Go ahead, pick the sick one...

and while you're at it, the one that's efficient and the one that's ready for market.

GrowSafe SYSTEMS

GrowSafe Systems

Engineers Computer and Animal Scientists
"Big Data" Acquisition Analytics Platform

Applications for the Livestock Production Chain

- **Seedstock, Research** – In market
- **Feedlot** – Trialed and scaling
- **Cow Calf, Dairy, Sheep** – POC

Measure Monitor Predict Mitigate Optimize

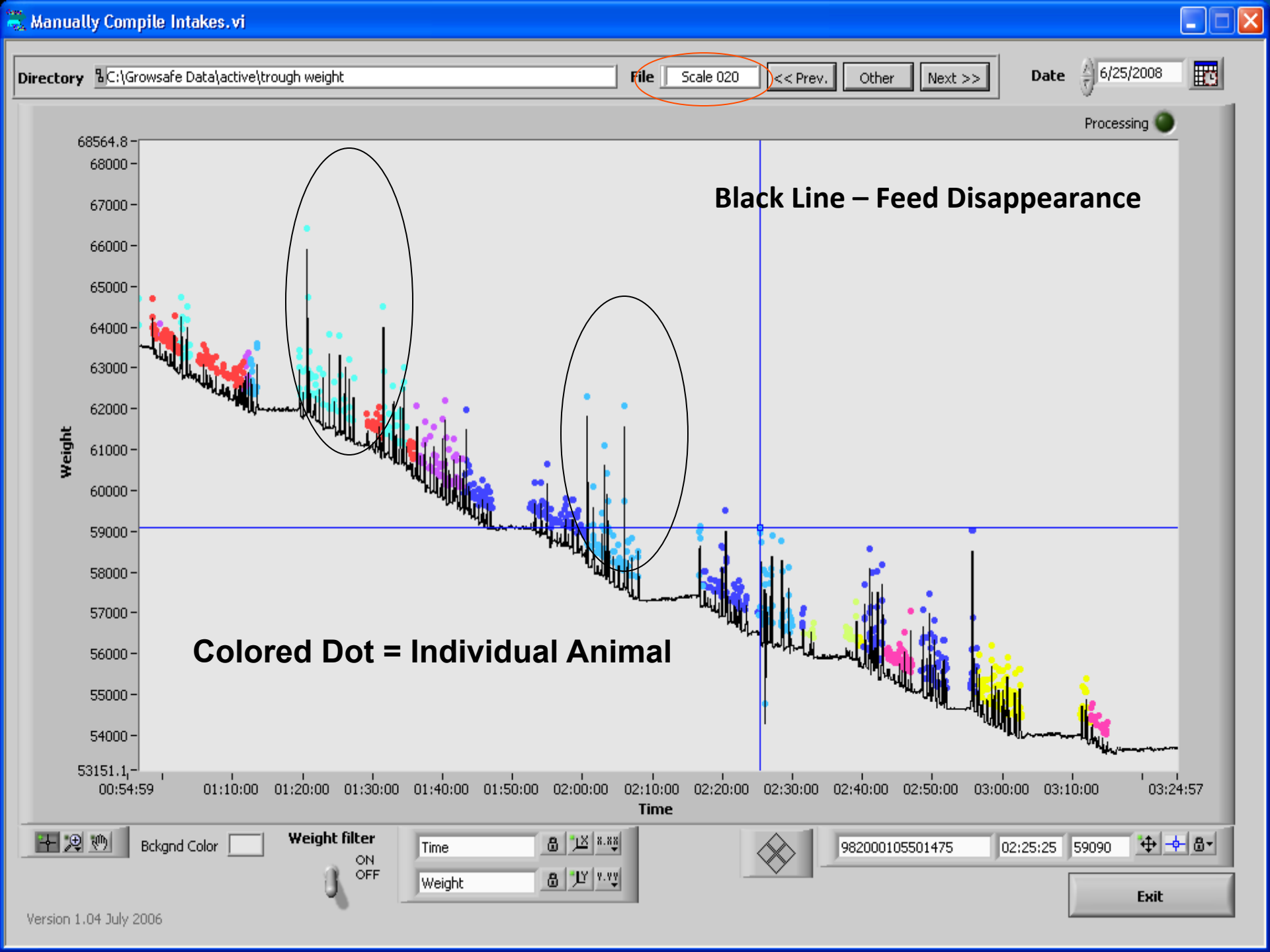
GrowSafe SYSTEMS www.growsafe.com

1st Application Seedstock

- Tagged with RFID tag
- Trough weight each sec.
- Software analyses and AUDITS data
- Automatically reports
  - individual feed intake and behavior each animal every day

