Issue N° 16 - November 2022

IDF ANIMAL HEALTH REPORT

Research progress | Global insights | Expert opinion

CONTENTS

PREFACE

MESSAGE FROM THE IDF DIRECTOR GENERAL

Animal health and welfare are key to IDF's commitment to sustainability. Good practices in animal husbandry contributes to the delivery of the UN Sustainable Development Goals as well as on climate commitments and methane emissions reduction.

This edition of the IDF Animal Health Report contributes to knowledge and experience sharing by presenting animal health and welfare research from eight different countries and one international organization, which showcases the many efforts that the Global Dairy sector is doing in all regions of the world to control and prevent infectious diseases in animals.

You will find different approaches to Mastitis treatment and prevention in Denmark and Sweden, measures to control Foot and Mouth Disease (FMD) in South Africa and Nigeria or the struggle against Bovine Reproductive Disease and Infectious Bovine Rhinotracheitis (IBR) in India. Interesting stories on Mycroplasma Bovis screening in New Zealand, a control programme to reduce respiratory diseases in bovines in Norway and an analysis of the effects of pegbovigrastim in Dutch dairy cows are also part of this edition.

The IDF Animal Health Report highlights contributions by key IDF stakeholders. In this regard, in the present edition we included an article on the role of the World Organisation for Animal Health (WOAH, founded as OIE) in monitoring global trends in Tuberculosis in animals.

We extend our thanks to the authors, whose contributions have helped to add value to this report through their insights and analysis.

Caroline Emond
IDF Director General

MESSAGE FROM THE ACTION TEAM LEADER

Dear Reader,

This edition of the IDF Animal Health Report focuses on infectious diseases. Authors from around the world have contributed reports on research and other industry initiatives related to the topic of infectious diseases in dairy cattle. We appreciate the willingness to share content and developments in animal health. This report clearly shows the diversity of the global dairy sector. For example, while some IDF member countries are struggling to control foot and mouth disease, others have had the opportunity to work on diseases with lesser impact. Some projects focus on one disease or pathogen, while others focus on good farming practices in general or the use of new technologies. There is no doubt that both are necessary to maintain the health and welfare of our dairy herds.

One must remember why the livestock sector is constantly working to control infectious diseases. There is an obvious link between bacterial infections and the inappropriate use of antibiotics. Antimicrobial resistance, the so-called “silent pandemic”, is responsible for 700,000 deaths annually according to the XXX. Good animal health is an important part of animal welfare. Infectious diseases often have a dramatic effect on the welfare of affected animals and appropriate treatment and control programs must be sought.

We hope this report will inspire people in the dairy sector to seek and share knowledge in our global network to continue and strengthen infectious disease control, locally, nationally and globally.

Håvard Nørstebø
Special advisor TINE Advisory Services, Norway

MESSAGE FROM THE SCIENTIFIC EDITOR

Dear Reader,

It is an honour to present the 16th edition of the International Dairy Federation Animal Health Report. You will find inspiring programs improving animal health and welfare as it relates to farm productivity, food security, safety and quality. This issue shows a selection of articles from the members of the animal health and welfare standing committee to inform our experts about the latest developments in the dairy sector.

The breadth of issues IDF covers in its work is extensive. I invite you to read more about current projects on animal health and welfare on the IDF website.

We wish all readers an interesting read.

Dr María Sánchez Mainar
IDF Science and Standards Manager
msanchezmainar@fil-idf.org

NEWS FROM IDF MEMBER COUNTRIES

DENMARK

Clinical mastitis due to NAS infections does not require systemic treatment: how we can reduce the use of antibiotics

Bacteriological cure rates of clinical mastitis cases caused by NAS are similar after local and combined (local plus systemic) penicillin treatment while the amount of antimicrobial compound used differs by factor 16.

AUTHOR
Line Svennesen & Svenja Woudstra, University of Copenhagen • Jutland, Denmark

line.svennesen@sund.ku.dk
svenja.woudstra@sund.ku.dk

UN SDGs

Summary

Location: Jutland, Denmark

IDF Welfare Action Area: Health management

Resource based measure:
Mastitis is a major problem in modern dairy herds. Antimicrobials used for mastitis therapy can potentially be reduced with the right treatment strategy. However, the effects must carefully be evaluated.

Animal based measure:
If local treatment is as effective as systemic treatment for clinical mastitis, side effects that are more common in systemic treatments may be reduced.

HOW TO TREAT NON-AUREUS STAPHYLOCOCCI?

Prudent use of antimicrobial substances is one important measure to combat the development of antimicrobial resistance. While in Denmark generally only simple penicillins can be used for the treatment of clinical mastitis cases, most treatments of clinical mastitis cases consist of a combined local plus systemic treatment (Wilm, 2021). To date, only a single study (Kalmus, 2014) compared bacteriological cure rates of penicillins administered either local or systemic for treatment of clinical mastitis, and it remains unknown which treatment should be chosen for clinical mastitis cases due to infections with non-aureus Staphylococci (NAS).

”Recent research indicates that subclinical non-aureus staphylococci infections are or short duration indicating that antimicrobial treatment may not be justified.”

Line Svennesen

The aim of the study was to evaluate bacteriological cure of clinical mastitis cases treated (A) for 3 days locally (Procaine benzylpenicillin) compared to (B) 3 days of local (Procaine benzylpenicillin) plus systemic treatment (Penethamate hydroiodide). Here, we present the results for bacteriological cure on species level for NAS infections.

MATERIALS AND METHODS

In a randomized clinical trial, non-severe clinical mastitis cases caused by Gram-positive bacteria from 12 Danish dairy herds received either treatment A or B. Further, all cows received Ketoprofene. Cases were selected based on an on-farm test. Treatment effect, defined as bacteriological cure, was evaluated for all clinically cured quarters based on follow-up milk samples after 2 and 3 weeks. Standard microbiology (following NMC guidelines) and MALDI-TOF MS were carried out on milk from the clinical case and both follow-up samples. Mixed infections were defined by 2 species. Treatment effect on cure-rates was assessed in a multivariate mixed logistic regression model.

STAPHYLOCOCCUS CHROMOGENES AND *STAPHYLOCOCCUS HAEMOLYTICUS* WERE THE SPECIES MOST ISOLATED

Of 345 clinical mastitis cases with follow-up records, NAS were isolated and identified to the species level in 40 and 56 cases of pure and mixed culture, respectively. The most frequent isolated NAS from pure cultures were *Staphylococcus chromogenes and Staphylococcus haemolyticus* (Table 1). The predicted probabilities of bacteriological cure from NAS isolated in pure culture was 84% (95% CI: 65-94) for treatment A and 86% (CI: 69-94) for treatment B (Figure 1). NAS isolated from mixed cultures had a lower predicted probability of cure at 75% (CI: 58-87) and 77% (CI: 62-88) for treatments A and B, respectively.

LOCAL BACTERIOLOGICAL TREATMENT, AS EFFECTIVE AS SYSTEMIC APPLICATION

The bacteriological cure rates for NAS infections did not differ significantly between local and combined treatment of clinical mastitis (Figure 1). Treatment with penicillins could therefore be limited to local treatment only, as every use of antibiotics increases the risk of antimicrobial resistance and systemic treatment consumes larger amounts of

	Pure culture (n=40 cases, 40 isolates)		Mixed infections (n=56 cases, 63 isolates)	
Species	Total	Cured (%)	Total	Cured* (%)
Staphylococcus capitis	0	-	1	1 (100)
Staphylococcus chromogenes	13	11 (85)	17	12 (70)
Staphylococcus epidermidis	2	2 (100)	10	7 (70)
Staphylococcus equorum	2	2 (100)	10	6 (60)
Staphylococcus gallinarum	2	1 (50)	1	1 (100)
Staphylococcus haemolyticus	10	8 (80)	5	4 (80)
Staphylococcus hominis	0	-	1	1 (100)
Staphylococcus hyicus	1	0 (0)	1	1 (100)
Staphylococcus sciuri	3	3 (100)	10	9 (90)
Staphylococcus simulans	5	5 (100)	0	-
Staphylococcus succinus	0	-	4	3 (75)
Staphylococcus xylosus	2	2 (100)	3	3 (100)
Total	40	34 (85)	63	48 (76)

* considered cured for the respective organism, if *Staphylococcus sp.* was isolated in follow-up samples, the NAS was considered not cured (due to uncertainty)

Table 1 – NAS species identified and cured in either pure culture or mixed infection.

antibiotic compound. It remains unclear if bacteriological cure rates after treatment significantly exceed spontaneous cure rates. Earlier research estimated spontaneous cure rates at 55-60% (Pinzón-Sánchez, 2011). However, recent research shows that at least subclinical NAS infections often have short durations indicating that antimicrobial treatment might not be justified (Woudstra, 2022).

Further research is necessary to explore if there is a benefit of treating clinical mastitis cases due to NAS infections compared to spontaneous cure. Furthermore, the role of mixed infections with regards to the cure rate of NAS should be investigated, as the cure rate for these were found lower than those for pure NAS infections. Combined treatment was not found to be significantly different from local treatment with penicillins only, therefore combined treatments for NAS infections should be discouraged.

