

SWINE CARCASS CONTEST EVALUATION METHODS

B. C. BREIDENSTEIN

UNIVERSITY OF ILLINOIS

Over a period of the past several years swine carcass contests have become increasingly popular. This increased popularity is undoubtedly due to the widespread publicity given to the various programs designed to demonstrate the value of the criteria commonly used to describe the "meat-type hog" and to extoll its virtues. It is presumed that the primary purpose of such contests is to acquaint the exhibitors and spectators with the specific criteria used and with the implications to the industry of improvement along these lines. Hence it appears obvious that these contests must have educational and promotional assets for the swine industry if we as educators can justify the expenditure of our time in assisting with them. It is just as obvious that, as in any educational venture, our first responsibility is to be certain of the validity of our facts.

There are several commonly used criteria primarily of quantitative yields of lean meat, but attempts are also usually made to account for quality differences in arriving at carcass placings. Criteria which are used to indicate lean yield of carcasses listed in approximately a decreasing order of popularity are:

1. Live weight
2. Carcass backfat
3. Carcass length
4. Dressing percentage
5. Visual appraisal of the intact carcass.
6. Loin eye area
7. Per cent lean cuts
8. Total cut-out

In rare cases, carcasses are placed by using some combination of the above measures and with no other consideration. More frequently, however, the placings which are thus derived are modified by considerations of quality factors such as carcass firmness, color of lean, feathering and marbling or intermingling of fat with the lean. With the multitude of criteria available to use either solely or as an aid in carcass placings, it behooves us to consider the basis for the use of anyone, or a combination of these indices.

Live weight is no doubt, the most universally accepted of all indicators of quantity of edible product and yet it is because of the inadequacies of this measurement that other indices have been developed and used. Most carcass contests incorporate live weight ranges into their rules as guides to differentiating classes. As a general rule, a total range in liveweight for all classes in a contest is not greater than 180 pounds as a minimum to 240 pounds as a maximum. There frequently are as many as two or three weight brackets within these total ranges which

represent the classes. It is the author's opinion that liveweight, while it may be acceptable as a criterion by which to categorize animals for class purposes, leaves considerable room for improvement in techniques insofar as using it as a placing criterion is concerned. Live weight can be, and is tailor-made to fit the particular weight group in which the exhibitor wishes to show the animal. Such procedures then leave a question as to the influence of age, of feeding regimes and other pre-slaughter treatment not only on the indices of quantity, but upon quality factors as well. Our current status of ignorance of the influence of such pre-slaughter treatment on carcass characteristics makes it impossible to prognosticate the complications that result therefrom.

Carcass backfat is another index of quantity that is almost universally accepted. In fact, it is so well accepted that one finds it reported in almost every report of carcass contests as well as being a part of all carcass testing programs. Negative correlation coefficients of between .47 and .72 have been reported to exist between carcass backfat and per cent lean cuts. A correlation coefficient of $-.18$ has been reported between carcass backfat and loin eye area. A correlation coefficient of $-.09$ has been reported to exist between carcass backfat and carcass length.

The relationship that exists between carcass length and per cent lean cuts has been reported as low as a $+.02$ and as high as a $+.33$. A correlation of $+.33$ has been reported to exist between carcass length and loin eye area. With correlation coefficients between carcass length and the other indices reported in these ranges, it leaves one with considerable question concerning the validity of length as an index to muscling. There may be reasons other than its value as a lean indicator to justify its use, but it appears questionable as to whether it has appreciable value in deriving carcass placings.

Dressing percentage of some adaptation of dressing percentage is frequently used as a criterion in deriving carcass placings. Its use again raises the rather important question concerning the exhibitors ability to alter it to the advantage of the animal he is exhibiting. Pre-slaughter fill or stresses placed on hogs being exhibited will result in rather drastic changes in dressing percentage. With the inclusion of live weight and its relationship to the carcass as a determinant in the placing of the carcass, it is entirely possible that the superior carcass will not win. In fact, the winner quite frequently will be the exhibitor who was able to withhold feed from his animal for the longest period of time prior to weighing for slaughter weight. Some work has been done to arrive at a "constant fill" factor which will eliminate this possibility. Mr. Carroll Plager of the Geo. A. Hormel Company is a staunch proponent of this method. Some work on this matter has, I believe, been conducted under Professor Kunkle at Ohio State also. The primary advantage of this method is to convert carcass information and carcass placings to a live basis in order to make the results and the information more meaningful to the producer-exhibitor.

Visual appraisal of the carcass as an attempt to subjectively estimate the lean meat yield, and to apply the judges estimate of the

probably qualities such as sales appeal and ultimate eating qualities of the product, constitute a part of almost all carcass contests. There are times when physical facilities preclude the possibility of further treatment of the product. Even such limited attention to the carcass, it may be argued, is superior to live animal placings since the judge is viewing the product one step closer to its consumption. It is, however, the author's opinion that only under conditions of limited physical conditions should such a method be exclusively used. Most assuredly a contest in which objective criteria of proven value are used, even though such measures are still in need of more thorough study, is superior to subjective estimates alone.

Loin eye area is widely accepted as an index to muscling and it can be used with relative ease, rapidity and accuracy. Loin eye area has been reported to be related to per cent lean cuts on a carcass basis with a correlation of between $+ .50$ and $+ .57$.

