

Selfish or Selfless: Focus on the Molecular, Biochemical, and Ecological Aspects of Vector-Borne Viruses

Guest Editor



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Message from the Guest Editor

Dear Colleagues,

The global economy suffers an annual loss of around \$220 billion due to plant diseases (FAO). Currently, vector-borne plant viruses are of concern due to their frequent association with epidemic outbreaks in fields. They exhibit diverse modes of transmission and have profound detrimental effects on crop production. Insects, including aphids, thrips, leafhoppers, planthoppers, whiteflies, mites, and mealybugs, can act as virus vectors whose behavior can change in presence of viruses that may lead to either higher or lower virus transmission. On the other hand, plants respond to vector-borne viruses by inducing various defensive responses against both vectors and viruses. Thus, highlighting intricate

interactions between vector, virus, and plants. The arm-race between the pathogenicity induced vector-borne viruses and the host defensive response determines the fate of virus infection in host plants.

Plants have evolved multi-layered defense machinery to counter vector-borne viruses that include (i) basal adaptive plant defense response i.e., plant antiviral RNA silencing (ii) *R*-gene mediated resistance (iii) phytohormone mediated defense, etc. Plants also accumulate various defense chemicals such as nitric oxide (NO), reactive oxygen species (ROS), secondary metabolites, and various defense plant volatiles in response to infection. Moreover, the effect of viruses on secondary metabolism is not limited to only resistant plants. The presence of different variants of viruses can also modulate the secondary metabolism of the susceptible host highlighting their critical role in the host's susceptibility. Besides altering defense response, plant-vector-virus interactions alter nutritional traits of plants by modulating various amino acids level. The advancement of reverse genetic approaches, such as RNA interference and next-generation sequencing, provides new insights into how plants respond to complex interactions of insect vectors and viruses transmitted by them in food web ecosystems. New evidence suggests that the host-virus interaction is not always antagonistic and can change depending upon abiotic conditions, thus, ensures the sustenance of vector-borne virus infection in nature. Understanding various factors that influence plant-vector-virus interactions enables us to develop various sustainable management strategies against vector-borne viruses and boost agricultural productivity and the global economy. The objective of this special issue is to present a collection of both original research and review articles demonstrating recent advancements in the area of plant-vector-virus interactions. The topics of interest for this special issue include (but are not limited to) molecular, biochemical, genetic, ecological, and evolutionary aspects of plant-vector-virus interactions, identification, and analysis of factors affecting these interactions, and advancement of various methodologies for studying these interactions.

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Guest Editors

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