MUSCLING IN MEAT HOGS

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Soil fertility and crop production are the foundations of agriculture. Most of the crops grown are fed to livestock and processed into meat. Hence, livestock makes up the backbone of the Cornbelt farm economy and accounts for almost three-fourths of that region's farm income. Hogs process about 50 percent of our annual corn crop into meat and meat products. The demand for corn and its price largely comes from the consumers' demand for meat. If pork demand is good, hog production expands and if slow, farmers curtail production. The corn-hog ratio is the barometer. Anything that can be done by the retailer, processor, or producer to help improve the quality or eye appeal of a pork commodity increases consumer acceptance, and in the end, consumption.

Since World War II, there has been a terrific change in our method of merchandising meat products. We have seen a great growth in supermarkets, and with them have come the self-service meat counters. Meat, today, has to sell itself on its own merit. Quality and eye appeal are of the utmost importance.

There are two basic things producers can do to improve this quality and eye appeal. First, produce heavy muscled hogs and then market them in the 200-225# weight bracket.

The two pigs you will see in the slides came from the same farm and ran to the same self-feeder. They are 5½ months old and both weighed 200 pounds alive. In the load of 40 hogs, we could have selected wider differences. This variation can be found in about any load of hogs. The purpose of these pictures is to show the differences in muscling in hogs and the amount of fat the hogs have and where it is located.

Picture No. 1 shows a meat type gilt...Note her trimness of jowl, her smoothness and firmness of shoulders...She is well muscled along the loin edge...she has a deep plump ham that is hooked up well forward, and she has trimness and firmness of middle. She is no perfect individual.... she has too much length of leg and is a little long in her neck. This pig was 29.5 inches long in the cooler and had 1.5 inches of back fat.

Picture No. 2 shows a rear view of this gilt. Note the turn over her top, she carries her thickness down through her hams which show this muscling. Note the firm appearance of this gilt in the cushion of the ham ....Her legs are out on the corners where they belong.

Picture No. 3....This barrow was 28.25 inches long and had 2.1 inches of back fat....He was 1.25 inches shorter than the meaty gilt we just saw and he has .6 inch more back fat. Remember, he weighed the same as the gilt, was the same age, and received the same feed. He is typical

of the over-finished hog that lacks muscling. He is sloppy about his jowl ...soft and wrinkled through the lower shoulder and sloppy about his middle ...creased along his side. Note the creasing in his lower ham which indicates over-finish.

Picture No. 4....The rear view of this barrow showing his flatness of top. You will also note that the thickest part of this hog is on top and that he tends to get narrower down toward the cushion of his ham. This wedge appearance...wide and flat on top and narrow at the bottom, is typical of this type of hog. In this type of hog, the tail head appears as if it comes out of a hole, like the stem of an apple.

Picture No. 5....The two pigs were put through the dehairing machine, a gland inspection was made in the throat. We went up in the flank between the hams and made a five-inch incision and removed the viscera. The carcasses were washed out completely. The meat-type gilt is on the left and the fat hog on the right. I believe you can see that the meat hog is a little long in the shank and is a little longer in the neck. The meat hog was 29.5 inches long while the fat one was 28.25 inches long. This measurement is from the first rib to the aitch bone.

The meat hog has 1.5 inches of back fat compared to 2.1 inches on the fat hog.

Picture No. 6....I believe this picture gives you a good idea of the differences in these two hogs. The meaty hog on the left has more length and carries its width quite uniformly. You can see down over the side of this meat hog. The fat hog is typical of this kind of hogs. His widest spot is in the center of his back. He tends to be narrower through the shoulder and ham area when hung on the rail. Note his flat top appearance. These hogs were chilled to 35° over night. Then they were stuffed with wax paper and their legs were put back in the normal position they were when they were alive. They had a normal arch of back, a curl was even put in their tails. These two hogs were frozen in a freezer over the week end. Then three 2-inch cross sections were taken of these two hogs...one just behind the front legs...one at the 10th rib...and the other just in front of the hind legs. The purpose being to show the muscling and fat covering.

