Seed borne plant viruses



Size of viruses: Large Molecules



Components of viruses

All viruses: Protein shell (cage) surrounding viral nucleic acid





Families and Genera of Viruses Infecting Plants

Plant Virus

Taxonomy





First known host and symptoms

Tobacco mosaic virus = TMV

Cucumber mosaic virus = CMV

Cauliflower mosaic virus = CaMV

Plant virus symptoms

- Mosaics: patterns of light and dark green in the leaves.
- Yellowing
- Stunting
- Vein clearing
- Ring spots
- Plant deformation



AMV on potato



Tobacco mosaic virus (TMV) Tomato mosaic virus (ToMV)

Mosaic,mottle,chlorosis spots on pea and yard long bean



Vein Clearing Symptom



Vein clearing in rose

Ring Spot Symptoms



Hydrangea Ring Spot Virus

Yellowing Symptoms



Bean Yellows Virus



Rose mosaic virus

Stunting



TSWV Stunting

Chlorotic & necrotic local lesions Chlorosis and necrosis



Mosaic & deformation

Zucchini yellow mosaic virus (ZYMV)







Shoe-stringing formation



Plant Deformation



Beet Curly Top Virus

Seed- borne plant virus

- Mechanical transmission
- Non persistant
- Serology

Important seed borne viruses



Bean Common Mosaic Virus

Incidence

Bean common mosaic virus is seedborne on a range of legumes. Klein et al. (1988) found BCMV in accessions of Phaseolus vulgaris, P. acutifolius, P. aborigineus and P. angustifolius seeds in a survey of the USDA Phaseolus germplasm collection. BCMV appeared to be a serious problem in P. vulgaris accessions; approximately 60% of the 207 tested were contaminated, incidences of infection of up to 70% being found in individual accessions.



Barley Stripe Mosaic Virus

Incidence

Seed infection of BSMV in barley has been studied extensively. Seed transmissibility (up to 90-100%) depends on the virus strain (Timian, 1974) as well as on the stage of development at which plants become infected, and is influenced by temperature (Singh et al., 1960). The percentage of pollen and ovule transmission varies from 10 to 35% and from 17 to 66%, respectively (Carroll and Mayhew, 1976a, 1976b).



Cucumber Mosaic Virus

Incidence

Palukaitis et al. (1992) list 22 plant species in which CMV is seedborne. Since 1992, the seed transmission of CMV in the following additional species has been reported: chickpea at a rate of 0.1-2%, lentil at 0.1-1% (Jones and Coutts, 1996) and spinach at 15%. CMV was present in all reproductive tissues of spinach, and it was identified as a member of subgroup II (Yang et al., 1997).



Soybean Mosaic Virus

Potyvirus

- Transmitted by aphids and seed
- Mottles, mosaics, rugosity, stunting, and seed mottling



Cucumber Mosaic Virus

Cucomovirus group

- Has largest host range of any plant virus
- Over winters in weed hosts



Detection of seed borne viruses

Biological testSerological test



Biological test



TMV produce local lesion on Nicotiana glutinosa



TMV produce mosaic symptom on Nicotiana tabacum





Seedling symptom test



Enzyme linked immunosorbant









TMV:ISEM

TMV:DEC-ISEM