

Pregnancy & Disease Detection from Milk Samples

A Global Overview - ICAR Chile 2016 - 25 October, 11.20-11.40



RUMINANTS
WIEDERKÄUER
RUMINANTS
RUMIANTES
反刍动物
反芻動物

Test With Confidence™



Agenda

- The Milk Sample
- Diagnostic Solutions
- IDEXX Milk Pregnancy Test:
 - What have we learned since the launch?
- Global Overview of Milk Pregnancy Testing Services
 - Europe
 - North America
 - Australia
 - Latin America

The Milk Sample

- Cattle, Sheep, Goat, Buffalo, ...
- Native, skimmed, conserved
- Multiple information:
 - Milk quality parameters
 - Mastitis, SCC
 - Disease: antibodies, antigen, DNA, RNA
 - Pregnancy-associated glycoproteins
 - Progesterone
 - More?
- Easy to collect sample
- Not so easy to store...getting sour easily
- Conserving milk helps stabilize the sample for use in the lab
- Tends to build flocks upon multiple freeze/thaw cycles



Fresh milk



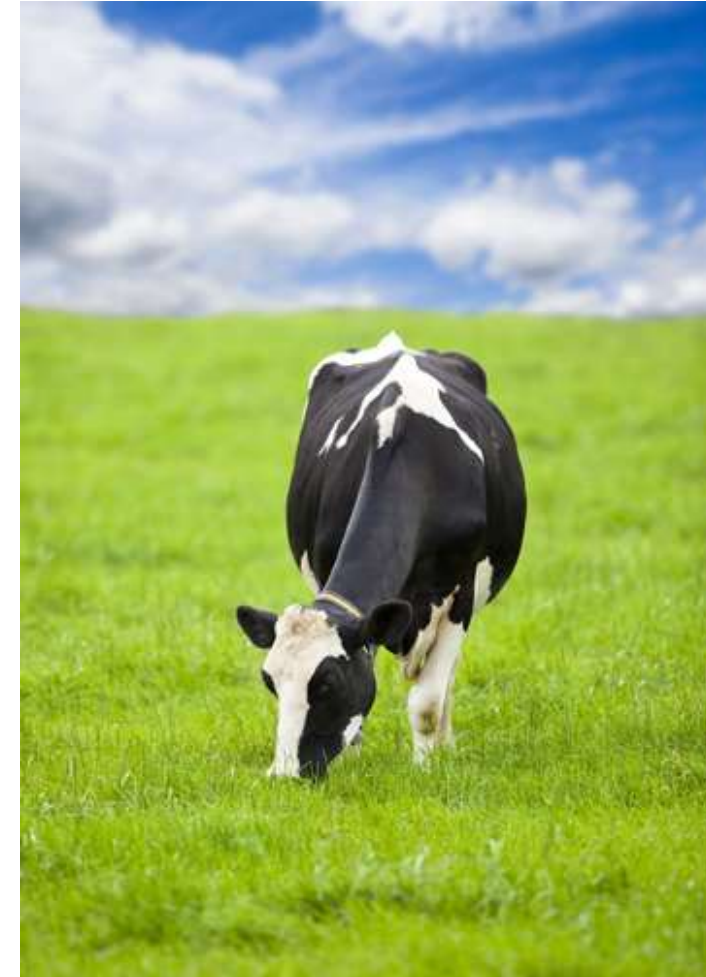
Soured milk

Test With Confidence™

IDEXX

Diagnostic Solutions: Adding Diagnostic Value

- More results from every milk sample
- Milk is a simple, accurate medium for regular disease testing
 - Bulk tank, individual milk
- Simplified collection and logistics
- Offer veterinarians and producers greater value with every result
- Antibody disease testing:
 - BVDV (bulk tank and individual)
 - IBR (bulk tank and individual)
 - EBL (BLV) (bulk tank and individual)
 - Brucellosis (bulk tank and individual)
 - Johne's (individual)
 - Fasciolosis (bulk tank)
 - Q Fever (individual)
- PCR:
 - RealPCR BVDV RNA Test
 - RealPCR MAP DNA Test (in validation)



Test With Confidence™

IDEXX

IDEXX Milk Pregnancy Test

- From 28 days post breeding (cows and goats)
- Coming soon:
 - Water Buffalo: from 30 days post breeding
 - Sheep: from 60 days post breeding
- ELISA test designed for large scale testing in DHI laboratories



