

Calgene moves into the black, brown, blue, and red

Lost in the wake of the sudden departure of Calgene (Davis, CA) CEO Roger Salquist was the announcement in late July that Calgene had been issued a US patent (US5,530,185) for transgenic color alteration in cotton plants. After two years of research, Calgene is growing plant prototypes in greenhouses. John Callahan, vice president of Calgene's cotton division, says he "expects brown, black, and blue transgenic cotton to be on the market by 1999," with red to follow. Similar research is also being done by CSIRO, the Australian government's scientific and industrial research organization.

While naturally occurring colored cotton has previously been cross-bred to produce bolls in various shades of brown and light green, yields have been low—less than half that of white cotton from the same number of plants. And largely because the

fibers are short and weak, it was about twice as expensive to produce, although Natural Cotton Colors' (Wickenburg, AZ) FoxFibre, an organically grown colored cotton fiber developed to have longer and stronger fibers, was a significant advance. However, the technology described in Calgene's patent could yield colored cotton with the physical properties of white cotton.

The patent covers gene constructs incorporating the pZ promoter, first characterized in tomato, linked to genes involved in the production of melanin, a dark brown or black pigment. The pZ promoter is tissue-specific in plant ovary cells, and temporally specific during flowering. As a result, the transgenic cotton fibers, which are seed hairs, are dark brown or black. Calgene's future research will focus on enhancing the brown/black shade of color, and on

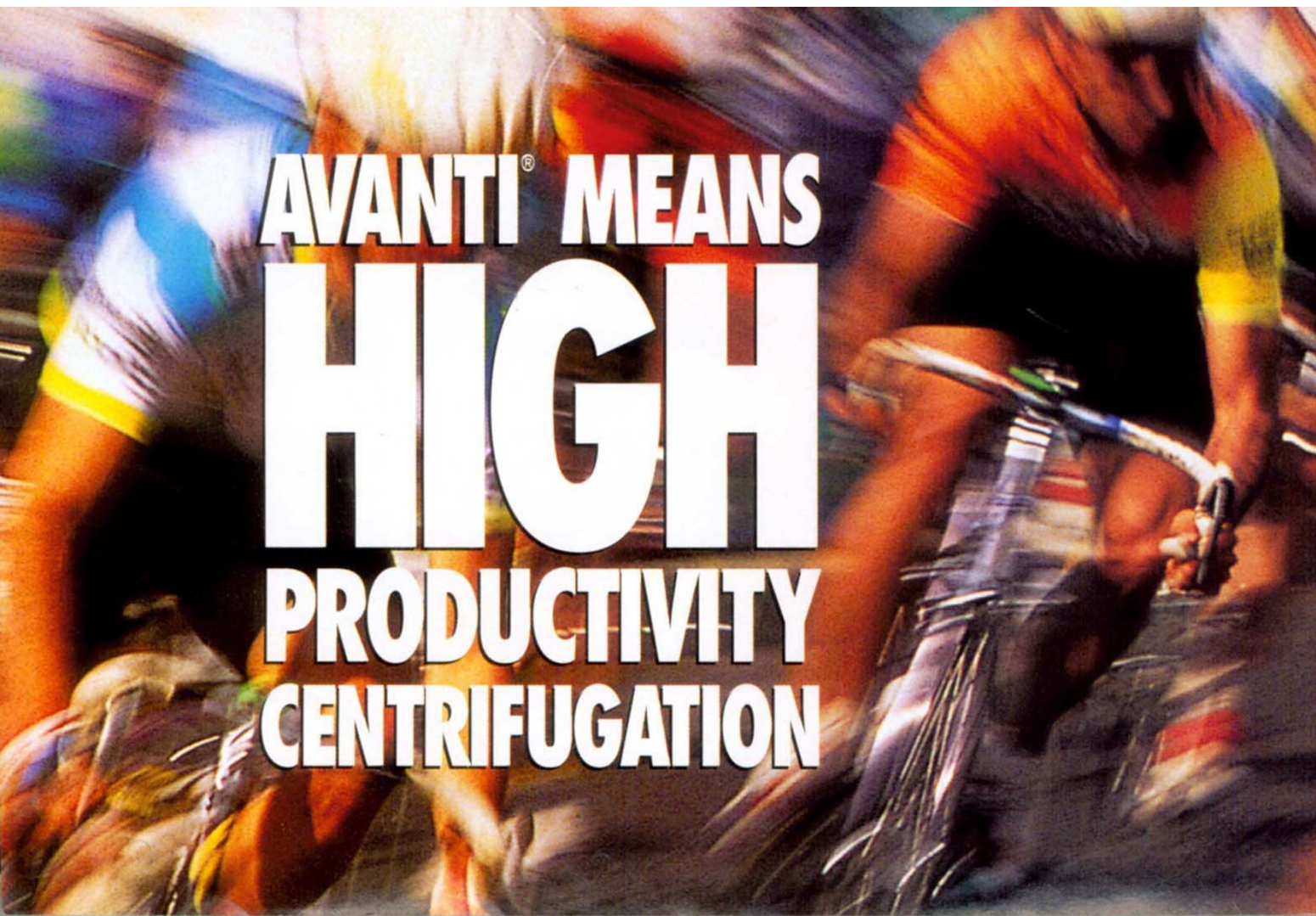
development of blue and red cotton fibers, using other such naturally occurring pigments as indigo.

Interestingly, Calgene does not plan to sell the seed for colored cotton, but rather the fiber itself. Under current agreements, Calgene's growers plant 60,000 acres of cotton to provide seed for a Calgene subsidiary, the Stoneville Pedigreed Seed Company (Stoneville, MS), which is the second-largest cotton seed provider in the US. As payment for growing cotton seed, the growers keep the fiber. But now the growers will be paid a premium, and Calgene will keep the fiber and market it to the textile industry directly. This practice, known as identity-preserved production, "is an important trend of the future," according to Callahan, and is already being used to produce certain varieties of corn and Calgene's own FlavrSavr tomato. Callahan emphasizes that the cotton project is strictly between Calgene and Stoneville, and does not involve Monsanto (St. Louis, MO), now the majority shareholder in Calgene, having increased its ownership stake from 49.9% to 54.6% through a \$50.2 million equity investment.

Michael Francisco



Making piece-dyed fabrics, a process using colored cotton fibers.



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