Libro degli Atti
Abstract Book

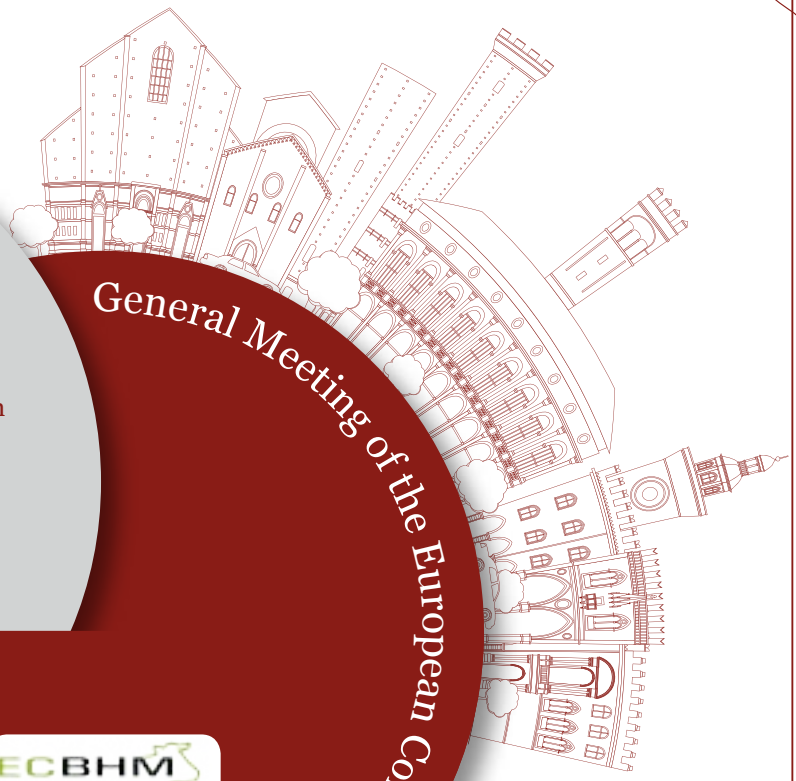
50th National Congress of the Italian Association for Buiatrics

S.I.B.
Società Italiana Buiatria

50th Anniversary
1968
2018

General Meeting of the European College of Bovine Health Management

ECBHM



BOLOGNA *(Italy)*

2018

October 10th - 13th

Savoia Hotel Regency

October 10th
Fe. Me. S.P.Rum. Meeting

Mediterranean Federation
of Health and Production
of Ruminants

Contents

Welcome

La Società Italiana di Buiatria con questo 50° congresso compie appunto cinquant'anni.

Dall'ormai lontano 8 Settembre 2018, quando si costituì a Bologna per la volontà di 23 veterinari italiani, la SIB ha cercato nell'avvicendarsi di tanti Presidenti e Comitati direttivi di tener fede alla sua missione di onorare e far circolare presso i veterinari buiatri la ricerca scientifica e l'esperienza professione.

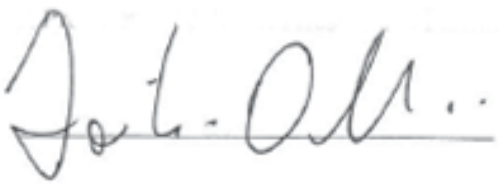
Quest'anno la SIB ha voluto celebrare il suo 50° congresso di nuovo a Bologna, dove nacque, con il format altamente simbolico della dimensione internazionale ospitando il *"General Meeting dell'European College of Bovine Health Management"* (ECBM), al Welcome Cocktail presso FICO Eataly World Bologna che è la vetrina internazionale permanente dell'Italian style nel food, e ospitando un gran numero di interventi tecnici e scientifici sia italiani che stranieri.

Avremmo ben 13 relazioni ad invito, 40 comunicazioni orali, 50 poster e 4 workshop satelliti.

Si può raccontare una Società Scientifica a parole ma noi abbiamo voluto, come sempre dalla sua fondazione, utilizzare i fatti e credendo fermamente nel ruolo del veterinario buiatria a tutela della salute fisica e mentale dei bovini e dei bufali, della salute e del benessere nutrizionale dei consumatori e dell'integrità dell'ambiente.

Il Presidente e il Comitato direttivo approfitta di questa prefazione per ringraziare tutti quei colleghi buiatri che da sempre hanno contribuito alla resilienza della SIB anche solo con loro presenza e augurare alla nostra società di arrivare al centenario con lo stesso entusiasmo e determinazione di questi anni ormai trascorsi.

Il Presidente SIB, Dr. Alessandro Fantini



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SALA REGENCY

RELAZIONI IN INGLESE/ OFFICIAL LANGUAGE: ENGLISH, NO TRANSLATION

MSD Animal Health

9.00 – 9.10 ***Cerimonia d'apertura / Opening ceremony***

Mediterranean Federation of Health and Production of Ruminants

Chairman: V. Cuteri

9.10 – 9.35 **Metals in blood and milk of dairy cows from a polluted area**
J. Staric

9.35 – 10.00 **Sheep and Bluetongue virus: an animal model for studying the pathogenesis of hypofertility caused by Arboviruses**
C. Ligios

10.00 – 10.25 **The control of reproductive seasonality in sheep**
V. Carcangiu

10.25 – 11.00 ***Coffee break***

11.00 – 11.25 **Emerging parasitosis and new diagnostic techniques of dairy cattle**
A. Bosco

11.25 – 11.50 **Cattle and Buffalo's coccidiosis: myths and reality**
L. Camara Alves

11.50 – 12.15 **How to reduce the use of antibiotic in mastitis therapy of dairy cows**
V. Cuteri

12.15 – 12.40 **SheepNet: Sharing Expertise and Experience towards sheep Productivity through NETworking**
A. Carta

12.40 – 14.00 ***Lunch***

Chairman: S. Carcangiu

14.00 – 14.15 **Sieroprevalenza e dinamica degli anticorpi nei confronti di Toxoplasma gondii in agnelli di razza sarda nati da madri sieropositive e sieronegative**
A. Scala, M. Scala, R. Panzalis , F. Barraqueddu, G. Dessì, A.P. Pipia, S. Carta, C. Tamponi, G. Sedda, S. Muntoni, A. Varcasia

14.15 – 14.30 **La legislazione sull'IBR e il piano di controllo del Veneto**
G. Ruffo, M. Beghetto, E. La Greca, P. Fossati

14.30 – 14.45 **La Rinotracheite Infettiva Bovina (IBR) e la Legislazione di Sanità Animale The Animal Health Law**
G. Ruffo, M. Beghetto, E. La Greca, Paola Fossati

14.45 – 15.00 **The role of the Court-appointed Expert in ruminant health management and the new Law no. 24/2017 (the so called Gelli-Bianco Law): observations on no. 20 cases**
G.M. Cubeddu, F. Meregaglia, A. Passantino

15.00 – 15.15 **Evaluation of heavy metals in: tank milk, soil, pastures and water in bovine cattle of San Pedro and Entrerríos, Colombia**
L.F. Londoño Franco, P. T. Londoño Muñoz, J. A. Villamarin Muñoz, F.G. Muñoz Garcia Z, J. R. Gonzalez- Montaña

15.15 – 15.30 **Metabolic profile in non-pregnant native sheep females in San Gil Santander (Colombia)**
G. A. Rueda, N. G. Sànchez, J. A. Parra Martin

15.30 – 15.45 **Differences in welfare parameters based on the animal depending on the bedding type and material used in milking cattle**
L. Rodriguez, J.M. Lomillos, R. Robles, J.R. Gonzalez-Montaña, L. Diez, M.E. Alonso

15.45 – 16.00 **Impiego di frazioni di differenti ceppi di lieviti nell'alimentazione del vitello a carne bianca**
M. Tassinari, D. Druidi, S. Marchetti

16.00 – 16.30 ***Coffee break***

Chairman: J. R. González-Montaña

16.30 – 17.00 **Consumers perception of animal welfare**
M. E. Alonso, J.R. González-Montaña, J.C. Domínguez

17.00 – 17.30 **Plant poisoning in farm animals: argentinian experiences**
M. Allassia

17.30 – 18.00 **Nutritional deficiencies**
M. Allassia

Welcome Cocktail

presso FICO Eataly World Bologna,
il parco agroalimentare più grande del mondo.
Punto di Ristoro "Parmigiano Reggiano"
Ritrovo alle ore 18.30 Hotel Savoia Regency
si partirà insieme con il pullman

FICO Eataly World Bologna,
the largest agri-food park in the world.
EatPoint "Parmigiano Reggiano"
Meeting point: 6.30 pm Hotel Savoia Regency
we will leave together by bus

8.00 Registrazione dei partecipanti/Participant Registration

SALA PLENARIA

RELAZIONI CON TRADUZIONE - TRANSLATION PROVIDED

8.45 Introduzione/Introduction
A. Fantini, Roma - E. Bouchard, Canada

9.00 – 9.45 RIPRODUZIONE/REPRODUCTION
Chairman: A. Fantini, Roma
Reproductive management in dairy cows: current status and a look to the future
G. Opsomer, Belgium

9.45 – 10.15 Interventi programmati
Chairman: G. Opsomer, Belgium

Application of SFT bull breeding soundness evaluation criteria on Italian Simmental young bull: a ten year analysis
G. Stradaioli, Udine

Potential repercussion of peripartal inflammatory conditions on the fertility
E. Trevisi, Piacenza

10.15 – 10.45 *Coffee break*

10.45 – 12.00 COMUNICAZIONI ORALI /ORAL COMUNICATIONS (Pag. 7)

12.00 – 13.00 Cerimonia del 50° Anniversario / Ceremony of the 50th Anniversary of SIB
A. Fantini, Roma - G. Ballarini, Parma - G. Sali, Piacenza
Con la partecipazione Istituzionale del Comune di Bologna

13.00 – 14.15 *Lunch*

14.15 – 14.45 WORKSHOP SATELLITE
Meccanismi di difesa della mammella contro le infezioni da S. Aureus, E. Coli, Str. Uberis e prevenzione vaccinale
A. Barberio, Izs Delle Venezie

14.45 – 15.15 PREMIO FERRARA STUDENTS COMPETITION
FERRARA STUDENTS PRIZE
Chairman: S. Allodi, Mantova

15.15 – 18.00 COMUNICAZIONI ORALI /ORAL COMUNICATIONS (Pag. 8)

COMUNICAZIONI ORALI /ORAL COMUNICATIONS

	SALA PLENARIA *Chairman:* *M. Morgante, Padova* RELAZIONI CON TRADUZIONE/ TRANSLATION PROVIDED	SALA GRACE-AUDREY *Chairman:* *P. Famigli Bergamini, Bologna* RELAZIONI IN ITALIANO/ OFFICIAL LANGUAGE: ITALIAN, NO TRANSLATION	SALA STUART *Chairman:* *M. Holzhauer, The Netherlands* RELAZIONI IN INGLESE/ OFFICIAL LANGUAGE: ENGLISH, NO TRANSLATION
10.45 **11.00**	**Relationship of ammonia and total bacterial air load with airway inflammation, lung consolidation and lower airway infection in indoor group housed calves** *K. van Leenen, L. Van Driessche, J. Jouret, P. Demeyer, L. De Cremer, L. Gille, C. Masmeijer, F. Boyen, P. Deprez, B. Pardon*	**Ipocolesterolemia ereditaria nella razza frisona** *M. Bolcato, J. Gonçalves Pontes Jacinto, G. Militerno, J. Cannas da Silva, A. Gentile*	**Effect of dietary phosphorus deprivation on leukocyte function in transition cows** *S.W.F. Eisenberg, L. Ravesloot, A.P. Koets, W. Grünberg*
11.00 **11.15**	**Rectal prolapse - a diagnostic pitfall** *M. Floeck*	**Significato clinico dei soffi cardiaci nel vitello: correlazione tra rilievi auscultatori ed ecocardiografici** *D. Caivano, P. Boni, L. Pisello, M. E. Giorgi, F. Porciello, G. Fruganti*	**Evaluation of a new biocide footbath solution in the prevention and healing of digital dermatitis lesions in dairy cows. A randomized controlled clinical trial** *J.M. Ariza, N. Bareille, A. Lehebel, K. Oberle, A. Relun, R. Guatteo*
11.15 **11.30**	**Andamento delle principali patologie e mortalità neonatali in allevamenti di bovine da latte in Pianura Padana** *G. Pisoni, S. Allodi, E. Bottoli, A. Caramaschi, D. Cimmieri, E. Sorgia, C. Zanardi*	**Difetto del setto ventricolare in una bovina di razza frisona** *A. Fruganti, M. Bazzano, T. Frigo, P. Boni, F. Laus, G. Fruganti, B. Tesei*	**The use of capillary blood for detection of the beta-hydroxybutyrate (BHB) concentration in cattle** *J.L. Khol, K. Freigassner, A. Stanitznig, A. Tichy, T. Wittek*
11.30 **11.45**	**The effect of early postpartum treatment with various prosta-glandins on uterine contractility and consecutive involutional changes in dairy cows** *Á. Bajcsy, Á. Bolla, O. Szenci, G.C. Van der Weijden, A. Doornenbal, J. Bartyik, F. Rezazadeh, K. Szabó-Ari, M.A.M. Taverne*	**Valutazione degli aspetti clinici, ultrasonografici ed emogasanalitici in vitelli affetti da broncopolmonite enzootica** *A. Boccardo, G. Sala, E. Coppoletta, S. Casarotto, A. Belloli, D. Pravettoni*	**The control of urine pH and magnesium content in close-up rations improve dairy cows health: a case study** *L.M.E Mammi, F. Ghiaccio, D. Cavallini, A. Formigoni*
11.45 **12.00**	**The impact of intramammary pirlimycin hydrochloride on the fecal microbiome of dairy cattle** *P.R.F. Adkins, A.C. Ericsson, J.R. Middleton*	**Focused lung ultrasonography of calves (fluc): valutazione di un protocollo rapido per la diagnosi ultrasonografica della broncopolmonite enzootica** *G. Sala, A. Boccardo, E. Coppoletta, A. Belloli, M. Colosio, D. Pravettoni*	**Effects of pre-partum dairy cow management on calf development and foetal programming - a review** *K. Mueller, I. Brady*

SESSIONI PARALLELE

	SALA PLENARIA RELAZIONI CON TRADUZIONE / TRANSLATION PROVIDED	SALA GRACE-AUDREY RELAZIONI IN ITALIANO/ OFFICIAL LANGUAGE: ITALIAN, NO TRANSLATION	SALA STUART RELAZIONI IN INGLESE/ OFFICIAL LANGUAGE: ENGLISH, NO TRANSLATION
15.15 16.00	**ECONOMIA IN BUIATRIA / ECONOMY IN BUIATRICS** *Chairman:* *A. Beltrami, Reggio Emilia* **The Veterinary Profession and Food in 2050** *D. Black, UK*		**SESSIONE BUFALI/ BUFFALOS** *Chairman: G.L. Neglia, Napoli* **Nuovi progressi nel management dell'azienda bufalina** *G. Campanile, Napoli*
16.00 16.30	***Coffee break***		
	Chairman: C. Rosignoli, Mantova	*Chairman: C. Barisani, Mantova*	*Chairman: G.L. Neglia, Napoli*
16.30 16.45	**Gastrointestinal parasites in dairy cattle in northern Italy: up to date and risk factors** *S. Zanzani, A. Gazzonis, E. Migliorati, G. Aloisio, C. Failla, L.Villa, G. Curone, D. Vigo, M.T. Manfredi*	**Bovine besnoitiosis in naturally infected dairy cattle in Lombardy (Italy)** *L. Villa, A.L. Gazzonis, S. Mazzola, S. A. Zanzani, C. Perlotti, M. T. Manfredi*	**Management della vitellaia bufalina** *D. De Nicola, Napoli*
16.45 17.00	**Indagini sierologiche su latte di massa in provincia di Brescia** *C. Martinelli, S. Giovannini, G.L. Alborali*	**Correlazione tra benessere animale e prevalenza di Clamidiosi e Neosporosi in aziende di bovine da latte** *G. Cascone, L. Bertocchi, F. Licitra*	
17.00 17.15	**Evaluation of the paratuberculosis herd status established by boot swab samples in Mycobacterium avium subsp. paratuberculosis positive small cattle herds** *S. Gschaider, J. Köchler, J. Spergser, A. Tichy, C. Mader, M. Vill, P. Ortner, J. Kössler, J. L. Khol*	**Oleander poisoning in dairy cattle in Apulia** *L. Ceci, F. Iarussi, M.T. Capucchio, F. Girolami, C. Nebbia, F. Gosetti, E. Marengo, G. Carelli*	**Comportamento del bufaloin moderne aziende zootecniche** *G. De Rosa, Napoli*
17.15 17.30	**Factors associated with ELISA positivity of heifers in Mycobacterium avium subsp. paratuberculosis infected herds** *M.F. Weber, M. Aalberts, Th. Dijkstra*	**Esperienze di didattica sul campo: rilievi su benessere e biosicurezza in allevamenti di vacche da latte dell'Emilia Romagna** *C. Petronelli, M. Roccaro, F. Campanerut, A. Scagliarini, A. Peli*	
17.30 17.45	**Age at onset of ELISA positivity of cattle in herds participating in a milk quality assurance programme for paratuberculosis** *M.F. Weber, Th. Dijkstra, M. Aalberts*	**Mesenchymal Stromal Cells in the treatment of bovine muscular injuries** *P. Boni, M. Gamboni, P. Ceccarelli, L. Pascucci*	
17.45 18.00	**Bovine paratuberculosis in Lombardy: results after four years of application of the National Guidelines** *N. Arrigoni, M. Boldini, G. Galletti, L. Ruocco, G. Brenzoni, M. Farioli, M. Gradassi, G. Ventura, S. Giovannini, F. Paterlini, C. Rosignoli, C. Martinelli, C. Garbarino, M. Tamba*	**Trattamento chirurgico "radicale" della malattia della linea bianca nella vacca da latte** *R. Rinnovati, B. Bianchin Butina, M. Morselli, A.L. Mordenti, A. Spadari*	**Benessere dei ruminati: sviluppo di un nuovo protocollodi valutazione nella specie bufalina** *D. Vecchio, Napoli*
18.00 19.00	*Assemblea dei soci SIB*	*Assemblea Generale ECBHM*	*Assemblea dei soci Fe.Me.S.P.Rum.*

18.00 **Termine dei lavori**

SALA PLENARIA

RELAZIONI CON TRADUZIONE /TRANSLATION PROVIDED

9.00 – 9.45 **NEONATOLOGIA E MALATTIE DEL VITELLO /NEONATOLOGY AND CALF DISEASES**

Chairman: E. Sorgia, Bologna

Calf health - Progress to date, current priorities and future perspectives
J. Mee, Ireland

9.45 – 10.30 **Interventi programmati**

Chairman: J. Mee, Ireland

Factors influencing colostrum quality with special emphasis on climate
D. Klein-Joebstl, Austria

Economics of calf health
D. Raboisson, France

Rationalizing antimicrobial use in calves: detection of pneumonia and differentiation from upper respiratory tract infection
B. Pardon, Belgium

10.30 – 11.00 ***Coffee break***

11.00 – 11.30 **WORKSHOP SATELLITE**

New data on Neonatal Calf Diarrhoea management
L. Durel - Tecnico di casa madre VIRBAC

11.30 – 12.00 **WORKSHOP SATELLITE**

Neonatal diarrhoea of the calf: etiology, control and possible therapeutic failures
A. Luppi, IZSLER Reggio Emilia

12.00 – 13.00 **MALATTIE ZOONOTICHE/ZOONOTIC DISEASES**

Chairman: I. Lorenz, Germany

The bovine practitioner's valuable role in public health
K. Poulsen, USA

13.00 – 14.30 ***Lunch***

14.30 – 15. 29 **COMUNICAZIONI ORALI /ORAL COMUNICATIONS**

Chairman: S. Astiz, Spain

14.30 – 14.42 **Comparison of two different treatment regimens for mastitis treatment in cattle**
M. Resch, M. Zenker, C.C. Gelfert

14.42 – 14.53 **A practical approach for reducing antimicrobial usage in dairy herds**
G. Capelli, M. Cannistrà, F. Scali, G. Merialdi, C. Garbarino, L. Bertocchi, L. Alborali, P. Trevisi V. Motta, C. Salvarani, G. Diegoli, N. Arrigoni

14.53 – 15.05 **Primi risultati del monitoraggio dell'impiego di antibiotici negli allevamenti bovini da latte nel Triveneto**
B. Dall'Ava, G. Rosa, E. Carapuli, K. Capello, A. Azzolin, P. Buniotto, L. Cestaro, C. Mozzi, L. Pierobon, A. Barberio

15.05 – 15.17 **Production a quality of cow milk**
G. Kovač, C. Tóthovás, V. Petrovič, T. Vozár

15.17 – 15.29 **Productive and reproductive performance in buffalo lactating cows with difference space allowance**
A. Salzano, E. Sermolino, D. De Nicola, F. Iannaccone, F. Bruno, M. Marrelli, F. Licitra, G. Neglia

15.30 – 16.00 ***Coffee break***

16.00 – 18.00 **COMUNICAZIONI ORALI / ECBHM RESIDENCY SYMPOSIUM**
Chairman: R. Guatteo, France

16.00 – 16.15 **Ultrasonographic evaluation of the mammary cistern size during dry period in healthy dairy cows**
F. Bonelli, L. Turini, V. Meucci, A. Pierattini, S. Citi

16.15 – 16.30 **Contrasting effect of starch and sugar diets on reticuloruminal pH, VFAs production, hematological and biochemical health indicators in cattle**
A. Francesio, L. Viora, W. Tulley, H. Ferguson, N. Jonsson

16.30 – 16.45 **Inter-observer agreement of a quick-scan lung ultrasound method in calves**
L. De Cremer, M. Van Wissen, L. Nelson, B. Pardon

16.45 – 17.00 **Bovine perinatal mortality in Switzerland: evidence of infectious causes in calves**
T. Mock, M. Dettwiler, S. Rodriguez-Campos, J. F. Mee, M.Bodmer, G. Hirsbrunner

17.00 – 17.15 **A Simmental Calf suffering from Juvenile Lymphosarcoma**
A. Stanitznig, T. Wittek

17.15 – 17.30 **Assessment of a commercial borescope to diagnose of Bovine Digital Dermatitis in the milking parlor**
S. Ferraro, M. Rousseau, S. Dufour, J. Dubuc, J-P. Roy, A. Desrochers

17.30 – 17.45 **Assessment of a tool to evaluate the methodological quality of large animal systematic reviews**
S. Ferraro, J.M. Vandeweerd, S. Buczinski

17.45 – 18.00 **Effect of cloxacillin benzathine in dairy water buffalo at dry-off: preliminary results**
J. Guccione, L. D'Andrea, A. Pesce, F. Toni, G. Borriello, C. Salzano, F. Diuccio, M. Pascale, P. Ciaramella

Cena Sociale - Gala Dinner

ore 20.00 Hotel Savoia Regency

SALA PLENARIA

RELAZIONI CON TRADUZIONE /TRANSLATION PROVIDED

9.00 – 9.30 **WORKSHOP SATELLITE**

L'importanza della genomica in buiatria

Chairman: S. Allodi, Mantova

Il Test genomico sulla linea femminile: quali opportunità per il buiatra

F. Toni - ZOETIS

9.30 – 10.00 **Strumenti genomici per la salute e il benessere animale**

Genomic tools in animal health and welfare

R. Negrini, Roma

10.00 – 10.30 ***Coffee break***

10.30 – 11.30 **DERMATITE NODULARE DEI BOVINI /LUMPY SKIN DISEASE**

Chairman: E. Schiavon, Padova

Lumpy skin disease: an emerging animal disease in Europe

G. Cattoli, Padova

Esperienza in Grecia

G. Christodoulopoulos, Greece

11.30 – 12.30 **BENESSERE ANIMALE/ANIMAL WELFARE**

Chairman: A. Peli, Bologna

Classyfarm : lavalutazione del rischio benessere e biosicurezza negli allevamenti bovini italiani

L. Bertocchi, Brescia

DairyCare: Developing technologies to assist dairy cow husbandry

C. Knight, Denmark

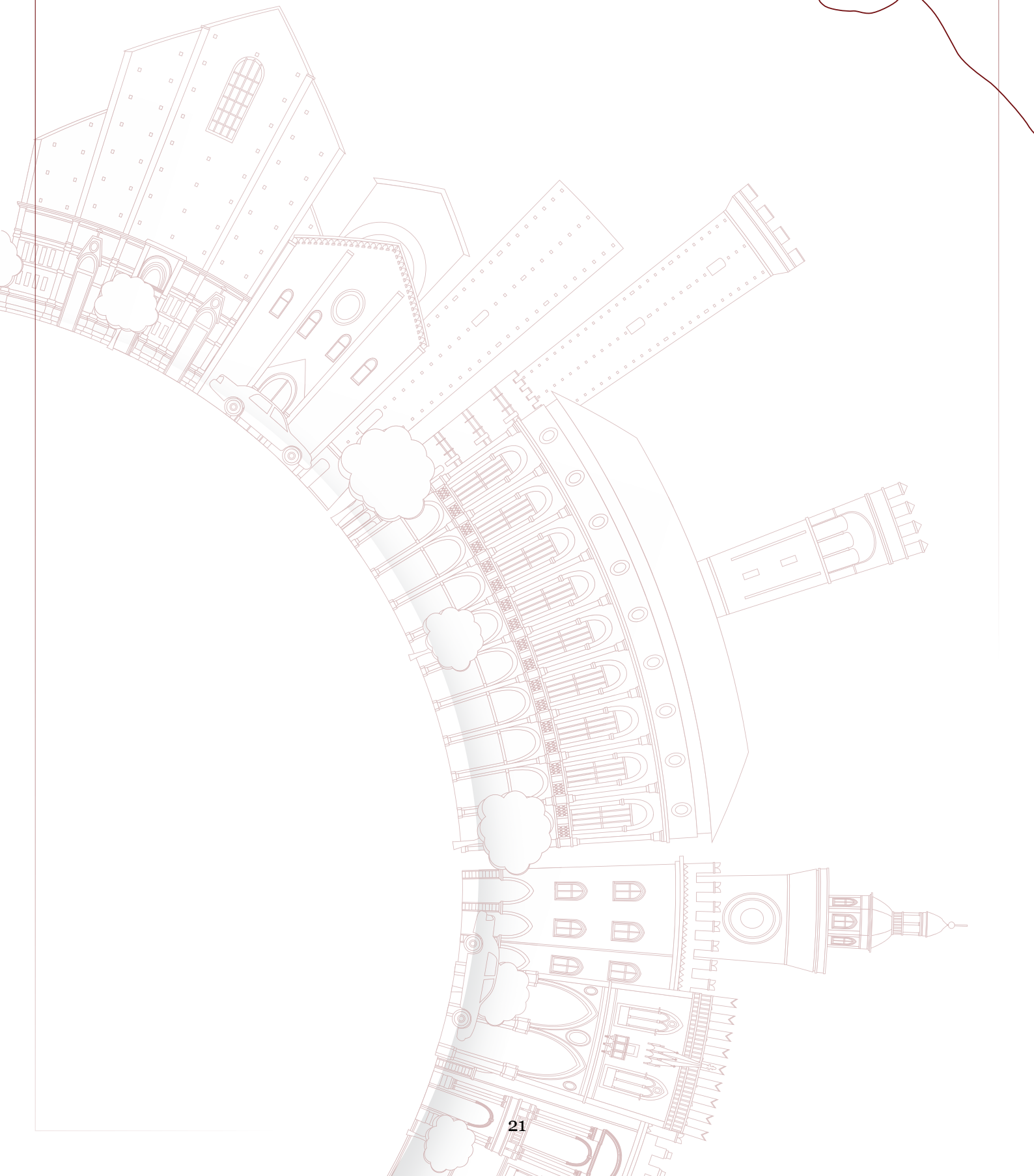
12.30 – 13.00 **Assegnazione Premio ECBHM e chiusura del 50° Congresso/Closing Cerimony**

SPEAKER

ORAL

POSTER

Speaker



THE VETERINARY PROFESSION AND FOOD IN 2050

Black D.