IDEXX Milk Pregnancy Test

IDEXX Milk Pregnancy Test – Lab-Based Milk Test

Value Proposition

- The IDEXX Milk Pregnancy Test helps labs, veterinarians and producers detect pregnant and open cows accurately as early as 28 days post breeding and throughout gestation with the first milk-based laboratory test in a cost-effective and time-efficient manner which allows re-breeding of open cows to improve reproductive efficiency.
- Dairy producer benefits
 - Shorter calving intervals, improved calving rates, increased milk production
 - Save \$3-5 per day open
 - Easy to collect routine samples
 - Less animal handling, cow comfort benefit
- Veterinarian benefits
 - Optimize on-farm time for investigating open cows and providing more value added services
 - Systematically capture pregnancy data to improve long-term reproductive management
- Laboratory benefits
 - New value-added service addresses top producer need using existing milk samples
 - Easy-to-run, familiar and trusted, high-throughput ELISA platform

IDEXX Milk Pregnancy Test Performance

- **Early and simple:**
 - From 28 days post breeding and throughout gestation
 - Test for pregnancy from routine DHI milk samples
 - Bovine and caprine milk
 - Whole or skim
 - Fresh or preserved

- Performance (bovine milk):



Sensitivity = 98.7% (LCL: 98%)*
Specificity = 94.4% (LCL: 92%)*
 Rechecks: 3% of total tested (2% pregnant and 1% open)

		Palpation / Ultrasound	
		pregnant	open
IDEXX Milk Pregnancy Test	Pregnant	1,121	36
	Recheck	45	20
	Open	15	602

*See IDEXX Milk Pregnancy Test validation report for complete performance data. Excluding IDEXX Milk Pregnancy Test recheck results.

IDEXX Milk Pregnancy Test Worldwide

- Mainly introduced to DHIs that service different dairy production systems
- Adoption of pregnancy diagnosis service in milk
 - Logistics: use routine samples from existing flow to lab and also use individual samples anytime
 - Install new testing parameter besides milk quality, mastitis PCR testing
 - IDEXX recommends instruments (shaker-incubator) and supports with all facets of installation (many DHIs are new to ELISA testing)
 - Recommended: participate in regular proficiency tests
 - Reporting: website (login), e-mail, SMS, fax and letter rare
 - Invoicing: routine, mostly on monthly basis for DHI members
 - Promotion:
 - Advertisements, producer events
 - Leverage regular presence of DHI technicians on farm
 - Examples of successful collaboration between DHI, breeding associations and genetic companies
 - Technical challenges
 - Carry over
 - The dip
 - Decline of PAGs after early embryonic death (EED) and abortion
 - Optional recheck zone

Carry Over Contamination

- There is a technical risk of carry-over contamination* for the IDEXX Milk Pregnancy Test
 - Carryover of <1% does not present a significant risk for false positive or recheck sample
 - 2.5- 5% carryover may increase # of recheck results but low risk of false positives
 - >10% carryover could significantly increase number of recheck and false positive results
- However, in reality, we see very few 'field-based' issues of carryover contamination
 - >2000 samples tested from routine DHI collections with very few false positive samples that could have been attributed to carryover contamination
 - Specificity in field trials and validation testing exceptionally high (>97%)
- In order to mitigate the risk of carryover contamination, IDEXX has the following recommendations included in the test protocol:

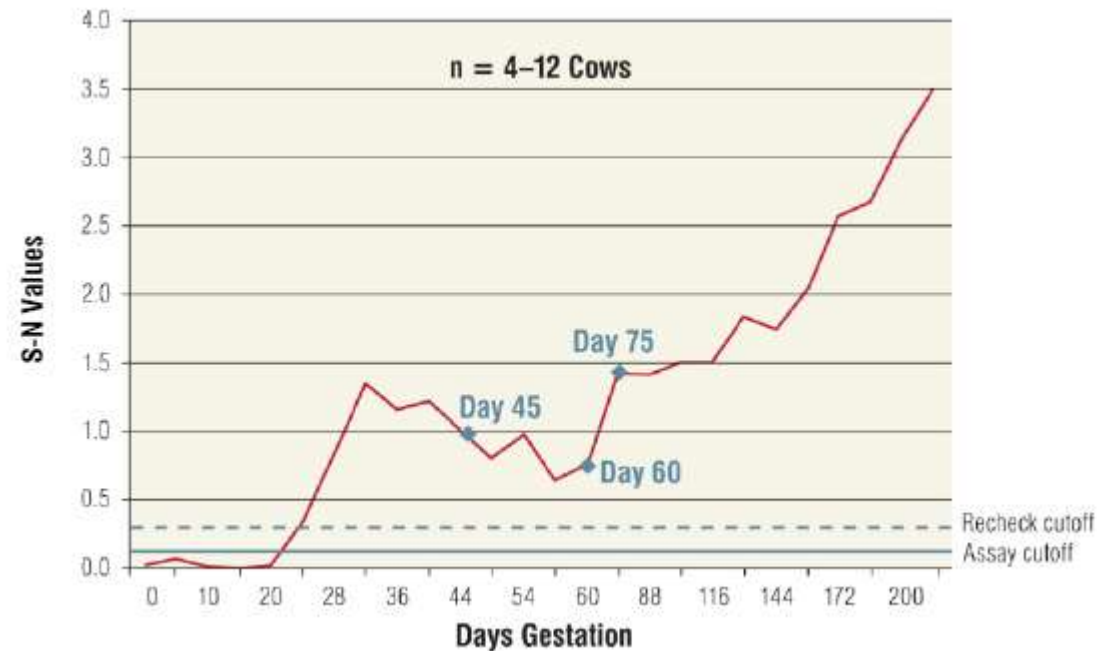
Sample Quality and Handling

- Care should be taken to minimize the likelihood of milk carryover from cow to cow during sample collection, particularly when using samples collected for routine herd recording.

