

Keynote Summary and Response

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The talks by Mike Tess, Steve Kerns, and Tom Socha highlighted many of the important problems facing swine breeders. Parts of Tom's presentation reminded me of experiences the dairy industry has already gone through. This chance to put thoughts in writing will also allow me to include a table I used in discussing boar testing but which was not included in my original written comments.

The economic values Mike Tess derived show the conflict between what most pork producers and their academic advisors think should be selection goals and what the market pays for. Mike showed that lean growth has little economic value when market hogs are sold on the basis of live weight. Obviously, producers are not going to select for lean growth (which consumers say they want) when the market is still buying fat. Mike's figures probably show why progress for leaner carcasses has been slow. The financial incentive has been lacking. He and his fellow Nebraska workers should be commended for showing the economic dilemma producers have.

A systems approach to finding proper economic values involves the same difficult problem as any other analysis system. The answers from a systems analysis are no better than the parameters and accompanying assumptions that are used in the model. In other words, how sensitive are the economic values Mike found to any errors in his parameters or in the costs he assumed? What is comforting is the quality and number of people in the Nebraska group who discussed such questions. Frequent and frank discussions are necessary to weed out obvious errors which may come out of systems analysis.

Steve Kerns made many good points in his remarks. At least two should be spotlighted. There were also two points which illustrate basic difficulties in swine selection.

Steve stated clearly that implementation is the major obstacle to the NSIF recommendations. He also advocated a "back to basics" approach and the avoidance of fads. NSIF has outlined the basic principles for swine improvement. What are the obstacles to their implementation and how can they be overcome? Are the breed associations the key? How many of the breed secretaries are pushing the NSIF guidelines? How many attend the scientific sessions NSIF sponsors. The best swine breeders from the universities are there to present new ideas and to let their brains be picked. If they aren't in attendance, what are the reasons? If progress such as has been made in England or in dairy breeding is to be made, the breed associations must work closely with the rest of the industry or they are likely to be replaced by private breeding companies. If registered dairymen had not used bulls available by AI they would have been left behind their commercial neighbors.

Steve brought up his customers' concerns for pigs adapted to confinement housing systems, an interest in toe size, rump shape, and

spraddle legs. These may be valid concerns. There are, however, two dangers. First it may be nearly impossible to select for the ideal pig for every kind of management system. Even more importantly, selection for many traits with relatively small and unknown economic values will drastically reduce the selection emphasis on the maternal and market traits with unquestioned economic value. Lee Norris had made comments the night before that every few years producers are being told to select for something new. Changing of selection goals can seriously reduce progress for traits with unquestioned importance.

The theme of the producer wanting a uniform product ran through Steve's talk. This desire poses a problem to swine breeders. Variation is the basis for selection of improved parents. Uniformity would imply the lack of selection potential. Uniformity is achieved in the hybrid corn business by developing completely inbred lines which when crossed provide a uniform final product. There have been many difficulties in developing highly inbred strains of hogs. The regional swine breeding project with which Gordon Dickerson was associated attempted to evaluate the merits of line crossing as compared to breed crossing. The results of that study might be useful in determining whether uniformity is a completely desirable goal.

A very important point Steve made was his doubt about whether turning over generations as fast as possible is always desirable. His point is one we need to remember. With any genetic evaluation system, the animals with the best evaluations should be used not necessarily those with the newest evaluations.

Tom Socha's discussion of estimated breeding values obtained from computer analysis of Nebraska SPF data brought up many interesting points which reminded me of experiences the dairy industry has had with computer evaluation systems.

Ratios to express performance would seem to be easy to understand but have the shortcoming that they do not relate well to the product being sold. The dairy industry except for Canada never fell into the trap of using ratios. Some of the beef breeders in the U.S. now feel that it was a mistake for them to use ratios. The Canadian beef breeders do not.

Dairymen have become accustomed to expressing records as differences from herd level or from average performance levels. These differences also are called deviations. Thus, evaluations are "plus" or "minus" from whatever the base for the difference is. A predicted daughter difference for bull A of +600 as compared to -200 for bull B tells dairymen that daughters of bull A would be expected to produce 800 lb more milk per lactation than daughters of bull B. Those 800 lb of milk would be worth about \$100, which is easy to understand. Genetic evaluations can only estimate differences between animals and can never estimate any absolute level.

There are, however, some psychological dangers associated with the use of differences. The base chosen to express differences from can make all the evaluations "seem" either good or bad. The USDA sire

evaluation uses as a base the average of records of cows freshening about 1968 to 1970. Certainly most bulls available today should have daughters superior to cows born 10 to 13 years ago. All sire proofs might be "plus". Are all the bulls good? Perhaps, but the bulls are not all equal. At one time because a bull that was +1 lb was "plus" proven, he, unfortunately, had a positive image while a bull that was -1 lb was "minus" proven and had an undesirable image. We all know that 2 lb of milk difference is impossible to measure and even if measureable would be worth only a few cents. Breeders must understand that the difference in evaluations between animals is what is important and not the evaluations themselves.

Tom's point that one purpose of the SPF computer evaluations is to help make producers think about genetic superiority is very important. The dairy sire evaluations put out by the USDA and by Cornell certainly have promoted the use of good bulls and have forced bull studs to compete to find the best bulls.

Bob Everett, our extension specialist in dairy cattle breeding, also made a very ingenious use of genetic evaluations to make dairymen think about genetic superiority when we changed to a new method of genetic cow evaluation which we call estimated transmitting ability (ETA). Transmitting ability is based on the sample half of the genetic value which is passed on to progeny. Thus, $ETA = \frac{1}{2}EBV$.

