

Laboratory 11 Study Guide (video: 1 hour 58 minutes)

Errata: The feast of Robigalia to thwart rust epidemics in Rome was held in April (April 25, to be exact) rather than August.

Study Questions

1. You should know all the spore stages of a typical macrocyclic, heteroecious rust such as wheat rust.
2. Which rust stages are capable of infecting the same host species as the one from which they originated?
3. Why does coffee rust have only one host, i.e. coffee? What is the alternate host of wheat rust?
4. What is the significance of the Mediterranean East winds?
5. How are urediospores transported? Why are they echinulate (i.e. covered with tiny spines)?
6. Why was barberry eradication such an important component in the control of wheat rust?
7. What type of symptoms do rusts cause? What are sori and what do they contain?
8. In regard to the coffee and wheat rusts, what historical significance did they have?
9. What types of tissues do the rusts, smuts, and leaf curls generally infect? Juvenile or more mature tissue?
10. What is the dikaryotic condition? How does it apply to the rust fungi? At what part of their life cycle do the rust fungi undergo plasmogamy, (but not karyogamy)?
11. Which rust spore stage/s is/are polycyclic/monocyclic?
12. The fusiform rust is considered to be much more damaging on pines than its alternate host, oak. Why? Also, it causes much more serious economic loss on seedling pines than adult ones. Why?
13. What types of symptoms do smuts cause? What types of host tissues are involved?
14. Precisely when in the life cycle do the *Ustilago* smuts become dikaryotic? *Tilletia* smuts?
15. Are the smut fungi as toxic as the ergot fungi and some of the species of *Fusarium* that contaminate stored grain?
16. Are the smut fungi mono- or polycyclic? How do they compare in this respect to the rust fungi?
17. Are protective foliar fungicides likely to be effective against the smut fungi? If so, why? If not, why?
18. What fungal structures are responsible for the dusty, black masses characteristic of the smut fungi?
19. What types of plants do the smut fungi generally infect?
20. The leaf curl fungi tend to be more serious problems during unusually cool growing seasons than in much hotter ones? Why? Are there many cycles throughout the growing season?

Key Words

Aecium (-ia)
Aeciospore
Autoecious (or monoecious)
Basidium (-ia)
Basidiospore)
Barberry (European)
Cedar apple rust
Coffee rust (*Hemileia vastatrix*)
Corn smut (*Ustilago maydis*)
Dikaryon
East wind
Fusiform rust (*Cronartium quercuum*)
Heteroecious
Hyphal anastomosis
Karyogamy
Leaf curl fungi (*Taphrina* and *Exobasidium*)
Macrocyclic (long-cycle)

Microcyclic (short cycle)
Monocyclic
Monoecious (or autoecious)
Peach leaf curl (*Taphrina deformans*)
Plasmogamy
Polycyclic
Primary cycle (in rusts)
Puccinia graminis
Robigus
Secondary cycles (in rusts)
Smut
Sorus (-i)
Spermogonium (-ia)
Spermatium (-ia)
Stinking smut (*T. foetida*)
Teliospore
Tilletia smuts
Urediospore
Uredium (-ia)
Ustilago smuts
Wheat rust (*P. graminis*)