# *Effects of a trainer cow on health, performance and behavior of newly weaned calves*

**D.J. Gibb, K.S. Schwarzkopf-Gensein, J.M. Stookey, T.A. McAllister and R.D. Wiedmeier**

# Objectives

- Determine if a mature, feedlot-adapted cow would influence feeding behavior, health or performance of newly weaned calves

# Materials and methods

***Trial 1***

- 297 (258±17) kg Charolais and Hereford x Angus calves calves
- 12 No Cow 12 Trainer Cow

## Materials and methods

***Trial 1***

- Vaccinated for IBR, PI3 and *Haemophilus somnus* on d 0
- Weight and rectal temperature
  - d 0, 3, 7, 14, 21 & 28
- Blood drawn on d 0, 3, & 7
  - (WBC) counts, neutrophil: lymphocyte ratios (N:L), and haptoglobin analysis

## Materials and methods

***Trial 1***

- Calf behavior
  - Calves observed at 10 min intervals from 0730 to 1730 on d 1, 2, 4, 5, & 6
    - % walking, lying, standing, or feeding was recorded

# Materials and methods

***Trial 1***

- Intakes
  - average calf intakes estimated by:
    - pen intakes - avg. cow intake (determined following removal from the pen)/number of calves in the pen

# Materials and methods

***Trial 1***

- 60 mixed Charolias cross steer calves (269 ±17 kg)
  - 2 No Cow pens

- 15 hd/pen

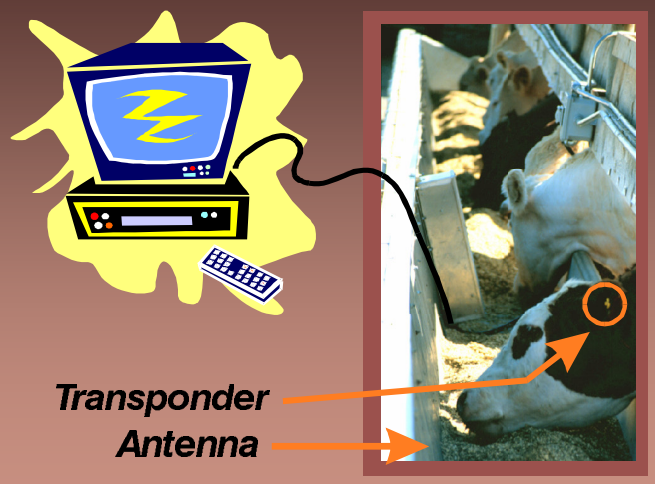
2 Trainer Cow pens

# Materials and methods

## Trial 2

- Weights, RT, blood sampling, and behavioral observations as described for Trial 1
  - no haptoglobin analysis

## Feeding Behaviour



## Results – Dry Matter Intake, kg/d

### Trial 1

| days | 0-3 | 4-7 | 8-14 | 15-21 | 22-28 | 0-28 | SEM |
|---|---|---|---|---|---|---|---|
| DMI, kg | 2.9[e] | 6.4[c] | 5.7[d] | 7.0[b] | 7.8[a] | 6.4[c] | .22 |

[abcde] means with unlike superscripts differ ($P<.05$)

## Results – Average Daily Gain, kg/d

| days | 0-3 | 0-7 | 0-14 | 0-21 | 0-28 |
|---|---|---|---|---|---|
| NC | .89[a] | .76 | 1.20 | 1.27 | 1.16 |
| TC | -.89[b] | .39 | 1.40 | 1.22 | 1.19 |
| SEM | .35 | .22 | .15 | .74 | .83 |

[ab] means in the same column with different superscripts differ ($P<.05$)

## Results – Rectal Temperature

| days | 0 | 3 | 7 | 14 | 21 | SEM |
|---|---|---|---|---|---|---|
| Trail 1 | $39.2^{b}$ | $39.8^{a}$ | $39.4^{b}$ | $39.3^{b}$ | $38.9^{b}$ | .05 |
| Trail 2 | $38.4^{b}$ | $38.7^{b}$ | $38.9^{ab}$ | $39.1^{a}$ | $39.0^{ab}$ | .13 |