*Data from laboratory –based dilution studies, not field samples

The Dip

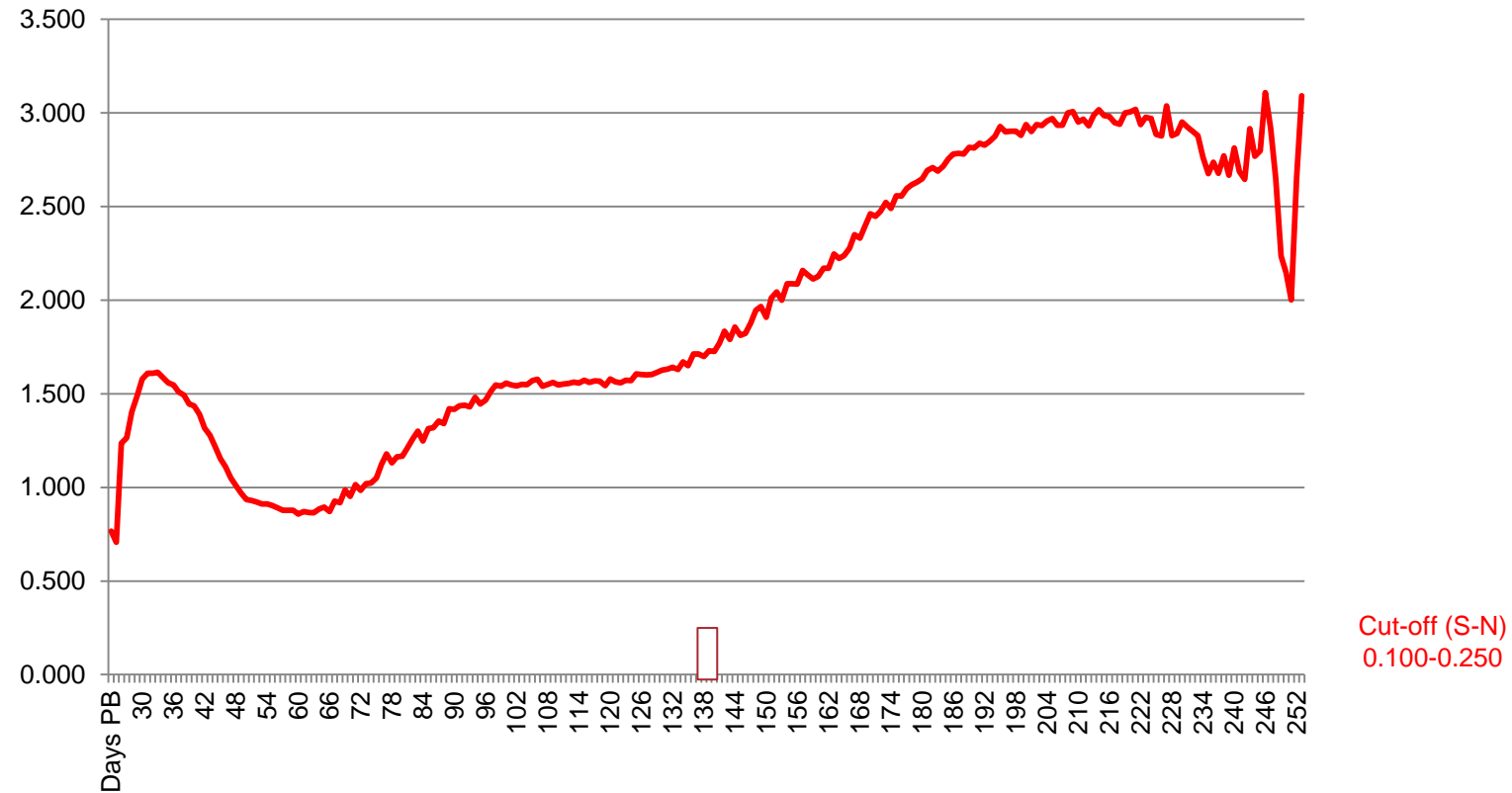
- Pregnant cows show rapid increase of PAGs up to day 32 post breeding. Levels decline above cut-off and increase again to day 70 post breeding creating a dip.
- Similar findings in published study (Ricci et al.)
- Conclusion: there is a dip between 32 and 70 days post breeding resulting in lower PAG levels. However, test performance remains at high levels.