Always Connected to GrowSafe

GrowSafe SYSTEMS www.growsafe.com


Manually Compile Intakes.vi
Directory
C:\Growsafe Data\active\trough weight
File
Scale 020
<< Prev.
Other
Next >>
Date
6/25/2008
Processing
Black Line – Feed Disappearance
Colored Dot = Individual Animal
Weight
68564.8
68000
67000
66000
65000
64000
63000
62000
61000
60000
59000
58000
57000
56000
55000
54000
53151.1
00:54:59
01:10:00
01:20:00
01:30:00
01:40:00
01:50:00
02:00:00
02:10:00
02:20:00
02:30:00
02:40:00
02:50:00
03:00:00
03:10:00
03:24:57
Time
Bckgnd Color
Weight filter
ON
OFF
Time
Weight
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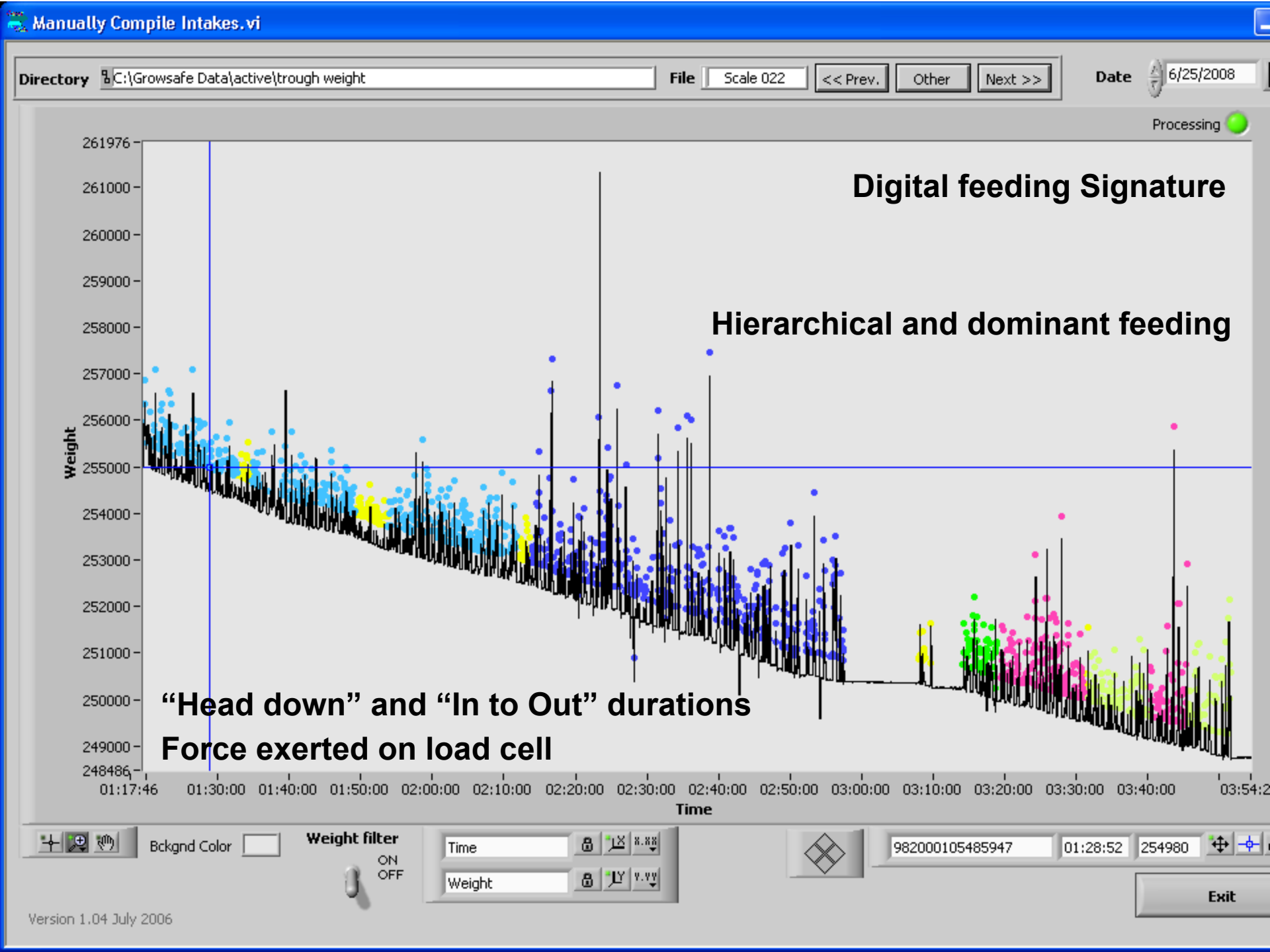
59090
Exit
Version 1.04 July 2006


