

An Integrated Overview of Urdbean Leaf Crinkle Disease

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Introduction

Urdbean, which contributes 70% of global production, is a key pulse crop in India but still yields only about 600 kg/ha against its potential of over 1.5 t/ha. One of the major constraints of the yield limit is Urdbean Leaf Crinkle Disease (ULCD), first reported in the late 1960s (Chohan & Kalia, 1967), observed severe leaf curling and crinkling in urdbean and mungbean. Since then, ULCD has become one of the most destructive viral diseases of the crop, causing 35–80% yield loss, and under early severe infections, losses can reach up to 100%.

Symptomatology

ULCD affects both vegetative and reproductive stages of the urdbean crop. The first symptom appears on the third trifoliate leaf, which becomes enlarged, curled and severely crinkled (Brar & Rataul, 1986). Infected plants show crinkled and puckered leaves, distorted lamina with shortened internodes, delayed flowering and malformed inflorescences, poor pod set with shrivelled light-brown seeds, and reduced root nodules. These combined symptoms make plants weak and largely unproductive, leading to major yield losses.

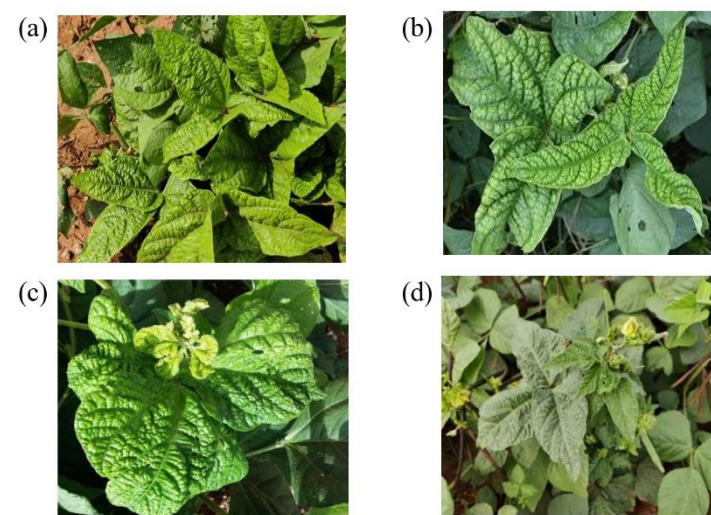


Fig. 1. (a) Crinkling of leaves (b) Puckered and rugose leaves (c) Distorted leaves (d) Floral malformation

Etiology

ULCD is often attributed to Urdbean Leaf Crinkle Virus, but its true causal agent is still unresolved (Kamaal et

al., 2023). Different studies have reported filamentous rods, spherical particles of 25–32 nm, and NGS detection of Cowpea Mild Mottle Virus (Baranwal et al., 2015). A recent review indicates that ULCD may involve multiple or mixed viruses, making it one of the least-resolved viral diseases of legumes.

Host Range

Urdbean is the main natural host of ULCD, but sap inoculation studies show that mungbean, cowpea and mothbean can also be infected (Kolte & Nene, 1975). Under experimental conditions, cucumber and bottle gourd have shown symptoms, and some weeds like *Convolvulus arvensis* and *Datura* spp. were occasionally susceptible. However, in the field, ULCD is largely confined to urdbean and mungbean.

Epidemiology

ULCD is most severe in the kharif season, while high summer temperatures greatly reduce symptoms. The disease is favoured by 30–35°C temperature and 60–70% RH, whereas temperatures above 38°C suppress symptom expression. Studies show that maximum and minimum temperatures strongly influence outbreaks, while rainfall and wind have minimal impact (Kadian, 1989).

Transmission

ULCD is transmitted mainly through seed, with several studies reporting 0–46% seed-borne transmission. It can also be spread through mechanical (sap) inoculation. Although some reports mention transmission by insects like aphids and whiteflies, later studies found no consistent vector, making insect transmission uncertain (Brar & Rataul, 1986).

Management

1. Use virus-free certified seed since ULCD is suspected to be seed-borne.
2. Adjust sowing time to avoid peak favourable conditions (30–35°C, high humidity).
3. Treat one kg seed with imidacloprid 600 FS @ 5 ml or thiamethoxam 70WS @ 5 g.
4. Remove and destroy the MYMV and other viral diseased or infected weeds in the fields/ on the field bunds/ around the fields.

5. Sow four rows of maize or jowar or bajra around the field as a guard crop to prevent the movement of vector population from neighboring fields.
6. Rogue out and destroy the viral infected plants when observed in the field
7. Erect yellow sticky traps for whiteflies and blue sticky traps for thrips 20/acre for each pest to monitor the vector population.
8. Spray 1500 ppm neem oil 5.0 ml/l or NSKE 5% at 15 days interval to destroy the eggs and nymphal population of the vector
9. Spray acephate 1.0 g or profenophos 2.0 ml or acetamiprid 0.2 g or thiamethoxam 0.2 g per litre at 10-15 days interval against whiteflies.
10. Spray acephate 1.0 g or thiamethoxam 0.2g or fipronil 1.5 ml or spinosad 0.3 ml per litre against thrips.
11. Spray acephate 1g or imidacloprid 0.4 ml or acetamiprid 0.2g or thiamethoxam 0.2g or

monocrotophos 1.6 ml or dimethoate 2 ml per litre against aphids.

References

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