THE CHANGING ECONOMIC STRUCTURE AND BEHAVIOR OF THE SWINE BREEDING STOCK MARKET

BY

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INTRODUCTION

The pork industry is an important segment of the agribusiness sector. The industry has experienced significant changes in (1) the size and scale of hog production units, (2) the type of hog produced, and (3) the structure and organization of the swine breeding stock supply industry. Most commercial hog producers select replacement female breeding stock from their own herds, but buy boars each year from specialized breeding stock suppliers to provide new, improved genetic material for their herds. Typically, the primary sources of purchased breeding stock have been (a) local commercial producers and purebred breeders if females were needed, and (b) purebred swine breeders for boars. A typical operation used a three breed rotation program and involved use of a different breed each year (e.g., Hampshire-Yorkshire-Duroc). However, the fairly recent entry into this market of some large corporate suppliers of swine breeding stock may be changing the nature of competition in this market, as well as some aspects of pork industry performance. In this study we propose to carefully examine the changing competitive structure of the swine breeding stock market, the marketing systems in use, and the likely implications of these changes on industry structure and performance in the future. By drawing upon several sources of published industry data and our surveys of the largest corporate breeding stock suppliers and purebred swine breed associations, we will describe and analyze the changes taking place, the reasons for those changes, and suggest whether further change would appear likely.
THE MARKET ENVIRONMENT

The market for breeding stock involves large numbers of animals each year. The USDA estimated the Dec. 1, 1980 total breeding stock inventory to be 9.16 million head. Exact data on sales is not available, but industry sources indicate that annual boar sales from all sources range between 250,000-350,000 head. The market for gilts is larger than that for boars, with the annual purchased gilt volume in the 400,000-525,000 head range. These estimates exclude boars and gilts retained by hog producers from their own herds.

Both the boar and gilt markets experience cyclical changes in demand which are largely derived from the commercial hog cycle. When slaughter hog prices fall and farm income is reduced, farmers tend to cut down the size of their breeding herds and keep their boars in service longer while relying on their own herds for replacement gilts. When the hog market strengthens, farmers are more willing to buy new boars each year. In addition, anticipation of an improved market increases the demand for purchased female breeding stock for both expansion of existing herds and stocking new hog production enterprises, and also increases the required number of boars needed to service them.

Thus, the demand for purchased breeding stock is quite sensitive to the profitability of commercial hog production and varies significantly in different phases of the hog production cycle. The profitability of commercial hog production is most dramatically affected by: (1) the overall demand for pork by consumers which in turn is influenced by consumer income levels, population, and the supply of competing products like beef and poultry; (2) the supply of pork on the market, which is primarily the result of producer decisions made 10-12 months earlier when market conditions may have been quite different--a
primary reason for cyclical hog production and profitability; and (3) the cost of hog production, with the prices of corn and soybean meal as the most important influences. These are the principal factors which indirectly determine the willingness of commercial hog producers to expand or contract their purchases of swine breeding stock. While some producers will keep boars longer when hog enterprise profits are low or nonexistent, most commercial producers continue to buy new boars each year; as a consequence, fluctuations in boar purchases follow a pattern similar to (but slightly more extreme than) the cyclical pattern in hog production. However, the peak in boar purchases usually follows the high price-low production period, while the cyclical low point is observed when profits are low and commercial herds are being cut back. Purchased gilt volumes follow a similar pattern with more extreme highs and lows as small or new herds buy more gilts during the expansion phase of the hog production cycle, and the contraction phase finds few new herds being established and older herds relying mostly on their own replacement gilts to minimize cash expenditures.

Since the demand for pork seldom exhibits dramatic change unless the future supply of closely competing products varies greatly, the volatility in demand for purchased breeding stock can be primarily attributed to the weather conditions around the world influencing the supply and price of feed grains, and to the market supply consequences of producers' breeding herd decisions a year earlier. Thus, the long term demand for swine breeding stock will continue to be quite variable, especially for female breeding stock, with the long term growth quite dependent upon the purchasing power of consumers and the price of feed grains. However, increasing size and management sophistication of commercial hog producers could cause some shifts from home-grown replacement
breeding stock to greater reliance on outside suppliers, although the increased disease concerns (and potential losses) of larger enterprises could effectively counterbalance that tendency.

A MARKET STRUCTURE OVERVIEW

The most important structural influence in the industry may be the relatively recent development of corporate suppliers which already has caused significant changes in the breeding stock sector. While there was some limited sow-leasing by feed companies prior to the early 1970s, nearly all purchased breeding stock typically came from purebred breeders or local commercial producers. The boar market was dominated by purebred breeders while purchased gilts were acquired from both purebred breeders and local commercial market hog producers. However, the overwhelming majority of replacement gilts came from the commercial producer's own herd.

Recent surveys by leading hog industry publications indicate continuing dominance of the boar market by purebred breeders; however, corporate suppliers have made significant inroads. Table 1 indicates the approximate shares of the breeding stock market currently held by the most important sources. While purebred breeders remain the primary suppliers of boars, corporate suppliers have acquired 15 to 20 percent of the market in the last decade. And crossbred (or hybrid) breeding stock are a large component of the corporate suppliers' attempt to differentiate their product in the minds of their customers.

Retention of gilts from within commercial breeders' herds remains the predominant source of female breeding stock. Estimates indicate that approximately 85 percent of all gilts are obtained from within the producers' herds,
### TABLE 1
**SOURCES OF BREEDING STOCK:**
**APPROXIMATE SHARES BY SOURCE, 1980**

<table>
<thead>
<tr>
<th></th>
<th>Purchased</th>
<th></th>
<th></th>
<th>Self-Produced</th>
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<tbody>
<tr>
<td></td>
<td>Purebred Breeders</td>
<td>Corporate Suppliers</td>
<td>Commercial Producers</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>Boars</td>
<td>65-70%</td>
<td>15-20%</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Gilts</td>
<td>7%</td>
<td>2%</td>
<td>5%</td>
<td>85%</td>
</tr>
</tbody>
</table>

Sources: Producer surveys by publishers of farm and hog industry magazines
suggesting that about 15 percent of all gilts are purchased. The purchased gilt market is dominated by purebred and commercial producers. Corporate breeders have again begun to exert some influence in the market, but this is considerably less than their impact on the boar market.

