We are making inroads on health and fitness traits

However, more work needs to be done. By including on-farm health data, we can breed even healthier cows.

by Kristen L. Parker Gaddis, Christian Maltecca and John B. Cole

WE HAVE used genetic selection to make dramatic improvements in milk and component yields over the past 50 years. Production traits are easy to measure, and most have relatively high heritabilities. In addition, producers are very interested in measuring production as it is directly tied to milk checks.

The health status of a cow is a much more subjective trait, making it more difficult to record in a consistent manner. However, successful herds do an excellent job managing their reproduction and herd health programs. Despite our overall desire to improve health and fitness traits, our efforts to advance the population through genetics have been hampered by inconsistent data recording, concern about data privacy and ownership, and the lack of a national database to routinely deposit health data. How can we move forward?

Research by several groups across the country has confirmed that health event data recorded by producers and stored in on-farm computer systems generally reflects the true incidence of those events within the population. Several European countries have collected health information for many years and have demonstrated that genetic improvement

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of dairy cattle health is possible over sufficiently long timelines.

In order to remain competitive with other countries, we need to focus our attention on improving the health and welfare of cows as well as maintaining high production. Current research is examining the combined gains that may be possible using genomic information and on-farm health event data. More complete data recording, along with the use of standardized health event definitions, will improve the accuracy of these genetic evaluations.

How do we get there? Large amounts of data are currently being recorded, but the lack of a consistent system throughout the industry makes the data difficult to handle in an automated manner.

The *Hoard's Dairyman* editors wrote a column calling for the standardization of health event codes used by farm management software in the November 2012 issue on page 750. There also appears to be a growing consensus that the industry must act in a coordinated fashion to address growing concerns about animal health and welfare.

Nate Zwald and his colleagues led the way in analyzing health data collected from on-farm computer systems. This work was the inspiration for AIPL's development of a data exchange format for health and management data which is known as Format 6. This was intended to facilitate the collection and exchange of health data for research purposes based on information collected through the national milk recording system.

Format 6 is similar to the AIPL reproductive record we call Format 5. There are currently 20 standardized health event codes, such as "MAST" for incidences of clinical mastitis, "RETP" for retained placenta and "LAME" to document incidences of lameness. The format also includes four more general codes such as "LOCO" for locomotion scores and "TEMP" for temperament information.

These sets of standardized codes can be expanded as the need arises based on producer feedback or availability of new phenotypes of interest, such as feed intake. Format 6 includes an optional field to provide additional details about each event, such as information about disease severity. For a variety of reasons, treatment information, such as the use of antibiotics, is not collected as part of these records.

What we found

Recent research by scientists at North Carolina State University's Department of Animal Science has shown that producer-recorded data from on-farm databases has similar incidence rates to data collected in disease-related studies. It also confirms that the relationships among those diseases are consistent with findings of the veterinary community. These results are important because they demonstrate that the information recorded by dairy farmers are of similar quality to those recorded by veterinarians and other herd management consultants.

Related research by scientists at the University of Wisconsin-Madison is attempting to unravel correlations among disease traits to determine how causal relationships are structured in dairy cows. Detailed knowledge of those relationships is necessary in order to calculate economic values associated with various diseases and to identify the best management strategies for each area of concern.

Bottom line

Herd health is closely tied to productivity and profitability. All other things being equal, healthier cows are more profitable cows. It is, therefore, necessary that the industry work with researchers to determine the best methods for improving overall herd health.

Genetic trend for milk yield

Source: AIPL, http://aipl.arsusda.gov/eval/summary/trend.cfm.

Producers must be engaged

Many people in the scientific community around the world are working on the problem of how to best improve the health and fitness of dairy cattle. However, they can't change your cows for you. What can you do as a herd manager to improve the health of your animals?

1. If your herd management software permits, opt-in to send your health event data to your dairy records processing center — this will help by gathering more records for analysis.

2. Record as many traits as you can, as consistently as you can — our work suggests that recording patterns change when employees change and that introduces noise into the system.

3. Think about how health traits fit into your genetic program — if you have an aggressive strategy in which you use lots of young genomic bulls, you'll make faster progress than if you use only older progeny-tested bulls but your risk is higher. Never put all of your proverbial eggs in one basket!

4. Expect reasonable things — the low heritability of health traits means that it will take consistent application of a focused genetic program over many years to achieve major changes, but remember that those gains are cumulative!

In short, keep good records, share your data whenever possible and focus on the long-term. Be wary of anyone who promises you that there's some shortcut. Traits with low heritabilities can be changed, but it takes time. The use of genomics will help by shortening the generation interval and boosting the selection intensity but it's not magic.