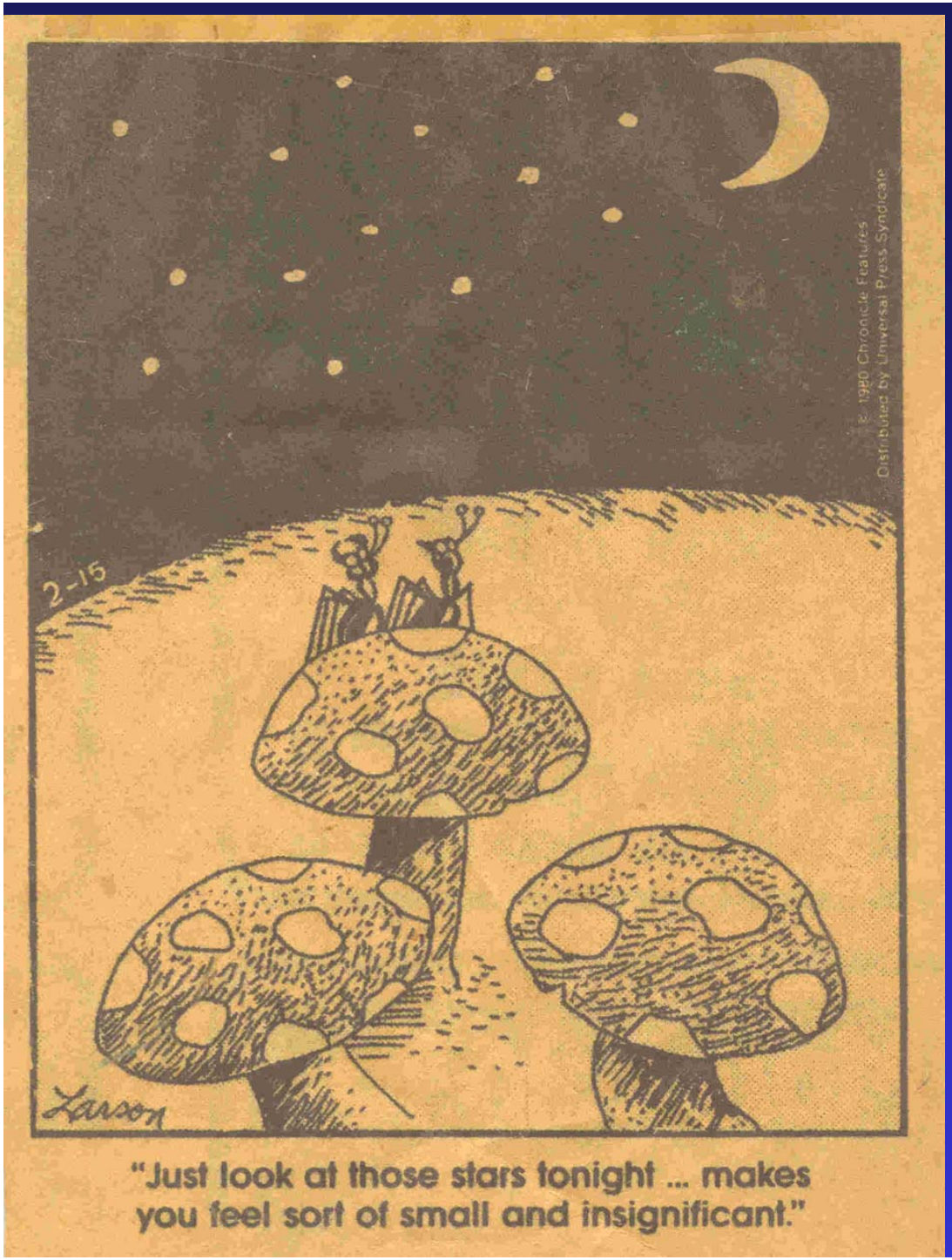
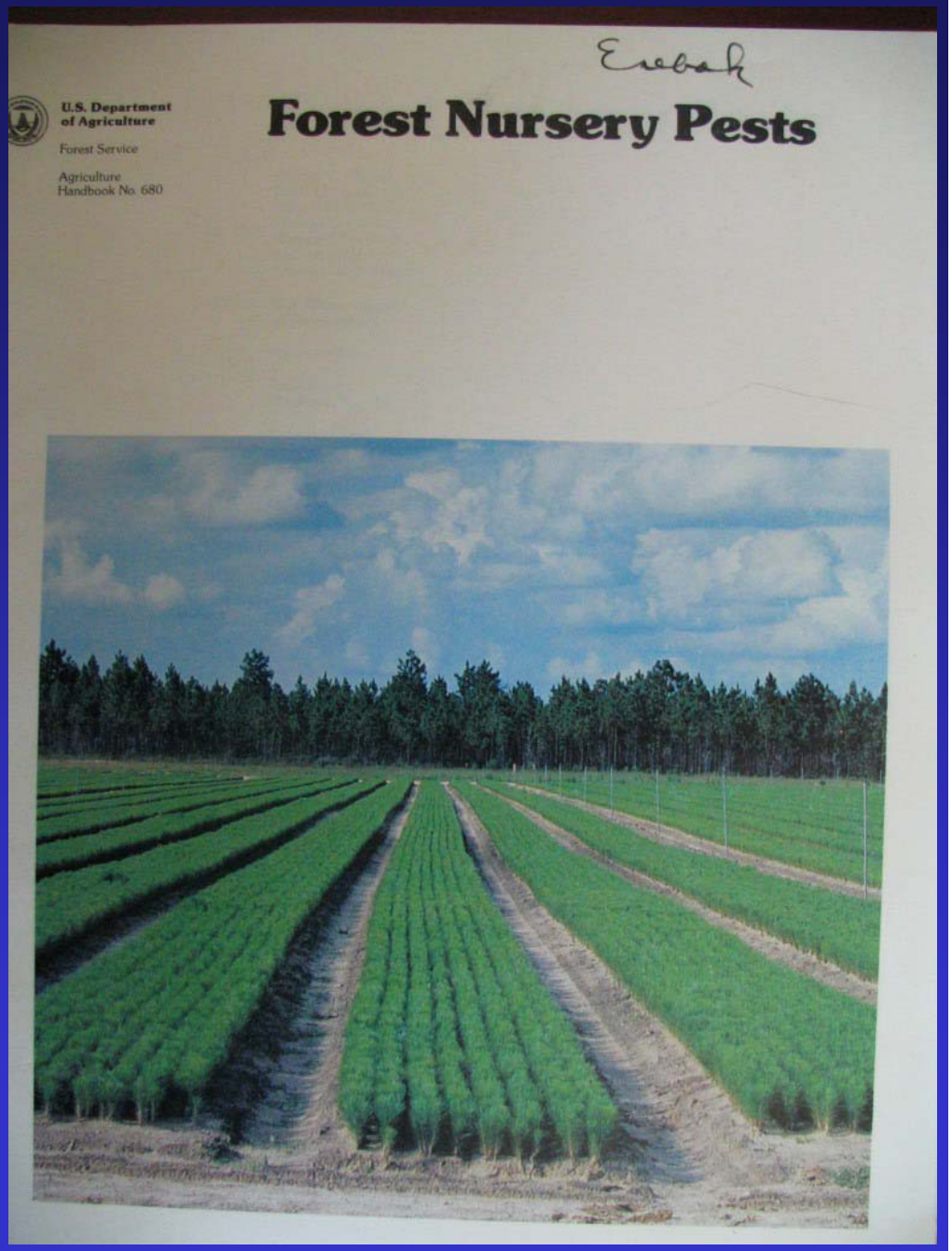