Two other relatively new sources of breeding stock should also be mentioned, frozen semen and ova transplantation. Frozen semen for artificial insemination became commercially available in the early 1970s. Although only one company provides this service presently, several more entrants are expected in the immediate future. The market share of breeding stock animals produced through artificial insemination is a fraction of one percent, but the extensive use of AI by dairy and purebred beef cattle operations suggests there may be a large potential for its future use, especially if disease transmission remains a major concern of large commercial producers.

Ova transplantation technology may allow greater exploitation of superior female breeding stock, and provides potentially greater genetic benefits with minimal disease risk.

CORPORATE BREEDING STOCK SUPPLIERS

The growth in the corporate suppliers' share of the swine breeding stock market has been quite rapid during the last decade, and some of the larger companies now appear to be positioning themselves for even larger incursions into the breeding stock market in the future. Since most corporate suppliers attempt to differentiate their products and services from those offered by purebred breeders, we will consider this segment of the market separately. To examine this structural development in greater detail, we will estimate the market shares currently held by the major corporate suppliers and analyze the
product development, pricing, and promotional methods which they are currently using to carve out a larger share of the market for breeding stock.

**Structural Characteristics of Corporate Suppliers**

The basic structure of the corporate breeding sector consists of a central core of several large firms which distribute on a national basis with an undetermined number of smaller firms either serving limited market areas or selling fewer animals throughout the United States. The major firms are Babcock Swine, DeKalb, Farmers Hybrid, Kleen Leen, and Pig Improvement Company (PIC). The relatively recent development of breeding stock companies precludes any estimate of the number or size of the smaller companies, but two examples of these types of firms are Pure Line Hog Company and McLean County Hog Service.

Table 2 indicates the relative shares of corporate sales of breeding stock by each of the major firms as ascertained by surveys of these firms and producer surveys by leading publishers serving hog producers. Although both the boar and gilt markets seem to be dominated by a relatively small number of firms, it must be remembered that corporate sources supply relatively small shares of the total breeding stock market. Thus, while they may be able to set prices for their breeding stock, their pricing or sales volume may be significantly influenced by competition from purebred and commercial producers.

An important aspect of market structure involves the association of the firms in a market with parent firms in similar or other industries. Connections with large corporations provide financial resources which smaller firms frequently do not have and may be influential in their long run growth. These resources allow large scale advertising, research and development and permit a
<table>
<thead>
<tr>
<th></th>
<th>Babcock</th>
<th>DeKalb</th>
<th>Farmers Hybrid</th>
<th>Kleen Leen</th>
<th>PIC</th>
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</thead>
<tbody>
<tr>
<td>Boars</td>
<td>5%</td>
<td>12%</td>
<td>50%</td>
<td>20%</td>
<td>12%</td>
</tr>
<tr>
<td>Gilts</td>
<td>22%</td>
<td>30%</td>
<td>10%</td>
<td>22%</td>
<td>15%</td>
</tr>
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wider array of marketing practices. They also could allow a subsidiary firm to operate at a loss in the short run while establishing a place in the market where the long run profit outlook appears favorable.

Most of the major corporate seed stock suppliers are subsidiaries of larger corporations. Farmers Hybrid is a subsidiary of Monsanto which is a large corporation with a variety of interests, particularly in chemicals. DeKalb's swine operations are only a limited part of their total involvement in agribusiness. Seed production, futures trading and hog marketing are a few of their other corporate interests. Ralston Purina, the large feed manufacturer and distributor, owns Kleen Leen. Ralston's extensive feed distribution system throughout the major hog production areas provides them potentially valuable access to and familiarity with many potential breeding stock customers.

The other two firms, Babcock Swine and PIC, have somewhat different corporate connections than the other three major swine corporations. Although Babcock was originally a subsidiary of Babcock Industries, which was itself owned by A. H. Robins, it recently was sold and is now an independent company. PIC is a world wide swine breeding stock company based in England. Thus, while PIC's widespread breeding stock interests provide a larger base upon which to depend than would an independent company, its only interests are in swine breeding stock.

Since all of the major firms at least originally entered the market with corporate backing by large companies, it appears that rather significant initial costs are involved in these operations. The large scale facilities necessary to carry out genetic research and the difficulty of gaining a reputation as a reputable firm in a market where trust plays a significant role as in the swine breeding stock market reinforce this view.
The fact that corporate suppliers account for only a small share of the total breeding stock market and the apparent ability of smaller firms to compete at least at a local or regional level indicate that entry by new firms is still possible, and entry costs are not prohibitive. This situation will tend to keep prices for breeding stock at moderate levels. If the existing firms develop and expand their shares of the total corporate and total breeding stock market, it could become increasingly difficult for small firms to enter and compete in the swine breeding stock industry. Thus, the industry is at an extremely important point in its development and the changes that occur over the next few years may dictate the ultimate structure of the industry.

Corporate Marketing of Breeding Stock

The marketing practices used by the corporate breeding stock sector are similar to those used in other industries with a few large firms. This structure allows each firm to exercise some discretion in the way it approaches the market. The major marketing strategies which corporate suppliers use to distinguish their products from competitors are: 1) pricing policy, 2) sales promotion and advertising, and 3) product development. While each corporate supplier has devised individual strategies for its marketing activities, there still is a great deal of similarity among their approaches.

The breeding stock market involves several types of products which are given varying degrees of emphasis by each corporate supplier. Some firms emphasize "package" sales of boars and gilts while others concentrate on either the boar or gilt market. Farmers Hybrid supplies nearly one-half of all boars sold by major corporate suppliers, but is last in corporate gilt sales.
Clearly, this pattern suggests that the boar market has been their primary market development focus, which Farmers Hybrid has publicly confirmed.

In contrast, all of the other large corporate producers sell many more gilts than boars. Among these producers Babcock especially emphasized gilt sales prior to its corporate reorganization.

While all of the corporate producers offer some form of boar-gilt combinations, such "package" sales play a more prominent role in the PIC, DeKalb and the new Babcock marketing plans. Only Kleen Leen does not appear to have specialized in some particular aspect of the breeding stock market. Since their breeding stock sales place them in the middle of both the boar and gilt markets, neither market seems to have been their primary focus.