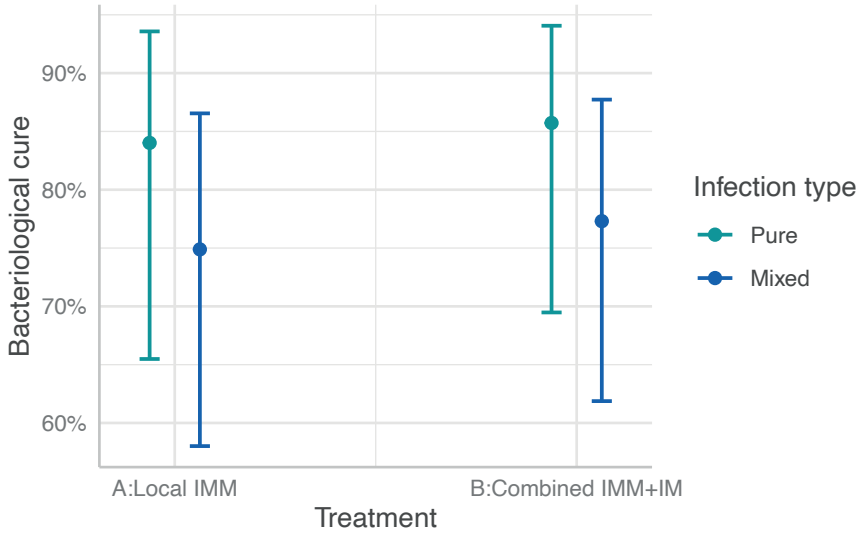

Figure 1 – Predicted probabilites of bacteriological cure

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DENMARK AND NIGERIA

Dairy farming challenges with high infectious rate of FMD disease in the neighborhood

Dealing with high infectious rate of FMD disease is a constant battle that needs everyone, within dairy farming industry in the relevant area or country, to participate and engage in.

AUTHOR
Snorri Sigurdsson & Jimmy Johnmark
Arla Global Dairy Products Ltd.
snorri.sigurdsson@arlafoods.com
jimmy.johnmark@arlafoods.com

UN SDGs

Summary

Location: Nigeria, Africa

IDF Welfare Action Area: Health management

Resource based measure:

- Lower carbon footprint with increased longevity & production
- Improved profitability of dairy farming
- Increased milk production

Animal based measure:

- Better animal welfare & health
- Reduced calf death
- Improved life time milk production

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THE IMPORTANCE OF FOOT-AND-MOUTH DISEASE

Foot-and-mouth disease (FMD) is a serious and highly contagious virus caused animal disease, that can affect all cloven-hoofed animals and is one of the most serious livestock diseases. Often this disease is confused with Hand, foot, and mouth disease which is common in young children but FMD is a different disease and is not transmitted to humans by consuming animal products. FMD is present in Asia, including in Indonesia, the Middle East, Africa, and parts of South America and different strains of viruses tend to dominate in different parts of the globe.

In Nigeria vaccination programs have shown to have good effect on FMD and both prevented outbreaks but also reduced the negative influence of the disease if an outbreak happens.

VACCINATION IS KEY

Experience from Nigerian experts in FMD show that the best way to deal with current situation, where FMD is a widespread disease that is hard to contain, is to use vaccination with known FMD virus strains to reduce the effect and impact of possible disease attack at the herd.

FMD is a highly contagious disease of some domestic and some wild animals in Nigeria that has devastating effects on the production and welfare the livestock. Although local experience show that few animals die from FMD, the animals that are infected with FMD show fever, drooling, poor appetite, and reluctance to move and FMD also causes fluid filled blisters (vesicles) on the lips, tongue, palate, feet and teats of infected animals. These blisters then burst and leave raw, painful ulcers that take up to 10 days to heal. The disease is endemic in most countries in sub-Saharan Africa, including Nigeria, causing huge economic losses each year. It is classified as a transboundary animal disease with epidemics reported in different countries each year.

FMD spreads rapidly from one animal to another, especially in cool, damp climates and/or when animals are penned or housed closely together. Virus is excreted in breath, saliva, mucus, milk and faces. FMD virus is mainly carried by live animals but also as well in soil, bones, untreated hides, vehicles and equipment used with these animals. It can also be carried on people's clothing and footwear. It can be transmitted through excretions and secretions and small aerosols or droplets from infected cattle and it is said to be found in milk or semen of infected cattle for up four days before any clinical signs are detected in infected animals. Cattle are very susceptible to, and can be infected by breathing in small quantities of the virus.

OUR EXPERIENCE IN NIGERIA

In endemic areas like Nigeria, prevention and control remain the best options to limit the disease. Fortunately vaccines, effective against the virus, have been developed and have been shown to protect susceptible cattle population from the disease. Vaccines made with specific viral serotypes similar to those found in the target area are developed and used to protect vulnerable cattle populations against the disease.

Other control measures include quarantine and isolation of infected cattle, limit their

”In endemic areas like Nigeria, prevention and control remain the best options to limit the disease.”

Snorri Sigurdsson

movement within specific areas and providing a buffer zone between infected and non-infected animals. Mass vaccination of vulnerable cattle population have been carried out by Government and some development partners, but consistency and frequency of these vaccinations have left much to be desired. Nigeria and ECOWAS (Economic Community of West African States) have also developed different policy documents in conjunction with FAO (The Food and Agriculture Organization of the United Nations) to tackle the disease and bring it under control.

ARLA'S NEW TEACHING FARM IN NORTHERN NIGERIA WILL FOCUS ON DISEASE PREVENTION

Arla is constructing a dairy farm in the state Kaduna in Northern Nigeria and this farm will have 450 cows and 400 Hectare of land, with the farm itself right in the middle of it. This is an attempt to have at least one Kilometer buffer zone between the farm and any potential infected cattle within the area, thereby reducing the risk of direct or indirect spread of any disease to our animals. For this farm there is also designed and developed a herd health program where disease prevention, rather than control, is the main focus. And for the farm there is also designed special inhouse isolation and quarantine house, for any suspected case on the farm. Furthermore strict biosecurity and animal movement control has been planned with regular and periodic vaccinations and testing.

With these measures it is believed that the farm can demonstrate that it is possible to protect animals from the menace of diseases like FMD and have a disease free & high producing dairy farm in endemic areas like Nigeria.

INDIA

Infectious agents in bovine reproductive disease: Zoonotic threat & One Health importance

AUTHOR

L.N. Sarangi[1], Tejaswi G[1], V.S. Bahekar[1], Sagar Shroff I[2], R.V. Chandrasekhar Reddy[1], Bajibabu P[1], A. Prasad[1], Ponnanna N.M.[1], S.K. Rana[2], A.V. Hari Kumar[2], Meenesh Shah[2]

[1] NDDB Research and Development Laboratory, Hyderabad 500032, India,

[2] National Dairy Development Board, Anand 388001, India,

meenesh@nddb.coop

UN SDGs

Summary

Location: The study was undertaken in villages of Gujarat state, India.

IDF Welfare Action Area: Health management

Resource based measure:

- Bring into focus the zoonotic threat posed by infectious agents causing abortions and reproductive disease in animals.
- Emphasize the need of One Health approach as a policy and management intervention for effective control.

Animal based measure:

- Reproductive health
- Cow welfare
- Cow longevity

"Effective management and control of bovine abortions & reproductive disease caused by zoonotic bacteria warrants a One Health approach."

Meenesh Shah

BACTERIAL AGENTS IN BOVINE REPRODUCTIVE DISEASES:

Bovine abortions and reproductive diseases have a huge economic impact on the dairy industry [1]. Infectious causes heighten the impact, as the diseases are contagious and can affect the entire herd. Abortions and reproductive disorders are catastrophic to the livelihoods of farmers in India and South Asia where dairying is mostly small-holding subsistence farming. Bacterial agents implicated in bovine abortions and reproductive disorders, such as *Brucella, Coxiella, Leptospira, Listeria* cause chronic disease in bovines, greatly affecting productivity. The infectious agents pose high zoonotic risks, especially in India and other countries, where dairying is largely a household activity with farmers living in close proximity to the animals. The Centres for Disease Control and Prevention (CDC), based on studies in seven developing countries, has prioritized brucellosis, leptospirosis, and Q-fever caused by *Coxiella burnetti* as major zoonotic diseases for control [2]. Currently, in India as well as in South Asia, systematic studies and true estimation of the prevalence of bacterial agents causing bovine reproductive diseases and the associated risk of zoonoses are lacking.

SURVEILLANCE OF BACTERIAL AGENTS IN REPRODUCTIVE DISEASES:

A pilot study was conducted by the National Dairy Development Board (NDDB) in the state of Gujarat, India- primarily to determine the role of *Brucella* spp. in bovine reproductive disorders. Clinical specimens were collected from 441 cattle and buffaloes in 211 villages in 23 districts of Gujarat between 2019 and 2021. The animals either aborted at mid-to-late stage gestation or showed symptoms of reproductive disorders after calving, such as retention of foetal membranes (RFM) or metritis. Samples (vaginal discharge/ placenta) were spotted onto Whatman® FTA® cards by local vets or paravets and shipped to the NDDB's R&D Laboratory. FTA® cards are proprietary filter-paper cards chemically treated to lyse and inactivate bacteria and viruses while retaining the integrity of its nucleic acid molecules (DNA & RNA) for downstream detection by molecular assays. These cards render easy sample collection, storage, and shipment; features that are suited to resource-limited, small holder dairying environments of India [3].

