

Low-Stress Dairy Handling Systems

Paul Rapnicki, DVM MBA
Clinical Professor Dairy Production Medicine
Veterinary Population Medicine

2011 Missouri Dairy Grazing Conference



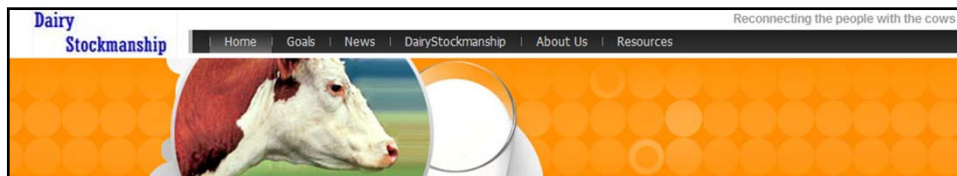
Components of a Cattle Handling System

- The design and maintenance of the facilities
- The cattle handling skills of the people



Poor Handling Skills are the Result of a Disconnection between the People and the Livestock

- Often facilitated by technology
- Lack of awareness by the people



- Our goal is to re-connect stockmanship to the dairy industry
 - Dairy Employees
 - Dairy Veterinarians
 - Dairy Professionals
 - Dairy Owners
- Includes all dairy production systems

HANDLING, MOVEMENT AND TRANSPORTATION

Employees should be properly trained to handle animals with a minimum of stress to the animal, and the consequences of inhumane handling should be known and enforced.



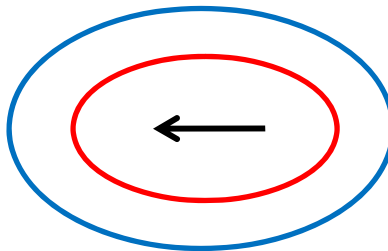
Training Programs should:

1. Be based on sound science
2. Produce the desired results



Stockmanship Principles

- Pressure area surrounds the flight zone



- Apply pressure to animals properly



All behavior is a product of

- Biological variables
 - Species history
 - Biological evolution and genetic makeup
- Environmental variables
 - The present environment
 - Including the internal physiological environment
 - The past environment
 - What has happened to the individual in the past



- Ethologist
 - One who studies animal behavior, as it occurs in a natural environment
- Behaviorist
 - One who studies behavior, in humans or animals



Life History Strategy

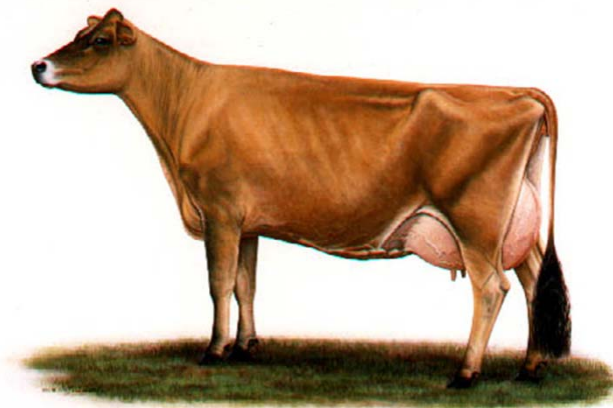
- Cattle are herbivores, a prey species that exhibits herding behaviors
- They do not communicate verbally, but rather experience the world with the uniqueness of their 5 senses



UNIVERSITY OF MINNESOTA
Driven to Discover™

Communicate so the Cow Understands

1. Taste
2. Smell
3. Hearing
4. Sight
5. Touch



UNIVERSITY OF MINNESOTA
Driven to Discover™

Taste & Smell

- Taste buds
- Olfactory epithelium
- VomeroNasal Organ
 - Flehman behavior



- Dew drops often form on nose or muzzle
 - Wiped with tongue, sensed by VNO
- Scents that are socially important to animals are derived from waste products: urine, feces, sweat, breath