BVM&S, DBR, DVetMed, MRCVS. Paragon Veterinary Group

Introduction

This paper considers the challenges faced by production animal veterinarians and speculates on the shape of the profession in 2050.

The global agricultural sector is facing significant, and quite polar, risks and opportunities, and the veterinary profession lies at the heart of these changes. The demand for food and in particular for protein, will only increase, while there is rising consumer demand for healthy food increases. The global population is predicted by FAO to rise to 9.1 billion by 2050. As well as a need for increased cereal production, and pressure on water supplies, an associated increase in demand for meat and milk protein from the developing countries is predicted. This will require increased efficiency of production, with less environmental impact.

The veterinary market is changing considerably; the challenges faced internationally are remarkably similar, including, reliance on medicine sales, changing demographics, recruitment and succession, yet we retain the trusting and science- based relationships. There has been significant change in the traditional vet business model over the last 10 years and this is only set to continue. Large city investors are seeking to buy into veterinary businesses - initially these corporate consolidators were seeking companion animal practices, but now there is a concerted drive to buy mixed, equine, and production animal businesses. How does the profession manage and lead this through good strategic planning, the use of business models, simulations and improved processes. Many vets are happy to work within these organisations which tend to be prescriptive and process driven, while being excellent at human resources and procurement. Yet others still wish to be entrepreneurial and be business owners who shape their own destiny. So there is a great need for us to deal with change, taking that down to the practical level. This presentation will explore some of these threats and opportunities and share visions and ideas.

The paper will discuss the One Health concept; the linkage between human, animal, and environmental health. Veterinarians stand at the intersection of these 3 spheres in virtually all that we do daily and we must consider the opportunities for the profession. Our role in the key issues of our time - antimicrobial resistance (AMR) and antimicrobial use (AMU), public health, zoonoses, emerging diseases, food safety and global biosecurity has never been more key. Yet we have an opportunity to position ourselves at the heart of a global strategy to produce sustainable wholesome food; the most efficient way of reducing environmental impact and benefit human health is to have the healthiest animals possible, and production animal vets are ideally placed to drive this.

In the future the consumer will have ever more power and the large food companies, supermarkets, etc will be required to demonstrate complete transparency of provenance, health and welfare - we have a role to help deliver that - being part of and central to the food chain, not just a deliverer of services to the suppliers - we should have strategic input.

We must reposition ourselves such that we offer a range of expert veterinary services that are outwith traditional first opinion. These vary from highly technical and innovative services such as advanced breeding (ovum pick-up (OPU) and in vitro embryo production (IVP)), product development, biosensors, precision agriculture, through data collection and interpretation including genomics and epigenetics,, through field studies and other research and development, to training of farmers, technicians and vets. We must value ourselves as the prescribers of veterinary medi-

cines and as the advocates for what is used on farms, always seeking the most technically and clinically appropriate solution, with value for money for the farmer in mind.

Demand for veterinarians in some countries continues to outstrip supply, while in others the quality and appropriateness of veterinary training may be challenged. Producing good vets takes time and the universities, processes and systems are not set up to change overnight - either in curriculum content or number of graduates. Additionally, both employers and employees are becoming increasingly sophisticated in their needs and wants. We must consider how we may better develop a consistently effective global veterinary workforce that wants to work with production animals. If we are successful, the challenges of recruitment may be addressed as well as providing colleagues with stimulating and enjoyable lifelong careers.

In all industries and indeed within veterinary businesses there is a trend to combine entities to create greater critical mass. Does the increasing number of veterinary practices merging to form larger entities create an opportunity for a higher level of service for the farmer and society, or can these opportunities be replicated in a more networked model? How important is it that veterinary businesses remain vet-led? How do we maintain the relationships we have developed?

But ultimately the veterinary businesses we work in must be profitable enough to remunerate the staff at an attractive level and to allow sustainable reinvestment. Many veterinary businesses have historically overly relied on medicine sales to cross-subsidise services, which has devalued the value the veterinarian in the eyes of the client. Furthermore many vet practices have utilised highly trained veterinary experts to undertake repetitive, technical work, such as reproductive examinations, foot trimming, dehorning etc., which would be better undertaken by trained paraprofessionals working as part of a vet led team. As with other professional service business models, we must find structures whereby the highest skilled, most experienced individuals attract the highest hourly charging rates, with many other tiers of fee earning within the business. Another challenge is to maximise the effectively chargeable hours in any one day, which is not easy, particularly within the ruminant sector. To attract the calibre of people we need, we must be able to pay them at a rate equivalent to other non-veterinary professional roles rather than recruiting by relying on their enjoyment of working with animals and on their goodwill.

This presentation will not provide all the answers, but it is hoped that it will stimulate some thoughts and discussion around the future of our profession. We are fortunate to be members of a relatively small and close-knit veterinary community, but global animal health and the demands on supply, and on producers are changing rapidly.
We must reposition ourselves because in a phrase often attributed to Charles Darwin; “It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is most adaptable to change”

LUMPY SKIN DISEASE: AN EMERGING ANIMAL DISEASE FOR EUROPE

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Keywords: Lumpy skin disease, emerging disease, cattle

Introduction (max. 1.000 characters - now 988)
Lumpy skin disease (LSD) is an infectious disease of cattle caused by the lumpy skin disease virus (LSDV), a DNA virus belonging to the genus Capripoxvirus within the family Poxviridae. LSD morbidity rates can vary between 1 and 20%, although outbreaks with rates as high as 50% have been reported. Mortality is limited, however the disease may have a serious economic impact in the affected regions, causing decreased milk production, abortion and infertility in cows, and decreased growth rate in beef cattle. Importantly, economic losses in the affected countries are also related to the trade restrictions imposed by international and national animal health regulations.
Clinically, in naïve cattle the disease is characterised by fever, nodules on the skin, on the mucosal membranes and the internal organs. The virus can be transmitted by direct contact with contaminated excretions and skin lesions or mechanically by blood-feeding arthropod vectors like flies, mosquitoes and ticks.

The transboundary spread of LSD
Since its first description in 1929 and for the subsequent 60 years, the disease was restricted to sub-Saharan Africa. In 1988 the disease was reported in Egypt, and LSD subsequently appeared in countries in the Middle East and the Arabian Gulf (1). In 2013 cases were reported in Turkey, a country where LSD is now considered endemic. In the last few years the geographic distribution of the virus has expanded rapidly, reaching Europe for the first time in 2015. LSD was reported in Greece in 2015 and Bulgaria in 2016. During the same period, cases were also reported in the Russian Federation, the Islamic Republic of Iran, Kazakhstan, the Caucasus region and in other European countries (Albania, the Former Yugoslavian Republic of Macedonia, Montenegro, Serbia). In the European Balkan region, 7483 LSD outbreaks were reported in 2016 (12,330 affected animals). The number of outbreaks dropped down to 385 outbreaks (850 affected animals) in 2017 (2) and no clinical outbreaks have been notified in 2018, so far. Totally, over 7,900 outbreaks were reported in South Eastern Europe since the beginning of the epidemic in 2015 (2).

Early detection and control of LSD
Early detection of infected animals is essential for effective surveillance and disease control. Several PCR-based methods have been described for the rapid and accurate detection of the virus in the skin lesions, tissues, blood and mucosal discharges. Distinct poxviruses (i.e. parapox- capripox- and orthopoxvirus) can cause similar clinical lesions and some poxviruses can infect different ruminant species. It is therefore important to develop and apply validated diagnostic assays capable to differentiate and precisely detect the specific causative agent. During the last few years, multiplex DNA-based diagnostic assays enabling the accurate detection and typing of the viruses have been made available for differential diagnosis and rapid screening of large number of samples (3-5).
Although the presence of serum antibodies in cattle does not correlate with immune protection, high-throughput serological tests for LSD and other capripoxviruses would be very useful for seromonitoring and disease surveillance in the susceptible animal populations. Unfortunately, little is known on the practical application of these tests as only one ELISA kit has been recently made available and marketed. Given the considerable threat posed by LSDV to livestock production and global trade, the development and validation of convenient and effective serodiagnostic tools is currently undertaken in some countries.

As for other arthropodes-transmitted infectious diseases, the control of LSD is challenging. In addition to direct control measures, such as culling of affected animals, quarantine, movements and trade restrictions, vaccination with live attenuated vaccines has proven to be effective. Indeed, the proper implementation of vaccination in Israel and the Balkan region prevented the appearance of new disease outbreaks and limited the economic losses (1, 2). Although DNA-based diagnostic tests are capable to differentiate field and vaccine strains, a true DIVA (Differentiating Infected and Vaccinated Animals) strategy has never been implemented to date in affected or at-risk countries due to the unavailability of ad-hoc serological tests and vaccines.

Conclusions

The emergence of LSD in Europe and within EU Member States, and the most recent example of outbreaks of Peste des Petites Ruminants (PPR) in Bulgaria, highlighted the constant threats posed by transboundary animal diseases to the livestock economy. Growing and faster movement of animals and animal products, climatic and socio-economic changes favour the rapid spread of diseases and their occurence in areas previously disease-free. Preparedness of the veterinary services and their laboratories is essential for the early and rapid detection and effective disease control. The emergence of LSD in Europe has revealed several knowledge gaps in the epidemiology and immunology of the disease. The absence of validated serological and DIVA tests had an impact on the implementation of disease surveillance and monitoring in affected and at-risk countries. Successes and challenges in LSD detection and control will be discussed.

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LUMPY SKIN DISEASE: THE GREEK EXPERIENCE

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In August 2015, Lumpy Skin Disease (LSD) was first time spread to Greece, with the epidemy starting from the land-border with Turkey. According to the Greek Ministry of Rural Development and Food, the epidemic event was resolved only in March 2017. This is a report of the epidemic statistics, and also includes our clinical experience with a number of animals diseased.

The disease was confirmed by real-time PCR in heparinized total blood in authorized state veterinary laboratories. In face of the epidemy, the Greek State implemented an extensive stamping-out policy and official disposal of carcasses. In addition, zoning, movement control, vaccination, surveillance, control of vectors and no-treatment of affected animals were implemented. The vaccination of the entire cattle population in the country was only completed by August 2017.

During the epidemy in Greece, two hundred twenty-five (225) infected farms were been confirmed. The epidemy affected mainly the cattle farms of northern Greece (Thrace and Macedonia); however, some isolated outbreaks in Thessaly, Epirus, Peloponnese and in the Islands Limnos, Lesvos and Corfu were also recorded.

The affected-225 farms had a total number of 12,679 cattle; out of them a number of 931 cattle had been found clinically diseased (apparent morbidity rate 7.343%) and other 106 heads had been found dead (apparent mortality rate 0.836%). Finally, in the above farms 12,573 cattle destroyed during the implementation of the stamping-out policy.

Clinical signs initially included lachrymation, fever (>40.5 ^{o}C), loss of appetite, and disinclination to move. Approximately one week after the initiation of the fever, nodules were appeared at all over the body and swelling of the superficial lymph nodes. The diameter of the nodules was 0.5 to 1.5 cm, size relatively small in comparison with the description of the literature (2.0 to 5.0 cm).

In this epidemy in Greece, two important causes contributed to the disease spread: 1- A delay of the vaccination, due to the unavailability of the vaccines. 2- The illegal livestock moves, as we can conclude from the distances between the outbreaks and the lax implementation of the movement control inside the country.

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MANAGEMENT OF THE BUFFALO CALF

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The management of the calf is one of the most important phases in buffalo breeding. Any mistake in this stage may inevitably affect future performance, deleting the investments performed to improve the genetic merit of the herd. These mistakes result in slow growth of the animals and significant neonatal mortality rates (sometimes above 20%). There are several aspects that differentiate the bovine calf from the buffalo counterpart, and that necessarily imply a different management. Firstly, the tropical origin of the species has to be considered and consequently the poor tolerability to low temperatures.

This leads to an increase in neonatal mortality especially in those farms that do not have a calving room, with straw litter and suitable covers. Therefore, the calves are born in the paddocks where the buffaloes spend the dry period, hygienically inadequate and not able to protect them from climatic adversities. Furthermore, this condition is worsen by the poor attention of personnel, since sometimes the calves are separated from their mothers and moved in individual boxes after many hours: hence they can not receive the appropriate post natal cares, such as the disinfection of the umbilical cord and the correct colostrum administration practices.

The intake recorded in the buffalo calf is also lower than that of the bovine calf: this aspect, associated with the different chemical composition of the milk, inevitably led to the use of specific milk replacers. Several studies have shown the reduced adaptability of the buffalo calf to “milk-free” milk replacers, as well as the need to supplement them, e.g. in Ca and P and reducing the presence of Cu. The reduced dry matter intake is also responsible for the longer period of milk replacer administration routinely carried out in this species (90 days vs. 60 days in cattle), and able to guarantee the intake of at least 1.5 kg of dry matter in the weaned calf.

Finally, it is important to be careful about the overcrowding that occurs in calf barn. This phenomenon occurs in both farms that apply the out of season breeding technique and in seasonal counterparts, and it is often on the basis of the lack of attention given to some subjects in some periods of the year. The key aim of this work was to examine the main problems encountered in buffalo calf breeding, providing the most appropriate solutions on the basis of current technical and scientific knowledge, in order to obtain the best growth performance.

THE BEHAVIOUR OF BUFFALOES IN MODERN DAIRY FARMS

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Keywords: dairy buffalo, behaviour, animal welfare

Abstract

In Italy, during the last fifty years, because of the economic interest, buffalo farming has moved from traditional techniques based on the extensive use of humid environments to intensive systems that were developed for dairy cattle with no access to grazing areas and water for wallowing. Such changes have negatively affected several aspects of buffalo behaviour and welfare. Therefore, this communication deals with the behaviour of river buffaloes (*Bubalus bubalis*), in confinement and in extensive conditions, also focusing on the effects of different housing and rearing conditions on their welfare. The behavioural pattern expressed by buffaloes in extensive and intensive conditions is similar to those displayed by other ruminants. However, through natural selection, buffaloes have also acquired several morphological, physiological and behavioural (i.e. wallowing) features, which allow their adaptation to hot areas. Buffaloes kept in intensive conditions and having no access to pasture and water for wallowing extend their periods of idling and are less often involved in investigative activities. Confinement has also determined a reduction of space allowance to dairy cattle standards with no specific studies on the real requirements of this species. Space restriction can adversely affect various aspects of buffalo welfare, such as health (increased levels of lesions and injuries), social behaviour (increased number of agonistic interactions) and heat dissipation. The buffaloes, originating from tropical areas, are well fit to large variations in food availability and quality, and to dietetic unbalances. For example, protein surplus can be excreted under the form of urea and even re-ingested through the saliva and re-utilised with no effects on animal health. As to human animal relationship, it has been observed that the behaviour of buffaloes in the milking parlour, expressed in terms of stepping and kicking, is positively correlated with the frequency of oxytocin injections. In addition, positive stockperson interactions with the animals, expressed in terms of talking quietly, petting and gentle touching, are negatively correlate with the number of kicks during milking. Finally, the effects of different farming practices on animal-related indicators are described.

NEONATAL DIARRHOEA OF THE CALF: ETIOLOGY, CONTROL AND POSSIBLE THERAPEUTIC FAILURES

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Introduction

Calf diarrhoea is a major cause of economic loss to cattle producers. Multiple enteric pathogens are involved and co-infection is frequently observed. Due to the multi-factorial nature of the disease and antimicrobial resistance in bacterial pathogens, particularly in *Escherichia coli*, calf diarrhoea is still problematic.

Methods

One-hundred twenty-three carcasses of death calves, 3-10 days old, showing clinical signs of diarrhoea and belonging to 70 dairy farms located in Emilia Romagna region, were sent to the diagnostic service of IZSLER (laboratory of Reggio Emilia) from 2016 to 2017. Samples of intestine were screened for rotavirus and coronavirus using real-time PCR (1), for *Cryptosporidium* spp. by microscopic evaluation of an intestinal slide smear with Ziehl Neelsen modified staining and bacterial pathogens. *E.coli* strains isolated have been tested using a multiplex PCR for fimbriae (F4, F5, F6, F41, F18) and toxins (STa, STb and LT) genes. Pathogenic *E.coli* strains have been tested for sensitivity to a panel of 10 antibiotics by disc diffusion. CLSI (2) interpretative criteria have been used and strains have been classified as susceptible (S), intermediate (I) and resistant (R). For data analysis, intermediate strains were grouped with the resistant ones.

Results

Enteric pathogens were isolated from 77.4% of calves. *Cryptosporidium* spp. was the most common pathogen identified (36.6%) followed by enterotoxigenic (ETEC) *E.coli* (31.7%), Rotavirus (27.6%) and Coronavirus (22%). Multiple pathogens were identified in the 61% of the cases. Among the ETEC isolated the most prevalent virotype was F5 STa (41%), followed by F5 F41 STa (28.2%). Sensitivity testing performed showed a high prevalence of *E.coli* strains resistant/intermediate to Tetracyclin (94.7%), Ampicillin (92.1%), Nalidixic acid (86.8%), Amoxicillin + Clavulanic Acid (84.2%), Cefazolin (84.2%), Enrofloxacin (81.6%), Kanamycin (78.9%), Trimethoprim+Sulphonamide (55.3%), Florfenicol (50%), Gentamicin (50%).

Conclusions

Most outbreaks of calf diarrhoea in dairy operations involve multiple pathogens and *Cryptosporidium* spp. and ETEC were the most frequently observed. High levels of antimicrobial resistance were recorded in ETEC strains. Bacteriological cultures, followed by testing for virulence factors and antimicrobial susceptibility are of fundamental importance to guide decisions on antimicrobial therapy, avoiding routine treatments.

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CALF HEALTH - PROGRESS TO DATE, CURRENT PRIORITIES AND FUTURE PERSPECTIVES

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Keywords: calf health, past, present, future

Introduction

Given that this is the 50th anniversary congress of the Italian Buiatrics association, this paper addresses the progress we have made in calf (unweaned youngstock) health over the past half century, the state-of-the-art today and horizon scans where developments might take us in calf health over the next half century, from a Euro-centric perspective.

How important is calf health and who defines important?

Before re/previewing calf health we perhaps need to put the relative importance of this topic into perspective. A search of global literature over 30 years (1987-2017) using Web of Science shows that only calf diarrhea ranks in the top five cattle disease categories (in descending order: cow mastitis, fertility, paratuberculosis, calf diarrhea and tuberculosis). An Irish Delphi study to set priorities for non-regulatory animal health appears to confirm this ranking. Young calf diseases (due to diarrhea and/or pneumonia) were ranked second, third and fifth (out of 13 all-age diseases/conditions) by beef farmers, dairy farmers and industry experts, respectively (More et al., 2010). Then if we look at the bottom line, economics, calf diseases represented only 4-11% of the cost of all-age diseases on US and French dairy farms, respectively (Fourichon et al., 2001, Sischo et al., 1990). But lifetime sequelae of calfhood diseases are often inadequately costed and heifer rearing costs can contribute up to 20% of the cost price of milk. The picture becomes even more complicated when we compare the perceptions of farmers and veterinarians. A Dutch study showed that for almost every period of young stock rearing, the ranking of calf health hazards differed between farmers and vets (Boersma et al., 2013). So, it may be concluded that calf health is secondary to cow health in economic importance, and its relative prioritisation varies between researchers, industry experts, veterinarians and farmers and between beef and dairy farmers.

Calf health in the past

The major causes of neonatal calf mortality, unsurprisingly, have not changed greatly over the past 50 years. A German knackery necropsy study of 1,000 calves (0-3mths) in the 1960s reported that the three main contributors to calf loss were perinatal asphyxia, respiratory disease and gastrointestinal infections, in that order (Von Helmig-Schumann, 1964). Reports by the National Academy of Sciences in the USA in 1968 (Anon. 1968) and by the Commission of the European Communities in 1975 came to similar conclusions (Rutter, 1975). National calf mortality rates (dairy & beef) in the UK were 1.7, 3.1 and 5.0% up to 1 and 4 weeks and 6 months, respectively in the 1960s (Anon. 1968). Web of Science shows that calf diarrhea, respiratory disease, welfare, malformations and stillbirth were the top 5 calf topics covered in the last 30 years. Since the 1960s numerous novel calf diseases have emerged (e.g. BNP, congenital defects, cryptosporidiosis, HCD, Hobi-like mucosal disease, necrotic enteritis of UA, SBV-AHS…) and calf disease control practices have evolved (e.g. colostrum pasteurisation, continued milk feeding of diarrhoeic calves, pulmonary ultrasonography…).

Current hot topics in calf health

At farm-level, the important calf health issues remain the same in 2018 (Mee et al, 2018) as in 1968 (Leech et al., 1968); calf diarrhea and pneumonia. At an industry-level some hot topics are global (e.g. AMR) and others are industry-specific (e.g. dairy male calf welfare in New Zealand, Ireland…). At a research-level, the genetics of calf

diseases (Vinet et al., 2018), automated monitoring of health (Kour et al., 2018), 'colostrology' (Lora et al., 2018), accelerated growth preweaning (Quigley et al., 2018), lifetime sequelae of calf-hood diseases (Chuck et al., 2018) and calf welfare (Neave et al., 2018) are all being actively investigated currently.

What will change in calf health by 2068?

External drivers of change will be the mega-trends; increasing global population growth, increasing societal concerns from a more affluent/urbanized population, climate change, One Health, AMR, increasing popularity of non-agricultural ideologies, e.g. veganism. A recent survey of non-agricultural respondents listed animal welfare as the primary reputational risk for modern dairy farming (Cardoso et al., 2016), hence, dairy welfare may become the new milk quota. All of these factors will incrementally drive better calf health. There will be greater emphasis on better calf quality-of-life; calf comfort will be the new cow comfort. Calf health/welfare certification will be monitored by QA schemes run by national organisations/retail oligopolies. There will be routine use of gender-selected semen on both heifers and cows to obviate the welfare issues associated with low value/male (in future female) dairy calves. With herd size increases continuing, calf rearing will become a specialized vertically integrated dairy enterprise for large units while smaller farms will continue with traditional management. Mega herds will outstrip their land base milking platform necessitating outsourcing of calf/heifer rearing to another specialized farmer (contract/custom rearers). Even for confinement units, contract youngstock rearing will normalize. These units will be SOP, digital tech-driven businesses with external certification agents. Animal health organisations will increasingly employ social science at a national-level to nudge farmer adoption of best-practices in calf health. Education and public engagement (EPE) on good calf rearing will be a pillar of sustainable agricultural systems (social license to farm).

