Bruising in fed cattle:
Where we are and where we’re going

October 10, 2016
Animal welfare in the cattle industry

- Focus on cull cows
- Focus on veal calves
- Focus on dairy cows
- Focus on fed beef cattle?
Animal welfare in regards to fed beef cattle

• Feedlot finished v. grass-fed
  – Economic sustainability
  – Environmental sustainability
  – Animal health

• Disease status
  – BRD
    • Stress in feeder calves
  – Acidosis
Animal welfare in regards to fed beef cattle

• How does transport fit in?
• Why do we care?
Fed cattle welfare and transport

• Issues?
  – Stocking density
  – Air flow
  – Bruising
Bruising in fed cattle

- Economic implications
  - Bruising on dorsal midline
- Welfare implications
- Prevalence in the United States
  - 53.3% (Stephens et al., 2015)
  - 23% (2011 National Beef Quality Audit)
- Prevalence in other countries
  - 99% (Jarvis et al., 1996, England)
  - 37.5% (Romero et al., 2013, Colombia)
Carcass bruising in finished cattle

- Horn prevalence
- Cattle temperament
- Cattle handling techniques
  - Feedlot
  - Slaughter facility
- Transport conditions
- Facility design
Current research

• Relationship between trauma sustained at unloading and carcass bruise prevalence in finished cattle at commercial slaughter facilities
Current research

• Objective
  – To determine whether a relationship exists between trauma incurred during unloading and prevalence of carcass bruising in finished beef cattle at commercial slaughter facilities
Current research

- Whole lots of finished beef cattle were observed at commercial slaughter facilities in July and August of 2015
- Observed by a trained observer
  - During unloading only
  - Potentially traumatic events between animals and the trailer
  - Traumatic events categorized by location (back, shoulder, rib, hip)
Current research

• A second trained observer evaluated bruising
• The Harvest Audit Program™ Bruise Scoring System
  – Carcass divided into grid of 9 sections
  – Size
    • Small (S): < 2 inches in diameter
    • Medium (M): 2 to 6 inches in diameter
    • Large: (L): > 6 inches in diameter
  – Color
    • Used as exclusion factor
      – Yellow bruises
Current research

Location 9, S, no mark for color

Locations 2 & 5, L, no mark for color
Current research

• Results: Bruising prevalence
  – 75 lots observed for traumatic events and carcass bruising
    • 9,860 total head
    – Average traumatic event prevalence by lot: **20.4% (± 1.11%)**
    – Average carcass bruising prevalence by lot: **68.2% (± 1.15%)**
Current research

<table>
<thead>
<tr>
<th>Location</th>
<th>Mean</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left</td>
<td>26.4%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Midline</td>
<td>53.5%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Right</td>
<td>19.9%</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

Values with different superscripts differ significantly ($P \leq 0.05$)
Current research

Traumatic Events and Carcass Bruising

$R^2 = 0.08^a$

Superscript a indicates $P < 0.05$
Current research

Traumatic Events and Bruising: Back

$R^2 = 0.14^a$

Superscript $a$ indicates $P \leq 0.05$
Current research

Traumatic Events and Bruising: Shoulder

$R^2 = 0.05$
Current research

Traumatic Events and Bruising: Rib and Hip

$R^2 = 0.00$
Current research: Conclusions

- Bruising prevalence higher than other studies in the U.S.
  - Lower than results in other countries
  - Most bruising occurred along the dorsal midline
- Significant correlation between trauma incurred at unloading and carcass bruise prevalence
  - Trauma at other points during transport?
Bruising in fed cattle

• Definition of a bruise (Hoffman, et al. 1998)
  – “A bruise is a tissue injury without laceration usually produced by a blunt object impacting an animal with sufficient force to cause rupture of the vascular supply and accumulation of blood and serum in tissues.”

• A result of trauma
  – Where does trauma occur?
Fed cattle welfare and transport: Where are we now?

- Carcass bruising is highly prevalent in fed beef cattle
  - Some bruising occurs during unloading
- Where else?
  - Feedyard
  - Trailer
  - Slaughter facility
Fed cattle welfare and transport: Where are we now?

- Why does it occur?
  - Animal handling
  - Average weight of fed cattle
    - 10-20 years ago
    - Today
  - Breed-specific?

Graph courtesy of 2015 CattleFax Directions Statistics
Fed cattle welfare and transport: Where are we now?

• Why does it occur?
  – Design of trailers used to haul fed cattle
    • The same for 20+ years
    • Trailer types
      – “Fat”
      – “Combo”
Trailer types: Fat/feeder combo trailer

- 69 in
- 66 in
Trailer types: Fat trailer

68 in

69 in
Current research
Current research
Fed cattle welfare and transport: Where are we going?

- New trailer designs

68 in

69 in
Fed cattle welfare and transport: Where are we going?

- Combo trailers
  - 66” belly height
  - Slide-in ramp
  - 55” clearance
- Fat trailers
  - 69” belly height
  - Slide-in ramp
  - 57-59” clearance
- New trailer designs
  - 69” belly height
  - Fold-up ramp
  - 9” cut from upper deck
  - 62.5-63.5” clearance
Fed cattle welfare and transport: Where are we going?

• Next steps
  – Further research: facility design, transport
    • Feedyard
    • Trailer type—new designs?
  – Risk factors for traumatic events and bruising
    • Sex
    • Breed
    • Carcass weight
Fed cattle welfare and transport: Where are we going?

• Designed experiments
  – Compare trailer types
  – New trailer designs
Fed cattle welfare and transport: Where are we going?

- Industry-wide issue
- Increased scrutiny
- We must face it head-on
  - Research
  - Collaboration
  - COOPERATION
Thank you!

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