Milk PAG Levels in Danish Milk recorded Cows 2013-2016

294.584 positive results in Holsteins, Jersey, Red Nordic, and Cross breed

Milk PAG Levels (S-N) and Days Post Breeding



Decline of PAGs after EED or Abortion

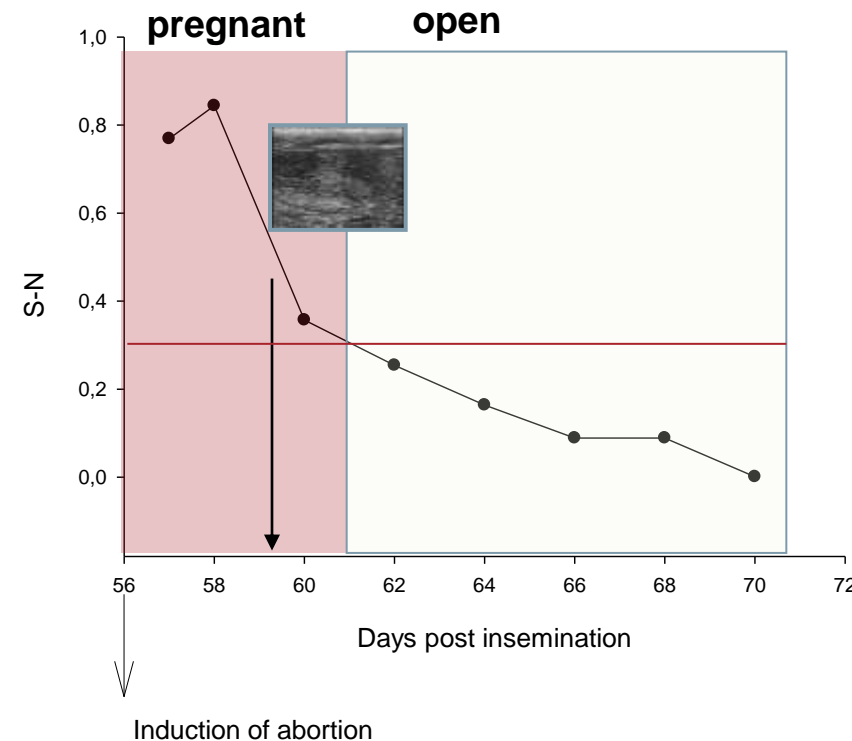
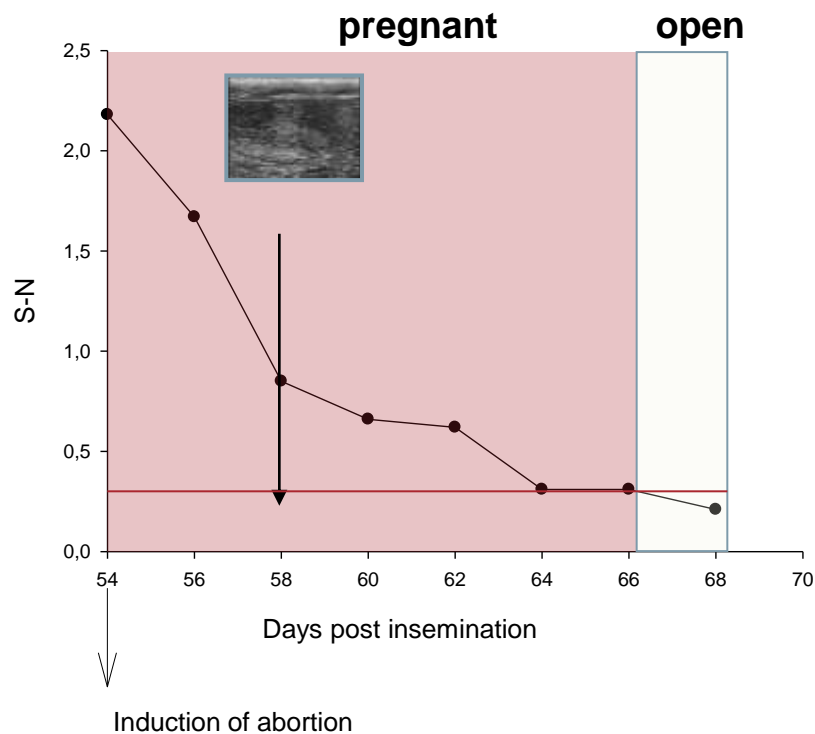
- PAGs are produced by trophoblast cells in the placenta. If placenta loses functionality due to early embryonic death (EED)/abortion PAGs will not be produced anymore and concentration of PAGs in blood and milk will decline over time.