Nursery Diseases

Reference

Forest Nursery Pests

USDA Forest Service Ag Handbook 680



Plant Pathology

– Pathogen:

– Parasite:

– Saprophyte:

– Symbiosis:

- Obligate Facultative:

- Obligate parasite:

- Facultative parasite:

- Obligate saprophyte:

- Facultative saprophytes

DISEASE = IMPARED PHYSIOLOGY

- Signs and Symptoms of Disease
  - Signs
  - Symptoms

Symptoms of Disease

– Necrosis

– Decay

– Cankers

– Leaf spots

- Wilts

- Blights

- Hypertrophy

- Atrophy

- Physiology

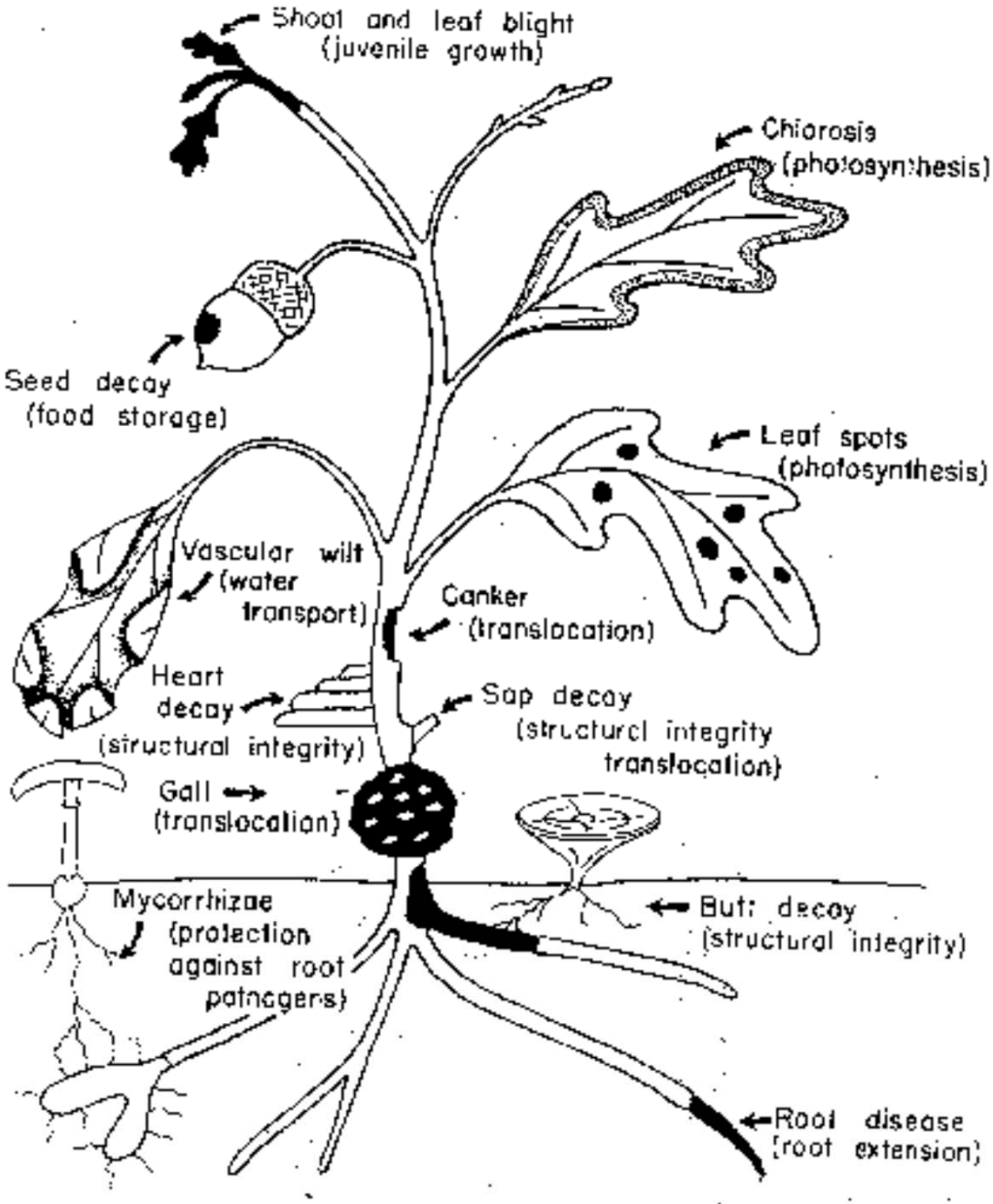


FIGURE 2.3 Schematic representation of the effects of diseases on tree health, showing the vital functions of a tree and their impairment by various types of pathogenic influences.