Manually Compile Intakes.vi
Directory
C:\Growsafe Data\active\trough weight
File
Scale 022
<< Prev.
Other
Next >>
Date
6/25/2008
Processing
Digital feeding Signature
Hierarchical and dominant feeding
"Head down" and "In to Out" durations
Force exerted on load cell
Weight
261976
261000
260000
259000
258000
257000
256000
255000
254000
253000
252000
251000
250000
249000
248486
01:17:46
01:30:00
01:40:00
01:50:00
02:00:00
02:10:00
02:20:00
02:30:00
02:40:00
02:50:00
03:00:00
03:10:00
03:20:00
03:30:00
03:40:00
Time
Bckgnd Color
Weight filter
ON
OFF
Time
Weight
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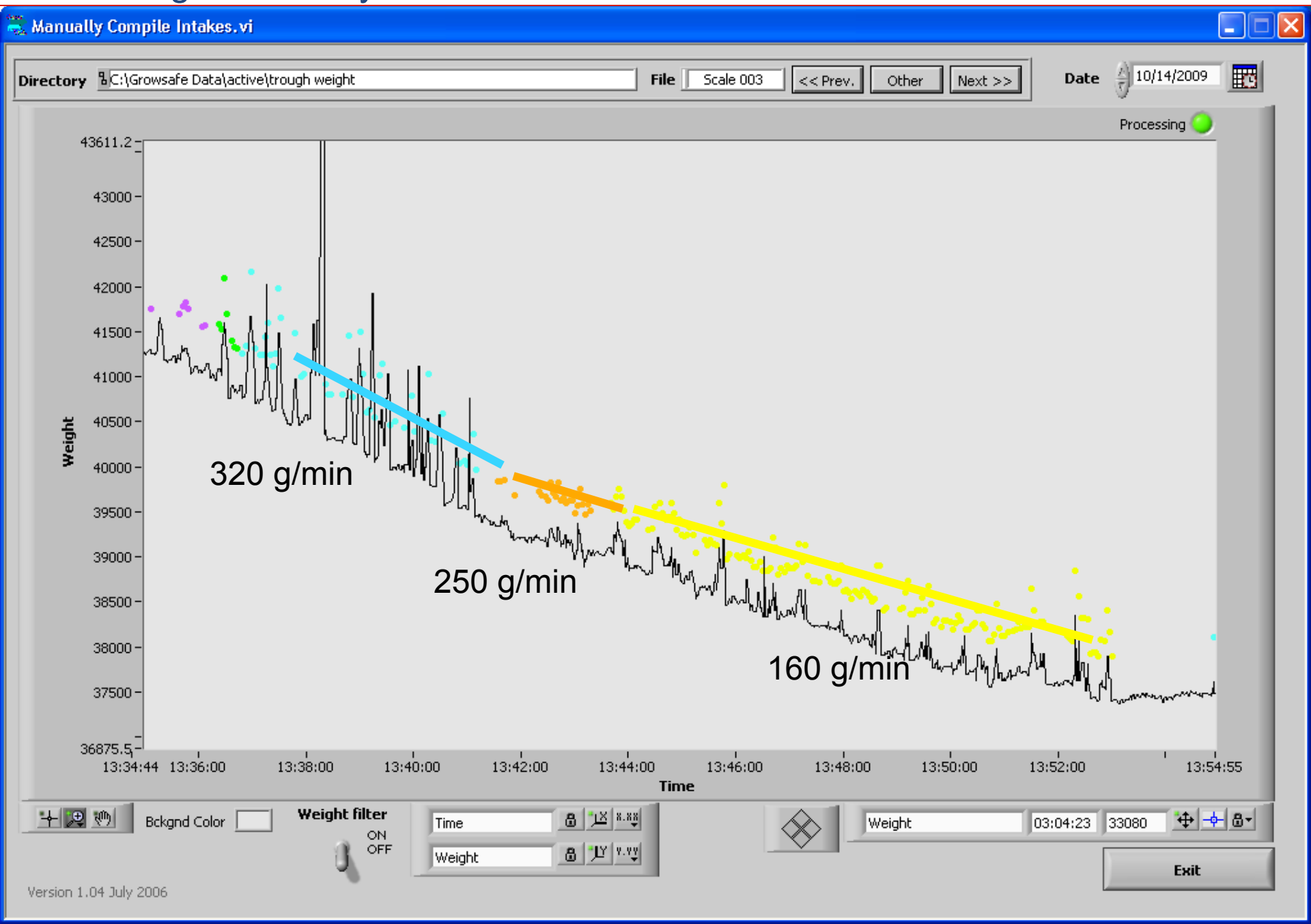
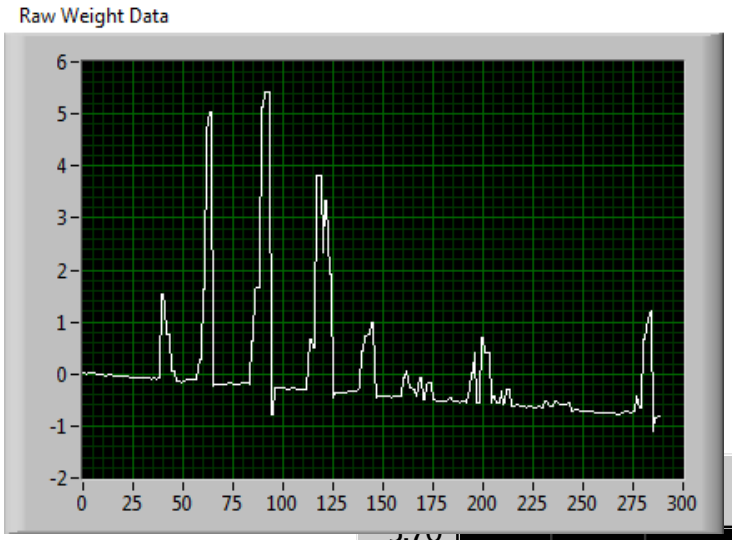
01:28:52
254980
Exit
Version 1.04 July 2006