The second feature which distinguishes the corporations' overall marketing objectives concerns the customers they attempt to reach. Farmers Hybrid and Kleen Leen stand out from the others in that they do not appear to have selected a particular type of farmer upon whom to focus. PIC, DeKalb and Babcock have all targeted moderate to large sized production operations, and concentrate their sales efforts on these types of commercial farms. These three companies have also attempted to concentrate their sales programs on new confinement units. In accordance with that focus, these three firms also placed the greatest emphasis on boar-gilt package deals.

Pricing of Corporate Breeding Stock

Each corporate supplier uses some variation of two basic systems to set prices for their breeding stock. The first system ties the boar price and gilt price to the prevailing commercial market hog price, while the second involves a flat price which varies according to the genetic and performance
characteristics of the animal. Thus, breeding stock with higher performance indexes have higher prices in the second system, but not in the first system. While the first pricing system involves price changes each week or month, the flat price schedules are adjusted at irregular intervals, usually a year or longer. The decision to change the flat price schedules is related to three primary factors: 1) the impact of inflation and changing costs, 2) the stage of the hog cycle, and 3) the competitive conditions at the time.

Our survey of large corporate breeding stock suppliers offers some detailed insights into the pricing systems in use in 1980. The system involving a commercial market base price was used by all companies for pricing gilts. Each corporation selected a market to serve as the base market. For example Kleen Leen and Farmers Hybrid used the Peoria hog market to establish their base prices. Since Farmers Hybrid sold only 200-225 pound gilts, they used the weekly average for U.S. 1 and 2 grade gilts in that weight range at the Peoria market. Kleen Leen gilt prices were based on the top price at the Peoria market on the day of delivery for each weight class of gilts they sell. Although different markets or prices were used by PIC, DeKalb and Babcock to establish their base prices, essentially similar pricing schemes were used.

The base price adjustments offered by the various companies vary significantly. For example, in 1980 Babcock's price for a 125 pound gilt was $222 based on a $40 per hundred weight (cwt.) market price. The price increased by $2 per gilt for each $1 per cwt. change in the commercial market. PIC maintained a price of $245 for its gilts so long as the commercial price remained within a range of $42-$58 per cwt. However, if the Peoria price moved outside that range, a $7 per head adjustment was made for each $1 movement in the
commercial market. The other three followed basically similar strategies, but with different dollar adjustments for changes in the commercial market.

Additional price adjustments were also available from some corporations. Babcock allowed quantity discounts as did Dekalb. Babcock also varied their gilt prices when average delivery weight varied from that ordered by the customer. Farmers Hybrid occasionally gave price reductions for boar/gilt combinations, but these were rather infrequent.

All corporate suppliers except Farmers Hybrid used the flat price system in setting boar prices during 1980. Within this system price classes are based upon the genetic or performance traits of the individual boars. These prices generally did not vary as market prices changed. Kleen Leen used a Genetic Potential Rating system (GPR) to establish seven price categories, with a resulting price range of $400-$1200 per boar. DeKalb established their own production indices which divided their boars into classes with prices between $450 and $950. Performance testing criteria were used by PIC to develop a price range of $450-$1200 over 5 classes of boars. Babcock differed somewhat from these three companies in that they set a single price of $500 for all of their boars.

Farmers Hybrid used a base market pricing system for boars which is quite similar to most corporate gilt pricing systems. They attempted to set their base price at a level exceeded by only 25 percent of the boars sold to commercial producers, according to market surveys. But they also float their price up or down by $5 for each $1 change in the prevailing price of market hogs.

Volume discounts were available from several corporate suppliers. Farmers Hybrid provided discounts for as few as two boars, with additional discounts
provided for larger orders. PIC allowed volume discounts only in certain boar classes, and Babcock provided one free boar for each four purchased.

One interesting aspect of the pricing strategies used by these corporations is the role that prices play as competitive weapons. Traditionally, price competition involves attempts to sell a product for the lowest possible price in order to attract customers. However, corporate suppliers have done just the opposite in their pricing systems. Rather than trying to maintain low prices relative to their competition, some suppliers deliberately attempt to price their breeding stock at high levels. Their explanation for this strategy is that commercial producers expect to pay high prices for the best breeding stock. When a firm's prices are below those of its competitors they believe that customers will infer that their product is lower in quality rather than a better buy. If commercial producers really do believe this and judge each supplier's stock quality by the price charged, raising prices may be an effective way for corporate suppliers to enhance their sales and profits. Research on producer buying behavior has shown that producers are willing to pay higher prices for breeding stock with superior genetic potential, under-paying for the probable economic worth of some characteristics and over-paying for others (Rothschild, et al.). However, there is no research to date which shows that commercial producers really consider the price of breeding stock to be a good index of quality.

Corporate Advertising and Promotion

Advertising and promotion play an important role in corporate breeding stock marketing activities. Advertising budgets, the size of the sales force and special sales facilities clearly are important facets of corporate behavior. However, other activities are not so easily recognized as being part of a
of a promotion scheme. Ancillary services and attempts to make a product seem to be uniquely different from competitors' products are two such activities.

Farmers Hybrid has the most extensive distribution system of the corporate suppliers. In the mid-1970s they shifted from a farmer-dealer marketing system spread throughout the Corn Belt to a specialized sales force with regional sales facilities in the primary hog producing areas. Farmers Hybrid now has fourteen sales centers located in five states which provide potential customers a chance to view and select their breeding stock. These centers are fully staffed with personnel to aid in the selection process. Animals are viewed from glassed-in rooms which allow the customer to get a good view of the breeding stock while still minimizing the risk of exposing the animals to disease. A full-time sales force of approximately 50 persons is involved in visiting producers on their farms and getting them to the sales centers.

A similar sales arrangement on a smaller scale is used by DeKalb. A sales force of twenty professional salesmen is used to promote DeKalb breeding stock. Eight Genetic Evaluation Stations in seven states provide commercial producers the opportunity to see and select breeding animals. However, both DeKalb and Farmers Hybrid will choose animals for hog farmers based on information about their commercial herds if that is preferred.