Time of loss	Estimated ⁽¹⁾ duration of PAG decline in blood
28-60 days of pregnancy (EED)	Up to 10 or more days
> 60 days of pregnancy (abortion)	Up to 60 days

(1) no exact data available yet. IDEXX is collecting data to learn more about it.

Decline of PAGs after EED or Abortion

- Study at University of Hannover, Germany with IDEXX Bovine Pregnancy Test:



Test With Confidence™



Optional Recheck Zone

- To summarize overall sensitivity and specificity for the IDEXX Milk Pregnancy Test on bovine milk samples using the optional method for interpretation of results for cows over 45 days postbreeding. With this method, cows more than 45 days postbreeding are considered pregnant if the S-N is greater than 0.10 (there is no recheck zone).

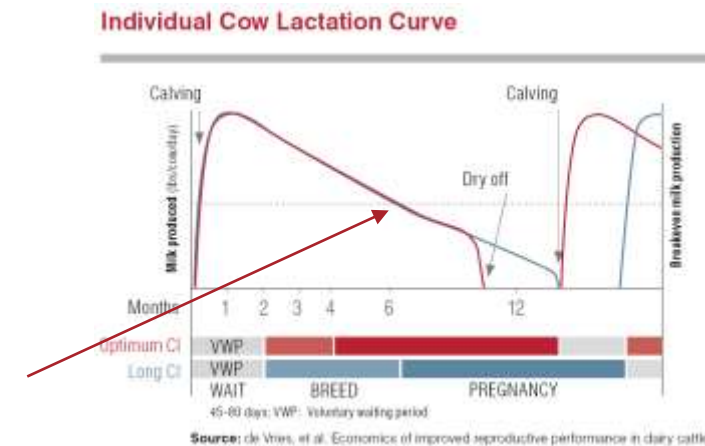
Days Bred	Standard Interpretation				Optional Interpretation		
	(0.10–0.25 Current Recheck)				(0.10 Cutoff and No Recheck)		
	Performance				Performance		
	Cows	Se	Sp	% Recheck	Cows	Se	Sp
28–34	524	99%	90%	2%	n/a	n/a	n/a
35–45	132	98%	91%	2%	n/a	n/a	n/a
46–55	125	97%	100%	13%	125	97%	92%
56–65	167	96%	100%	15%	167	97%	100%
66–75	62	98%	100%	3%	62	98%	89%
76–85	34	97%	100%	0%	34	97%	100%
86–95	54	100%	100%	2%	54	100%	100%
96–105	66	100%	100%	0%	66	100%	100%
>105	411	100%	92%	0%	411	99%	85%
Overall	1,839	99%	94%	3%	1839	99%	93%

*See IDEXX Milk Pregnancy Test validation report for complete performance data. Excluding IDEXX Milk Pregnancy Test recheck results.

