PERFORMANCE TRENDS OF BOARS TESTED AT THE OKLAHOMA SWINE EVALUATION STATION (1971 TO 1990)

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Story in Brief

Performance data from 2,931 boars tested at the Oklahoma Swine Evaluation Station (1971 to 1990) were analyzed to investigate time trends. Meaningful results were obtained for Chester White, Duroc, Hampshire, Spot and Yorkshire boars. Traits measured were average daily gain, pen feed efficiency, backfat thickness (at 230 lb) and loin eye area (at 230 lb). There has been a steady increase in average daily gain. A trend in feed efficiency has not been apparent. Backfat thickness and loin eye area have experienced periods of rapid change, but these changes have not been consistently in one direction. If these changes are reflective of actual genetic trend in the swine industry, they indicate favorable change in growth but no consistent improvement in the other traits.

(Key Words: Swine, Test Station, Breeds, Growth, Feed Efficiency, Carcass Merit.)

Introduction

Boar testing stations have been used as a tool for genetic improvement of commercial swine production since the 1950's. The function of a test station is to evaluate boars from different herds for postweaning performance under uniform conditions. The Oklahoma Swine Breeder's Association established a testing station on the OSU Animal Science Department Farm near Stillwater in 1971. Examination of time trends should indicate the change in boars that were brought to the station. Genetic change in the Oklahoma purebred swine industry is one, but not the only, factor involved. The purpose of this report is to evaluate those time trends.

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Materials and Methods

The Oklahoma Swine Evaluation Station was built in 1970. The station originally had one barn with 24 open-front pens measuring 5 by 15 ft. A second barn was constructed in 1975 which increased capacity to 48 pens. The method of testing has varied during the life of the station. Each pen contained three or four males of which two or three were boars. In most cases, pigs within a pen were progeny of the same sire. Pigs were placed on test when the pen averaged 70 lb and were removed from test at 230 lb. During most years there has been a spring test and a fall test.

Data obtained when the pigs reached off-test weight included average daily gain, pen feed efficiency and an ultrasonic scanogram estimate for loin eye area and backfat thickness. Feed efficiency was not included for any pens that included pigs by more than one sire. Backfat thickness was the average of measurements taken at the shoulder, the last rib and the last lumbar vertebra. Loin eye area was measured at approximately the tenth rib. All backfat and loin eye area values were adjusted to 230 lb with equations recommended by the National Swine Improvement Federation.

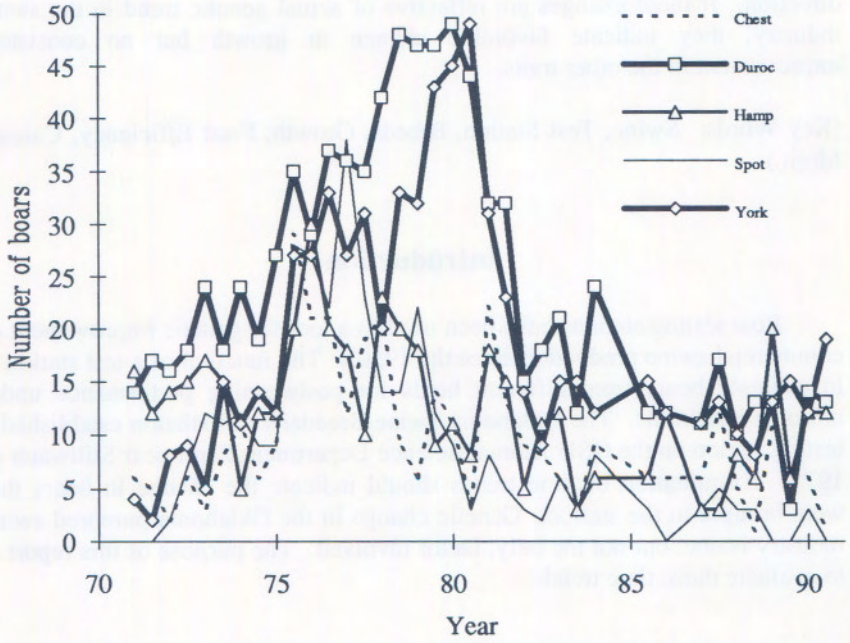

Figure 1. Number of boars tested at the Oklahoma Swine Evaluation Station.

Boars (n=2931) have been tested from nine breeds: Berkshire, Chester White, Duroc, Hampshire, Landrace, Poland China, Spot, Yorkshire and Red Wattle. There was an insufficient number of boars (n<70) from the Berkshire, Landrace, Poland China and Red Wattle breeds to have meaningful time trends and they were not included in these analyses. The numbers of boars for each year-season group is shown in Figure 1. The increase in number of boars tested in 1975 is a reflection of the completion of the second test barn. After 1981, the second barn has been used for other evaluation programs which reduced the number of boars tested. More Duroc and Yorkshire boars have been tested than any other breed. More Hampshire than Yorkshire boars were tested until 1974, but the number of Hampshire boars has been lower since. Spot and Chester White boars have never been tested in large numbers, but there have been representatives from these breeds in most test groups.

