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A global view

07 March 2007 | News

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A global view

Globally, the acreage of biotech cotton has been showing an increase year on year and has reached significant hectarage.

The International Service for the Acquisition of Agri-Biotech Applications (ISAAA) brings out a status report on the global status of commercialized biotech/GM crops. Some excerpts from this report which give an overview of the world wide biotech cotton scenario.

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- Of the 40 countries that grow cotton, a majority of area (75%) is occupied by six countries i.e. US, China, India, Pakistan, Brazil and Uzbekistan.
- Four countries US (37.5), Australia (7.2), Uzbekistan (10.3) and Brazil (5.2) occupy TWO-THIRD share of global export of cotton. Rest is shared by 34 countries.
- Nine major producer and exporter of cotton have adopted GM Cotton in 2006 (see map).

The area planted to Bt cotton globally in 2006 was up 3.6 million hectares, equivalent to a 37 percent growth over 2006, the highest of all biotech crops, reaching 13.4 million hectares globally and equivalent to 38 percent of all the global area of 35 million hectares in 2006. Most (70 percent) of the 3.6 million hectare growth was in India (2.5 million hectares) followed distantly by the US (6,75,000 hectares), Argentina (285,000), and China (200,000) hectares. The significant growth overshadowed the biotech cotton decreases of 80,000 hectares in Mexico, due to seed import constraints, and 90,000 hectares in Australia, in line with substantial reductions of total plantings of cotton due to drought. Approximately 1,20,000 hectares of Bt cotton was grown in Brazil for the first time and this is expected to be a steep adoption curve similar to that witnessed in India and China to-date.

The details about how biotech cotton is faring in some of the different countries that have adopted it is as follows:

USA

The US is one of the six "founder biotech crop countries" having commercialized biotech cotton, maize, soybean and potato in 1996, the first year of global commercialization of biotech crops. The total plantings of upland cotton at 6.0 million hectares in 2006 (the fourth highest in 30 years) were up seven percent on last year's 5.63 million hectares with growers increasing their hectarage of cotton in Mississippi, New Mexico, Arizona and California. The increase in biotech cotton was 675,000 hectares equivalent to a 15 percent increase and now occupies 88 percent of upland cotton in the US.

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The total plantings of biotech cotton in the US in 2006 at 5.3 million hectares are a record high in hectarage and adoption (88 percent). RR Flex cotton was introduced in the US and Australia for the first time in 2006 by Monsanto. It was marketed as a single gene and also as a stacked product with insect resistance in Bollgard II. RR Flex herbicide tolerant cotton was launched in 2006 on over 800,000 hectares. RR Flex cotton was planted as a single trait and as a stacked product with Bt, with the latter occupying the majority of the hectarage. The plantings were principally in the US with a smaller hectarage in Australia.

The first ever biotech variety of American Pima Cotton, PHY 810 R, resistant to the herbicide RoundUp was planted in the US in 2006. The product was introduced by Phytogen, a joint venture between Mycogen Corporation and an affiliate DowAgroSciences LLC, and JG Boswell. It is estimated that PHY 810 R occupied approximately 5 percent of the American Pima cotton hectarage in the US in 2006.

Argentina

Argentina is also one of the six "founder biotech crop countries" having commercialized RR Soybean and Bt cotton in 1996. Argentina increased its reported area of biotech cotton in 2006 significantly to approximately
3, 60,000 hectares of which over 2, 70,000 hectares was Bt cotton and 90,000 hectares was herbicide tolerant cotton.

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Brazil

The approval in 2005 of one biotech cotton event (BCE 531) in the variety DP9B allowed cotton growers in Brazil to legally plant Bt cotton for the first time in the 2006/07 season. This variety underwent field-testing in Brazil prior to the events that delayed registration due to legal considerations. In July 2006, another Bt cotton variety NuOpal was registered, thus two varieties were available in 2006. Input costs on cotton production in Brazil are very high with insecticides comprising up to 40 percent of the total production costs and involving up to 14 sprays per season. Brazil is expected to grow approx 1.2 million hectares of cotton in 2006 making it the sixth largest grower of cotton by area in the world after India, the US, China, Pakistan, and Uzbekistan. The adoption of biotech cotton in Brazil in 2006/07 was rapid and expected to reach high adoption

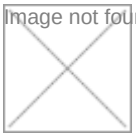
rates in the near term as more adopted varieties become available and are approved for registration.