DNA was extracted from the punched-out portions of the specimen spotted cards as detailed in the product insert. Only cards that contained adequate DNA were considered for the detection of bacteria. Adequacy of DNA was ascertained by a real-time PCR assay detecting the presence of host cell DNA (bovine growth hormone, bGH). Sample spotted cards from 401 animals that were qualified with the presence of bGH DNA, were then assayed with real-time PCR (for the detection of *Brucella* spp) or PCR (for the detection of *Leptospira* spp, *Coxiella* spp, and *Listeria* spp) [4].

PREVALENCE OF ZOONOTIC BACTERIA

Investigation into the 401 cases (270 in cattle and 131 in buffaloes) of bovine reproductive disorders indicated the role of either *Brucella*, *Leptospira*, or *Coxiella* in nearly 58% (232 out of 401) cases. Among the bacteria, the prevalence of *Coxiella* spp was highest (116 cases) at 29%, followed by *Leptospira* spp. in ~22% (89 cases) and *Brucella* spp. at 19% (71 cases). However, *Listeria* spp. was not detected in any of the sample spotted cards. Mixed infections (presence of two or more bacteria) were seen in about 45 (~11%) of the total 401 cases. *Coxiella* spp alone was detected in 80 cases (~20%), *Leptospira* alone in 64 (~16%), and *Brucella* spp alone in 43 (11%) cases. The results are detailed in Table 1.

The disease manifestations recorded in the sampled animals were 108 cases of abortions, 312 cases of RFM, 28 cases involving both RFM and abortions, and 9 cases of metritis. Bacteria were detected in 55% of the cases with RFM (173 of 312 cases). In cases of abortions, the number of animals in which bacteria were detected was higher (~67%; 72 of 108). DNA of *Brucella*, *Coxiella*, and *Leptospira* in cases of abortions were ~32% (35 cases), ~31% (32 cases), and 25% (27 cases) respectively. In RFM

Disease/ Condition	Animals screened	Bacteria detected in the samples			
		Brucella	*Leptospira*	*Listeria*	*Coxiella*
Abortion	108	34 (31.48)	27 (25.00)	33 (30.56)	0 (0.0)
Retention of foetal membrane (RFM)	312	46 (14.74)	72 (23.08)	83 (26.60)	0 (0.0)
Both RFM and Abortion	28	7 (25.00)	11 (39.29)	4 (14.29)	0 (0.0)
Metritis	9	1 (11.11)	1 (11.11)	4 (44.44)	0 (0.0)
Total	**401**	**71 (18.45)**	**89 (22.19)**	**116 (28.93)**	**0 (0.0)**

Tabel 1 – Prevalence of zoonotic bacteria in the clinical specimens of animals with reproductive disorders

cases, *Coxiella* was detected in ~27% of cases while *Leptospira* and *Brucella* were detected in ~23% and ~15% of cases respectively. *Coxiella* was also detected in 4 of the 9 metritis cases while *Brucella* and *Leptospira* in one each. Interestingly, the prevalence of *Leptospira* was higher at ~36% in buffaloes (47 of 131) than in cattle (~16%; 43 of 270).

ONE HEALTH IMPORTANCE:

Bovine brucellosis is one of the most known causes of infectious abortions in cattle in India and hence, nationwide control programs are afoot to address the challenge. Subsequent calving in brucellosis-afflicted animals is often associated with RFM. The higher rate of prevalence of *Coxiella* and *Leptospira* in this study is revealing. The results of this study prompt the need for systematic surveillance of *Coxiella* and *Leptospira* in bovine abortions and reproductive diseases.

The major bacteria that were associated with reproductive disease in the study viz., *Coxiella*, *Leptospira* and *Brucella*, are zoonotic agents. These bacteria are known to cause debilitating diseases in humans. Animals infected with the *Brucella*, *Coxiella* and *Leptospira* harbour these zoonotic bacteria for long periods. Bacteria are shed in copious amounts through urine, faeces, milk, and postpartum discharges through the genital tract long after abortions or calving. Thus, bovine infectious abortions and reproductive disease pose an immense threat to livestock, the environment and public health. The smallholder farmers living in close proximity with dairy animals, farm workers and veterinarians are the most vulnerable. Zoonotic infections in humans cause enormous economic impact by means of loss in productive work hours and the long road to recovery. However, a true estimation of zoonoses is lacking, since more often than not, the affected individuals in the rural dairy sector do not seek medical care or have limited access to it.

Concerted efforts and systematic surveillance programmes are necessitated for determining the circulation of zoonotic agents and implementing effective strategies for mitigating their transmission. The results of our study suggest that effective management and control of bovine abortions and reproductive disease caused by zoonotic bacteria warrants a One Health approach.

Department of Animal Husbandry & Dairying, Government of India has envisaged One Health to address livestock diseases in India. A pilot programme has been launched in the state of Karnataka for concerted surveillance and prioritizing of zoonotic diseases of One Health importance. NDDB is also running a pilot-scale brucellosis control programme in the districts of Gujarat with the One Health approach. The programme involves (i) surveillance for the determination of prevalence of the Brucella spp in animals, the dairy environment, and people involved in dairy farming; (ii) concerted effort for raising awareness on the disease, transmission, biosecurity and sanitary measures for disinfection and disposal of aborted and postpartum biological waste; and (iii) promoting vaccination of calves (B. abortus S19 calf-hood vaccination) and treatment of affected humans.

CONCLUSION:

Management of bovine abortions and reproductive diseases caused by infectious agents warrants a One health approach. There is a compelling need for the extension of epidemiological research on infectious bacterial causes of bovine abortions and reproductive diseases beyond brucellosis in the Indian dairy scenario. The high prevalence of *Coxiella* and *Leptospira* in the clinical samples from animals with the bovine reproductive disease in this study prompts a closer scrutiny of these zoonotic bacteria in the Indian dairy setting.

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INDIA

Road to freedom from infectious bovine rhinotracheitis (IBR): Success story of an elite semen station

AUTHOR

N. Patel[1], N.K. Agrahari[1], A. Prasad[2], L.N. Sarangi[2], R.V.C.S. Reddy[2], K.S.N.L. Surendra[2], Ponnanna N.M.[2], S.K. Rana[3], A.V. Harikumar[3], G.K. Sharma[3], V.A. Srinivasan[3], C.P. Devanand[4], R.O. Gupta[3], Meenesh Shah[3]

[1] Animal Breeding Centre, Salon, Rae Bareli, Uttar Pradesh, India

[2] NDDB Research and Development Laboratory, Hyderabad 500032, India,

[3] National Dairy Development Board, Anand 388001, India,

[4] NDDB Dairy Service, Safdarjung Enclave, New Delhi 110029, India,

meenesh@nddb.coop

UN SDGs

Summary

Location: The project was undertaken in a semen station (Animal Breeding Centre, Salon), located in Uttar Pradesh, India

IDF Welfare Action Area: Animal Health management

Resource based measure:

- Improvement of herd health and well-being, production of BHV-1 free semen and control of disease transmission
- Improved cost economics of semen production by elimination of QC tests of semen batches and scope for export of frozen semen

Animal based measure: Animal health and well-being

> "Strict biosecurity measures, intensive serological screening, prompt segregation and gradual but systematic culling of seropositive bulls, and stringent screening of new bull calves prior to induction can lead to freedom from IBR and save costs."
>
> **Meenesh Shah**

FROZEN SEMEN DOSE PRODUCTION AND IBR:

Frozen semen doses required for the extensive artificial insemination (AI) programs in India are produced from bulls with high genetic potential at the modern, state-owned, semen stations (SS). The Department of Animal Husbandry and Dairying (DAH&D), Government of India, in line with the Terrestrial code of the World Organization for Animal Health (WOAH), has issued a guideline manual - the "Compendium of minimum standard protocols (MSP) for bovine frozen semen production". As detailed in the MSP, the SS should be maintained free of infectious diseases such as brucellosis, bovine tuberculosis, and Johne's disease. Bulls are periodically screened for these diseases and infected animals are removed from the herd immediately.

Although infectious bovine rhinotracheitis (IBR) in cattle and buffaloes is a highly contagious and economically important disease, the MSP manual stops short of advocating outright removal of IBR-positive bulls owing to the high prevalence of the disease in India and the limited availability of IBR-free, high-genetic merit bulls and bull calves of bovine breeds, especially indigenous. However, the manual lays stringent procedures for the use of semen produced from IBR-positive bulls and recommends semen stations to achieve IBR-free status in a time-bound manner through the "Guideline for progressive IBR and BVD control roadmap" [1]. Establishing IBR-free semen stations coupled with the nationwide, intensive, and regular vaccination of the dairy herd might pave the way for IBR control in India [2].

IBR, caused by the bovine alphaherpesvirus-1 (BoHV-1), is listed as one of the bovine diseases of international concern by WOAH [3]. Infection may manifest into inflammatory conditions of any of the myriad tissues and organs causing rhinotracheitis, vulvovaginitis, balanoposthitis, conjunctivitis, enteritis, and even affect ovaries (oophoritis) [4]. The disease might result in brief but acute decreases in milk production, weight loss, abortions, and infertility [5]. In fact, IBR is one of the most diagnosed viral cause of bovine abortions in unvaccinated dairy herds with rates ranging from 5 to 60%.