$^{ab}$ means in the same row with different superscripts differ ($P<.05$)

## Results - WBC counts, X $10^9$/L

| days | 0 | 3 | 7 | SEM |
|---|---|---|---|---|
| | $9.7^{b}$ | $10.3^{a}$ | $9.8^{b}$ | .26 |

$^{ab}$ means with different superscripts differ ($P<.05$)

## Results - N:L ratios

| days | 0 | 3 | 7 | SEM |
|---|---|---|---|---|
| N:L | .33[b] | .37[b] | .41[a] | .03 |

[ab] means with different superscripts differ (*P*=.06)

## Results - haptoglobin

| days | 0 | 3 | 7 | SEM |
|---|---|---|---|---|
| Haptoglobin, log[4] | 165[c] | 1521[a] | 904[b] | 104 |

[abc] means with different superscripts differ (P<.001)

## Morbity rates, %

| days | 0 | 0-3 | 4-7 | 8-14 | 15-21 | 22-28 | 0-28 | SEM |
|---|---|---|---|---|---|---|---|---|
| | 2.9 | 17.9 | 4.1 | 3.7 | 2.1 | 2.9 | 34.2 | 1.9 |

## Behavior observations

| | Standing | Walking | Eating | Lying |
|---|---|---|---|---|
| NC | 23.6[a] | 14.7 | 20.5 | 42.7 |
| TC | 25.4[b] | 16.7 | 19.5 | 38.0 |
| SEM | .3 | 1.0 | 4.1 | 1.1 |

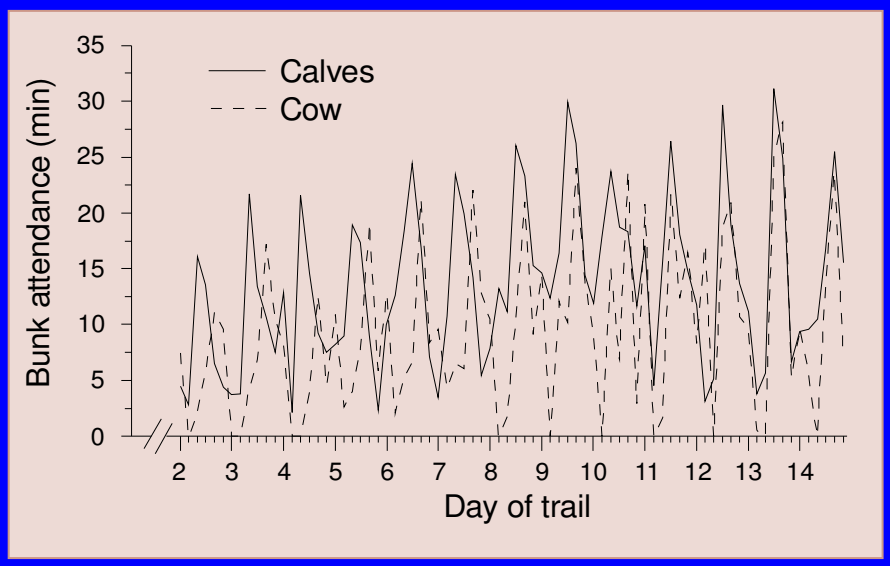
[ab] means in the same column with different superscripts differ ($P<.05$)

## Bunk attendance

| Day | Frequency, visits/d | Duration, min/d |
|---|---|---|
| 1-3 | 9.6[b] | 56.7[c] |
| 4-7 | 9.5[b] | 95.5[b] |
| 8.14 | 12.1[a] | 115.9[a] |
| 15-21 | 12.3[a] | 108.9[a] |
| 22-28 | 10.1[b] | 87.5[b] |
| SEM | .37 | 4.57 |

[ab] means in the same column with different superscripts differ ($P<.05$)

## Bunk attendance by 4 h periods



## Summary

- Trainer cows did not affect immune function or health of newly weaned calves
- ADG was negatively influenced by TC early in the trials but no difference detected by the end of the 28 d trials
- No difference in bunk attendance between TC and NC calves

## Conclusion

- Negative effect of TC on ADG early in the trials as well as differences in times spent feeding for calves and TCs indicate that a TC may be an additional source of unfamiliarity and stress for newly weaned calves entering the feedlot

# *Competitive Interactions in Beef Feedlot Cattle*

**G. Zobel, K.S. Schwartzkopf-Genswein, B.M.A. Genswein and M.A.G. von Keyserlingk**

- Competitive behaviour has been recognized for decades as a means for establishing a social structure in a group of cattle. However, little work exists in terms of how *individual differences* in competitive behaviour are related to feeding behaviour and intake.

