



StaufferSeeds

Quarterly

Summer 2001

Dr. Jim Parks, plant breeder for StaufferSeeds, on our plant genetics, consistent performance and StaufferSeeds' future



You've known the StaufferSeeds brand for a long time. What's your perspective on the company today?

As growers know, the seed industry has become very competitive. StaufferSeeds is moving quickly to respond to the opportunity we have in front of us. We want to further our reputation for bringing the latest

genetics to the field quickly and lead the way in the development of corn with innovative output traits like high value industrial and pharmaceutical proteins.

I think StaufferSeeds has positioned itself very well through the development of quality yellow dent products and the company's exclusive relationship with ProdiGene.

What makes the StaufferSeeds breeding program important?

The inbreds and hybrids we are developing in the StaufferSeeds breeding program today are the foundation for both the StaufferSeeds yellow dent products and the ICS products we are producing for ProdiGene.

We are ramping up the breeding program with an eye on the future. Our focus is on genetic diversity in the product line. Genetic diversity yields products with stable performance in a wide range of maturity zones and environmental conditions. Stable performance means high quality yellow dent products with consistent yields for growers today and in the future.

Stable performance also equates to consistent harvests for ProdiGene today and in the future. We are counting on this performance as we continue to backcross the plants from ProdiGene's labs into the StaufferSeeds elite germplasm and scale up our protein production system. That's why the breeding program is important.

What genetics traits are you selecting in the yellow dent product line up?

As our current yellow dent product line shows, we are developing high quality, high yielding hybrids with fast dry down, standability and excellent plant health, as well as management traits such as herbicide and corn borer resistance.

We recognize that our growers are farming more acres, planting earlier and tilling their soils less. In response, we have been focusing on producing hybrids with early vigor to better handle this reality. Our goal is to help growers produce high yielding products with good grain quality...grain that is ready for market.

Inside this issue

- Yellow Dent Features: 2435, 2585, 2814
- Interview with ProdiGene's Marketing Director, John McClellan
- A letter to growers from Tony Laos, CEO of StaufferSeeds and ProdiGene
- Win a trip to ProdiGene! See below...



Come see ProdiGene up close and personal

Return the business reply card enclosed in this newsletter to enter to win one of four all-expense paid visits to ProdiGene's laboratory in College Station Texas.

Meet the scientists and see for yourself the progress StaufferSeeds and ProdiGene are making.

Media Update

ProdiGene's Edible Vaccine Patent named by MIT as one of five patents "That will transform business and technology"!



For more information go to
www.staufferseeds.com/0701news.htm



New Yellow Dent Hybrids for 2002

2435



Relative Maturity 102 days

- Consistent yields with great test weight
- Good plant health allows use in Southern Minnesota, Northern Iowa, and Northeast Nebraska
- Very good seedling vigor
- Excellent flex ear capability
- Consistent ear development under stress situations

2585



Relative Maturity 107 days

- Exceptional yields for this maturity with good grain quality
- Expect good response to higher populations
- Exceptional early vigor
- Adapts well to most soils
- Develops long flex ear
- Excellent staygreen and drydown capability

2814



Relative Maturity 116 days

- Big robust hybrid with potential for exceptional yield results
- Tall plant with exceptional flex ear
- Best performance at medium or lower plant populations
- Performs well on sandy soils
- Excellent staygreen and late season appearance
- Handles heat stress well

Jim Parks continued

Why is the genetic diversity of hybrids important?



Development of genetically diverse hybrids that do well in a variety of conditions allows StaufferSeeds to bring to market multiple products for each maturity zone that excel in real world conditions.

We are selecting products that consistently yield above the average mean across multiple environments. As a result when producers plant a package of several StaufferSeeds hybrids they can spread their risk and benefit through higher yields. That's stable performance. As I said before, this is important for both StaufferSeeds ICS and yellow dent products today and in the future.

How are your results achieved?

By the time a new hybrid is selected, we've looked at the hybrid for at least four years in multiple environments and we've checked multiple replications at each site. We stress the plants through high plant populations, disease exposure, along with

various moisture and temperature levels to evaluate yields in a variety of conditions. Our hybrids are also screened for their ability to tolerate popular herbicides used by growers.

There are hybrids that excel in low population conditions and there are those that do well in high populations. Some plants handle environmental stresses better than others. We're looking for consistency in the data over time and location...we're selecting for the plants that excel across the board.

How does the yellow dent breeding program tie in with the products produced for ProdiGene?

The traits from ProdiGene's lab are backcrossed into StaufferSeeds elite germplasm, resulting in a strong hybrid that contains ProdiGene's proteins. Now, when you put a new gene in a plant you are asking more from the plant's metabolism. We are finding that certain genetic backgrounds are affected differently by the process.


So, in addition to creating strong plants, we are also looking for ways to better suit our germplasm to protein production in corn.

Particular attention is paid to plants that are more suitable for use in future high value products that StaufferSeeds will produce for ProdiGene.

What we would like to do is minimize the impact the genetic engineering has on the productivity of the plant. Our challenge is to get all the good characteristics back after the backcrossing along with optimal expression of the protein trait.

The grower is accustomed to 180-200 bushel corn. We need to get the grower a plant that produces a good yield and a useful level of proteins at the same time. In essence, we are striving for yellow dent performance along with the protein yields.

