Case study: New tools to monitor reproductive performance of dairy cows

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Background
8,800 lactating Jersey herd in the Midwest
- Expansion from 3,000 to 6,400 in the winter of 2009 and from 6,400 to 8,700 in the fall of 2013
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- 8,800 lactating Jersey herd in the Midwest
  - Expansion from 3,000 to 6,400 in the winter of 2009 and from 6,400 to 8,700 in the fall of 2013
- Reported pregnancy rates as high as 32% with AI submission rate ranging from 65 to 75%
  - Recent herd checks (starting in November 2013) presented low palpation pregnancy rate
  - Percentage of animals re-inseminated reducing
  - Expression of estrus not as strong
Evaluation of Dairy Comp 305 Data

- Pregnancy rates
- Percentage of cows (by lactation group) inseminated in estrus for 1st AI
- Percentage of cows (by lactation group) re-inseminated 3 to 27 d after 1st AI
  - Proxy to palpation pregnancy rate
- Incidence of periparturient diseases
Pattern of First AI of Lactating Dairy Cows over Time

GRAPH DIMFB BY 1STBR BY B1COD FOR LACT>0 1STBR>-2000
Pattern of Second AI of Lactating Dairy Cows over Time

GRAPH HINT1 BY B2DAT FOR LACT>0 B2DAT>-2000 TBRD>1 ABDAT=0"L
Pregnancy per AI of 1st Lactation Cows
Pregnancy per AI of Mature Cows

Bredsum\xbcd1500 - Month by Bred Number from 2/14/09 through 7/3/14
Mature Cows
Percentage of Cows Inseminated in Estrus

PCT B1COD=4 BY MO1AI BY LCTGP FOR LACT>0 1STBR>-365

Month of first AI

Percent

0 10 20 30 40 50 60 70 80 90 100


LCTGP=1
LCTGP=2
LCTGP=3
Percentage of Cows Inseminated in Estrus

Month of first AI

Percent

PCT B1COD=4 BY MO1AI BY LCTGP FOR LACT>0 1STBR>-365\L
Percentage of Cows Re-Inseminated in Estrus

PCT B2COD=4 BY MO1AI BY LCTGP FOR LACT>0 MO1AI>-365 TBRD>1\L
PCT B2COD=4 BY MO1AI BY LCTGP FOR LACT>0 MO1AI>-365 TBRD>1
AI Submission and Pregnancy Rates of 1st Lactation Cows
AI Submission and Pregnancy Rates of Mature Cows

Insemination Risk, PR 95% CI, Pregnancy Risk

Dates: 08/04/13 to 07/30/14

Percentages chart showing submission and pregnancy rates over time.
Percentage of Cows Inseminated in Estrus

PCT B1COD=4 BY MO1AI BY LCTGP FOR LACT>0 1STBR>-1100\L
Percentage of Cows Inseminated in Estrus

PCT B1COD=4 BY MO1AI BY LCTGP FOR LACT>0 1STBR>-1100\L
Percentage of Cows Re-Inseminated in Estrus

Month of first AI

PCT B2COD=4 BY MO1AI BY LCTGP FOR LACT>0 MO1AI>-1150 TBRD>1

LCTGP=1
LCTGP=2
LCTGP=3
Percentage of Cows Re-Inseminated in Estrus

PCT B2COD=4 BY MO1AI BY LCTGP FOR LACT>0 MO1AI>-1150 TBRD>1\L
AI Submission and Pregnancy Rates of 1\textsuperscript{st} Lactation Cows
AI Submission and Pregnancy Rates of 1st Lactation Cows

[Bar chart showing AI submission and pregnancy rates over time with labels for Winter.]
AI Submission and Pregnancy Rates of Mature Cows

08/06/14  New Sweden Dairy

Insemination Risk  PR 95% CI  Pregnancy Risk

Date

Percent
AI Submission and Pregnancy Rates of Mature Cows

08/06/14  New Sweden Dairy

- Red: Insemination Risk
- Black: PR 95% CI
- Green: Pregnancy Risk

Date: 08/15/11 11/13/11 02/11/12 05/11/12 08/09/12 11/07/12 02/05/13 05/06/13 08/04/13 11/02/13 01/31/14 05/01/14 07/30/14

Percent: 0 10 20 30 40 50 60 70
Incidence of Periparturient Diseases of 1\textsuperscript{st} Lactation Cows
Incidence of Periparturient Diseases of 1st Lactation Cows
Incidence of Periparturient Diseases of Mature Cows
Incidence of Periparturient Diseases of Mature Cows

![Graph showing the incidence of periparturient diseases of mature cows over time. The graph indicates peaks and troughs for different months, with the months of summer marked as high risk periods. The graph uses various colored lines to represent different disease types and categories, with labels such as 'FRESH', 'MAST<21', 'METR<21', 'RP<21', 'DA<21', 'MF<21', and 'KETOSIS<21'.]
Percentage of 1st Lactation Cows with First Test (5-35 DIM) Fat > 5%

