

## Analyzing the U.S. corn-genetics business



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In plant genetics, nothing comes close to hybrid seed corn as the perfect genetic target. In recent years, U.S. farmers have planted about 80 million acres to corn annually. Corn production typically accounts for over 20 percent of the total area planted to all crops. In total grain production, corn is over two-and-one-half times greater than wheat. About 80 percent of corn grain is fed to livestock and poultry, and the remainder goes to food products, sweeteners, alcohol production, and seed for planting.

The structure of and players in the U.S. hybrid-seed-corn industry are unique. The flow of genetic lines through the industry is even more unique.

The unit of product is a bag of seed corn, which contains 80,000 kernels and plants a little over three acres. Each year, seed-corn companies produce and sell some 25 million bags of seed to U.S. farmers at a retail value of about \$1.5 billion. Gross profit margins per bag range from 50 percent to 65 percent. A well-managed hybrid-seed-corn company can achieve operating profit margins in excess of 25 percent and after tax margins in the range of 10-15 percent.

From a genetics perspective, advantage is derived from the hybrid nature of the seed. Seed for planting is obtained by crossing two separate parental lines. Hybrid seed cannot readily be reverse engineered to reveal the identities of the parental lines that compose it. Both the parental lines and the resulting hybrid can be protected under general patent law or under the Plant Variety Protection Act of 1970. Moreover, hybrid seed displays a mystical, unexplained yield increase known as heterosis. This yield kick persists in the first planting. If grain harvested at the end of the season is planted as seed in subsequent years, heterosis disappears, and the farmer's yield, relative to his first planting of hybrid seed, decreases materially. This loss of yield after the first planting is convenient, because the farmer is required to buy hybrid seed annually.

Rod Stacey, currently president of

Calgene (Davis, CA), coined the now-popular phrase "Snow White and the Seven Dwarfs" to express the market-share positions of the major seed-corn companies. Snow White specifically refers to Pioneer Hi-Bred International (Des Moines, IA). Founded in 1913, it has grown to be the world's largest seed-corn business. Pioneer has held this position without interruption for the past 20 years. In fact, industry analysts place Pioneer's share of the retail seed-corn market at nearly 40 percent.

The Seven Dwarfs are a collection of multinational competitors, all chasing Pioneer. Dekalb Genetics (Dekalb, IL) weighs in with a steady 9 percent market share. Cargill (Minneapolis, MN), Asgrow (Kalamazoo, MI), Northrup King (Golden Valley, MN), Ciba Seeds (Greensboro, NC), ICI Seeds (Coon Rapids, IA), and Agrigenetics (Eastlake, OH) each claim a 2-4 percent share. The remaining one-third share is held by over 100 mom-and-pop operations.

The Seven Dwarfs have been pressed hardest to maintain market share and attain profitability. Each envisions itself as a future Pioneer and is fighting to keep its modest market share, while maintaining expensive breeding and biotechnology efforts. Profits of this group have suffered during the past decade. By contrast, the mom-and-pop companies have largely neglected original research and simply produced and distributed seed developed by others, a tenuous but highly profitable strategy. The profitability of mom-and-pop firms can also be attributed to their concentrated distribution in several counties in a state or a portion of a state. Of course, Pioneer sets the price and product-quality umbrellas for the industry.

The most unusual feature of the industry is the flow of genetics. In the face of modern research machines like Pioneer and ICI, how can mom-and-pop firms do little or no research and still offer competitive products? The existence of foundation-seed companies explains this apparent discrepancy.

Foundation seed is the genetic stock that corn-seed companies plant to raise hybrid seed for sale. Foundation seed is sold in small packets that contain a particular parent line. Each year approximately 650,000 acres are sown in foundation seed to yield the 25 million plus bags of hybrid seed demanded by seed companies and farmers.

Small, research-intensive, foundation-seed companies—such as Holden's (Williamsburg, IA), Mike Brayton Seed (Ames, IA), and Illinois Foundation (Champaign, IL)—have been the genetic backbone of virtually all seed-corn competitors, except Pioneer. Holden's foundation seed is the most widely used in the industry. Some estimate that over half of the corn cultivated in America includes genetic stock that originated from Holden's.

For almost two decades, Holden's breeding programs have been competitive with Pioneer. As a result, Holden's parental lines are the critical ingredients—and the salvation—of product offerings from the mom-and-pop seed companies. Many of the Seven Dwarfs have also benefited from Holden's prowess.

Holden's product successes against Pioneer have not been without controversy. In 1981, Pioneer sued Holden's for unlawful acquisition and use of certain proprietary corn lines. In 1987, the courts found Holden's at fault, but the damages payable by Holden's to Pioneer are still in litigation. If damages are eventually paid by Holden's, many in the industry estimate that tens of millions of dollars could be involved. Holden's has fortified its financial position by raising its foundation-seed prices. The mom-and-pop seed companies are only too willing to absorb the price increases, because their source of future products, as well as their businesses, is at stake. On a separate path, Holden's has forged significant ties with several multinationals, the most visible and prominent of which is with Du Pont (Wilmington, DE). The outcome of the Pioneer-Holden's litigation may even restructure the seed-corn industry. //