Hearing

- Humans



- Cattle



- Dogs



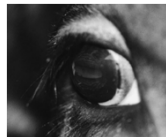
Low -----High
Frequency in KiloHertz



Cattle and Noise

- Evidence shows that cattle are sensitive to auditory contact with humans
- Researchers have found that cattle show a similar aversion, based on avoidance, to hitting as to shouting by humans

Pajor EA, Rushen J, de Passile AMB. Aversion learning techniques to evaluate dairy cattle handling techniques. *Appl Animal Behav Sci* 2000; 69:89-102



Sight

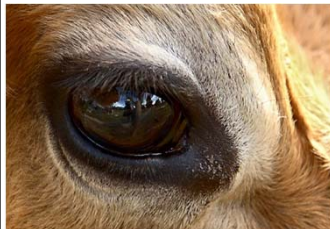
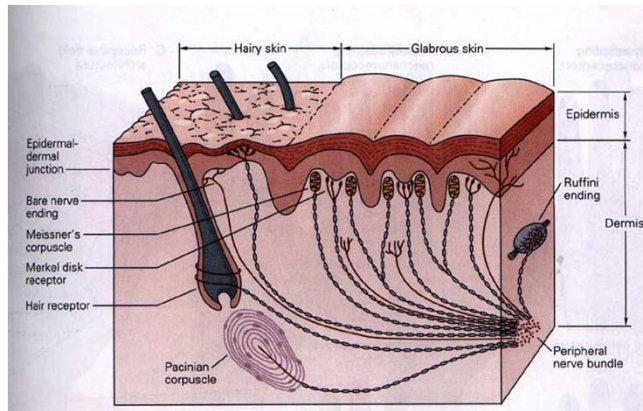


- Primary sense used by grazing animals
- Horizontal, rectangular pupil shape
- Narrow field of vertical vision
- Located on sides of the head and bulbular
- Wide field of vision
- Poor depth perception



Touch Receptors

- Pressure
- Pain
- Warmth
- Cold

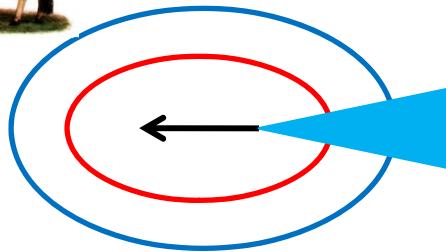


Key message

- We need to be honest with cattle and always let them see where we are
- Cattle will look (listen) to what is what is pressuring them
- *Be aware of the which senses are being stimulated, and work to avoid startle*

The Right Way

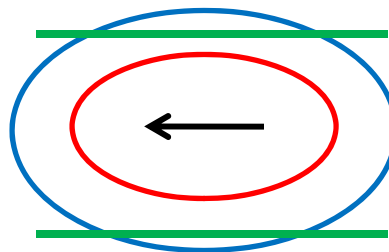
- The Cow cannot see behind her



UNIVERSITY OF MINNESOTA
Driven to Discover™

The Right Way

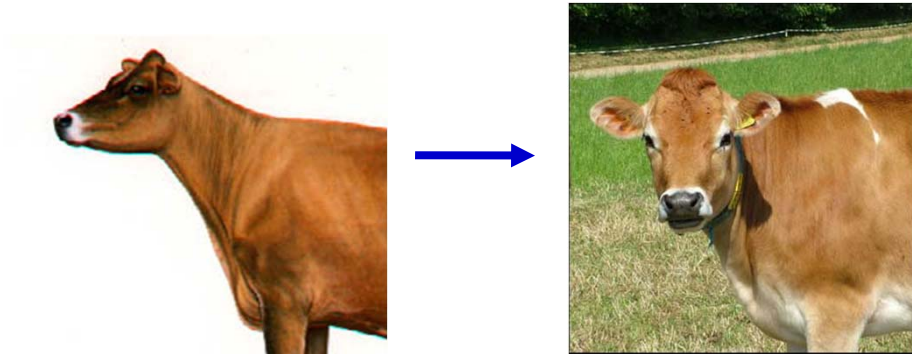
- The best place to let the cow see you is from her side