Bob developed an educational program to tell dairymen about the new ETA's. To create interest in the regional meetings he held, he first sent a letter to each dairyman in the region. The letter listed his second best cow as Matilda (or whatever) and that if the dairyman wanted to know which was his best cow he should come to the meeting.

The listing which was available at the meeting contained much more information than which were the dairyman's best and second best cows.

The ETA's allow a plot of genetic change from year to year for each herd which can be compared to the average change in all herds. The estimated change in management level is also plotted. The average ETA of the best herd in the state is compared with the herd of each dairyman (and also with the poorest herd). The bulls used in the dairyman's herd, the best herd, and the poorest herd are also listed along with their genetic evaluations to illustrate that the best herds have used the best bulls. Such reports are now routinely available to all dairymen as an option in the DHI program.

Computer evaluations can certainly be used as an extension tool to start producers thinking about genetic selection. Each producer would like to be similar to the best herd rather than similar to the poorest herd.

Since not every breed, and perhaps not every breeder, should use the same economic values for different traits, Tom's procedure of evaluating each trait separately from records on all traits and then weighting those evaluations by economic values has many advantages. Any breeder

would have the opportunity to assign his own economic values. This opportunity should help overcome the reluctance of different breed groups to join a unified records system. The opportunity to assign economic values, however, can easily be misused because proper economic values are difficult to determine. This danger could be turned into an educational opportunity. A short computer program could be developed to calculate expected genetic change in all traits for any choice of economic values. The producer could then be shown immediately the possible consequences of his choices. The expected consequences would promote more realistic choices for use in the final index.

The question Dale Miller asked about whether the Nebraska SPF program would be opened to producers in other areas and whether the software (computer programs) would be made available to other groups reminded me of some experiences we have had with computer evaluations in dairy. The first experience I remember is when Maryland wanted to take the programs from New York (which then processed Maryland as well as New England area records) and establish their own system. At that time the several New York programs were comparatively simple as compared to now since the IBM computer was relatively limited. The Maryland specialists spent considerable time in Ithaca, NY, and programmers at College Park spent much time trying to make the changes that are always necessary when a different computer installation is involved. After 2 to 3 years (and many dollars and many man years), Maryland couldn't make the system work and shifted their records to the Ohio center. The Ohio center has since closed and I think Maryland records go to Provo, Utah, which is the only noncooperative dairy records processing center of the 9 or 10 regional centers. Now Maryland records are processed nearly 3,000 miles from where they are collected rather than 250 miles as when they were done in New York.

Almost weekly we have people come through our dairy processing center and ask if they can obtain a copy of our sire evaluation "program" or our cow evaluation "program". The answer is that there is no single program. Sire evaluation involves about 20 individual, interrelated, and complicated computer programs. The cow evaluation system is equally as complicated. It is difficult to describe to our own computer operators how to run these programs. It would be impossible to expect the programs to be compatible with any other computer installation. Our usual suggestion is that a well-trained person should be sent to visit us for 2 to 6 months and write the programs. We can then easily provide advise when it is needed. The programs then would go to where they are to be used with the person who knows how to make them work and who is most likely to find the spot in the "program" which is in error when the inevitable exception occurs that breaks down the system.

My advice to Tom is that he not provide software unless he is prepared to spend a lot of time on the phone trying to help others use it. Another bit of advice concerns providing computer service for other states. He should obtain iron-clad guarantees that he will have the same authority to edit and obtain corrections as for SPF data.

Comparison of on-the-farm and central boar testing^a.

	<u>On-the-farm</u>	<u>Central boar test</u>
Accuracy of evaluation		
In herd comparisons		
Boars		
Sows	+++	
Across herd comparisons		
Boars		+++
Selection intensity factor (boars)		
No AI used	++++	
AI used	+++++	++
Smaller cost of testing/animal	+++	
Advertising benefits	+?	+++

^a The number of pluses indicate the relative advantage of the two types of testing.

During the talk Sunday evening I made some subjective comparisons between on-the-farm testing programs and central boar testing. These comparisons were not included in the written version I submitted beforehand. The comparisons are shown in the table.

For selection within the herd the on-farm test is more accurate for comparisons of boars because the performance of all boars born in the same year can be compared. Only a few boars from a single herd can be accommodated at central test stations.

The central boar test will be slightly more accurate for comparison of boars from different herds. On-farm tests cannot account for differences in management level from herd to herd.

On-farm testing also has a strong advantage for the fraction of boars which need to be selected whether AI is used or not. The reason is the large number of boars which can be measured relative to the number needed for breeding purposes.

The cost of central testing is much more per boar tested than for on-farm testing. The total cost from testing all pigs born on a farm may be greater but the cost per pig will be less.

Central testing probably is used more for advertising than for any other purpose. On-the-farm testing is more subject to manipulation of records. There is a characteristic of swine breeding which makes manipulation less likely. A buyer can be fooled once but he will know the results before he buys a boar the next year. Breeders with a reputation for reliable records will have repeat buyers and eventually the advertising value of their on-farm testing may approach that of central testing. Manipulation of dairy records is less subject to self-correction because up to five years will elapse before buyers will realize they have been fooled. Check testing is designed to protect buyers from practices of the few breeders who might indulge in such unethical practices.

In closing, I feel on-the-farm testing has the potential to make a large impact on genetic progress in the swine industry. The natural advantages of the pig, together with modern computer evaluation techniques and appropriate economic weights for market and maternal traits, provide the opportunity to select quickly for profitable pigs which satisfy the consumer.

Again, good luck.