Picture No. 7....These are the shoulder cross sections. Three ribs have been exposed in the body cavity. A polar planimeter was used to get the areas in these two cross sections. The meat hog on the left has a ratio of one square inch of fat to every 4.7 square inches of muscling. The fat hog has one square inch of fat to every 2.9 square inches of muscling. Note the amount of fat within the muscles on the hog on the right. It is pretty hard for a processor to make a top-notch picnic out of this hog.

Picture No. 8....This is the cross-section at the tenth rib. The area of the loin muscle in the meat hog on the left is 3.53 square inches and the fat one is 2.15 square inches. It's pretty hard to move pork chops in self-service meat counters like the ones that came from hogs on the right. Note the difference in this muscling in the bellies. I don't believe anyone would have a hard time making up his mind which hog he would prefer bacon from. Also, you will note a difference in the amount of leaf or abdominal fat in these two hogs. I believe you'll note that the meat hog has more room for a digestive system.

Picture No. 9....This cross-section is just in front of the hind leg of the hog as he would be standing in his normal position alive.

The meat hog has a ratio of one square inch of fat to every 3.8 square inches of muscling. The fat hog has a ratio of one square inch of fat to every 2.4 square inches of muscling. If you were buying center cut slices of ham in a self-service store, is there any question of which you would choose? Note the difference in crotch fat on these two hogs.

Picture No. 10....Summary of areas and ratio....Keep in mind that the main reason we raise hogs is meat....Lard is a by-product.

Picture No. 11....We are recommending that producers pick out their longer meatier gilts and use a good meat type boar. Note the length of this sow, her depth of side, and the well-muscled hams. She is clean and broody about the head.

Picture No. 12....This is the same sow's rear view. Note the spring of rib and turn over her top. She carries her thickness down through her hams and her feet and legs are out on the corners.

Picture No. 13....We recommend that breeding gilts have good length of side with udder sections that are prominent and well placed.

Picture No. 14....Here is a good example of a heavy muscled meat type boar from behind. Note the turn over his top....his spring of rib... the muscling through his hams. This boar has plenty of bone and his legs are out on the corners where they belong.

Picture No. 15....This meat-type certification program of the various breed associations where you consider length, fat back thickness, and loin eye muscle, along with size of litter and rate of gain, is the greatest move the purebred swine industry has made in the last 50 years.

A number of the colleges such as Ohio State have gone one step further and are securing feed conversion figures.

The production of heavy muscled meat-type hogs is not as simple as some people have let us believe. If our hogs are to be improved, it will require selection and testing on both the part of the commercial producer as well as the breeder. The commercial producer and breeder should consider litter size, rate of gain, muscling and type, and efficiency of gain whenever possible. The commercial producer can improve his hogs by ear-notching and weighing his pigs, and having some of his hogs slaughtered with a cooperating packer. With this information, he can do a good job of selecting his gilts from large litters of fast-growing pigs that have good carcasses.

Through testing on farms by commercial producers and breeders cooperating in their various breed testing programs, and state college feed efficiency and carcass testing programs, the swine industry will make great strides.

If a commercial producer or purebred breeder can select meat type gilts from large litters of fast growing pigs and can buy a good boar whose

littermates have been tested, he can produce a good crop of meat type hogs. Improvement in the swine industry can come rapidly because sows reproduce with large litters and can produce two litters a year. The vast improvement in the dairy breeding has come about by testing, culling, and using proven bulls. The broiler producers have improved their product by producing a broad-breasted bird and their sales have increased. The swine industry is facing the same problem.

If a producer is going to be successful in raising hogs, I believe there are four very important things to keep in mind...I don't know which is the most important over the long pull....

1. Disease Control--Everything else can be successful, but if disease hits, you are out of business. We need to do a better job of swine sanitation.