Internal drivers of change will be external drivers, and the need for better calf health diagnostics and disease prevention in large specialized calf units. As global sub/urbanization escalates, skilled labour availability will diminish and will be supplanted by agro-digital technologies (precision dairy farming). Widespread adoption of pen-side diagnostics (e.g. infrared thermography, pulse oximetry, real-time DNA/RNA sequencing..), wearable wellness sensors (e.g. accelerometers, calving sensors, ear fever tags, nano-biosensors, smart contact lenses?...) combined with 24/7 data collection on feeding, behavior, welfare (automated pupillometry?) and intake via automatic feeders will facilitate pre-clinical diagnosis smart phone alerts of individual calf and group deviations from expected norms of health and performance (farm-level 'big data'). The paradigm will shift from novel disease therapies to better disease prevention. Genomics will identify calves of superior genetic merit and both genetic and epigenetic strategies will reduce susceptibility to infectious diseases (the world's first gene-edited pigs resistant to PRRS were born in 2018). Conceptual advances in knowledge about the gut microbiome (Malmuthuge et al., 2016) will stimulate greater use of direct-fed microbials and prebiotics (e.g. as supplements added to natural colostrum) and reduce the use of antimicrobials and associated risks of AMR. Recent research shows that algorithmic therapy can reduce antimicrobial use and calf diarrhea (Gomez et al., 2017). Novel (phyto/herbal?) therapies and immunobiotics/life-long vaccines will be developed to address the intransigent problems of coccidiosis, cryptosporidiosis and pneumonia. Step changes will occur at a national level where infectious disease eradication schemes (e.g. BVDv in Ireland, possibly *Mycoplasma bovis* in New Zealand) will tangentially improve calf health and immunity. But...'black swan' events may alter all predictions....

Conclusions

In conclusion, while the major calf health problems have not changed over the last 50 years, nor will they change greatly over the next 50, management of calf health will be better at both farm and national-levels in the future. Veterinarians will increasingly play a team leader consultative role in translating emerging knowledge into farm-specific solutions for their clients.

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REPRODUCTION IN DAIRY COWS: SOME THOUGHTS FOR THE FUTURE

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Keywords: Dairy cow fertility, herd management, breeding,

Abstract

Major drivers of change in dairy herd health management include the significant increase in herd/farm size, quota removal (within Europe) and the increase in technologies to aid in dairy cow reproductive management. Key areas for improving fertility management lie in handling of substantial volumes of data, genetic selection (including improved phenotypes for use in breeding programmes), nutritional management (including transition cow management), control of infectious disease, reproductive management (and automated systems to improve reproductive management), ovulation / oestrous synchronisation, rapid diagnostics of reproductive status, and management of the male side of fertility. This review covers the current status and future outlook of many of these key factors that contribute to dairy cow herd health and fertility.

Introduction

Dairy herd health management is undergoing a period of radical change worldwide. The drivers of this change are many. They include the massive increase in technologies to aid in dairy cow reproductive management, quota removal (within Europe) and the significant increase in herd / farm size. Following the removal of quotas in Europe, in multiple countries there is a pursuit to increase milk production by both an increase in herd size as well as an increase in milk yield per individual cow. While this expansion has commenced, it is somewhat curtailed by the current downward pressure on world market price for milk.

Since cows have to calve before milk production starts, reproductive efficiency remains a major item and questions may arise as how reproductive management at herd level will follow the current drastic changes.

Herd fertility and data management strategies

Since the 1950's, computers have been used as a management tool in dairy farming (Lissemore, 1989). Over subsequent decades, dairy herd management software has evolved quickly and the personal computer has emerged as an important management tool to monitor production, reproduction and health (Gloy and Akridge, 2000). Technologies to collect and store data have been evolving at a quicker pace compared with the speed at which new insights in dairy science have been discovered. The exponentially increased volume and speed at which data is created in the post-dotcom decade, commonly referred to as Big Data, has brought new challenges for research in dairy science. The way researchers have to leverage the power of Big Data has been at the center of attention ever since the publication trend that started around 2009 (Chen et al., 2012; Sagiroglu and Sinanc, 2013). How to address these challenges will be the main scope for future research.

Genetic strategies to improve reproduction

Up to the early 2000s, dairy genetic selection programmes in dairy producing countries traditionally selected predominantly for milk yield often at the expense of other dairy relevant traits, including fertility and health. Breeding programmes in the early part of this century started to include fertility (eg longevity and calving intervals) and health as part of the selection traits. Inclusion of these traits has served to reverse some of the earlier trends that gave rise to reduced fertility. Over the last 15 years it is now recognized that trends in both longevity (increased) and calving intervals (decreased) have improved. The major challenge for breeding programmes in terms of incorporation of fertility traits has been to develop phenotypes that have high heritability. For example

many fertility traits typically have only low heritability estimates. The second major issue for many fertility traits is to have easily measured phenotypic traits or genomic markers (SNPs) that correlate to appropriate fertility traits. Biomarkers that are easily measurable in milk would allow animal breeders to select for cows with a propensity for increased fertility.

Nutritional strategies to improve reproduction

Modern dairy cows have been predominantly selected for a high milk yield in early lactation that is associated with a very high capacity to mobilize body reserves during this period, often leading to serious metabolic stress. Management strategies for transition cows are currently focused on helping the cows to cope with the metabolic load by optimizing health, minimizing stress (e.g., by minimizing the changes in group or ration), stimulating dry matter intake and immune function. There are great opportunities for the veterinary practitioner to regularly monitor and adapt the herd management in order to do so. LeBlanc (2010) and Mulligan et al. (2006) identified the key issues that should be covered by the practitioner to optimally guide farmer clients to optimize their transition-cow management.

Furthermore, application of diets specifically designed to improve fertility by counteracting mechanisms related to the negative energy balance (NEB) or by supporting a specific pathway that is necessary for successful fertility, has always been a very attractive way to circumvent the impairment of reproduction during early lactation. Adaptations of the diet composition have been very attractive in the pursuit of reducing the fertility decline. Although the reproductive system is known to be influenced by multiple hormones that are also involved in the adaptation towards high milk production (e.g., GH, IGF-1 and leptin), only insulin is known to be relatively responsive to changes in the composition of the ration. Ovarian follicles contain insulin receptors (Bossaert et al., 2010) and cows with lower peripheral insulin levels in the immediate postpartum period suffer from retarded postpartum ovarian resumption and normal cyclicity among others by a higher risk to suffer from cystic ovarian disease (Vanholder et al., 2005). Therefore, glucogenic diets have been advocated in the immediate postpartum period aiming to enhance the peripheral insulin concentrations and advance normal ovarian resumption (Gong et al., 2002). However, insulin has been shown to have detrimental effects on oocyte and embryo competence (Fouladi-Nashta et al., 2005) and has been shown to stimulate enzymatic catabolism of P4 in the liver (Lemley et al., 2008). The latter suggests glucogenic diets only being of advantage when offered in the immediate postpartum period, while they should be avoided when cows are inseminated.

Rations leading to high peripheral urea levels are generally mentioned to be associated with lower pregnancy rates due to its detrimental effects on the embryo. However, the mechanistic pathways by which this detrimental effect may be caused and the threshold peripheral urea level, are both still matters of debate. Special attention in this respect should be given to the supplementation of soybean meal as the main protein source in the ration. In a recent study we demonstrated that commercially available soybean meal contains isoflavones in concentrations that are able to induce increases in the blood concentration of oestrogenically active isoflavone metabolites (equol, O-DMA, DHD) in high yielding dairy cows post partum, even when supplemented in relatively low amounts (1.72 kg per day on average). When compared with rapeseed meal, soy supplementation was furthermore associated with a decreased angio- and steroidogenesis at the level of the corpus luteum based on biopsy sampling at day 9 of the oestrous cycle. However, authors were not able to demonstrate any effect on the peripheral progesterone concentration during the first 3 oestrous cycles after calving. Therefore, although the results of that study suggest negative effects of soy feeding on CL function in recently calved dairy cows, the contribution of this effect on the peripheral progesterone concentration and consequently on overall fertility of supplemented cows warrants further research (Cools et al., 2014).

Adding fats is another strategy that has been extensively tested to reduce the impaired reproductive capacity of dairy cows. A study aiming to minimize the negative energy balance by decreasing the milk fat synthesis and hence limiting energy output via milk by supplementing the ration with exogenous fats, was not successful since cows simply produced more milk when reducing the NEB (Hostens et al., 2011). Omega-6 fatty acids are believed to have pro-inflammatory and thus PGF2a-stimulating properties rendering them of extra value early post-partum, while omega-3 fatty acids can weaken this inflammatory potency, leading to a higher chance of survival of the

embryo when supplemented during the periconceptual period. Unfortunately, research results rarely provide a consensus in this topic. The consequences of these fat-feeding strategies on oocyte and embryo quality remain an intriguing issue for debate. Fat feeding may alter the microenvironment of the growing and maturing oocyte of the early and older embryo and thus may affect reproductive outcome. Research has shown that dietary-induced hyperlipidaemic conditions can be harmful for embryo development and metabolism. However, to date, research results remain somewhat conflicting most probably due to differences in fat sources used, in diet and duration of supplementation and in experimental set-up in general. Furthermore, peripheral blood in lactating dairy cows will contain a mixture of fatty acids of dietary origin and from body-tissue breakdown, the latter being largely abundant in the immediate postpartum period and containing a high proportion of saturated fatty acids. Especially the latter have been shown to have a significantly detrimental effect on both the oocyte as well as embryo quality (Leroy et al., 2005).

Adding extra vitamins and minerals to the diet has often been suggested as a "golden bullet" solution to reduce declines in cow fertility by various commercial interests. Usually farmers are highly sensitive these proposed solutions since they don't involve extra labour which is their paramount constraint nowadays. Stating whether the amount of these compounds is sufficient in the ration is often very difficult for the practitioner since it is usually impossible to even estimate the content of these substances present in the basic ration. In herds in which cows are given high quantities of concentrates to sustain peak yield in the immediate postpartum period, the risk of suffering from specific deficiencies is lower due to the fact that concentrates are usually highly supplemented with vitamins and minerals. In terms of their effect on immune response and embryo quality, special attention should be given to Vit E and Selenium. The latter was supported by recent finding that in herds that were tocopherol deficient during the dry period, treatment with injectable vitamin E of 1000 IU each week for the last 3 weeks of gestation not only reduced the incidence of retained placenta and stillbirth but also significantly decreased pregnancy loss (20.5% vs. 12.5%; $P < 0.01$) (Pontes et al., 2015).

Controlling infectious diseases

Veterinarians managing fertility in dairy herds should regularly evaluate the herd health status for pathogens known to compromise reproductive efficiency. Infections with pathogens like *Leptospira hardjo*, Bovine Virus Diarrhoea or Herpes viruses are known to reduce conception rates, while infections with *Neospora caninum* and emerging viruses like the Bluetongue virus may cause foetal losses and abortions. Bovine Herpes Virus 4 is reported to have a tropism for endometrial cells which is therefore suggested to be especially monitored and controlled in herds suffering from uterine diseases (Donofrio et al., 2007). Besides continuing careful monitoring, appropriate biosecurity plans eventually including vaccination protocols should be implemented to prevent the introduction of new agents into the herd and to prevent eventual spread within the herd (Sanderson and Gnad, 2002).

Of special interest among infectious diseases, is the minimization of uterine diseases. In cattle, bacterial contamination of the uterus is ubiquitous at parturition. However, the latter does not automatically imply the establishment of uterine disease and subsequent fertility problems. Despite the fact that several papers have been published aiming to come to a general agreement about the definitions of postpartum uterine diseases based on mainly clinical symptoms (LeBlanc et al 2002; Sheldon et al., 2006), there is still a lot of confusion about these definitions among practitioners. The latter gives rise to a wide variety of preventative and curative treatment protocols being applied in the field, many of which are not scientifically proven to be efficacious. Recent literature underlines the high incidence of especially subclinical endometritis in high yielding herds. Diagnosis of this impairment is based on intra-uterine sampling for cytology, which is not routinely done at the moment. Therefore, recently we reported the use of the cytotape that allows sampling during insemination and facilitates for example profiling in repeat breeder cows (Pascottini et al., 2015). The generally accepted necessity to minimize the use of antibiotics in cows should be extended to treatment of uterine infections. It is important to determine the risk factors for the different uterine diseases, and design prevention and control programmes to reduce the incidence of disease.

Use of precision livestock farming

Oestrous detection

Traditional approaches to reproductive management and use of artificial insemination have included either visual observation of oestrous behaviour, or the use of fixed time insemination protocols (eg OVSYNC, Pursley et al., 1995).

Successful reproductive performance based on detection of oestrous behaviour implies the need to accurately detect oestrous onset in the majority of cows, and then inseminate 4 to 16 hours later. This led to the common practice of breeding cows according to the am-pm rule. This requires that cows are observed for oestrus 5 times per day, and those commencing oestrus in the morning get inseminated that evening and those commencing oestrus after 12.00 noon are inseminated the next morning (onset of oestrus defined as the first observation period where the cow is observed to stand to be mounted by other herd mates or a teaser bull). This approach has served well for herds prepared to invest the time and effort into good and accurate oestrous detection. However, it requires a significant commitment of labour, good cow identification and personnel trained in detection of oestrus in cows.

Aids to oestrous detection

To achieve high submission rates to AI, which are critical to achieve a 365-d calving interval in seasonal calving herds, requires an effective, practical means of identifying each cow in oestrus. Standing to be mounted is considered the main behavioral sign identifying an estrous period and is used to determine the correct time to inseminate. Both the physical activity and mounting activity induced by increased oestradiol production during the preovulatory follicular phase can be monitored in various ways. Visual observation of mounting activity for 20 min 3 to 5 times per day results in 90 to 95% submission rate (Diskin and Sreenan, 2000) but is laborious and time consuming. In Holstein-Friesian cows where behavioral signs of oestrus were monitored every 3 h, sniffing and chin resting were noted and 90% of oestrous periods showed mounting and 58% of cows were detected in oestrus. Attempts have been made to monitor changes in physical activity to predict oestrus. The pedometer, either attached to a leg (S.A.E. Afikim, Kibbutz Afikim, Israel; Holman, et al., 2011) or neck collar (ALPRO; DeLaval International AB, Tumba, Sweden; Peralta, et al., 2005), identifies increased physical activity as an activity cluster.

Furthermore, in high-yielding dairy cows, the percentage of cows that display standing to be mounted by other cows has decreased, leaving it more difficult to detect oestrus. Roelofs et al. (2005a) found that only 58% of cows were observed in standing oestrus. This, in turn, decreases submission rate to AI and thereby contributes significantly to reduced reproductive efficiency (Diskin, 2008). Several aids exist to improve the efficiency of detection of estrus.

Oestrous synchronization and ovulation synchronization

Traditional oestrous synchronisation methods were designed to synchronise oestrus, but at best still requires observation of oestrus to optimize timing of mating and pregnancy rates. At best use of 2 injection of prostaglandin 11 days apart in heifers can work will with FTAI at 72 and 96h or alternatively at 72h, and then intensively observe for oestrus for a further 3-4 days and inseminate those late coming into oestrus, in response to standing oestrus (using the am-pm rule).

Ovulation synchronisation programmes were designed to facilitate use of AI in herds without significant investment of time and labour into oestrous detection. These were developed from the early 1990s onwards (Pursley et al., 1995). They are more appropriate to large non-seasonal herds where calving to calving intervals are somewhat less relevant to economic performance of the herd and often calving intervals are allowed to extend beyond 400-420 days. The major issues for a basis OVSYNCH programme is that conception rates to a single round of OVSYNCH are approximately only 30%; and in a European context are relatively expensive. Studies have furthermore shown that European consumers are very skeptical to the intensive use of drugs to improve dairy herd fertility. Strategies to improve pregnancy rates have been developed (e.g., Double OVSYNCH and PRESYNCH OVSNCH; Herlihy et al., 2012) that are acceptable in many US herds, but incur substantial costs in terms or time and drug costs that leave their use questionable in European dairy herds.

The male side of the story

Although most evidence suggests the pressure on reproductive efficiency in modern dairy herds is primarily related to the high producing females, it is obvious that the role of the male should not be forgotten. While veterinary practitioners often overlook the importance of this side of the coin, farmers often blame issues like sperm quality and the expertise of the AI-technician, mostly because it is human nature to prefer blaming someone else instead of being critical against personal shortcomings. In a study examining the pregnancy outcome of 5,883 inseminations, 1 of the 35 bulls that delivered semen was associated with a 4.7-fold increase in pregnancy results (Lopez-Gatius et al., 2005). In another study of the same group (Garcia-Ispierto et al., 2007) in which the pregnancy results of 10,965 inseminations were scrutinized, not only a difference between bulls but also dramatic differences among inseminators were observed. The likelihood of a pregnancy decreased by a factor 4 when a cow was inseminated by the worst versus the best inseminator.

The success of an insemination depends amongst other factors on the deposition of appropriate numbers of sperm with a good fertilizing capacity at the appropriate site in the reproductive tract at the appropriate time in relation to ovulation. The fertility potential of an artificial insemination dose is a function of the quantity, quality, and health status of the semen contained therein. It is the task of the AI-industry to continue to maintain intense quality control programmes to ensure cryopreserved semen doses released for sale are disease free and meet the above mentioned criteria. A large survey of semen processing practices at AI companies in multiple countries reported that the average cryopreserved AI dose contains approximately 20 x 10^6 total spermatozoa (Viswanath, 2003). The latter has been estimated to be on average 2 to 20 times greater than estimates of minimum threshold numbers required to guarantee normal fertilization rates. Remarkably, bulls that are known to produce marginal quality semen often achieve below average fertility despite compensatory increases in number of spermatozoa per dose and vice versa (DeJarnette, 2004).

In 2003 Pace reviewed the technological advances that have been adopted by the AI industry since establishment in the late 1930s and concluded that 'from a technological standpoint, the dairy industry is receiving the highest quality semen ever produced'. Technological advances in semen processing are reflected in fertilization rates using cryopreserved semen in the late 1990s early 2000s comparable to those reported for non-frozen semen in the 1950s (DeJarnette et al., 2004). Innovative techniques recently tested in the AI industry are cryopreservation techniques that improve post-thaw sperm survival and thereby reduce sensitivity to the optimal timing of the insemination. In this regard, microencapsulation of spermatozoa for sustained time release (Viswanath et al., 1997) or techniques designed to reduce the magnitude of cryopreservation-induced capacitation (Watson, 1995) have been tested.

Use of semen from sires with proven high-fertility is probably the most obvious and simple recommendation. However, when one starts to use super fertility bulls in a widespread manner on cows suffering from fertility problems, the question arises in what sense the latter may affect the fertility data reported for these bulls. Use of semen from other breeds in which the fertility decline is not as severe a problem as in the Holstein breed, may also be considered as an alternative to improve herd fertility especially if semen is used of bulls from appropriately progeny-tested sires from breeds with comparable production levels. However we should keep in mind that cross-breeding is not per se a genetic improvement and that genetic selection is still strongly requested within the breeds used.

Recently reports have been published showing that some sires perform better in timed AI scenarios than others (Hiers et al., 2003). The latter should stimulate the managers and veterinarians to analyze the fertility data of their herd in relation to the use of specific bulls. On the other hand, it is still unknown whether in this way we stimulate the selection towards animals that are better at coping with specific fixed time protocols instead of stimulating the selection towards enhanced fertility.

A further contributing factor is the site of semen deposition. Although the uterine body is generally accepted to be the proper site for semen deposition, in an experiment using contrast radiography to evaluate the accuracy of professional inseminators, the deposition of semen into the uterine body was successful in only 39% of the attempts, while in 25% of the cases, the semen was deposited in the cervix. While several studies observed improved fertility in response to horn breeding (deep bicornual insemination in which the full insemination dose is divided among

both uterine horns or deep unicornual insemination following a preceding ultrasound examination to detect the site of the ovulatory follicle in order to allow ipsilateral insemination), most comparative studies indicated no difference. Recently, a new device that significantly facilitates deep intra-uterine insemination was developed (Verberckmoes et al., 2004), although authors were not able to demonstrate ameliorated pregnancy results using this device versus conventional insemination in the uterine body (Verberckmoes et al., 2005). Horn breeding was especially tested for the insemination of low cell number doses of sex sorted sperm. Although flow cytometry/cell sorting has been shown to be a reliable procedure to differentiate X- versus Y-chromosome bearing spermatozoa, the use of sexed semen is currently only recommended for nulliparous heifers because of disappointing fertility results in multiparous animals. As a conclusion, DeJarnette et al. (2004) reviewing available papers, mentioned that the primary concern is to ensure that semen deposition takes place cranially of the internal cervical os. Remarkable in this context is the paper of López-Gatius and Hunter (2011) in which authors report about the successful intrafollicular insemination in repeat breeder cows under heat stress. The latter study however needs confirmation with additional studies.

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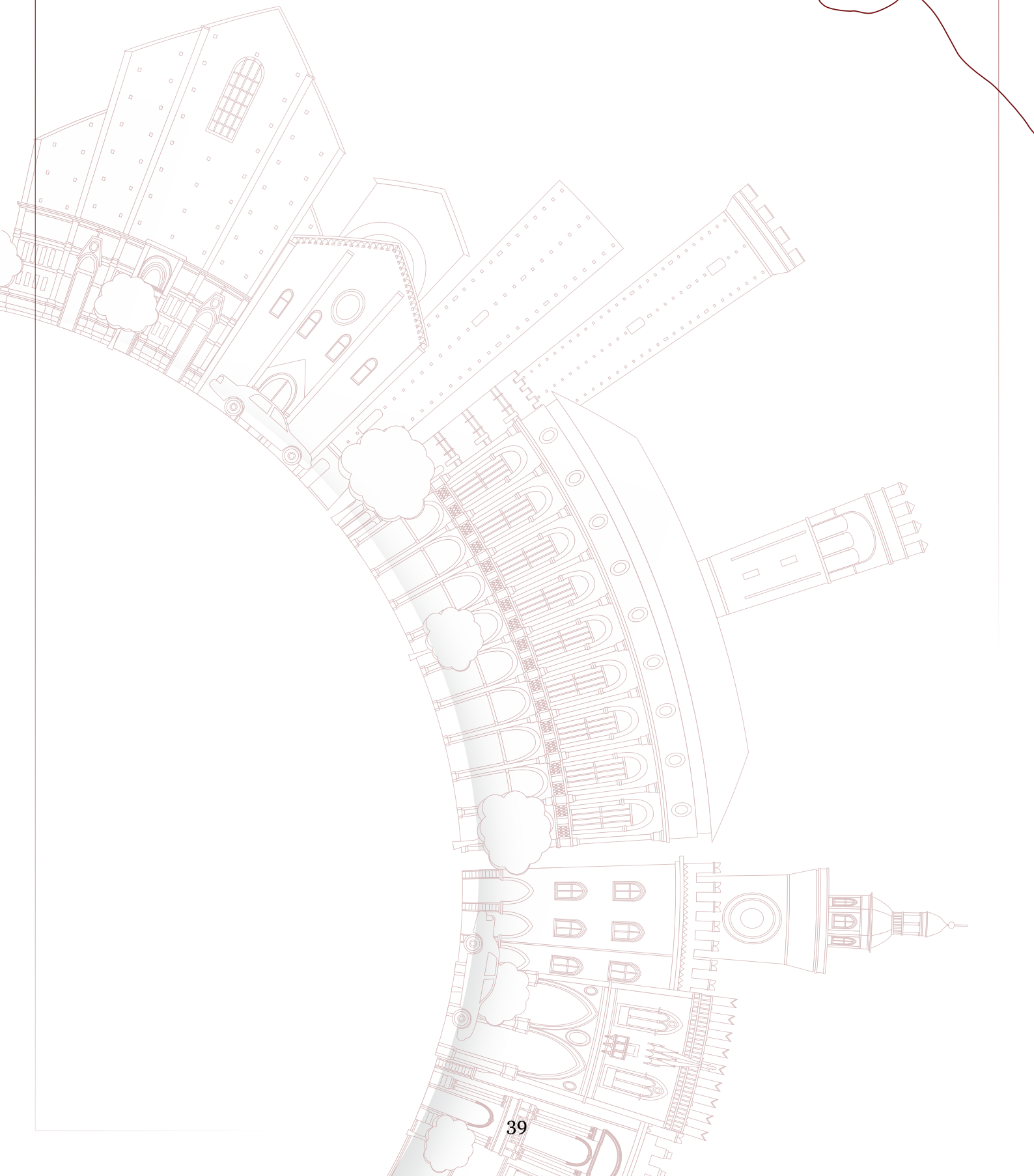
Oral



METALS IN BLOOD AND MILK OF DAIRY COWS FROM A POLLUTED AREA

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Introduction
The paper presents concentrations of selected elements in feed, blood and milk of homebred dairy cows from Meža Valley. The Meža Valley was exposed to industrial pollution by plumb mine and smelter and therefore, there is great concern of transfer of toxic elements from polluted environment to animal feed (via absorption from earth and by deposits of dust), which results in hazard to human and animal health in the region. Dairy cows as grazing animals consuming large quantities of locally produced forages are among the most exposed. The aim of the study was to align values of selected elements (essential and toxic) obtained in feed to those of blood and milk of dairy cows in autumn (after grazing season) and spring (before the grazing season).

