

1. Arhar (Pigeon pea) *Cajanus cajan* (L.) Millsp.

1. Sterility Mosaic

Economic importance: A serious problem in India and Nepal where it is estimated to cause annual pigeonpea grain losses worth US \$ 282 million. Sterility mosaic is the most damaging disease of pigeonpea endemic in Indian subcontinent. About 90% of pigeonpea is grown in India and Nepal. The losses caused by the disease in India and Nepal are more than USD 300 million per annum.

Symptoms:

- Symptoms of the disease are typical mosaic mottling.
- Leaves show faint yellow mosaic pattern they are short in size.
- Dwarfing of branches and small size of leaves gives bushy appearances to top of plant.
- No flowering (sterility) or reduced flowering which don't form pods.



Causal organism: A previously undescribed virus, pigeonpea sterility mosaic (PPSMV), shows properties similar to viruses in the genus *Tenuivirus*. However, all tenuiviruses are phloem limited, are transmitted by planthoppers and infects plants only in family Poaceae, thus ruling out PPSMV as a tenuivirus. In ultrastructural studies of PPSMV infected tissues showed 100 – 150 nm quasispherical-membrane bound bodies (MBBs) and fibrous inclusions. The filamentous virus-like particles (VLPs) of PPSMV resemble the nucleoprotein particles of tomato spotted wilt virus (TSWV), but PPSMV VLPs are slightly larger than those of TSWV and is not serologically related to maize stripe tenuivirus and peanut bud necrosis tospovirus. The sterility mosaic causal agent is transmitted by the arthropod mite vector – *Aceria cajani* an eriophyid mite.

PPSMV and High plains virus share some common properties: transmission by eriophyid mite *A. cajani*, 4-7 similar sized MBBs and similar morphology. Similar MBBs have been detected in plants infected with fig mosaic, wheat spot mosaic etc. which are also infected by eriophyid mite, suggesting that these viruses may constitute a new virus genus.

Perpetuation and transmission: The disease is transmitted by an eriophid mite *Aceria cajani*. The self- sown red gram plants and perennial types of red gram serve as source of infection.

Disease Cycle: The sterility mosaic thrives readily in crops under irrigation or near irrigated fields. Such crops remain at risk of early infection. The virus and the vector mite both survives on self sown plants during off season and when the crop is sown the virus infection takes place through the vector. The secondary infection takes place from primarily infected plants in the crop by the mite vector.

Disease Management:

- Cultivation of disease resistant varieties like ICPY-035, YR-3, Purple-1, ICP-8861, Da-11, DA-32, ICP-6997, ICPL 87119 (Asha), ICPL 227, Jagruti, Baharand BSMR-235 is the most viable way to manage this virus disease of pigeonpea.
- Rouge out infected plants upto 40 days after sowing.
- Spray of Monocrotophose at 500 ml/ha or Malathion 0.25% in soon after appearance of the disease and if necessary, repeate after 15 days intervals.
- Spray Dicofol 3ml or Sulphur 3g in one liter of water to control mite vector in early stages of disease development.
- Eradication of self sown plants in and around pigeon pea fields is very helpful to manage sterility mosaic.