

General Master Gardener Training

1

Plant Diseases

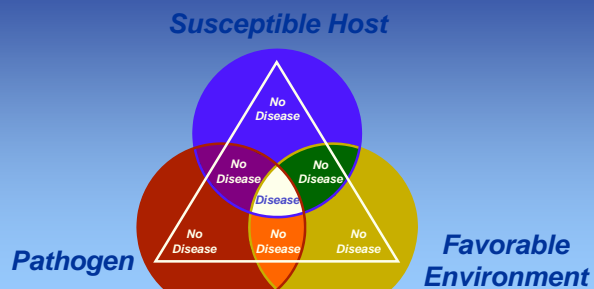
Brian D. Hudelson
Department of Plant Pathology
University of Wisconsin-
Madison/Extension



© 2005-2017 by the Board of Regents of the University of Wisconsin System doing business as the Division of Cooperative Extension of the University of Wisconsin-Extension

Plant Diseases The Disease Triangle

2



© 2005-2017 by the Board of Regents of the University of Wisconsin System doing business as the Division of Cooperative Extension of the University of Wisconsin-Extension

Plant Diseases Causes of Plant Diseases

3

- **Fungi/Fungi-Like Organisms**
- **Bacteria**
- **Viruses**
- **Nematodes**
- **Phytoplasmas**
- **Abiotic factors**

© 2005-2017 by the Board of Regents of the University of Wisconsin System doing business as the Division of Cooperative Extension of the University of Wisconsin-Extension

Plant Diseases Fungi/Fungi-Like Organisms

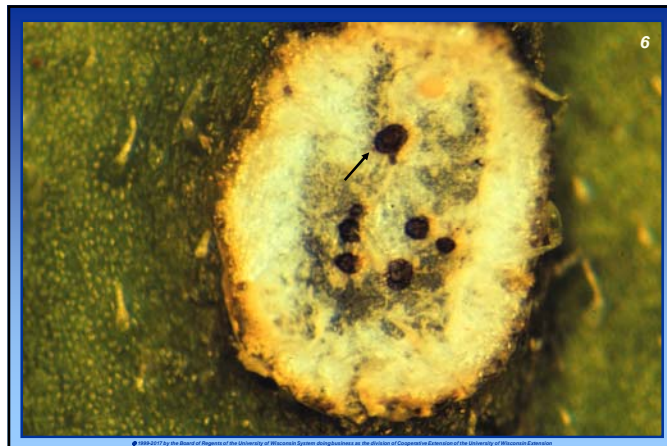
4

- **Largest pathogen group**
- **More than 8000 pathogenic species**
- **Can be seen with the naked eye**
- **Vegetative growth through production of multicellular fungal threads (hyphae)**
- **Reproduce via spores**

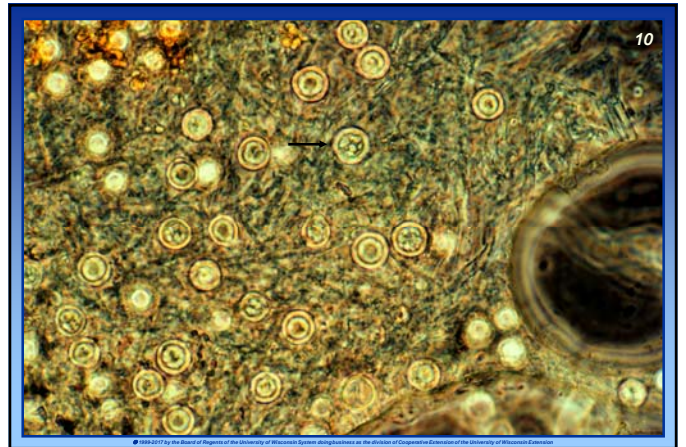
© 2005-2017 by the Board of Regents of the University of Wisconsin System doing business as the Division of Cooperative Extension of the University of Wisconsin-Extension

