Study Guide – Citrus Diseases (March 2026)

1. The pathogens associated with citrus foot rot and gummosis are bacteria of the genus *Phytophthora* (choose the correct answer):
   a) True
   b) False

2. Assume that you detect the presence of basal gummosis in a commercial orange orchard in full production. Consider that the orchard is approximately 10 years old, the rootstock is 'Volkamer' lemon, the soil is clayey, and irrigation is localised along the tree row using micro-sprinklers positioned close to the trunks. Indicate, justifying your answer, which protection measures you would recommend to the grower in the short and medium term.

3. Assume that you are responsible for managing an orange orchard (variety maturing between October and March), whose production is intended for the juice concentrate industry, located in the Silves region. What protection strategy would you implement if symptoms of Alternaria brown spot were detected on fruits with a diameter greater than 5 cm, already at the ripening stage?

4. The symptomatology associated with citrus tristeza disease shows variations that may hinder diagnosis at the early stages of infection.
   Which parameters affect the symptom expression of this disease?

5. If citrus tristeza disease is detected in an orange and mandarin orchard in the Algarve region, what advice would you give to the citrus grower regarding the protection strategies to be adopted?

6. Since the insect vector of citrus HLB is already present in Portugal, if the disease is detected in a citrus orchard, what protection measures should be implemented immediately?

Technical Glossary – Citrus Diseases

General and Epidemiological Terms

- **Citrus**
  Fruit crops of the genus *Citrus*, including orange, lemon, mandarin, grapefruit and lime.
- **Pathogen**
  Any microorganism (fungus, bacterium or virus) capable of causing disease in plants.
- **Disease management / protection strategy**
  Set of preventive and curative measures used to reduce disease incidence and severity.
- **Symptomatology**
  The set of visible symptoms expressed by a plant as a result of infection.
- **Vector**
  An organism (usually an insect) that transmits a pathogen from one plant to another.

Soilborne and Trunk Diseases

- ***Phytophthora* spp.**
  A genus of oomycetes responsible for several citrus diseases, including root rot, foot rot and gummosis.
- **Citrus foot rot**
  Disease caused by *Phytophthora* spp., affecting the trunk base and roots of citrus trees.
- **Basal gummosis**
  A disease symptom characterised by the exudation of gum from lesions at the base of the trunk.
- **Gummosis**
  Production and release of gummy exudates from infected plant tissues, often associated with *Phytophthora* infections.
- **Clay soil**
  Soil with high clay content, typically poorly drained and favourable to soilborne pathogens.
- **Rootstock**
  The lower part of a grafted citrus tree, influencing vigour, tolerance to diseases and adaptation to soil conditions.
- **'Volkamer' lemon**
  A citrus rootstock known for high vigour but moderate susceptibility to *Phytophthora* spp.

Foliar and Fruit Diseases

- **Alternaria brown spot**
  A fungal disease caused by *Alternaria alternata* (citrus pathotype), mainly affecting mandarins and some orange cultivars.
- ***Alternaria alternata***
  Fungal pathogen responsible for brown spot symptoms on citrus leaves and fruits.
- **Fruit lesion**
  Necrotic or sunken area on the fruit surface caused by fungal infection.
- **Ripening stage / maturation stage**
  Final phase of fruit development, when colour and internal quality are completed.
- **Fruit diameter**
  A commonly used parameter to assess susceptibility stages and timing of disease management measures.

Viral and Bacterial Diseases

- **Citrus tristeza disease**
  A viral disease caused by Citrus tristeza virus (CTV), affecting tree vigour, productivity and longevity.
- **Citrus tristeza virus (CTV)**
  A phloem-limited virus transmitted mainly by aphids.
- **Symptom expression**
  The way symptoms develop and become visible, which may vary according to host and environmental conditions.
- **Key parameters affecting symptomatology**
  Factors such as citrus species or cultivar, rootstock, virus strain, tree age, nutrition and environmental conditions.

HLB (Huanglongbing)

- **HLB (Huanglongbing) / Citrus greening disease**
  One of the most destructive citrus diseases worldwide, caused by phloem-limited bacteria of the genus *Candidatus Liberibacter*.
- **Insect vector of HLB**
  Psyllid insects responsible for transmitting the HLB pathogen, notably *Trioza erytreae* in Europe.
- **Immediate control measures**
  Urgent actions implemented after disease detection, including tree removal, vector control and movement restrictions.
- **Quarantine measures**
  Phytosanitary actions aimed at preventing the spread of regulated pests and diseases.