Kleen Leen uses a different sales and distribution approach. As a subsidiary of Ralston Purina, they have access to a large sales force of Ralston Purina feed dealers. However, some dealers are not involved in selling breeding stock, and those who are involved divide their sales time and efforts among a wide variety of products. Also, many feed dealers were not specifically trained to sell swine breeding stock, although Ralston is now changing this situation through an education program. In addition to their feed
dealers, Kleen Leen maintains a field sales force of fourteen who cover the
entire sales area and keep dealers informed about Kleen Leen operations. Kleen
Leen does not have facilities comparable to the sales centers or Genetic Eval-
uation Stations maintained by Farmers Hybrid and DeKalb; rather, animals are
chosen by Kleen Leen personnel based upon plans developed by the commercial
producer and the Kleen Leen salesman. Animals cannot be seen at any type of
viewing area because Kleen Leen management believes this is the best way to
minimize animal exposure to disease and guarantee the health of the breeding
stock they sell. Although animals are delivered sight unseen, producers do
have the right to reject any animals they find unsatisfactory.

PIC maintains policies very similar to those of Kleen Leen. Animals are
chosen based upon the genetic and performance standards desired by the
producer, but selection is done by PIC personnel. They also believe that herd
health is best maintained by eliminating exposure to outsiders. They too
provide producers with the right to reject any animals although this option is
chosen rarely. PIC's sales force of ten professional salespeople is smaller
than those of their major competitors.

Babcock does not have special viewing stations such as those of DeKalb and
Farmers Hybrid. Producers are allowed to see boars at their Wisconsin breeding
farm and gilts can be seen at multiplier herds around the country. However, as
part of their health program all visitors are required to shower and wear
clothing provided by Babcock when visiting these facilities, and visits are
generally not encouraged. As a part of their recent change in management
Babcock now sells new breeding herds almost exclusively to owners of new large
scale total hog confinement systems, although they also provide boars to opera-
tions which they previously stocked. Because they sell only through builders
of these systems they have a very small sales staff which varies in size depending upon the stage of the hog cycle at the time.

All of the large corporate suppliers have made extensive use of several advertising media. Advertisements in major hog publications, in newspapers, and on the radio are regular parts of their sales promotion strategies. In addition, DeKalb and Farmers Hybrid publish their own short magazines which have interviews and articles concerning topics of importance to commercial hog producers along with information about their breeding stock.

All of the corporate suppliers attempt to distinguish their products from those of their competitors. Each has developed special hybrid lines of breeding stock which they claim have unique genetic and performance attributes. In addition to emphasizing the special nature and performance characteristics of their product, they offer a variety of associated services which accompany sales of their breeding stock.

Two primary strategies have been used to distinguish important physical differences in corporate breeding stock from that available from most purebred breeders. Corporate suppliers emphasize their rigorous use of genetic principles and performance testing in their breeding programs. This is seen in corporate advertising which frequently mentions that geneticists are in charge of much of the corporate breeding programs. Further, many companies emphasize the superior performance characteristics of their breeding stock due to the "hybrid vigor" from their crossbreeding and selection program -- an attempt to distinguish their products from purebreds (although Kleen Leen also sells purebred lines).

Similarly, the second strategy tends to distinguish corporate producers from purebred producers rather than from one another. All corporate producers
have promoted the idea that the health standards maintained in their respective breeding programs are higher than those usually seen in purebred herds. This claim is used as a strong selling point in corporate promotion schemes in an era when disease outbreaks can be disastrous to large commercial swine operators.

Ancillary services provide another major method for corporate suppliers to distinguish their products from those of their competitors. These services include professional assistance in selection of breeding stock and advice on management of the hog enterprise. Trained animal scientists visit the producer to analyze his herd, develop goals for his commercial operation, and then map out the strategy necessary to achieve those goals. This assistance includes aid in choosing the specific type and quality of breeding stock necessary to achieve the producer's goals.

Management services are very important in the total services concept. Producers are given help in developing management skills such as performance and production record evaluation and general record keeping. Changes in the design and use of farm facilities and practices may also be encouraged. Management schools are run by some corporations which educate and train producers just entering the commercial swine business in all aspects of production and management.

As in the case of programs designed to emphasize physical differences in breeding stock, the corporate promotion of their ancillary services tends primarily to distinguish corporate suppliers from purebred breeders. These strategies make it clear that corporate suppliers view the dominant position of purebred breeders as the most important obstacle to their growth. They appear to be attempting to expand corporate sales at the expense of purebred sales,
and are not yet as concerned about competition from other corporate suppliers.

Product Development

Product development by corporate suppliers involves their efforts to produce breeding stock which is superior to any that is currently available. This could be accomplished either through selection and development of existing breeds or by developing a significantly different product.

An obvious change caused by corporate suppliers is the large scale development and sale of hybrid breeding stock (a hybrid is actually a crossbred developed from specific crosses of breeds). Purchases of crossbred boars were practically zero before corporate suppliers began operation. Since little performance testing had been done comparing purebred and crossbred boars, they devoted a substantial amount of their research, education and promotion efforts to develop crossbred lines with good performance characteristics, and to persuade commercial producers of their potential advantages. Independent evaluation of crossbred boar performance is still in the preliminary stages, but some early evidence suggests that crossbred boars do have certain advantages over purebreds. Studies (Neely, Johnson and Robison; Fent; and Wilson, Johnson and Wetteman) indicate that crossbred boars may reach sexual maturity more quickly and may be capable of settling sows more effectively. This could be a result of increased sex drive on the part of the boar or increased sperm production. Some data suggest that crossbred boars may increase conception rates and litter sizes, although this evidence is still sketchy. If crossbred boars offer improved performance for some commercial hog production systems,
corporate research efforts will have played an important role in improving production efficiency.

Corporate product development efforts may also result in important changes in the way breeding stock are raised. Since the reproductive and performance data they collect covers their entire herds and often includes more information on each animal than has been available from most purebred breeders, corporate breeders are better able to use genetic selection techniques to improve breeding herd quality. If this additional data is valuable to the commercial producer in his breeding stock purchase decisions, purebred breeders may be at a disadvantage if they do not supply equivalent information about their animals and use the best techniques available to make their products perform well enough to be effective competitors. Thus, one long-term effect of corporate product development could be the increased use of performance testing and selective breeding programs for the entire breeding stock industry. The likelihood of this happening depends upon the economic payoffs from producing better animals. The costs associated with these changes are significant; unless commercial customers are willing to pay higher prices for improved breeding stock, breeding stock suppliers will not have adequate incentives to regularly do in-depth performance testing and supply that information to their customers.