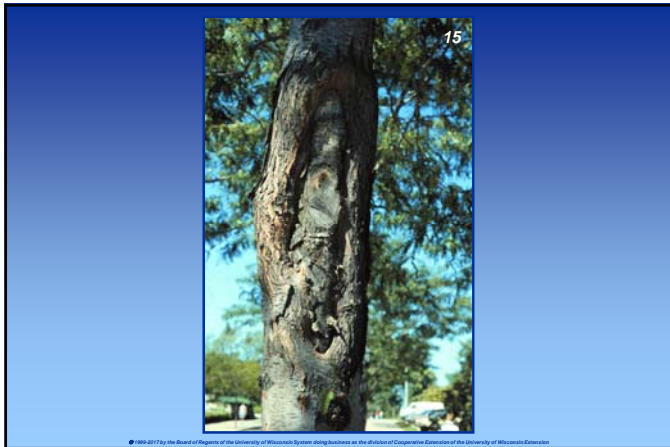
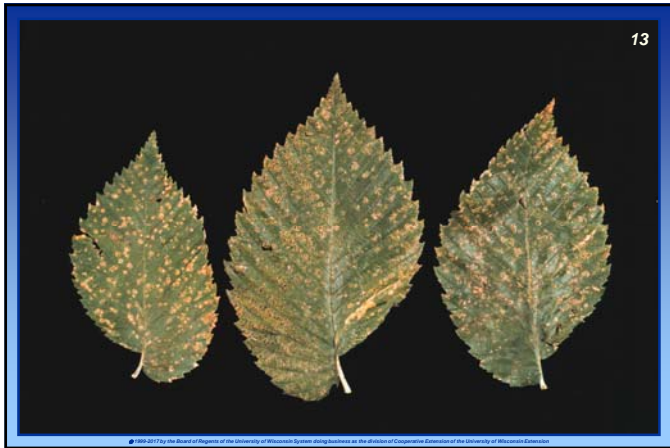


© 2005-2017 by the Board of Regents of the University of Wisconsin System doing business as the Division of Cooperative Extension of the University of Wisconsin-Extension



© 2005-2017 by the Board of Regents of the University of Wisconsin System doing business as the Division of Cooperative Extension of the University of Wisconsin-Extension







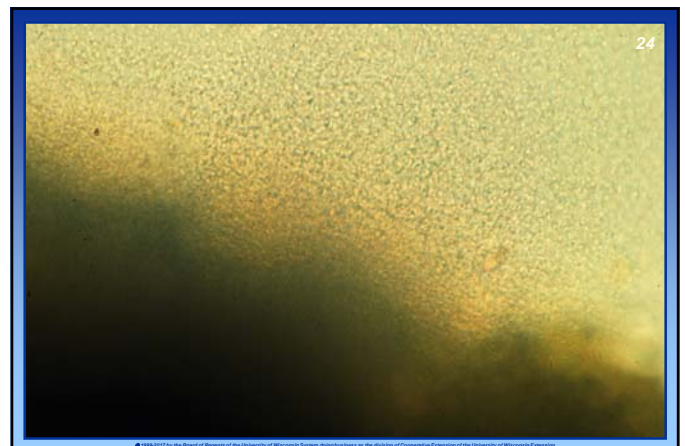
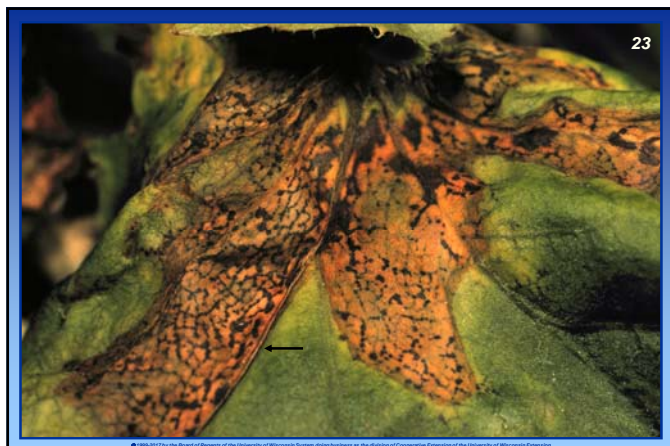
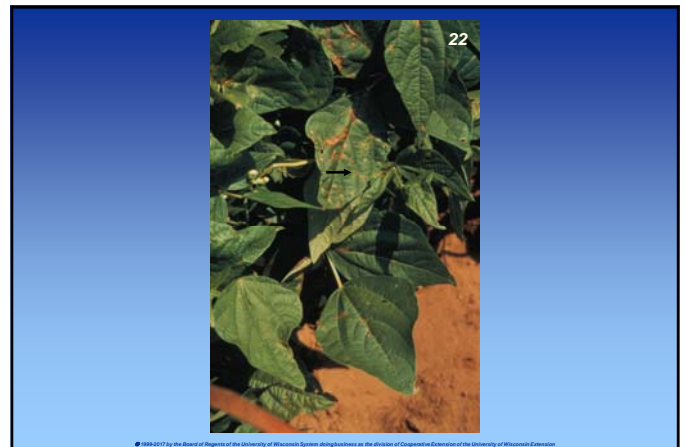
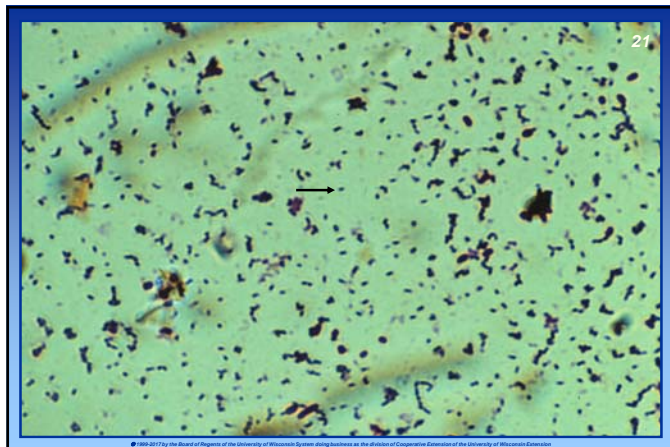
Plant Diseases