UNIVERSITY OF MINNESOTA
Driven to Discover™

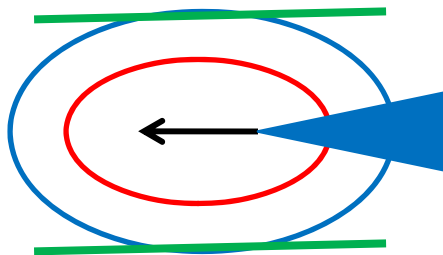
The Right Way

- Notice when a cow looks at you with 2 eyes



Dairy Stockmanship


- Pressure animals where they can see you



- Only 1 person should pressure at a time


Driving a Cow

A diagram illustrating a cow's movement. Two vertical red lines are positioned side-by-side. A black arrow points upwards from the bottom center between these two lines. A green 'X' is located below the arrow, centered between the two lines.



Driving a Cow

A diagram illustrating a cow's movement. A single vertical red line is positioned on the left side. A black arrow points upwards from the bottom center next to this line. A green 'X' is located to the right of the arrow, at the same vertical level as the arrow's tip.

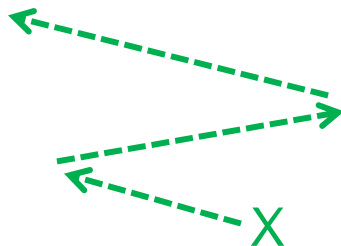


Driving a Cow



UNIVERSITY OF MINNESOTA
Driven to Discover™

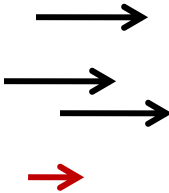
Driving a Cow



UNIVERSITY OF MINNESOTA
Driven to Discover™

The Right Way

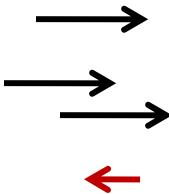
- Walking with animals will slow them down



- Cows walk 2 mph, People walk 3-4 mph

The Right Way

- Walking opposite direction speeds animals up



Low Stress Handling Systems

- Informally, this is how to work cattle with low-stress methods
- Formally, this is the study of cow behavior and her stress response
 - We can apply the sciences of behavior analysis and stress biology



Low Stress Handling Systems

- What is Low Stress?
- What is High Stress?
- What is Stress?
- What is Distress?
- What is Eustress?



What is Stress?

- Ask a dozen people to define “stress” and you would likely get 12 different answers
- If we struggle to define stress, how can we possibly measure it?



Definitions

- **Stressor** = event threatening or potentially threatening the homeostatic balance
- **Stress Response** = the bodies attempt to re-establish the homeostasis after encountering a stressor

2011 Trends in Stress Biology



Stress Response

Robert Sapolsky

- Stress response evolved as adaptive
- Consequences of the stress response can be maladaptive
- There is a “cost” to mounting a stress response



Stress Related Disease

Sapolsky

- Stress does not make you sick
- *“Stress makes you more likely to get diseases that make you sick”*



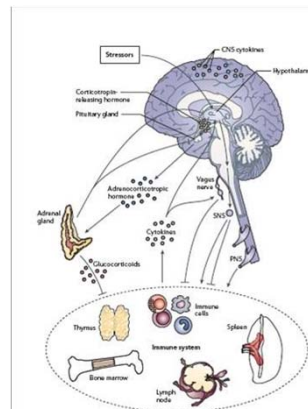
Testing for stress

- There is no litmus test for stress



Measuring the Stress Response

- Neuroendocrine system (HPA)
- Autonomic Nervous System
 - Sympathetic
 - Parasympathetic
- Immune System
- **Behavior**



All behavior is a product of

- Biological variables
 - Species history
 - Biological evolution and genetic makeup
- Environmental variables
 - The present environment
 - Including the internal physiological environment
 - The past environment
 - What has happened to the individual in the past

