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Scenario of Yellow Mosaic Virus on Pulses in India

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SUMMARY

India being a developing country vastly relied on agriculture. Around 23.40 million tones of pulses had been produced in 2018-19 but to meet the country's targeted need 26.30 million tones was imported. India ranks 102nd in global hunger index out of 117 qualifying countries. This reflects the importance cultivation of food grains to meet the needy. Around 46.6million children are stunted, half of the population of under 5 year children die to to undernutrition and malnutrition. In this direction, pulses production and consumption throws limelight in to prevent kwashiorkor and marasmus as they are rich in proteins and building blocks of body. Its cultivation is severely reduced mainly by biotic and abiotic stresses. Among that Yellow mosaic virus is most prevalent

INTRODUCTION

Pulses are the annual leguminous crops belonging to family leguminaceae, rich in protein content. Pulses serves as major protein source for all vegans. These crops does not require much fertilizers, manures to grow but supply large quantity of proteins yet these are grown in marginal lands in India due to erratic monsoons, limited mechanizations, poor marketability which ended up with poor yields and also farmers are very reluctant to grow pulses than any other crops due to the susceptibility to various pests and diseases. It is reported that around 250 insects affect pulses viz. pod borer, stem borer, plant hoppers, aphids, whiteflies, cut worm and so on. Besides feeding leaves, flowers and pods; some insect pests also acts as a vector to spread diseases like soybean yellow mosaic, soybean mosaic, pigeon pea sterility mosaic, Black gram and Green gram leaf crinkle, necrosis, leaf streak and many are vector borne diseases. Among these yellow mosaic virus is most prevalent in all pulse growing areas causing 80- 100% yield loss.

Yellow Mosaic Virus in Pulses

Bengal Gram (Chick Pea/ Chana), Pigeon Pea (Arhar / Toor / Red Gram), Green gram, Black gram (Urd bean), Rajma, Lobiya, Lentils (Masoor), Peas (Matar) and Soybean are the major pulses grown and consumed in India. These suffer majorly from vector borne disease called yellow mosaic disease (YMD). Soybean yellow mosaic disease (YMD) is most serious and devastating disease of soybean and reported that it causes up to 15-75% and sometimes 100% devastating yield loss if the crop is affected at early growth stages.

Various species that causes YMD in Pulses

Yellow mosaic disease of many leguminous crop in India is majorly caused by four main species of geminivirus. Those are Mung bean yellow mosaic virus (MYMV), Mung bean yellow mosaic India virus (MYMIV), Dolichus yellow mosaic virus (DYMV) and Horse gram yellow mosaic virus (HYMV).

Etiology of Viruses

It belongs to the begomovirus of the family Geminiviridae having bipartite, single stranded, circular genome having DNA A having 6 ORFs and DNA B having 2 ORFs of about 2.5 – 2.7kb in size having 84% identity between them. The opposing transcripts of DNA-A and DNA B are separated by an intergenic region (IR) that generally shares a highly conserved region of approx 200 nucleotide called common region.

Symptomatology

Symptoms are mainly depended on the host species and the susceptibility to different strains of virus. Initially symptoms are characterised by the appearance of small yellow specks on veins later spreads to entire leaf to become chlorotic, crinkled leaf.

Cytological effects of viral infection may include hypertrophy of nucleolus and accumulation of fibrillary rings in the nucleus and finally it drastically reduces the total dry matter content of plants to encounter major yield losses.

Transmission

Gemini viruses are known to infect phloem tissues, though they can also invade mesophyll cells. But yet there is no clarification regarding its invasion.

It does not transmit through sap that was tested by rubbing freshly extracted sap from infected plant to uninfected plant but there was no disease found thereafter. Results were checked by Nariani et al. He later checked and concluded that grafting transmits yellow mosaic disease. He also found that Gemini viruses does not transmit through seeds.

Finally it was proven that YMD was only transmitted through vector (white fly).

Epidemiology

Vector population builds up with the onset of monsoon (June-July) but before monsoon *B.tabaci* are non-viruliferous. All genotypes are tend to be susceptible during summer than spring.

Management or Control Measures

- Development of YMV tolerant varieties.
- Infected plants must be removed.
- Destroy the host weeds and intercrop with non host crops like sorghum, pearl millet and maize.
- Control the spread of vector by applying insecticides like dimethoate 0.03% or metasystox 0.1% at the initial stages of disease occurance.

CONCLUSION

It is necessary to take step may be by developing resistant varietirs or by analyzing insect-host relationship inorder to enhance pulse growing areas in India to meet the nation need and to serve the needy to overcome malnutrition like kwashiorkor and marasmus.

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