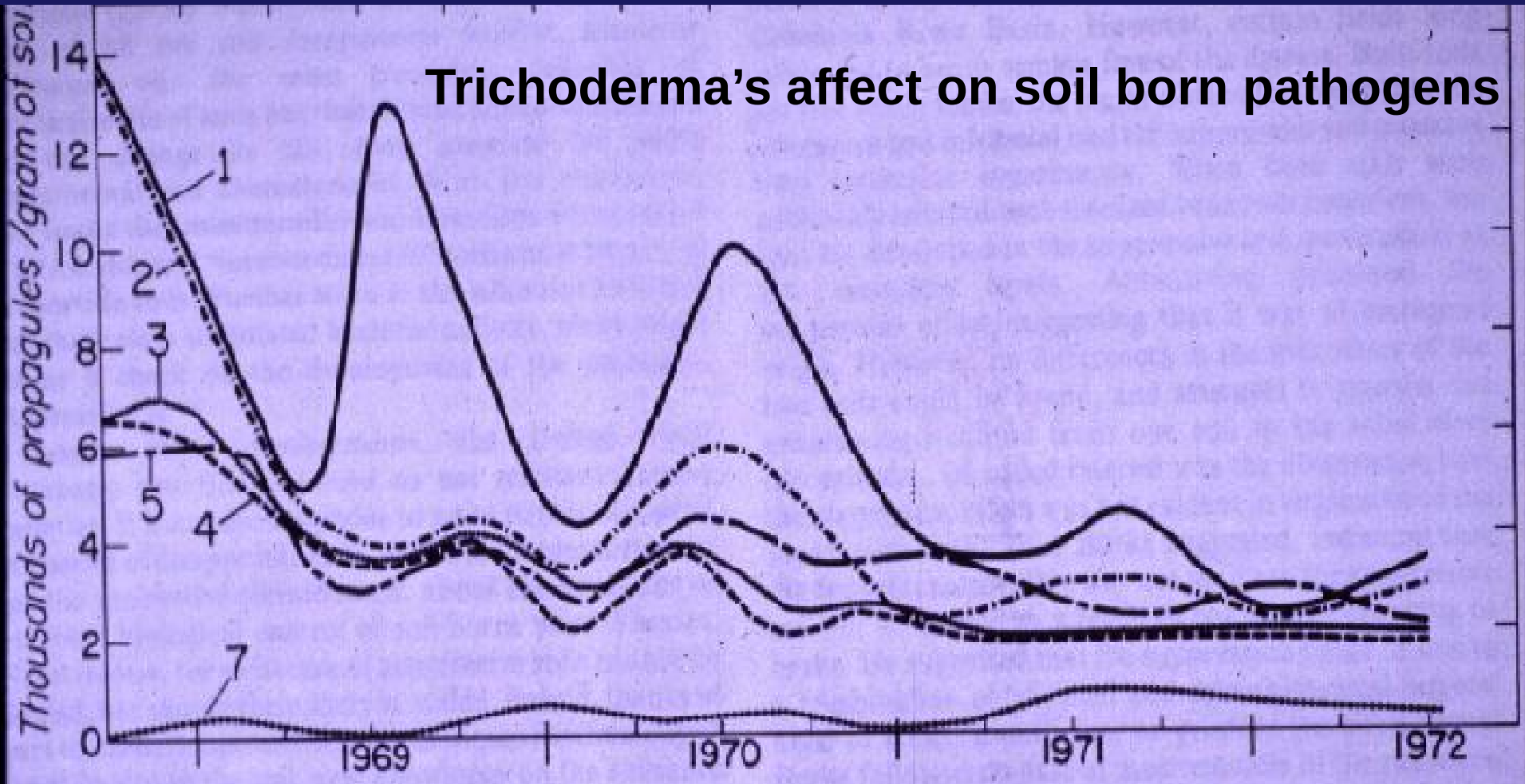
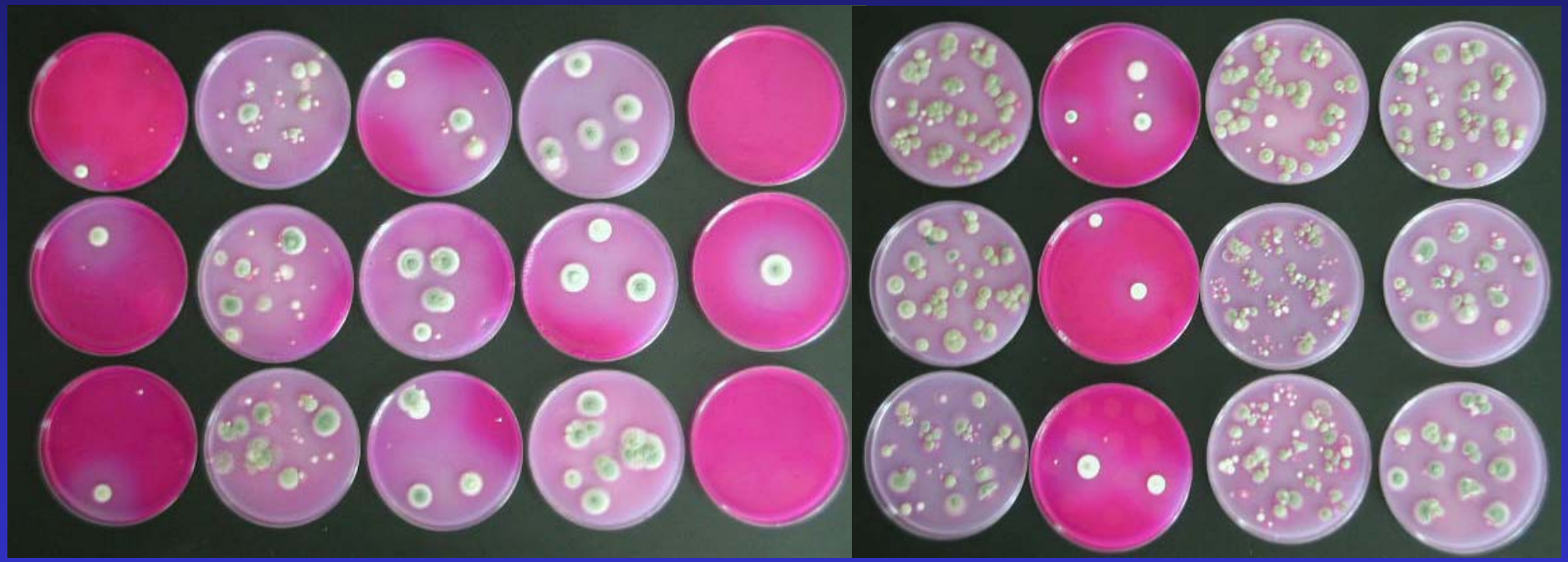