BoHV-1 establishes latency in nearly all infected animals. Latent infection is characterized by bouts of reactivation induced by stress throughout the lifespan of an animal [6]. High inflammatory conditions during infection and reactivation may facilitate susceptibility to secondary bacterial and viral infections and associated complications. Reactivation results in high rates of virus replication and intermittent shedding in the natural secretions including semen of the animal; further enhancing disease transmission in the herd. BoHV-1 in semen poses a high risk of infection in the recipient cows. Both the Terrestrial code of WOAH, and DAH&D's MSP manual advocate strict screening of every batch of the semen produced from an IBR seropositive bull for BoHV-1 and destruction of BoHV-1 positive batches by incineration. Only BoHV-1 free FSDs are recommended for use in the AI for breeding.

DESCRIPTION OF THE HERD:

The Animal Breeding Centre (ABC) was established in 1988 by the National Dairy Development Board (NDDB) at Salon in the Raebareli district of the state of Uttar Pradesh. The SS, professionally managed by the NDDB Dairy Services (NDS), New Delhi is one of the largest in India. Since its establishment, the SS has been a vital cog in the national dairy productivity enhancement programs. It has consistently supplied superior quality,

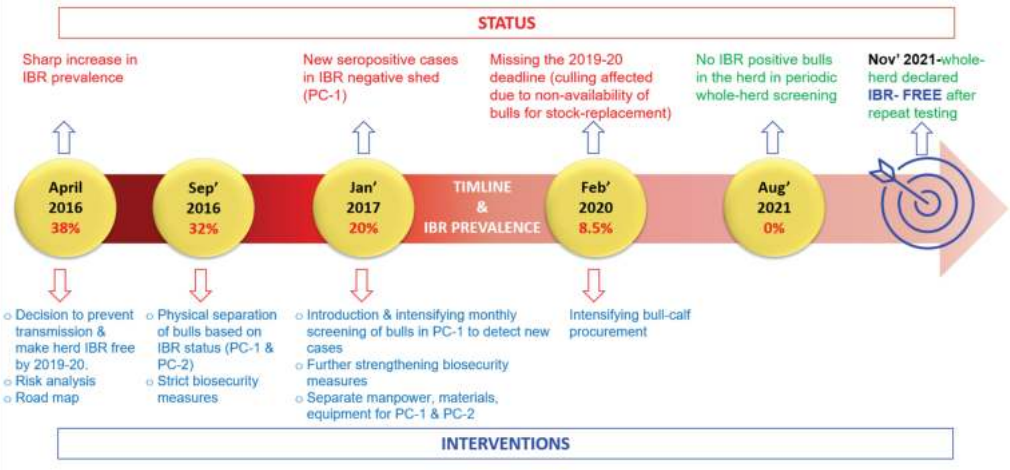

Figure 1 – Timeline of the road to freedom from IBR

disease-free frozen semen doses (FSDs) for AI across India. DAH&D's Committees for the evaluation of semen station have consistently rated it "Grade A" and elite since 2005. The SS is also certified with the "5S Workplace Management System" and ISO 9001: 2015 quality standards.

During the periodic serological screening in April 2015, the SS recorded an IBR prevalence of 29% (112 IBR positive bulls out of 386 herd strength). In the subsequent year (April 2016) the prevalence spiked sharply to 38.35%. Retrospective analysis revealed that 41 of the 223 IBR seronegative bulls (~18%) had turned seropositive. In view of the sharp rise in incidence and the associated cost escalation in screening FSDs for BoHV-1, the management decided to implement suitable strategies for the prevention of further spread and subsequently achieve IBR-free status by 2019 without adversely impacting the production of FSDs.

ROAD MAP TOWARDS IBR-FREEDOM:

Risk analysis identified the following risk factors that led to the indiscriminate spread of IBR in the herd (i). Free movement and contact of IBR positive and negative bulls; (ii). Uncontrolled movement of manpower and animal handlers; (iii). Use of common materials and equipment for managing infected and non-infected animals.

SEGREGATION OF IBR POSITIVE AND NEGATIVE BULLS:

The SS initiated management practices to address the identified risks in September 2016. Firstly, the IBR seronegative and seropositive bulls were segregated into two distinct zones viz. Production centre-1 (PC-1) and production centre-2 (PC-2) respectively. PC-1 and PC-2 consisted of 8 sheds each. The zones were 500m apart. Access was physically restricted with a boundary wall erected between them. Secondly, separate equipment & machinery for feed, fodder and animal handling were established. Thirdly, separate manpower was recruited for semen collection from production centres and day-wise semen collection roasters were prepared such that collection times for PC-1 & PC-2 do not overlap.

STRICT BIOSECURITY MEASURES:

Biosecurity measures were tightened throughout the farm, including pre-quarantine, quarantine, and rearing sheds. All the farm personnel were made aware of the risk of transmission and mitigation measures being implemented. Free movement of farm workers from pre-quarantine & quarantine sheds into the production centres was restricted. Perimeter fencing of the farm was bolstered to prevent the entry of stray animals and unauthorised man movement. Entry of visitors to the production centres was prohibited. Vehicle movement was controlled and outside vehicles were restricted. No farm personnel visiting an outside farm or laboratory were allowed access to the production centres within 72 hours of their visit. Man and vehicle movement between the PC-1 and PC-2 were restricted and strictly monitored.

The biosecurity procedures at quarantine and rearing stations were also made stringent to ensure no seropositive bull was inadvertently introduced into the herd. Bull calves found positive for IBR at the quarantine station were immediately isolated, castrated and removed. The quarantine of other calves was extended, screened again after a month and introduced into the herd only after all bull calves were found negative in two consecutive serological screening tests. The intensive screening and culling strategy led to the removal of 17 bull calves from the quarantine station in 2017. Further, it was observed that in 11 of the 17 bull calves, the dam was also IBR seropositive. Therefore the bull-calf procurement for induction into the herd was restricted to the calves from seronegative dams

INTENSIVE DISEASE SCREENING:

Although the IBR seronegative and seropositive bulls were segregated in PC-1 and PC-2 respectively in September 2016, the subsequent IBR screening in January 2017 revealed 12 new seropositive cases in the negative herd (PC-1). The unexpected new incidences of IBR was attributed to underlying infection in a few animals that may have just contracted the infection from seropositive animals prior to segregation. This early stage infection may have gone undetected. The infected animals may have further spread the disease to other naïve animals in the subsequent months. Therefore, the farm management in consultation with the NDDB R&D Laboratory pursued intensive screening of the animals in the PC-1 on

Month'	Total bulls screened	% positive
April-2015	386	29.0
Sep -2015	396	28.3
April-2016	475	38.1
Sep-2016	473	31.5
Mar-2017	490	15.3
Aug-2017	480	15.0
Mar-2018	495	14.8
July-2018	464	10.8
Mar-2019	507	9.7
Nov-2019	503	8.9
Feb-2020	482	8.5
Aug-2020	487	5.1
Feb-2021	481	4.6
Aug-2021	456	0.00
Nov- 2021	482	0.00

Tabel 1 – Prevalence of IBR in the semen station over different time periods

a monthly basis from Jan 2017 to May 2017 as a follow-up measure to detect underlying infections in the negative herd.

The laboratory adopted a combination of ELISAs of various sensitivities and specificities viz., the blocking ELISA test detecting antibodies to the glycoprotein-B of BoHV-1 and indirect ELISA with BoHV-1 whole-virus antigen, for interpretation of the positive, negative and suspect (inconclusive) cases. The inconclusive cases were discussed with the farm management and advised for segregation into a separate shed until further resolution of the infection status. All positive cases were immediately moved to PC-2. The bulls turning conclusively negative in consecutive tests performed a month apart were considered for inclusion back into the negative herd; most suspect cases were found to eventually turn negative.

GAINING FREEDOM FROM IBR:

The road to freedom from IBR is illustrated in Figure 1. The SS progressively reduced the number of IBR seropositive bulls by periodic culling. Intensive screening, segregation of IBR seronegative and positive bulls and strict biosecurity measures checked disease spread, new incidences, and overall prevalence in the herd (Table-1). Periodic culling ensured a steady decrease in IBR prevalence. The plan to attain IBR-free status by 2019 was delayed due to unexpected roadblocks-first due to the limited bull procurement in 2018-19 and hence the availability of desired breeds for replenishing the herd strength in lieu of culling and the onset of COVID-19 affecting bull procurement and culling operations in 2020. Intensified culling towards the end of 2021 (Table-1 & 2) brought the number of IBR-positive animals in the herd to zero.

Apart from the IBR seropositive bulls, falling productivity and aging decided the choice of animals for culling (Table 2). Periodic culling, throughout the period, was compensated by intensive procurement and induction of young bulls into the herd; bolstering the herd strength and ensuring adequate FSD production. About 450 disease-free, high-genetic merit bull calves through progeny testing and pedigree selection programs were procured during the period.