## Access to Resources

- Relationship between competition at bunk
  - Performance ?
  - Health ?
- The objective of this study was to compare competitive interactions to feeding behaviour and intake of individual feedlot cattle.

## Methods

- 45 feedlot heifers (520 ± 33 kg BW); 15 heifers per pen
- 3 GrowSafe™ pens / 2 tubs continuously monitored individual animal intake and feeding duration
- Competitive interactions occurring near the feed tubs were continuously monitored between 0800 and 2200

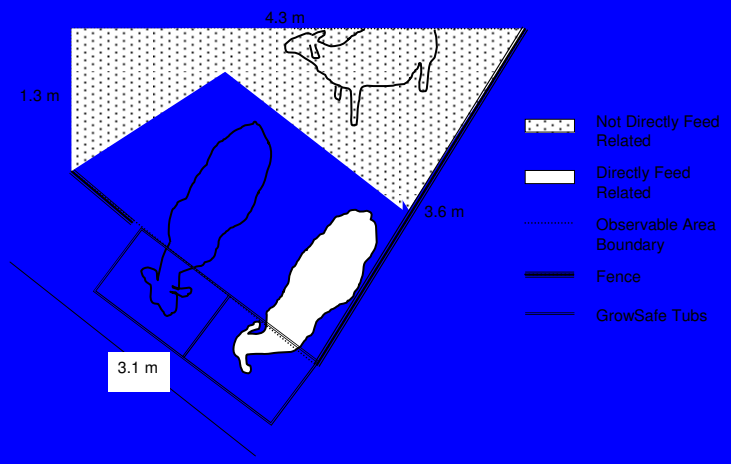
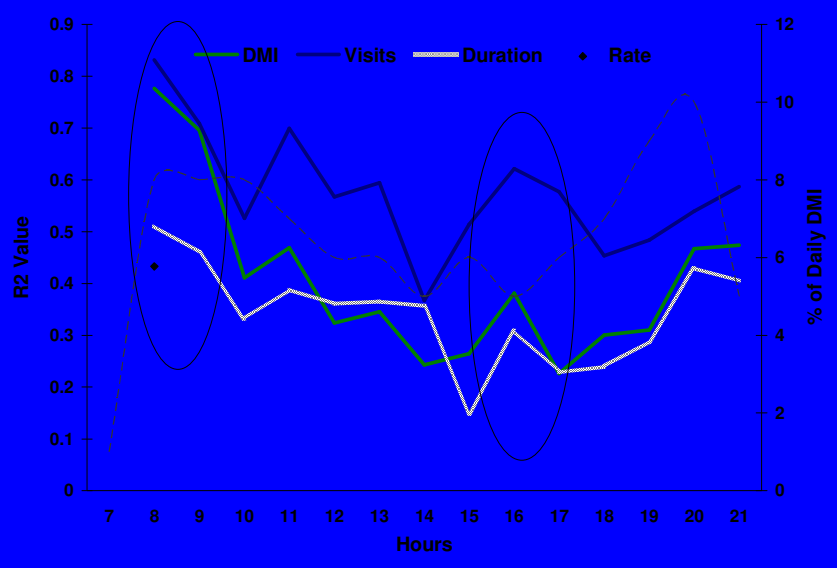



**Figure 1:** Area of observation used for coding competitive behaviors. Includes which locations were classified as "directly feed-related" and "not directly feed-related".