All data were analyzed using least squares with a model that included the effects of breed, year, season, test group and two- and three-way interactions among breed, year and season. The results are presented graphically from the least squares means from the three-way interaction of breed, year and season.

Results and Discussion

The time trend for average daily gain is shown in Figure 2. There has been an increase (P<.01), over time, in average daily gain of boars tested. No one breed is clearly the fastest growing although Hampshire boars grew the fastest during many test periods. In contrast, Chester White boars were the slowest growing breed during many of the test periods and, from 1977 through 1983, the difference was quite large.

Feed efficiency (Figure 3) has been very erratic over time. There is no clear trend. The inconsistent performance may, in part, be a reflection of the difficulty in measuring feed intake accurately. No breed showed a clear advantage in feed efficiency although Spot boars had the poorest feed efficiency during 16 of the test periods in which they were involved.

Backfat thickness has undergone several changes over time (Figure 4). Until 1979, backfat thickness declined rapidly. This may be reflective of pressure to decrease fat and increase muscling that predominated in the industry during the 1950's through much of the 1970's. Following 1979 there was an abrupt change in trend for backfat thickness as it increased rapidly for approximately eight years. This was followed by another decrease in fat thickness through 1990. Hampshire boars had the lowest backfat thickness in nearly every test group. The other breeds were generally quite similar.

Loin eye area has also experienced several changes in trend (Figure 5). Through 1974 there was an increase in loin eye area. This was followed by a

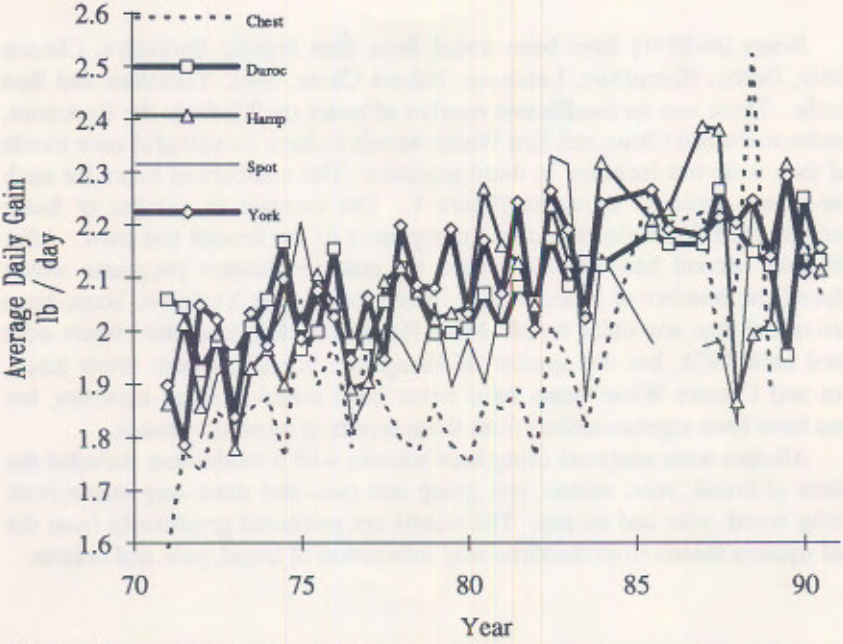

Figure 2. Average daily gain time trends for boars tested at the Oklahoma Swine Evaluation Station.

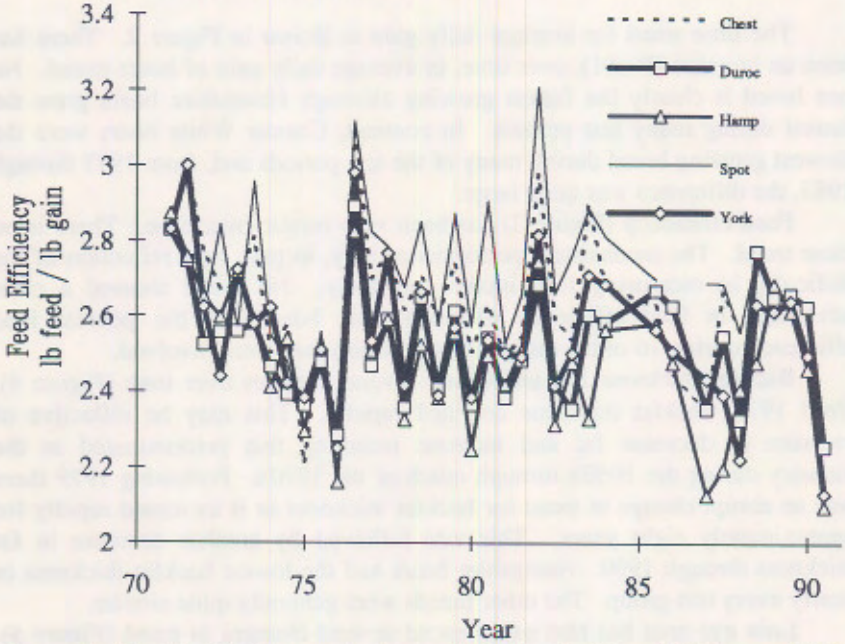

Figure 3. Feed efficiency of boars tested at the Oklahoma Swine Evaluation Station.