Methods
Six dairy farms located within 10 km from ex-lead mine and smelter, with seasonal grazing were included in the study. The animals and their feed were sampled twice, in spring before the grazing season and in autumn after grazing season. Total content of selected elements (Fe, Co, Zn, Cu, Mo, Mn, Cr, Ni, Hg, Pb and Cd) in the ration was calculated according to the concentration in separate feed components and their quantity in the ration. Milk and blood were sampled from all the animals in lactation. After closed-vessel microwave digestion, inductively coupled plasma mass spectrometry (ICP-MS) was used to analyse samples of feed, blood and milk. The obtained values were compared and evaluated according to reference values and regulations.

Results
Differences were found for trace elements levels in rations, blood and milk from six different dairy cattle farms. The data suggest that cattle fed rations based on home produced forages in the area have deficit in essential trace elements (Cu, Zn, Mn and Co). The contents of Cr, Mo, Pb and Cd were in some rations elevated. Three rations from the examined farms had elevated Pb content (1 in spring and 2 in autumn), one Cd and one Mo (in autumn), and – eight rations Cr (three in spring and five in autumn). The contents of trace elements in cattle rations were not necessary related to their content in blood and milk.

Conclusions
The data suggest that cattle fed rations based on home produced forages in the area should be supplemented with trace elements, of which the most important trace elements needed are Cu, Zn, and Co. Even though many actions were taken to ameliorate effects of heavy Pb industry pollution in Meža valley in the past there is still significant risk of toxic elements entering food chain. According to legislation maximum permitted levels of Pb were exceeded in 5 samples of milk on one farm in spring time. Attention should be paid to preparation and storage of animal feeds. Reference values for some trace elements in whole milk of cattle are non-existent in literature and should be more systematically tackled in the future.

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SHEEP AND BLUETONGUE VIRUS: AN ANIMAL MODEL FOR STUDYING THE PATHOGENESIS OF HYPOFERTILITY CAUSED BY ARBOVIRUSES

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Testicular degeneration with destruction of the tubular germinative cells has been often described in humans and animals, as a result of different viral infections. However, the pathogenesis of these infections leading to infertility conditions is little known and studies have only referred to murine model. Interestingly, the recent Zika virus epidemic highlighted the possibility that arbovirus may negatively affect the male reproductive tract. Herein, Bluetongue virus (BTV) in sheep was used as an animal model for studying the pathological consequences of arbovirus infection on male reproductive tract.

By using 2 different isolates of BTV serotype 1 collected from naturally infected sheep, during 2006 (BTV-1_{IT2006}) and 2013 (BTV-1_{IT2013}) epidemics in Sardinia (Italy), 2 groups of 6 rams were infected and serially euthanized for pathological and virological investigations.

Testicular degeneration and azoospermia was induced in these rams with either BTV-1_{IT2006} or BTV-1_{IT2013} isolates, although the former was significantly less virulent. Testicular lesions in BTV-infected rams were due to viral replication in endothelial cells of the intertubular vessels, resulting in stimulation of a type-I interferon response, reduction of testosterone biosynthesis by Leydig cells, and destruction of Sertoli cells of the blood-testis barrier, in more severe cases.

Unlike other gonadotropic viruses, BTV-induced testicular degeneration is associated with viral replication in the endothelial cells of the intertubular vessels and type-I IFN response. This study shows that BTV infection in sheep is a model for studying the viral pathogenic mechanism leading to male fertility.

CONTROL OF REPRODUCTIVE SEASONALITY IN SHEEP

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Survival of several mammals is subject to synchronization between reproductive activity and climatic variables. In fact, this behavior guarantees that the birth takes place in a favorable season for the development of the new born, which is usually spring. This fact, however, in some species such as sheep, creates a limitation that also determines the seasonalization of production with a considerable limitation in the marketing of products. Therefore, the study of the mechanisms that regulate reproductive seasonality is an always current topic and involves both the technicians of the sector and the researchers. Considerable progress has been made in the last decades but much remains to be clarified in order to control the reproductive seasonality in small ruminants. Over the last 50 years, various effective techniques have been developed to control reproductive activity and to direct it towards the most appropriate period to make sheep breeding as productive as possible. In fact, the use of synthetic progestins has guaranteed and guarantees, with precision, the appropriate time to perform artificial insemination and also determines a real synchronization of the lambing. However, this molecule has disadvantages such as residues in milk and meat, too many interventions on the animal. Recently the use of melatonin in combination with the male effect has certainly allowed to modulate the effect of the photoperiod on sexual activity but not to totally control it. This molecule is now used all over the world and has provided good results allowing a de-seasonalization of reproductive activity. Furthermore, the technique of using the male effect and flushing has recently been perfected as a natural method that still provides good results. In recent years the researchers' attention has turned to the identification of a genetic factor that can influence the reproductive seasonality in order to obtain animals less sensitive to the photoperiod with a good reproductive efficiency. In conclusion, despite the progress in understanding the mechanisms that regulate reproductive seasonality are considerable, much remains to be clarified.

EMERGIN PARASITOSIS AND NEW DIAGNOSTIC TECHNIQUES OF DAIRY CATTLE

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Introduction

Parasitic gastroenteritis in European cattle results principally from infections with *Ostertagia ostertagi*, a common gastrointestinal nematode (GIN). These abomasal infections, single or associated with other GI helminths (e.g. *Haemonchus, Cooperia, Bunostomum*), are usually chronic and associated with hidden subclinical losses such as reduced weight gain, milk yields and reproductive performance [1, 2].

The purpose of this study was to investigate the *Ostertagia ostertagi* infection status of Italian cattle dairy herds through measurement of antibody concentration in the bulk tank milk (BTM). The *O. ostertagi* antibody levels in milk were determined using a commercial ELISA kit (SVANOVIR® *O. ostertagi*-Ab) and expressed as optical density ratio (ODR). In addition, relationships between ODR, management data and season were investigated.

Methods

BTM samples were collected in 1209 dairy cattle farms located in different Northern (Piedmont, Lombardy, Veneto, Trentino Alto-Adige, Friuli Venezia- Giulia and Emilia Romagna), Central (Marche, Umbria, Tuscany and Lazio), Southern (Abruzzo, Campania, Basilicata and Apulia) and Insular (Sardinia) Italian regions from March 2015 to September 2017. *O. ostertagi* milk samples with an ODR > 0.6 were classified as positive, milk samples with an ODR < 0.3 as negative and ODR values between 0.3 and 0.6 as a grey zone. Prevalence of positive samples, mean ODR, 25^{th}-75^{th} percentile, standard deviation (SD) and minimum and maximum values were calculated.

Results

The overall mean ODR revealed a value of 0.49 in Italy; in particular, regional differences were observed for *O. ostertagi* BTM ODR values ($p < 0.05$). Herds with access to pasture showed significantly higher titers ($p < 0.0001$) of *O. ostertagi* antibodies in milk (mean ODR= 0.63) than in those in total-confinement housing (mean ODR= 0.42). The ODR values ranged from 0.45 in Autumn and 0.53 in Spring and was found a positive association between ODR and seasonality ($p < 0.05$).

Conclusions

This study will provide a quantitative assessment of the *O. ostertagi* status of Italian dairy herds and represents a significant step forward in evidence-based medicine for dairy veterinarians, advisors and farmers.

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CATTLE AND BUFFALO'S COCCIDIOSIS: MYTHS AND REALITY

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The disease coccidiosis or eimeriosis plays a major role in the livestock animals, specially cattle and buffalo which impacts directly the health and wellbeing, because is related to gastrointestinal disorders and in some cases can cause death. It is also important to understand that it is one of the most important cause of neonatal mortality in livestock, including buffalos. Outbreaks in cattle are associated with several species of *Eimeria*, they also have a correlation with the age of the animal, the dose of the protozoan, and environmental factors in different countries. Nowdays it is known that livestock animals can be affected by at least 12 species of *Eimeria* parasites. Five out of twelve are (*E. bovis*, *E zuernii*, *E. auburnensis*, *E. ellipsoidalis*, and *E. alabamensis*) are considered pathogenic. Clinical coccidiosis due to *E. zuernei* and *E. bovis* results in huge losses to cattle industry worldwide and *Eimeria bareillyi* is the most pathogenic for buffalo. Usually adults animals are not clinically ill (asymptomatic), although, they can be the source of infection for young animals. Infected animals may be clinically asymptomatic or can show some GI signs, such as diarrhea, dysentery, dehydration, debilitation or even death – depending on the amount of exposure to the protozoan. Also death might occur if the animal is highly exposed to the protozoans and do not develop acquired immunity to the pathogens. Morphology of oocysts, knowing the endogenous stages, and their location in the host, are extremally helpful to differentiate the species of Eimeria either in cattle or in buffalos. There are plenty of myths about this disease that must be discussed, with that, discussing some points of diagnosis, treatment and livestock management of this pathogenic disease it will help the understanding of Coccidiosis or/and Eimeriosis in cattle and buffalos.

SHEEPNET: SHARING EXPERTISE AND EXPERIENCE TOWARDS SHEEP PRODUCTIVITY THROUGH NETWORKING

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SheepNet is an EU funded project on sheep productivity. Ewe productivity (number of lambs reared per ewe joined) is a combination of reproduction success, embryonic and lamb survival and litter size. SheepNet is designed to stimulate knowledge exchange between research and stakeholders to widely disseminate best practices and innovations, with the objective of increasing ewe productivity. SheepNet involves the 6 main EU sheep producing countries (Ireland, France, United Kingdom, Romania, Spain and Italy) and Turkey. It has also now gained interest from Hungary, Portugal and Germany

SheepNet will establish durable exchange of scientific and practical knowledge among researchers, farmers and advisors, through a multi-actor and transdisciplinary approach at national and international levels and by the broad involvement of European Agriculture knowledge and Innovation Systems. This will promote the implementation and dissemination of innovative and best technologies and practices for the improvement of sheep productivity. The project aims to produce a scientific, technical and practical knowledge reservoir through a combined “top-down and bottom-up” approach and the strong involvement of 45 innovative farms;• foster cross-fertilization through multi-actors workshops at national and international levels, a broad and interactive participation of the “sheep community” via social networks and an interactive platform;• develop an easily understandable support package of communication and learning material, web-based tools, interactive platform, designed to help both scientists and stakeholders and a strong interactions with the EIP AGRI.

The main results of the first 18 months of activity will be presented.

SIEROPREVALENZA E DINAMICA DEGLI ANTICORPI NEI CONFRONTI DI *TOXOPLASMA GONDII* IN AGNELLI DI RAZZA SARDA NATI DA MADRI SIEROPOSITIVE E SIERONEGATIVE

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Introduzione

La mancanza di dati sull'entità della trasmissione di anticorpi nei confronti di *Toxoplasma gondii,* protozoo di spiccata importanza zoonosica*,* dalle pecore ai loro agnelli e del perdurare di questa immunità passiva tramite l'ingestione del colostro ci ha indotto ad attuare la presente ricerca.

Materiali e Metodi

Lo studio è stato condotto in tre allevamenti di ovini di razza della Sardegna ed è stato articolato in due fasi. La prima fase ha riguardato le pecore: 30-45 giorni prima del parto sono stati prelevati ed analizzati complessivamente i sieri di 47 pecore, di cui 27 sieropositive nei confronti di *T. gondii*. Mentre la seconda fase, ha interessato gli agnelli nati dalle pecore sieropositive e sieronegative esaminate nella prima fase. Subito dopo il parto, sugli agnelli, sono stati effettuati prelievi di sangue avvenuti in tempi differenti: a 24 e 48 ore dopo l'assunzione del colostro e, successivamente, a distanza di 30, 60, 75 e 90 giorni dalla nascita. Su tali campioni si è proceduto alla ricerca delle IgG1 con l'uso del kit commerciale ELISA *PrioCHEKâ Toxoplasma Ab SR* (*Prionics, Schlieren-Zurich, Switzerland*) per piccoli ruminanti.

Resultati

IgG1 contro *T. gondii* sono stati riscontrati in oltre il 90% degli agnelli nati da pecore sieropositive già nelle prime 48 ore di vita; tali valori di sieroprevalenza tendono a decrescere in modo regolare e significativo (c2 *trend*= 48,240; P= 0,000), per raggiungere i valori minimi (8,7%) alla fine del periodo di monitoraggio (90 giorni).
Negli agnelli nati dalle pecore sieronegative si rilevano invece valori di sieroprevalenza del 60% in quelli di 48 ore di vita e del 10% in quelli di 15 giorni, mentre già a 30 giorni e sino alla fine del periodo di monitoraggio tutti gli agnelli risultano sieronegativi.

Conclusioni

Alla luce dei risultati conseguiti possiamo per cui concludere che per quanto riguarda il caso da noi monitorato l'immunità passiva attraverso l'assunzione del colostro trasmessa dalle pecore sarde sieropositive ai rispettivi agnelli possa "coprire" in modo efficace la prole per circa 2 mesi.

LA LEGISLAZIONE SULL'IBR E IL PIANO DI CONTROLLO DEL VENETO

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Introduzione
Gli Autori analizzano la legislazione sulla rinotracheite infettiva bovina (IBR) a livello nazionale e della Regione Veneto, nonché i costi rischi-benefici dei piani di controllo, considerando che l'IBR non è una malattia soggetta ad obbligo di denuncia.

Materiali e Metodi
Nel presente lavoro si considerano le normative nazionali e regionale, in particolare della Regione Veneto. L'esito negativo per IBR è richiesto per bovini maschi ai fini dell'ammissione nei centri di controllo genetico e nei centri di raccolta dello sperma. (D.M.S. n. 323/1991 e D.Lgs. n. 132/2005)
Il **Piano di controllo dell'IBR del Veneto** (Delib.G.R. n. 526/2014) stabilisce gli obblighi del Veterinario aziendale, le modalità d'esecuzione dei controlli sierologici negli allevamenti e sui campioni di latte di massa, le misure da attivare in caso di positività è attivato il piano aziendale di risanamento. L'adesione al Piano da parte degli allevatori è volontaria, mentre è obbligatoria, in particolare, per i capi movimentati verso le malghe della provincia di Belluno. Nella stessa provincia l'obbligo è stato poi esteso a tutti i capi da riproduzione.

Risultati
Regione Veneto ha previsto che i bovini di Belluno e provenienti da allevamenti *indenni da IBR* condividano l'alpeggio con animali dello stesso status sanitario del Friuli-Venezia Giulia, di Trento e Bolzano, riconosciuti indenni dalla UE.
Una questione rilevante sotto il profilo sanitario, riguarda la destinazione dei capi positivi negli allevamenti aderenti o soggetti al piano volontario di eradicazione, che devono essere *rimossi* (*allontanati*). Delib.G.R. n. 526/2014

Conclusioni
Il Piano della Regione Veneto è stato approvato a seguito delle perdite economiche causate dall'IBR negli allevamenti di bovini da latte e per evitare una discriminazione nelle movimentazioni e nel commercio dei bovini allevati in Veneto rispetto a quelli dei territori confinanti riconosciuti indenni. Dalla legislazione nazionale e regionale, non sono previsti lo stamping-out dei bovini positivi, né il divieto di movimentazione, ma la *rimozione*.
Inoltre l'IBR non è soggetta ad obbligo di denuncia nel D.P.R. n. 320/1954, né compare nell'elenco delle malattie soggette ad obbligo di notifica del Reg. UE n. 429/2016.

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LA RINOTRACHEITE INFETTIVA BOVINA (IBR) E LA LEGISLAZIONE DI SANITÀ ANIMALE -THE ANIMAL HEALTH LAW -

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Introduzione
Gli Autori analizzano la legislazione europea vigente in materia di rinotracheite infettiva bovina, (IBR) con lo scopo di rapportare la malattia al Regolamento UE n. 429/2016.

Materiali e Metodi
La Direttiva 64/432/CEE comprende l'IBR fra le malattie per le quali possono essere approvati programmi nazionali di lotta e richieste garanzie complementari nel commercio intracomunitario. Dal 1988 al 2017 sono state emanate numerose direttive e decisioni che inserivano gli Stati membri o loro territori come promotori di un piano di eradicazione o dichiarati ufficialmente indenni.
Si analizza il Regolamento UE n. 429/2016 in rapporto all'IBR.

Risultati
L'art. 5 del Reg. UE n. 429/2016, che elenca le malattie soggette ad obbligo di notifica nella UE, riporta anche i criteri che dovrà utilizzare la Commissione al fine di inserire una malattia nell'elenco di quelle soggette a notifica, mediante un approccio che si basa sulla biosicurezza e sulla valutazione del rischio.
Dall'analisi dei criteri da considerare in toto, l'IBR non presenta un rischio per la salute pubblica a causa del suo carattere zoonotico.

Conclusioni
Si prende atto che, ad oggi, l'IBR non compare in alcun elenco comunitario di malattie infettive soggette ad obbligo di denuncia. L'IBR non è stata inserita nell'elenco del Reg. UE n. 429/2016 e dall'esame difetta di uno dei criteri obbligatori ai fini dell'inserimento nel medesimo elenco.
Le Decisioni esaminate riportano che in alcuni Stati Membri *l'IBR è una malattia soggetta a dichiarazione obbligatoria* e vige l'obbligo di destinazione al macello in caso di importazione di bovini in uno Stato Membro che ha qualifica sanitaria superiore. E questo non garantisce i criteri di uniformità auspicati dal legislatore comunitario.
Inoltre la Direttiva 64/432/CEE è in corso di abrogazione in forza del Reg. UE n. 429/2016.

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THE ROLE OF THE COURT-APPOINTED EXPERT IN RUMINANT HEALTH MANAGEMENT AND THE NEW LAW NO. 24/2017 (THE SO CALLED GELLI-BIANCO LAW): OBSERVATIONS ON NO. 20 CASES

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Introduction

The Office Technical Consultancy, in civil and criminal procedures concerning the responsibility of health care professionals, has always played a fundamental role as a probative instrument. With the entry into force of the Law 24/2017 (so called Gelli-Bianco Law) this task is further strengthened dictating common rules to the civil and criminal procedures regarding the rules of the choice of the Court appointed, or official, technical consultant (OTC) (article 15).

In the light of recent legislative changes, the Authors examine the role of the OTCs in the veterinary profession, and highlight how the rules of the law no. 24/2017 do not reflect the legal and organisational framework of the veterinary profession.

However, they point out that, in civil and criminal procedures concerning the ruminants veterinarian's responsibility, the judicial authority must entrust the technical consultancy to a practitioner who knows the matter of the litigation, i.e. to a "specialist in ruminant health management" entered in the appropriate register.

In fact, the law states that the choice of the members of the individual board of examiners must take place "among those enrolled in the registers [...] in which the specializations of registered medical experts must be indicated and documented" (paragraph 1, article 15). These registers, during the revision, "must indicate the professional experience gained by individual experts, with particular reference to the number and type of assignments conferred and those revoked" (paragraph 2, article 15). This would lead to greater transparency and efficiency in appointing animal welfare and protection experts. For these reasons, it is hoped that the FNOVI (National Federation of Italian Veterinarians) and all Orders of the Italian Veterinarians are more selective in choosing the veterinarians as OTC. On the basis of the aforementioned and continuation of previous papers concerning civil and criminal matters (2-4), the Authors in order to outline the activity of the OTC in a practical way report n. 20 cases occurred to their attention on disputes concerning ruminants.

EVALUATION OF HEAVY METALS IN: TANK MILK, SOIL, PASTURES AND WATER IN BOVINE CATTLE OF SAN PEDRO AND ENTRERRÍOS, COLOMBIA

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Introduction

There are several environmental risks associated with the use and contamination of soil, water, air and vegetables where the producer and his livestock live. And in most cases, they are beyond the control of the rancher and official sector. In this scenario, the public administration in Colombia must guarantee an adequate safety and health of the livestock products.

Methods

We analyzed 40 samples from 10 dairy farms in the mentioned municipalities, during February-March 2013 (summer) and December-April 2014 (winter). The analysis in Environmental Management and Research Laboratory, University of Antioquia by atomic absorption spectroscopy. We applied descriptive statistics and Spearman correlations, with significance $p < 0.05$, to find correlations between the metals evaluated, the farms and matrices studied.

Results

The presence of all the metals studied in the farms of the municipality of Entrerríos was established in the soil and pasture matrices, while only arsenic and copper were detected in some farms in the municipality of San Pedro. We did not find significant variation in the concentration of heavy metals depending on the season: summer and winter.

Conclusions

We can affirm that the most dangerous heavy metals, taking into account their concentrations and to affect the trophic chain and even influence public health, were arsenic and to a lesser extent copper.

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METABOLIC PROFILE IN NON-PREGNANT NATIVE SHEEP FEMALES IN SAN GIL SANTANDER (COLOMBIA)

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Introduction

The identification of the metabolic profile in production animals is a method of evaluation of herds, as well as an important clinical diagnostic tool that allows to have vital information to prevent and correct nutritional imbalances that may be affecting productivity. The aim of this study is to contribute to the knowledge of the metabolic profile of Creole sheep females under semi-pastoring conditions in San Gil, Colombia.

Methods

30 non-pregnant females were used in optimal health, from the local farm "El Ciruelo", body condition (BC) was recorded on a scale (1-5) and weight (kg), with averages of CC of 2.8 ± 0.15 and 46.2 ± 5.9. Blood samples were obtained by jugular venopuncture for three consecutive days at different times (07: 00h, 10: 00h, and 13: 30 h) and deposited in vacuum tubes without anticoagulant (BD Vacutainer® red cap). Subsequently, the blood samples obtained were left at 37°C for 1 hour and centrifuged to separate the serum at 4000 rpm for 10 minutes, extracting 1 mL of serum that was frozen in a plastic microtube at -25°C until analysis. The samples were analyzed in the Laboratory of Animal Nutrition, Food and Food Quality at Universidad Cooperativa de Colombia (UCC) where the blood glucose, urea, albumin, total protein and cholesterol values were determined through diagnostic kits (IHR® LTDA. Cromatest.) and spectrophotometer (Thermo Scientific ™ Genesys 10S UV-VIS).

Results

In blood metabolites, mean values were found: Glucose 57.3 ± 18.7, Cholesterol 69.9 ± 18.2, Total proteins 6.6 ± 1.7, Albumin 3.3 ± 0.5, Urea 40, 3 ± 10.2 and BUN 18.8 ± 4.7.

Conclusions

In the concentrations of the blood metabolites, significant differences were found between days and time of the moment of the collection of the sample, indicating that the animals could be subjected to food, water or management stress due to the extensive production system.

The concentrations of metabolites are lower than other studies conducted in native sheep in Colombian, which may be related to the type of feeding and the physiological or reproductive state, but they remain within the reference values for metabolites in the species, being necessary the bromatological analysis of the forages consumed, establishing the contributions of nutrients to the animals, allowing to relate contributions with nutritional requirements necessary for the productive stage.

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DIFFERENCES IN WELFARE PARAMETERS BASED ON THE ANIMAL DEPENDING ON THE BEDDING TYPE AND MATERIAL USED IN MILKING CATTLE

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Introduction

Animal welfare is becoming more and more important both for consumers and producers and our role as veterinarians should include helping farmers to improve the welfare of the animals used to produce food for ethical and economic reasons. Nevertheless, the evaluation of welfare is a complex task because welfare is multifaceted involving animal's health, adapt to the environment ability and emotional state.

Methods

In this study, animal welfare was assessed in 9 Friesian dairy cattle farms under an intensive production system located in the northwest of Castilla y León (Spain), provinces of León and Zamora. For this assessment it was used a modified protocol based on the guidelines published by Welfare Quality® in 150 of a total of 1543 lactating cows. Farms were classified considering bedding types: strawyard (3), straw stalls (2), sand stalls (3) and mattress stalls (1) in order to test its influence on body condition, dirt scores, hairless patches or lesions and Somatic Cell Counts (SCC). Data were analyzed by ANOVA and Tukey test as post-oc comparations.

Results

The results showed significant differences been strawyard cows dirtier than the ones lying in straw or sand stalls ($F(3, 146)= 9.79$ $p <0.001$). Sand stalls produced significant increases in the number of cows with hairless patches ($F(3, 146)= 5.68$ $p <0.001$). Cows in strawyard presented higher body condition scores than the cows that used mattress and straw as resting material in cubicles ($F(3, 146)= 3.27$ $p <0.05$). SCC was higher in strawyard and mattress stalls compared with the other two types of cubicles ($F(3, 23)= 22.17$ $p <0.001$).

Conclusion

The bedding material and type of resting area have and influence in welfare and health indicators such as dirt score and SCC and this can be improved by using sand and straw cubicles instead of strawyard.

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IMPIEGO DI FRAZIONI DI DIFFERENTI CEPPI DI LIEVITI NELL'ALIMENTAZIONE DEL VITELLO A CARNE BIANCA

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Introduzione

Il problema dell'antibiotico resistenza è spesso indicato come un problema legato all'uso indiscriminato di antibiotici negli animali in produzione zootecnica. Per far fronte alle richieste dei consumatori si sta cercando di ridurre l'uso di antibiotici nella produzione degli alimenti di origine animale ma, soprattutto, farne un uso più razionale.

