Automated Milking and Calf Feeding
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Why robotic/automated milking?
- Improve quality of life
- Labor management
- Human health
- Latest technology
- Consistency

Lots of individual cow and herd information at their fingertips!

Activity chart
Automated/Robotic Milking Systems
Box Systems

- Lely
- DeLaval
- GEA Farm Technologies
- AMS-Galaxy
- BouMatic Robotics
BouMatic Robotics

Free flow system

Guided flow – Milk first system

Parlor Systems
- DeLaval
- GEA Farm Technologies
- MiRobot

Milking Process – Fully Automated
Capacity depends on the number of stalls (32-80)

The AMR™ milking process
10 steps
- AMR™ may be CW or CCW
- Rotation 1 stall/move- not continuous motion
- Five (5) robotic arms
- Robot function if CW rotation:
  - #1 preps left teats
  - #2 preps right teats
  - #3 attaches rear teats
  - #4 attaches front teats
  - #5 individual teat spray
- Possibility for easy manual attach if/when desired

Slide courtesy of Greg Larson, GEA Farm Technologies
How many farms use robots?

- Over 30,000 units worldwide
- More robots in Europe than in the US
- About 150-200 farms in the US
- Five manufacturers in North America: Lely, DeLaval, GEA Farm Technologies, AMS-Galaxy, and BouMatic
- Most units in the US and Canada are Lely and DeLaval

RMS Goals

Important:

- > 2.8 milking per cow per day (> 2.4)
- < 5 failed milking per robot per day
- > 1.5 hours free time on the robot/day
- Fetch cows at 5-10 cows or less/robot/day
- Production goal of more than 5,000 lbs. milk per robot per day
  * > 4,000 lbs = OK; > 4,500 = good; > 5,000 = excellent

Chad Kieffer, Kiefland Holsteins

Pounds of milk per robot

Average = 4,325

Number of milkings per day

Average = 2.6

Other facility attributes

<table>
<thead>
<tr>
<th>Feature</th>
<th>Percent of farms</th>
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<tbody>
<tr>
<td>Mechanical rotating brushes</td>
<td>62%</td>
</tr>
<tr>
<td>Automatic feed pushers</td>
<td>21%</td>
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<tr>
<td>Robotic manure scraper</td>
<td>4%</td>
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Summary

- Producers wanted robots for quality of life and labor management
- Robotic barns more likely to have automated manure removal systems, robotic feed pushers and mechanical brushes than other freestall barns

Most dairy farms in the U.S. house baby calves individually in outdoor calf hutches

AUTOMATED CALF FEEDERS

Why feed calves in groups?

- More space per calf
- Social interaction
- More frequent feeding
- Easier to feed larger amounts of milk
- Labor management

Automated calf feeder
What are some of the challenges?

- Calf individual observation
- Prevention of disease
- Competition for feed
- Cost of equipment
- Equipment setup
- Equipment cleanliness

Ventilation system

Naturally ventilated 50%
Mechanically ventilated 39%
Tunnel ventilated 8%
Lgbox 3%

Use of ventilation tubes

Tubes 87%
No Tubes 13%

Mark your calendars!

Thank you for your time and attention! Questions/Comments: mlrandres@umn.edu