The IDEXX Milk Pregnancy Test

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Discussion Topics

• What is the IDEXX Milk Pregnancy Test?
• How does the IDEXX Milk Pregnancy Test work?
• What is the performance of the IDEXX Milk Pregnancy Test?
• When can the IDEXX Milk Pregnancy Test be used?
• How can vets and producers use the IDEXX Milk Pregnancy Test to maximize reproductive efficiency?
Why is Pregnancy Diagnosis Important?

- The primary motivation for pregnancy diagnosis is the management of calving interval in the herd

- Considerations include:
  - Relatively poor performance of artificial insemination (AI)
  - Lactation management
  - Culling decisions
  - Performance monitoring
Pregnancy Diagnosis in Dairy Cattle

Current Methods of Pregnancy Diagnosis

- Rectal palpation
- Ultrasound
- Progesterone
- Early Conception Factor
- Oestrone Sulphate
- Pregnancy Associated Glycoproteins (PAGs)
What are the Consequences of Poor Dairy Herd Fertility?

- Loss of milk production
- Disruption to the calving season and milk production pattern
- Enforced culling, resulting in more replacements being reared or bought and loss of mature cow production
- Reduced calf sales
- Loss of valuable genetics
- Additional AI costs
- Extra veterinary treatment costs
Managing Calving Intervals

Pregnancy Loss in Dairy Cattle

- Pregnancy diagnosis was conducted at 28, 42, 56, 70, and 98 days post AI for 1,600 dairy cows.
- The conception rate of cows at 28 days post AI was 32%, and overall pregnancy loss from day 28 to calving was nearly 25%.
- Pregnancy confirmation throughout gestation aids timely identification of open cows.

*Chart adapted from Vasconcelos et al, 1997.*
IDEXX Milk Pregnancy Test
A New Opportunity for Laboratory-Based Pregnancy Testing

• **Accurate** determination of pregnancy status - High levels of sensitivity and specificity from day 35 post breeding and throughout gestation

• **Trusted, timely results** - Obtain results in less than 3.5 hours using proven IDEXXX ELISA technology

• **Expanded testing options** - Test for pregnancy from routine milk samples

• **Improved reproductive performance** - Earlier identification and rebreeding of open cows results in shorter calving intervals and increased milk production
IDEXX Milk Pregnancy Test
Technology

Pregnancy Associated Glycoproteins (PAGs)

• Target antigen for the IDEXX Milk Pregnancy Test
• Placenta-specific expression
  – Expressed in maternal and embryonic regions of the placenta
• Subgroup of aspartic protease family
  – 22+ bovine transcribed genes identified
• Temporally expressed
  – Variable gene expression at different stages of pregnancy
• True function not well understood

Source: Guruprasad et al, 1996.
IDEXX Milk Pregnancy Test
Trusted, simple ELISA platform

• **Principle of the assay**
  – Laboratory-plate ELISA for the detection of pregnancy associated glycoproteins (PAGs)

• **Sample type**
  – Bovine milk
  – Whole or skim
  – Fresh or preserved

• **Test protocol**
  – Ready-to-use reagents
  – Total assay time less than 3.5 hours

• **Kit configuration**
  – 5-plate kit
  – Strip format (1 x 8)
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Trusted, simple ELISA platform

ELISA Protocol

**Solid Phase (plate)**
Anti-PAG Capture Ab

**Milk Sample**
*Incubate for 120 minutes at 37°C*

**Detector Solution**
(Biotinylated Ab)
*Incubate for 30 minutes*

**Conjugate**
(HRPO)
*Incubate for 30 minutes*

**Substrate**
(TMB)
*Incubate for 20 minutes*

**Stop Solution**
*Calculate results*

**WASH STEP**
IDEXX Milk Pregnancy Test
Result Interpretation

| Validity                                                                 | Mean positive control OD – Mean negative control OD ≥0.500  
<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>Mean negative control ≤0.200</td>
</tr>
<tr>
<td>Calculation</td>
<td>S – N</td>
</tr>
<tr>
<td>Result</td>
<td>S – N &lt;0.100 = Not pregnant (open)</td>
</tr>
<tr>
<td></td>
<td>S – N ≥0.100 and &lt;0.250 = Recheck to confirm pregnancy status</td>
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<tr>
<td></td>
<td>S – N ≥0.250 = Pregnant</td>
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**Recheck:**
- Embryonic death is common in early stages of cow pregnancy and PAGs can circulate in cows/heifers for some time after early embryonic death

IDEXX encourages producers to work closely with their veterinarian to develop a reproductive management program that is appropriate for their operation
• Pregnancy Associated Glycoproteins (PAGs) are detectable early in pregnancy and throughout gestation
• Variability in PAG levels detected from different cows*
• Very strong signal in late gestation through calving

*IDEXX temporal study conducted on multiple cows throughout gestation (data in graph represents average S – N from a total of 12 cows).
†See IDEXX Milk Pregnancy Test validation report for full performance data.
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Post calving Decline in Milk PAG Levels

- PAG levels decline rapidly after calving
- Specificity of **100%*** by **8.5 weeks** (60 days) after calving

*Specificity for sample population tested. See IDEXX Milk Pregnancy Test validation report for complete test performance data.

