

INSECTS AS PLANT VIRUS VECTORS

Daniel L. Ochoa Martínez

Department of Plant Pathology, Colegio de Postgraduados-Campus Montecillo, México

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Summary

Viruses are the second most important plant pathogens in cultivated crops due to the losses they cause. Up to date, it has not been possible to eliminate selectively viruses from infected plant cells. In agroecosystems, plant viruses are transmitted efficiently by several insects like aphids, whiteflies, leafhoppers, thrips and beetles, aphids being the most important. The insect-plant virus relationship is highly specific so, viruses transmitted by aphids, for example, cannot be transmitted by whiteflies and vice versa. Acquisition and inoculation of viruses by insects vary from seconds to minutes or hours.

1. Introduction

Viruses are submicroscopic particles that are composed by nucleic acid (DNA or RNA) and a protein coat (capsid). Viruses can infect living-organism cells where they replicate themselves (obligate parasites).

Nearly one fourth of the described viruses infect plants causing a biotic disease. Plant viruses are one of the most important pathogens of cultivated plants just after fungi. Almost all plant viruses (76.6%) are single-strand of positive RNA, which acts as messenger RNA that is translated by plant ribosome into proteins. Plant viruses have two basic forms: rod-shaped or filamentous and polyhedral. Rod-shaped virus can be rigid, flexible, and long or short (bacilliform); polyhedral particles result in a spherical appearance. Sometimes two identical polyhedral particles constitute a single virus known as geminate typical of viruses belonging to the family *Geminiviridae*; Bacilliform or polyhedral viruses may be covered by a lipoprotein membrane (enveloped viruses) or not (naked viruses).

Plant viruses are grouped into families, genera and species. Virus species name is formed by three parts: a) common name of host plant (first report of main crop); b) main symptom in the plant host; and c) the word “virus”, all in italics, for example: *Tobacco mosaic virus*, *Tomato spotted wilt virus*) and *Alfalfa mosaic virus*.

In order to infect a host, virus has to get access into the cell cytoplasm. In agroecosystems, plant virus get into the cell by mechanical abrasion (erosion of cell wall), wounds (grafting), parasite plants (dodder), pollen, and insects, acari, nematodes and fungi that transport and introduce virus when they feed on plants, constituting the most important dissemination mechanism of plant virus.

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Biographical Sketch

Daniel L. Ochoa Martínez occupies the professorship of Plant Virology in the Department of Plant Pathology of the Colegio de Postgraduados, Mexico. His main research interests are the management of plant virus diseases by inducing systemic resistance with soil bacteria, actinomycetes and honey bee, among others, as well as to reduce plant virus transmission by insects with several plant extracts.