With this in mind, you can understand why the research and development we are doing with plants today is central to the ICS products we are producing for ProdiGene.

 For more information about StaufferSeeds yellow dent hybrids go to www.staufferseeds.com/0301dent.htm

Dr. Jim Parks is a plant breeder with StaufferSeeds. Dr. Parks has a B.S. in Agronomy from Purdue and a Masters and Ph.D. in Plant Breeding from University of Minnesota.



Interview with John McClellan, Director of Marketing At ProdiGene



Give us an update from ProdiGene...

Product development is progressing well. We currently have Avidin and GUS (beta-Glucuronidase) on the market and 16 other products in development including projects with Eli Lilly, Genencor, Avant Immunotherapeutics and Sigma-Aldrich

Laccase is being submitted for regulatory approval and we are working with the USDA, FDA and National Corn Growers on the regulatory front as well.

In March, MIT Technology Review magazine named ProdiGene's edible vaccine patent one of five patents "That will transform business and technology". That's exciting news and a big feather in our cap.

ProdiGene is working hard to get the word out and build acceptance for our platform and the idea of large scale, plant based protein manufacturing. There's a lot of work being done to advance the concept.

What makes ProdiGene different from its competitors?

Several things make ProdiGene stand out. The most important thing is that ProdiGene remains the first and only company to produce commercial quantities of recombinant proteins from plants. We have had recombinant Avidin and GUS produced by StaufferSeeds growers on the shelf for three years now. None of our competitors in plant transgenics has shipped a product.

ProdiGene's technology is one of the few, if not only, platforms that offers cost-effective, large-scale production of recombinant proteins. Many of the new bio-pharmaceutical companies are working with transgenic systems using potatoes, tobacco, alfalfa, chickens and goats. All are competing to produce certain high value, low volume specialty products. Like the traditional Chinese Hamster Ovary cell, yeast and bacteria fermentation production methods, these other transgenic plant and animal systems are very expensive to bring online and cannot scale up volume easily. In addition, many of these systems can only produce one specific type of protein.

What does ProdiGene do better?



Medium density fiberboard made with ProdiGene's Laccase.

We've produced a broad range of proteins including monoclonal antibodies, vaccines, enzymes, binding proteins and structural proteins. This is not just talk...we've produced these products. We've done it and no one else has.

We've also produced these products at a fraction of the cost compared to the other systems I just mentioned. Another important aspect of our system is scalability. ProdiGene can make the high value products that our competitors are focusing on. We can also make the production of lower value proteins profitable with this same production system. Other protein production systems have difficulty doing this because their start-up and production costs are too high.

How is ProdiGene positioning itself to the pharmaceutical industry?

The pharmaceutical industry needs a scalable, high volume, cost effective and pathogen free manufacturing system for human therapeutic proteins. Over the past three years we have proven that our protein production system addresses all of these needs.

A corn based protein system can be rapidly scaled up and down and can deliver very large volumes of product.

We believe ProdiGene's protein production system has an advantage because it is able to manufacture high volumes of protein products in a cost-effective manner.

Most manufactures lack the capability and infrastructure to handle



John McClellan Interview continued

What kind of acreage do you foresee in 5 years?

It is a fair question for growers to ask, however, it is difficult to project how many acres and when they will be needed. Keep in mind that this is a new and developing technology and that the production of pharmaceuticals and therapeutic proteins, in any system, has a complex and lengthy regulatory path before final approval. What we do believe, and have invested our future in, is that ProdiGene's system is the right technology to produce large volumes of cost-effective recombinant proteins. It is an added bonus that it produces proteins that are free of contaminants often found in animal systems.

The 18 products ProdiGene currently has in development represent the potential for several million acres of transgenic corn. I want to emphasize that these acre projections are based on products currently in development. In addition to the partnerships ProdiGene currently has, we are in discussion with a number of companies to produce new healthcare protein products in corn. These opportunities along with the growing demand for larger and larger volumes of cost-effective, non-animal transgenic proteins promise to continue generating new products and more acreage needs.

What do you think growers should know about the ICS products and ProdiGene's protein production system?

One of the most important things a grower should recognize is that this is new technology that is not going to happen overnight. Growers who are looking for the quick buck will be disappointed.

Producing the ICS products requires extra effort. This effort yields the premiums.

What does this mean to StaufferSeeds' producers?

For the early adopters of this technology, it means that they are in a very good position. In the markets ProdiGene is pursuing there is a high degree of interest in using products produced from transgenic plants. StaufferSeeds and ProdiGene are recognized as the leaders in developing this platform technology. Knowledge and experience with IP systems like ours is a marketable skill today and will continue to be in the future.

With market pressures creating a strong incentive for this type of technology we have every reason to believe we will be successful. Also the StaufferSeeds team has worked hard to make sure there is minimal risk to getting involved in our seed program.

We believe those producers that get involved in our program early and stick with it will prosper.

The bottom line is: Growers have to buy corn seed this year. They might as well buy into a deal like the ICS program that may open up a new opportunity for them. Growers have nothing to lose and a lot to gain by getting involved with us now.



For more information about ProdiGene visit them online at www.prodigene.com.

John McClellan is the Director of Marketing for ProdiGene. John was formerly the Commercial Manager at Amersham Corporation. John has a BS in Biology and a MS in Biochemistry from Texas Tech University School of Medicine.



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