2. We have to raise and market 8 pigs per sow if we are going to be successful swine raisers and have a high standard of living for our families. Farrowing crates and heat lamps have been a big help in accomplishing this. Average number of pigs saved per litter in 1932 - 5.88,
Average number of pigs saved per litter in 1952 - 6.76.

3. We have to get economical gains. Good producers today can produce 100 pounds of pork with a little over 300 pounds of feed. We need to study and use modern nutrition more. Most producers marketing 100 head of hogs have $3,000 or more worth of corn and protein invested in them. We can do a better job of feeding.

4. If we have accomplished the first three, let's market a top-notch product that someone wants to buy. We can select our meatier gilts and use a meat type boar. It doesn't cost much to do a good job. Top these hogs out at 200-225 pounds and market them. By having hogs come to market in smaller lots, we avoid gluts. Producers have done an excellent job of spreading out farrowings the last few years.

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CHAIRMAN KLINE: Thanks very much, Bernard, for that excellent presentation. This is a new way of presenting the meat type hog and those slides I am sure were very well made.

Dick, we will let you take over for the discussion.

MR. WHEELER: We have copies of the slides, Bernie, from your company, and they are working out very nicely for our extension people especially.

Some of the institutions are changing their names, and I thought I would mention that we are also changing a few things at Clemson. As of February 1 of this year it became a co-educational institution which is something new for us.

So we are making quite a few changes as well as moving into the $3,000,000 agricultural center and the meats laboratory is part of the project. So we are certainly going to do more research on meats than we have done in the past.

Our program with the meat type hog is following along what the other institutions are doing. We have hogs now at the college from farmers over the state and we are feeding them in individual feeding pens. We are going to get complete carcass information from those animals, so that we will know exactly what we are getting in terms of feed efficiency and feed conversion. We hope to have the complete picture on that.

Bernard, I wonder if there is a possibility of not getting enough marbling in these leaner type hogs. Do you care to make some comments about that?

MR. EBBING: I think that as long as we keep the eye muscle there we are not going to get this pork too stringy. In other words, we have run taste tests and we find it very acceptable in ham, etc.

I should like to point out to you gentlemen that I think we are probably all aware of the import figures that we have been facing in the business this last year. We are down to a $16 and $17 hog market most of the winter, and yet people abroad are getting an extra fee when selling pork to us. I think we must give this a little of our attention if we expect to get the market back. I don't mean by putting on higher tariffs. I mean by getting our product in line. It is rather sad, at least it makes me feel bad. Iowa is the No. 1 hog state, yet they can ship a ham from Denmark or Poland, give it a nice ride across the water to New York and a nice train ride out to Waterloo, and compete with us right in the hog belt. I think we had better look at our whole carcass.

CHAIRMAN WHEELER: Does anyone have questions that he would like to ask of Bob, Marshall, or Bernard, considering what we have on this program?

MR. KASTELIC: I have just one little question to ask the gentleman from Tennessee. Can you tell us what the range in iodine numbers was in these hogs from hard to soft? You don't have that recorded on your sheet but you do have the statistical data.

MR. SAFFLE: I don't believe I have that. This project was about finished when I arrived at Tennessee, and it mostly meant just taking it off this paper and presenting it here. Prof. Cole will be in here late tonight. If you are staying for the short course you may ask him and I am sure he can give it to you.

MR. WHEELER: We have done a little work with hogs, and we find that some of these extremely long hogs are a little disappointing to us. Bernard, I wonder if you want to say anything about it.

MR. EBBING: I should like to have Jim Hillier. Jim has summarized the material and I think he has some statistical information.

He did the work. If he does not have the figures he can tell you what the outcome of it was.

