

Lecture 6 Study Guide (video: 50 minutes)

ERRATA: Late in this lecture, as the ELISA test is being diagramed, the term "antibody conjugate" is wrongly applied. The term should be "enzyme substrate" instead. The "antibody conjugate" is an antibody molecule to which an enzyme molecule is attached, whereas the "enzyme substrate" is the chemical that reacts with the conjugated enzyme.

Study Questions

1. Which two groups of viruses have no natural vectors, yet are readily transmitted from plant to plant because they occur in high concentrations in their hosts and are extremely stable? If no natural vector is involved, what does transmit these viruses?
2. What does mechanical transmission refer to, and why is carborundum commonly used to facilitate it?
3. Tomatoes are grown both in South and North Florida; yet, geminiviruses cause the most damage in the south, whereas tomato spotted wilt is most common in the north. Why? Similarly, why is tobacco rattle virus ("corky ringspot") common only on potatoes grown in the Hastings area?
4. There are three types of mite that can infest crops. Of these, which one can transmit virus? Which two can induce systemic feeding damage that resembles virus symptoms? Where do spider mites (tetranychids) fit in, if at all?
5. Most suctorial insects belong to the order Hemiptera, which is subdivided into of two suborders, Homoptera and Heteroptera. Are Heteropterous insects likely to be important virus vectors? Homopterous ones?
6. What plant tissues are involved when suctorial insects acquire and transmit persistent viruses? Nonpersistent ones? How do the terms "persistent" and "nonpersistent" relate to "stylet-borne" and "circulative"?
7. How are specific viruses identified? In this regard, how can symptom expression and serology be helpful?
8. What are antigens? Antibodies? Antisera? In relation to plant virus serology, which are derived from plants? Animals?
9. What term is used to describe the act of separating virus proteins from plant proteins as a prerequisite to obtaining diagnostic antiserum?
10. What does the acronym "ELISA" mean? How does this test work? What is an enzyme conjugate? Enzyme substrate?

Key Words

Antibodies (produced in animals, esp. rabbits)
Antibodies (present in plants?)
Antigen
Antiserum (to specific plant viruses)
Aphids (as vectors of persistent and nonpersistent viruses)
Beetles (as virus vectors)
Carborundum (as an abrasive)
Dorylaim nematodes (as vectors of tobacco rattle virus in Hastings FL)
ELISA (enzyme linked immunosorbent assay)
Epidermis (where nonpersistent viruses are acquired by aphids)
Eriophyid mites (as vectors of certain plant viruses)
Heteroptera (as suctoral insects that do not transmit plant viruses)
Homoptera (as suctoral insects that transmit many viruses)
Leafhoppers (as vectors of many persistent viruses)
Mechanical transmission
Nematodes (as virus vectors)
Nonpersistent transmission (a.k.a. stylet-borne transmission)
Persistent transmission (a.k.a. circulative transmission)
Phloem (where persistent viruses are acquired by various homoptera)
Potexvirus group (transmission of)
Protein coat (as a virus antigen)
Purification (as a means to separate virus from host protein)
Running out (applied to old vegetatively propagated plant varieties)
Seed transmission (in embryo, in seed coat)
Serology (as a tool for identifying viruses)
Stylet (as applied to nonpersistent viruses)
Suctoral insects (as virus vectors)
Symptoms (as a tool for identifying viruses)
Tarsonemid mites (i.e. broad mites as non vectors of plant viruses)
Tetranychid mites (i.e. spider mites as nonvectors of plant viruses)
Thrips (as vectors of tomato spotted wilt in North Florida)
Virus-like symptoms (induced by some aphids and many eriophyid and tarsonemid mites)
Whiteflies (as vectors of geminiviruses in South Florida)