China

Like the US, Argentina and Canada, China is a member of the group of six "founder biotech crop countries" having commercialized Bt cotton in 1996, the first year of global commercialization of biotech crops. The national area planted to cotton in china increased from 5.1 million hectares in 2005 to 5.3 million hectares in 2006. This increase of 5 percent in total plantings resulted in a parallel increase in area of Bt cotton from 3.3 million hectares in 2005 to 3.5 million hectares in 2006, with percentage adoption of Bt at 66 percent, the same as in 2005. In 2005 approval was granted to grow one of the new hybrids, Yinmian 2 on about 700 hectares in the yellow river region in 2006. Notably the public sector in China has invested significantly in crop biotechnology and has developed Bt cotton varieties that share the market with varieties developed by the international private sector. The simultaneous marketing of biotech crops from the public and private sector is unique to China at this time but is expected to also become more prevalent in India as biotech crops are developed by government supported public sector institutions.

South Africa

Total cotton planting in 2006 were estimated at 22,000 hectares, similar to last year, of which 20,000 hectares or 92 percent were biotech cotton. Of the 20,000 hectares of biotech cotton, 13,000 hectares (65 percent of biotech cotton hectares) had stacked traits of both Bt and herbicide tolerance, 5,000 hectares (25 percent of biotech cotton hectares) were the single Bt and 2,000 hectares (10 percent of biotech cotton hectares) were herbicide tolerant , used mostly as refugia in Bt fields.

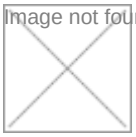


Australia

Australia is the fifth member of the six "founder biotech crop countries" having commercialized Bt cotton in 1996. Australia is expected to plant only 200,000 hectares of cotton in 2006 because of continuing severe droughts. It is projected that in 2006 about 66 percent of all cotton in Australia will feature the stacked genes for herbicide tolerance and insect resistance (the dual RR and BT gene Bollgard II-this will include a small area of RR flex; 17 percent with the dual Bt gene on its own, compared with 10 percent in 2005; 8 percent with a single gene for herbicide tolerance including some of the newly introduced RR flex cotton and the remaining 8 percent in conventional cotton compared with 10 percent in 2005. Australia has achieved the complete substitution of the single Bt gene product (Bollgard I) with the dual Bt gene varieties (Bollgard II) in only two years 2002/03.

Mexico

Mexico is the last of the six "founder biotech crop countries" having grown biotech Bt cotton in 1996. After a large increase in 2005 to 120,000 hectares biotech cotton hectarage in 2006 decreased to approx 55,000 because of regulatory delays that precluded the importation of biotech cotton seed for the early planting in Mexico. In 2006, biotech cotton in Mexico comprised Bt cotton (about 25,000 hectares), herbicide tolerant (HT) cotton (1,000 hectares) and the stacked traits of Bt /HT (30,000 hectares). Mexico is one of the four countries to deploy the Bt/HT stacked cotton, the other countries are the US, Australia and South Africa.



Columbia

Colombia introduced Bt cotton in 2002 on approx 2,000 hectares and in the interim this has increased consistently each year in 2003, 2004 and 2005 to reach 30,000 hectares in 2006, equivalent to almost 40 percent of the national cotton crop of 72,000 hectares in 2006. In 2006 Columbia also grew its first crop of herbicide tolerant cotton on approx 1,000 hectares.

Chronology of Bt cotton in India

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March 10, 1995: Department of Biotechnology (DBT) of the Government of India permits import of 100 gm of transgenic Cocker-312 variety of cottonseed cultivated in the US by Mahyco. This variety contained the Cry1Ac gene from the bacterium Bacillus thuringiensis.

April 1998: Monsanto-Mahyco tie up. Monsanto given permission for small trials of Bt cotton 100 g per trial by the Department of Biotechnology (DBT).

July 13,1998: LOI (Letter of Intent) by the DBT without involving GEAC. MAHYCO agrees to LOI.

July 27, 1998: Impunged permission by the DBT for trials at 15 locations, in August another 15 locations approved

November 16, 1998: News breaks of trials being carried out by Monsanto on Bt cotton without the permission of regional governments and without the consent of local communities.

November 28, 1998: Thousands of farmers occupied and burned down Bt cotton trial fields in Karnataka as part of Operation Cremation Monsanto.

December 2, 1998: About 200 farmers of Andhra Pradesh set fire to the experimental field of the "Bollgard" cotton crop raised by Monsanto in Urugonda village of Warangal district. The Andhra Pradesh government asks Mahyco Monsanto Biotech (I) Private Limited to stop forthwith the field trials of Bollgard gene seeds of cotton going on in seven districts in the state.

December 16, 1998: The "Monsanto, Quit India" campaign by various groups. Monsanto sues the Andhra Pradesh Raitha Sangha (Federation of all the farmer organisations of Andhra Pradesh) through its president, Malla Reddy.

January 6, 1999: Vandana Shiva's Research Foundation for Science, Technology and Ecology goes to the Supreme Court challenging the "illegality" of the field trials authorized by the DBT.