# Methods


- Animals were considered successful if they displaced another animal and gained access to one or both of the feed tubs
- The number of successful interactions was compared to total dry matter intake (DMI) and total time spent eating for each hour of the day

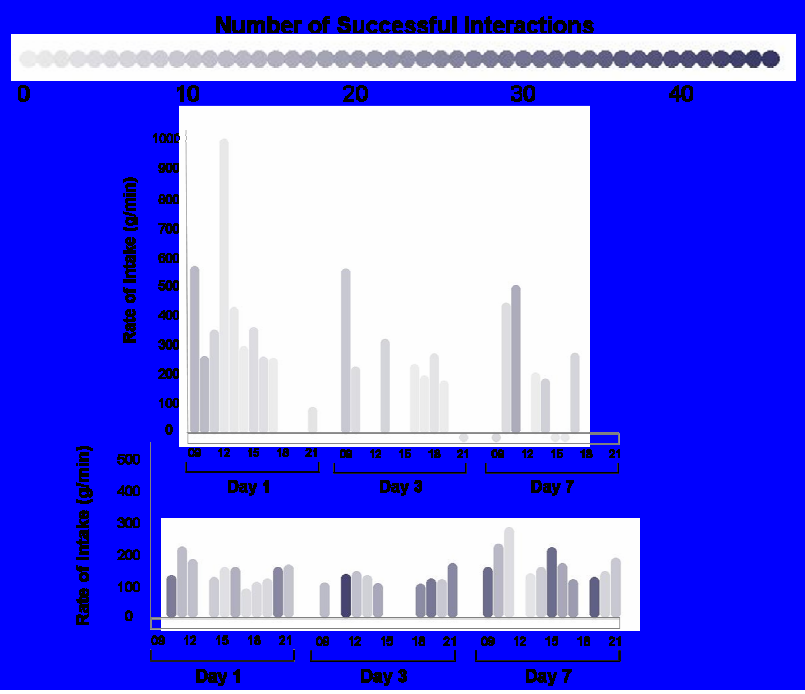
| *Competitive Behaviour* | *Outcome* |
|---|---|
| **1. Contact** | **Successful** |
| | A. Food: Reactor moves and instigator eats or instigator prevents reactor from eating. |
| | B. ACCESS: Reactor move and instigator gains access to feed, but does not eat. |
| | C. Non-Food: Reactor moves away from instigator. Both in non-food area. |
| **2. Non-contact** | **Unsuccessful** |
| | A. Food: Instigator attempts to move reactor but is unsuccessful and does not get feed |
| | B. Access: Instigator has own feed tub and attempts to remove reactor from their own feed tub but is unsuccessful. |
| | C. Non-Food: Reactor does not move away from instigator. Both in non-food area. |



# Results

- Positive significant relationships between
- #of successful interactions
- intake R2=0.43
- time spent eating R2=.34
- (p=0.0001) 24 h period

- Higher R2 values at the beginning and end of the diurnal feeding period indicate that successfulness is more important when motivation to feed is high



## Results

- Individual animals develop a variety of methods for gaining access to feed, including:
  - Competitive interactions
  - Increased eating rates
  - Alternative eating times

## Conclusions

- Competitive interactions at the feed bunk are related to increased intake and time spent eating; however, this relationship varies depending on the animal's motivation for feed.
- Observations of individual cattle eating patterns indicate that competition is more important for some animals than others; certain animals develop alternate coping strategies when presented with competitive feeding situations.

# Objective Measures of Temperament in Beef Cattle

Objective measures of reactivity


# *Prediction of temperament*

Regression values for automated scoring vs visual scoring n=28

| *Visual scores* | *Stain gauge* | *Accelero -meter* | *Both* |
|---|---|---|---|
| Entry | .56 (4) | .53 (5) | .65 (8) |
| Restr. | .31 (3) | .42 (5) | .76 (9) |
| Exit | .33 (3) | .62 (5) | .77 (7) |

