

## **Viroids: Risks for agricultural crops**

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### **ABSTRACT:**

Viroids are the smallest known pathogenic agents of higher plants and consist of a nontranslated, single-stranded, circular RNA of 246 to 463 nucleotide long. The first recognized viroid was *Potato spindle tuber viroid* (PSTVd) causing potato spindle tuber disease. There are two families, *Pospiviroidae* and *Avsunviroidae*. The *Pospiviroidae* are rod-like, replicate in the nucleus and are composed of five regions consisting of two terminal ends, as well as a central, pathogenicity, and variable region. And the *Avsunviroidae*, a second family of ribozyme-containing viroids that replicate in the chloroplast and its secondary structure does not contain the five structural/functional domains as in *Pospiviroidae*. They do not encode any movement proteins. So, they rely on host movement factors to move via the phloem, throughout the plant. Viroids can be transmitted by mechanical means, vegetative tissues, pollens, seeds, dodder, nematodes and insects. The rates of seed transmission such as PSTVd infecting tomato and potato plants, seedling transmission rates were varied with plant varieties ranging from 0 to 100%. Thus, international trade may disperse the viroids worldwide via infected seeds. Moreover, most of viroid infected horticultural plants show symptomless which they might be reservoir of pathogenic viroids to serve as a means of introduction of this pathogen to susceptible crops. Therefore, this pathogen is of phytosanitary concern because infected seeds and symptomless plants are thought to be the factors contributing to the spread of economically important diseases.