Recommended Times to Assess Pregnancy Status

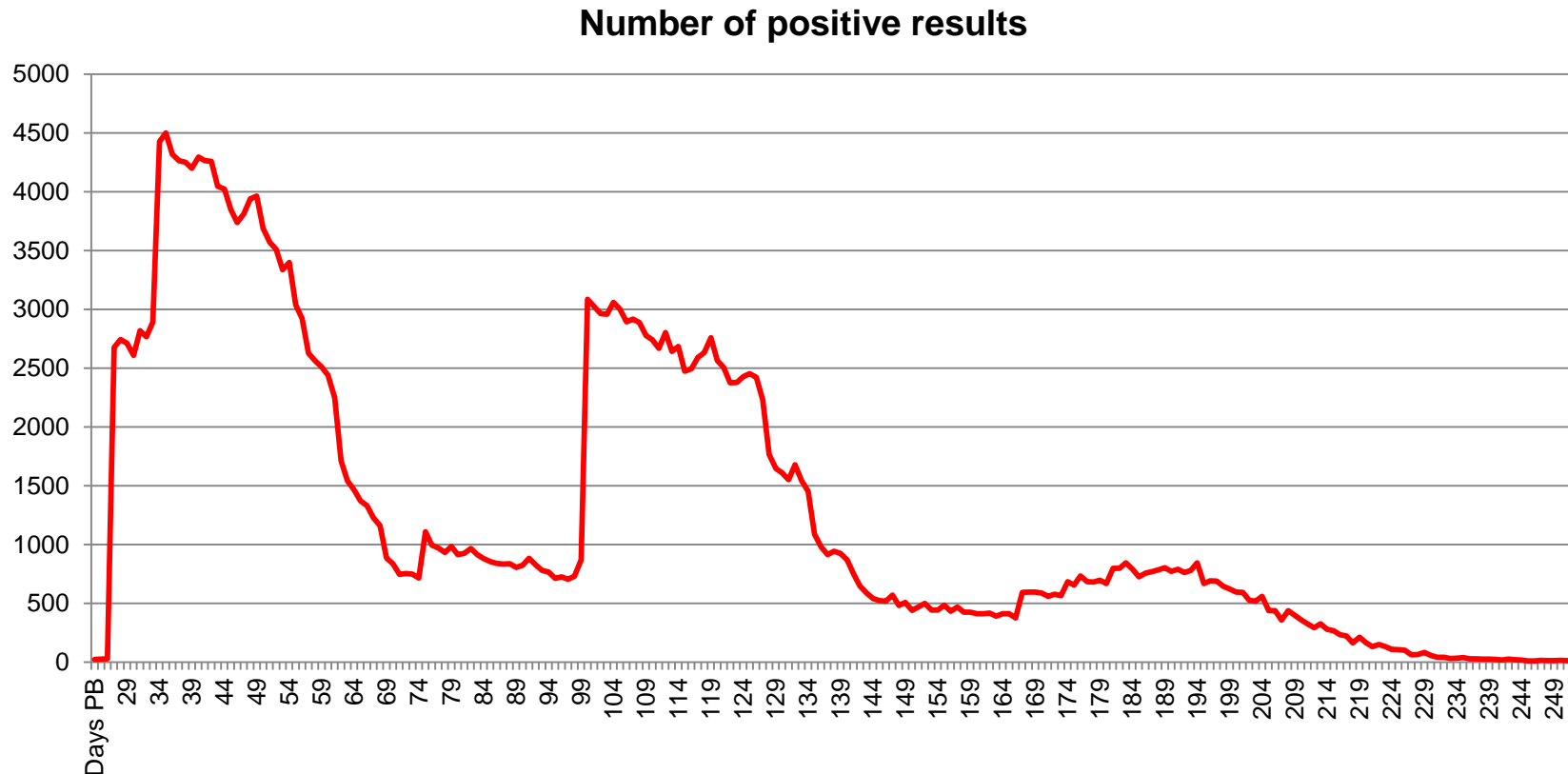
With IDEXX Milk Pregnancy Test

- P1: 28-35 days in gestation (post AI)
 - The opportunity to find non-pregnant (open) cows
 - Estrous Synchronization programs allow these cows to re-enter the program quicker
- P2: 45-70 days in gestation
 - Peak period of Early Embryonic Death (EED)
 - Best practice management programs
- P3: 90-110 days of gestation
 - Early Embryonic Death (EED) peak is now past
 - Cow approaching break-even phase of lactation curve
- P4: 200-230 days of gestation (dry-off)
 - Although uncommon, pregnancy loss can occur between 100-230 days
 - Important decision point for culling after finishing lactation



Frequency of Positive Pregnancy Checks

Danish milk recorded cows, between day 25 and 254 postbreeding



(1) Pregnancy Test in Denmark 2016 (2013-2016) Lars Fast Hansen, Niels Henning Nielsen, Aarhus 22 July 2016

Global Overview of Milk Pregnancy Testing Services

- Germany
 - Milchprüfring Bayern e.V. Routine DHI (<https://www.mpr-bayern.de/eng>)
 - ▶ One of the largest independent milk testing laboratories for automated analyses of payment and DHI samples worldwide.
 - ▶ 275.000 pregnancy tests since launch two years ago
 - ▶ Routine DHI samples and individual samples for members and also non-members
 - ▶ Shortly available: mpr-App «mpr-mobil» for online reception of results.
 - Animal Health Bavaria
 - ▶ www.tiergesundheitsbayern.de
 - ▶ Do not slaughter high pregnant cows!
 - ▶ Test options recommended:
 - PD by vet or technician
 - PAG test using blood or milk



Dead unborn calf in abattoir, "0.6% of high pregnant cows have been slaughtered in Bavaria in first half of 2016." Information leaflet tiergesundheitsbayern, Sept 2016

Test With Confidence™

IDEXX

Global Overview of Milk Pregnancy Testing Services

- Switzerland
 - The only Swiss DHI lab, Suisselab offers pregnancy testing services (www.fertalys.ch) together with breeding associations and swissgenetics (Swiss semen company), results via e-mail or SMS
 - Easy contact options: fertalys@suisselab.ch
 - Online order options for sample kits
 - Currently establishing program to promote 2nd sample from same cow (confirmation)



Fertalys: advertisement

info@braunvieh.ch
(Resultate FERTALYS,
Betrieb: [235160](tel:235160))
NIVANA Trächtig
RAHEL Trächtig
KONFETTI Trächtig
ENDORA Trächtig
www.brunanet.ch

Fertalys: Result via text message (SMS) to farmer

Global Overview of Milk Pregnancy Testing Services

- Denmark
 - RYK - Eurofins Steins, www.vfl.dk/ryk
 - Great experience with samples from robot units

RYK

Systematisk drægtighedstest
- uden at have fat i koen

RYK Registrering og ydelseskontrol
 Sænk T 5781 1500
 Højbakke T 5781 1000
 Skovby T 5781 1510
 Web vfl.dk/ryk

RYK

Systematisk drægtighedstest

Det mener mælkeproducenterne om drægtighedstest på mælkeprøver:

Jens Jensen, 1/5 Vestergaard ved Løkken - 670 DH-koer, RYK Tu Test mælkemølere og RYK støvretensere
 - Vi sparer en masse tid og undgår at stresser dyrene. Også er det en kæmpe fordel, at testen er så sikker.

