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Means of Control of Plant Viruses

Bailoori Sai Nirmala

Department of Chemical Engineering, Andhra University College of Engineering, Visakhapatnam, India; E-mail: bailoorinirmala@gmail.com

Viruses are very small (submicroscopic) infectious particles (virions) composed of a protein coat and a macromolecule core. They carry genetic information encoded in their macromolecule, which usually specifies two or more proteins. Translation of the genome (to produce proteins) or transcription and replication (to produce more nucleic acid) takes place within the host cell and uses a number of the host's biochemical "machinery". Viruses don't capture or store free energy and aren't functionally active outside their host. They therefore parasites (and usually pathogens) but aren't usually considered genuine microorganisms. Viruses also cause many important plant diseases and are liable for huge losses in crop production and quality altogether parts of the planet. Infected plants may show a variety of symptoms counting on the disease but often there's leaf yellowing (either of the entire leaf or during a pattern of stripes or blotches), leaf distortion and/or other growth distortions.

Some important animal and human viruses are often spread through aerosols. The viruses have the "machinery" to enter the animal cells directly by fusing with the cell wall (e.g. within the nasal lining or gut). Against this, plant cells have a strong cell membrane and viruses cannot penetrate them unaided. Most plant viruses are therefore transmitted by a vector organism that feeds on the plant or (in some diseases) are introduced through wounds made, for instance, during cultural operations. A little number of viruses is often transmitted through pollen to the seed while many who cause systemic infections accumulate in vegetatively-propagated crops. Plant viruses can't be directly controlled by chemical application.

Major means of control (depending on the disease)

Chemical or biological control of the vector (the organism transmitting the disease, often an insect): this will be very effective where the vectors got to feed for a few time on a crop before the virus is transmitted but are of much less value where transmission occurs very rapidly and should have already got taken place before the vector succumbs to the pesticide.

Growing resistant crop varieties: in some crops and for a few viruses there are highly effective sources of resistance that plant breeders are using for several years. However, no such "natural" resistance has been identified for several others. Transgenic resistance has shown considerable promise for several plant-virus combinations following the invention that the incorporation of a part of the virus genome into the host plant may confer a considerable degree of resistance. For instance, the utilization of this approach in Hawaii to regulate Papaya ring spot virus has been credited with saving the local papaya industry. However, this technology is controversial, particularly in Europe, and therefore the extent to which it'll be used commercially is currently uncertain.

Use of virus-free planting material: in vegetatively propagated crops (e.g. potatoes, many fruit crops) and where viruses are transmitted through seed major efforts are made through breeding, certification schemes etc., to make sure that the planting material is virus-free.

Exclusion the prevention of disease establishment in areas where it doesn't yet occur. This is often a serious objective of plant quarantine procedures throughout the planet also as more local schemes.