**New traits and economic updates for the net merit index**

**P.M. VanRaden\*,1, J.B. Cole1, M.J. VandeHaar2, M. Neupane1, and J.L. Hutchison1**

1Animal Genomics and Improvement Laboratory, ARS, USDA, Beltsville, MD
2Department of Animal Science, Michigan State University, E. Lansing, MI

2020 J. Dairy Sci. *[Not published because of a technical error]*

**ABSTRACT**

Net merit revisions have become more frequent to include new traits and account for changing management and economics. Residual feed intake (RFI), early first calving (EFC), and heifer livability (HLIV) could be added to net merit in 2020. Trait RFI could get 16% of total emphasis but reliabilities and variances of predictions are low, leading to a 0.85% increase in net merit progress worth $4.3 million per year to the U.S. industry. The current negative emphasis on body weight composite should double from -5% to -10% because maintenance cost used since 2000 was too low, potentially increasing progress by 0.62% worth $3.1 million per year. Trait EFC could get 3% of emphasis, but the emphasis on heifer conception rate which currently gets indirect credit for EFC will be reduced. This change should improve progress by 0.04% worth $0.2 million per year. Trait HLIV could get 1% of emphasis depending on calf value and is expected to increase progress 0.01% worth $0.05 million per year. Because faster progress gives younger cows higher genetic merit compared to older cows than in past decades, current productive life emphasis could decrease from 12% to 7% leading to increased economic progress of 0.42% worth $2.1 million per year. Correlation of the proposed new index with current is 0.981 leading to 1.9% faster progress per year. Several traits that previously had only traditional evaluations may also have genomic predictions in 2020. Those traits include 88,000 records for both mobility and milking speed for Brown Swiss and 500,000 records for rear teat placement (both side and rear view) for Jersey, and body depth for Ayrshire and Guernsey that were previously excluded because body depth was not scored for Jersey. Rear udder width (RUW) has domestic data for all cows scored for all breeds but was excluded from Interbull and genomic evaluations initially due to very high correlation with rear udder height. Reliabilities of new trait predictions depend mainly on heritability and numbers of records which vary from several thousand for RFI to more than 3 million for HLIV. Genomic selection for more traits and revisions to net merit should increase genetic progress worth nearly $10 million annually to U.S. dairy producers.

**Keywords:** selection index, genomic prediction, economic efficiency