S.N.	Financial year (FY)	Herd strength (March)	Culling of bulls		
			Total	IBR positive	% culling
1	2015-16	480	31	14	6.45
2	2016-17	490	68	38	13.87
3	2017-18	495	45	16	9.09
4	2018-19	507	37	23	7.29
5	2019-20	482	70	35	14.52
6	2020-21	485	34	21	6.8
7	2021-22	488	109	62	22.33

Tabel 2 – The year wise culling/removal of bulls from the Semen station

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NEW ZEALAND

Screening bulk tank milk for *Mycoplasma bovis*

AUTHOR
Amy Burroughs, Principal Adviser Strategic Epidemiology
Ministry for Primary Industries, Manatū Ahu Matua, New Zealand
amy.burroughs@mpi.govt.nz

UN SDGs

Summary
Location: National

MYCOPLASMA BOVIS ERADICATION PROCESS IN NEW ZEALAND SINCE 2017

Mycoplasma bovis (*M. bovis*) was confirmed in New Zealand (NZ) for the first time in July 2017.[1] For cattle, it may cause disease including mastitis, pneumonia, and arthritis.[2] Infection is often refractory to antibiotics and can have negative impacts on animal welfare and farming profitability.[2] Government and farming industry bodies (DairyNZ and Beef + Lamb New Zealand) announced in May 2018 that a world-first attempt would be made to eradicate *M. bovis* from NZ by June 2028.[1,2,3]

The three goals of the *M. bovis* Eradication programme ('the Programme') are to:

- eradicate M. bovis from NZ,
- reduce the impact of the disease and the eradication programme for everyone affected by M. bovis, and
- leave NZ's biosecurity system stronger.[4]

WHERE IS IT FOUND?

Mycoplasma bovis is primarily found by tracing cattle and milk movements on and off infected farms ('network surveillance'). Background surveillance screens for infection across the country and gives the Programme an opportunity to find infection that may be missed by network surveillance (e.g., when cattle movements are not recorded). Background surveillance of the dairy sector involves screening bulk tank milk (BTM) samples for the presence of *M. bovis* antibodies.

> "The routine screening of bulk tank milk for indications of *M. bovis* infection has contributed significantly to the progress made towards eradication."
>
> Amy Burroughs

MATERIALS AND METHODS

A single laboratory in NZ, MilkTestNZ, performs routine component and composition testing for all commercially supplying dairies. These existing systems are utilised for the Programme's background surveillance of the dairy sector. From July 2018, every dairy in NZ supplying milk for commercial processing has a BTM sample screened at least monthly using a commercial *M. bovis* ELISA kit (ID Screen® *Mycoplasma bovis* Indirect ELISA; IDVet, Grabels, France).

Dairy farms that produce a BTM sample for which the sample-to-positive (S/P) ratio is ≥ 30, and farms where the S/P ratio is ≥ 20 for two consecutive samples, are followed up with on-farm blood sampling and herd-level serology to determine their true infection status.

OUR HISTORY OF SUCCESS

As of 15 September 2022, a total of 275 properties have been confirmed as infected in the outbreak, including 70 dairies (Figure 1).[5] Of the 70 dairies, 20 were identified by BTM screening.

In 2021, 11,192 dairies were captured by BTM screening. Of these, 179 had at least one sample meet the criteria for on-farm investigation. Of these 179 dairies, three were confirmed as infected with *M. bovis*.

For 2022 to date, 10,903 dairies have been captured by BTM screening. Of these, 80 have had at least one sample meet the criteria for on-farm investigation. Of these, only one has been confirmed as infected with *M. bovis*.

The Programme is in the tail of the outbreak and expects to still find a small number of infected farms over the coming years.

OUR FARMERS, THE MAIN BENEFICIARIES

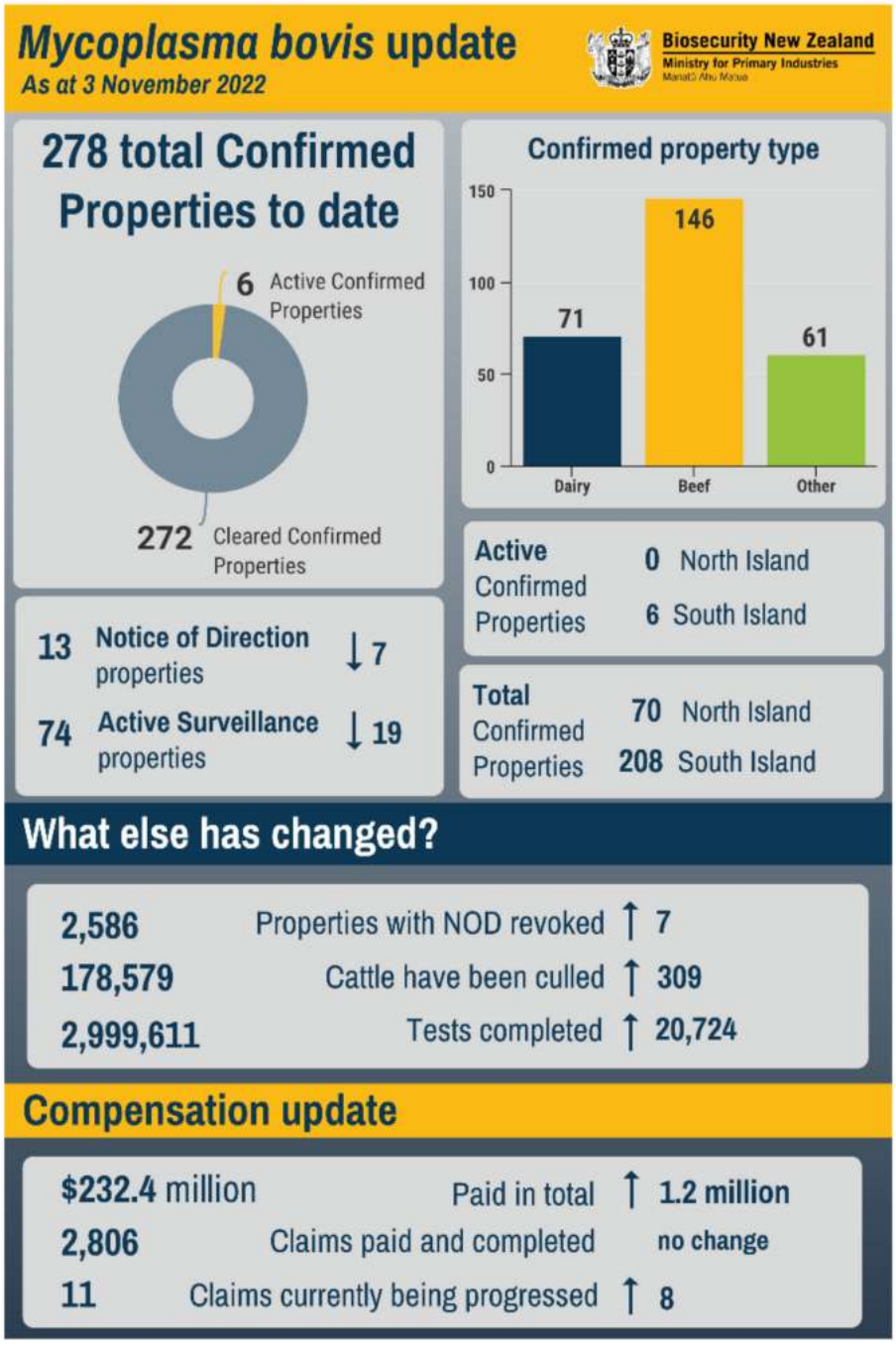
The routine screening of BTM for indications of *M. bovis* infection has contributed significantly to the progress made towards eradication. It provides assurance that infection is not widespread in the dairy sector and has helped to identify cases that may not have been found by tracing cattle movements. Monthly screening can identify infection early so control measures are applied quickly to minimise onwards spread.

Impacts on farmers have been minimised through using:

- existing milk collection systems,
- efficient on-farm investigations, and
- •the high specificity of the ELISA test (i.e., very low rate of false positives).

THE NEXT STEPS TO ERRADICATION

After *M. bovis* has been cleared from the last infected farm, background surveillance must continue for several years. In the absence of finding no infection, we can then provide enough confidence to declare eradication. BTM screening will be a key component in generating the negative data required to build up a high level of confidence that NZ is free.



The processes, relationships, and knowledge of test performance built up over time for BTM screening in the Programme will be valuable to transfer to future disease control programmes where milk can be used for surveillance.

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NORWAY

Experiences from the industry-driven BRSV and BCoV control program

AUTHOR
Håvard Nørstebø
TINE SA
havard.norstebo@tine.no

UN SDGs

Summary

Location: Norway

IDF Welfare Action Area: Health management

A CONTROL PROGRAM AIMING TO REDUCE RESPIRATORY DISEASES

Respiratory diseases in cattle cause big economic losses and poor animal welfare on cattle farms worldwide. The dominating causal pathogens vary between regions. In 2016, a joint Norwegian cattle industry decided to establish a control program aiming to reduce the occurrence of disease caused by Bovine Coronavirus (BCoV) and Bovine Respiratory Syncytial Virus (BRSV).

THE NORWEGIAN PROGRAMME

The Norwegian BRSV and BCoV control program consist of three main elements: 1) herd-level diagnostics (ELISA based), 2) outbreak notification system and 3) biosecurity measures in national livestock trade. In addition, information to farmers, veterinarians and other personnel is key.