MARKETING OF PUREBRED BREEDING STOCK

Purebred producers face the same marketing problems as do corporate suppliers. However, the methods they have used to establish prices and develop, advertise and promote breeding stock with improved or unique characteristics are quite different from those of their corporate competitors. Much
of the difference can be attributed to the tremendous size and financial resource differentials separating individual farmers and large corporations. Institutions such as breed associations, land grant university research and extension programs, swine testing stations, and cooperatives historically have provided purebred breeders with some of the tools needed to compete with corporate producers which individual breeders could not develop alone. In addition, new marketing systems are being developed which may help to reduce the apparent corporate distribution advantages.

Since systematic records of all sales of breeding stock by breed are not available, secondary data sources must be used to estimate the market shares held by each of the major breeds. Table 3 reports three indicators of the relative importance of each breed in the purebred breeding stock market.

Official transfers include only those sales of registered boars and gilts which have been reported to the various breed associations. Transfers underestimate total sales since many purebred sales do not involve transfer of registration papers to the new owners. Although the proportion of sales resulting in transfers probably varies somewhat among breeds, the relative rankings indicated by transfers provide one estimate of each breed's rank in the purebred market.

Individual registrations include all purebred boars and gilts which are issued pedigrees by the purebred associations, and provide another estimate of the ranking of purebred sales. These figures tend to overestimate purebred sales of breeding stock; all breed associations automatically register all animals in a litter when the litter is registered, but every animal in each litter is not necessarily sold and used as breeding stock. Although the actual number of registrations is not an accurate indication of breeding stock sales,
<table>
<thead>
<tr>
<th>Breed</th>
<th>Individual Registrations</th>
<th>Transfers of Registered Breeding Stock</th>
<th>Percent of Producers Purchasing at Least One Animal for Breeding Purposes*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yorkshire</td>
<td>246,356</td>
<td>220,747</td>
<td>31,457</td>
</tr>
<tr>
<td>Duroc</td>
<td>258,245</td>
<td>248,052</td>
<td>51,248</td>
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<tr>
<td>Hampshire</td>
<td>143,716</td>
<td>120,659</td>
<td>29,103</td>
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<td>Spotted</td>
<td>130,023</td>
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<td>Landrace</td>
<td>79,331</td>
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<td>Chester White</td>
<td>62,679</td>
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<td>Poland China</td>
<td>18,905</td>
<td>17,893</td>
<td>2,769</td>
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<tr>
<td>Total</td>
<td>954,267</td>
<td>889,196</td>
<td>170,334</td>
</tr>
</tbody>
</table>

*The sum of the percentages reported exceed 100%, since many producers buy more than one breed each year.

Source: Breed association surveys and Hog Farm Management readership surveys.
the ranking of breeds by registration serves as a reasonable indicator of relative sales positions.

Additional information is furnished by the results of a readership survey by a major swine industry publication, Hog Farm Management. The percentages reported indicate the proportion of producers who purchased at least one animal from that breed for breeding purposes. Since this procedure does not differentiate between purchase of a single or several animals and only reflects the purchases of that magazine's readers, the results can only be used as rough estimates of breed shares.

All three estimates indicate the Yorkshire and Duroc sales are considerably larger than third ranked breed, Hampshire. Spotted, Landrace and Chester White shares follow the three leaders, while Berkshire and Poland China are smaller still.

Our survey suggests that several breeds have grown in importance over the past several years. The relatively recent emphasis on maternal performance traits has benefited the three white breeds, especially Landrace. Among the other breeds Duroc sales (particularly of boars) have been consistent while Spotted and Berkshire sales have improved. Demand for Poland China breeding stock has declined, and although Hampshire remains one of the leading breeds, its share appears to have fallen recently.

Pricing Purebred Breeding Stock

To determine the pricing and marketing systems used by purebred breeders, the secretaries of each of the major swine breed associations were surveyed by
mail or telephone. They provided estimates of the breeding stock sales methods used by their members. The results of these surveys are summarized in Table 4.

Several avenues are used by purebred breeders in pricing their breeding stock. These include in decreasing order of importance: 1) individual negotiations, 2) firm asking price, 3) auction, and 4) long term contracts. Although the relative importance of each varies slightly among breeds, few exceptions to this pattern occur.

Individual negotiation is the primary method of price setting among members of seven of the eight breed associations interviewed. Only among Spotted breeders are individual negotiations used in fewer than half of non-auction sales.

Firm prices (essentially take it or leave it) are set by breeders in a large part of the remaining sales, often with buyers selecting from several groups of boars priced at different levels. This is the predominant pricing method used in Spotted sales and is also very important in the sale of purebred Berkshires.

Long term contracts are significant for only three of the breeds. Somewhat fewer than five percent each of Yorkshire, Berkshire, and Hampshire sales are established by these contracts. The other five breeds report no significant use of long term sales agreements. Frequently, these sales are at the breeder's prevailing list price, with the oral contract establishing the priority given the buyer in making his selection from a particular group of boars reaching maturity.

Auctions are the final important method of price determination among purebred breeders. While all breeds used auctions to some extent, they were
<table>
<thead>
<tr>
<th>Breed</th>
<th>Auction</th>
<th>Negotiation</th>
<th>Private Firm price</th>
<th>Treaty Forward</th>
<th>Contract</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland China</td>
<td>5%</td>
<td>80%</td>
<td>15%</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Duroc</td>
<td>8%</td>
<td>65%</td>
<td>27%</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Chester White</td>
<td>7%</td>
<td>70%</td>
<td>23%</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Landrace</td>
<td>3%</td>
<td>94%</td>
<td>2%</td>
<td>0</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Spotted</td>
<td>14%</td>
<td>21.5%</td>
<td>64.5%</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Yorkshire</td>
<td>5%</td>
<td>85%</td>
<td>5%</td>
<td>5%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Berkshire</td>
<td>20%</td>
<td>40%</td>
<td>36%</td>
<td>4%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Hampshire</td>
<td>10%</td>
<td>67%</td>
<td>13%</td>
<td>5%</td>
<td>5%</td>
<td></td>
</tr>
</tbody>
</table>

Source: Survey of Purebred Swine Association Secretaries
clearly most important for Berkshire and Spotted sales and relatively unimportant to Yorkshire, Poland and Landrace breeders.