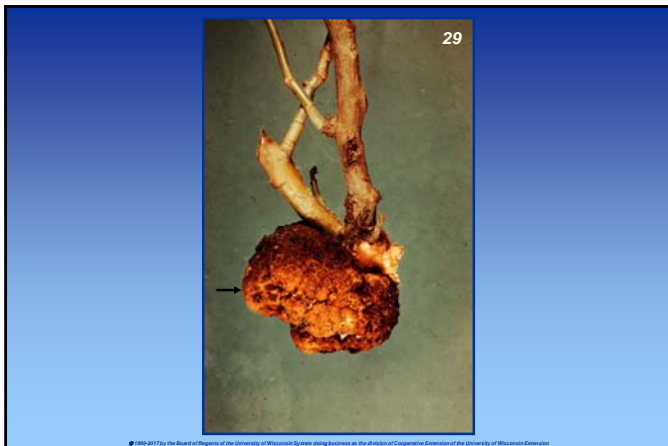
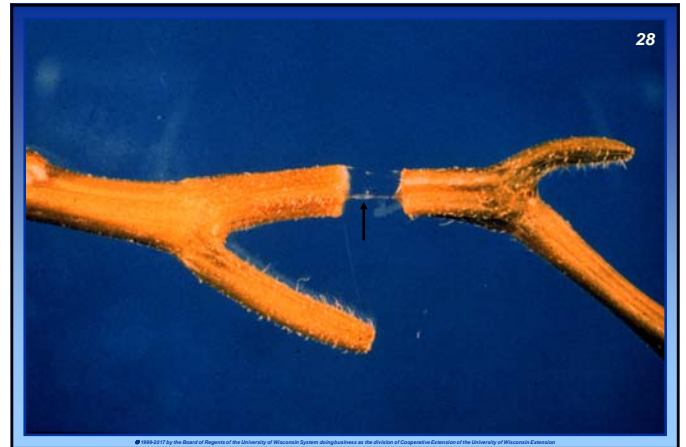
Bacteria

20

- *About 200 pathogenic species*
- *Can be seen with a light microscope*
- *Simple, unicellular*
- *Reproduce by binary fission*

© 1999-2017 by the Board of Regents of the University of Wisconsin System doing business as the Division of Cooperative Extension of the University of Wisconsin Extension





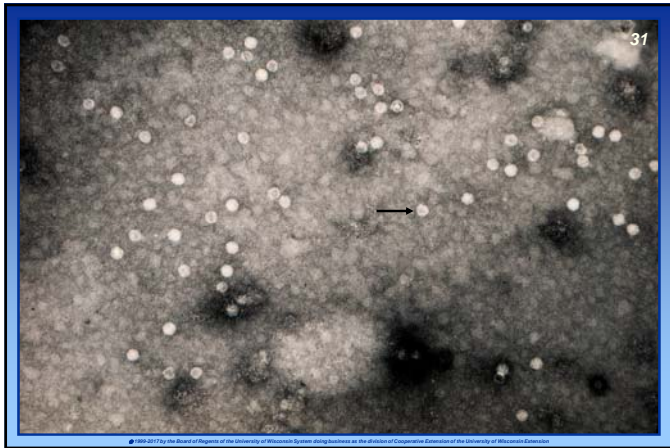
30

Plant Diseases

Viruses

- *Can only be seen using an electron microscope*
- *Extremely simple - nucleic acid with a protein coat*
- *Reproduce by taking over host reproductive machinery*
- *Often associated with insect vectors*

© 1993-2017 by the Board of Regents of the University of Wisconsin System doing business as the division of Cooperative Extension of the University of Wisconsin-Extension