Farmers and veterinarians are encouraged to report ongoing clinical outbreaks possibly caused by BRSV or BCoV. This information is then distributed to other cattle farmers in the same area to increase their awareness and, if possible, strengthen their external biosecurity measures. To further reduce the risk of transmission between herds, outbreak information is distributed to veterinarians, AI technicians, milk truck drivers, livestock traders and other personnel visiting farms.

OUR HISTORY OF SUCCESS

When the project was started, the number of reported herd outbreaks increased rapidly (Figure). A peak was reached in the winter months in 2017-2018. After 2018, the number has decreased substantially. Assuming that the willingness to report an outbreak has not decreased in the same period, the occurrence of respiratory disease and diarrhoea has decreased.

In contrast to the reduction in reported outbreaks, the use of herd-level diagnostics and biosecurity measures in livestock trade has been more complicated. Even though the ELISA-based antibody analysis was provided free of charge for farmers, many farmers has not utilized this service. Hence, a large proportion of Norwegian herds does not have a known antibody status, and there is a lack of data to get reliable estimates of the development in herd level antibody prevalence.

BRSV AND BCOV OUTBREAKS HAVE A GREAT ECONOMIC IMPACT ON AFFECTED HERDS

It is likely that the program has reduced the total economic losses associated with the diseases. Acute respiratory disease and diarrhoea is compromising the animal welfare, especially in calves, under Norwegian conditions. Reducing the occurrence of BRSV and BCoV is an important part of improving calf health and welfare, of course in addition to colostrum management, intestinal parasites etc.

Reducing bovine respiratory diseases outbreaks is also a contributing to a reduction in antimicrobial use, in particular broad-spectrum types.

FUTURE OPPORTUNITIES

The BRSV and BCoV control program has likely lead to changes in farmers mindset around biosecurity. Intensive communication activities, including farmer meetings, newspaper discussions, social media etc., especially in the early phases of the project, needs to be followed by gentle reminders in the coming years.

”Reducing bovine respiratory diseases outbreaks contributes to a reduction in antimicrobial use, as well as alleviates the economic impact on affected herds.”

Håvard Nørstebø

Even though the specific program is discontinued after year 2022, the individual components will remain active. To prevent between-herd transmission, it is of particular importance to identify the first case in a new district.

Diagnostic tests remain an area of improvement. It is possible that a rapid antigen- or RNA-based diagnostics test could improve the ability to prevent transmission by livestock trade.

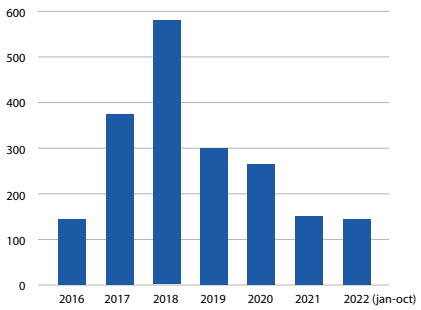

Figure 1 – Reported outbreaks (herds)

SOUTH AFRICA

Measures implemented to control a Foot and Mouth Disease outbreak

AUTHOR
Dr Mark Chimes BVSc • Milk South Africa: Research and Development Project Sustainability: Coordinator Animal Health and Welfare
Dairy Standard Agency: Veterinarian Consultant
mchimes@mweb.co.za

UN SDGs

Summary

Location: The whole of South Africa

IDF Welfare Action Area: Health management

Resource based measure:

- Prevention of spread of FMD
- Launch of the National Biosecurity Hub
- Government commitment to implement a National Livestock Identification and Traceability System

Animal based measure:

- Improved veterinary monitoring of rural communal cattle
- Improved biosecurity awareness by livestock farmers
- Improved disease surveillance

FOOT AND MOUTH DISEASE HAS ENORMOUS IMPACT ON THE FARMER

Should a dairy farm contract Foot and Mouth Disease (FMD) it will be placed under quarantine. No livestock or unpasteurised milk may be transported from the farm. Very strict biosecurity measures must be applied. No bull calves may be transported from the farm. Milk from infected farms must be discarded until the farm is clear of FMD. If the farmer can pasteurise the milk on the farm, he or she may transport it off the farm. Alternatively, the farmer may sell his unpasteurised milk to a facility that only processes milk from FMD infected farms. In some cases, years of genetic improvements are lost due to slaughter of affected animals. These measures may financially ruin a dairy farmer.

OUR INITIATIVE ASSISTS THE FARMER

Our initiative was to assist the farmers through communications as to what measures they can implement to prevent them from contracting FMD. Information on improved biosecurity and how to monitor and inspect their herds for signs of FMD to facilitate early detection, was provided to the various role players and farmers in the dairy industry.

> ”To date, not a single dairy farm tested positive for FMD in the whole of South Africa, which indicates the high level of biosecurity of our dairy farms.”
>
> Dr Mark Chimes

MILK SOUTH AFRICA ACTIONS WERE FOCUSED ON COMMUNICATION

Milk South Africa liaised with the various bodies in the livestock industry to assist with a co-ordinated effort to prevent the spread of Foot and Mouth Disease (FMD). These included (but were not limited to):

a. The Dept of Agriculture, Land Reform and Rural Development (DALRRD)
b. The Red Meat Producers Organisation (RPO)
c. The Ruminant Veterinary Association of South Africa (RUVASA)
d. The National Animal Health Forum (NAHF)
e. State Veterinary Services

Information pamphlets on the monitoring of herds for FMD and the early detection of FMD were compiled in conjunction with the above listed entities and disseminated to farmers.

Information pamphlets were compiled and distributed to farmers to advise on the biosecurity measures that they could implement to prevent their herds from contracting FMD.

OUR SUCCESS STORY

The Directorate of Animal Health of the Department of Agriculture, Land Reform and Rural Development (DALRRD) issued a written report on a monthly basis to update all players in the livestock industry of new, current and past outbreaks and control measures. The number of farms and animals involved were indicated on maps as well. This helped farmers to understand the level of risk of FMD in their area and helped to increase awareness of the disease. It assisted in reducing the spread of FMD considerably. The spread was limited to localised areas in 6 of the 9 provinces of South Africa. 3 Provinces did not have any positive cases at all.

IF A DAIRY SHOULD CONTRACT FMD IT WILL FINANCIALLY RUIN THAT FARMER.

In contrast to a beef farm, where the farmer can retain his animals until his farm is clear and then sell them, a dairy farm would have to discard its entire milk production and keep all the bull calves on the farm until it is cleared of FMD. Therefore, our efforts were focused on the dairy industry specifically. To date, not a single dairy farm tested positive for FMD in the whole of South Africa. The results speak not only to our efforts to educate the farmers on FMD, but also indicates the high level of biosecurity that was already implemented on the average dairy farm.

FMD HAS MADE THE FARMERS MUCH MORE AWARE OF BIOSECURITY AND TRACEABILITY.

We are implementing the following:

1. We have now implemented a biosecurity assessment score as part of the dairy farm audits performed by the Dairy Standard Agency of South Africa (DSA). This has been instrumental in indicating to the farmers weaknesses in their biosecurity measures.

2. The updated Code of Practice for Milk Producers published by the Dairy Standard Agency included a chapter on biosecurity measures that can be implemented on a dairy farm.

3. The National Biosecurity HUB was launched by the Department of Agriculture, Land Reform and Rural Development (DALRRD) in October 2022. This hub includes biosecurity threats to all agricultural produce, not only dairy. However, the FMD outbreak helped to indicate to government the urgency of establishing such a hub.

4. A national Livestock Identification and Traceability System (LITS) has been on the horizon for some time. FMD has highlighted the necessity of a LITS system with the result that it is being prioritised by the livestock industry.

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THE NETHERLANDS

Sensor-based mastitis management in Automatic Milking Systems

AUTHOR
John Bonestroo
Wageningen University/ Swedish University of Agricultural Sciences/ DeLaval International
john.bonestroo@wur.nl

UN SDGs

Summary

Location: We used data from European and American farms.

IDF Welfare Action Area: Health management

Resource based measure:

- costs of chronic mastitis

Animal based measure:

- chronic mastitis
- milk yield

”Sensor results can provide the basis for a decision support system and will help the farmer take the best economic decisions for its farm.”

John Bonestroo

MASTITIS, OR UDDER INFLAMMATION, IS ONE OF THE MOST PREVALENT AND COSTLIEST DISEASES IN DAIRY FARMING.

Automatic milking systems, equipped with sensors measuring mastitis indicators, have been used commercially since the 1990s. These systems are equipped with sensors that measure the cow’s health by analyzing her milk. For instance, these sensors could measure electrical conductivity (EC), the number of immune cells, and activity of enzymes in the milk. Different algorithms have been developed to use this sensor data to alarm the farmer in the case of mastitis. However, less algorithms have been developed to help the farmer decide what to do when mastitis is found.

OUR PROJECT

The overall objective for this PhD project was to explore the potential for a decision support system in automatic milking systems supporting chronic mastitis decision-making.

MATERIALS AND METHODS

For all papers, sensor data from European and American automatic milking systems was used. Paper I used linear mixed models to estimate the progression of online somatic cell count (SCC) and EC of recovered mastitis cases. Paper II estimated the association of SCC, EC, and Lactate Dehydrogenase (LDH) with milk yield. Paper III used a combination of recent sensor data and gradient-boosting trees to forecast future chronicity status of ongoing mastitis cases. Paper IV used a bioeconomic model of an average Dutch dairy herd to estimate the cost of chronic mastitis, relative to the total cost of mastitis.