Principals of Disease Prevention

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

Agents of Plant Disease in Forest Tree Nurseries

- Fungi are the big 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

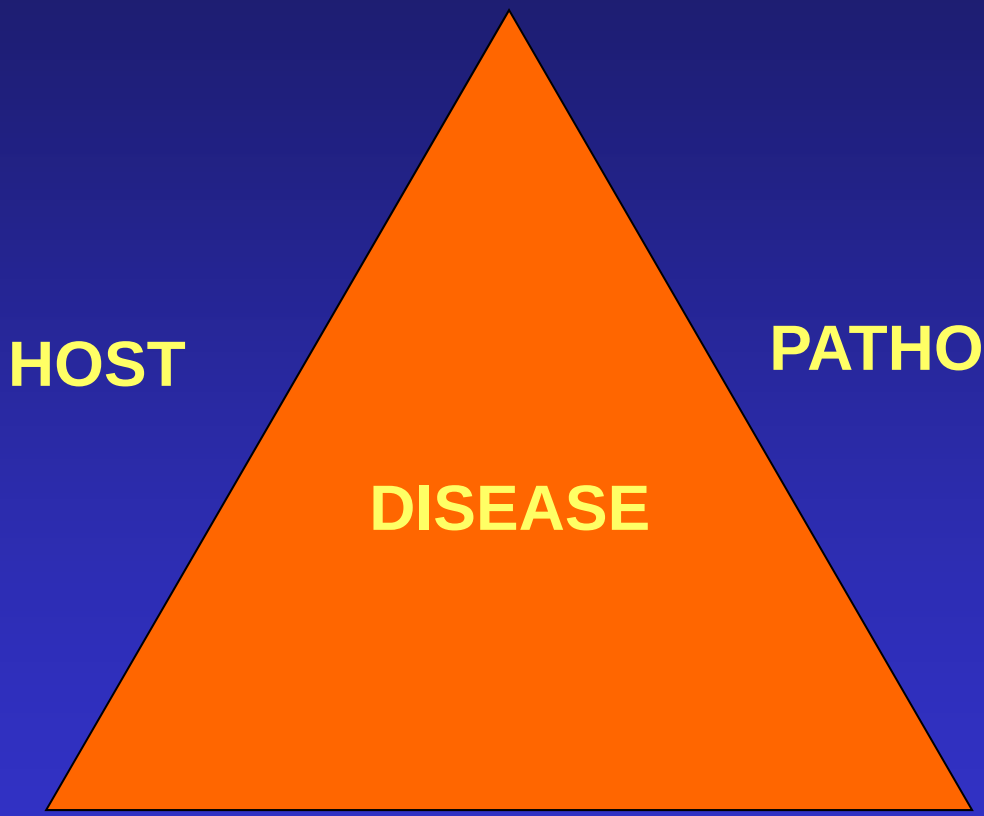
  plural = Hyphae
- Propagate via spores

KOCH'S RULES OF PROOF

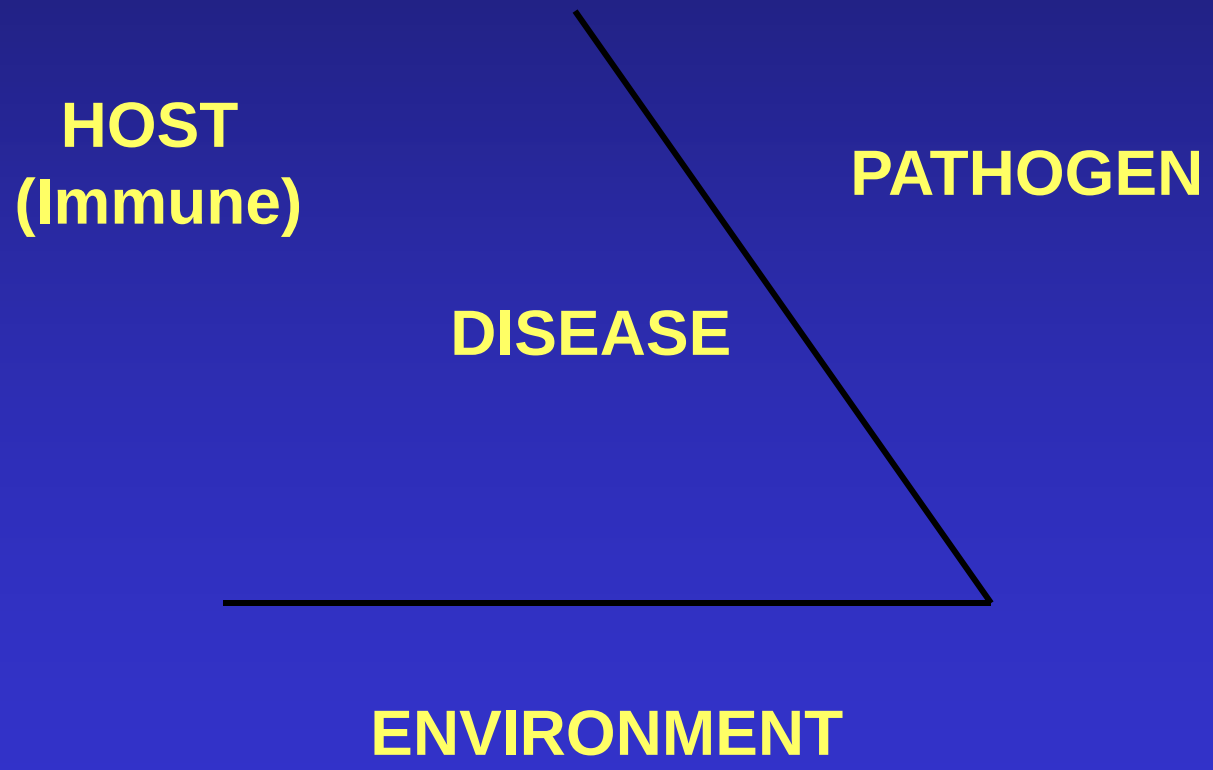
Proof of Pathogenicity

1. **The pathogen must be associated with the disease in all the symptomatic plants examined.**
2. **The pathogen must be isolated and grown in pure culture on nutrient media and its characteristics described.**
3. **The pathogen in pure culture must be inoculated into healthy plants of the same species and produce the same symptoms in the diseased plants in No. 1**
4. **The pathogen must be re-isolated from inoculated plants and grown in pure culture again and its characteristics must be like those described in No. 2**