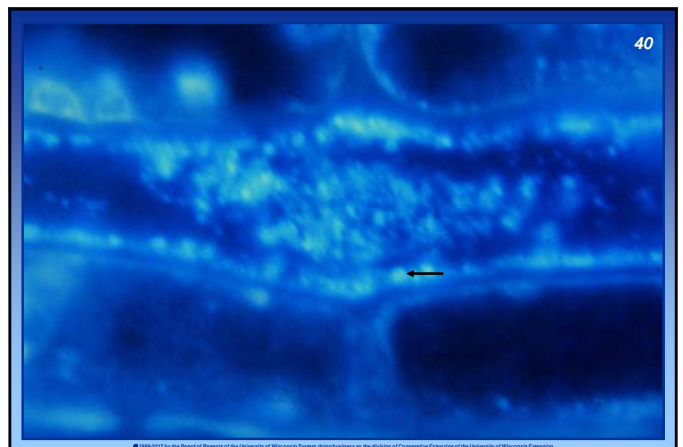


Plant Diseases Phytoplasmas

39

- *Funky bacteria*
- *Small, wall-less*
- *Phloem limited*
- *Usually seen only with an electron microscope*
- *Reproduce by binary fission*
- *Transmitted by insects (leafhoppers)*

© 1993-2017 by the Board of Regents of the University of Wisconsin System, doing business as the Division of Cooperative Extension of the University of Wisconsin Extension





45

Plant Diseases

Nematodes

- *Parasitic worms*
- *Very complex compared to other pathogens*
- *Usually seen only with a light microscope*
- *Reproduce by eggs*



Plant Diseases Abiotic Factors

49

- *Nutritional abnormalities*
- *Pesticide exposure*
- *Environmental pollutants*
- *Adverse weather conditions*

© 1999-2017 by the Board of Regents of the University of Wisconsin System doing business as the Division of Cooperative Extension of the University of Wisconsin-Extension



© 1999-2017 by the Board of Regents of the University of Wisconsin System doing business as the Division of Cooperative Extension of the University of Wisconsin-Extension



© 1999-2017 by the Board of Regents of the University of Wisconsin System doing business as the Division of Cooperative Extension of the University of Wisconsin-Extension



© 1999-2017 by the Board of Regents of the University of Wisconsin System doing business as the Division of Cooperative Extension of the University of Wisconsin-Extension



© 1999-2017 by the Board of Regents of the University of Wisconsin System doing business as the Division of Cooperative Extension of the University of Wisconsin-Extension



© 1999-2017 by the Board of Regents of the University of Wisconsin System doing business as the Division of Cooperative Extension of the University of Wisconsin-Extension





Plant Diseases Cultural Control

63

- **Avoid pathogens**
 - Buy seed from a reputable source
 - Inspect plants prior to purchase for above and below ground pathogens/diseases
 - Inspect plants for insect pests
 - Control alternate hosts
 - Use non-contaminated water

Plant Diseases Cultural Control

64

- **Avoid conducive environmental conditions**
 - Moderate soil moisture
 - Reduce humidity
 - Have balanced nutrition
 - Prevent water/heat stress
 - Be aware of activities surrounding your plants

Plant Diseases Cultural Control

65

- **Sanitation**
 - Disinfest tools
 - Adequately clean pots and benches
 - Pasteurize soil prior to use
 - Decontaminate recycled water
 - Remove diseased plants promptly
 - Remove senescent plant parts promptly

Plant Diseases Chemical Control

66

- **Protectant fungicides/bactericides**
- **Systemic fungicides/bactericides**
- **Fumigants**

Plant Diseases Chemical Control

67

- *Use registered/labeled materials only*
- *Use products safely*
- *Get training*

© 1998-2017 by the Board of Regents of the University of Wisconsin System doing business as the Division of Cooperative Extension of the University of Wisconsin-Extension

Plant Diseases Biological Control

68

- *Disease resistance*
- *Biological pesticides*
 - *Plant extracts*
 - *Antagonistic microorganisms*

© 1998-2017 by the Board of Regents of the University of Wisconsin System doing business as the Division of Cooperative Extension of the University of Wisconsin-Extension

Plant Diseases Where to Go for Help

69

***Plant Disease Diagnostics Clinic
Department of Plant Pathology
University of Wisconsin-Madison
1630 Linden Drive
Madison, WI 53706-1598
(608) 262-2863
bdh@plantpath.wisc.edu
<http://pddc.wisc.edu>
Follow on Facebook and Twitter @UWPDDC***

© 1998-2017 by the Board of Regents of the University of Wisconsin System doing business as the Division of Cooperative Extension of the University of Wisconsin-Extension

Plant Diseases Where to Go for Help

70

***Soil and Forage Analysis Laboratory
2611 Yellowstone Drive
Marshfield, WI 54449
(715) 387-2523
<http://uwlabs.soils.wisc.edu>***

© 1998-2017 by the Board of Regents of the University of Wisconsin System doing business as the Division of Cooperative Extension of the University of Wisconsin-Extension