International perspectives on feed intake phenotyping and feed efficiency in cattle

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International interest in incorporating feed efficiency into breeding goals has increased in recent years. To expand the volume and diversity of phenotypes, attention was also directed towards measuring feed intake under commercial herd conditions. Larger phenotype resources lead to a better understanding of the relationship between feed intake and other traits and may prompt re-evaluation of how feed efficiency is defined. Within this context, the Brian Wickham Young Person Exchange Program set out to (1) document practical procedures needed to obtain reliable phenotypes in research and commercial settings, (2) revisit definitions of feed efficiency, and (3) investigate the genetic relationships between feed intake and other traits.

The program entailed visits to the following organizations: University of Guelph (CAN), Lactanet (CAN), Aarhus University (DNK), VikingGenetics (DNK), ICBF (IRL), Teagasc (IRL), ANAFIBJ (ITA), CRV (NLD), Wageningen University and Research (NLD), Geno SA (NOR), NMBU (NOR), SRUC (GBR), University of Wisconsin-Madison (USA), and CDCB (USA). Information on feed intake recording was gathered through expert interviews and farm visits. The results were then complemented by a literature review.

Important steps for obtaining reliable phenotypes include calibration and ongoing maintenance of measurement systems. Implementation varies across farms: some adhere to strict protocols with defined schedules, whereas others calibrate and maintain the system on as-needed basis. Protocols typically include quality-control procedures (e.g., manufacturer-integrated checks or custom algorithms), followed by data editing to remove errors and outliers. Regarding feed efficiency, the predominant definition used in selection indexes is a form of “feed saved”, although it is often calculated slightly differently. Genetic correlations between feed intake and other traits showed large variation. For example, the genetic correlation between feed intake and enteric methane production ranged from -0.20 to 0.84. Overall, robust protocols to ensure reliable feed intake phenotypes exist across countries. Because feed efficiency remains a complex trait, deeper understanding of its genetic relationships with other traits is essential for sustainable genetic improvement.