

Lecture 10 Study Guide (video: 40 minutes)

Note: disregard the lecture on disease control that follows this one (genetics)

Study Questions

1. Compare and contrast vertical and horizontal resistance. Which, over the long run, is preferable, and why? How does this apply, for example, to peanut seed production?
2. What is gene erosion? How does this concept apply to us in relation to genetic resources where such crops as wheat, potato, rice, and maize originate?
3. Norman Borlaug, who won the Nobel Peace Prize for his work on improving wheat yields in low-income countries, is sometimes vilified for his efforts. Why?
4. What is meant “avirulence”? Under what specific conditions is a plant cell with protein receptors in its membrane likely to be resistant to pathogens with “avirulence” (i.e. “Achilles heel”) genes? (See Agrios Figure 6-7.)
5. In the race for producing new, self-beneficial mutants, which invariable has “the edge,” pathogens or their hosts? Why?
6. What do the words “phenotype” and “genotype” mean? How do these terms relate to the control of plant diseases?
7. The lay public often assumes that high-technology research will invariably save the day as current human populations continue to increase towards their Malthusian limits. What are some of the shortcomings or limitations of such research? Conversely, do you think high technology research will be humankind’s panacea?

Key Words

Apparent resistance
Avirulence (*avr*) genes
Borlaug, Norman
Centers of origin (for wheat, rice, maize, potato, rubber, coffee)
Composite lines (esp. peanut)
Disease escape
“Frankenfoods”
Gene-for-gene concept
Genetic engineering
Genetic erosion
Genotype
Green Revolution
Horizontal (multigenic) resistance
Hypersensitive resistance
Nonhost resistance
Phenotype
Protoplast fusion
Tissue culture
Ti plasmid (*Agrobacterium tumefaciens*)

Tolerance
True resistance
Vertical (monogenic) resistance