The long-term economic viability of the U.S. beef industry, which represents approximately 20 percent of total U.S. farm receipts, is being challenged by rising input costs, global competition, and societal concerns about the environment. Because more than 60 percent of the cost of producing beef is feed inputs and because many of the adverse environmental impacts of producing beef are due to manure output, improving feed efficiency is key to identifying cattle that are more economically and environmentally sustainable to produce.

Two recent developments provide opportunities to improve the genetic merit of beef cattle for feed efficiency: (1) emerging commercialization of new technologies to cost-effectively measure feed intake in cattle and (2) discovery of a new efficiency trait, residual feed intake (RFI), which facilitates selection of efficient cattle without affecting mature cow size.

Current research is focused on developing herds of low- and high-efficiency cattle to help identify the biological basis for genotypic (genetic makeup) and phenotypic (appearance of cattle resulting from interaction of the genotype and the environment) variation in feed efficiency of beef cattle. Measurement of RFI has been restricted largely to Calan Gate or GrowSafe feeding facilities, at which individual animal intake can be measured. Most cattle, except for steers, spend their lives on pasture. Determining RFI under grazing conditions is a vital component in determining feed efficiency. There are, however, some obstacles to the immediate determination of RFI on pasture.

Process
- Animals will be dosed with markers (alkanes) to determine the influence of marker type, frequency of dosing, and frequency of fecal sampling on estimation of intake.
- Intake will be estimated on a variety of forages to determine the influence of forage type on intake estimation.
- Alternative methods for administering markers will be investigated.

Objectives
- Develop methods for delivering internal markers to large numbers of grazing cattle.
- Determine the optimal frequency of dosing and fecal sampling.
- Determine the effect of forage type, quality, and availability on estimation of intake.

Outcome
The expected outcome of this research is development of a method for estimating RFI in grazing cattle.

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