OUR RESULTS

Paper I described that the somatic cell count (SCC) and electrical conductivity (EC) of mastitis cases, usually recover three to four weeks, if they recover. Paper II found strong non-linearities between milk production and lactate dehydrogenase (LDH), SCC, and EC. The milk production losses would increase substantially after specific higher sensor values. Paper III showed that it was possible to forecast the progression of mastitis with a combination of recent sensor data and gradient-boosting trees. Finally, Paper IV showed that chronic mastitis has a approximately 50% of the total cost of mastitis.

HOW CAN FARMERS USE OUR OUTCOMES?

The results from Paper I mean that farmers may want to intervene after 3-4 weeks when cows have consistently high SCC and/or EC because there will be a very small opportunity of spontaneous recovery. Using thresholds of Paper II, farmers can be alerted when the milk yield production decreases substantially and that action may be needed. The forecast of Paper III could help the farmer in the decision to intervene in a mastitis case when it becomes clear that a case does not recover on its own. Paper IV shows the value of chronic mastitis management relative to the value of mastitis management in general and can therefore be used to prioritize chronic mastitis.

It is possible to support the farmer on mastitis management

This thesis shows that it is possible to support management regarding chronic mastitis with sensors, routinely measuring SCC, EC and/or LDH. It provides the basis for a decision support system. This decision support system would be a system that could tell the farmer which cases of mastitis are chronic, are likely to become chronic, are associated with large milk production loss, and could tell the economic consequences of chronic mastitis cases.

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THE NETHERLANDS

The effect of pegbovigrastim on health, fertility, culling and economic performance during a full lactation in grazing dairy cows

AUTHOR
JDr Joaquín Barca,Wageningen University, the Netherlands.
Prof. Ana Meikle, Universidad de la República, Uruguay;
Prof. Henk Hogeveen, Wageningen University & Research, the Netherlands
Prof. Ynte Schukken, Wageningen University, the Netherlands.
barca.joaquin@gmail.com

UN SDGs

Summary

Location: The Netherlands

IDF Welfare Action Area: Health management

EARLY LACTATION: A MORE FRAGILE IMMUNE SYSTEM

Early lactation clinical diseases, which affect up to 50% of modern dairy cows, are associated with impaired productive and reproductive performance, reduced longevity, and have an important impact on the economic performance of dairy farming. Around parturition, immune dysfunction and metabolic challenge, a major factor associated with the immune dysfunction, have been linked to early lactation clinical disease.

Immune stimulation therapies may be an innovative development that would mitigate this problem. Recently, a long-lasting analogue of bovine granulocyte colony stimulating factor (pegbovigrastim; PEG) has been developed, as a tool to improve immune dysfunction around parturition.

OUR STUDY

This PhD thesis was based on a large randomized clinical trial, where we evaluated the use of PEG under commercial conditions in grazing dairy farms. In addition, we evaluated whether the metabolic status of the transition dairy cow, seen as prepartum body condition score (BCS) and prepartum nonesterified fatty acids (NEFA) concentration, would be associated with the effect of PEG treatment.

PEGBOVIGRASTIM TREATMENT SHOWED PROMISING RESULTS

First, we focused on the effect of PEG treatment on postpartum [5 to 8 days in milk (DIM)] circulating white blood cell counts. Pegbovigrastim treatment reversed the negative association of prepartum NEFA concentration with circulating neutrophil counts. Then, we showed that PEG treatment reduced the occurrence of a first case of clinical mastitis (CM) during the first 30 DIM, particularly in cows in an over body condition and in cows with elevated prepartum NEFA concentration. Moreover, PEG treatment reduced the hazard of a first case and the rate of total cases of CM during the full lactation, and in cows that experienced metritis, PEG treatment reduced the incidence of subsequent endometritis. In addition, we investigated the effects of PEG on fertility, culling and on the economic performance of cows. We showed that the effect of PEG treatment on fertility and culling interacts with prepartum NEFA concentration. In cows with low prepartum NEFA concentration, no treatment effect was detected. In cows with elevated prepartum NEFA concentration, PEG treatment increased the rate of first insemination and counteracted the negative association of a first case of CM during the first 30 DIM and uterine disease (i.e. retained placenta, metritis or both) with the rate of pregnancy. At the same time, in cows with elevated prepartum NEFA concentration, PEG treatment decreased the hazard of culling. Ultimately, we found that PEG treatment resulted in an overall economic benefit, mostly explained by a reduced cost of culling in PEG treated cows.

> ”Immune stimulation therapies may be an innovative way to improve immune dysfunction around parturition.”
>
> **Joaquin Barca**

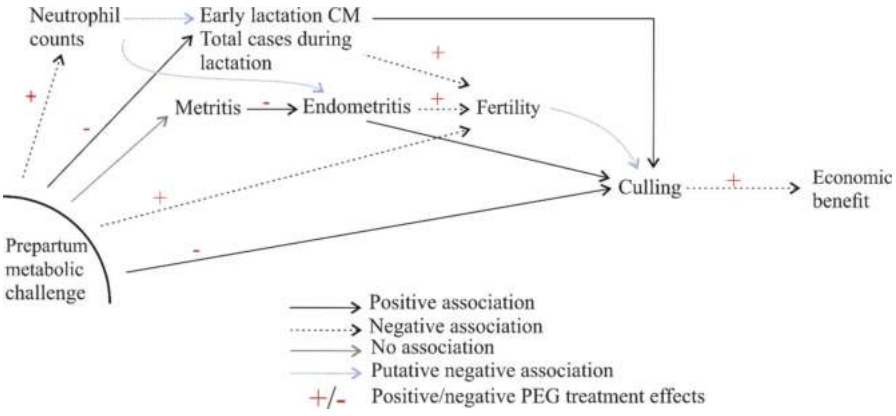

Figure 1 – Schematic diagram with the main findings of this thesis. Metabolic challenge based on prepartum excessive body condition score and/or elevated nonesterified fatty acids concentration. A + on an arrow indicates a positive (beneficial) Pegbovigrastim treatment effect, a – on an arrow indicates a negative (still beneficial, as it reduced unwanted outcomes such as early lactation CM and hazard of culling) Pegbovigrastim treatment effect.

CONCLUSION

Altogether, we showed that the beneficial effect of PEG treatment depends on the metabolic status of transition dairy cows, and that PEG treatment was particularly beneficial for cows undergoing prepartum metabolic challenge.

NEXT STEPS:

Since PEG treatment appeared to be associated with better CM and uterine disease outcomes, to evaluate the effect of PEG as an adjunct treatment for these diseases may be of interest. In addition, we propose to validate the use of PEG in terms of health, fertility, longevity and economic performance in a large multicenter field study.

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UNITED STATES

Calf Care & Quality Assurance: A must-have for all calf raisers

AUTHOR
Beverly Hampton Phifer
National Milk Producer Federation / National Dairy Farmer Assuring Responsible Management Program
bhamptonphifer@nmpf.org

UN SDGs

Summary

Location: United States

IDF Welfare Action Area: Husbandry practices

THE DAIRY CALF SECTOR IS EVOLVING ON HEIFER AND CALF RAISING FACILITIES

The dairy calf sector has seen substantial growth and diversification over the past several years. The industry is evolving to include a growing number of contracted heifer and calf raising facilities and a larger focus on the incorporation of beef genetics in addition to the existing on-farm calf rearing and veal operations. While existing quality assurance programs apply to much of the U.S. dairy industry and uniquely cover one portion of the industry, no single organization or program covers all segments of calf raising.

Calf Care Quality Assurance or CCQA Program provides science-driven resources specifically designed to highlight best management practices, provide employee training opportunities and build consumer confidence through 2nd or 3rd party auditing.

OUR CALF CARE & QUALITY ASSURANCE PROGRAMME HELPS FARMERS ON DIFFERENT ASPECTS OF CALF RAISING

Established in 2019, CCQA was created through a collaboration with National Dairy Farmers Assuring Responsible Management (FARM)™, Beef Quality Assurance (BQA), Veal Quality Assurance (VQA) and the Dairy Calf and Heifer Association (DCHA). A task force was formed of producers, veterinarians and academic representation from each industry sector. By the direction of this task force a literature review was conducted by the University of Wisconsin to identify program alignment, discrepancies and gaps as well as gaps in peer-reviewed research related to calf management. This task force them decided the need for program priorities and deliverables.

> "The CCQA Program addresses four main aspects of calf raising to help you achieve your individual goals."
>
> **Beverly Hampton Phifer**

The CCQA Program addresses four main aspects of calf raising to help you achieve your individual goals.

Employee training and continuing education

CCQA provides calf raisers with a tool to train employees to develop their understanding of calf care and management.

Emergency preparedness

CCQA resources provide documentation, protocols and training in place.

Calf health, animal handling and stockmanship opportunities

CCQA is an opportunity to identify areas within calf raising protocols and management that can be improved upon.

Consumer confidence

CCQA provides verifiable, documented data to boost consumer confidence that calf operations meet the highest standards of calf management and care.