Examples Getting Cows Into the Milking Parlor

The flowchart illustrates the field of Microbial Endocrinology. It is positioned at the center, with arrows pointing to it from 'Microbiology' (left) and 'Neurobiology' (right). From 'Microbiology', an arrow points to 'Low inoculum Gut environment'. From 'Neurobiology', an arrow points to 'Stress-induced neurohormone release', 'Catecholamines as prototypical examples', and 'Enteric nervous system'. From 'Microbial Endocrinology', three arrows point downwards to three categories: 'Bacterial hormone production' (listing GABA and Somatostatin), 'Growth' (listing Food-borne pathogens like *E. coli* O157:H7 and *S. enterica*, and Commensals like *E. coli*), and 'Virulence factors' (listing Attachment factors, Toxins, and Autoinducers). At the bottom of the flowchart, it says 'Evolution as a theme throughout' and 'TRENDS in Microbiology'.

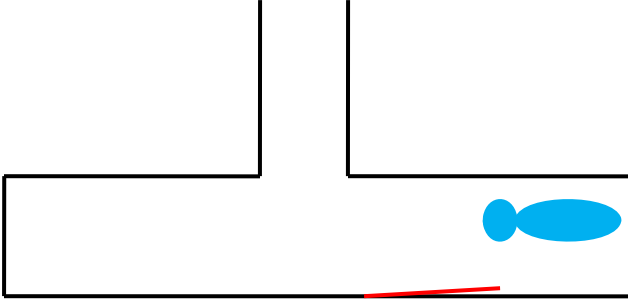
A 3D rendered white figure is sitting on a large blue question mark. The figure is in a contemplative pose, leaning against the question mark.

TRENDS in Microbiology Vol.12 No.1 January 2004

UNIVERSITY OF MINNESOTA
Driven to Discover™


Bud Box Technique for Moving Cattle Safely and Efficiently

UNIVERSITY OF MINNESOTA
Driven to Discover™

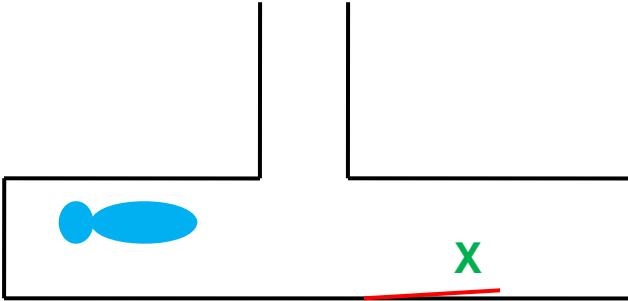


The diagram shows a horizontal line with a red diagonal line segment at its right end. A blue fish-like object is positioned above the horizontal line on the right side. A green 'X' is located to the right of the fish. The diagram is enclosed in a black rectangular frame.

The Bud
Box




UNIVERSITY OF MINNESOTA
Driven to Discover™

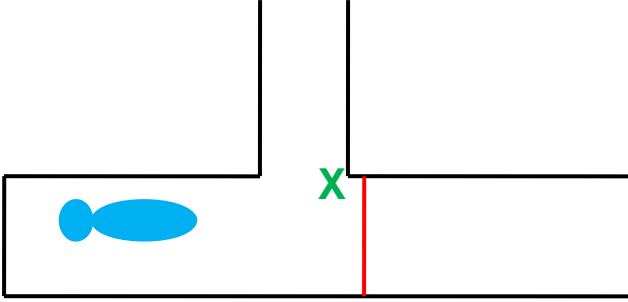


The diagram shows a horizontal line with a red diagonal line segment at its right end. A blue fish-like object is positioned above the horizontal line on the left side. A green 'X' is located to the right of the fish. The diagram is enclosed in a black rectangular frame.


