

WHERE IS THE BEEF SEEDSTOCK INDUSTRY HEADED?^a

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A CHANGING AGRICULTURE

U.S. agriculture is in the midst of major structural change to a more industrialized model of production, similar to changes that have already occurred in other industries (Boehlje, et al., 1999a,b). This change is characterized by increased consolidation and coordination, resulting in formation of what is known in the agribusiness world as “food supply chains.” In agriculture, structural change occurred first in the poultry industry, followed by the pork industry, and now it is coming to the beef industry. The often-asked question is, “How far will the beef industry go?” Certainly not as far as poultry, and probably not as far as pork. However, there may be some trends we can foresee by studying these industries, especially the pork industry.

THE POULTRY AND PORK INDUSTRIES

The top five broiler companies have more than 55% of total market share in the chicken industry. Tyson Foods, the largest company, has about a quarter of the U.S. chicken market. Seedstock sources in the broiler sector have narrowed down to just six companies. In the turkey sector, there are only three seedstock sources. The poultry industry is totally integrated throughout the supply chain, from hatchery through processor. Pork production is not totally integrated through the processing phase, but is coordinated in varying degrees through the finishing phase. More than 40% of U.S. hogs are marketed by operations producing over 50,000 hogs per year. The 50 largest producers market 50% of the nation’s hogs. Smithfield, the largest producer, markets 14% of all U.S. hogs. From 1993 to 2001, the percentage of U.S. hogs marketed in some type of prearranged, value-based contractual arrangement increased from 11% to 83% (Grimes and Meyers, 2001). In the beef industry, when one considers alliances, futures, contracts, formulas, grids, and all other marketing arrangements, it is estimated that over 40% of fed cattle are now being marketed on some basis other than the spot/cash market.

On the genetic side, use of artificial insemination (**A.I.**) by commercial swine producers has grown from 15% in 1990 to 70 to 75% today (Nugent, 2000; See, 2000). Over 90% of the sows in the 50 largest operations are bred A.I. Genetic companies provide about two-thirds of today’s commercial seedstock (including semen and live breeding stock.) Independent seedstock breeders supply the remaining one-third. Approximately 100 independent breeders account for the lion’s share of this. Of the 100 independent breeders that are still marketing to significant numbers of commercial producers, about 25 have become “full-service genetic providers.” They generally supply more than one breed, often three or four breeds. They sell semen as well as boars and employ customer service representatives.

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Most of the genetics provided by the swine companies can be accounted for by ten firms. A few of them are global in scope and provide genetics for widely diverse environments. Genetic lines are specifically designed for their targeted environments. The companies have acquired two-thirds of U.S. market share by making optimum use of within-breed selection, breed differences (complementarity), heterosis, and more recently DNA technology. They are full-service oriented, offering assistance in nutrition, herd health, total quality management (**TQM**), marketing and risk management, record systems, and technology updates.

Much of the genetics that swine companies market to commercial producers consists of composites of two or more breeds. In the future, it is possible that composite genetics could play a larger role in the beef industry. Ben Ball of Elders, Ltd., a global agribusiness company, predicted that the beef industry will eventually adopt breeding systems somewhat similar to the pork industry (Ball, 1998). He projected that the commercial sector will use “lines based on complementary genetic mixes that are composites of pure breeds.” He added that, “pure breeds will still be necessary to support these commercial lines.” Composite systems have already been adopted by some commercial cattle producers who found it difficult to manage traditional rotational crossbreeding systems, because they required more breeding pastures and breeds of bulls. They can also result in large swings in biological type from one generation to another, making it difficult to optimize breed composition to match both the environment and the marketplace. Consequently, a number of larger seedstock breeders are producing hybrids/composites as well as purebreds for their commercial customers.

BEEF BREEDS AND BREEDERS

Very few of the 50-plus beef cattle breeds in the U.S. will disappear, but they will likely sort into three groups: 1) ten breeds, or perhaps less, that will provide the genetic make-up of the bulk of the commercial cattle population; 2) a few breeds having unique attributes that will be involved in niche markets; 3) recreational breeds that will provide pleasure and entertainment to hobby breeders via shows, field days, etc.

Associations hoping to position their breed to capture a significant share of the commercial market will first and foremost need to have a database large enough to enable producers to source genetics capable of meeting diverse production and marketing goals. Application of increasingly sophisticated statistical methodology may result in future sire summaries having Expected Progeny Differences (**EPDs**) for as many as 25 to 30 traits. If this comes about, we desperately need a decision support system that will weight these traits for their relative economic value under specific production and marketing environments. The result could be an overall selection index for each sire based on potential profit. The Australian Angus Society is already publishing profit indexes on bulls in their sire summary (Parnell and Barwick, 1999). The index combines eleven traits into a dollar value that is defined as expected net profitability per cow bred. In the U.S., a profitability index has been developed to rank bulls in the Angus Sire Alliance, sponsored by Circle A Angus and ABS Global Inc. (Herring, 1999). In Canada, Caron and Kemp

(2000) have designed a selection index to compare Charolais sires for terminal production of market calves.

