

# Effect of Sampling Time on Feed Intake Data and Residual Feed Intake when Compared to Extended Sample Times

## A.S. Leaflet R2838

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### Summary and Implications

A shorter term of feed intake monitoring, whether it is from a consecutive number of days or from a periodic sampling, correlates fairly well with a full duration accumulation of feed intake data in a normal bull performance test for the weaning contemporary group.

### Introduction

Feed efficiency measurements are described in the Beef Improvement Federation (BIF) guidelines. The use of electronic identification in combination with electronic scales under feed bunks has been very helpful in allowing the measurement to take place. However these setups are quite expensive and bunk space capacity is limited. Because of this point, time on the system comes with a premium and anyway that could limit the time an animal is on the system is of interest. The BIF guidelines recommend a 70 day test where individual feed intake data are collected and animals weighed periodically through the test (every two weeks). This 70 day period is about one half or slightly over one half of the total time used for the normal bull development testing. This paper provides some observations of different sampling times cattle are on the system and relates the observed shortened period intake and feed efficiency performance in terms of residual feed intake (RFI) over the result if the data were collected over the total period of time.

### Material and Methods

Angus bulls undergoing bull development testing were placed on the Iowa State University Feed Intake Monitoring System (FIMS). During a four year period, spring born (late March through April) bull calves were placed on test in November and remained on the system until late March. Each year seven pens with six bulls per pen of a weaning

contemporary group were fed together. Bulls entered the facility about two weeks prior to the beginning of the trials and weighed an average of 678 pounds (st.dev = 83 pounds) on starting the trial and came off trial at an average weight of 1158 pounds (st.dev. = 115 pounds). Daily feed dry matter intake (DMI) was collected each day and converted to a dry matter basis. Five bull weights were recorded while on test. The ration fed was corn silage, corn distillers grain, soybean meal, grass hay, dry corn and a vitamin mineral supplement. Bulls that showed signs of illness were medically treated but left in their pen.

Once the complete period of DMI was recorded a sampling of DMI was taken and then compared with the overall average DMI for the entire period. The samples taken were the first 30 days, the first 60 days, the first 90 days, the last 30 days, the last 60 days, the last 90 days, the middle 52 days and an average of the first 30 and last 30 days on feed. The average DMI over these times were then correlated with the actual intakes. Likewise, an RFI was also calculated over the entire time the animals were on test and a sampling RFI taken as if the test were only for the minimal required time either in the first 70 days or over the last 70 days of the entire bull testing period. These also were compared to the full testing time RFI calculations. In this case the Bulls were ranked on their RFI outcome and the sample time ranks were compared to the overall period ranks.

### Results

#### *Dry Matter Intake*

Average DMI for the trial was 20.8 pounds with a standard deviation of 2.7 between cattle averages and an average day to day variation of 6.7 pounds for a given animal. The correlations over the fixed times within the pen appears below in Table 1. In general, a longer sample time is better and thus the recommendation of at least 70 days seems to be a minimum. It does appear that sampling older animals increases accuracy to a point as long as the animals are still growing at acceptable rates.

## Iowa State University Animal Industry Report 2014

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**Table 1. Observed Correlations of DMI Sample Times with Overall Actual DMI.**

	First30 Days	First60 Days	First90 Days	Last30 Days	Last60 Days	Last90 Days	Mid 52 Days	F30+L30 Days
Avg. Correlation	0.48	0.75	0.86	0.68	0.76	0.87	0.85	0.80
SEM	0.39	0.23	0.19	0.32	0.26	0.15	0.16	0.20

### *Residual Feed Intake*

Table 2 provides a summary of the results when RFI is the focus of the sampling times. The rate at which the animal is gaining weight seems to have much to do with the outcome in this case while the feed intake, although

directing the rate of gain, is partially a behavior that exists regardless of other demands. With this being the case it appears that if an RFI calculation is being provided, the earlier half of the test tends to be more accurate than the later half.

**Table 2. Correlation of RFI Rankings between Sample Period and Total Period Test Times.**

	First Half with Total Period	Last Half with Total Period
Avg. Correlation	0.80	0.60
Standard Error of Means	0.30	0.40

### **Implications**

When long term feed intake monitoring for efficiency calculations are not possible compromises are made. It seems though if the entire weight change over the entire test period is considered and the relative feed intake of the individual in his contemporary group is considered based on a sampling of actual feed intake over a well correlated sampling time frame within the total test period a reasonable ranking of contemporaries can be achieved.