

Uncertain Etiology Diseases of the Coconut Palm

KARL MARAMOROSCH

Waksman Institute of Microbiology, Rutgers University, New Brunswick, N. J. 08903, U.S.A.

The present status of rickettsia-like and mycoplasma-like diseases of plants and their relevance to coconut palm diseases will be discussed. Certain plant diseases, earlier grouped together with virus diseases, are caused by viroids, spiroplasma, mycoplasma, or rickettsia-like agents. Electron microscopy techniques have been used in several instances, including coconut lethal yellowing disease, for the visualization of mycoplasma microorganisms. Tetracycline chemotherapy gave additional support to the mycoplasma etiology of lethal yellowing disease. In other instances, electron microscopy revealed the presence of artifacts, or of particles such as phytoferritin. The etiology of Kerala wilt of coconut palms is still uncertain. Interactions between disease agents, plant hosts, and insect vectors can be manipulated so as to prevent spread of diseases, even if the etiology is uncertain.

Discussions

- Carlos : Thank you for suggesting the hypothesis. Rest assured, our colleagues in the Philippines will learn about this. Incidentally, are there known cases indicating that viroids are transmissible?
- Maramorosch : All viroids studied to date have been transmitted mechanically to plants, and none has been transmitted by vectors. For instance, agents of potato spindle tuber and chrysanthemum stunt, both viroids, have no known vectors.
- Chenulu : Do you doubt the etiology of Rickettsia as causal agents of plant diseases even after the work of Windsor and Black on clover club leaf?
- Maramorosch : The clover club leaf, as well as several other RLO associated diseases are definitely caused by the microorganisms found (by electron microscopy observatives) in the phloem. However, the name "Rickettsia" or "RLO" is not correct. These are bacteria as far as could be determined, but none has been identified as members of the Rickettsia. The name was given merely on the

basis of the biological association with insects and inability to culture the RLO in bacteriological media. These characteristics, as well as the rippled cell wall are not adequate systematic characteristics of the genus *Rickettsia*.

- Nirula** : Can you kindly indicate which of the factors responsible for such diseases could be eliminated in case of root (wilt) disease, so that our field of investigation could be narrowed down to fewer factors and we are able to arrive at the conclusion at an early date ?
- Maramorosch** : If the assumption is correct that the disease is infectious and that it is spreading, all that can be suggested at this stage is to consider all known disease agents of plants, as well as possibly new, as yet unknown, agents. A decade ago we did not suspect mycoplasmas, and we did not know of the existence of spiroplasmas or viroids. This possibility—of as yet unknown disease agents—should be kept in mind.
- Mariau** : How can one interpret the 'dosage effect' observed in the two diseases—the increased severity related to the increased number of insects ?
- Maramorosch** : We don't record the insects on a per palm basis, but per 100 seedlings plot. If so happens that insects are more numerous in plots where the incidence of disease is also more. But the number of inspected insects is never very high. For instance, when we count, 50 Delphacidae on 100 coconut palms in two-months period (four records a month), the incidence of dry bud rot is 30%. But, when we record in the same place 10 insects, the incidence is only 20%.