January 8, 1999: RCGM expresses satisfaction over the trial results at 40 locations and on April 12th directs MAHYCO to submit applications for trials at 10 locations before MEC.

May 25, 1999: Revised proposal top RCGM submitted to Mahyco

Juneâ€“November, 1999: Permission granted for different field trials. Oct-Nov: Shiva's group undertakes field visits.

May 2000: Mahyco writes to GEAC seeking approval for 'release for large scale commercial field trials and hybrid seed production of indigenously developed Bt cotton hybrids'.

July 2000: GEAC clears for large scale field trials on 85 hectares and seed production on 150 hecatares. Mahyco allowed to conduct large-scale field trials including seed production at 40 sites in six states. The permission was granted based on the "totally confidential" data from the small trials that allowed regulators to infer that Bt cotton was "safe." The DBT sets up committee to "independently" monitor and evaluate large scale field trials.

October 2000: RFSTE files application to amend petition challenging fresh clearance. Geeta Bharathan writes in Current Science on the controversy that evokes responses from scientists and Mahyco in subsequent issues.

Jan 5, 2001: A 10-member delegation comprising US judges and scientists meet Supreme Court Chief Justice AS Anand to educate him and other members of the judiciary on biotechnology.

June 18, 2001: An open dialogue held between Monsanto and Greenpeace to discuss Bt cotton with scientists, Ministry of Environment representatives and farmers. No data on field trials are presented, though farmers vociferously demand Bt cotton be commercialized. Technical questions and concerns raised by Greenpeace remain unanswered.

June 2001: PAN AP and others take urgent action at the request of activists both within India and abroad in protesting Mahyco/ Monsanto's aggressive attempt to fast-track governmental approval for Bt cotton commercialization. Some 300 emails were received from all over the world by the Indian government.

June 19, 2001: Genetic Engineering Approval Committee (GEAC) extends field trials of Bt cotton by another year. Mahyco conducts large-scale trials on 100 hectares in seven states.

October 2001: Mahyco discovers commercial Bt cotton farming over several thousand hectares in Gujarat. Source of the cotton is traced back to Navbharat Seeds Pvt Ltd.

October 2001: GEAC orders Bt cotton fields to be burnt in Gujarat. No action taken after farmers' protest order.

November 20, 2001: Gene Campaign files a case in the Delhi High Court charging the government with negligence in allowing large-scale field trials to be conducted without appropriate monitoring, regulation and safety precautions.

December 12, 2001: Sharma writes an open letter to the PM warning of the potentially devastating impact GE cotton seeds could have on farmers in India and the scientific fraud involved in the way the research trials have been conducted and monitored "the biggest scientific scam" to have ever hit India.

January 23, 2002: Dr Manju Sharma, secretary of DBT, declares that the latest round of Bt cotton trials were satisfactory and that it is up to the GEAC and the Ministry of Environment to decide on a date of commercial release.

February 20, 2002: The Indian Council of Agricultural Research (ICAR) submits a positive report to the Ministry of Environment on the field trials of Bt cotton. It is now expected that the Genetic Engineering and Approval Committee (GEAC) of the environment ministry will approve commerical use of Bt cotton within a month.

March 25, 2002: Approval given to Bt cotton by GEAC

May 2002: Piyush Patel of Navbharat seeds finally arrested. Monsanto ready to release another Bt-gene Cry2x also known as Cry2Ab for pest resistance in cotton. Expects clearance in India in three years. Rasi Seeds gets nod to conduct Bt cotton trials.

June 2002: Chinese environmental protection agency â€“ Greenpeace report showing fall in diversity index in Bt cotton fields, other pests increased. Several groups in India ask for ban on Bt cotton as a result through press release in Bangalore

August 8, 2002: Suman Sahai of Gene Campaign demands release of Bt cotton data

August 9, 2002: Government bans sale of Bt cotton seeds temporarily

August 24, 2002: First reports from Khargone of 100 percent failure of Bt crops (Shah and Banerjee)

April 2004: GEAC approves large-scale field trials and seed production of 12 varieties of Bt cotton hybrids developed by Rasi Seeds, Ankur Seeds and Mahyco.

April 2005: For the first time, six Bt cotton hybrids approved for cultivation in the North region. A total of 20 Bt cotton hybrids approved for cultivation in different regions of the country.

2006: GEAC approves 42 new Bt cotton hybrids for commercial cultivation taking the total to 62 Bt cotton hybrids approved for planting in the country.

Of the 62 Bt cotton hybrids approved for commercial cultivation, 14 hybrids featuring three events were sold by six companies in the northern region, 36 hybrids featuring four events were sold by 15 companies in the Central zone and 31 hybrids featuring four events were sold by 13 companies in the Southern zone.

Source: www.greenpeace.org/india and GEAC