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SELECTION

Cooperative Extension Service PURDUE UNIVERSITY Lafayette, Indiana

Selection for ~~Pork~~ ^{Stock} Carcass Improvement

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Selection for muscularity

Most swine producers know about pork carcass evaluation procedures. Breeders supplying stock for commercial use realize that their sales cannot be based solely on the genetic ability of their stock to grow rapidly. There is an increasing demand for them to present evidence that their animals will produce lean carcasses of high quality as well. The breeder or producer must decide how much time he can devote to obtaining the measurements and then choose the method which is most suitable for him. Several methods are available, all of which may be used singly or in combination.

Muscularity refers to the lean portions of the carcass included in the ham, loin, picnic, Boston butt and bacon cuts. Since the ham and loin make up about 70 per cent of the lean cut weight of the carcass, plus the fact they are the highest valued cuts, their percentage of the total can be used as an efficient measure of muscularity. The inclusion of other cuts often introduces error stemming from cutting variations. The greatest difficulty is obtaining live animal measurements which accurately reflect muscularity.

Visual appraisal

This is the oldest and most frequently used method of assessing muscularity. But to use it effectively one must be certain that he concentrates only on the points which accurately indicate muscle mass. The muscularity of hams and loins is more easily dis-

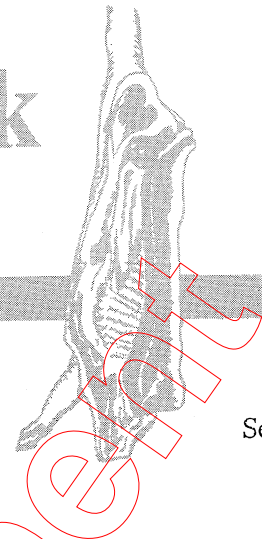
cerned than any other part of the live animal. Certainly they should receive the major emphasis in any visual appraisal. In order that fat not be confused for muscularity, the appraisals should be made in the period before the laying down of fat becomes prominent. Furthermore, in making such judgments, one should recognize the extraneous factors which influence muscularity but have no influence upon the breeding value of the animal such as management, season, and so forth.

Backfat thickness

Backfat thickness measurements can be obtained relatively quickly and easily by means of the probe. It, like most of the carcass traits, is highly heritable. Consequently rapid progress can be made through selection against backfat thickness. Research has shown it to be highly related to other carcass and production traits as well. As backfat has been reduced by selection, decreases in feed utilization and increases in average daily gain, per cent lean cuts, per cent ham and loin, and loin eye area have resulted simultaneously. Thus, this trait measured on the live animal offers the breeder and producer one of the quickest, most accurate, and most profitable methods of herd improvement.

Loin eye area

The relationships between loin eye area and carcass and production traits are not as great as they are in the case of backfat thickness. Therefore, selection solely for this



trait does not offer as good a method of swine improvement as does that of backfat. It has value, however, as a measure of leanness inasmuch as it influences pork acceptability by the consumer. Presently the only means of measurement of the trait is by the use of ultrasonics. Special equipment is necessary as is considerable time to take and interpret the ultrasonic measurements.

Selecting for quality

What is quality?

The term "quality" has different meanings throughout the swine industry. In its most restricted sense, it refers to the characteristics of pork muscle which give assurance of palatability and acceptable processing or cooking characteristics. Therefore, muscle quality is a combination of visible properties which give the greatest chance of having tenderness, juiciness, flavor and minimal cooking shrinkage.

Color, firmness and structure

Some properties of muscle are closely related to each other. For example, pale colored muscles are usually soft and have excessive juice loss during refrigerated storage. This combination of characteristics is described as a pale, soft exudative (PSE) muscle condition and is highly undesirable. Consequently these combined characteristics (color, firmness, and structure) are the most important quality factors that are normally observed. A scoring system has been developed which aids in making uniform judgments of these traits:

- 1 = Pale, soft and exudative (unacceptable)
- 3 = Normal
- 5 = Dark, firm and dry (not normal but acceptable)

These scores appear frequently on the summary sheets for carcass shows, type demonstration data, and so forth.

Marbling

Of lesser importance is the quality characteristic of intramuscular fat or marbling. However the presence of marbling in pork muscle does give some assurance of a tender, juicy, flavorful product. Marbling is usually scored as follows:

- 1 = Practically devoid
- 3 = Moderate
- 5 = Abundant

The score 3 is considered adequate for marbling and higher degrees add little, if any, to palatability.

Tools for selection for quality

Only recently has information become available which provides some guidelines for producers to use in selection of breeding animals with superior muscle quality. It should be emphasized however, that there are no simple live animal traits that always indicate the degree of muscle quality.

There is some evidence that muscle quality factors are heritable characteristics. It is possible therefore to utilize the information available from the slaughter of littermate animals for certification, carcass contests, and so forth.

There are also some live animal characteristics which are useful indicators of the presence or absence of quality, particularly with respect to the PSE muscle condition. Research has shown that a certain degree of stress susceptibility is necessary for an animal to exhibit PSE muscles. Consequently, producers should be especially watchful for strains in their herds which seem susceptible to heat stroke, weather changes, excitement or other types of stress.

Relation to muscularity

Information on animals exhibited in carcass shows and those slaughtered for research

shows clearly that muscular animals have a higher frequency of PSE muscles than do poorly muscled pigs. This could mean that poor muscle quality results from selection of muscular animals. On the other hand, it is possible that the conditions of the growing environment produce this relationship. Some research indicates that growing en-

vironments with low stress levels reduce the tendency for muscularity to be accompanied by poor quality. In any case producers should be watchful for evidence of stress susceptibility in their herds and avoid management systems that are inherently stressful to the pigs.

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