Fig. 1. Fluctuations of *Fusarium* populations in forest and nursery soils. Numbers on curves refer to soil types and treatments as follows: *1)* nursery soil left at nursery undisturbed, kept uncovered, *2)* nursery soil left at nursery, undisturbed, covered with 15-cm layer pine needles, *3)* nursery soil taken to pine forest, kept uncovered, *4)* nursery soil taken to pine forest, covered with 15-cm layer pine needles, *5)* nursery soil taken to laboratory and kept air dry (control), and *7)* forest soil taken to nursery, left uncovered. The following forest soils contained no detectable *Fusarium* and were not graphed: *6)* forest soil left at pine forest, undisturbed, covered with 15-cm layer pine needles, and *8)* forest soil taken to nursery and covered with 15-cm layer pine needles. Soils 3, 4, and 6 were replicated. (Courtesy of R. S. Smith, Jr., Pacific Southwest Forest and Range Experiment Station, U.S. Forest Service, Berkeley, California.)

Trichoderma after fumigation with MBr and other fumigants

Trichoderma dilution plates 1 seedling crop & 9 months after fumigation, Glennville GA 2005

BAS MI MI MI BAS MBr BAS MBr MBr

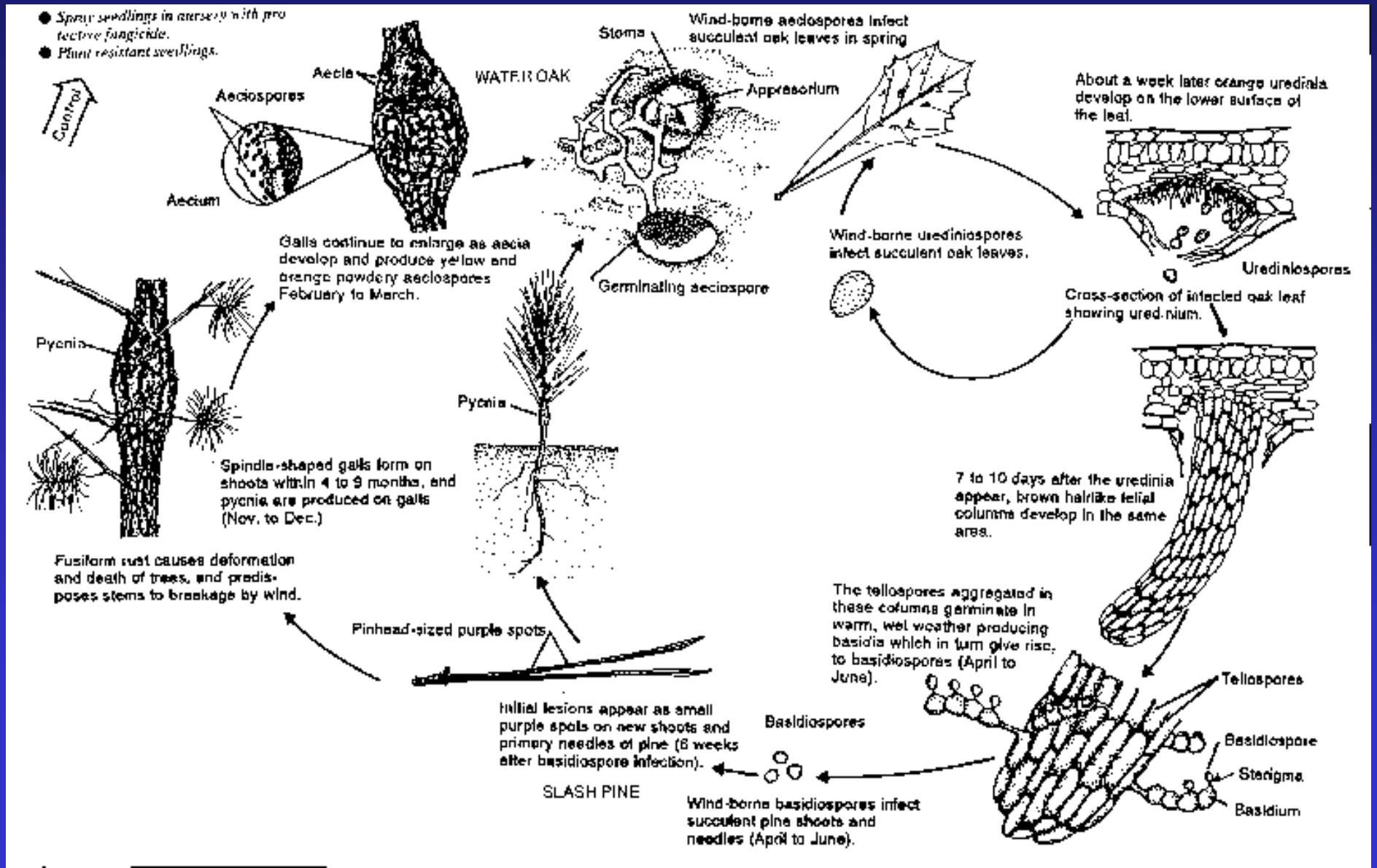


Block 1 Block 9

Rhizoctonia without and with Trichoderma

Fusiform rust

Cronartium quercuum f.sp. *fusiforme*



Fusiform rust

Cronartium quercuum f.sp. *fusiforme*

Seed treatment:
Bayleton & Thiram at time of sowing. Gives 21 days of rust control.

Foliar sprays: 21 days post sowing, every 21 days until mid to late June.
When the threat of basidospores is past.

Rhizoctonia needle blight

Rhizoctonia solani