Feeding Rate Analyses



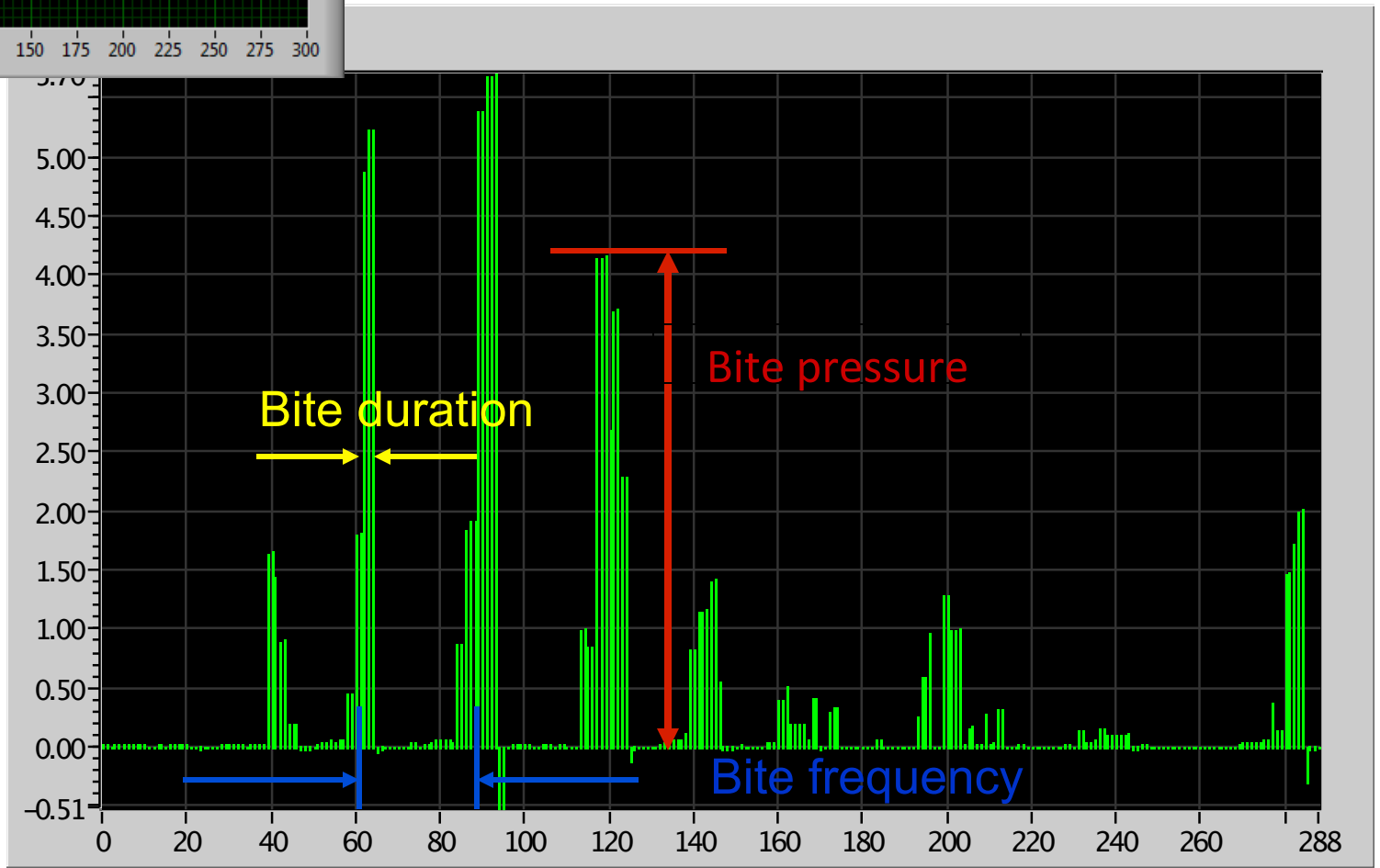


Bite size Calculation

Bite pressure – N

Bite duration – sec.

Bite frequency - Hz



2nd App - Feedlot - GrowSafe Beef

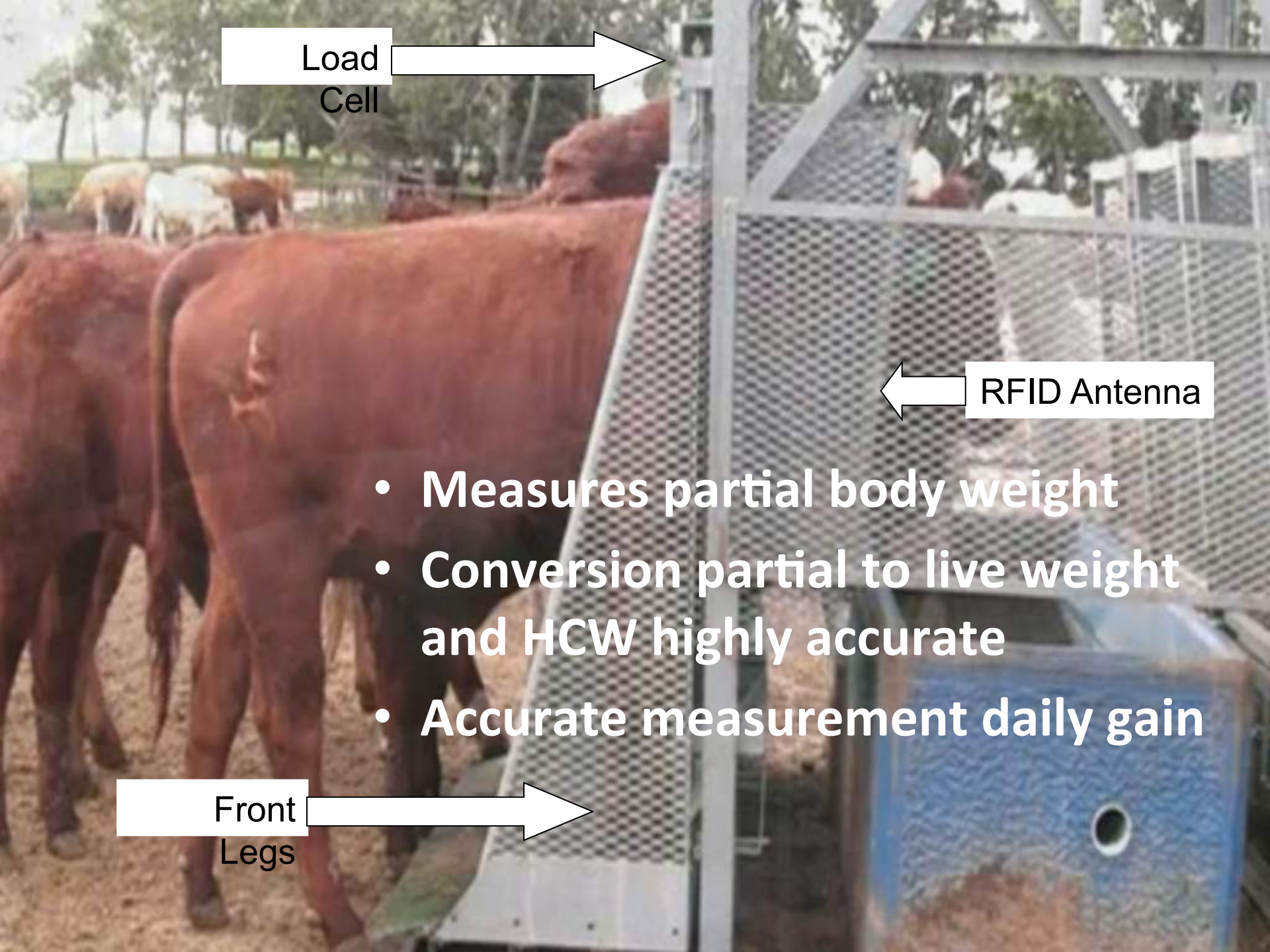
GrowSafe Beef®

In Pen Measurement Unit

Data acquired when animal drinks:

- Non-invasive
- RFID and data from multiple environmental and biometric sensors
- Automatic continuous
- Wireless

Always Connected to GrowSafe



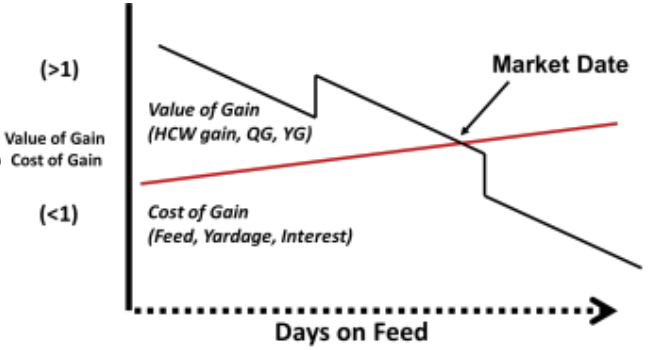
- Measures partial body weight
- Conversion partial to live weight and HCW highly accurate
- Accurate measurement daily gain

Water Intake and Behaviour

- Individual animal water intake measured by individual ‘sinks’

Software 'Learning' Algorithms

- Integrates ration/treatment/harvest data
- Reports daily weight and growth statistics
- Accurately forecasts future feed intake and weight
- Digitally profiles animal health
  - ID sick 4d+ adv clinical symptoms
  - 24 hrs adv body temp change
- Determines optimum market time
  - —When COG=VOG



More Data – More We Learn

GrowSafe SYSTEMS
www.growsafe.com

Targets Health Outliers

System Triggers:

Marking

Medicating

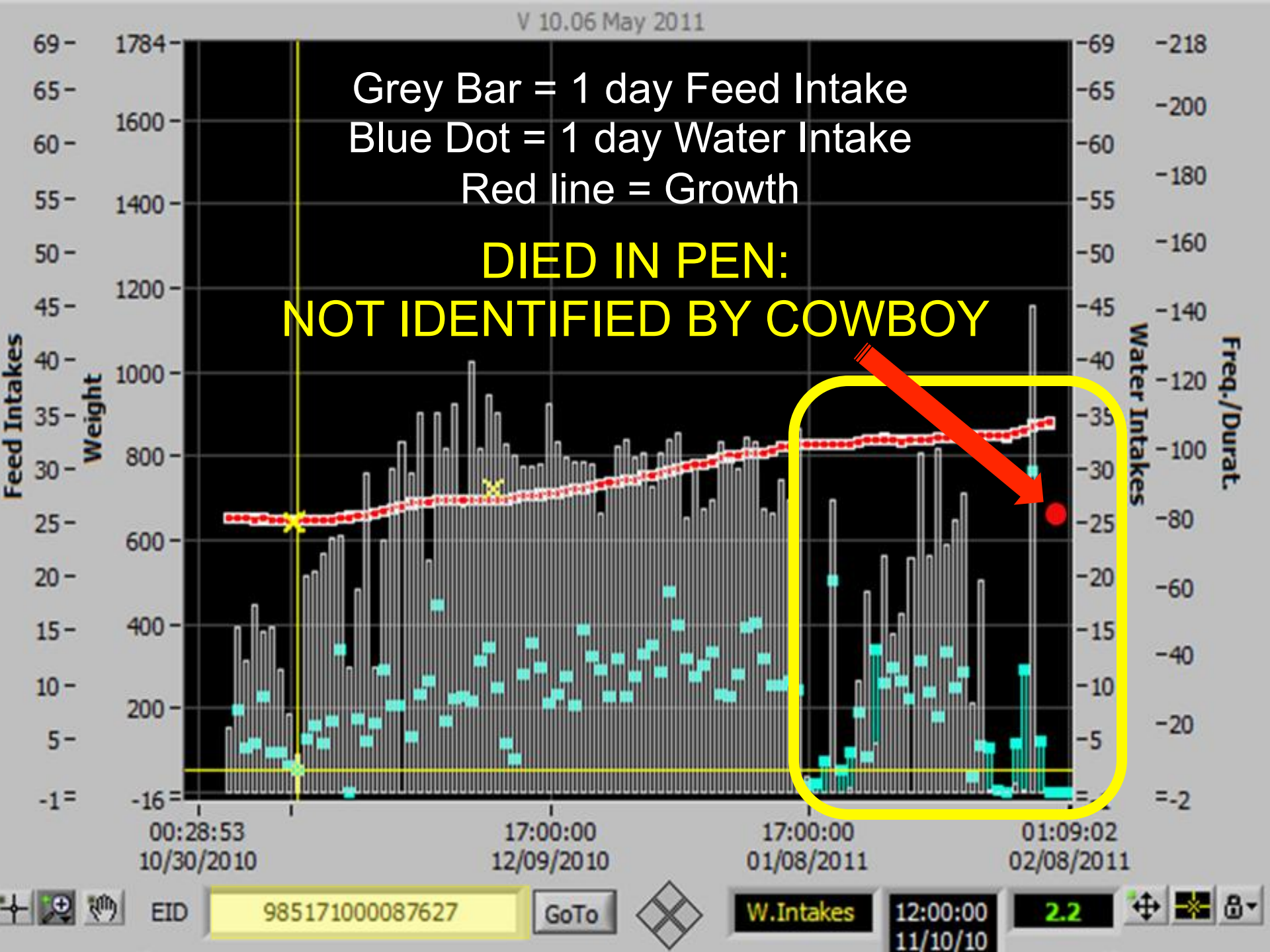
Up to 4 Water Soluble Products

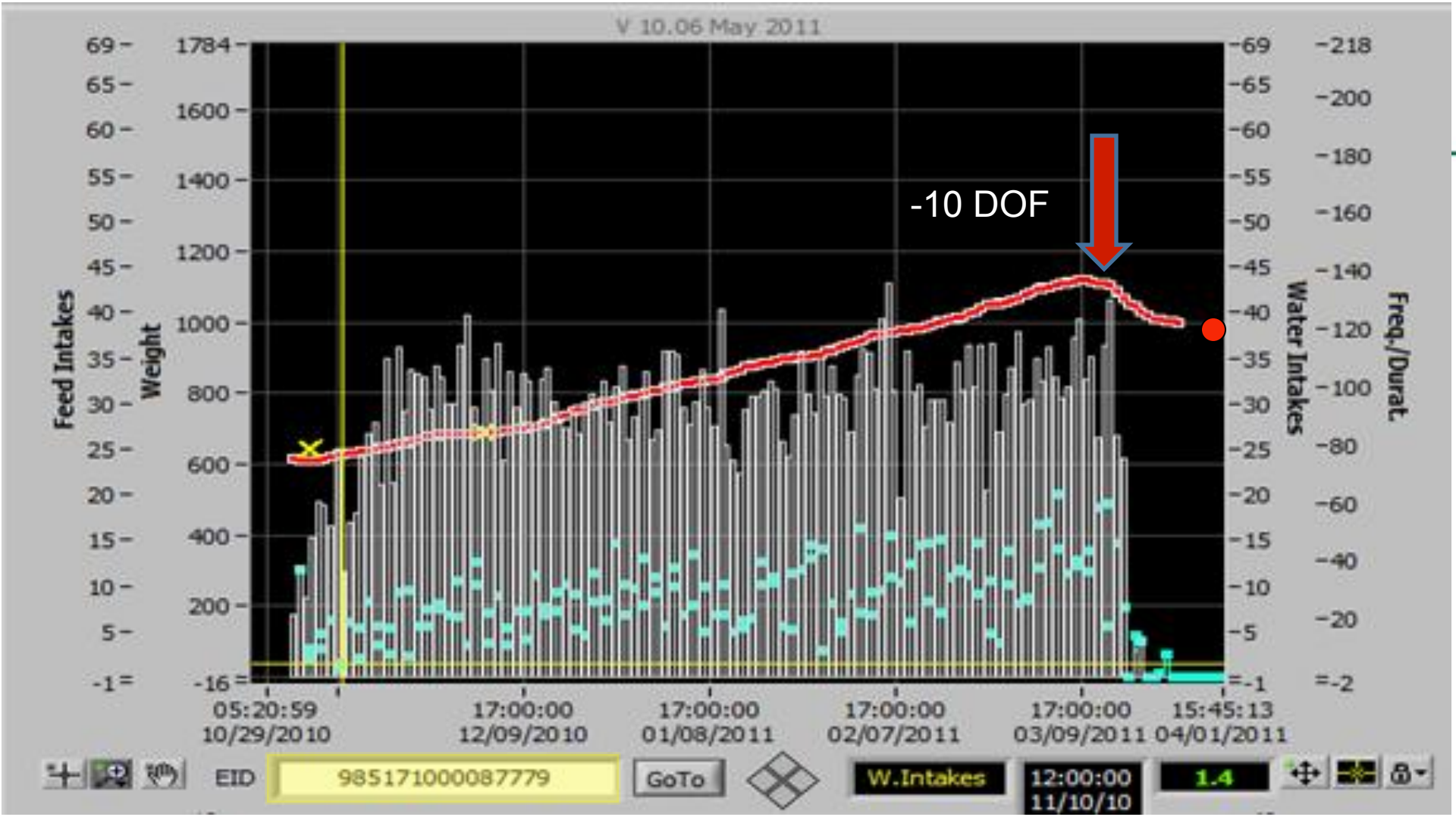
Unprecedented ability in real-time to:

- Continuously and automatically track animals
- Identify disease before symptom expression
- Measure & predict future gain & market value
- Treat individuals without human intervention