***Descriptive statistics for growth and behavioural traits, and their relationship to beef tenderness as measured by WBSF***

| | Level of significance values | | | |
|---|---|---|---|---|
| | Flight speed | Visual score | | Flight zone |
| January | 0.760 | Entry: | 0.452 | 0.777 |
| | | Restrained: | 0.637 | |
| | | Exit: | 0.935 | |
| February | 0.189 | Entry: | 0.067 | 0.423 |
| | | Restrained: | 0.900 | |
| | | Exit: | 0.84 | |
| March | 0.977 | Entry: | 0.020 | 0.122 |
| | | Restrained: | 0.406 | |
| | | Exit: | 0.313 | |
| May | 0.613 | Entry: | 0.674 | 0.073 |
| | | Restrained: | 0.462 | |
| | | Exit: | 0.410 | |
| July | 0.331 | Entry: | 0.463 | 0.875 |
| | | Restrained: | 0.188 | |
| | | Exit: | 0.132 | |

## Summary

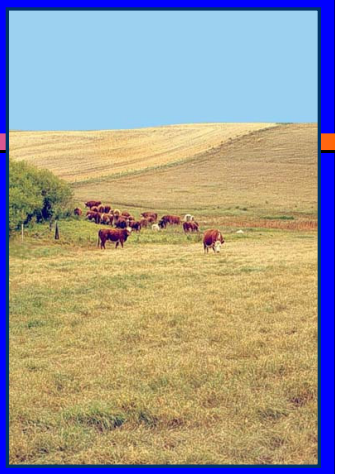
- combining scoring methods – more accurate prediction
- What are we assessing?
- Must be easy to use for the industry

# *Determination of cow preference for forage types based on feeding behaviour and intake patterns*

**K.S. Schwartzkopf-Genswein, J. Baah, R. Silasi and T.A. McAllister**

## *Preference?*

- Free ranging herbivores can and do eat a diverse array of foods
- Cattle can select/prefer one food over another
- Cattle can distinguish between plant species and plant parts (Westoby, 1978; Atwood *et al.,* 2002)



## Why look at preference?

- In confinement choices are limited
- Preference depends on:
  - Experience
  - Nutritional needs based on metabolic status
  - May not be related to quality

## Why look at preference?

- Determining preference by animal "type" may improve
  - Intake
  - Gain
  - Efficiency
  - Cost of production
  - Milk production
  - Fertility

## Objective

- Determine preference of dry cows for different types of hay
- Based on feed intake, duration and frequency of feed attendance

## Methods

- 32 non-lactating Holstein cows (518 kg BW)
- 32 d feeding trial
- Provided with dry cow ration
  - 80% barley silage:20% dry cow concentrate (DM basis)
- *Ad libitum* access to water