Per cent lean cuts probably represents the ultimate in "true carcass value", at least in the eyes of neophytes. Careful inspection of data will, however, reveal that inaccuracies apparently exist in this measure as well as others. If one can assume that animals are bilaterally symmetrical, then it is certain that per cent lean cuts cannot be determined with anywhere near 100% accuracy. In unpublished work conducted on a packer's cutting line by University of Illinois workers, the highest correlation coefficient between an individual cut of the right side and the comparable cut of the left side was $+ .83$ for green bellies. Correlation coefficients for each of the four lean cuts were all below this figure, some appreciably so. It thus seems apparent that, while cut-out represents the return to the packer, it is relatively inaccurate in determining differences in value between individual carcasses or animals. It thus falls into the category of being useful, but not ideal as a measure of value differences for contest purposes.

Total carcass cut-out is used quite frequently as a means of arriving at a carcass placing. On occasion this complete cut-out is used to determine the per cwt. live value. Total cut-out is subject to the same human errors as is per cent lean cuts. Furthermore, relating such figures to live value incorporates the errors of dressing per cent and of live weight. Hence it seems that the use of such a method could easily result in sizeable errors in differentiating between individuals. There is likewise the question of the value of total cut-out over and above use of the four lean cuts. Since nearly 70% of the dollar carcass value of a superior hog lies in the four lean cuts, and since on a weight basis, the fat cuts constitute a higher percentage of the total weight of the carcass in a fatter hog than is the case with lean hogs, it is difficult for the author to comprehend the advantages of total cut-out over per cent lean cuts as a means of differentiating between carcasses.

In conclusion, I believe there are considerable errors in any one index to carcass value. Probably the most effective job of evaluating and placing can be done by incorporating several of the validated or partially validated measures into one's judging procedure. It also seems apparent that subjective appraisal, particularly of quality

factors, must constitute a part of the judging routine and must play a role in the final placings. The problems associated with differentiating between carcasses either for carcass contests or to evaluate pre-slaughter treatments are far from being solved. Considerably more work must be done if we are to accurately depict carcass differences for any purpose. Finally, for contest purposes one must interpret the results in understandable layman's language if we are to fulfill our educational responsibilities.

SIMPLE CORRELATIONS - TABLE I

	Backfat	Length	Dressing Percentage	Loin Eye Area	% Lean Cuts	% Primal Cuts	References
Backfat	----	----	.17	----	----	----	(1)
	----	----	----	----	-.49	----	(2)
	----	----	----	----	-.47	-.39	(4)
	----	-.09	----	-.18	-.72	-.66	(5)
	----	----	----	----	----	-.27	(6)
Length	----	----	----	----	.28	----	(2)
	----	----	----	----	.28	.38	(3)
	----	----	----	----	.33	.36	(4)
	-.09	----	----	.33	.02	.05	(5)
Dressing Percentage	.17	----	----	----	----	----	(1)
	----	----	----	----	----	-.24	(2)
	----	----	----	.20	----	----	(5)
Loin Eye Area	----	----	----	----	.52	.59	(3)
	-.18	.33	.20	----	.50	.37	(5)
	----	----	----	----	.57	.38	(6)
% Lean Cuts	-.49	.28	----	----	----	----	(2)
	----	.28	----	.52	----	----	(3)
	-.47	.33	----	----	----	----	(4)
	-.72	.02	----	.50	----	----	(5)
	----	----	----	.57	----	----	(6)
% Primal Cuts	----	.38	-.24	.59	----	----	(2)
	-.39	.36	----	----	----	----	(4)
	-.66	.05	----	.37	----	----	(5)
	-.27	----	----	.38	----	----	(6)

REFERENCES CITED

1. Hetzer, H. O., J. H. Zeller and O. G. Hankins. 1956. Carcass yields as related to live hog probes at various weights and locations. J. Animal Sci. 15:257.
2. Pearson, A. M., L. J. Bratzler, R. J. Deans, J. F. Price, J. A. Hoefer, E. P. Reineke and R. W. Luecke, 1956. The use of specific gravity of certain untrimmed pork cuts as a measure of carcass value. J. Animal Sci. 15:86.
3. Pearson, A. M., L. J. Bratzler, J. A. Hoefer, J. F. Price, W. T. Magee and R. J. Deans. 1956. The fat-lean ratio in the rough loin as a tool in evaluation of pork carcasses. J. Animal Sci. 15:896.
4. Pearson, A. M., L. J. Bratzler and W. T. Magee. 1958. Some simple cut indices for predicting carcass traits of swine. II, Supplementary measures of leanness.
5. Price, J. F., A. M. Pearson and E. J. Benne. 1957. Specific gravity and chemical composition of the untrimmed ham as related to leanness of pork carcasses. J. Animal Sci. 16:85.
6. Zabrisky, S. E., D. E. Brady, J. F. Lasley and L. A. Weaver. 1959. Significant relationships in pork carcass evaluation. I. Lean cuts as criteria for live hog value. J. Animal Sci. 18:420.

- - - - -

CHAIRMAN BRAY: I know we didn't have Burdette present but we might have seen him jabbing at least in that talk. I think he did a nice job in covering some of the shortcomings of many of the evaluation procedures now in use.

For covering the next subject, "Beef and Lamb Carcass Contest Evaluation Methods," we have asked Dr. E. A. Kline of Iowa State to cover this subject and talk about it. We haven't heard much from you. Here is your chance.

#