The Bud
Box



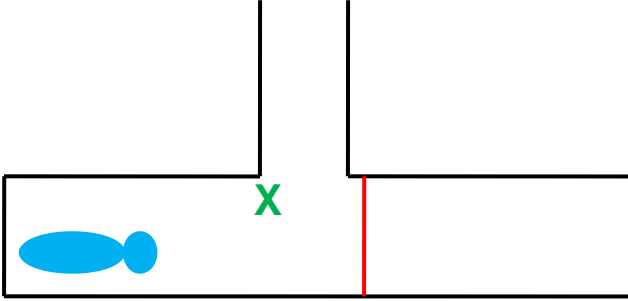
UNIVERSITY OF MINNESOTA
Driven to Discover™




The Bud Box



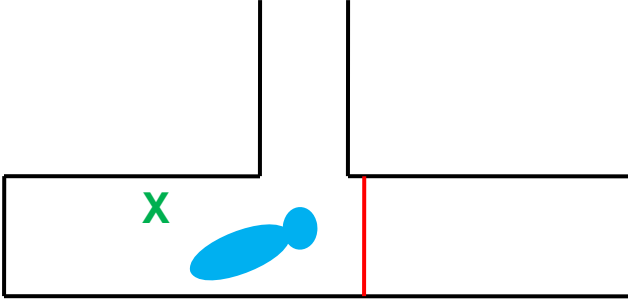
The diagram shows a cross-section of a bud box. On the left side, there is a blue bud. A vertical red line is positioned on the right side of the box. A green 'X' is located at the junction of the top horizontal line and the vertical line on the right side.



The Bud Box




The diagram shows a cross-section of a bud box. On the right side, there is a blue bud. A vertical red line is positioned on the right side of the box. A green 'X' is located at the junction of the top horizontal line and the vertical line on the right side.

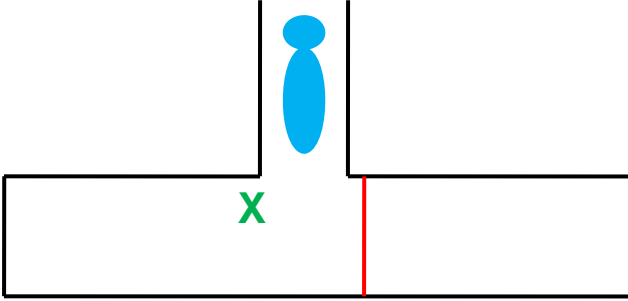


The diagram shows a cross-section of a bud box. It consists of a horizontal base with two vertical walls rising from it. A red vertical line is drawn on the right side of the base. A blue bud is positioned on the left side of the base, to the left of the red line. A green 'X' is placed on the left side of the base, to the left of the bud.

The Bud
Box




UNIVERSITY OF MINNESOTA
Driven to Discover™



The diagram shows a cross-section of a bud box, similar to the one above. It consists of a horizontal base with two vertical walls rising from it. A red vertical line is drawn on the right side of the base. A blue bud is positioned on the right side of the base, to the right of the red line. A green 'X' is placed on the left side of the base, to the left of the red line.

The Bud
Box



UNIVERSITY OF MINNESOTA
Driven to Discover™

Bud Box Design

- 14 x 20 to load a chute
- 14 x 30 to load a truck
- Same size
 - Regardless of the animal size
 - Regardless of the number of animals
- Exit opening wide enough for 1 animal



Components of a Cattle Handling System

- The design of the facilities
 - The maintenance of the facilities
- The cattle handling skills of the people



Dairy Stockmanship

- Every interaction between people and their livestock is important
 - Positive experiences/conditioning
 - Negative experiences/conditioning
- Be aware of the behaviors you are training your animals to perform



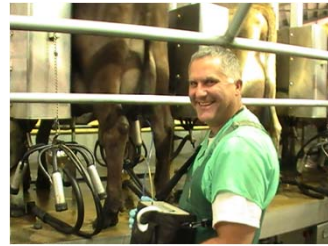
Interactions with Youngstock

- The concept of “Brain Plasticity”
- Important periods in behavioral development
 - Pre and Post-natal periods
 - Adolescence
- Condition the appropriate behaviors for an adult lactating cow in your production system



THANKS!

- Don Höglund, MS DVM
- Gail Peterson, PhD BCBA
- Bud Williams
- Tom Noffsinger, DVM
- Margaret Perala, DVM
- Walt Guterbock, DVM
- Gordie Jones, DVM



UNIVERSITY OF MINNESOTA
Driven to Discover™