# Forage treatments

Timothy hay

Oat hay

Sudangrass

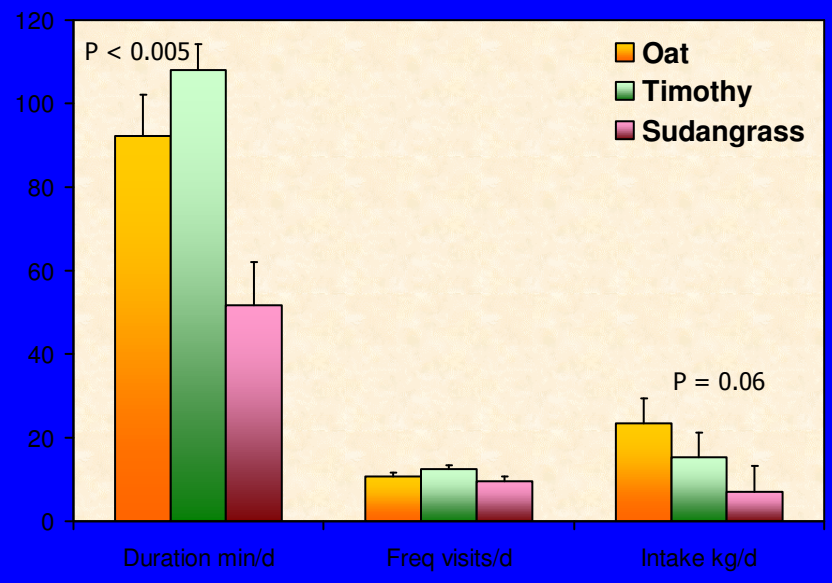
# Feeding

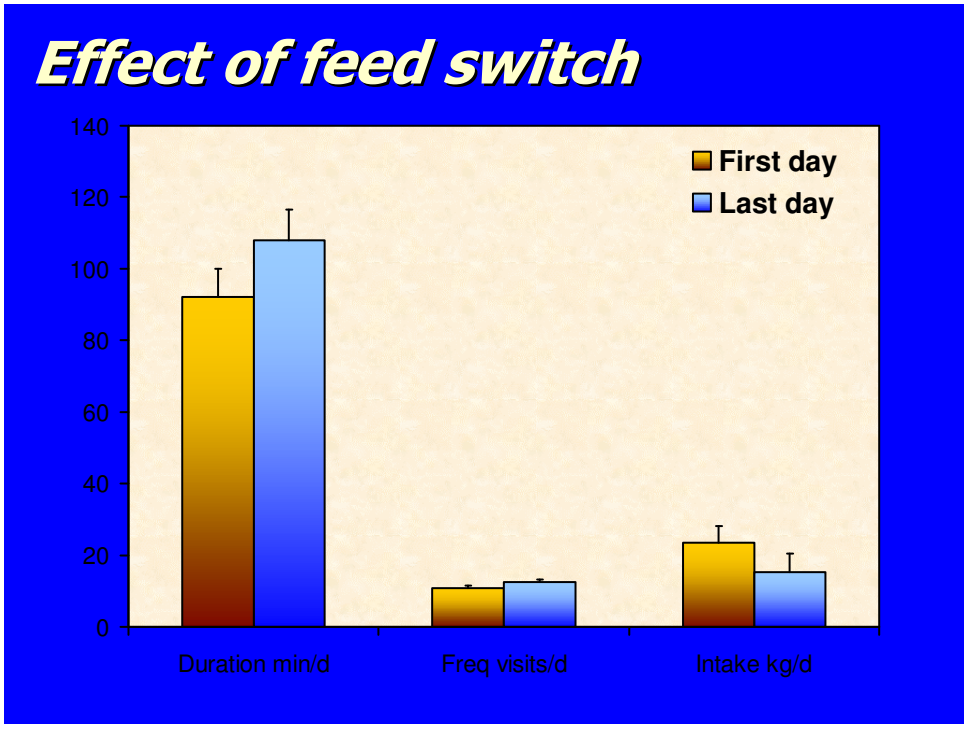
- Fed once daily @ 0900 h
- Hay type offered in one of 3 feed tubs
- Location of feed type switched every 4 d
- Weighbacks collected at 0800 h daily

