Scientists are working on a new variety of chickpea that doesn't fall prey to the parasite

One gene vs another in battle against bollworm

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PUNE, JULY 19

SCIENTISTS at the Pune-based National Chemical Laboratory (NCL) hope to develop a new variety of chickpea that is bollworm resistant by using proteinase inhibitor (PI) genes instead of the bacteria-based BT gene.

Bollworms, also known as gram pod borer (Helicoverpa armigera), are known to target crops like cotton, chickpea, pigeon pea, sunflower and tomato.

NCL's eight-year-long effort at developing a resistant chickpea variety got a boost when in March it got 20,000 Euros from Max Planck Society in Germany. Scientists are focusing on chickpea for now but if the trials are successful, then other plants will be studied for resistance against bollworms.

All plants have PI genes. The bollworm is successful against those plants whose PI it can destroy. As part of the trial, scientists have identified PI genes of plants that do not host the bollworm. Such 'non-host' plants include the winged bean, bitter gourd and capsicum, said Ashok Giri, scientist at the Biochemical Sciences Division at NCL. "If the PI genes from these plants are successfully transferred to the chickpea, then it has a chance to resist the bollworm," said Giri.

PI genes are similar to BT genes in providing resistance against the bollworm. "But the PI has an advantage because it does not kill the insect. It only inhibits the digestive system of the insect. If you try to wipe out a population, there are chances that it develops resistance faster," said Giri.

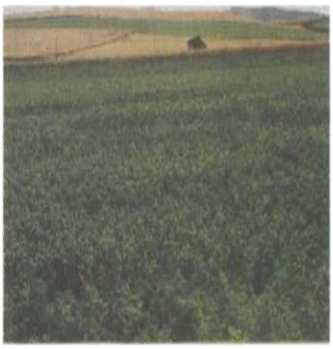
By inhibiting the digestive system of the insect, it reduces the population of the insects by being detrimental to their growth and by impairing their reproductive potential of the insects. An NCL paper says the PI gene is more environment-friendly than BT because it reduces the use of chemicals and pesticides.

To transfer the PI gene from a plant that does not host the bollworm to an infected plant, NCL scientists are using the process of 'plant transformation'. "The protective PI gene is transferred to a bacteria which is allowed to infest the target plant, giving it defence against the bollworm," said Giri.

Scientists also need to study whether the PI gene adversely affects the growth of the plant.

A study conducted in Germany on tobacco found that the gene reduced the height of the plant—a price it paid to resist the bollworm.

While similar studies will be conducted on the chickpea, Giri said that in another two to three years, they hope to be out with resistant plants. And if all goes well — after testing for toxicity on humans, numerous government approvals, and if a seed making company buys the technology— PI seeds might end up in the market.



A chickpea farm

Paper Clipping dated 20th July, 2007