No interference when testing for the next pregnancy
IDEXX Milk Pregnancy Test

Test Performance

Sensitivity: 98.8% (95% CI, 97.7% - 99.3%)*
Specificity: 97.4% (95% CI, 95.2% - 98.6%)*

Recheck results: 4% of total tested (3% pregnant & 1% open cows)

Accurate confirmation of pregnancy status from day 35 post breeding and throughout gestation†

† See IDEXX Milk Pregnancy Test validation report for complete performance data.
* Recheck results are excluded from sensitivity and specificity calculations
IDEXX Milk Pregnancy Test  
Benefits for the Dairy Farm

- Identify open cows and re-breed earlier to shorten calving interval and improve economic performance
- Timely identification of open cows and rapid re-breeding are key components of a successful reproductive program
- The highest rate of embryo loss occurs in early gestation however embryo/fetal mortality occurs throughout gestation
- Following early pregnancy detection, monitoring is necessary to find out quickly, if and when, a pregnancy is lost
- The economic impact of open cows in mid-late lactation is significant
  - Too late to re-breed
  - Declining milk production
  - Once dried off an ‘open’ cow is non-productive and use of dry cow therapy may prevent culling (knowing she is open prior to dry-off saves feed and drug costs)
- The IDEXX Milk Pregnancy Test offers a simple, convenient & cost-effective way to monitor pregnancy status of the dairy herd
IDEXX Milk Pregnancy Test
Why and How to Use

- Confirmation of early pregnancy diagnosis
- Adds value to existing milk recording samples for milk recording laboratories, veterinarians and producers
- Supports more frequent confirmatory testing in later stages of pregnancy, enabling timely identification of open cows
- Veterinarian input regarding reproductive management and result interpretation as well as investigation of non-pregnant cows, embryonic loss & abortion
- Simple, accurate, safe, hygienic
- Improve calving intervals & overall economic efficiency

Complements Traditional Methods of Early Pregnancy Detection
Is laboratory based pregnancy diagnosis a good fit for your practice?

- Veterinarians who are interested in chemical pregnancy testing are interested because:
  - They can offer their clients more frequent confirmatory testing by using chemical based pregnancy tests in addition to palpation and ultrasound.
  - They can have a technician visit the farm to collect the samples (or the producer can collect samples themselves), freeing up the veterinarian to focus on other veterinary activities.
  - They can maintain a high level of accuracy, even when a large number of cows are tested at one time.
  - Reduced physical wear & tear.
IDEXX Milk Pregnancy Test
Laboratory Training and Support

• Key customers for the IDEXX Milk Pregnancy Test are milk recording (DHI) laboratories and veterinary clinics

• IDEXX can provide everything needed to set up your laboratory for pregnancy testing (blood or milk) supported by:
  – **International direct sales and distributor team**
    » Local, dedicated sales support
  – **World-class technical services team**
    » Assist in setting up the ELISA laboratory as required
    » Provide training for your staff
    » Ongoing troubleshooting and customer support
  – **Dedicated customer services team**
    » Easy order placement process
    » Rapid shipping from distribution centers
IDEXX Milk Pregnancy Test
Summary

• The IDEXX Milk Pregnancy Test can be used from 60 days post-calving and 35 days post-breeding
• Accuracy on par with alternative methods of pregnancy diagnosis
• Using routine milk samples offers a simple, cost-effective way to monitor pregnancy status in the herd
• Veterinarians play an important role in the design and implementation of herd reproductive managements programs, including pregnancy diagnosis
• No single program will suit all herds
• PAG pregnancy testing (blood or milk) is another tool that veterinarians can incorporate into comprehensive systems for managing reproduction on farms
Thank you
For more information, visit the IDEXX Learning Centre

Webinars  www.idexxlearningcenter.com
Thank you for attending today’s Webinar:

The IDEXX Milk Pregnancy Test

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For a complete list of educational events, visit us online at idexxlearningcenter.com.
References

- de Vries A, van Leeuwen J, Thatcher WW. *Economics of Improved Reproductive Performance in Dairy Cattle* [publication AN156]. Gainesville, FL: University of Florida, Institute of Food and Agricultural Sciences; 2005.
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