Auctions are not equally appropriate for all sizes of purebred breeders. Substantial costs such as purchase and distribution of auction catalogs and preparation of an auction meal are incurred in promoting and executing such a sale. Although these expenses will depend upon the size of the auction, even minimal arrangements may cost two thousand dollars. An auctioneer must also be hired with a standard fee of 2 percent of the total sales receipts. Thus, a substantial number of animals must be sold at a private auction in order for the producer to defray all of the expenses and still receive a net return from the sale equal to or exceeding the returns from private treaty sales.

No clear pattern of change emerged from our survey, regarding the use of the various pricing methods. In the last 5-10 years auctions have become more important in three breeds: Berkshire; Duroc; and Chester White; but are less important in two others, Landrace and Poland China. The use of firm asking prices has increased in Berkshire and Duroc sales, but the other six breeds have not had any significant usage change over the last five years. Similarly, the use of individually negotiated prices has remained stable for all breeds except Berkshire where fewer recent sales involve negotiation.

Only long term contracts demonstrate any kind of generally increasing importance, although five breeds indicate no significant usage of contracts. The Yorkshire, Berkshire, and Hampshire breed secretaries all report increased importance of contracts. Since the level of usage is still very low, the importance of this pattern remains unclear.
Advertising and Promotion of Purebreds

Until very recently product differentiation efforts by purebred breeders were primarily attempts to favorably distinguish their product from other breeding stock by promoting the advantages of their breed compared to other purebred breeds. Advertising and promotion by individual producers and breed associations attempted to establish specific characteristics of their particular breed. For example, Yorkshires have established a reputation as an outstanding mother breed, Durocs are known as a fast growing breed, and Hampshires are recognized as lean carcass or meat hogs.

The growth of corporate suppliers of hybrid and crossbred boars with extensive advertising aroused some purebred breeders to counter that strategy by generally promoting purebred breeders as a source of breeding stock. This effort has been coordinated through the National Association of Swine Records. Initial funding was through voluntary donations by individual breeders, but more recently each purebred breeder has been required to contribute one dollar to NASR for each litter registered. In 1980 more than $100,000 were raised in this way to finance national all-breed purebred advertising. Just as the corporate suppliers tend to focus on purebreds as their competition more than other corporate suppliers, the purebred breeders' strategy involves greater interbreed cooperation and increasingly presents a more united front against corporate suppliers.

Individual breeder advertising still plays the most important role in purebred promotion. Table 5 summarizes the findings of the breed association survey concerning advertising. Clearly, local and area newspapers are the most important media used by individual breeders for sales promotion. This fact indicates that the most important market to the purebred producer is local
<table>
<thead>
<tr>
<th>Breeds</th>
<th>Breed Magazine</th>
<th>Regional or National Publication</th>
<th>Local or Area Newspaper</th>
<th>Radio or Television</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duroc</td>
<td>23</td>
<td>10</td>
<td>50</td>
<td>less than 1</td>
</tr>
<tr>
<td>Poland China</td>
<td>15</td>
<td>2</td>
<td>40-50</td>
<td>0</td>
</tr>
<tr>
<td>Chester White</td>
<td>25-30</td>
<td>5</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>Landrace</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>Spotted</td>
<td>6</td>
<td>6</td>
<td>10-12</td>
<td>0</td>
</tr>
<tr>
<td>Yorkshire</td>
<td>10</td>
<td>2</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>Berkshire</td>
<td>30</td>
<td>10</td>
<td>40</td>
<td>0</td>
</tr>
<tr>
<td>Hampshire</td>
<td>30</td>
<td>40</td>
<td>40</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Breed Association Survey
commercial breeders. Breed magazine and regional or national publication advertising tend to be directed to other purebred breeders. Although sales to other breed members are important, for most purebred producers this is a secondary market.

Auction catalogs also play an important role as a type of specialized advertising for purebred breeders, both for the auction itself and as a general advertisement of the types of breeding stock available throughout the year. Catalogs indicating the time, place and date of a breeder's auction are frequently mailed by the breeder to potentially important customers. These customers include people who have previously purchased breeding stock from the breeder as well as other important breeders. The catalogs generally provide pictures of the animals to be auctioned along with their pedigree and any available performance data.

Cooperative Involvement

The management services provided by corporate suppliers have also generated a response among purebred breeders. Purebred breeders generally have not provided commercial producers with management services. Cooperative marketing organizations are developing to offer these services on behalf of purebred members, and to offer the large volume of breeding stock required by very large commercial producers.

Genetics Unlimited was organized by 140 purebred breeders in 1976. Its purpose was to provide commercial farmers with help in their managerial, breeding, and planning programs, as well as in their selection of seedstock. Since many purebred breeders are too small to provide the large number of breeding stock required by some very large confinement breeding and feeding
operations, this cooperative serves as a vehicle for member breeders to serve this increasingly important segment of swine production which otherwise would be served by the corporate suppliers (almost by default). It also aids its member breeders in reaching geographic markets they would not normally serve since the cooperative serves customers throughout the United States and Mexico. Finally, the Genetics Unlimited staff helps breeders to evaluate the performance characteristics, genetic potential, and pedigree of their animals in order to determine fair prices for them. Although GU advisors play an important role in recommending selling prices, the ultimate decision is in the hands of the owner member.

Presently, crossbred gilts in addition to purebred breeding stock from all eight major breeds are available through Genetics Unlimited. As part of their procurement services, the association provides a health program which requires vaccinations and issue of a health certificate by an accredited veterinarian in all breeding stock sales. Genetics Unlimited gives commercial producers access to the same sorts of management, genetic and health services previously available only through corporate sources.

Genetics Unlimited is not the only cooperative involved in marketing of swine breeding stock. Land O'Lakes has used a rather different system in aiding its members over the last five years. The cooperative maintains parent herds of Yorkshires, Landrace, Durocs and Hampshires; a few farmer herds also produce purebred animals. Land O'Lakes then sells purebred animals to its members who use them to produce crossbred gilts. In return the cooperative guarantees to purchase at least one boar per litter and the top 40 percent of gilts produced. Premiums are paid for pigs on test with additional premiums available for the best pigs on test.
Land O'Lakes then sells the crossbred gilts through their marketing system. They maintain a small sales force and use a show and demonstration unit to promote sales. Glassed-in viewing rooms are used to display the animals.