Marianne Christensen, Kolstrup Mølle ved Nibe - 500 DH-koer, egne faststøtterede mælkemølere
 - Det er en fantastisk løsning, som jeg kun kan anbefale andre. Vi sparer tid og finder også dem, der aborterer tidligt. Dem fandt vi aldrig før. Nu undgår vi at gælde dem og spilde foder på dem og kan med det samme tage stilling til, om de skal sættes eller hormonbehandles.

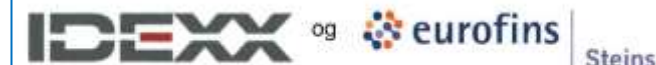
Kirsten Jensen, Ridsgrøden ved Mørke - 180 DH-koer, Lely robotter
 - Jeg har kørt med automatisk drægtighedstest siden starten for to år siden, og der har ikke været en eneste svips. Der er virkelig stor sikkerhed på resultatet.

Hans Peter Havnøping, Tinghøgaard ved Aars - 800 DH-koer, egne faststøtterede mælkemølere
 - Vi drægtighedsundersøger 150 dyr hver måned, så det kan helt klart betale sig at teste via ydelseskontrollen. Og man kan gangse tidbesparelsen med to, fordi vi tester hhv. 35 og 100 dage efter inseminering.

Testimonials

Læs mere om testen på www.vfl.dk/ryk

Drægtighedstest på mælkeprøver udbydes i samarbejde med



Promotional folder

Test With Confidence™



Global Overview of Milk Pregnancy Testing Services

- France
 - Clasel, French DHI lab
 - ▶ <http://www.clasel.fr/clasel-nos-prestations/offre-medria-copie.html>
 - ▶ Gestadetect, a reliable, simple pregnancy indicator

- United Kingdom
 - National Milk Recording (NMR)
 - ▶ <https://www.nmr.co.uk/breeding/pregnancy-testing>
 - ▶ Why use?
 - It's accurate, flexible, easy, cost-effective, pays a check, pays a dry-off check

 - The Cattle Information Service – CIS
 - ▶ http://www.thecis.co.uk/theCIS/CIS_PregCheck.aspx
 - ▶ Managing the reproductive cycle on your farm

GESTA DÉTECT
L'INDICATEUR DE GESTATION DANS LE LAIT

**Gestante ?
Confirmez-le
avec le lait**

**Les 5 avantages
qui font la différence**

- 1 **Fiable** : les vaches gestantes sont détectées avec une précision de 99,8 %.
- 2 **Simple** : les analyses se font sur les échantillons issus du contrôle de performance.
- 3 **Précoce** : l'analyse peut être faite dès 30 jours après l'A et pendant toute la lactation.
- 4 **Pratique** : pas de manipulation des animaux. Gain de temps et de confort.
- 5 **Sécurisé** : pas de risque de transmission de maladie d'un animal à l'autre (non invasif/non intrusif).

FAIBLES COÛTS
Lorsqu'une vache est présumée gestante, l'éleveur sait que possible toute intervention qui favorise l'entretien des réserves de la future vache. L'indicateur de gestation permet de bien gérer le temps pour l'éleveur !

THÉRY VÉTIQUON
Avec deux enfants à Gec, j'ai fait partie des fermes pilotes, qui pensent au bien-être de leurs vaches. Gestadetect®. Ça me l'apprend dans un instant. Je n'ai plus à faire de saupiquet de leur enlever et le gain de temps pour l'éleveur !

www.clasel.fr **Seenergi** **Clasel**

Gestadetect: the five advantages making the difference

Global Overview of Milk Pregnancy Testing Services

- AntelBio USA, a division of NorthStar Cooperative
 - <http://www.northstarcooperative.com/pregnancy/>
 - Collaborated to validate the first milk pregnancy test
- USA, Dairy One
 - <http://dairyone.com/analytical-services/pregnancy-testing/>
 - Dairy One Ithaca Lab, routine samples and individual samples (free shipping), sample transportation system, FAQs,
 - BOTH OPTIONS *Now Offering free “RECHECK’s*“
- The Dairy Authority, Colorado, USA
 - <http://www.dairymd.com/lab.php>
 - A vet clinic, offering Milk Preg Test 24 hrs TAT



AntelBio and IDEXX collaborated to validate the first milk pregnancy test. It is the only milk-based test for improving efficiency of reproductive programs in dairy herds.

