Reproductive Management Strategies for Second and Subsequent AI Services

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Dairy Cattle Biology and Management

Maximize Fertility

Ideal Resynch

Minimize interbreeding interval (EDAI vs TAI)

2+ AI Management In US Dairy Herds

1-anestrus
2-ovulatory failure
3-anestrus and anovulation

Giordano et al., (2015)
Stevenson et al., (2014)

Treatments for 2+ AI Based on Ovarian Status

- Reduce interbreeding interval + increase fertility
  - Option 1 - favoring AI at detect estrus
  - Option 2 - favoring TAI services

- Maximize insemination of cows at detected estrus
Effective strategy to maximize performance when P/Al to estrus is good (≥ 35%).

Key facts:
- allows normal estrus expression
- reduces interbreeding interval for TAI services in cows with CL at NPD
- increases TAI fertility for cows without a CL at NPD
GnRH 25 vs NoGnRH 25 (SR) Fertility

- Good EDAI + shorter IBI for cows with CL + higher P/AI for cows with no CL
- Cows with CL
- Cows without CL
- Estrus suppression...?
- GnRH

<table>
<thead>
<tr>
<th>Group</th>
<th>G25</th>
<th>NoG25</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDAI before NPD</td>
<td>44.6%</td>
<td>53.5%</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>(262/587)</td>
<td>(313/585)</td>
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<td></td>
</tr>
<tr>
<td>CL at NPD &amp; TAI</td>
<td>83.7%</td>
<td>71.3%</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>(272/325)</td>
<td>(194/272)</td>
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<td></td>
</tr>
<tr>
<td>CL at NPD &amp; TAI</td>
<td>40.6%</td>
<td>32.8%</td>
<td>0.05*</td>
</tr>
<tr>
<td>(106/261)</td>
<td>(62/189)</td>
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</tr>
<tr>
<td>NoCL at NPD &amp; TAI</td>
<td>40.4%</td>
<td>36.7%</td>
<td>0.82</td>
</tr>
<tr>
<td>(21/52)</td>
<td>(29/75)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall (EDA1 + TAI)</td>
<td>39.6%</td>
<td>39.0%</td>
<td>0.79</td>
</tr>
<tr>
<td>(226/571)</td>
<td>(223/572)</td>
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</table>

*One tailed test

Wijma et al., 2018
## Treatment Item

<table>
<thead>
<tr>
<th>Item</th>
<th>Control (Ovsynch32)</th>
<th>Treatment (NoG25+CIDR-Synch)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cows with a CL at PregCheck</td>
<td>32.0% (391)</td>
<td>31.8% (481)</td>
<td>0.97</td>
</tr>
<tr>
<td>Cows without CL at PregCheck</td>
<td>24.5% (159)</td>
<td>37.1% (186)</td>
<td>0.01</td>
</tr>
<tr>
<td>Overall</td>
<td>29.8% (561)</td>
<td>33.3% (667)</td>
<td>0.18</td>
</tr>
</tbody>
</table>

72% cows at NPD

### Short Resynch + CIDR-Synch

- **Reduced Time to Pregnancy**
  - Median days to pregnancy: Resynch-D32: 105 (89-120)
  - Treatment: 89 (74-105)
  - P = 0.04
  - HR Treat vs Resynch-D32: 1.21 (1.01 – 1.44)
  - 6.9 pp more pregnant cows for SR+CIDR-Synch than D32-Resynch

### D25 Resynch + CIDR-Synch

- Preferred for farms that are **NOT** successful with estrus breedings!!!

### D50 Resynch + CIDR-Synch

- Preferred for farms that are successful with estrus breedings!!!