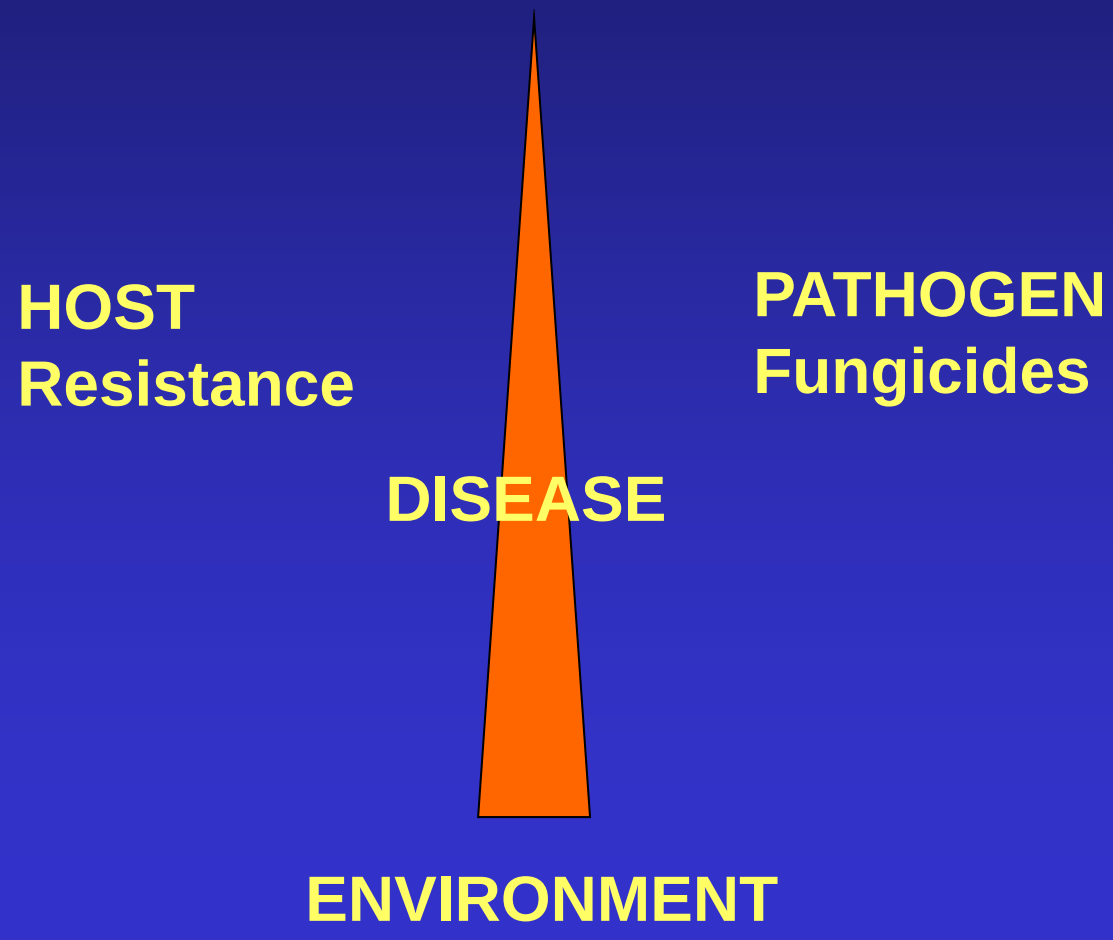
THE DISEASE TRIANGLE



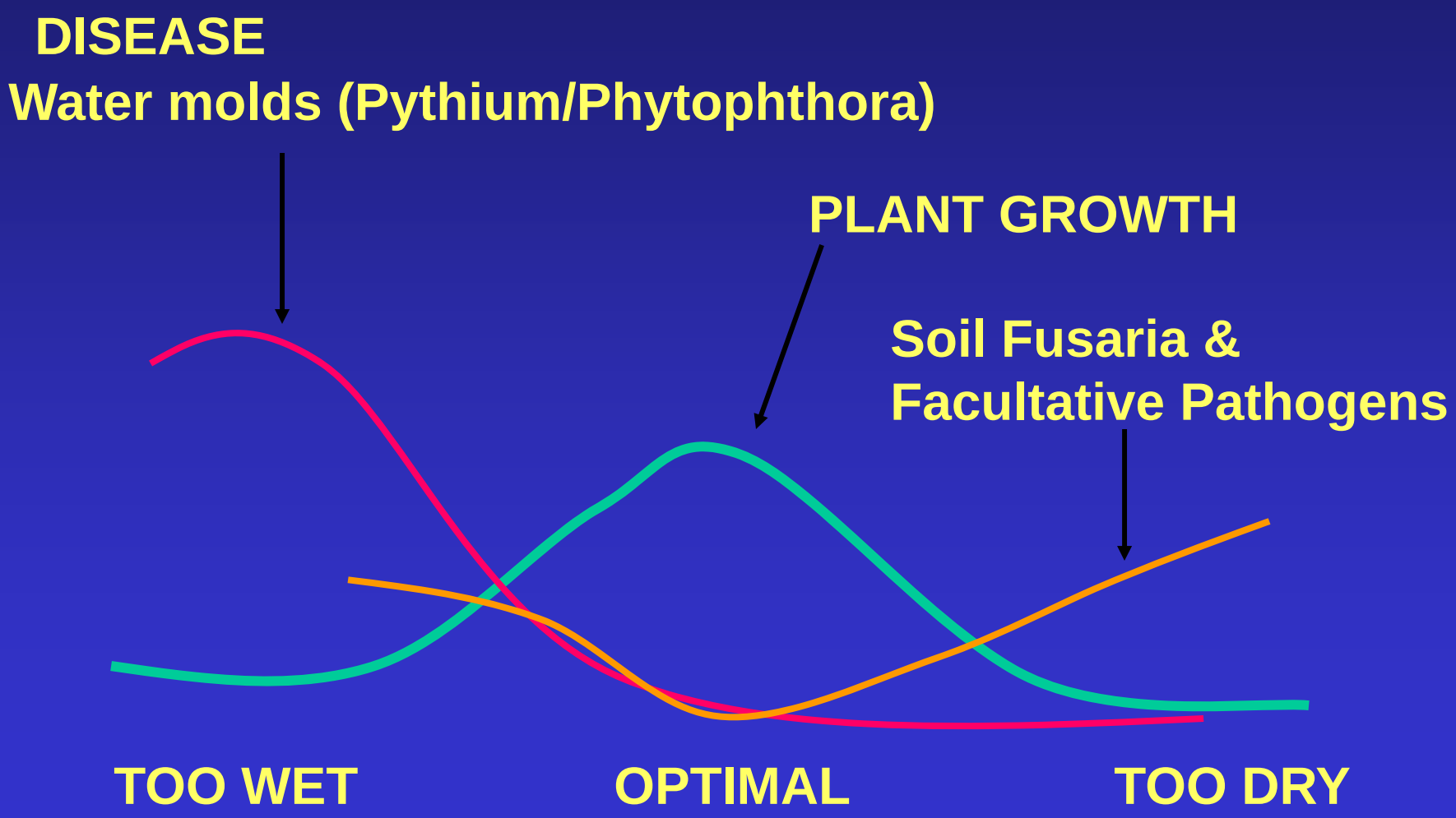
THE DISEASE TRIANGLE



THE DISEASE TRIANGLE FOR A PATHOGEN LIKE A RUST

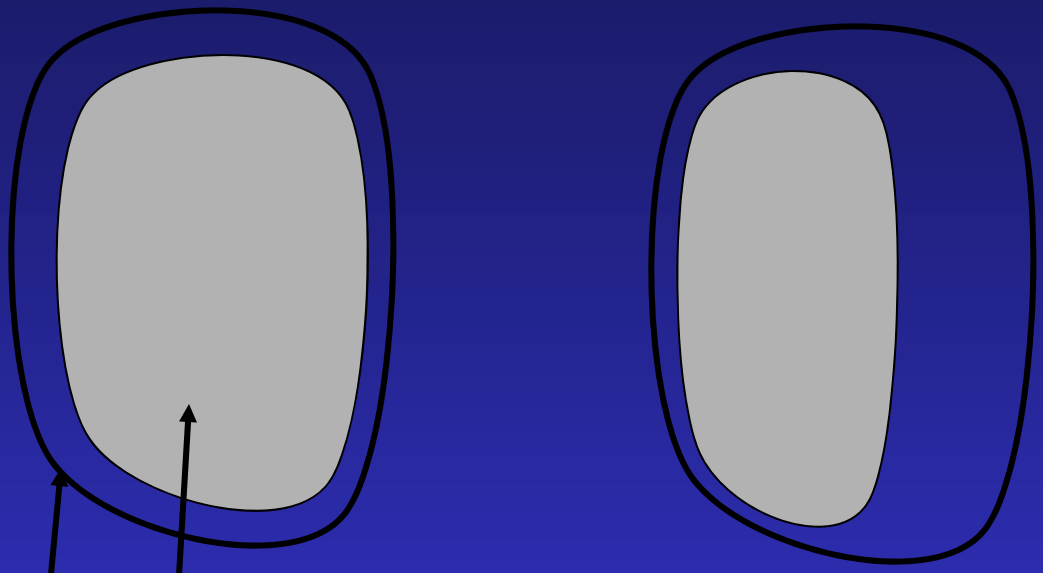


EFFECTS OF SOIL MOISTURE ON DISEASE POTENTIAL and PLANT GROWTH