PCT FTFAT > 5 BY MOFSH BY LCTGP FOR LACT>0 FDAT>-1100 FTDIM=5-35
Conclusion from Dairy Comp 305 Data Analysis
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• Reduced AI submission rates of heifers
  – Apparently in the last 2 winters (13 and 14) 1st lactation cows had significantly decreased estrus expression
  – AI submission rate of mature cows is apparently more compromised during summer
Conclusion from Dairy Comp 305 Data Analysis

• Reduced AI submission rates of heifers
  – Apparently in the last 2 winters (13 and 14) 1st lactation cows had significantly decreased estrus expression
  – AI submission rate of mature cows is apparently more compromised during summer

• Incidence of uterine diseases (metritis, acute metritis)
  – Increased incidence of uterine diseases in 1st lactation cows during the winter
  – Increased incidence of uterine diseases in mature cows during the winter
Percentage of 1st Lactation Cows Cyclic by ~60 DIM: Historical and Recent Data
Percentage of 1\textsuperscript{st} Lactation Cows Cyclic by \(~60\) DIM: Historical and Recent Data

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- Investigation conducted in 2013: 130 cows, 87% cyclic by 53%
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Percentage of 1st Lactation Cows Cyclic by ~60 DIM: Historical and Recent Data

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Why Would Disease Increase In Heifers Calving During the Winter???
Bedding Condition Affects Stall Usage and Placement of the Cow in the Stall
Bedding Condition Affects Stall Usage and Placement of the Cow in the Stall

Percentage stalls empty

- BrisketLocator
- NoBrisketLocator
- SW2
- SW3
- SW4
- Raked
- NotRaked
Bedding Condition Affects Stall Usage and Placement of the Cow in the Stall

Percentage stalls empty

- BrisketLocator
- NoBrisketLocator
- SW2
- SW3
- SW4
- Raked
- NotRaked

Percentage of cows with proper rear placement

- SW2
- SW3
- SW4
Utilization of an iPhoneApp to Evaluate Herd Level Parameters Related to Welfare
iDairyConsulty – Consultant Tool

- Tool for consultants to evaluate management practices and welfare
- Data stored in the phone (offline capability)
- At the end of the visit graphical and Excel sheets reports may be created immediately and attached to an e-mail
Body Condition Score of Close-up Heifers

BCS for each pen (across time) - Pen 70

Number of Cows

Body Condition Score

Body Condition Score of Fresh Heifers

BCS for each pen (across time) - Pen 92

- Red: Feb 7, 2014
- Green: Feb 28, 2014
- Blue: Jul 12, 2014
Lying Behavior of Close-up Heifers

Freestall Lying Behavior for each pen (across time) - Pen 70

Visits

Feb 7, 2014
Feb 28, 2014
Jul 12, 2014

Number of Cows

Lying Properly
Lying Improperly
Perching
Standing on the Stall
Lying Behavior of Fresh Heifers

Freestall Lying Behavior for each pen (across time) - Pen 92

- Lying Properly
- Lying Improperly
- Perching
- Standing on the Stall

Visits

Feb 7, 2014
Feb 28, 2014
Jul 12, 2014

Number of Cows
Bedding Comfort of Fresh Heifers

Knee drop test (across time)

<table>
<thead>
<tr>
<th>Visits</th>
<th>Excellent</th>
<th>Good</th>
<th>Somewhat Poor</th>
<th>Poor</th>
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<tbody>
<tr>
<td>Feb 7, 2014</td>
<td></td>
<td></td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Feb 28, 2014</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Jul 12, 2014</td>
<td></td>
<td>20</td>
<td>10</td>
<td>3</td>
</tr>
</tbody>
</table>
Bedding Surface Height of Close-up Heifers

Bedding Surface Height from Curb for each pen - Pen 70

<table>
<thead>
<tr>
<th>Inches</th>
<th>Number of stalls</th>
</tr>
</thead>
<tbody>
<tr>
<td>-3</td>
<td>2.0</td>
</tr>
<tr>
<td>-2</td>
<td>2.0</td>
</tr>
<tr>
<td>-1</td>
<td>2.0</td>
</tr>
<tr>
<td>0</td>
<td>6.0</td>
</tr>
<tr>
<td>1</td>
<td>6.0</td>
</tr>
<tr>
<td>2</td>
<td>6.0</td>
</tr>
<tr>
<td>3</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Bedding Surface Height of Close-up Heifers

Bedding Surface Height from Curb for each pen - Pen 70

Number of stalls

Inches

1 2 3 4
Bedding Surface Height of Fresh Heifers

Bedding Surface Height from Curb for each pen - Pen 92

Number of stalls

Inches

-3  -2  -1  0  1  2

8.0  6.0  4.0  2.0  0.0
Bedding Surface Height of Fresh Heifers

Bedding Surface Height from Curb for each pen - Pen 92

Number of stalls

Inches

-2 -1 0 1 2 3 4
Cud Chewing of Close-up Heifers

Cud Chewing for each pen (across time) - Pen 70

Visits


% 

Chewing  Not Chewing
Cud Chewing of Fresh Heifers

Cud Chewing for each pen (across time) - Pen 92

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Chewing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Chewing</td>
<td>30</td>
<td>25</td>
<td>10</td>
</tr>
</tbody>
</table>

Legend:
- Red: Chewing
- Green: Not Chewing