In 2014, China grew 3.9 million hectares of biotech crops: ~3.9 million hectares of Bt cotton, ~8,000 hectares of virus resistant papaya, and ~543 hectares of Bt poplar.

Bt cotton was planted by an estimated 7.1 million small, resource-poor farmers in China.

The total biotech cotton plantings in China in 2014 were estimated at ~3.9 million hectares, which is ~93% of its total national cotton area. The adoption rate of Bt cotton in China was estimated at 93% in 2014, compared to 90% in 2013.

Virus-resistant biotech papaya plantings increased by ~50% from 5,800 hectares in 2013 to ~8,000 hectares in 2014. Papaya growing regions Guangdong province and Hunan Island were joined by Guangxi province in 2014.

Bt poplar has been planted in China since 2003. By 2014, 543 hectares of poplar has been planted.

The economic benefit to China from biotech cotton for the period 1997 to 2013 is US$16.2 billion and US$1.6 billion for 2013 alone.

### BT COTTON

China belongs to the “six founder biotech crop countries” having first commercialized Bt cotton in 1996, the first year of global commercial planting of biotech crops.

China increased their income by approximately US$220 per hectare (equivalent to approximately US$1 billion nationally) due, on average, to a 10% increase in yield, and a 60% reduction in insecticides, both of which contribute to a more sustainable agriculture and the prosperity of small, resource-poor farmers.

### VIRUS RESISTANT PAPAYA

In September 2006, China’s National Biosafety Committee recommended for commercialization a locally developed biotech papaya resistant to papaya ring spot virus (PRSV). The technology features the viral replicase gene and was developed by South China Agricultural University; the biotech papaya is highly resistant to all the local strains of PRSV.

In Guangdong province, the main province for papaya production in China, 95% of the 4,500 hectares of papaya is now biotech, equivalent to 4,275 hectares.

Hainan Island planted biotech papaya for the first time in 2012, and in 2014, 60% of the 4,000 hectares of papaya grown in the area was biotech.

Guangxi province planted their first biotech papaya in 2014 with...
an initial 90% adoption of the 2,000 hectares of papaya in the province. Thus, a total of 8,475 hectares of biotech papaya was planted in China in 2014, a 46% increase from 5,800 hectares in 2013.

**INSECT RESISTANT POPLAR**

The first Bt poplars were developed and commercialized in 2003 by the Research Institute of Forestry in Beijing, Chinese Academy of Forestry to meet China’s need for timber which by 2015 is estimated at 330-340 million cubic meters of timber.

Under rigorous performance testing, two Bt poplar clones have exhibited a high level of resistance to leaf pests, resulting in a substantial 90% reduction in leaf damage. The two clones were first commercialized in 2003 in Northern China, and by 2014, 543 hectares were planted in China.

**BIOTECH CROPS BENEFITS**

A study led by KM Wu in 2008 suggested that the potential number of small farmers actually benefiting indirectly from Bt cotton in China might be 10 million more, which was confirmed by a separate study led by WD Hutchinson in 2010. The research estimated that the 10 million beneficiary farmers are those cultivating 22 million hectares of crops other than cotton, which also host cotton bollworm, but where infestations have decreased to up to 10-fold, because of lower infestations in Bt cotton. Thus, the actual number of beneficiary farmers of biotech Bt cotton in China may well exceed 17.5 million.

Biotech phytase maize and Bt rice approved for biosafety on 27 November 2009, are undergoing extensive and rigorous field trials. The biosafety certificates are up for renewal in 2015.

A study on the adoption and uptake pathways of Bt cotton by small-scale farmers in China and the changes these have brought to farmers’ lives was conducted by the Center for Chinese Agricultural Policy. The study was conducted in the provinces of Hebei, Shandong, Anhui and Henan provinces where Bt cotton is widely cultivated, also referred to as China’s Huang-Huai-Hai cotton production zone.

The adoption rate of Bt cotton is highest in Hebei province at 100%. The most promising benefit that the farmers derived from Bt cotton adoption is the reduction of pesticide use, which was evident in all of the four provinces. In Hebei, the farmers now spray pesticide only 4 times compared to more than 25 times before adopting Bt cotton. Majority of farmers also reported that planting Bt cotton enabled them to use less labor input, but higher yield with good cotton quality. This reduced their farming cost compared to the conventional cotton. In terms of income, farmers receive net revenue for Bt cotton three times more (31.9 yuan/ha) than what they get from non Bt cotton (9.7 yuan/ha). The difference of total cost between Bt cotton and non Bt cotton production is 5,028.6 yuan/ha.

**FUTURE PROSPECTS**

Origin Biotechnology, a subsidiary of Origin Agritech Ltd., has reached a comprehensive, worldwide agreement with the Institute of Plant Protection, Chinese Academy of Agricultural Sciences (CAAS) for the exclusive rights of the Bt gene developed by CAAS. Origin Biotechnology has the rights to this genetic trait in China, and has been passing this product through the Ministry of Agriculture regulatory trials.

Scientists at Hainan University and Hunan Provincial Academy of Agricultural Sciences are developing a high yielding salt tolerant rice variety. The initial results showed that the biotech rice could produce 6 tonnes per hectare. The harvest in October 2013 also showed one variety has similar output as those varieties grown in normal farmlands.

**SOURCES**


For more information, contact:

ISAAA SEAsiaCenter
GS Khush Hall, IRRI
Los Baños, Laguna 4031 Philippines
Telefax: +63 49 5367216
Email: knowledge.center@isaaa.org

www.isaaa.org