“Disease-Free” Nursery Beds

Rhizoctonia “appearing” after top clipping

Rhizoctonia within Seedling Rows

Hyphae – fungal threads of Rhizoctonia

Rhizoctonia Blight: Management

- **Fumigation appears to affect incidence and severity.**
- **Time since fumigation increases disease.**
- **Moisture and stand density affect disease.**
- **Fungicides can be used to control pathogen; iprodinone, fludioxonil & azoxystrobin (Research Report 2003-04)**

Other Diseases:

Brown spot needle blight: Longleaf

Brown Spot Needle Blight: Management

Chlorothalonial – Bravo, Bravo Weather-Stick

Pitch canker: Seed borne

Resin soaked wood

Resin soaked wood

Pitch Canker: Management

- There are no registered fungicides to control pitch canker.
- Reduce incidence by controlling insects.
- Use seed from uninfected seed orchard.
- Clean seed using hydrogen peroxide.

Nematodes: Root Knot, Stunt, Lesion

Nematodes

Nematodes: Management

- There are no registered fungicides to control nematodes during the growing season.
- Fumigate with Telone prior to sowing in between fumigation with MBr/Chloropicrin
- Push seedlings with additional liquid fertilizer.
- Type of cover crop will influence nematodes
  - Fallow is better than cover crop
  - Sorghum is better than corn

Excessive moisture coupled with hurricane force winds. Abiotic disorder that mimics foliar pathogen.

Powdery Mildews: Management

- Purely cosmetic, but annoys nursery personnel.
- Rarely kills/affects infected trees.
- Fungicides available, but leaves will fall off prior to lifting.
- Is the cost (fungicides) worth the benefit (feeling better)?