MR. HILLIER: Well, fellows, this thing that he refers to is a summary of the first year's figures from the certification program in the Hampshire meat type certification. It involves, I believe, 236 hogs that weighed 180 to 230 pounds, and it is the entire group that has been slaughtered. Some of them certified and some of them did not. I don't have the figures too well in mind on this. However, in general I think the important thing that came out of these figures is that the characteristics that we are looking for -- length, minimum backfat, heavy muscling -- apparently are rather independent of each other. That means that it is possible to put them together in combinations perhaps that we want. They don't have any strong antagonisms to overcome. The two factors that I think you are hinting at, length and eye muscle, were quite independent. It does appear possible to have length with muscling. The correlation indicates it.

Of course, this is not a particularly large group of hogs, but in general I thought the figures indicated that this program could progress without running one factor off in any way. That is, seeking muscling would not tend to shorten the hogs, or in seeking length you would not tend to have a smaller loin eye. To me it is encouraging that these things are independent enough and can be combined enough as most folks have observed, but we always like to have a few figures to substantiate these observations.

One of the other things that came out of it is the fact that there was a strong association between length and rate of gain. As length improved rate of gain improved. That is a little contrary to the way of thinking of some of the hog identification boys, although if you will check back I think most folks will agree that good hogs, with sufficient length -- ruggedness -- about them are the good gaining hogs.

MR. WHEELER: Thank you, Jim.

MR. KROPF: We have some figures that I think bear out what Jim has said, that carcass length and carcass muscling are independent of each other. We ran correlations on the 56 hogs that we had at the type conference at Madison, and we have a negative correlation of .11 which is, of course, not significant.

MR. BRATZLER: I am wondering if you made any studies or if you gathered any data, Jim or anyone here, on the variation you get within litters. In other words, you take a barrow and a gilt out of a litter and certify the whole litter. Have you done any of that, Jim or anyone?

MR. HILLIER: Well, as between sexes I think it is becoming very obvious that the gilt is the best meat. As a matter of fact, I have told some of our boys who are buying hogs for the various packinghouses that if the stockyards people would let us do it we could send a kid down the alley who knows the difference between the sexes and he could do a pretty good job of sorting the hogs that way.

There is a lot of difference between the gilts and the barrows. We did not have enough in this particular study to check this, but anyone who thinks that his litter is on the edge of not certifying would certainly do well to use the gilt rather than the barrow. He would have a much better chance. I think in some of our publications this is now pointed out. For instance, I know of one that showed two spotted pigs and called one a meat type and one a fat type, and I really believe that the real difference between those two was the sex.

MR. BRATZLER: Does that hold true for Bernard's?

MR. HILLIER: Yes, I definitely think that is right. Of course, there are differences above and beyond that in his situation but sex is a big item.

MR. KUNKLE: The rule of the Swine Records Association calls for the nomination of one barrow and one gilt for slaughter and carcass yield testing. The owner must have the approval of a fieldman, county agent, or vocational agricultural teacher when the two representatives of the litter are selected.

MR. EBBING: I have a pair of litter mates, Chester Whites, purebred, and they have a very wide variation. Actually, they are wider than these two. I think there is no question that there is a loophole in the certification program on that point. However, when a fellow puts two pigs over for slaughter he had better have something that he can sell that still looks kind of halfway decent.

It is rather a good thing that some of us who have worked with these fellows feel that the fellows who have been meeting certification still have pigs at home that are very pleasing. A sow has to raise eight pigs and to meet this 200 pound weight and carcass quality, no one factor of which is too tough in itself, but when they have to clear those various hurdles a lot of them stumble on the first hurdle, some stumble on the second, and quite a few on the third. So consequently what you have isn't too bad. There is no question that you have variations in litters, but you still have to have something that these purebred breeders can sell.

MR. BRADY: I am not going to ask you to defend gilt work before you came there, but I certainly don't feel that the data that you have there can be substantiated from the work that has been done at quite a few stations.

I believe that most of the work that we have done, work done at the U.S.D.A., and work at North Carolina would indicate ground meat that is oily. When you start talking about being frozen a year in storage, it would not have the same lifetime as pork with a hard fat. There is quite a bit of data in the literature to substantiate that. I am not asking you to defend it but I should like to put it in the record here.