Materiali e Metodi

Lo studio ha riguardato l'utilizzo di YANG®, combinazione di frazioni di differenti ceppi di lieviti *Saccharomyces cerevisiae e Cyberlindnera jadinii*, nell'alimentazione di vitelli a carne bianca, al fine di verificare se vi fossero positivi effetti sulle performances e sulla sanità degli animali. La ricerca è stata condotta su due gruppi di vitelli maschi pezzati neri (101 capi gruppo YANG® e 107 capi gruppo CONTROLLO). Dall'ingresso in stalla e per tutto il ciclo di allevamento i piani alimentari sono stati uguali e la somministrazione di YANG® è avvenuta per i primi 90 giorni ai soli vitelli del gruppo YANG®. Gli animali sono stati pesati all'ingresso in stalla ed alla fine del ciclo produttivo (circa 192 giorni di stalla).

Risultati

I vitelli del gruppo YANG® hanno evidenziato un maggior incremento medio ponderale totale rispetto a quelli del gruppo CONTROLLO (234,26 kg *vs* 222,53 kg, + 5,27%) ed un maggior peso carcassa (+ 3,39%). Nei vitelli del gruppo YANG® si è registrata una significativa (P=0,025) riduzione del numero di vitelli trattati terapeuticamente (32,99% di terapie in meno), una riduzione della mortalità del 24,31%, un significativo (P<0,05) aumento delle Gamma globuline e proteine totali ematiche; nei vitelli del gruppo CONTROLLO vi è stata una tendenza più precoce per i primi trattamenti terapeutici (P=0,109). L'azione delle frazioni dei 2 differenti ceppi di lieviti si è manifestata a livello intestinale riducendo di fatto le problematiche di tipo enterico (25,64% in meno di trattamenti per forme enteriche) che manifestano i vitelli all'inizio del ciclo produttivo.

Conclusioni

Nell'ottica di una riduzione dei farmaci nell'allevamento del vitello a carne bianca l'utilizzo di YANG® sembra un valido aiuto per migliorare la sanità dei vitelli, oltre ad indubbi vantaggi di ordine economico per l'allevatore (guadagno, nella nostra ricerca, di oltre 23,00 €/capo per il maggior peso delle carcasse).

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CONSUMERS PERCEPTION OF ANIMAL WELFARE

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Resumen

En la situación socioeconómica actual los consumidores demandan productos que se hayan obtenido de animales criados y mantenidos en condiciones que cubran sus necesidades fisiológicas y etológicas, permitiendo una vida libre de dolor, estrés o miedo, lo que de uno u otro modo se engloba bajo el término global de Bienestar Animal. Por ello, los ganaderos se ven abocados, cada día más, a demostrar ante los consumidores que sus metodologías de producción son capaces de cumplir con dichas premisas.

La labor del veterinario va más allá de conseguir que los animales gocen de un estado de salud que les permita afrontar con éxito la reproducción para que puedan manifestar todo su potencial productivo. No solo debemos ocuparnos de que los ganaderos obtengan sus productos en las mejores circunstancias y condiciones tanto higiénicas y sanitarias como económicas, sino que debemos ayudarles a alcanzar el mejor mercado posible para ellos. Así, resulta de gran trascendencia que, en una sociedad globalizada como es la actual, donde la creciente preocupación de los consumidores por las implicaciones éticas de los sistemas y modos de producción puede suponer un veto para algunos productos, nosotros como veterinarios seamos capaces de adaptar los sistemas de producción a las nuevas exigencias éticas proporcionando además a los ganaderos razones que les permitan justificar moralmente sus estrategias productivas. Esto solo puede lograrse desde el conociendo y dominio de los principales argumentos bioéticos.

Abstract

In the current socioeconomic situation consumers demand products that have been obtained from animals raised and maintained in conditions that meet their physiological and ethological needs, allowing them to live a life free of pain, stress or fear, which in one way or another is included under the global term of Animal Welfare. For these reasons, farmers are forced, greater every day, to demonstrate to consumers that their production methodologies are able to cope with these premises.

The work of the veterinarians goes beyond getting animals to enjoy a state of health that allows them to successfully face reproduction so that they can express their full productive potential. We must not only deal with the fact that farmers obtain their products in the best circumstances and conditions, hygienic, sanitary and economic, but we must help them to reach the best possible market for their products. Thus, in a globalized society as it is today, where the growing concern of consumers about the Animal Welfare and ethical implications of animal production systems and modes may suppose a veto for some products, it is of great importance that we as veterinarians are able to adapt the production systems to the new requirements also providing farmers with reasons that allow them to morally justify their productive strategies. This can only be achieved from knowing and mastering the main bioethical arguments.

PLANTAS TÓXICAS EN ANIMALES DOMÉSTICOS: EXPERIENCIA EN ARGENTINA

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Definimos como **planta tóxica** a toda aquella que por ingestión o contacto, es capaz de producir efectos nocivos con alteraciones en el estado de salud de los animales abarcando desde un desempeño zootécnico ineficiente hasta -incluso- su muerte.

Poseen amplia distribución, así las podemos encontrar en montes (*Baccharis coridifolia)*, campos (*Cynodon spp)*, pantanos (*Solanum malacoxylon, Ludwigia peploides)*, regiones secas *(Astragalus spp),* bordes de caminos (*Senecio spp*) y parques (*Lantana camara*). Crecen tanto silvestres como cultivadas *(Sorgum spp)*. Algunas son ornamentales tales como laurel de jardín (*Nerium oleander*).

Contienen tóxicos, tales como alcaloides, glucósidos, saponinas, resinoides, oxalatos, compuestos fotosensibilizadores, glucósido cianogénico, nitrato-nitrito, acumulan ciertos minerales, como selenio, molibdeno, azufre/sulfato, metales pesados (mercurio), o vitaminas por ejemplo: D_3. Bajo ciertas condiciones puede ser colonizada por hongos lo cual posibilita la formación de micotoxinas.

Los compuestos peligrosos pueden estar distribuidos por todas las partes de la planta (*Conium maculatum)* o acumularse más en unos lugares que en otros, como la raíz (*Ipomoea sp*.) o las hojas (*Nerium oleander*) o en sus semillas (*Senecio spp*). La toxicidad de una planta puede variar con el estado fenológico; por lo general, la nocividad aumenta con la madurez; sin embargo, algunas especies son muy tóxicas en sus fases juveniles *(Sorghum spp)*.

En casos de muy bajas disponibilidad forrajera el animal comerá tales plantas o bien las puede ingerir por falta de un conocimiento previo o se encuentran junto a otros vegetales inocuos. Otra situación puede suceder cuando son incorporadas en el heno (semillas de *Xanthium sp* o plantas de *Wedelia glauca*) o grano molido por ejemplo sorgo molido o junto a semillas de *Datura ferox*. Epidemiológicamente son importantes datos sobre carga animal/ disponibilidad forrajera, traslado de animales, edad, cambio brusco de potreros, clima, lluvias persistentes que ayudan a orientar el caso.

Las plantas tóxicas pueden ser: **Tóxicas permanentes:** la concentración del principio tóxico no varía en su desarrollo fenológico, por ejemplo mío-mío (*Baccharis coridifolia*); **Tóxicas temporarias:** en un período de su desarrollo fenológico poseen una alta concentración de principio tóxico el cual lo pierde al completar su ciclo. Ejemplo: sorgos de pastoreo; **Tóxicas circunstanciales:** son aquellas que en determinadas condiciones climatológicas y/o edáficas o en determinada época del año incrementan la concentración del principio tóxico. Ejemplo: gramilla rastrera o pata de perdiz (*Cynodon dactylon)*, yuyo colorado *(Amaranthus quitensis)*, yuyo blanco *(Chenopolium album*).

De acuerdo a la evolución de la presentación clínica pueden clasificarse en **Sobreaguda**, **Aguda**, **Subaguda**, **Crónica**, **Acumulativa**.

De acuerdo al órgano diana principalmente afectado clasificamos en **hepatotóxicas**, **nefrotóxicas**, **cardiotóxicas**, **fotosensibilizantes**, afectan al aparato **músculo esquelético**, al sistema **digestivo**, al **sistema nervioso central**, las que alteran la **utilización del O_2** (muerte súbita), etc.

Las plantas que mayor casuística presentan en Argentina son *Solanum malacoxilum* (afección de músculo esquelético), *Baccharis coridifolia* (afección de retículo-rumen), *Wedelia glauca* y *Cestrum parqui* (hepatotóxica aguda); *Senecio sp*. (hepatotóxica crónica); de forma circunstancial se presenta intoxicación por nitritos y glucósidos cianogenéticos (síndrome de muerte súbita), *Lantana sp*. (fotosensibilización secundaria), *Nerium oleander* (cardiotóxica), *Amaranthus quitensis* (nefrotóxica), *Prosopis sp*. (neuropatía central). La incidencia varía de acuerdo al área geográfica puntual.

Las intoxicaciones vegetales más frecuentes en bovinos en Argentina son a causa de la ingestión de:

- ***Solanum glaucophyllum*:** También conocida como *Solanum malacoxilum* y vulgarmente como "varilla" o "duraznillo blanco". Su principio tóxico es la vitamina D3 (1 – 25 dihidroxicolecalciferol), bastan 0,04 gr. de hojas/ kg.p.v. semanalmente para que se produzca la intoxicación. Provoca un aumento en la absorción intestinal de calcio y un depósito de fosfato de calcio en el colágeno de diferentes tejidos. Entre los signos encontramos progresiva disminución del consumo con pérdida de peso, claudicaciones, apoyo en pinzas, falsa xifosis, envaramiento, trastornos reproductivos y muerte por inanición. No existe tratamiento eficaz y los animales deben ser rotados de lugar lo antes posible o destinar a faena.
- ***Baccharis coridifolia***: Conocida vulgarmente como "mio-mio" o "romerillo". Provoca una intoxicación sobreaguda (síndrome muerte súbita) asociada a signos gastroentéricos y nerviosos. El principio activo es una micotoxina del grupo de los trichotecenos (Miroteciotoxina) Roridina A – Roridina E producida por el hongo *Mirothecium verrucaria*. El principio está 4 a 8 veces más concentrado en la etapa de floración. Si el proceso lo permite, los signos más importantes encontrados son constipación, diarrea, regurgitación, temblores musculares e inestabilidad del tren posterior. La lesión característica es una reticulitis-ruminitis hemorrágica.
- ***Wedelia glauca* y *Cestrum parqui*:** Si bien son plantas totalmente distintas comparten el mismo principio tóxico: glucósido carborxi-atractilósido, por lo que producen la misma patología: insuficiencia hepática aguda. El heno puede contener plantas o partes de ella provocando el trastorno sin la presencia de la planta en el establecimiento. De acuerdo a la evolución del cuadro podemos encontrar desde hepatomegalia solamente hasta un cuadro de ictericia generalizado, reticulado tóxico hepático, edema amarillento en la flexura duodenal. A nivel microscópico aparece una necrosis centrolobulillar. El tratamiento sintomático puede ayudar a la recuperación dependiendo del grado de afección presente.
- ***Senecio sp.***: Existe muchas especies de *Senecio* que se distribuyen desde el norte al sur del país. Estas plantas presentan alcaloides pirrolizidínicos que de acuerdo al metabolismo hepático de cada especie animal lo puede transformar en compuestos atóxicos, levemente tóxicos o muy tóxicos que generan una insuficiencia hepática crónica. Intoxicación muy relacionada con la carga animal/disponibilidad forrajera. La signología varía desde tintes ictéricos leves, edemas en zonas declives, pérdida de estado general, diarrea/constipación. A la necropsia se encuentran principalmente un aumento de la consistencia hepática con aumento o disminución del tamaño, ascitis, hidrotórax. Ante el diagnóstico deben destinarse rápidamente a faena debido a que la lesión es irreversible.
- Recientemente y de forma circunstancial se presentaron casos de intoxicación por **nitritos** y **glucósidos cianogenéticos** produciendo muerte súbita, ***Lantana sp.*** produce fotosensibilización secundaria, ***Nerium oleander*** que produce cardiotoxicidad, ***Amaranthus quitensis*** que produce insuficiencia renal crónica, ***Prosopis sp.*** genera neuropatía central.

ENFERMEDADES CARENCIALES: EXPERIENCIA EN ARGENTINA

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Los trastornos carenciales son más frecuentes en animales en crecimiento. Pueden suceder por carencia primaria, secundaria o de tipo zootécnica. La predisposición a sufrir estos trastornos dependerá del nivel productivo de los animales y tipo de alimentación recibida, ubicación del establecimiento con su calidad de suelo y de agua.
Cada carencia tiene su signología clínica característica, algunas de ellas presentan lesiones macroscópicas y microscópicas orientadoras. De manera subclínica, producen disminución de la respuesta inmune influyendo en el aumento de la susceptibilidad a enfermedades por ejemplo las vitaminas A y E junto al Selenio, Cobre, Zinc, Manganeso son responsables de neutralizar las especies reactivas de oxígeno (EROs) generadas por la producción celular.

▪ **Vitamina E - Selenio:** Esta carencia sucede en animales de alta producción con una elevada generación de EROs. La signología clínica característica dependerá de los músculos afectados. Puede producir muerte súbita por afección cardíaca, disnea, claudicación, decúbito. De acuerdo a la evolución de la enfermedad se pueden observar como lesiones características el aspecto blanquecino de los músculos, edema intersticial de pulmón, ascitis, hidrotórax, aspecto heterogéneo del parénquima hepático.

▪ **Vitamina B (tiamina):** El complejo vitamínico B es una vitamina hidrosoluble que es formada por los microorganismos del rumen. La carencia de la misma puede ser por una alteración ruminal (acidosis), presencia de tiaminasas o exceso de sulfatos. La signología característica es de origen nerviosa central presentando amaurosis, estrabismo, deambular en círculos, opistótonos. Posee buena respuesta a la aplicación continua cada 4 a 6 horas de tiamina siempre que el trastorno sea tratado a tiempo.

▪ **Vitamina A:** La vitamina A es liposoluble y posee una adecuada reserva a nivel hepático. El consumo de materia verde aporta niveles adecuados de carotenos. La presentación se observa en explotaciones con engorde o recría a corral sin aporte de un núcleo vitamínico. Se presenta al final del engorde o recría, por agotamiento de las reservas. Presenta nictalopatía, amaurosis, convulsiones, hiperqueratosis. La administración de vitamina A no revierte la ceguera.

▪ **Cobre:** La carencia de cobre puede ser primario o secundaria a niveles elevados de sulfatos en agua o de molibdeno en la pastura. Produce desde alteraciones en el manto piloso o lanoso, degeneración nerviosa, alteraciones óseas, anemia, diarrea. No es mortal salvo la presentación cardíaca. El diagnóstico se basa en la medición de la cupremia o de los niveles de la ceruloplasmina.

▪ **Desbalance Calcio-Fósforo:** La alimentación en base a granos de maíz entero aporte niveles elevados de fósforo. Este aporte, al no ir acompañado de la suplementación de calcio, produce un hiperparatiroidismo nutricional secundario. Se manifiesta con claudicaciones, fracturas espontáneas, disnea, paresia/parálisis del tren posterior, decúbito sin alteración del sensorio. Los niveles en sangre de dichos minerales no siempre se ven alterados.

▪ **Manganeso:** El diagnóstico de dicha carencia se realizó debido a la respuesta clínica al suplemento puntual con óxido manganoso en la dieta. La signología observada fue lengüeteo, ataxia, parálisis uni o bilateral del nervio facial, síndrome vestibular. La regresión de los signos luego de la suplementación fue variable según la evolución del cuadro. No se determinó si existe una carencia primaria o secundaria a este mineral.

▪ **Cloro y sodio:** La carencia de estos dos minerales es relativamente rara debido a su aporte a través del agua de bebida. En los establecimientos donde se presentan esta patología la cantidad de sales totales en agua no supera los 1000 ppm. La signología en estos casos fue pica marcada (geofagia) y las consecuencias de este comportamiento. El consumo voraz de sal común confirma lo observado en los niveles sanguíneos de cloro y sodio.

RELATIONSHIP OF AMMONIA AND TOTAL BACTERIAL AIR LOAD WITH AIRWAY INFLAMMATION, LUNG CONSOLIDATION AND LOWER AIRWAY INFECTION IN INDOOR GROUP HOUSED CALVES

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Introduction

In calf housings air ammonia concentrations < 4.7 – 6 ppm are recommended. Recently, total bacterial air load is increasingly being used as an additional air quality parameter. The objective of this study was to quantify ammonia concentrations and total bacterial air load in indoor calf group housings and to determine associations with airway inflammation, lung consolidation

Methods

Clinical examination, thoracic ultrasound and non-endoscopic broncho-alveolar lavage were performed on 202 indoor group housed calves, aged 1 to 6 months from 33 conveniently selected Belgian herds. Broncho-alveolar lavage fluid (BALf) was analyzed for total nucleated and differential cell count and bacterial culture performed. Air ammonia concentrations were measured for a 24-hour period using a multi-gas monitor and bacterial air load was determined by sampling 1 liter stable air onto a blood agar plate with an impaction-type air sampler.

Results

Mean ammonia concentrations were 1.8 ppm (standard deviation (SD) 1.2; range (R) 0 – 10). On 33.3% (11/33) of the farms housed calves, aged 1 to 6 months from 33 conveniently selected Belgian herds. Broncho-alveolar lavage fluid (BALf) was 3.1×10^5 cfu/m^3 (SD 1.2×10^5, R 2.8×10^4 – 4.0×10^5). No association was found between ammonia concentration and total bacterial air load in stable air. Of the calves 42.6% (68/202) demonstrated a lung consolidation with a depth of ≥ 1 cm on ultrasound. *Pasteurella multocida* was isolated in 25.7 % (52/202) of the calves, *Mannheimia haemolytica* in 19.3% (39/202), *Histophilus somni* in 7.9% (16/202) and *Mycoplasma bovis* in 3.0% (6/202) of the calves. Mean BALf total nucleated cell count (TNCC) was 1,8 x 109 cells/L (SD 1.4; R 0.0 - 8.2) and mean neutrophil percentage was 36.1% (SD 24.6; R 0.5 – 97.3). A significant positive association was found for isolation of *P. multocida* and BALf neutrophil percentage. No associations were found for ammonia concentrations and total bacterial air load with lung consolidation, lower airway infection and lower airway inflammation.

Conclusion

Neither air ammonia concentrations nor bacterial air load were associated with lung consolidation, lower airway inflammation and infection suggesting that the influence of other air pollutants should be explored.

RECTAL PROLAPSE - A DIAGNOSTIC PITFALL

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Rectal prolapse is a common occurrence in cattle and generally results from an increased pressure gradient between the abdominal/pelvic cavity and the anus. Predisposing factors that contribute to rectal prolapse include increased abdominal pressure or fill, excessive coughing, colitis, cystitis, diarrhea, urolithiasis, and tenesmus due to dystocia (Steiner, 2004; Anderson and Miesner, 2008).

Generally, management of rectal prolapse includes elimination of predisposing factors, elimination of straining, and resolving the prolapse (Steiner, 2004). However, a general clinical and laboratory examination of such patients is absolutely necessary. This will help to avoid the sort of embarrassing error in which a calf has a surgical correction of a rectal prolapse as sequela of a congenital liver disease.

A search at the database of the University Clinic for Ruminants in Vienna revealed 3 Galloway calves, and 3 Simmental calves with rectal prolapse due to hepatic lipodystrophy, and congenital hepatic cirrhosis respectively, diagnosed at necropsy between 2002 and 2018. Clinical, laboratory, sonographic, and necropsy findings are described.

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ANDAMENTO DELLE PRINCIPALI PATOLOGIE E MORTALITÀ NEONATALI IN ALLEVAMENTI DI BOVINE DA LATTE IN PIANURA PADANA

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Introduzione

Ad oggi, nell'allevamento del bovino da latte, le patologie neonatali e la percentuale di mortalità dei giovani animali rappresentano una tra le principali cause di perdite economiche sia dirette, come costo delle terapie e dell'intervento veterinario, sia indirette, legate ai mancati incrementi ponderali, ai ritardi nella messa in produzione dei soggetti selezionati come rimonta e non da ultimo alla perdita di materiale genetico. In mancanza di dati oggettivi, è stata effettuata un'indagine conoscitiva con lo scopo sia di definire la prevalenza di tali problematiche all'interno di singoli allevamenti e sia di valutare il corretto management della vitellaia.

Metodi

Nel semestre luglio-dicembre 2017, sono stati arruolati 36 allevamenti di bovini da latte localizzati nella provincia di Mantova (consistenza media di 200 bovine in lattazione, range da 60 a 600 capi) in cui è stata effettuata, tramite questionario, una raccolta dati sistematica relativa al numero di soggetti nati per mese, al numero di femmine con patologia enterica e respiratoria e alla mortalità da 1 a 60gg di vita. Il questionario comprendeva inoltre la raccolta dei dati relativi al management dei vitelli al momento del parto, alle modalità di somministrazione del colostro e dell'alimentazione lattea, ai piani di profilassi ed alla gestione ambientale.

Risultati

L'analisi dei dati raccolti ha evidenziato una prevalenza delle patologie enteriche del 27,6%, delle patologie respiratorie del 9,2% e della mortalità del 4,1%. È stata riscontrata una significativa variabilità fra i singoli allevamenti: il range di prevalenza delle patologie enteriche variava dallo 0 al 100%, delle patologie respiratorie dallo 0 al 53% e della mortalità dallo 0 al 20%. La percentuale di mortalità è risultata maggiormente correlata alla patologia enterica rispetto alla quella respiratoria (R^2 = 0,17 vs R^2 = 0,0003). Rispetto al management è stata evidenziata una eterogeneità nelle procedure di gestione dei vitelli con particolare evidenza su alcuni punti critici: assenza di disinfezione dell'ombelico nel 22%, assenza della banca del colostro nel 28%, assenza della misurazione della qualità del colostro nel 53%, assenza di misurazione della temperatura del colostro e del latte rispettivamente nel 50% e 25%, assenza di vaccinazione per patologia enterica e respiratoria nel rispettivamente 33% e 47%.

Conclusioni

I dati raccolti nel presente lavoro dimostrano che, ancora oggi, la patologia enterica e respiratoria e la mortalità nella vitellaia da latte hanno una prevalenza rilevante che impatta sulla redditività e produttività dell'allevamento.

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THE EFFECT OF EARLY POSTPARTUM TREATMENT WITH VARIOUS PROSTAGLANDINS ON UTERINE CONTRACTILITY AND CONSECUTIVE INVOLUTIONAL CHANGES IN DAIRY COWS

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Introduction

Treatments with natural and synthetic prostaglandins are often used in the sence of facilitating puerperal changes by enhancing contractility of the uterus early postpartum. These treatments are usually based on traditions and their exact effect on uterine contractility and involution is controversial. Therefore, we aimed to investigate the effect of an early postpartum single treatment with natural prostaglandin $F_{2\alpha}$ or and its two synthetic analogues on uterine mechanical function and on the course of involution in dairy cows.

Methods

In a field study at a large-scale Hungarian dairy cattle farm, a two phasic experiment has been carried out. In the first phase 39 multiparous cows were treated with a single intramuscular
injection between 14 and 17 hours postpartum administering either 25 mg natural $PGF_{2\alpha}$, (Group 1, n= 10) or 500 mg cloprostenol (Group 2, n=9) or 150 mg D-cloprostenol (Group 3, n=10) or 5 ml saline solution (Group 4, n=10). Only cows were included that had normal parturition, and had expelled their placenta within 12 hours after calving. The investigations on the effect of treatments on uterine contractility were carried out until 48 h postpartum.
During the second phase of the study all previously treated cows were investigated and evaluated for their ovarian characteristics, their uterine horns, cervices and vaginal discharges, by performing rectal palpations to follow the course of involution at days 21, 30 and 42 postpartum.

Results

The results of contractility had been analysed and reported earlier, and found no significant effect on contraction frequency, amplitude and mean and total area under the curve. However, duration slightly differed among groups ($P<0.05$), mainly due to the differences between the $PGF_{2\alpha}$ and cloprostenol treatments. Even the results of the second phase of the analysis, as the main subject of this report, did not show any beneficial effect of any of the treatments on the processes of involution. However, obvious time related changes on ovarian dynamics and uterine involution including the size reductions of cervices and uterine horns but occassionally even various pathological findings (formation of ovarian cysts, uterine discharge) could be observed in the cows, irrespectively to which treatment groups they belonged to.

Conclusions

Although, a possible positive effect of treatments with prostaglandins on the involutional processes at a later stage after parturition is often reported and is realistic, if treatments occur on the first day after parturition, no significant beneficial effect was found that enhanced contractility or facilitated the processes of involution in dairy cows.

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THE IMPACT OF INTRAMAMMARY PIRLIMYCIN HYDROCHLORIDE ON THE FECAL MICROBIOME OF DAIRY CATTLE

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Introduction

Mastitis therapy accounts for the largest proportion of antimicrobial drug use on dairy farms and pirlimycin hydrochloride is among the commonly used intramammary (IMM) therapies. Pirlimycin has activity against most Gram-positive bacteria, and when administered IMM, approximately 24% of the original dose distributes in feces with 45% being unchanged (Hornish et al., 1995). Currently, the effect IMM pirlimycin on the fecal microbiome of dairy cattle is unknown. Therefore, the objective was to determine the effect of IMM pirlimycin on the fecal microbiome of dairy cattle.