Turnkey Technology Solution – $12 per animal

80% Profit Improvements to Feedyard

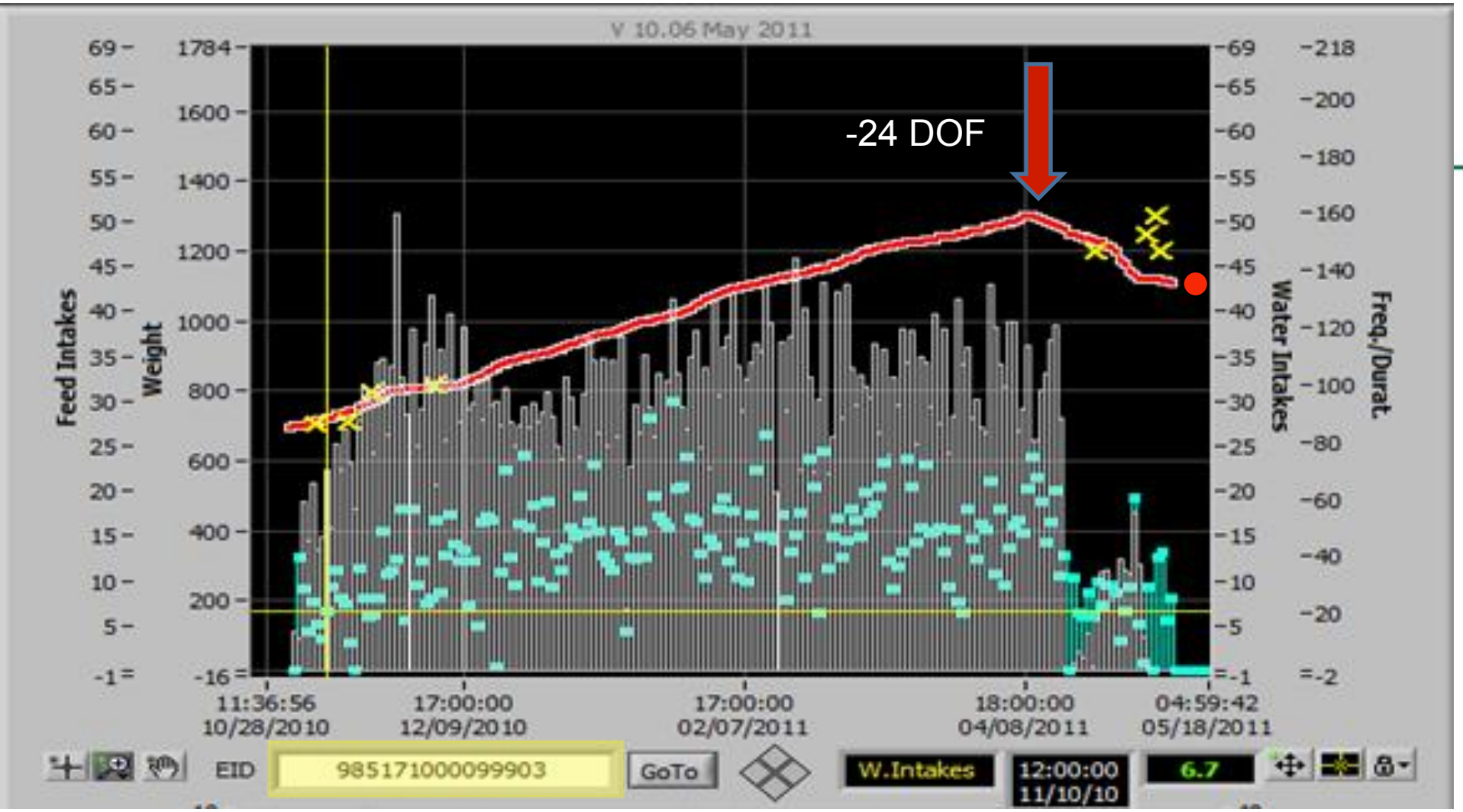

V 10.06 May 2011
Grey Bar = 1 day Feed Intake
Blue Dot = 1 day Water Intake
Red line = Growth
DIED IN PEN:
NOT IDENTIFIED BY COWBOY
Feed Intakes
Weight
Water Intakes
Freq./Durat.
00:28:53
10/30/2010
17:00:00
12/09/2010
17:00:00
01/08/2011
01:09:02
02/08/2011
EID
985171000087627
GoTo
W.Intakes
12:00:00
11/10/10
2.2



~50 DOF

Animal VID#50 died in pen 2011-03-25 Bloat

No Cowboy Pull GS Pull -10d



Animal VID#153 Died 2011-05-10 Chronic Pneumonia

GS Pull -24 Cowboy Pull -16

GS 8 days earlier than visual

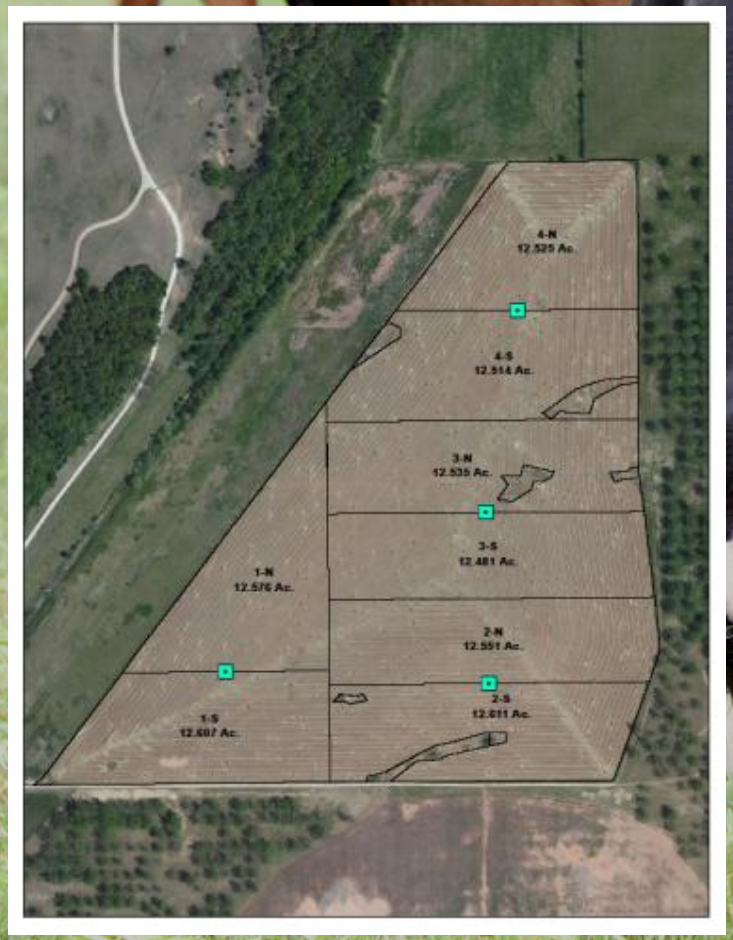
THE SAMUEL ROBERTS
NOBLE
FOUNDATION

3rd Application - Pasture

Animal Response = Pasture Measure

THE SAMUEL ROBERTS
NOBLE
FOUNDATION

Research Ongoing



DMI to WI correlation and LOA

Defining “normal” variation in DMI and WI

Forage SR and heifer RFI effects on grazing heifer ADG

Building models to integrate pasture and animal data

How GrowSafe Handles Data

Idaho Feedyard :

- 840 animals – Feed Intake
- 5400 animals – 36 pens GSB
  - 69M data points per day logged in GrowSafe native format:
    - Fast access, small archive
    - MSecs to find and read data

Existing databases can not handle large data volumes without extensive computer infrastructure

- At midnight 30 processes populate the Feedyard DB
- We leverage personal computer and the time available