Construction of selection indices has ranged from complex matrix algebra computations, requiring difficult-to-obtain data and numerous estimates, to overly simplified unproven methods, with few alternatives between the two. However, Hammett (2000) recently used an intermediate approach to design an innovative user-friendly index that can be customized to an individual producer's production and marketing system.

The seedstock sector is at a crossroads where more than superior pedigrees and outstanding EPDs will be required (Hammett, 2000). Commercial customers are continually expecting more from their genetic providers. In order for mainstream seedstock breeders to ensure their sustainability well into the future, it will be necessary that they strive to become "full-service genetic providers." Smaller breeders who are unable or unwilling to make this transition on their own could potentially remain viable by partnering or networking with other smaller breeders having similar objectives, in order to gain enough scale to form a full-service alliance. Others could align themselves with a full-service provider and become satellite cooperating herds for the full-service nucleus firm. In some instances, full-service providers may license their genetics to breeders in other regions as a means of expanding their market base.

A number of seedstock producers have already positioned themselves as full-service providers. The services they offer are similar to those provided by the genetic companies and mainstream independent breeders in the swine industry, as noted previously. Among other characteristics, they have relatively large populations of cattle at their disposal and offer more than one breed of cattle, and in some cases, hybrid seedstock. Examples of the services provided now and/or in the future are: assistance in merchandising feeder calves; programs for retained ownership that will return feedyard performance and carcass data on individual cattle; special feeder calf and heifer sales for customers; heifer development programs; assistance in carcass data collection; assistance in selecting and joining an alliance; contracting of specific matings two years in advance of delivery of bulls; record systems; herd health and nutrition consulting services; low or no interest payment plans; one-year insurance policy on bulls; hosting field days and educational seminars; assistance in designing selection indices tailored to individual customer needs; fetal sexing of replacement heifers; ultrasound measures of live cattle for carcass traits; EPDs of hybrid seedstock; pelvic measurements; breeding soundness exams (Grant, 1995; Gordon, 1999a,b; Ritchie, 2000).

BREED ASSOCIATIONS

In the midst of the changing structure of the beef seedstock sector, it will be important for breed associations to assume a proactive role if their breeds are to be major suppliers of seedstock to the commercial sector. In the near future, associations will have an opportunity to add a new generation of EPDs that have a more direct impact on profitability than previous EPDs. Examples are tenderness, heifer pregnancy, cow maintenance, days to market, calf survival, and male fertility. As noted before, increasing

the number of EPDs creates an ever-increasing need for a decision support system such as multiple-trait selection indices.

Points of control in a modern food supply chain tend to lie at the ends of the chain: genetics on one end and information from end-users on the other end (Boehlje, 1999b). This suggests that breed associations and their constituencies are uniquely positioned to participate in the governance of the beef supply chain. Following is a list of potential areas of activity in which associations could play a role. Several associations are already engaged in some of these activities.

- Assist breeders in the evolving process of becoming full-service genetic providers.
- Assist breeders that have common objectives in development of coordinated marketing programs.
- Facilitate linkages between adjoining industry sectors, such as seedstock breeders and commercial producers, commercial producers and feedyards, and feedyards and packers.
- Provide specific services for the commercial sector, such as sire selection, assistance in marketing the calf crop, and assisting commercial producers in identifying feedyards for retained ownership.
- Assisting feedyards in identifying commercial herds for the kind of genetics they need.
- Assistance in collecting carcass data.
- Develop relationships with alliances that have coordinated breeding and marketing programs.
- Develop relationships with other agribusiness entities, such as A.I./genetics, nutrition, and animal health companies.
- Develop a systematic program for producing and recording hybrid seedstock.
- Continuing to up-grade educational programs, such as an informative breed publication that reviews current technology and industry trends, special publications targeted to commercial cow-calf producers and feedyards, high quality symposia and seminars, and innovative junior activities.
- Creation of foreign marketing initiatives.

In the future, it may be necessary for small and mid-sized breed associations to ally or merge with other associations in order to provide quality programs and services that are of mutual benefit to their members. This has already occurred in the swine industry (Anderson, 2000). In 1994, three associations – Duroc, Hampshire and Yorkshire – consolidated to form the “National Swine Registry” (**NSR**). In 1998, they were joined by the Landrace Association. These four breeds have retained their identity, but are now much stronger financially because they are able to share resources – one executive director, three field representatives, one marketing program director, and an office staff under one roof. NSR has engaged in a national swine evaluation program that generates EPDs, publishes a sire summary, and has developed three multiple-trait selection indices (Terminal Sire Index, Sow Productivity Index, and Maternal Line Index).

IMPLICATIONS

Whether we like it or not, the beef industry is on the verge of major change to a more industrialized model of production and marketing. The industry will not integrate to the extent of poultry or pork, but there will be increased coordination throughout the supply chain. There will be demands on each sector of the industry to add value. The seedstock sector will not be exempt from these trends. Individual seedstock breeders will evolve to becoming “full-service genetic providers.” The same will be true for breed associations. As a result, there will be varying forms of consolidation, as has been the case in other industries.

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