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Wijma et al., 2018
### Preliminary results

**Cows with CL (%)**
- CIDR-Synch + CIDR-Synch: 84 (990/1,178)
- CIDR-Synch + CIDR-Synch: 76 (737/969)

**P/AI CL at NPD (%)**
- D25 - Resynch or ShortResynch: 41 (410/990)
- D25 - Resynch or ShortResynch: 33 (243/737)

**P/AI NO CL at NPD (%)**
- CIDR-Synch: 39 (73/188)
- CIDR-Synch: 44 (102/232)

**Overall cows pregnant**
- CIDR-Synch: 41 (483/1,178)
- CIDR-Synch: 36 (345/969)

**Time to pregnancy**

- HR (G25 vs. NoG25) = 1.05 (CI: 0.89 – 1.22)

**Key facts:**
- Increases cows EDAI after non-pregnancy diagnosis
- Treatment NOT adapted to cow physiological status
- Beneficial to use synch protocol after PGF treatment
Maximizing EDAI For 2+ AI Services

Key facts:
- Increases cows EDAI after non-pregnancy diagnosis
- Treatment adapted to cow physiological status
- Beneficial to use synch protocol after PGF treatment

Use of PGF at NPD to Increase EDAI for 2+ AI Services

Key facts:
- Increases cows EDAI after non-pregnancy diagnosis
- Treatment adapted to cow physiological status
- Beneficial to use synch protocol after PGF treatment

CIDR-Synch with 2 PGF Improves P/AI for No CL* cows

Expected P/AI = ~35-40%

PreG-Ovsynch with two PGF Improves P/AI for No CL* cows

Expected P/AI = ~35-40%

Giordano et al., 2016 JDS 99:2967-2978
Wijma et al., 2017 JDS (In Press)
Carvalho et al., 2016 JDS

*Includes Cystic cows
Reproductive performance of dairy cows managed with a program aimed at increasing insemination of cows in estrus based on increased physical activity and fertility of timed artificial inseminations


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Treatment
EDA + 5d-Ovsynch+P4

40% EDAI

PGF + AIACT + TAI based on Ovarian status versus a Day32 Resynch
• Same time to pregnancy during lactation (Giordano et al., 2015)

Maximizing AI in Estrus for 2+ Al Services using AAM

PGF + EDAI + TAI based on Ovarian status versus Day32 Resynch for CL cows + PreG-Ovsynch for NoCL cows
• Same time to pregnancy during lactation (Masello et al., unpublished)

Days to Pregnancy
From 1st Al to 270 DIM

Group P = 0.28 C vs. T HR 1.07 (95% CI = 0.95-1.21)
Parity P = 0.01 P vs. M HR 1.21 (95% CI = 1.07-1.38)

Median days to Pregnancy
CON = 110
TRT = 111

Group
CON (n = 634)
TRT (n = 616)

PGF + EDAI + TAI

Days after first service

CON = 110
TRT = 111
Summary

Programs aimed to maximize EDAI after NPD are reasonable if:

1-At least ~65% of cows have a CL and receive a PGF injection
2-Detection of estrus after NPD is medium-to-high (≥ 40%)
3-A synch program is systematically used immediately after the period of estrus detection
2+ Service
Short Resynch + CIDR-Synch

- Estrous detection + AI – 32 ± 3 d
- Will NOT affect AI to estrus
- Will NOT maximize P/AI to TAI
- Avoids unnecessary GnRH use

NPD TUS* = nonpregnancy diagnosis by transrectal ultrasonography

2+ Service
D25 Resynch + CIDR-Synch

- Estrous detection + AI – 25 ± 3 d
- Will NOT maximize AI to estrus
- Will maximize P/AI to TAI

NPD TUS* = nonpregnancy diagnosis by transrectal ultrasonography

Repro Management
21d-Preg Rate

First Service
Presynch-Ovsynch 14-14
**2+ Service**
**PGF+CIDR-Synch**

<table>
<thead>
<tr>
<th>Sun</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
<th>Sat</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAI</td>
<td></td>
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Estrus detection + AI – at all times for 32 d

<table>
<thead>
<tr>
<th>CL-PGF</th>
<th>PGF+CIDR</th>
<th>GnRH+CIDR</th>
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<tbody>
<tr>
<td>NoCL</td>
<td>NoCL</td>
<td>NoCL</td>
</tr>
</tbody>
</table>

GnRH+CIDR Estrus detection + AI

PGF+CIDR PGF  GnRH+CIDR

PGF  PGF  GnRH  PM  TAI-AM

PGF  PGF  GnRH  PM  TAI-AM

*NPD TUS* = nonpregnancy diagnosis by transrectal ultrasonography

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Thank you!

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