MR. WHEELER: Are there other questions or comments pertaining to this part of the program?

MR. HILLIER: I should like to make one comment here. It seems to me that things are working out to the point that we can expect a great deal of improvement in the muscling of these hogs and the meatiness of these hogs as we go along the next few years.

It seems to me that the next step and one that will help to add a great deal of momentum to this meat hog program is to get through to the consumer with the differential on these cuts. I think that is a point that really needs a lot of attention right now and in the immediate future. Certainly there is a difference between the value of the cuts as Bernard showed them up there in those shoulders, and so on, and it seems to me that our efforts could well be put on getting through to the consumer on a price differential for these cuts of various qualities.

MR. CROWN: I am wondering if any group has kept a record of the number of ribs in relation to the length of the carcass. We have found at Louisiana that some of our 16-rib hogs turn out to be the shortest in length of carcass and some of them were the long ones, but in many instances some of the 16-rib hogs were rather short in length from the first rib to the aitchbone.

MR. WHEELER: We don't think it makes any difference.

MR. AUNAN: In connection with Mr. Crown's statement we did some work at Minnesota on a number of ribs and weighed the carcass. I think our variation was 13 to 17 ribs and length was not a factor in connection with the number of ribs.

MR. CROWN: We had some 13 to 16. I didn't find that seventeenth.

MR. HECK: We have found in Arkansas some 15 ribs where they normally should have 14, but we, too, have found no extra length due to that extra rib. By the same token we have found that the longer hogs do have more ribs. In other words, the 15-rib hogs are usually a little longer than the other pigs.

I should like to get back to Lyman's statement about selecting these pigs from the breeders out in the state. We select four pigs, two gilts and two barrows. We try to select them randomly from the breeder and to bring them in at 56 days of age. I did not mention that. We think it is important because they should be fed the same ration that our own pigs are fed if we are going to test the breeders' pigs at the station.

All the different breeds, the Poland, Hampshires, Durocs, and our pigs are fed the same rations and slaughtered and measurements taken at given weights, 200 pounds. We have found that the breeders in the state of Arkansas are producing much shorter pigs and lot fatter pigs than we are at the Arkansas station.

Of course, we are supposed to be leading the way, and this is one medium to get the information out to them that they are selling to their fellow breeders the wrong kind of pigs, that they are too short,

and to have a change we are going to have to get better breeding stock before we can improve the hogs.

Of course, one reason we are moving so fast in Arkansas is because we watch that corn-hog ratio just like a lot of folks watch the stock market. We have to because we lose money. We have to buy almost all of the feed that we feed to the pigs there. We have to make money on them or we are out of business, and we are in and out quite a lot.

MR. WHEELER: I believe we are running overtime.

MR. BRISKEY: Mr. Ebbing stressed that we should emphasize the angle of the rib, the spring rib, to producers. I just wonder if he thinks that we can predict the eye muscle area by virtue of that.

MR. EBBING: Well, we have done quite a little work on it. The thing kind of flops around on you, but I feel definitely that as we get some of this right angle spring in these ribs and in the carcasses, they are not too disappointing when you determine the eye muscle area. In other words, if I am going to do a little gambling I would rather do it with one that has the right angle spring than with one that is just a little too sharp, because there is not enough room in there to have muscling. I definitely think that work can be done on this particular point.

MR. WHEELER: I believe that we have run over into the next program about fifteen minutes. If you have some additional questions I suggest that you talk to these people personally and I believe they can come up with some answers for you.

Thank you, Ed.

CHAIRMAN KLINE: I am sure that we have had some very good discussion on this meat type hog program. Even if we did not answer all of your questions, I am sure there has been a lot of food for thought tossed around.

Now I guess we have come to the place on the program where we are going to let Dr. Aunan take over, and we will turn to the Research Methods Committee, Woodie.

MR. AUNAN: Thank you, Ed.

At this time, so that we don't get beyond the limitations of the clock, we will call on Dr. Pearson, from Michigan State College.