

# Researchers help develop pest-resistant eggplant for South Asia

October 8 2007

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Cornell researchers and Sathguru Management Consultants of India have successfully led an international consortium through the first phase of developing a pest-resistant eggplant. By about 2009 this eggplant is expected to be the first genetically engineered food crop in South Asia. Farmers have grown genetically altered cotton in India since 2002.

The engineered eggplant expresses a natural insecticide derived from the bacteria *Bacillus thuringiensis* (Bt), making it resistant to the fruit and shoot borer (FSB), a highly destructive pest. The tiny larvae account for up to 40 percent of eggplant crop losses each year in India, Bangladesh and the Philippines, and other areas of South and Southeast Asia.

The work on the resistant eggplant is part of the Agricultural Biotechnology Support Project (ABSP) II, which is funded by the U.S. Agency for International Development and administered by Cornell in partnership with Sathguru, a firm associated with Cornell's College of Agriculture and Life Sciences (CALS).

Cornell researchers from plant breeding, entomology, molecular biology, applied economics, communication, international programs and the Cornell Center for Technology Enterprise and Commercialization began collaborating on the development of the Bt eggplant in 2002. Another partner, Maharashtra Hybrid Seeds, is on schedule to commercialize the genetically modified fruit by 2009.

"Cornell has worked effectively to facilitate a productive partnership

between the public and private sectors that will make this technology available to eggplant producers at every economic level," said Ronnie Coffman, international professor of plant breeding and genetics and director of International Programs in CALS.

"In five years, with support from Sathguru and Cornell, our partners were able to bring this flagship program to field trials and get food, feed and environmental safety approvals," said K.V. Raman, Cornell professor of plant breeding.

All the safety tests for the Bt eggplant have been conducted in India, starting in greenhouses and now moving to large-scale field trials. The eggplant has been found to be nontoxic to fish, chickens, rabbits, goats, rats and cattle as well as nonallergenic. Ongoing tests will examine such questions as whether the plant will continue to resist FSB in the field and for how long; whether the Bt eggplant cross pollinates with other eggplants in the field and how far the Bt plants should be from other eggplant fields; whether nontarget insect populations are affected in the long term; and how yields compare with those of other eggplant varieties.

It is estimated that the Bt eggplant will reduce insecticide use by 30 percent while doubling the yield of marketable fruit (although eggplant is eaten as a vegetable).

Eggplant is a popular crop in the subtropics and tropics, especially in India and Bangladesh, where it is grown on about 1.5 million acres.

India and Bangladesh together expect to plant 110,000 acres of the FSB-resistant eggplant commercially by the end of 2010 and 650,000 acres by 2015. Economists from Cornell and other institutions report that the Bt eggplant would result in lower prices for consumers, higher yields for farmers and, by 2015, boost the Indian economy by \$411 million and the

Bangladeshi economy by \$37 million.

"In spite of the green revolution in India, agricultural growth has stagnated there to less than 2 percent per year," said Raman. "It is important for a land-grant university like Cornell to be engaged in the improvement of technologies and help create a road map that leads to agricultural and economic growth in places like South and Southeast Asia and Africa."

Source: Cornell University

Citation: Researchers help develop pest-resistant eggplant for South Asia (2007, October 8) retrieved 15 May 2024 from <https://phys.org/news/2007-10-pest-resistant-eggplant-south-asia.html>

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