Methods

Mammary quarter milk samples were collected from all Holstein heifers at University of Missouri dairy at approximately 3-7 days in milk and cultured for mastitis pathogens. All heifers with a Gram-positive intramammary infection in at least one quarter and no post-partum health events or other antimicrobial treatments were enrolled. Heifers were assigned to treatment (Tx) or control (Ctl) groups in a 2:1 ratio. Treated heifers received two 50 mg IMM doses of pirlimycin hydrochloride (Pirsue, Zoetis) 24 h apart in one infected quarter. Control heifers received no treatment. All enrolled heifers had fecal samples collected on D0, D2, and D7, which were stored at -20°C until analyzed. DNA was extracted from feces and bacterial 16S rRNA gene amplicons were generated by amplification and sequencing of the V4 hypervariable region. Samples returning >10,000 reads were included in the analysis. Sequences were assigned to operational taxonomic units (OTUs) based on a ≥ 97% nucleotide identity and annotated against the a 16S rRNA gene database using BLAST. Testing for differences in community composition was performed via PERMANOVA of Bray-Curtis using Past 3.13. Mean total counts of OTUs were compared using two-way repeated measures ANOVA with Bonferroni pairwise comparisons using SigmaPlot 14.0.

Results

To date, fecal samples have been analyzed for 16 heifers (11 treated and 5 control).

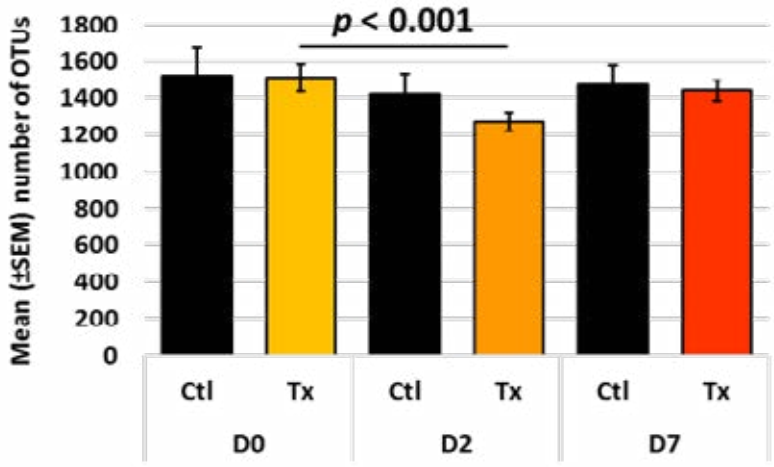

Figure 1. Comparison of number of OTUs by treatment day. There was a significant decrease in richness between D0 and D2 in pirlimycin-treated cows ($P < 0.001$), but not control cows ($P = 0.473$).

Conclusions

Based on these data, two doses of IMM pirlimycin given 24 h apart resulted in a significant decrease in richness in fecal bacterial communities approximately 24 hours after the last treatment (D2) when compared to pretreatment (D0). Further analysis of fecal samples is underway as well as the effect of extended IMM therapy (8 doses) on fecal microbiome.

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AUTOSOMAL RECESSIVE CHOLESTEROL DEFICIENCY IN A HOLSTEIN CALF

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Introduction

Cholesterol deficiency (CD), a newly identified autosomal recessive inherited genetic defect in Holstein cattle, has been reported to have unresponsive diarrhea as a clinical sign, failure to thrive, hypocholesterolemia and the animals usually die within the first weeks or months of life (Kipp *et al.*, 2016). CD is caused by a mutation of the *APOB* (Menzi *et al.*, 2015).

Methods

The study was carried out on a 6-month Holstein calf with clinical history of intermittent diarrhea and erosions in the buccal cavity was admitted at the Clinic. This case report included a full clinical examination, a complete blood count and blood chemistry. Total blood cholesterol was also measured in the dam, sister 1 and sister 2. The calf was spontaneously died 33 days after the admission at the clinic and necropsied. A genetic test was performed using blood for sampling (calf, dam, sister 1, sister 2) and semen (sire) to determine the *APOB* genotype.

Results

The calf was confirmed homozygous for the *APOB* mutation. The sire and the dam resulted heterozygous carriers of the *APOB* mutation whereas the two sisters were free from the *APOB* mutation. The clinical phenotype included failure to thrive and intermittent diarrhea. The culture of buccal swab resulted positive to *Candida albicans*. Marked hypocholesterolemia was present in the affected the calf; in the dam it was slightly decreased. Gross pathology and histology did not show specific findings: the buccal lesions were accompanied by ulcerative erosions in the oesophagus. The intestine showed segmental enteritis and the meningeal vessels were hyperemic. Slight inflammation of the respiratory tract was also evident.

Conclusions

The findings that was possible to obtain during the investigation of the affected calf were quite similar to the recent reports on CD that can be found in the literature (Mock *et al.*, 2016). The lesions at the level of the upper digestive tract, the lung and the central nervous system were considered of secondary origin. They might be a consequence of an increased susceptibility to secondary infections resulting from vitamin deficiency.
In the FHBL (Welty, 2014) the malabsorption of lipid-soluble vitamins (A, D, E, K), leading to retinal degeneration, neuropathy, and coagulopathy is a well-known pathogenetic element (Lee & Hegele, 2014). Moreover, in human patients with FHBL oesophagitis is described as one of the possible complications of the disease (Lee & Hegele, 2014). To our knowledge, the presence of esophagitis as not been reported in bovine CD.

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SIGNIFICATO CLINICO DEI SOFFI CARDIACI NEL VITELLO: CORRELAZIONE TRA RILIEVI AUSCULTATORI ED ECOCARDIOGRAFICI

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Introduction
Il riscontro di soffi cardiaci in soggetti in età neonatale o nel corso delle prime settimane di vita risulta essere una condizione molto frequente, per la presenza di strutture fetali non ancora regredite o per alterazioni transitorie del flusso non legate ad anomalie anatomiche. Ma la presenza di soffi cardiaci può essere legata anche ad alterazioni anatomiche, che possono derivare da difetti cardiaci congeniti o acquisiti. L'obiettivo di questo studio è quello di valutare il significato clinico di soffi cardiaci riscontrati in vitelli di poche settimane di vita, correlando i rilievi auscultatori a quelli ecocardiografici.

Methods
Sessantacinque vitelli di razza Frisona e Chianina, appartenenti a differenti allevamenti, di età < 2 mesi, sono stati sottoposti a visita clinica ed auscultazione cardiaca. Nei soggetti in cui era possibile apprezzare la presenza di un soffio cardiaco, è stata effettuata una valutazione ecocardiografica completa al fine di stabilire la natura del soffio. Tutti i vitelli con presenza di soffi cardiaci sono stati ricontrollati a distanza di 10-15 giorni.

Results
La presenza di un soffio cardiaco veniva messa in evidenza in 41 vitelli. In 23/41 vitelli (età < 10 giorni), i soffi cardiaci erano continui o pre-sistolici, presentavano intensità ≤ 2/6, timbro dolce ed erano meglio auscultabili alla base del cuore. L'esame ecocardiografico associava la presenza di tali soffi a strutture fetali non regredite (dotto o forame di Botallo). Il successivo controllo di tali soggetti non permetteva più di apprezzare alcun rumore di soffio. Tre dei 41 vitelli (età compresa tra 8 e 50 giorni), in cui l'ecocardiografia aveva dimostrato la presenza di difetti cardiaci congeniti, presentavano soffi cardiaci continui o sistolici, di intensità ≥ 3/6, con timbro aspro e punto di massima intensità alla base del cuore. In 15/41 vitelli (età compresa tra 9 e 41 giorni) veniva invece auscultato un soffio sistolico, di intensità ≤ 2/6, a volte intermittente, con timbro dolce e punto di massima intensità alla base del cuore, in assenza di anomalie anatomiche all'ecocardiografia.

Conclusions
L'auscultazione cardiaca nei vitelli di poche settimane di vita consente il riconoscimento e la differenziazione dei soffi cardiaci in innocenti/funzionali e patologici in relazione alla loro intensità, timbro e persistenza dopo il periodo neonatale.

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VENTRICULAR SEPTAL DEFECT IN A FRIESIAN COW

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Introduction

The prevalence of congenital heart defects in cattle settles between 0.17% and 0.7% ([1; 2]).
Ventricular septal defects, ectopia cordis, ventricular hypoplasia, patent ductus arteriosus and dextraposed aorta are the most frequent ([3; 4]).
Symptoms include poor growth, exercise intolerance, reduced performance and sudden death ([5]).

Methods

A female, 20-month-old, Friesian bovine has been referred at the Veterinary Hospital of the Camerino University for a heart murmur. After a physical examination, an echocardiography (m-mode, 2D-mode and Doppler) has been performed by the use of an Esaote MyLab 30 vet gold echographer, equipped with a multi-frequencies phased-array probe (1-4MHz) and a cable for electrocardiographic monitoring.

Results

The clinical examination revealed a poor growth; a tachycardia (75 bpm); a grade 4/6 systolic cardiac murmur over the right hemithorax, at the level of the tricuspid valve, near the sternal border; a grade 3/6 systolic murmur at the left heart base, at the level of pulmonary valve.
The Echocardiography showed: a 14.6mm ventricular septal defect (VSD) at the level of the membranous portion of the septum; a 4.48m/s peak systolic left to right shunt flow velocity; a 2.59m/s (26.8mmHg) peak systolic blood flow through the pulmonary valve; a 80.3mmHg interventricular gradient; a 0.22 (<0.30) VSD to aortic root ratio (DIV/Ao).

Conclusions

The diagnosis of VSD with a resistive flow and a mild secondary pulmonary stenosis was then possible, according to the literature ([6]).
The early diagnosis of congenital heart disease in cattle is therefore very important for the prognosis and the economic implications for the farm.

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VALUTAZIONE DEGLI ASPETTI CLINICI, ULTRASONOGRAFICI ED EMOGASANALITICI IN VITELLI AFFETTI DA BRONCOPOLMONITE ENZOOTICA

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Introduzione

La broncopolmonite enzootica rappresenta una delle più comuni patologie che colpiscono l'allevamento bovino in tutto il mondo ed è una delle maggiori cause di perdita economica aziendale. La valutazione oggettiva delle lesioni anatomiche tipiche di questa affezione riveste un ruolo fondamentale per migliorare gli aspetti diagnostici e prognostici della patologia. Lo scopo di questo studio è correlare le manifestazioni cliniche, i reperti ecografici polmonari e la variazione dei valori di ossigenazione ematica tra vitelli affetti da broncopolmonite enzootica e vitelli senza sintomi di patologia respiratoria.

Materiali e metodi

Vitelli di frisona italiana ricoverati presso la Clinica dei Ruminati e del Suino di un'età compresa tra 30 giorni e 6 mesi, con un punteggio di *Calf respiratory score* (CRS) ≥ 5 sono stati inclusi nel gruppo dei casi. Come gruppo controllo sono stati selezionati vitelli con le medesime caratteristiche, ma con un punteggio del CRS < 5. Ogni vitello è stato sottoposto a visita clinica, ecografia polmonare ed emogasanalisi su sangue arterioso. Per rendere la valutazione clinica ed ultrasonografica confrontabile tra i soggetti, per ogni vitello è stato registrato il CRS, lo score di auscultazione polmonare (AUS), e il *lung ultrasonographic score system* (LUS). Gli animali sono stati suddivisi in gruppi in base ai risultati dei tre score utilizzati: CRS-basso, CRS-medio, CRS-alto, AUS-basso, AUS-alto, LUS-basso, LUS-alto.
L'analisi statistica dei rilievi clinici, ultrasonografici ed emogasanalitici dei gruppi sono stati messi in correlazione tra loro mediante il test ANOVA.

Risultati

Sono stati inclusi 18 vitelli (11 casi e 7 controlli). I risultati evidenziano come i vitelli del gruppo CRS-basso abbiano una differenza statisticamente significativa di LUS, AUS, PO_2, AaDO2, sodio, cloro e potassio rispetto ai vitelli nei gruppi CRS-medio e CRS-alto. Nessuna differenza è stata evidenziata tra i gruppi CRS-medio e CRS-alto per questi parametri (Tab. 1).
L'ecografia è risultata essere statisticamente significativa tra i gruppi CRS-basso e CRS-medio/alto, ma delle lesioni polmonari sono state identificate anche negli animali con CRS basso. L'esame emogasanalitico su sangue arterioso ha rilevato una riduzione statisticamente significativa della funzionalità polmonare tra gli animali con CRS ≥ 5 e gli animali con CRS< 5, ma non correlata all'entità delle lesioni polmonari e al crescere degli score clinici.
La mortalità nel gruppo dei casi è risultata essere del 18%, mentre nel gruppo dei controlli la mortalità è stata dello 0%.

Conclusioni

Il CRS e l'auscultazione sono utili per distinguere gli animali sani da quelli malati, ma non permettono di distinguere con precisione l'entità delle lesioni polmonari. In tal senso, l'esame di prima scelta risulta essere l'ecografia, che può essere associata all'esame emogasanalitico per avere un'idea più precisa della compromissione funzionale del polmone. L'auscultazione, l'ecografia toracica e l'esame emogasanalitico possono essere eseguiti al fine di stabilire

una terapia coerente con il tipo e l'estensione delle lesioni polmonari. È importante conoscere la prognosi in funzione della compromissione polmonare, in quanto l'estensione del consolidamento polmonare a più lobi suggerisce una prognosi negativa.

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Tabella 1 Media e deviazione standard dello score dell'auscultazione, dell'ecografia toracica e dei parametri emo-gasanalitici dei tre gruppi

	CRS-sani1	CRS-medio2	CRS-alto3	1-2	1-3	2-3
Lung ultrasound score (LUS)	0,86±0,69	3,67±1,51	4,67±0,58	*	*	
Score di ascultazione (AUS)	0,14±0,38	3,29±1,11	3,75±0,5	*	*	
pH	7,43±0,03	7,46±0,05	7,43±0,03			
Pressione parziale di anidride carbonica (mmHg)	44,11±5,46	43,71±8,65	47±9,63			
Pressione parziale di ossigeno (mmHg)	102,43±16,7	81±16,91	65±19,93	*	*	
Temperatura (°C)	39,11±0,28	38,65±0,49	38,95±0,83	*		
Base Excess (mmol/L)	3,53±1,56	5,5±3,67	5,58±6,25			
Anidride carbonica totale (mmol/L)	28,9±2,28	30,83±4,68	31,38±7,15	*		
Bicarbonato ematico (mmol/L)	27,69±2,15	29,60±4,45	30,45±7,11			
Saturazione d'ossigeno (%)	95,71±3,09	94,57±4,04	87±10,23			
Alveolar-arterial oxygen difference (mmHg)	1,57±4,16	15,75±12,03	27,55±12,90	*	*	
Contenuto di ossigeno (vol%)	11,74±1,48	13,41±5,34	12,88±1,53			
Natriemia (mmol/L)	138,57±1,99	139 ±4,65	132,25±3,86	*	*	
Kaliemia (mmol/L)	3,64±0,22	3,31±0,33	4±0,18	*	*	
Cloremia (mmol/L)	103,43±1,27	103,29±3,15	97,5±2,38	*	*	
Anion Gap (mmol/L)	11,07±1,81	9,29±3,52	9,03±6,79			
Emoglobina (g/dL)	8,57±1,18	8,26±2,94	10,75±0,76			
Ematocrito (%)	25,71±3,82	20,85±9,71	32±2,16	*		

(*) valori statisticamente significativi per P <0,05.

FOCUSED LUNG ULTRASONOGRAPHY OF CALVES (FLUC): VALUTAZIONE DI UN PROTOCOLLO RAPIDO PER LA DIAGNOSI ULTRASONOGRAFICA DELLA BRONCOPOLMONITE ENZOOTICA

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Introduzione

Nella pratica buiatrica vengono comunemente usati gli score clinici che rappresentano un mezzo diagnostico pratico ed immediato per la diagnosi di broncopolmonite enzootica (BRD), nonostante la sensibilità e la specificità di questi score sia bassa (*Calf respiratory score* – CRS: sensibilità 55%, specificità 58%; auscultazione toracica: sensibilità 3-17%). L'ecografia del torace, invece, è un esame molto accurato che permette di avere un quadro dei danni anatomici al polmone, difficilmente riscontrabili con altri mezzo diagnostici. Benché il "*lung ultrasonographic score system*" (LUS), rappresenti il "gold standard" per la valutazione delle alterazioni patologiche del polmone, questa tecnica si dimostra spesso indaginosa soprattutto per i veterinari che hanno poca dimestichezza con l'ecografia toracica. (aggiungere specificità e sensibilità score clinici e eco)

Lo scopo di questo studio è stabilire la validità di un protocollo ecografico rapido utilizzabile anche da veterinari senza esperienza in ecografia del torace, limitando la scansione a specifiche regioni dell'area polmonare (lobi craniali) che vengono comunemente colpite in corso di BRD.

Materiali e metodi

Vitelli di razza frisona italiana con un'età compresa tra 30 giorni e 6 mesi, un punteggio di *Calf respiratory score* (CRS) maggiore a 5 e l'assenza di patologie concomitanti sono stati selezionati come casi. Come controlli sono stati selezionati vitelli con le medesime caratteristiche ma con un punteggio del CRS inferiore a 5. Ogni vitello è stato sottoposto a visita clinica, a compilazione del CRS e a LUS.

Immediatamente dopo la scansione ecografica, un operatore con scarsa esperienza ha effettuato la sola ecografia del V spazio intercostale di entrambi gli emitoraci (focused lung ultrasonography of calves; FLUC) utilizzando come marker ventrale la giunzione costo-condrale e la deviazione pleurica. Sono state calcolate sensibilità, specificità e valori predittivi negativo e positivo per la presenza del consolidamento polmonare riscontrato tramite FLUC.

Risultati

Nello studio sono stati inclusi 26 vitelli (19 "malati" e 7 "sani"). Tramite esecuzione della FLUC nel gruppo "malati" è stato possibile rinvenire consolidamento polmonare a livello del quinto spazio intercostale destro e/o sinistro in 17 animali su 19. I due animali che non presentavano consolidamento avevano numerosi artefatti a coda di cometa a livello del V spazio intercostale. Nel gruppo "sani" la FLUC non ha riscontrato la presenza di consolidamento polmonare in nessun animale. Valutando gli animali tramite LUS, tutti gli animali inclusi nel gruppo "malati" hanno mostrato uno score ≥ 2, mentre gli animali nel gruppo "sani" hanno ottenuto uno score < 2.

L'accuratezza della FLUC, confrontata all'ecografia totale dell'area polmonare, è risultata essere pari all'85%. La sensibilità è risultata essere 81% e la specificità 100%. Il valore predittivo positivo del test è stato pari al 100%, mentre il valore predittivo negativo 56%.

Conclusioni

La metodica FLUC si è rivelata essere una metodica pratica, rapida e facilmente eseguibile da un solo operatore, in grado di dare una buona rappresentazione della situazione polmonare. Può essere quindi considerato un ulteriore strumento per i veterinari di campo per raggiungere una precoce, accurata e corretta diagnosi della broncopolmonite enzootica con riferimenti riguardanti il tipo di lesioni, fondamentale per applicare un protocollo terapeutico efficace e risolutivo.

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EFFECT OF DIETARY PHOSPHORUS DEPRIVATION ON LEUKOCYTE FUNCTION IN TRANSITION COWS

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Introduction

Hypophosphatemia hampers immune function in different species, an effect barely studied in dairy cows that commonly develop hypophosphatemia in early lactation. The objective of this study was to determine the effect of hypophosphatemia on leukocyte function of periparturient cows.

Methods

Eighteen late pregnant cows were randomly assigned to either a treatment group that was offered a markedly P-deficient diet or a control group receiving a ration with adequate P-content from 4 weeks ante- to 4 weeks postpartum. P-depletion was followed by two weeks of P-supplementation during which both groups received a diet with adequate P- content. Blood samples for leukocyte counts and leukocyte function analysis were obtained immediately prior to dietary P-deprivation, after two weeks of P-deprivation, within the first week of lactation, at the end of the P-depletion period and after 2 weeks of dietary P-supplementation.

Results

Dietary P-deprivation resulted in pronounced and sustained hypophosphatemia. Time effects were observed on the counts of different leukocyte fractions, the number of phagocyting granulocytes, the mean fluorescence index (MFI), and the lymphocyte proliferation. Differences between P-deprived and control cows were only identified for the MFI that was lower in P-deprived cows compared to control cows. The correlation and regression analyses revealed positive associations of the plasma phosphate concentration with the granulocyte count, the number of phagocyting granulocytes and the MFI at the end of the dietary P-deprivation.

Conclusions

These results suggest a mild negative effect of pronounced and sustained hypophosphatemia on the granulocyte count and the phagocytic activity of granulocytes in transition dairy cows.

EVALUATION OF A NEW BIOCIDE FOOTBATH SOLUTION IN THE PREVENTION AND HEALING OF DIGITAL DERMATITIS LESIONS IN DAIRY COWS. A RANDOMIZED CONTROLLED CLINICAL TRIAL

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Introduction
The main objective of this study was to assess the effectiveness of new biodegradable biocidal footbath solution (Pink-Step™, Qalian, France) without copper sulfate or formaldehyde used at different regimens on the healing and the occurrence of bovine digital dermatitis (bDD) lesions.

Methods
The investigation was conducted through a randomized controlled within cow clinical trial in which the hind feet of cows from each farm were allocated either to the control group or to one of two footbath regimen groups. The trial involved 1036 cows (2072 feet) from 10 dairy farms located in western France where bDD was endemic. Split footbaths were placed at the exit of the milking parlor of each farm, allowing the biocide solution to be administered to one side of the cows while using the other side as a negative control. According to the frequency of administration, footbaths regimen groups were moderate (MR = 2 days every week for the first month, then every fortnight for the second month, and then once a month) or intensive (IR = 2 days every week for the first 2 months, and then every fortnight). Both regimens were administered during approximately 140 days, and feet were evaluated for the presence of bDD lesions at least once a month in the milking parlor. Nested survival models were used to estimate the relative impact of the footbath regimens and other concomitant risk factors on the time that bDD lesions occurred (preventive effect) or healed (healing effect).

Results
No preventive effect of the solution was evidenced during the trial. Moreover, the risk for bDD occurrence was increased significantly by poor feet cleanliness at both the cow (HR = 1.69, CI 1.21–2.39) and farm level (HR = 2.06, CI 1.44–2.94). Otherwise, the results indicate that the use of Pink-Step™ footbaths in an intensive regimen is effective in improving the healing of bDD lesions (HR = 1.79, CI 1.12–2.88). The time to healing was also shortened in inactive lesions (HR = 2.19, CI 1.42–3.37). Conversely, the time to healing was delayed in feet receiving hoof-trimming (HR 0.41, CI 0.26–0.62), in cows with a contralateral lesion (HR 0.32, CI 0.22–0.46) or in late lactation (HR 0.61 CI 0.43–0.85), and finally in farms with large herds (>100 cows) (HR = 0.48, CI 0.34–0.67).

Conclusions
These findings reinforce the crucial role of hygiene in bDD disease dynamics and highlight the importance of implementing multiple control measures simultaneously, such as hygiene improvements in the barn, early detection and treatment of bDD lesions and the correct usage of individual and collective treatments.

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THE USE OF CAPILLARY BLOOD FOR DETECTION OF THE BETA-HYDROXYBUTYRATE (BHB) CONCENTRATION IN CATTLE

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Introduction

Increased concentrations of ketone bodies (KB), including beta-hydroxybutyrate (BHB) due to a negative energy balance is a common finding in high yielding dairy cows during early lactation. Elevated concentrations of KB not only have been associated with a reduced milk yield, but also with an increased risk for the occurrence of additional diseases (Suthar et al. 2013). Handheld devices to detect the level of KB in bovine blood samples, originally intended for the use in humans, are widely used today. Electronic devices also had been used on capillary blood from the external vulva, reporting a comparable performance to venous blood samples after modification of threshold levels (Iwersen et al. 2017).

The aim of the present study was to evaluate a handheld electronic device, intended only for the use in veterinary medicine, to detect BHB-concentrations in capillary blood from the external vulva in cows (WellionVet BELUA, MED TRUST Handels GmbH, Marz, Austria).

Methods

Altogether, 250 blood samples, originated from female cattle with a minimum age of 6 months and in different stages of the production cycle, were enrolled in the study. Capillary blood gained by puncture of the external vulva, was tested for BHB by a handheld device (WellionVet BELUA, MED TRUST Handels GmbH, Marz, Austria). Venous whole blood, collected from the jugular vein at the same time, was sent to a certified laboratory to evaluate the BHB-concentration as a reference method.

Results

The BHB-results obtained from the capillary blood showed a high agreement with the reference method with a correlation coefficient of 0.94 (p=0.000) and a Kappa-value of 0.89. Altogether, 98.0% of all samples where correctly classified as above or below the cut off of 1.2 mmol/l (Mahrt et al. 2015) by the handheld device. The calculated sensitivity of the test device applied in capillary blood was 96% and the specificity 98% respectively, when compared to the reference method. The ROC (Receiver operating Characteristics)-Analysis of the BHB-concentrations measured with the handheld device compared to the reference method showed an area under the curve (AUC) of 0.998. An increase of the correlation by adaptation of the cut off level for capillary blood samples could not be achieved.