A core 2 duo processor 2GHZ, 2GB RAM takes ~6 hrs to process data

Standard i5 PC has reduced processing time to 1.5 hours

IT Started Here - 2001

OLDS COLLEGE EST. 1913

GrowSafe SYSTEMS www.growsafe.com

Alberta Leading Research

Collaboration

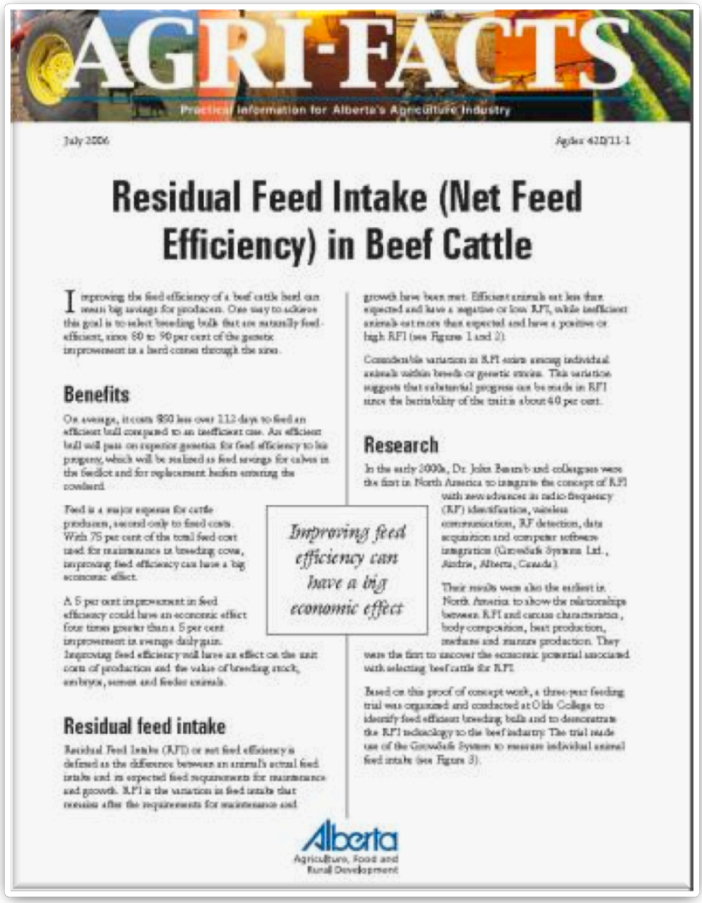
Alberta Agriculture
Olds College
Lacombe Research Center
Lethbridge Research Center
University of Alberta
Morison Farms
Cattleland Feedlots
All the Producers

Inspiration

Dr John Basarab
Dr. Stephen Moore
Dr. Denny Crews
Patrick Ramsey
Neil French
Dr. Erasmus Okine
Dr. Barry Irving
Dr. Karen Schwartzkopf-Genswein
Dr. Tim McAllister
Dr. Susan Marcus

Perspiration

Cletus Sehn
Vern Erickson
Connie Burton
Trevor Hamilton
Lisa McKeown
Brant Baker
All the Students



AGRI-FACTS

Practical information for Alberta's Agriculture Industry

July 2006 Agdex 420/11-1

Residual Feed Intake (Net Feed Efficiency) in Beef Cattle

Improving the feed efficiency of a beef cattle herd can mean big savings for producers. One way to achieve this goal is to select breeding bulls that are naturally feed-efficient, since 80 to 90 per cent of the genetic improvement in a herd comes through the sires.

Benefits

On average, it costs $80 less over 112 days to feed an efficient bull compared to an inefficient one. An efficient bull will pass on superior genetics for feed efficiency to his progeny, which will be realized as feed savings for calves in the feedlot and for replacement heifers entering the purebred.

Feed is a major expense for cattle producers, second only to feed costs. With 75 per cent of the total feed cost used for maintenance in breeding cows, improving feed efficiency can have a big economic effect.

Improving feed efficiency can have a big economic effect

A 5 per cent improvement in feed efficiency could have an economic effect four times greater than a 5 per cent improvement in average daily gain. Improving feed efficiency will have an effect on the unit cost of production and the value of breeding stock, embryos, semen and feeder animals.

Residual feed intake

Residual Feed Intake (RFI) or net feed efficiency is defined as the difference between an animal's actual feed intake and its expected feed requirements for maintenance and growth. RFI is the variation in feed intake that remains after the requirements for maintenance and growth have been met. Efficient animals eat less than expected and have a negative or low RFI, while inefficient animals eat more than expected and have a positive or high RFI (see Figures 1 and 2).

Considerable variation in RFI exists among individual animals within breeds or genetic strains. This variation suggests that substantial progress can be made in RFI since the heritability of the trait is about 40 per cent.

Research

In the early 2000s, Dr. John Basarab and colleagues were the first in North America to integrate the concept of RFI with new advances in radio frequency (RF) identification, wireless communication, RF detection, data acquisition and computer software integration (Growsafe Systems Ltd., Airdrie, Alberta, Canada).

Their results were also the earliest in North America to show the relationships between RFI and carcass characteristics, body composition, heat production, methane and manure production. They were the first to uncover the economic potential associated with selecting beef cattle for RFI.

Based on this proof of concept work, a three-year feeding trial was organized and conducted at Olds College to identify feed efficient breeding bulls and to demonstrate the RFI technology to the beef industry. The trial made use of the Growsafe System to measure individual animal feed intake (see Figure 3).

Alberta
Agriculture, Food and Rural Development

GrowSafe SYSTEMS
www.growsafe.com

GrowSafe Testing

Where

100+ installations

23 US States

7 Canadian Provinces

10 Alberta Sites

Mexico

Australia

UK

Finland

Uruguay

Brazil

More than 40 Students

More than 450 publications