Computerized Livestock Performance Records

Roger G. Haugen

Computer technology has enhanced the utilization of livestock performance records through more precise accuracy in predicting genetic differences in animals. By definition, a performance record is "something written down relative to a required function of an animal." Thus performance records document the performance level for a given trait of an individual and/or herd (flock). To put performance record utiliztion in perspective, certain basic facts relative to animal production must be recognized: (1) in different environments, animals perform differently; (2) in the same environment, animals perform differntly; and (3) the management provided is a part of the environment in which an animal must perform. Records are primarily useful in providing a basis for comparing animals managed alike with in a herd (flock).

While visual appraisal serves a useful purpose in a livestock evaluation procedure, by itself it is not an adequate method for accurately appraising the genetic merit of animals. Maximum genetic progress can be made by keeping good performance records on animals and using them in the selection process. The computer has enabled this selection procedure to become a very valuable and accurate management tool through its tremendous data capacity and manipulation. Before computers, many records were never fully utilized because hundreds of calculations were needed to complete a formula or index.

Utilization of advanced genetic formulas is now possible because of computers. A method of predicting future performance based upon past performance is enhanced through computers. Efficient improvement programs must correct or adjust measurement data for environmental effects prior to their use in selection. Computers can handle the many formulas and storage capacity required to perform these adjustments.

The latest advances in animal breeding research can be incorporated in selection programs to be utilized by producers. Performance information on relatives can now be added to individual records to give more accurate breeding values for individuals. Simultaneous solutions to complex animal breeding equations are now being made quickly using computers. Methodology has been developed which utilizes a relationship matrix that includes the performance of every relative in the population, with appropriate weights, to calculate the estimated breeding value of an individual.

Producers can now predict with greater accuracy what an animal will produce as well as what it will pass on to its offspring. Increasing the number of records on an individual results in a relatively greater accuracy in selection, especially for lowly heritable traits such as reproductive traits. Through computers, this is now possible.

Dairy producers have utilized computers for performance records longer than other species. Today they are the most sophisticated. Beef cattle, swine and sheep performance records have been basically growth records for many years. Computer utilization has expanded their performance records to include breeding values, predicted producing values, sire evaluations, superior dam findings, etc. Interpretation of records is the single most important reason for keeping records.

Permanent improvement in livestock is based on effective selection of breeding stock through culling the poor and selecting replacements from the best. Guesswork in this process can no longer be tolerated. It has been said that in any livestock enterprise, the top one-third make the money, the middle third break even, and the bottom cost money. The problem to overcome for producers is to realize which animals make the bottom third for culling and which make up the top third for selection purposes.

Computers have opened the door to the development of performance testing programs. The concept of performance testing didn't excite producers until computers made it possible to put a lot of data together into a useable form. The Dairy Herd Improvement (DHI) program is the oldest program. Beef programs are now operating through the Beef Cattle Improvement Associations. Swine programs are operating in many states and are based on recommendations of the National Swine Improvement Federation. Sheep programs are being used in Ohio, Wisconsin, Purdue, and North Dakota.

Improvements have been made through the performance programs. In the last 15 years (1969-84), averaging weaning weight of calves has increased 40 pounds for producers testing in the North Dakota Beef Cattle Testing Program. In four years (1982-85), producers on the North Dakota Sheep Production Testing Program have increased average

Haugen is livestock specialist, Cooperative Extension Service.

90-day weights by 7 pounds and pounds of lamb produced per ewe lambing by 24 pounds. Death loss has decreased from 25 percent to 13 percent. The North Dakota Swine Testing Program is in its initial years of utilization and progress cannot be truly evaluated yet.

Computer technology has enabled workable scientific record programs to be developed for livestock producers which provide information that when properly utilized can improve production efficiency and enterprise income. Both commercial and seedstock producers can benefit from performance records.

The current level of production and quality in a herd (flock) should be documented at the beginning of performance testing and goals for future performance should be set. Goals should reflect changes in production and quality which individual producers consider necessary to establish the most profitable system based on the conditions imposed within their own operation. Whether performance records are simple or complex, computers help in their evaluation and use.

Some may say that they do not understand and therefore do not trust all of the new computer technology being used in the livestock record programs. However, most don't question the high technology that went into the development of the seedcorn they utilize. Does anyone really need to know any more about the livestock performance testing programs than that they are the most accurate evaluation method that is practical to use today? Or that they are formulated using all of the best genetic research as the base? Hopefully producers will trust, like so many other things in our modern-day lives, the ability of the programs to do what they are developed to do without understanding all the details within the programs.

Each producer has the right to choose what he wants to do and how much of what he wants to do, but making **real** genetic improvement requires measuring traits by performance records. Decisions made today are consequences tomorrow.

Through the use of computers, the late 1980s and the 1990s offer possibilities for genetic improvement not previously seen. The challenge to livestock producers will be to use and incorporate the available modern computer technology in a manner which is both cost effective and genetically sound.

Stegman, E.C. and D.A. Coe. 1984a. Water balance irrigation scheduling based on Jensen-Haise equation: Software for Apple II, II+ and IIe computers. N. Dak. Res. Rpt. 100. Agr. Exp. Sta., N. Dak. State Univ., Fargo, ND. 26p.

Stegman, E.C. and D.A. Coe. 1984b. Irrigation scheduling software for microcomputers. ASAE Paper No. 84-301. Presented at 1984 NCR meeting of ASAE. Morris, MN. Oct. 12-13. 20p.

Wagner, S.W., E.C. Stegman and A.D. Marzolf. 1985. On-site microcomputer based irrigation scheduling: II System software. ASAE Paper No. 85-2075. Presented at ASAE Summer Meeting. Michigan State Univ., E. Lansing, MI. 18p.