- **First transgenic cotton on the market**
  There are 17 agro-biotech companies in the USA involved in developing transgenic plants and bio-pesticides. Only a few of them are engaged in cotton or cotton related products. The first experiments on genetically engineered cotton were started in the fall of 1987. Stoneville Pedigree Seed Company, a subsidiary of Calgene Inc., has been testing genetically engineered cotton tolerant to the herbicide bromoxynil for the last five years. Considering that enough data had been generated, Calgene Inc. made a request to the USDA last September to deregulate bromoxynil-resistant transgenic cotton. The Animal and Plant Health Inspection Service of the USDA, after considering comments from the state officials, universities, cooperative extension services and farmer organizations, a usual procedure, has deregulated the herbicide-tolerant cotton effective February 15, 1994. Now Calgene Inc. has legal permission for planting transgenic cotton beyond small scale field experiments.

  The bromoxynil-tolerant cotton is the first genetically engineered

transgenic cotton released for commercial cultivation. Although the bromoxynil-tolerant cotton has been deregulated, the company does not plan to distribute the seed of genetically engineered cotton until the 1995/96 season. Calgene Inc. is planning to have one more counter check on its own and develop additional data to determine the price of transgenic cotton where biotechnology companies have invested millions of dollars in the past. Calgene is planning to give the bromoxynil-tolerant seed to a selected group of top cotton growers in the US, who will grow the seed on their farms and furnish their opinions to Calgene Inc. The company will use the growers' opinion and their data in addition to four-year economic analysis and trial data developed by universities in determining the price of transgenic cotton for the year 1995/96. Because of the availability of other options to control broad leaf weeds, the price will be a very critical factor in determining commercial adoption of the first genetically engineered cotton on the market.

Agracetus Inc. has a broad spectrum patent from the USDA for all types of transgenic cottons. For the next 17 years, all companies in the field of genetically engineered cotton must obtain permission and pay a royalty

to Agracetus Inc. for releasing any transgenic cotton to the farmers. Broad spectrum patenting by the USDA to a single private company does not stop any other company from undertaking research on any aspect of biotechnology in cotton, but all companies must have permission from Agracetus to sell transgenic cotton to growers. Permission undoubtedly will not be accorded without paying a royalty to Agracetus. Calgene already has permission from Agracetus to sell bromoxynil-tolerant seed on a commercial scale and so is the case with Monsanto Company for Bt cotton tolerant to lepidopteran insects. After bromoxynil-tolerant cotton, growers will be looking for Bt cotton in the next 2-3 years. Presently, two companies are researching and field testing herbicide-tolerant and insect resistant cotton separately, but probably the next step will be putting together bromoxynil-tolerance and resistance to lepidopteran insects in one genotype.

Agracetus Inc. should not be hesitant to accord permits for commercial use of any transgenic cotton unless its interests clash with any other biotechnology companies. Presently, the company has no research in competition with Monsanto and Calgene Inc., but it has many projects

regarding fiber traits. Natural colors, other than brown and green, are almost non-existent in cotton, Agracetus is trying to develop blue cotton through gene manipulation. The heritable blue color in transgenic cotton should not fade and is expected to be much more reliable than the color of the present denims. The indigo pigment, if developed through gene insertion from non-related species of cotton, will have extensive use in the industry. Agracetus is also working to develop ultra-strong fiber, enhanced dying characteristics, dimension stability (shrinkage, wrinkling and creasing) and modified absorbency.

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