OUR CALF CARE & QUALITY ASSURANCE PROGRAMME RESOURCES AVAILABLE

Program resources include:

1. **Animal Care Reference Manual**: A collection of science-based, on-farm best management practices for rearing healthy calves on beef, dairy and veal facilities.

2. **CCQA caretaker certification**: Officially recognize participation and commitment to quality assurance through a six-module online or in-person training with a CCQA instructor. Certification is good for three years. Qualified individuals can become certified CCQA instructors in order to facilitate CCQA caretaker trainings.

3. **Facility self-assessment**: Serves as a starting point for farms to evaluate their operations compared to CCQA industry benchmarks. The goal is to identify strengths, weaknesses and priorities in addition to establishing opportunities for continuous improvement.

NEW OPPORTUNITIES

Second- or third-party audit tool (coming Fall 2022): This tool will provide quality assurance and risk mitigation opportunities for calf raising facilities and their accompanying supply chains.

REFERENCES

Website: www.calfcareqa.org

Reference Manual

CCQA Self-Assessment

Calf Management Resources

Calf Caretaker Online Training

NEWS FROM INTERNATIONAL ORGANIZATIONS

WOAH's role in monitoring global trends in tuberculosis in animals

AUTHOR
Tizzani Paolo, Awada Lina, Melens Peter, Morales Roberta, Hutchison Jenny, Torres Gregorio, Yael Fahri, Daptardar Monal
World Organisation for Animal Health (WOAH, founded as OIE)
p.tizzani@woah.org

UN SDGs

Summary
Location: Global initiative
IDF Welfare Action Area: Health management

THE BIG PICTURE

The World Organisation for Animal Health (WOAH, founded as OIE) is an intergovernmental organisation, whose main missions are the transparent dissemination of information on animal diseases and the improvement of animal health globally. WOAH collects, since its creation in 1924, information on bovine tuberculosis, and since 2019 more widely on the 'Mycobacterium tuberculosis complex' in animals. In 2017, the WOAH, the World Health Organization (WHO), the Food and Agriculture Organization of the UN (FAO) and the International Union Against Tuberculosis and Lung Disease (The Union) jointly launched the first-ever, 'Roadmap To Tackle Zoonotic TB By 2030'.

THE PROMISE

Monitoring the epidemiology of the infection of animals by the Mycobacterium tuberculosis complex is key to efficiently tackle the disease. It contributes to the achievement of the 'Roadmap to Tackle Zoonotic Tuberculosis by 2030'.

MATERIAL AND METHODS

Mycobacterium tuberculosis complex causes high morbidity rates in animals and generates considerable economic losses and the predominant pathogen (M. bovis) can also infect and cause TB in humans. The World Health Organization (WHO) estimated that 'in 2016 there were 147,000 new cases in humans and 12,500 deaths due to this type of TB'. Therefore, the goal of WHO's End TB Strategy would not be possible without surveillance and control of tuberculosis in animals. Surveillance data on Mycobacterium tuberculosis complex in animals are collected by WOAH from 196 countries and territories using the World Animal Health Information System (WAHIS).

> "This roadmap aims to ensure safer food, improve animal health, reduce the risk of TB among people, increase awareness, and opportunity for multistakeholder engagement."
>
> Paolo Tizzani

THE HISTORY OF SUCCESS

On average, between 2005 and 2019, 152 countries and territories/year reported surveillance activities in their six-monthly reporting. The recent distribution (2019 – 2022) of M. tuberculosis complex is reported in figure 1. Since 2019, 77 countries have reported the disease either present or suspected, most of them (N= 61) from Africa, the Americas and Europe. In term of quantitative data (Fig. 2), more than 260,000 outbreaks have been reported since 2005, with around 32,000 since 2019. The number of outbreaks

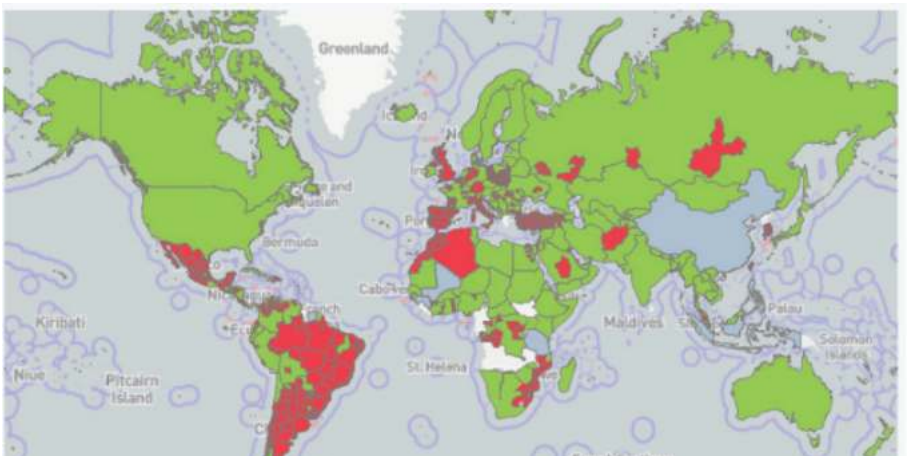

Figure 1 – Global distribution of Mycobacterium tuberculosis complex (2019 – 2022)

reported does not show any specific trend during the period 2005 – 2022, indicating a quite stable situation of the disease worldwide.

DISCUSSION OF YOUR PROJECT (100 WORDS): WHAT IS THE VALUE OF WHAT YOU DID? WHO WERE THE MAIN BENEFICIARIES?

This analysis illustrates the importance of the coordinated global collection of official animal disease data. This mission of WOAH allows to monitor disease trend in time, inform prevention and control programmes as well as the development and implementation of animal disease standards. It contributes to the activities of the road map for zoonotic tuberculosis, which benefits mainly the high-risk people and communities exposed to livestock, consumers of unpasteurised milk and dairy products as well as immunocompromised people. This roadmap aims to ensure safer food, improve animal health, reduce the risk of TB among people, increase awareness, and opportunity for multistakeholder engagement.

NEW OPPORTUNITIES

In the context of the zoonotic TB roadmap, WOAH also aims to improve animal tuberculosis diagnostic techniques, explore animal tuberculosis disease control strategies, strengthen collaboration between human and animal health services and improve animal surveillance systems and data sharing.

More generally on disease surveillance, from early 2023, WOAH will enable easier data sharing through a new public application programming interface (API) technology. The collection and analysis of data contained in a data hub will add value to WOAH data from a variety of data sources, including WAHIS.

REFERENCES

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- Roadmap for zoonotic tuberculosis- https://www.woah.org/app/uploads/2021/03/roadmap-zoonotic-tb.pdf

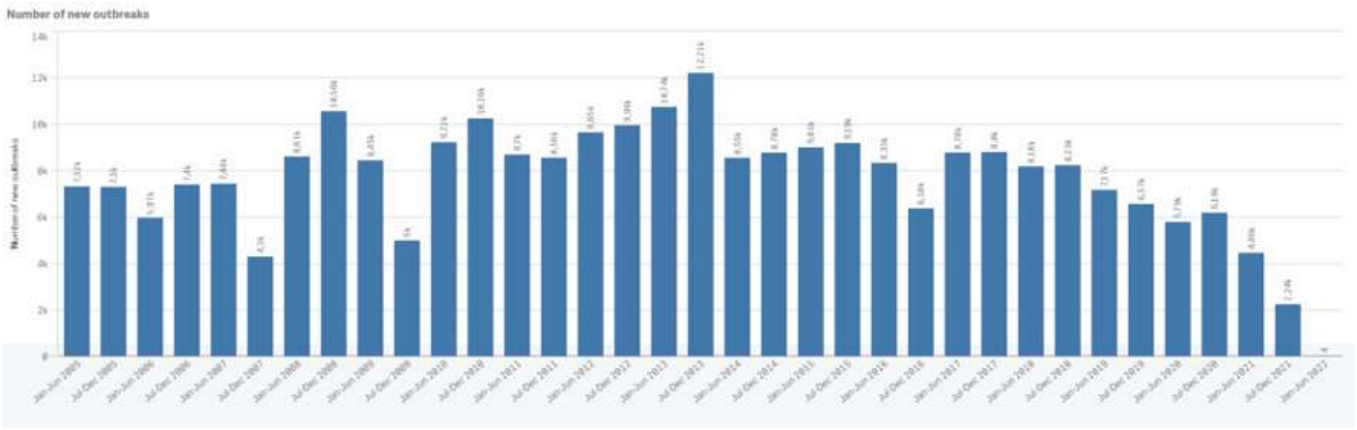

Figure 2 – Trend of bovine tuberculosis (2005 – 2018) and Mycobacterium tuberculosis complex (2019 – 2022) at global level


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HELPING NOURISH THE WORLD WITH SAFE AND SUSTAINABLE DAIRY

The IDF is the leading source of scientific and technical expertise for all stakeholders of the dairy chain. Since 1903, IDF has provided a mechanism for the dairy sector to reach global consensus on how to help feed the world with safe and sustainable dairy products.

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INTERNATIONAL DAIRY FEDERATION
70/B, Boulevard Auguste Reyers
1030 Brussels - Belgium
Tel: +32 2 325 67 40
Email: info@fil-idf.org

@FIL_IDF
International-dairy-federation
@international dairy federation
www.fil-idf.org