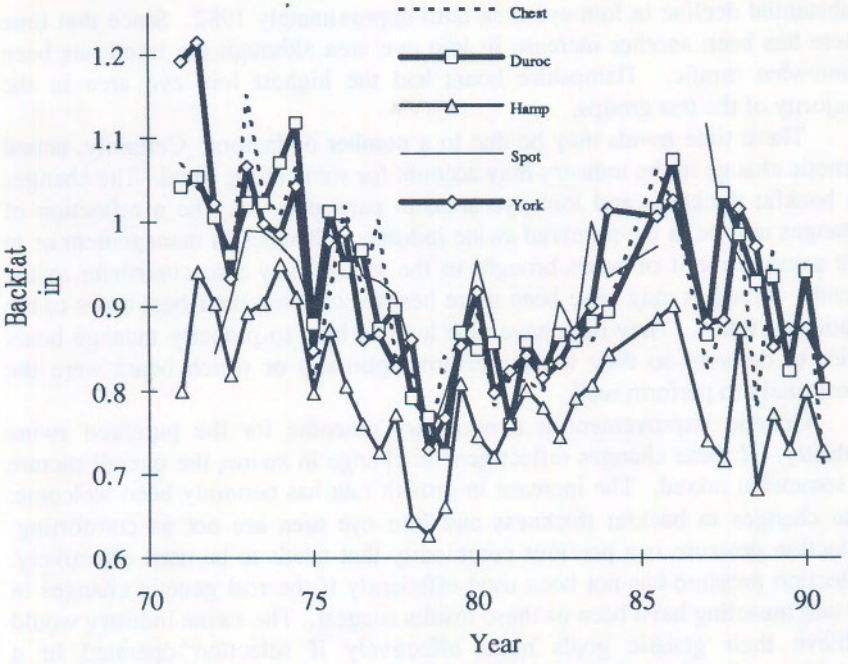

Figure 4. Backfat of boars tested at the Oklahoma Swine Evaluation Station.

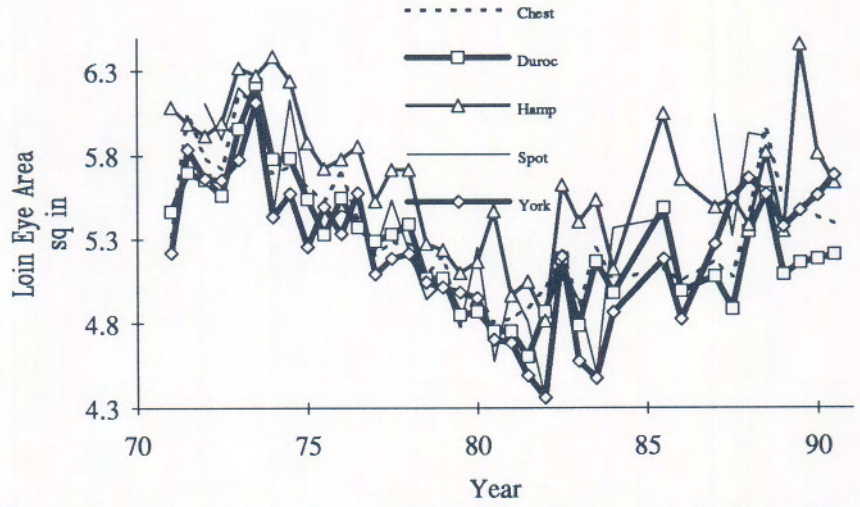

Figure 5. Loin eye area of boars tested at the Oklahoma Swine Evaluation Station.

substantial decline in loin eye area until approximately 1982. Since that time there has been another increase in loin eye area although the trend has been somewhat erratic. Hampshire boars had the highest loin eye area in the majority of the test groups.

These time trends may be due to a number of factors. Certainly, actual genetic change in the industry may account for some of the trend. The changes in backfat thickness and loin eye area, in particular, may be a reflection of changes in type in the purebred swine industry. Changes in management or in the average merit of boars brought to the station may also contribute to the trends. Breeders may have been more hesitant to bring their best boars to the station at times. They may have also learned how to properly manage boars prior to delivery so they would perform optimally or which boars were the most likely to perform well.

Genetic improvement is a necessary outcome for the purebred swine industry. If these changes reflect genetic change in swine, the overall picture is somewhat mixed. The increase in growth rate has certainly been welcome. The changes in backfat thickness and loin eye area are not as comforting. Selection pressure is a precious commodity that needs to be used effectively. Selection pressure has not been used efficiently if the real genetic changes in fat and muscling have been as these results suggest. The swine industry would achieve their genetic goals more effectively if selection operated in a consistent direction and extremes were avoided.