Conclusions

Based on the results of the present study it can be concluded, that the used handheld device to evaluate the BHB concentration in capillary blood from the external vulva, provides a reliable tool for the detection of ketosis in cows. A modification of the BHB-threshold for ketosis applied for venous whole blood of 1.2 mmol/l seems not to be necessary.

Acknowledgement

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THE CONTROL OF URINE PH AND MAGNESIUM CONTENT IN CLOSE -UP RATIONS IMPROVE DAIRY COWS HEALTH: A CASE STUDY

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Introduction

Subclinical hypocalcemia (SH) in dairy cows is responsible for reduced muscles contractility and impaired neutrophils functions that are involved in most postpartum problems like retained foetal membranes (RFM), metritis (M) and milk fever (MF). Compensated metabolic acidosis, induced by negative DCAD of prepartum diet, together with Mg supplementation, has been proved to increase postpartum blood Ca availability.
The objective of this study was to confirm the effectiveness of this strategy also in Parmigiano Reggiano dry diets reach in forages.

Methods

Two Parmigiano Reggiano dairy herds (h1 and h2), with 90 and 730 milked cows, respectively, were monitored from 1/2017 to 6/2018. For a 6 months period (TRT) prepartum diet was enhanced with MgCl (0.5 kg/h/d, h1) and MgCl (0.5 kg/h/d) + anionic supplement (0.6 kg/h/d, Animate®, h2).
Urine pH was monitored at 15 and 7 days before calving and incidence (% of calving) of RFM, M and MF was recorded. TRT period was compared with the same 6 months period of the previews year (CTR) where no strategies for the control of SH were applied.

Results

In the CTR period, 57 cows calved in h1 and 413 in h2, and their urine pH during close-up was >8. In the TRT period, 30 and 437 cows calved in h1 and h2, and their close-up urine pH was on average 6 and 6.5.
In h1, incidence of diseases linked to SH in primiparous (P) and multiparous (ML) cows was strongly reduced.
RFM dropped from 35% (45 and 25%, in P and ML) to 10% (12 and 8 %, for P and ML). Likewise, cases of M decreased from 23 to 10% (24 and 21 vs 11 and 8%, for P and ML) and MF was eliminated (4% in the CTR period vs 0% in TRT).
The same trend was observed in h2, where the incidence of RFM was reduced in both P and ML cows from 0.6 and 4% to 0 and 3%, respectively.
In h2, the reduction of M decreased particularly in P cows (9 to 2%) while in ML remained steady (4%).
MF was already rare in h2 (0.4%) in CTR period and in the TRT no cases of MF occurred.

Conclusions

These results confirm that during prepartum period a negative DCAD and a higher Mg availability improve fresh cows health.

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EFFECTS OF PRE-PARTUM DAIRY COW MANAGEMENT ON CALF DEVELOPMENT AND FOETAL PROGRAMMING - A REVIEW

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Introduction
Research on the management of the pre-partum cow typically has focused on post-partum cow performance (yield, fertility etc.). With the realisation that many disease conditions in later life may in part stem from influences on the developing fetus in-utero, the aspect of foetal programming is receiving increasing interest.
This is a review of recent publications on pre-partum cow management and its influence on foetal programming in dairy calves, with a particular focus on the calf's immune system.

Methods
A literature review was undertaken, using multiple veterinary medicine publication databases, and a set of key words.

Results
Investigation of foetal programming in dairy cattle appears to be relatively limited. However, research on heat stress, dry-period length and dry period ration energy density allow formulation of the management factors important in the optimum development of the bovine fetus.

Heat stress has an influence on placental development, and the calf's birth weight, immune response, growth, development and metabolism. While a short dry period may be beneficial to the cow and does not appear to have a detrimental effect on the calf, complete omission of a dry period carries a risk of inadequate passive transfer. Variations in energy density of the ration of pre-partum cows showed effects on colostrum quality and quantity, oxidative stress and growth and development.

Conclusions
While research in this area is still limited, there is evidence that the management of the pre-partum dairy cow has an effect on the development and future performance of the fetus and calf. There are indications that heat stress and ration energy density may also have long term effects on the calf's health and production ability.

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GASTROINTESTINAL PARASITES IN DAIRY CATTLE IN NORTHERN ITALY: UP TO DATE AND RISK FACTORS

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Introduction

Worldwide, cattle are usually infected by gastrointestinal nematodes (GIN) that are a cause of production losses. Moreover, *Eimeria* spp. is one of the most critical protozoan parasites causing gastrointestinal problems in calves and younger stock. A study was planned to characterize the parasitological status of dairy cattle in the largest area of cattle breeding in Italy to update epidemiological data and to analyze risk factors.

Methods

In the present study both intensive, and traditional farms were surveyed. From March 2017 to June 2018, 17 dairy farms in Northern Italy (Lombardy and Liguria) were included in the study. An overall of 440 fecal samples were collected from cattle belonging to the following categories: calves <6 months (n°117), heifers (n°119), cows (n°202) and bulls (n°2). Data on animal and management were collected by a questionnaire at sampling. A quali-quantitative copromicroscopic analysis was performed by a FLOTAC Dual Technique® (FDT) using two flotation solutions (NaCl, sg=1200 and ZnSO4, sg=1350)[1]. EPG (eggs/g of feces) and OPG (oocysts/g of feces) were determined.

Results

Eimeria spp., Strongylida, *Trichuris* spp., *Nematodirus* spp. and *Capillaria* spp. were the recovered taxa by the FDT showing the prevalence values of 46.6%, 19.8%, 2.3%, 0.9% and 0.2% respectively. No cestodes/trematodes eggs and no nematodes larvae were found. Mean abundance of *Eimeria* and Strongylida were 41.5 OPG (s.d. 122.5; min. 0, max 1100) and 4 EPG (s.d. 14.2; min. 0, max. 172) respectively. *Eimeria* and Strongylida infections presented different patterns in calves, heifers, and cows. *Eimeria* observed prevalence was extremely high in heifers (91.6%; 109/119), while lower prevalence was observed in calves (29.1%) and cows (30.7%;). Abundance peaked in heifers too (94 OPG), but it also differed between calves (45.2 OPG) and cows (9.5 OPG). Strongylida prevalence and abundance were higher in heifers (31.1%; 4.7 EPG) and cows (23.3%; 5.8 EPG) than in calves (2.6%; 0.3 EPG). In the two tested bulls, no parasitic infections were detected. Strongylida eggs were also found in not grazing cattle, but in animals from extensive farm presented significant higher prevalence and abundance ($p<0.001$). Differences in *Eimeria* infection was related to categories whereas the management did not result in a significant risk factor.

Conclusions

The study revealed the presence of sub-clinical gastrointestinal nematode infections in dairy cattle under different rearing systems, that should warrant attention by veterinarians and breeders especially if occurring in high producers.

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INDAGINI SIEROLOGICHE SU LATTE DI MASSA IN PROVINCIA DI BRESCIA

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Introduction

Il latte di massa in un allevamento bovino può essere un semplice ed economico strumento per la valutazione sanitaria non solo della singola realtà ma dell'intero territorio provinciale. Tramite esso si può infatti monitorare la presenza di diverse malattie infettive e valutare le migliori strategie di controllo

Methods

Nel corso del primo semestre 2017, nell'ambito del monitoraggio sul latte di massa per la brucellosi previsto dal D.D.U.O. n. 97/2011 e successive modifiche, sono stati raccolti 1570 campioni di latte di massa di allevamenti bovini presenti sul territorio della provincia di Brescia; di questi, 1236 fanno parte dell'ATS di Brescia e 334 dell'ATS della Montagna (Val Camonica).

Ciascun campione, oltre che per Brucellosi, è stato analizzato tramite tecnica ELISA per la ricerca anticorpale nei confronti di IBRgE, IBRtot, *Neospora caninum* e BVD anti-ns2-3.

Results

Gli esami di laboratorio evidenziano una positività per IBR gE del 23% (356/1570 aziende) tra gli allevamenti della provincia di Brescia; di questi, solo uno si trova nell'ATS della Val Camonica, mentre tutti gli altri sono nell'ATS di Brescia. Per quanto riguarda la prova IBR tot è stata rilevata una positività complessiva del 64,45%, di cui il 41,8% si riferisce ad aziende che, molto verosimilmente, applicano piani vaccinali secondo quanto previsto dal Piano Regionale.

Per quanto riguarda *Neospora caninum,* il 21% (331/1570) delle aziende è risultata positiva, anche in questo caso con una prevalenza maggiore nell'ATS di Brescia (25%) rispetto all'ATS della Montagna (8%).

La prova ELISA anti-ns2-3 ha evidenziato una elevata prevalenza nei confronti del virus BVD (81,8%). Quelli con titoli anticorpali maggiori o uguali a 1,0 s/p sono l'11,5% (180/1570), mentre i negativi rappresentano il 18% (286/1570).

Nel caso dell'IBR le prove sierologiche su latte di massa vengono già utilizzate per l'attribuzione delle qualifiche previste dal Piano Regionale.

La prova ELISA per Neospora su latte di massa permette di rilevare solo sieroprevalenze relativamente elevate (superiori al 15%) (Bartles et al., 2005).

La prova ELISA anti-ns2-3 su latte ha messo in evidenza una prevalenza piuttosto elevata sul territorio che dovrebbe essere approfondita al fine di stabilire la reale diffusione del virus.

Conclusions

Il latte di massa può quindi costituire un'ottima matrice per il monitoraggio sanitario del territorio nel tempo. Le positività delle singole aziende potranno poi essere approfondite tramite ulteriori indagini sui singoli animali.

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EVALUATION OF THE PARATUBERCULOSIS HERD STATUS ESTABLISHED BY BOOT SWAB SAMPLES IN *MYCOBACTERIUM AVIUM* SUBSP. *PARATUBERCULOSIS* POSITIVE SMALL CATTLE HERDS

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Introduction

Paratuberculosis (Johne's disease, JD) is caused by *Mycobacterium avium* ssp. *paratuberculosis* (MAP). JD is a chronic enteric infection in cattle with a long period of latency (Sweeney 2011). In the early stage of the infection, neither fecal shedding of MAP nor specific antibodies occurs, thereby hampering the detection of infected individuals (Sweeney 1996). Boot swab sampling has ben applied to detect MAP-positive cattle herds (Eisenberg et al. 2013), with a reported sensitivity between 50% and 90% (Donat et al. 2016), depending on the intra-herd-prevalence of MAP-shedding individuals.
The aim of the present study was to evaluate the development of the MAP-herd status determined by boot swab samples and the association of the boot swab results with the intra herd prevalence of animals shedding MAP with their feces in small structured cattle herds.

Methods

Individual fecal samples were collected from adult animals in 275 cattle farms identified positive for MAP within 1.5 years before. Average herd size of farms enrolled was 14 animals with a minimum age of 2 years. In addition, a boot swab sample was collected as described by Donat et al. (2016) in 30 of these farms, chosen randomly. Fecal samples were tested for MAP by a combination of solid culture and PCR. A logistic regression and the Pearson Correlation were calculated to calculate the relation between MAP-positive cows and boot swab result.

Results

In 66.9% of the herds, no positive individual fecal sample was detected, indicating possible fadeout of the infection. In 9 (30.0%) of the 30 selected farms, at least one MAP-shedding individual was found, but boot swab samples were positive in 5 (16.7%) of these farms only. None of the herds without individual MAP-shedders had a positive boot swab sample result respectively. The statistic evaluation showed that boot swabs were positive with a probability near 100 %, if at least 4 animals (50.0% intra herd prevalence) were shedding MAP with their feces within in a herd.

Conclusions

The results from the present study indicate that boot swab samples have to be interpreted with caution in smaller herds, as a relatively high intra-herd prevalence of MAP-shedding animals is needed to assure reliable results. To avoid false negative boot swab results, repeated sampling should be applied to increase the probability to detect MAP-positive herds (Eisenberg et al., 2013; Khol et al., 2009).

Acknowledgement
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FACTORS ASSOCIATED WITH ELISA POSITIVITY OF HEIFERS IN *MYCOBACTERIUM AVIUM* SUBSP. *PARATUBERCULOSIS* INFECTED HERDS

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Introduction

Understanding the mechanisms underlying *Mycobacterium avium* subsp. *paratuberculosis* (Map) transmission aids in controlling the infection. To gain such understanding, the identification of risk factors for infection is useful. To identify risk factors for infection, test positivity is frequently used as proxy parameter for infection while all available test results are included in the analyses. However, this approach is inappropriate in herds participating in test-and-cull schemes in which individuals are repeatedly tested. Culling test positive cattle is likely to result in a reduced diagnostic sensitivity at the subsequent test round, which in turn may result in biased estimates of risk factors for infection. This hurdle may be circumvented by including only the first test result of each individual in the analyses. Therefore, the aim of this study was to determine the risk factors associated with a positive milk ELISA result in heifers that were tested for the first time.

Methods

Map antibody ELISA results of milk samples submitted between January 2006 and March 2018 from a cohort of 136 dairy herds were analysed. The herds entered the Dutch milk quality assurance programme for paratuberculosis in 2006 or 2007 with at least 2% positive ELISA results within a 12-month period around the initial assessment of the herd. For each individual, the first test result was included in the analyses, provided that this result was obtained at 24 to 36 months of age. Sample-to-positive ratio's ≥1.00 were considered positive. The data were analysed with a multi-variable logistic regression model.

Results

Heifers born within five years (OR=0.45) or five to ten years (OR=0.17) after the initial assessment of the herd were less likely to be ELISA positive than heifers born before the initial assessment. Heifers born in an open herd were more likely (OR=1.19) to be ELISA positive than heifers born in a closed herd. Heifers born to a dam with a highest sample-to-positive ratio ≥ 1.00 were more likely (OR=2.14) to be ELISA positive than heifers born to a dam with sample-to-positive ratio's <0.30 only. Other risk factors included in the final model were age at testing, the proportion of positive samples from the herd in a 12-month period around the initial assessment, region and soil type.

Conclusion

We conclude that prolonged participation in the paratuberculosis programme and a closed herd management are associated with a lower risk of a positive ELISA results in heifers. The offspring of high positive dams is more likely to become ELISA positive. Thus, both the test result of the individual as well as test results of its dam should be taken into account in decisions on breeding and culling.

AGE AT ONSET OF ELISA POSITIVITY OF CATTLE IN HERDS PARTICIPATING IN A MILK QUALITY ASSURANCE PROGRAMME FOR PARATUBERCULOSIS

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Introduction

Age at onset of a detectable antibody response is an important parameter in the control of *Mycobacterium avium* subsp. *paratuberculosis* (Map) infections in cattle. Firstly, age at onset of the antibody response depends on the age at infection and the infectious dose. Thus, a delayed onset of Map antibody ELISA positivity indicates a decreasing infection pressure. Secondly, a delayed onset of ELISA positivity of an individual is a likely reflection of a delayed onset of infectiousness of this individual. Thirdly, a delayed onset of ELISA positivity in herds participating in a test-and-cull scheme results in a higher age at culling because of test positivity, allowing for a longer productive life span of cattle. Therefore, the aim of this study was to quantify the distribution of age at onset of ELISA positivity.

Methods

Age at onset of Map antibody ELISA positivity was quantified using all ELISA results obtained between January 2006 and March 2018 in a cohort of 136 dairy herds that entered the Dutch milk quality assurance programme in 2006 and 2007 with at least 2% positive ELISA results within a 12-month period around the initial assessment of the herd. Serum and milk samples with a sample-to-positive ratio > 1.00 were considered positive. The data were analysed with a Weibull proportional hazards model, taking into account the asynchronous interval censored nature of the data.

Results

In total, results of 103,904 samples from 42,798 cattle in 136 herds were available for analyses, of which 2.5% were ELISA positive. The fitted survival, i.e. the proportion of cattle remaining ELISA negative until a certain age, was always higher for cattle born within five years after the initial assessment of the herd than for cattle born within five years before the initial assessment. Up to 6.5 years of age, the same applied to cattle born between 5 and 10 years after the initial assessment; sufficient data to accurately estimate survival at higher ages were not yet available in this group of cattle.

Conclusion

We conclude that the age at onset of Map antibody ELISA positivity was delayed in cattle born after the initial assessment of the herd, which indicates a reduction of the infection pressure in infected herds participating in the milk quality assurance programme.

BOVINE PARATUBERCULOSIS IN LOMBARDY: RESULTS AFTER FOUR YEARS OF APPLICATION OF THE NATIONAL GUIDELINES

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Introduction

Paratuberculosis is widespread in Italy, where over 50% of bovine herds are infected (2).
In order to improve the health status of dairy herds and to protect the dairy export market, the Italian Ministry of Health issued the "*National guidelines for the control of bovine paratuberculosis and for assigning the health ranking of herds*" (1). All of the regions have formally adopted the guidelines, but their application, being voluntary, is not uniform throughout the Italian territory.

Methods

Here we present the results of the first four years of application of the National guidelines in Lombardy, where 5,673 dairy herds and 1,000,000 total heads (including 500,000 dairy cows) are present and where nearly 40% of Italian milk is produced.

Results

In 2017, out of 5,673 herds, 4,157 officially adopted the guidelines.
From 2014 to 2017 we observed:

- a rise in the number of herds joining the plan (from 56.0% to 73.3% of total dairy herds)
- a rise in the number of tested herds (from 7.2% to 20.9% of total dairy herds)
- a reduction of both infected herds (from 74.2% to 56.0% of tested herds) and positive cows (from 4.2% to 1.9% of tested cows)
- a reduction of "high within-prevalence herds" (>5%) (from 28.8% to 8.4%)
- a rise in the number of herds obtaining a health ranking (from 340 to 1,062), in particular PT1 (from 187 to 577) and PT2 (from 137 to 393).

Conclusions

In the Lombardy region, during the period 2014-2017, we recorded a general improvement in the situation of both prevalence of infected herds and infected animals, despite the absence of economical compensation for culled animals and financial support for the ELISA tests, which are paid for exclusively by the farmers.
Among the critical points, there is the under-reporting of clinical cases, partially due to the fact that farmers tend to cull seropositive cows, in particular with high S/P values, anticipating the onset of clinical disease.
The main strength of the improvements recorded is the synergic collaboration among health veterinary services, laboratories, practitioners and farmers through the specific creation of support groups, in order to sustain joining and participation in the program; for this purpose the information resources created by the National reference center for paratuberculosis were of help.

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BOVINE BESNOITIOSIS IN NATURALLY INFECTED DAIRY CATTLE IN LOMBARDY (ITALY)

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Introduction

Bovine besnoitiosis, caused by *Besnoitia besnoiti*, is a (re)emerging disease in Europe, including Italy [1]. However, its economic impact is scarcely considered and generally underestimated and there are still little studied aspects concerning both the parasite and the disease. Following a natural outbreak of besnoitiosis in a dairy herd, a study was planned to characterize *B. besnoiti* infection in cattle through a multidisciplinary approach.

Methods

Suspicious abortions and clinical cases of besnoitiosis were reported in a dairy farm (September 2017, Northern Italy) housing 216 Holstein Friesian cattle. Blood samples were collected; haematological (WBC, RBC, Hb, Ht , MCV, MCH, MCHC, RDW, PLT, MPV, Pct, PDW, Lymphocyte, Granulocyte) and serological analyses for *B. besnoiti* antibodies using the recommended approach of initial screening by ELISA (ID Screen® Besnoitia Indirect 2.0, IDVET) and confirmatory Western Blot [2] were performed. Seropositive animals were examined for the presence of tissue cysts. Reproductive and productive data were collected.

Results

Out of 59 animals resulted positive to ELISA, 50 (23%) were confirmed by Western Blot. *B. besnoiti* prevalence was higher in cows (41%) than in calves (12%); any heifer did not result positive to the infection. Considering haematological parameters, a significant shift in the differential leucocyte formula from lymphocyte to granulocyte was recorded in infected cows (Mean±S.D.: L=46.1±18.4, G=53.9±18.4) if compared to negative animals (Student's T-test, p=0.012). Out of 31 examined animals, 24 showed tissue cysts localized in skin, sclera and/or vulva. Any significative correlation between infection and reduction of reproductive and productive parameters was not detected.

Conclusions

The prevalence of *B. besnoiti* infection was higher than the values reported in a previous study carried out in dairy cattle in Central Italy [3]. The results demonstrated that bovine besnoitiosis continues to spread in Italy: standardized diagnostic procedures including clinical and laboratory tests should be implemented as prerequisite to design specific control programs, to be adapted to the epidemiological situation of each herd or region. Breeders and veterinarians should be aware of this parasitic disease with consequences on health and well-being of infected animals, as well as on the economy of affected farms.

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CORRELAZIONE TRA BENESSERE ANIMALE E PREVALENZA DI CLAMIDIOSI E NEOSPOROSI IN AZIENDE DI BOVINE DA LATTE

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Introduzione
L'obiettivo del lavoro è stato studiare la correlazione tra le principali malattie (diagnosticate attraverso esami sierologici), il grado di benessere e la biosicurezza riscontrate in ogni azienda di bovine da latte oggetto dello studio. Sono state scelte 35 aziende rappresentative del territorio siciliano in particolare della zona del ragusano. Delle quali 15 aziende con stabulazione libera e le restanti a stabulazione libera con pascolo.

Metodi
Nelle aziende è stata effettuata la valutazione del "benessere animale" compilando la check-list redatta dal Centro Di Referenza Nazionale Per Il Benessere Animale del IZS di Lombardia ed Emilia Romagna. Tale Check-list valuta i pericoli attraverso parametri collocati in 4 aree. In questo lavoro si è presa in considerazione l'Area di "Biosicurezza". Nelle 35 aziende sono stati effettuati prelievi sui capi presenti per la diagnosi sierologica di Clamidiosi e Neosporosi, tramite metodica ELISA .

Risultati
Nelle 35 aziende sono stati eseguiti prelievi su 3865 bovine da latte. Di seguito si riportano i valori minimo e massimo in percentuale dell'Area di Biosicurezza riscontrati nelle 35 aziende: (val. min.)18,12 e (val. max) 82,58. La prevalenza della clamidia oscilla da 0 - 6 e la prevalenza di neospora da 0 a 41,3.

Conclusioni
Si è proceduto alla elaborazione del dato tramite la correlazione di Spearman. Si è riscontrata una correlazione inversa statisticamente significativa (con p=0) ovvero all'aumentare del valore della biosicurezza vi è una diminuzione della prevalenza della malattia.
Sulla base dei risultati riportati nella presente indagine che ha interessato 35 aziende si può affermare l'esistenza di una correlazione tra il livello di presenza di patologie aziendali e lo stato di benessere animale generale nelle aziende zootecniche.

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AVVELENAMENTO DA OLEANDRO NEL BOVINO DA LATTE IN PUGLIA
OLEANDER POISONING IN DAIRY CATTLE IN APULIA

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Riassunto

L'avvelenamento naturale da oleandro (*Nerium oleander*) è stato osservato in un allevamento di bovini da latte in Puglia. In seguito al consumo di foglie di oleandro, erroneamente aggiunte all'alimento, 50 animali, dopo 24 ore dall'ingestione, hanno presentato una fase acuta di malattia caratterizzata da depressione, anoressia, atonia ruminale, diarrea, scolo nasale, calo vistoso della produzione e tachicardia. Il primo animale è morto dopo 48 ore dall'ingestione, gli altri decessi si sono verificati nell'arco di 4 giorni, coinvolgendo in totale 13 animali. Il presente studio descrive gli effetti tossici acuti, le caratteristiche cliniche, patologiche e tossicologiche in corso di avvelenamento da oleandro. Inoltre si vuole porre l'attenzione sulla pericolosità di questa pianta per gli animali e per l'uomo.

Abstract

A natural oleander poisoning (*Nerium oleander*) was observed in dairy cattle breeding in Puglia. After the ingestion of oleander leaves, erroneously added to food, 50 animals, after 24 hours from ingestion, presented an acute phase of disease characterized by depression of sensory, anorexia, ruminal atony, diarrhea, nasal drain, a considerable decline in production and tachycardia. The first bovine died after 48 hours from ingestion, the other animals deaths occurred in a period of 4 days, involving a total of 13 animals. This article describes the acute toxic effects, clinical features, pathological and toxicological characteristics in a oleander poisoning. Furthermore, this paper focuses on such plant dangerousness for humans and animals.

UNIVERSITY OF BOLOGNA FIELD WORK ON BIOSECURITY AND ANIMAL WELFARE ASSESSMENTS IN DAIRY FARMS: RESULTS OF A 5-YEAR EXPERIENCE

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Introduction

Farm animal welfare and biosecurity have increasingly established themselves as major issues. Pursuing these principles leads to a lower use of drugs and vaccines, with benefits for animal health, the farm's economy and food safety. Therefore, practical teaching of these subjects in the Veterinary Medicine Degree Course represents a significant educational objective.

Methods

This is a 5-year retrospective study (2014-2018) on welfare and biosecurity of 50 dairy farms of Emilia-Romagna region. The on-farm visits were carried out by groups of 4-8 final year students (for a total of 257 students), supervised by a teacher and an Official Veterinarian, during the professional practical training provided by the Veterinary Medicine Degree Course of the University of Bologna.