Healthy / full turgor

Plasmalized



The plasmalized cell is predisposed to penetration by fungi

Plasma membrane with cytoplasm inside

Primary cell wall

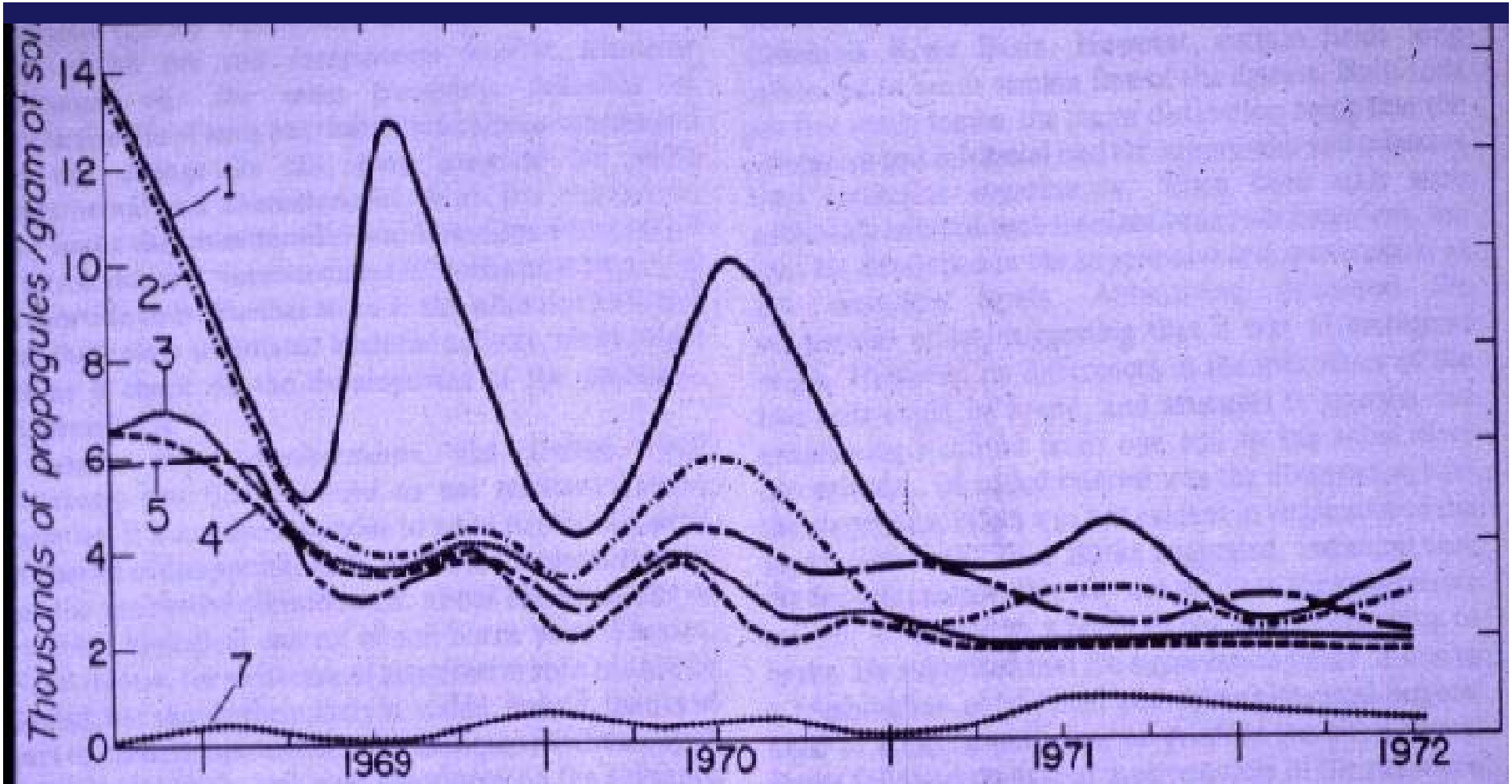
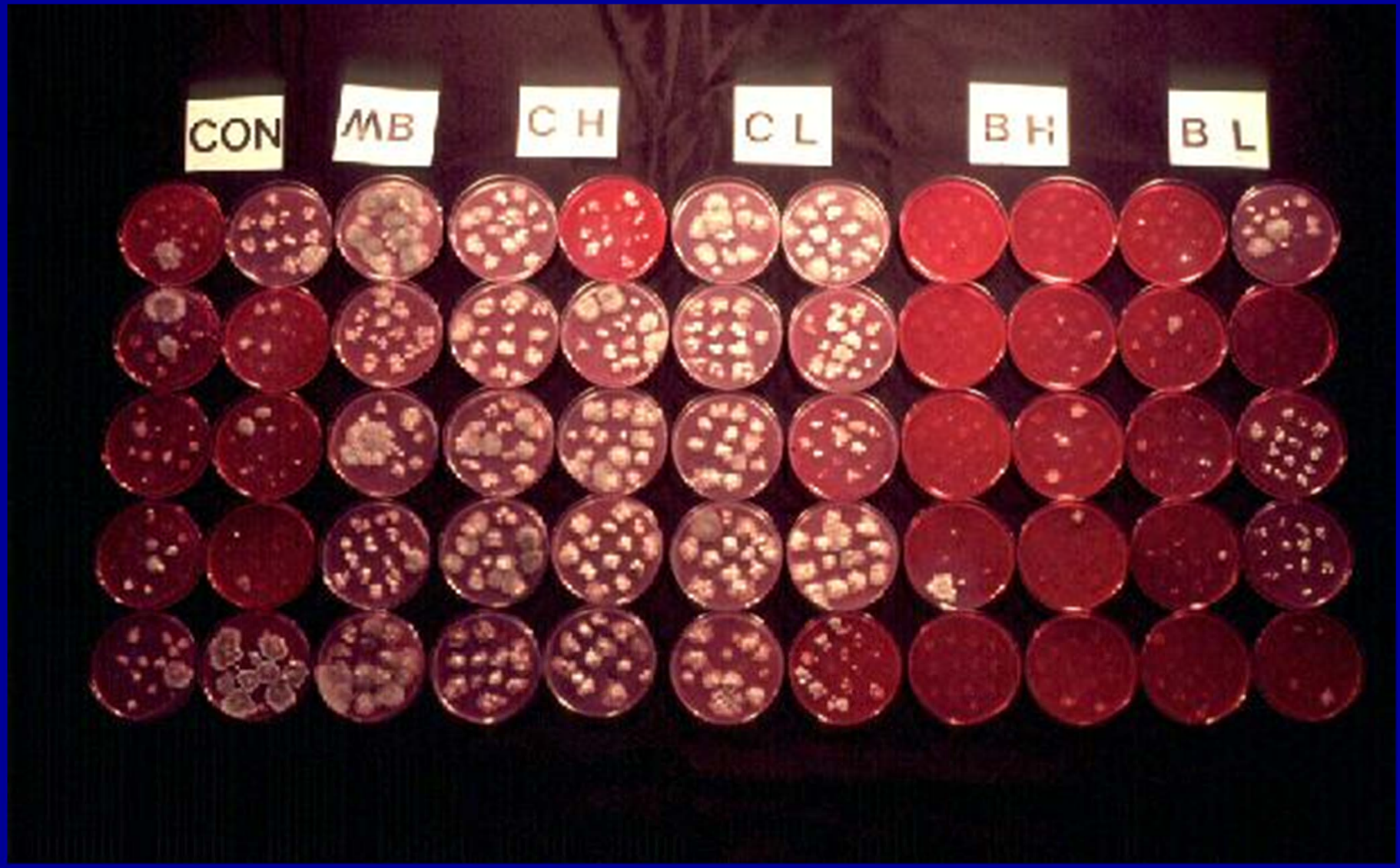


