IMI-Resistant Mustard Hybrids

Prelims: *Current events of national and international importance*

Why in News?

In the 2026-27 rabi sowing season, Indian farmers are set to begin the wide-scale cultivation of imidazolinone-resistant (IMI-resistant) mustard hybrids.

- **IMI Resistant Mustard Hybrids** – The mustard varities that are resistance to imidazolinone herbicide.
- It is designed to overcome a parasitic weed called Orobanche, a major hurdle in oilseed production.
- **Orobanche –** A destructive *root parasite* that attaches to the mustard plant and drains water and nutrients (It has more recently been called Phelipanche.)
- **Edible oil deficit** – India imported 16 million tonnes of edible oils in 2024–25, at about Rs 1.6 lakh crore.
- **Mustard** – It is the most vital oilseed crop to meet the edible oil demand, especially in the arid environments of North India.
- However, its yields have been suppressed throughout the year by Orobanche.
- **Development Process** – Unlike genetically modified (GM) crops, these hybrids were developed in a process called *mutation breeding* — where scientists breed crops to preserve certain natural mutations.
    - **Mutation breeding** – It is the process of exposing plant seeds or tissue to physical agents (like radiation) or chemical mutagens to intentionally induce genetic variations
- **Key Enzyme** – The process is based on an enzyme called *acetolactate synthase (ALS),* which is essential for plant growth.
- Normal mustard plants are killed by IMI herbicides because the herbicides inhibit ALS.
- **Working of the New Hybrid**
    - In the IMI-resistant mustard hybrids, a single DNA change makes the plant's ALS enzyme resistant to imidazolinone (IMI) herbicides, freeing farmers to spray IMI herbicides directly over the field.
    - The herbicide kills weeds like Orobanche but leaves the mustard crop unharmed.
    - It's especially effective against Orobanche because the herbicide travels through soil and plant tissues, reaching the parasite where manual weeding cannot.
- **Benefit** – Farmers don't increase the demand for labour during the short, critical weeding period, and the research community because it protects oilseeds.

To know about ***GM Mustard***, click here

Reference

[The Hindu | New herbicide-tolerant mustard hybrids need diverse farming plans]