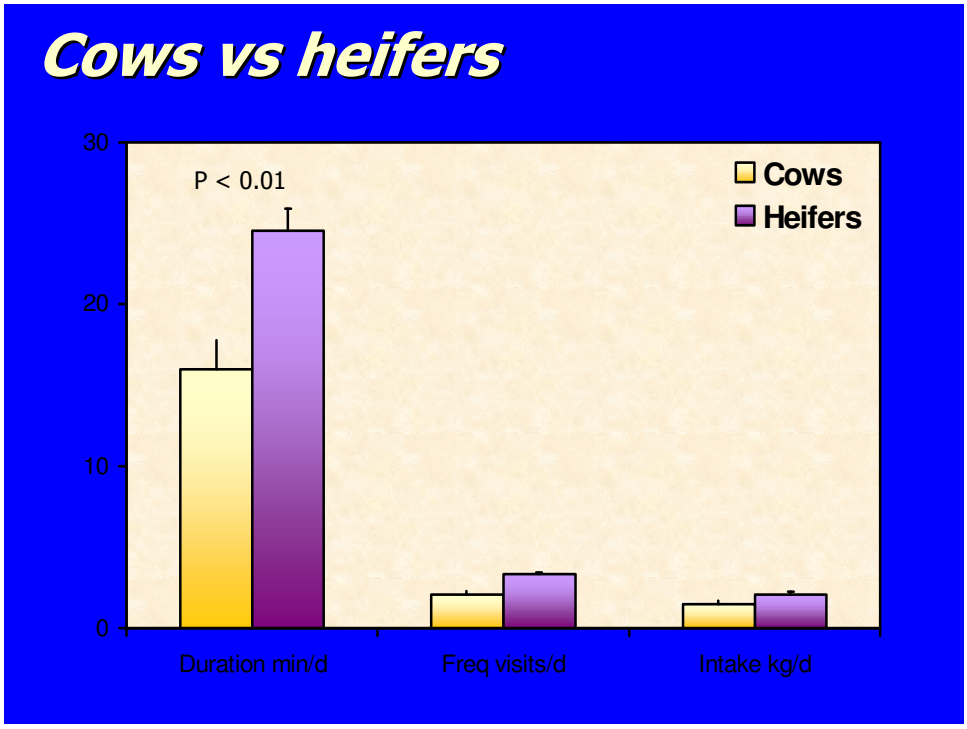
## Measurements

- Bunk attendance
  - Frequency
  - Duration
- DM intake by individual cows at each tub
- Obtained over 32 d trial
- 24-h period before and after switch of forage type

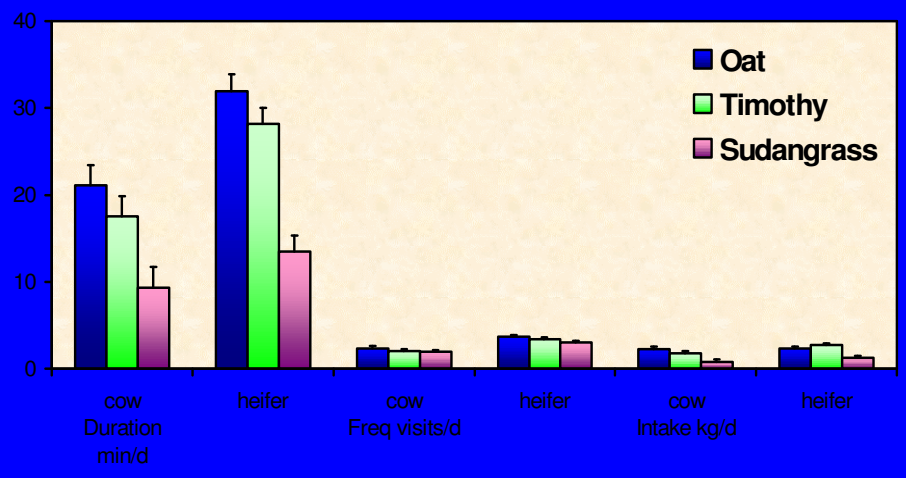
## Bunk attendance and intake




Effect of feed switch
140
120
100
80
60
40
20
0
First day
Last day
Duration min/d
Freq visits/d
Intake kg/d


Cows vs heifers
30
20
10
0
P < 0.01
Cows
Heifers
Duration min/d
Freq visits/d
Intake kg/d

# Age x forage interactions




# Effect of tub location

| Location | Visits /d | Duration min/d | Intake kg/d |
|---|---|---|---|
| Tub 1 | 2.1+/ .22 | 16.2 +/ 2.2 | 1.4+/ .29 |
| Tub 2 | 2.3+/ .22 | 16.3 +/ 2.1 | 1.3+/ .26 |
| Tub 4 | 2.3+/ .22 | 20.7 +/ 2.2 | 1.7+/ .26 |
| Tub 7 | 2.7+/ .21 | 18.9 +/ 2.0 | 1.8 +/ .24 |
| Tub 9 | 3.3+/ .20 | 22.1 +/ 1.9 | 2.6 +/ .24 [a] |
| Tub 10 | 3.6+/ .20 [a] | 27.1 +/ 1.9 [a] | 2.0 +/ .23 [a] |

* P < . 001

## Conclusions

- Strong preference for Oat and Timothy over Sudangrass
- No clear preference between Oat and Timothy hay
- Variation in bale-to bale quality
- Preference for bunk location

## Conclusions

- Lack of feeding behaviour X switch day interaction
- Cows easily discriminate and select different forage types
- Performance?
- Relationship to nutritive value?
- Preference of individuals - skewing???

## *Industry application?*

- Allow free choice access to feeds normally offered in a TMR?
- Impacts on performance and cost of feed?