Currently, only purebred boars are sold by Land O'Lakes, but they plan to market crossbred boars in the near future. Their boars can also be viewed in glassed-in rooms.

Selling prices are set by Land O'Lakes. Gilt prices are based on a sliding scale which accounts for both performance characteristics of the breeding animals and market circumstances. The early 1981 price range for gilts was $220-$240 per head. Boars are grouped into three classes based upon their performance testing results. Prices primarily reflect this test classification, but the breed of the animal and competitive conditions also have some influence. The boar price spread during early 1981 was $354-$850 per boar.

A third cooperative, Farmland, provides purebred producers with somewhat different services than either Land O'Lakes or Genetics Unlimited. Farmland acts only as a marketing agent for its members. They chose the animals which they will market for their breeders and help set the prices to be charged. All breeding stock sold through Farmland must meet performance testing and structural standards established by the cooperative. These specifications include back fat probe and growth rate requirements. Test station data are used in deciding which breeders and parent stock to use. Additional data on the breeding stock sold to commercial producers are gathered on the commercial producers farm.

The majority of breeding stock sold through Farmland are crossbred gilts. The prices suggested by the cooperative for these gilts are based upon current
market prices. Crossbred gilt prices in early 1981 were four times the market price, resulting in a price of $160 per gilt. Purebred prices are higher, five times the market price, and were approximately $200 then.

Boar prices are based upon the performance of a contemporary group of the boar on the producers farm and on the performance of animals on that farm to that on other purebred farms. The breeder's evaluation of the animal's value is also considered. The resulting price range was $250 to $400 in the first quarter of 1981.

Although each cooperative supplies different services, their objectives are basically similar. Each provides the purebred producer with marketing advantages which would not usually be available to any one individual. Thus, although corporate breeding stock suppliers have had advantages in advertising and promoting their products, institutions are developing which help the purebred producer to compete effectively and which offer commercial producers a source of potentially high-performance breeding stock.

**Product Development by Purebred Breeders**

Research and development in animal breeding requires large investments of time and financial resources. In contrast to the large corporate suppliers' investments in genetic research, testing, and selection for various production characteristics, little basic genetic research is performed by individual producers. This gap in basic research is closed to a significant extent through research at land grant universities which is then made available to breeders through the extension service. Purebred breeders must then apply the findings of this research to their production practices. This final step is critical if purebred producers are to continue as major breeding stock suppliers.
While visual inspection and evaluation along with growth rates, litter sizes, etc. continue to be important development and selection criteria, performance testing is an important tool used by many progressive purebred breeders to improve their breed, and also used as a sales and promotion tool. However, only a small percentage of purebred producers engage in systematic performance testing. Our survey of breed secretaries indicates that between 5 and 20 percent of purebred producers (depending upon the breed) keep records on average daily gain and the age at which animals reach a typical market weight. Ultrasonic or probe data (measuring loin muscling and backfat thickness) are available less often than that, and feed efficiency, sow mothering ability and other production information are not available from many purebred breeders.

Prior to the advent of corporate suppliers, commercial hog producers often did not have the option of choosing animals which had been subject to extensive production testing. Since performance indexes are now available from several corporate suppliers, purebred producers may be at a competitive disadvantage if they do not provide comparable information. The importance of developing thorough performance testing procedures on the purebred farm was emphasized by many of the breed associations. Seven association secretaries identified inadequate performance data as a primary problem in production and marketing of swine breeding stock. It appears that the leadership in many breed associations recognize that significant changes may be necessary for purebred breeders to retain their position in the breeding stock market.

Purebred breeders have demonstrated the ability to respond to similar demand changes in the past when economic incentives made it feasible. However, improved purebred performance does not always result in improved commercial performance, and some traits have been unresponsive at both levels.
Increased demand for leaner and meatier hogs has resulted in significant changes in carcass composition since 1955. Selective breeding by purebred producers has improved muscling and reduced backfat in breeding stock. These changes have carried over into the commercial sector in the form of decreased average lard yield (Table 6). According to an unpublished USDA study, average backfat thickness declined three-tenths of an inch, and average carcass length increased six-tenths of an inch during the last 13 years.

However, other performance characteristics have not improved significantly over the past twenty years. Table 6 indicates that despite improved breeding stock test station feed efficiency results, commercial producers' feed efficiency has not appreciably changed during the last 20-30 years. Litter size has also remained rather stagnant although purebred litter size statistics aren't readily available. In some cases, purebred breeders have overlooked important commercial characteristics by concentrating on visual selection techniques and responding to current breed type fads rather than focusing on the commercial performance traits having the greatest long term payoff.

More recently, purebred producers have responded to both the corporate development of special crossbred lines and increased demand for crossbred breeding stock. Many purebred breeders now maintain purebred herds of two or three breeds in order to both serve commercial producers with a two or three breed rotation breeding program, and to produce crossbred breeding stock. Although selling crossbred gilts is widely accepted in the purebred community, the production and sale of crossbred boars by purebred breeders remains controversial in many purebred circles, though an increasing number of purebred breeders have begun to sell them.
<table>
<thead>
<tr>
<th>Year</th>
<th>Pigs Per Litter, U.S. Average&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Average Land Yield, U.S.&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Pounds of Feed Per Hundred Weight of Gain&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>6.31 Dec-May, 6.65 June-Nov</td>
<td>35.4</td>
<td>440</td>
</tr>
<tr>
<td>1955</td>
<td>6.90 Dec-May, 6.81 June-Nov</td>
<td>34.9</td>
<td>417</td>
</tr>
<tr>
<td>1960</td>
<td>9.96 Dec-May, 7.02 June-Nov</td>
<td>32.2</td>
<td>424</td>
</tr>
<tr>
<td>1965</td>
<td>7.22 Dec-May, 7.23 June-Nov</td>
<td>27.9</td>
<td>407</td>
</tr>
<tr>
<td>1970</td>
<td>7.33 Dec-May, 7.21 June-Nov</td>
<td>22.8</td>
<td>420</td>
</tr>
<tr>
<td>1975</td>
<td>7.15 Dec-May, 7.21 June-Nov</td>
<td>14.8</td>
<td>441</td>
</tr>
<tr>
<td>1980</td>
<td>7.26 Dec-May, 7.23 June-Nov</td>
<td>13.0 (1979)</td>
<td>410</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Boar Probe Backfat&lt;sup&gt;d&lt;/sup&gt;</th>
<th>Percent Muscling&lt;sup&gt;d,e&lt;/sup&gt;</th>
<th>Pounds of Feed Per Hundred Weight of Gain, Boars&lt;sup&gt;d&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1956</td>
<td>1.46 Spring, 1.31 Fall</td>
<td>47.33 Spring, 48.53 Fall</td>
<td>285 Spring, 296 Fall</td>
</tr>
<tr>
<td>1960</td>
<td>1.19 Spring, 1.20 Fall</td>
<td>50.46 Spring, 50.67 Fall</td>
<td>277 Spring, 285 Fall</td>
</tr>
<tr>
<td>1965</td>
<td>.95 Spring, 1.08 Fall</td>
<td>53.93 Spring, 53.85 Fall</td>
<td>274 Spring, 261 Fall</td>
</tr>
<tr>
<td>1970</td>
<td>.76 Spring, .73 Fall</td>
<td>55.27 Spring, 56.94 Fall</td>
<td>246 Spring, 253 Fall</td>
</tr>
<tr>
<td>1975</td>
<td>.80 Spring, .87 Fall</td>
<td>56.78 Spring, 55.73 Fall</td>
<td>243 Spring, 249 Fall</td>
</tr>
<tr>
<td>1980</td>
<td>.79 Spring, .77 Fall</td>
<td>54.8 Spring, 53.9 Fall</td>
<td>249 Spring, 241 Fall</td>
</tr>
</tbody>
</table>