Global Overview of Milk Pregnancy Testing Services

- Heart of America DHIA
 - <http://www.hoadhia.com/lab.html>
 - ELISA submission form for Pregnancy and Johne's
- Lancaster DHIA
 - <http://www.lancasterdhia.com/>
 - *"Let us help you find open cows"*
 - Routine and individual samples, „call your local DHI technician“ offer a mailing box, members and non-members
- Texas DHIA
 - <http://www.texasdhia.com/SERVICES.html>
 - Our milk pregnancy test is 96% accurate and the results are collected within 6 hours of receiving the samples.
 - This is the industry leading test for reducing invasiveness and unnecessary stress on the animal.
 - Milk pregnancy testing eliminates the need for additional animal sorting, restraining, and sampling. It also **allows for better time management between the producer and veterinarian.**



Lancaster DHIA sample kit

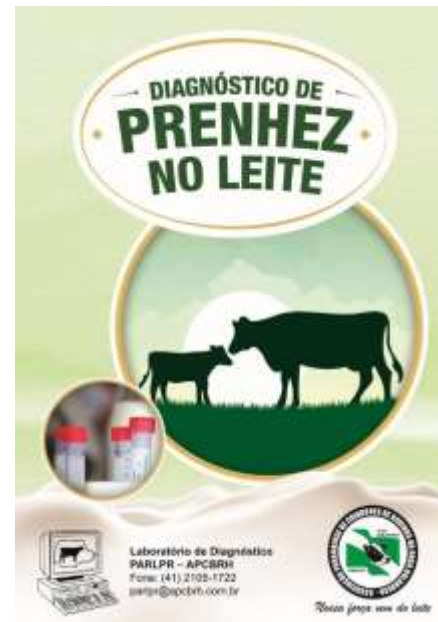
Global Overview of Milk Pregnancy Testing Services

- Canada
 - Valacta (www.valacta.com) DHI, Quebec:
 - ▶ Gestalab, now available every day (since 3rd October 2016)
 - With sampling kits
 - In collaboration with CIAQ (www.ciaq.com, a semen company)
 - CanWest DHI (www.canwestdhi.com)
 - ▶ Accurate, easy & cost-effective
 - ▶ Use as 1st check, Recheck and dry-off check
- Australia
 - http://www.nationalherd.com.au/herd_recording/pregnancy_testing
 - IDEXX Pregnancy Test, 28 Day Milk Pregnancy Testing

Global Overview of Milk Pregnancy Testing Services

- Brazil
 - Clínica do Leite
<http://www.clinicadoleite.com.br/fazenda/B2B-FazendasLocaweb/Clinica/Inicio.html>
 - ▶ Promoting P-CHECK

 - APCBRH, Parana
<http://www.apcbrh.com.br/>



COM ESTA **AMOSTRA DE LEITE** JÁ GERAMOS MUITA **INFORMAÇÃO** PARA **MELHORAR** O SEU **NEGÓCIO**

CCS Gordura
Proteína Uréia

MAS AGORA, FAREMOS AINDA MAIS...

P-CHECK ✓

TESTE DE PREENHEZ NO LEITE

CLÍNICA DO LEITE
ESALUS-USP

Entre em contato com nossa Central de Relacionamento:
Clínica do Leite - ESALUS/USP
Fone: (19) 3422-3631
qd@clinicadoleite.com.br

Apóio
IDEXX
LABORATORIES

Test With Confidence™

IDEXX

Global Overview of Milk Pregnancy Testing Services

- Chile
 - Cooprinsem (<http://cooprinsem.cl/home/>)



DIAGNÓSTICO TEMPRANO DE PREÑEZ
ELISA en leche

Una identificación temprana de las vacas abiertas le permitirá mejorar los intervalos entre partos, optimizando la eficiencia reproductiva de su rebaño.

¿Qué es este análisis?
Es un kit de ELISA de IDEXX que permite detectar glicoproteínas asociadas a la gestación (PAG), con una muestra de leche desde los 26 días post cubierta. Estas PAG son producidas solamente por la placenta, por lo tanto es un análisis preciso y exacto.



cooprinsem

Laboratorio Diagnóstico Veterinario
Avenida 2000, 4430000 La Serena | Santiago: Cooprinsem S.A. | www.cooprinsem.cl | www.idexx.com

Test With Confidence™

IDEXX

What Customers Are Saying

- “Our producer clients are really seeing the benefits of getting a pregnancy test milk sample in the parlor **without the extra efforts of having to lock up or sort cows**. The process is efficient and eliminates potential delays in breeding programs, which saves valuable time.”
Bruce W. Hoffman, DVM President, Animal Profiling International, Inc., USA
- “Testing milk samples for pregnancy during our DHI test is a lot easier, and it's on my schedule every month.”
Mark Bontekoe, Touchdown Dairy, LLC, USA



Test With Confidence™

IDEXX