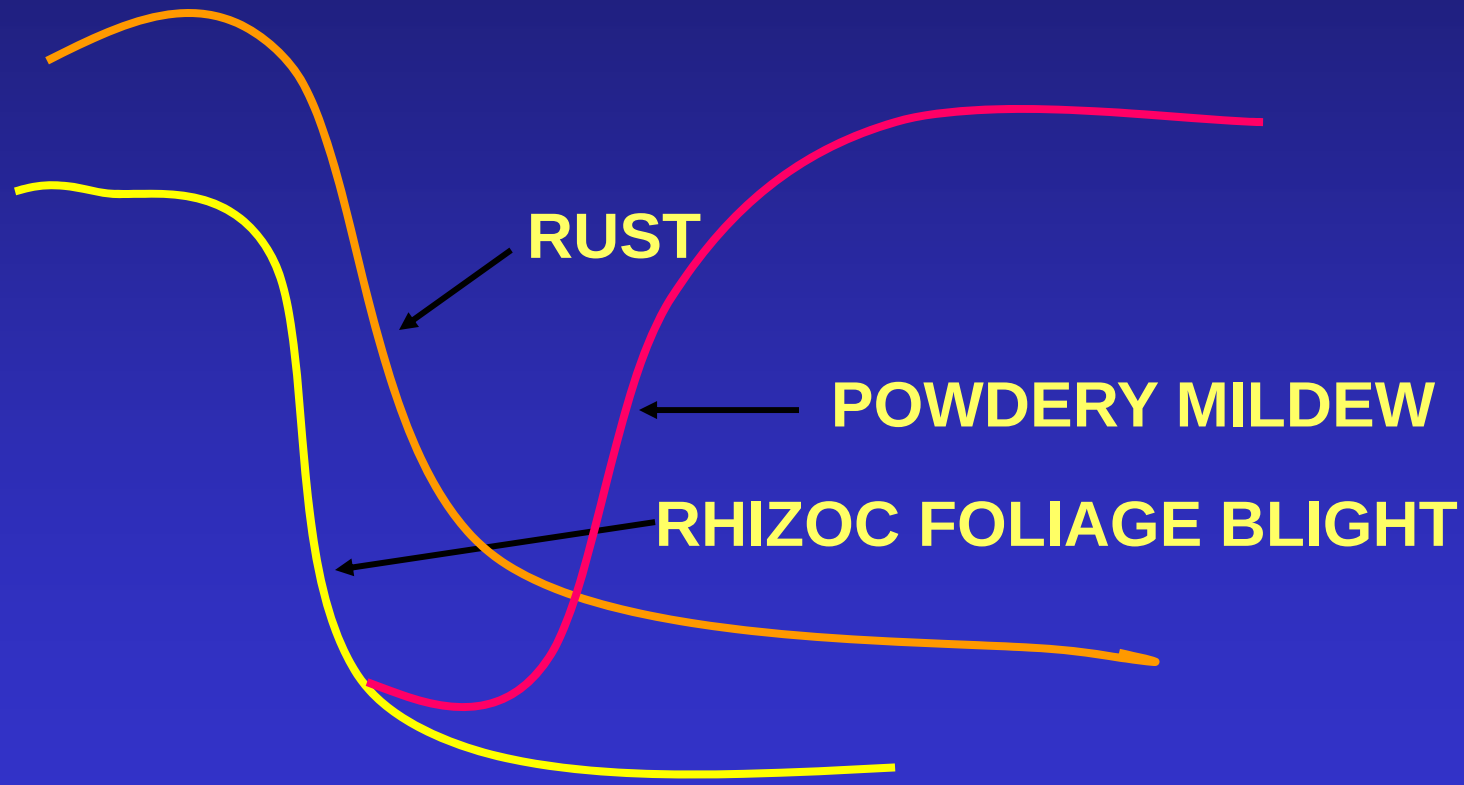
Fig. 1. Fluctuations of *Fusarium* populations in forest and nursery soils. Numbers on curves refer to soil types and treatments as follows: *1)* nursery soil left at nursery undisturbed, kept uncovered, *2)* nursery soil left at nursery, undisturbed, covered with 15-cm layer pine needles, *3)* nursery 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