<sup>c</sup>Illinois Farm Business Farm Management Recordkeepers (selected Illinois Commercial Swine Producers).

<sup>d</sup>Iowa Swine Testing Station, Box A, ISU Station, Ames, Iowa.

<sup>e</sup>Barrow Sibs of Boars being tested.
Thus, although purebred producers cannot maintain basic research facilities, current research data is available to them. They have responded to new information and the changes in demand that resulted by improving existing breed lines or by developing their own new types of breeding stock. Still, many purebred breeders appear to be falling behind their corporate competitors in the area of performance testing and, if current trends continue, they may find it increasingly difficult to compete in the swine breeding stock market.

SUMMARY AND IMPLICATIONS

Our surveys of corporate and purebred swine breeding stock suppliers clearly indicate that the structure of the industry has been changing significantly during the last decade. The gradual consolidation of commercial swine production into large, specialized, capital-intensive units has led to a greater demand for large volume units of breeding stock which have high genetic performance potential and minimal risk of disease. As this structural change has been taking place, large corporate suppliers of breeding stock have emerged as an important competitive force in the breeding stock market, offering a package of sophisticated genetic selection and performance testing, health programs, and management services to their customers. By focusing on the sale of crossbred or hybrid breeding stock, the corporate suppliers have developed a product that differs from the product offered by purebred breeders who continue as the dominant suppliers in the breeding stock market. The marketing practices of the major corporate suppliers usually involve premium prices, often based upon performance indexes, and extensive advertising, promotion, and sales efforts relative to their purebred competitors.
Corporate suppliers have made inroads into the breeding stock market, now supplying 15-20% of all boars purchased. Purebred breeders have responded to the changing market environment and competition in several ways. Many purebred breeders now have several breeds to accommodate commercial producers with three-breed rotations, and also supply crossbred gilts (and sometimes crossbred boars). In addition, purebred breeder cooperatives have been formed or become active in trying to respond to the corporate supplier challenges. The National Association of Swine Records involves nearly all purebred breeders cooperatively financing purebred advertising and promotion. Genetics Unlimited is a cooperative effort by a group of purebred breeders to offer large volumes of performance tested product and breeding herd selection and management services to large scale commercial producers. While these and other cooperative efforts are beginning to take effect, most purebred association leaders continue to feel that the lack of adequate performance testing and records is an important area requiring improvement by most purebred breeders during the next decade.

The ultimate structure of the swine breeding stock industry will largely be determined by commercial producers' demand. Therefore, the present trend toward large confinement systems in the commercial swine sector will have important implications for the breeding stock industry. Since these new methods generally involve complex production and business techniques, the commercial producer is becoming a sophisticated manager. It seems likely that these producers will place greater emphasis upon scientific measures of performance and genetic characteristics in selecting breeding stock than ever before. Large confinement unit managers are also extremely disease conscious. Since confinement systems require large investments in building and equipment and are conducive to rapid
spread of disease, the financial risks involved if disease is introduced are very great. Therefore, the suppliers who can accommodate these demands will dominate the swine breeding stock industry. Although these conditions appear to favor corporate suppliers, this is not necessarily the case.

Although the role for small, traditional suppliers will be limited, progressive purebred breeders should play an integral part in the industry. Many purebred breeders have adopted the same scientific approach to breeding animals as have corporate suppliers, but have focused more on visual selection rather than performance testing and associated selection techniques. The large number of breeders provides a more extensive and diverse gene pool than is available from corporate suppliers. This can be an advantage when the demand for various breeding stock characteristics changes as it sometimes does in swine production.

Purebred breeders are also more aware of disease problems now than they have ever been before. This concern is evident in the development of specific pathogen free classifications for swine herds and in the health program devised by Genetics Unlimited. And, although purebred breeders have not been totally successful in dealing with this problem, some corporate suppliers have experienced similar difficulties.

While artificial insemination with frozen semen was only mentioned briefly, it is still in its infancy and could become much more important in the future. The great advantage of artificial insemination is that it provides superior genetic material with an extremely low disease risk. Despite this advantage, the techniques employed in collection and use of frozen semen dictate that it will play a smaller role in swine production than it has in the dairy industry.
The cyclical nature of the swine breeding stock market will undoubtedly continue, causing this capital intensive industry's financial performance to rise and fall in similar fashion. While large corporations and older, established purebred breeders are better able to survive the bad times during these cycles, unstable financial results are often looked upon with disfavor by corporate investors, and could affect the attractiveness of more extensive long-term corporate involvement in supplying swine breeding stock.

In summary, the swine breeding stock industry should continue to be dominated by individual breeding stock suppliers, but the market share held by corporate producers is likely to continue to grow. However, the successful private breeder will be different from the traditional purebred breeder today, and will employ many of the same production and management techniques as his corporate competitor.
REFERENCES


