

Orobanche Threat to Mustard: How a Parasitic Weed Is Undermining India's Edible Oil Crop

January 12, 2026 • vajiramandravi.com



Orobanche Threat to Mustard Latest News

- Mustard is India's **largest indigenous** source of edible oil, cultivated across nearly nine million hectares, mainly in Rajasthan, Uttar Pradesh, Madhya Pradesh, Haryana and West Bengal.
- However, the crop is increasingly threatened by ***Orobanche aegyptiaca***, a parasitic weed that attaches to mustard roots and siphons off water and nutrients, leading to poor plant growth and reduced seed yields.

How Orobanche Damages the Crop

- Orobanche attaches itself to mustard roots underground and siphons off water, nutrients and carbon.
- This leads to wilting, yellowing, stunted plant growth and ultimately sharp declines in seed yields.
- Because the parasite remains **hidden below the soil** initially, damage is already extensive by the time it becomes visible.

Farmers See Sharp Yield Losses

- Farmers report steep yield declines despite following recommended control measures.
- In Haryana's Sirsa district, yields have fallen from 9-12 quintals per acre earlier to nearly 6 quintals per acre in recent seasons.
- Even herbicide sprays have shown little effect, pushing farmers to reduce mustard acreage in favour of wheat, chickpea and barley.

Why Infestation Is Spreading Fast

- Each Orobanche plant produces thousands of tiny seeds that can remain viable in soil for up to 20 years and spread through wind and water.
- Fields repeatedly planted with mustard are especially vulnerable, as irrigation creates ideal conditions for seed germination and rapid underground attachment to crop roots.
- The rising infestation has shaken farmer confidence in mustard, traditionally valued for its low irrigation needs.
- As Orobanche spreads, many farmers are cutting back on mustard cultivation, raising concerns over future domestic edible oil production.

Why Mustard Matters for India

- Mustard is India's most important edible oilseed crop, contributing over **4 million tonnes** out of the country's **10.5-10.6 million tonnes** of annual indigenous edible oil production.
- It is central to efforts to cut India's heavy dependence on edible oil imports.
- **Reducing Import Dependence** – India imports nearly 16 million tonnes of edible oils every year — mainly palm, soybean and sunflower oil — costing \$15.9 billion in 2023-24 and \$18.3 billion in 2024-25.
 - Improving mustard yields is therefore a key national priority to reduce this import bill.
- **Rising Disease and Pest Pressure** – Mustard's increasing vulnerability to **Orobanche (margoja)**, along with pests like **aphids** and fungal diseases such as white rust, leaf blight, stem rot and powdery mildew, has emerged as a serious concern for productivity and farmer confidence.

Farmers Flag Changing Threat Patterns

- Farmers report that Orobanche infestation is now appearing earlier in the crop cycle and in fertile soils, unlike earlier when it emerged later and mostly in sandy fields.
- This shift signals a growing and more aggressive threat.
- The buildup of long-lasting Orobanche seed banks in soil has increased the weed's damage potential, enabling early emergence and greater yield losses.
- This has left farmers increasingly uncertain, sowing mustard largely on hope rather than confidence.

Herbicides as a Possible Control Tool

- Chemical control using herbicides such as **glyphosate** is one possible way to tackle Orobanche.
- However, this approach has major limitations with conventional mustard varieties.

Why Conventional Herbicides Don't Work

- Glyphosate and similar broad-spectrum, non-selective herbicides kill all plants by blocking the EPSPS (5-enolpyruvylshikimate-3-phosphate synthase) enzyme essential for protein formation.
- Applied to normal mustard, they destroy the crop along with the weed.
- At currently recommended low doses, they are also ineffective against Orobanche.

Role of Herbicide-Resistant Mustard

- A new approach lies in **breeding** mustard varieties that can tolerate specific herbicides.
- Farmers are testing a hybrid mustard that is resistant to **imidazolinone herbicides**, allowing selective control of Orobanche without harming the crop.
- The hybrid '**Pioneer-45S42CL**' can tolerate imazapyr and imazapic herbicides.
- Sold with a compatible herbicide formulation, it requires a single spray after 25 days of sowing and has shown encouraging early results in farmers' fields.

GM Mustard as a Future Option

- Researchers have also developed **GM mustard** lines resistant to glyphosate and other herbicides, offering multiple chemical options and reducing the risk of resistance buildup.
- Given mustard's strategic importance and the rising weed threat, policymakers face a critical decision on permitting GM crops.
- Any decision, experts argue, should be guided by science and farm economics rather than ideology.

Source: IE

Source: <https://vajiramandravi.com/current-affairs/orobanche-threat-to-mustard-how-a-parasitic-weed-is-undermining-indias-edible-oil-crop/>
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