Rhizoctonia without and with Trichoderma

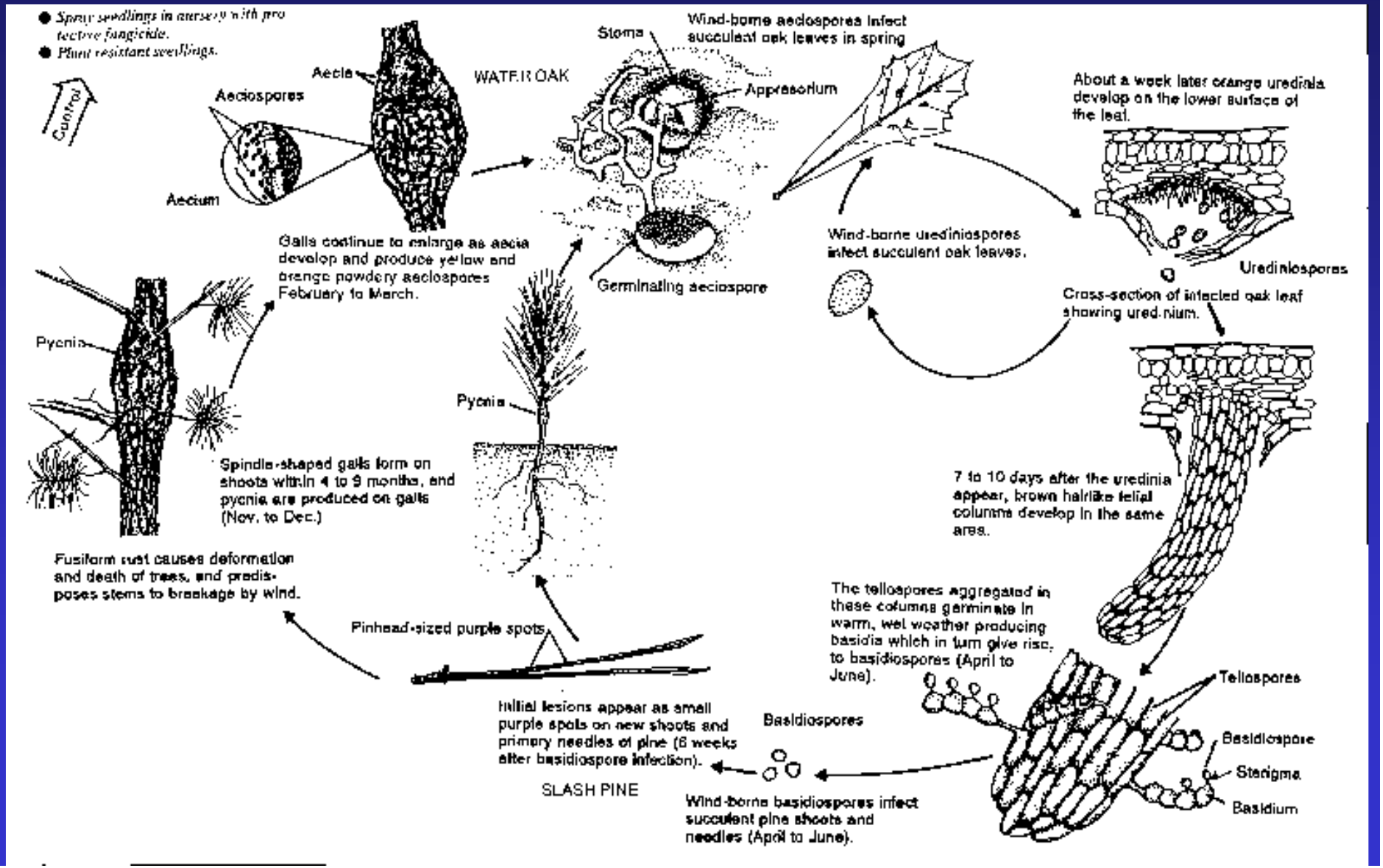
EFFECTS OF FOLIAGE MOISTURE ON DISEASE POTENTIAL OF THREE PATHOGENS

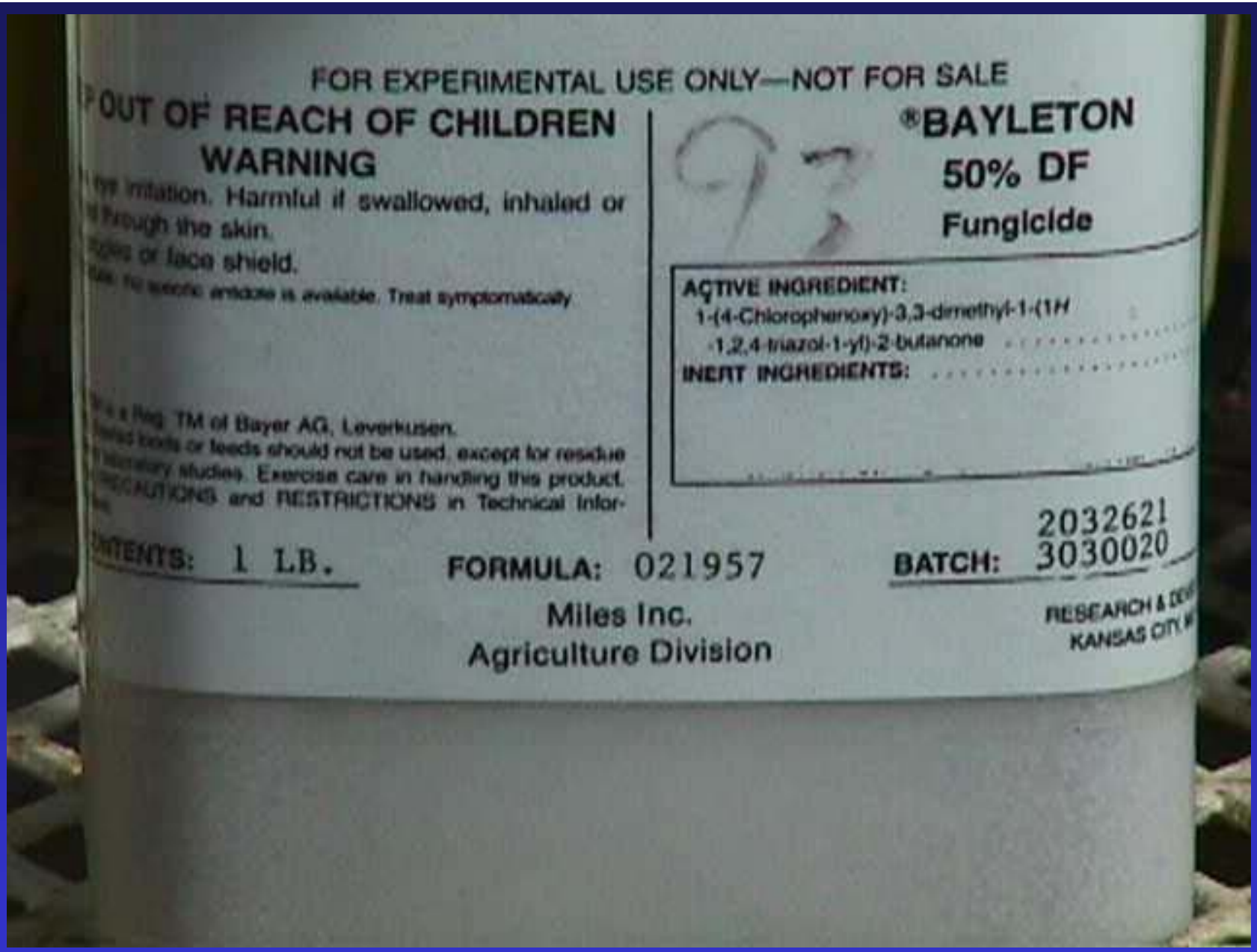


HRS/ DAY 24 20 12

Fusiform rust

Cronartium quercuum f.sp. *fusiforme*





Triadimefon - Bayleton

Fusiform rust

Cronartium quercuum f.sp. *fusiforme*

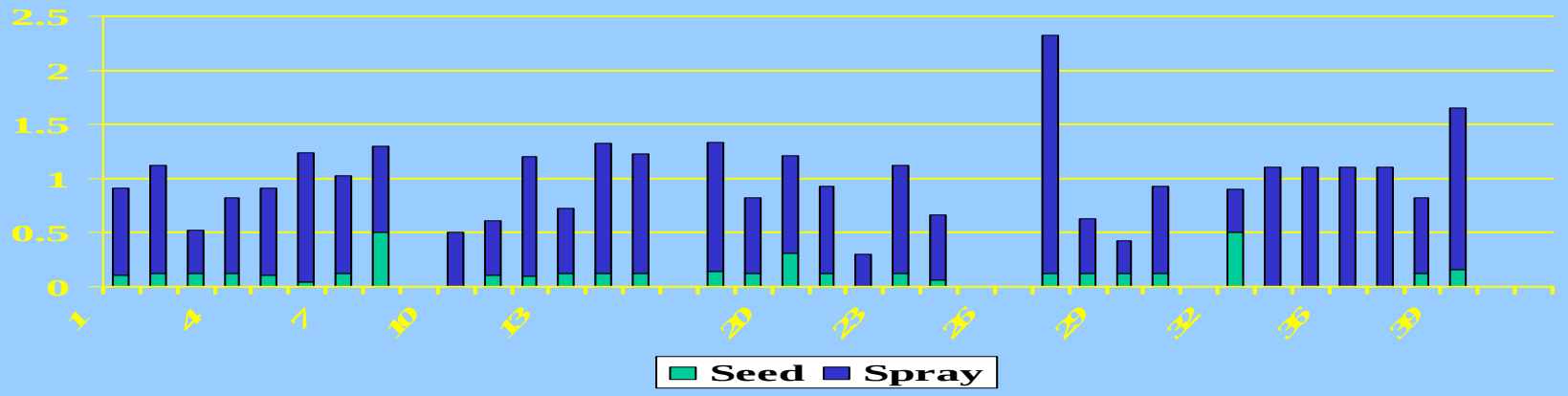
Seed treatment:
Bayleton & Thiram at time of sowing

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

Bayleton & Thiram

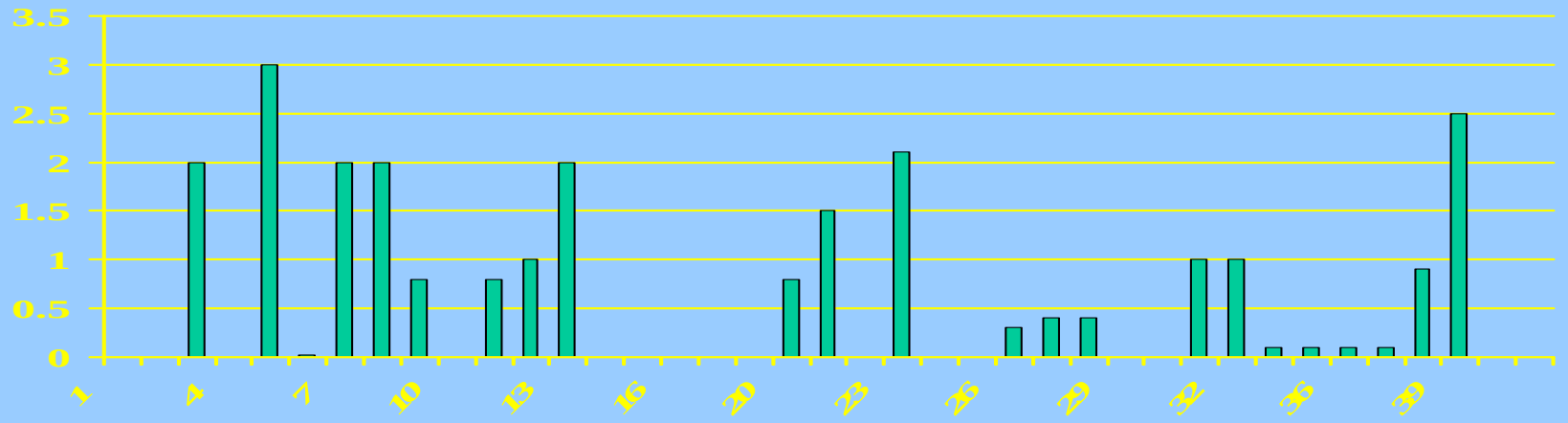
lbs ai/100 lbs & /ac

Bayleton



lbs ai / 100 lb seed

Thiram



Rhizoctonia needle blight

Rhizoctonia solani

“Disease-Free” Nursery Beds

Rhizoctonia within Seedling Rows

Rhizoctonia “appearing” after top clipping

Hyphae – fungal threads of Rhizoctonia

Rhizoctonia Blight: Management

- **Fumigation appears to affect incidence and severity.**
- **Moisture and stand density related to disease.**
- **Fungicides can be used to control pathogen; iprodinone, fludioxonil & azoxystrobin (RR 03-04)**

Other Diseases:

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

Disease control other than rust