Biosecurity and welfare assessments were performed using the official protocols adopted by the Authorities in Emilia-Romagna region, but also evaluating the animal-based criteria included in the protocol developed by the national reference centre for animal welfare (CReNBA). The assessment was carried out by interviewing the farmer, checking the documents and the national database (BDN), inspecting the farm structures and the animals. When needed, laboratory exams were performed. At the end of the training, the students presented a report enlightening the farms' strengths and weaknesses and suggesting measures for improvement.

Results

The most recurring welfare failures were: lack or inadequacy of pens for injured or sick animals (50% of farms), inadequate number or malfunction of drinking troughs (36%), paucity of cubicles (30%), lack or inadequacy of ventilation systems (26%) and of the partum area (22%), lack of water supply for calves (22%), poor cleaning of calves' pens (21%), poor heifer housing and management (20%), failure of passive transfer (16%).

The most recurring biosecurity failures were: no control of the way in to the farm (46%), no quarantine premises for new entries (40%), lack of a specific area for loading/unloading animals (32%), poor milking hygiene (26%), free access of companion animals to the pens (24%), no reporting of abortions to the Local Health Authority and inadequate disposal of foetuses (24%), no control plan against rodents (22%), promiscuity with wild animals (22%).

The most recurring parasitic species where coccidia (50% of farms, with mild infestation in 34% of cases), strongyles (20%) and *Cryptosporidium parvum* (10%). Papillomaviruses and Tricophyton verrucosum were detected from skin scrapings in 12% and 10% of farms respectively.

Conclusions

The on-field teaching experience proved to be very useful for the acquisition of practical skills on biosecurity and welfare assessments by the graduands in Veterinary Medicine, in the role of both the Official Veterinarian, who verifies compliance to the law in force, and the farm veterinarian, who works in synergy with the farmer to improve biosecurity, health and welfare conditions. Furthermore, this 5-year experience allowed to collect a considerable amount of data on farming conditions in Emilia-Romagna region.

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MESENCHYMAL STROMAL CELLS IN THE TREATMENT OF BOVINE MUSCULAR INJURIES

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Introduction

Mesenchymal Stromal Cells (MSC) are multipotent, highly proliferative adult stem cells virtually present in almost all the organs of the body. MSC promote the regeneration of injured tissue both through differentiation and the production of trophic factors. Adipose tissue is considered one of the most attractive source of MSC for cell therapy in human as well as in veterinary medicine. In this study, the clinical efficacy of adipose-derived mesenchymal stromal cells (Ad-MSCs) on three spontaneous muscular injuries occurred in bovine patients are described.

Methods

Subcutaneous tissue samples were finely minced, digested with collagenase type I and centrifuged to obtain a pellet. The precipitated stromal vascular cell fraction was seeded in tissue culture flasks with DMEM, 10% FBS, penicillin and streptomycin. Cells were incubated at 37 °C with 5% CO2. Adherent cells were maintained in culture until passage 3. Three bovines suffering from gastrocnemius injury were treated with autologous Ad-MSCs. A Chianina calf, suffering from spastic paresis, had undergone tibial nerve resection. Due to inadequate postoperative rest, a mere leap caused the rupture of gastrocnemius muscle which, meanwhile, had become fibrotic. Three Ad-MSCs injections were performed. An eight-year-old Holstein Frisona cow suffered from gastrocnemius injury, caused by a fall during the parturition at the end of November 2016. The animal was treated with 2 injections of Ad-MSCs.
A three-day-old Chianina calf presented a monolateral injury of gastrocnemius muscle. The animal was treated with 3 injections of Ad-MSCs. Ultrasonographic examination of injured muscles was carried out during the healing process.

Results

In the short term (48-72 hours) all animals showed a significant reduction of swelling and pain. A two months follow up of the animals showed a significant reduction in lameness and after a few months it was almost impossible, clinically and echographically, to detect the effects of previous injuries.

Conclusions

MSCs are emerging as a potential tool for tissue regeneration in many musculoskeletal tissues of animals. This study shows that the application of MSCs in skeletal muscle regeneration following injury may be explored even in bovines in which the use of MSC may be considered a safe and effective approach.

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TRATTAMENTO CHIRURGICO RADICALE PER LA CURA DELLA MALATTIA DELLA LINEA BIANCA NELLA BOVINA DA LATTE. TREATMENT OF WHITE LINE DISEASE IN DAIRY COWS WITH RADICAL SURGICAL APROACH.

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Keywords: bovine claw lesions, sole ulcers, surgical treatment, white line disease, lameness

Summary
White line disease (WLD) lesions in 236 lame cows were treated with aggressive surgical debridement followed by medicated bandage. Decreased lameness score, resurfacing of the foot with new horn and subsequent improvement in milk production represent evidence of clinical healing. The procedure consisted in claw trimming, affected wall and sole horn generous removal until bleeding, lavage, application of topical antibiotic and bandage. Out of the initial 236 lame cows, on day two 40 cows were not lame anymore and 196 cows showed improved the score. On day 18, only two cows had lameness, with the lesions being smaller but not completely healed in all patients. On days 30 and 40, none of the remaining 234 cows developed recurrence of pathology or lameness. At day 60, lesions were completely healed in these patients. This aggressive surgical treatment allows overall milk production not to decrease comparing to the control group and can be easy to perform in practice. Since bovine claw lesions represent one of the main problems in dairy cattles, this surgical technique could be considered as a valid option for the treatment of WLD in cows.

Conflict of interest
None of the authors of this paper has a financial or personal relationship with other people or organizations that could inappropriately influence or bias the content of the paper.

COMPARISON OF TWO DIFFERENT TREATMENT REGIMENS FOR MASTITIS TREATMENT IN CATTLE

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Objectives

Until recently, modern classes of cephalosporins were increasingly used for mastitis control. Looking for efficient therapy alternatives, we investigated an elder generation of cephalosporin antibiotics in comparison, hypothesizing that a) the bacteriological cure rates for both udder tubes were similar and b) that the additional use of prednisolone had a positive effect on clinical cure rate compared to that caused by the use of a modern cephalosporin.

Material and methods

The study was performed on two dairy farms in different parts of Germany (results of one farm are already available). Vets and farmers were selected on willingness to participate and competence to comply to the study protocol. On each farm, the first 100 naturally occurring clinical mastitis cases were enrolled, from August 1st 2017 onwards. Before treatment, milk samples were taken from all quarters and sent to a laboratory for bacteriological testing. Cows were randomly assigned to two treatment groups.

In group one, the infected quarter was treated intramammarily with cefquinome (Cobactan LC, C). In group two, cows were treated with cefapirin and prednisolone (Mastiplan LC, M). In both groups, the udders of the treated cows were clinically examined by the veterinarian for the following five days using an udder score (Swinkels et al., 2014). The veterinarian was not aware of the treatment given. Milk samples were taken at day 14 and 21 to determine bacteriological cure.

Bacteriological and clinical cure were used to compare the different treatments. Bacteriological cure rate was defined as the presence of a pathogen at enrolment and the absence of that pathogen in both post treatment samples.

For clinical cure the infected udder was examined using an udder score (udder swelling, pain, firmness and milk quality/changes in milk nature) for five days from mastitis onset.

Results

Since the study is still ongoing on one of the two farms, preliminary results are presented.

The results show that cefapirin is as efficient as cefquinome concerning bacteriological cure rates (M: 63,3% , C: 45.8%; p=0,018 sig. proven non-inferiority). For Streptococcus uberis, which in both groups had been the major pathogen, the non-inferiority has been proven for p=0,11 (bacteriological cure rates: M: 80%, C: 78.95%) .

A significantly better improvement of total udder score from day 0 to day 1 could be shown in the Mastiplan LC- group compared to the Cobactan LC- group (p=0,0179), similar improvement has been seen in terms of udder swelling for day 1 and 2 (p=0,0004).

Conclusion

According to the preliminary results from the evaluated farm, our hypothesis that a 1st generation cephalosporin is as efficient as a 4th generation with regard to the bacteriological cure is confirmed. The combination of cefapirin and prednisolone (20mg) showed benefits concerning the clinical cure when compared to an antibiotic treatment without cortisone.

A PRACTICAL APPROACH FOR REDUCING ANTIMICROBIAL USAGE IN DAIRY HERDS

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Introduction

To counteract the phenomenon of antimicrobial resistance, the European Union recommended the adoption of measures aimed at reducing drug usage in the zootechnical sector (1). In Emilia Romagna, the project "*Integrated approach aimed at reducing the use of antimicrobial in milk production for regional PDO cheese, contributing to reduce the risk of antimicrobial-resistance occurrence*", has been developed using a "benchmarking approach", based on periodic data collection, ongoing interactive discussion and training of breeders and veterinarians. We report the preliminary results of the first year of the project below.

Methods

In 63 dairy herds of Emilia Romagna, conferring milk to three different cheese processors (2 of Parmigiano Reggiano and 1 of Grana Padano), data on antimicrobial consumption (in DDDAit, Defined Daily Dose Animal for Italy) of two consecutive years (2016 - 2017) were monitored. Data concerning risk assessment for animal welfare and biosecurity (CReNBA method) and zootechnical data were also collected, using an integrated monitoring system. The data on antimicrobial consumption (total consumption and HP CIAs, Highest Priority Critically Important Antimicrobials) were presented in individual reports to each farmer in periodic meetings, involving the bovine practitioners. In the same report, each farmer also received a list of risk factors regarding animal welfare and biosecurity, with suggestions for improving the situation of the herd (2). In 6 partner farms, rapid diagnostic tools (on farm culture) were also introduced, aimed at limiting the use of antimicrobials for mastitis therapy.

Results

The data on antimicrobials consumption showed a decrease in 2017 compared to 2016. In particular:

- in calves we observed a 21.3% decrease of total DDDAit and a 53.3% decrease of HPCIAs.
- in cows we observed a slight decrease (0.6%) of total DDDAit but a larger HPCIAs decrease (23.5%).

In the 6 partner farms the reduction was more consistent.

Regarding animal welfare rate, 75.6% of loose housing herds and 80.7% of tie-stall herds reached the level defined as acceptable by CReNBA method. Regarding biosecurity rate, 66.7% of herds attained the acceptable level.

Conclusions

Although there is room for improvement, the Project, still ongoing, is achieving its goal. The awareness actions and the training carried out in collaboration with farmers and practitioners, have led to a total reduction of antimicrobial consumption, in particular of HPCIAs.

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PRIMI RISULTATI DEL MONITORAGGIO DELL'IMPIEGO DI ANTIBIOTICI NEGLI ALLEVAMENTI BOVINI DA LATTE NEL TRIVENETO

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Introduzione

L'impiego di antibiotico e il fenomeno dell'antimicrobico-resistenza risultano strettamente correlati tra loro (1), pertanto poter valutare il consumo di antimicrobici anche in allevamento bovino costituisce un aspetto di fondamentale importanza. Il presente studio si prefigge lo scopo di quantificare l'utilizzo di antibiotici in un campione di allevamenti bovini da latte attraverso i giorni di terapia, parametro già utilizzato in medicina umana (2), valutando altresì le caratteristiche gestionali, strutturali ed igienico-sanitarie aziendali.

Metodi

Lo studio ha previsto il monitoraggio, per dodici mesi, dei trattamenti antibiotici effettuati in 27 allevamenti italiani di bovini da latte del Nord Est (92% dei quali in Veneto), scelti mediante campionamento di convenienza, differenziandoli in base a sette categorie causali (mastiti, asciutta, metriti, patologie enteriche, respiratorie, articolari/locomotorie e altre patologie), unitamente alla raccolta dati sulle caratteristiche aziendali, gestionali e produttive.

Risultati

Oltre il 56% dei trattamenti è effettuato nei mesi autunnali e invernali, il 21% in primavera. Per il 35% si tratta di terapie endomammarie, il 39% parenterali, il 14% orali e il 12% intrauterine.

I motivi di trattamento riguardano principalmente le terapie per mastiti (29%) ed asciutta (18%), a cui seguono le patologie enteriche (14%), metriti (12%), patologie respiratorie (9%) ed articolari (8%). L'asciutta selettiva è effettuata nel 30% delle aziende, in cui l'utilizzo del sigillante è comunque diffuso (81% degli allevamenti).

Considerando la durata della terapia, emerge che alle patologie enteriche è ascrivibile il maggior numero medio di giorni di trattamento/capo/anno (1,13), a cui seguono le mastiti (0,97 gg/capo/anno), le patologie respiratorie (0,37 gg/capo/anno), l'asciutta (0,31 gg/capo/anno), le metriti (0,30 gg/capo/anno) e le zoppie (0,28 gg/capo/anno). Nelle patologie enteriche si registra un ampio uso di amminosidina (45%) e di sulfamidici (25%), utilizzati generalmente per il controllo rispettivamente della criptosporidiosi e della coccidiosi nei vitelli, ai quali soltanto nel 30% delle aziende si effettua una doppia somministrazione del colostro entro le prime sei ore di vita.

Non si evidenzia corrispondenza alcuna tra il valore dei giorni medi annui di trattamento per capo allevato e la consistenza degli allevamenti.

Conclusioni

Valutati per singola azienda, i dati raccolti permettono di evidenziare alcune criticità specifiche, spesso riconducibili a pratiche gestionali legate alle norme di biosicurezza ed igiene.

La vitellaia si conferma uno dei punti critici su cui è possibile intervenire, anche attraverso protocolli vaccinali materni, ottimizzando di concerto la qualità della colostratura.

Il fatto poi che una terapia per le mastiti previa indagine di laboratorio e relativa valutazione di sensibilità agli antibiotici venga attuata solamente nel 26% delle aziende considerate invita a sensibilizzare maggiormente l'utenza sull'importanza degli strumenti diagnostici disponibili.

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PRODUCTION A QUALITY OF COW MILK

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Introduction

Variation in composition and daily yield of milk is a regular phenomenon in any milking animals. Both are influenced by physiological (genetic make-up, age, pregnancy, etc.) and environmental (climate, nutritional status, management, etc.) factors. Milk quality and quantity is economically important to milk producers and processors and nutritionally important to consumers. Our paper analyses factors affecting milk composition such as breed, genetic variation within breed, health, environment, management practices, and the diet are than reviewed.

Methods

This paper summarized knowledge from literature and our experiences

Results

Production and quality of dairy cattle milk are influenced with following factors: *Breed. Individuality of animal. Dry period. Age and body weight at the calving. Lactation number. Pregnancy Season of calving. .Temperature &Humidity. Nutrition .System rearing of dairy cows. Milking interval. Milking frequency. Diseases.*

Conclusions

Diagnosis, therapy and prevention of health disorders of mammary gland include application of HACCP-like program which consist from: 1.Clinical monitoring of mastitis; 2. Hygiene at/around milking; 3. Milking equipment 4. Milking procedures; 5. Housing conditions; 6. Climatic conditions; 7. Mastitis management (to prevent increasing SCC about 200 000 cells /ml of milk); 8. Veterinary udder health control (California mastitis test, bacteriological examination of milk samples, milk amyloid A test for determination pre-clinical stadium of inflammation, etc.); 9. Other managerial issues.

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PRODUCTIVE AND REPRODUCTIVE PERFORMANCE IN BUFFALO LACTATING COWS WITH DIFFERENCE SPACE ALLOWANCE

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Introduction

The aim of this study was to evaluate how the space allowance can influence the productive and reproductive performance in the buffalo species, with particular attention to the differences between animals with different parity.

Methods

The trial was carried out on 96 subjects, divided into two homogeneous groups, according to days in milk, parity and average of milk production during 10 days before the start of the experimentation for 100 days. The animals were kept in free barns with different space allowance: the animals of the S + Group had 14.7 m2/head, while 10.0 m2/head were assigned to the S-Group. Lactating buffaloes were milked twice daily 12 hours apart and received the same feeding throughout the experimental period. At the start of the trial, a milk sample was collected (time 0) and the individual milk production was recorded daily using an automated data collection system that was in the milking parlor. Once a month an individual milk sampling was carried out from each of the buffalo for the evaluation of the qualitative characteristics of milk. In the middle and at the end of the test, blood samples were taken on 7 buffaloes/group for the evaluation of the hemato-biochemical profile. Finally, at the end of the trial, some animals/group were selected for ovulation synchronization and artificial insemination.

Results

No statistically significant differences were recorded on pluriparous buffaloes for quantitative production and the qualitative characteristics of the milk between the animals of both groups. The analysis of the hemato-biochemical profile of the two groups did not show significant differences for all the parameters considered, which were within the physiological range for buffalo species. On the contrary, a significant increase (about 0.74 lt of milk) was observed in primiparous buffaloes of S+ group throughout the experimental period. In this category of buffaloes the ALP (119.5 ± 8.1 vs 72.0 ± 11.2, in the S- and S + group, respectively) and the GGT (36.3 ± 1), 3 vs. 27.3 ± 2.0, in the S- and S + group, respectively) were significantly ($P < 0.05$) higher compared to S- counterparts. Regarding the evaluation of reproductive performance a similar pregnancy rate was recorded between the two groups.

Conclusions

It can be concluded that an improvement of animal welfare conditions, for the greater space allowance is particularly important in primiparous buffaloes, to reduce the stress of the first lactation and improve the performance

ULTRASONOGRAPHIC EVALUATION OF THE MAMMARY CISTERN SIZE DURING DRY PERIOD IN HEALTHY DAIRY COWS

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Introduction

The dry period (DP) is defined as the nonlactating period prior to parturition in dairy cows. During the DP, new udder tissue is formed and prepared for the next lactation [1]. The aim of this study was to evaluate the udder cistern (UC) size during the dry period by the ultrasound technique.

Methods

Ten Italian Friesian cows were included, for a total of 40 quarters. All the cows underwent the same management condition. The following inclusion criteria were set: 1) no heifer; 2) abruptly drying-off; 3) no mastitis or other diseases at drying-off and during the whole study period. A convex probe (5 MHz) was placed immediately cranial to the insertion of each teat on the udder in order to visualize the UC of each quarter. The probe was first held parallel to the teat for a longitudinal section, then a 90° rotation was applied for the cross-section view [2]. All the animals were evaluated at the drying-off (T0) and 24 hours later (T1), then regularly until the end of the dry period (T7, T14, T21, T28, T38, T48, T58), during the colostrum production phase (TCPP) and at 7 days in milking (T7PP). The Spearman test was applied to evaluate the correlation between ultrasonographic UC size (UUCS) assessment and time. The Friedman test and the Dunn's test for multiple comparisons as *post-hoc* were performed to compare the cross-section UUCS of the forequarters (FQCS) and hindquarters (HQCS) and the longitudinal section UUCS of the forequarters (FQL) and hindquarters (HQL) at T0 *vs* T58 *vs* TCPP *vs* T7PP. Values of $p < 0.05$ were considered statistically significant.

Results

No subject developed mastitis or other diseases during the study period. The ultrasound evaluation of the UUCS was easy to perform in field conditions. A total of 440 images have been measured. There was a statistically significant negative linear correlation between the time and the UUCS for FQCS and FQL ($r = -0.95$; $p < 0.0004$) and for HQCS and HQL ($r = -0.90$; $p < 0.002$). The Friedman test was statistically significant ($p < 0.0001$), showing that the UUCS at T58 were lower, compared to other times for FQCS, FQL and HQCS. T0 did not differ from TCPP.

Conclusions

No studies can be found in literature evaluating the UUCS during the dry period. Studies on UC cellular proliferation showed that the UC cellular involution during dry period peaked 25 days after the dry-off [3,4]. In our study, the UUCS decreased throughout the whole dry period and started to increase at the beginning of the next lactation. This difference could be due to a discrepancy between the UC cellular proliferative and the ultrasonographic evaluation of the UC. In conclusion, the evaluation of the UUCS during the dry period in healthy cows was feasible for field conditions. UUCS might give useful information for the udder dry period monitoring.

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CONTRASTING EFFECT OF STARCH AND SUGAR DIETS ON RETICULORUMINAL PH, VFAS PRODUCTION, HEMATOLOGICAL AND BIOCHEMICAL HEALTH INDICATORS IN CATTLE

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Introduction

The clinical definition of SARA proposed by Nordlund and colleagues in 1995[1], has been widely used to determine the prevalence of SARA within cattle populations.[2-3] The main criticism is about the low reproducibility of the diagnostic process. Also the effect of sugar addition in ruminant diets has traditionally been linked with the potential risk of a sudden molar increase of lactic acid.[4] However when results from past trials were reviewed decrease of ruminal pH was not reported consistently.[5]We investigate the effect of two different sources of carbohydrate on different physiological parameters.

Methods

6 adult, non-lactating, Jersey cows were administered a pH sensor bolus (Moletech, UK) in a 3×3 Latin square design for a total duration of 9 wk. During the first 2-wk of each 3-wk period, cows were fed a maintenance diet (CO). In wk-3 of each 3-wk period, the animals were fed one of 3 diets: maintenance (CO), starch based (HSt) or sugar-based (HSu) diet. Animals were monitored daily and 4 health-related variables were recorded: diarrhoea, inappetence, depression and ruminal tympany. Blood and ruminal samples were taken before feeding on day-1 (D-1), day-2 (D-2) and day-7 (D-7) of each challenge week. Haematology, biochemistry and VFAs composition were determined. Differences between D-2 and D-1 and between D-7 and D-2 were calculated for each of the variables and the effects of treatment and time-point were determined by Kruskal-Wallis rank sum test for univariate relationships and then by generalized linear model (GLM).

Results

HSt and HSu both significantly reduced the hourly median pH, hourly minimum pH and increased standard deviation ($p<0.0001$). The HSt diet was more likely to be completely eaten than the HSu diet ($p=0.001$). HSu and HSt diets were more likely to cause diarrhoea than the maintenance diet ($p=0.0003$). Kruskal test showed a significant reduction ($p=0.0035$) in lymphocyte and a significant increase ($p=0.02$) in neutrophils in HSt cows on D-2. GLM showed a significant reduction of monocytes on D-7 independent of the diet ($p=0.02$). Kruskall Wallis test showed a significant increase on D-2 for acid acetic ($p=0.01$), propionic ($p<0.01$), butyric ($p<0.01$), iso-butyric ($p=0.05$) and iso-valeric ($p=0.04$) for the starch based diet. At D-7 all the VFAs mentioned returned closer to basal values. Other variables showed no significant effect of diet ($p>0.1$).

Conclusions

Starch and sugar-based diets induced ruminal pH changes consistent with SARA and increased the incidence of diarrhoea. Haematology suggests that starch-based diet had a more pronounced inflammatory effect than the sugar-based diet. The return to basal values at D-7 of haematological and VFAs parameters in the HSt group suggests that animals had adapted to the abrupt change of diet over the week.

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INTEROBSERVER AGREEMENT OF A QUICK-SCAN LUNG ULTRASOUND METHOD IN CALVES

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To rationalize antimicrobial use in calves, distinguishing animals with bronchopneumonia from those with an upper respiratory tract infection is essential. Of all diagnostic methods, achievable in practice, thoracic ultrasound has been shown to be most accurate to detect pneumonia. However, different scanning protocols have been described, and their interobserver agreement not determined. To be economically sustainable in practice, the scanning procedure needs to be as quickly as possible. Also, the learning curve needs to be short, to allow veterinarians to start using this technique in a reliable way as quickly as possible. Therefore, in the present study the UGhent quick-scan method and algorithm was demonstrated to two novice observers and their performance after one session was compared with an experienced operator. At a commercial veal farm, 50 calves aged 8-12 weeks, were scanned by three operators (two novice and 1 experienced (2 years)). A consolidation of any size was considered as pneumonia and a positive test result. Percentage of agreement, kappa statistics, prevalence and bias index were used to characterize inter-observer agreement. Of the calves, based on the experienced operator, 32.0% (16/50) showed consolidation, of which 43.8% (7/16) only left, 12.5% (2/16) only right, and 43.8% (7/16) on both sides. Percentage of agreement and kappa values between novice 1 and the experienced observer, and novice 2 and the experienced observer were in each case 78% and 0.38, respectively. Percentage of agreement and kappa value between both novices was 96.0% and 0.78, respectively. Agreement between the novices and the experienced operator was better on the right lung lobe than on the left lung lobe, likely because the right cranial lobes can more easy be visualized. The mean scanning time (± standard deviation) pro calf was 50 ± 11 sec. for the experienced operator, and 117 sec. ±31 and 131 sec. ±52 for novice operator 1 and 2, respectively. In conclusion, the present study suggests that this scanning protocol and training session have a fast learning curve to achieve an accuracy above clinical diagnosis alone. However, exercise to perfect the and quicken the scanning method is required make it an economically justifiable procedure in herd health management.

BOVINE PERINATAL MORTALITY IN SWITZERLAND: EVIDENCE OF INFECTIOUS CAUSES IN CALVES

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Introduction

Perinatal mortality (PM) usually refers to calf death within 24-48 hrs of birth after a gestation length of >260 d[1,2]. While Bleul described a PM rate of 2.4% (0-24 hrs) in Switzerland (2005-07)[2], it is currently perceived by farmers and practicing veterinarians that the incidence of PM is increasing. However, there are no published data on the causes of PM in Swiss calves. Hence, a pilot study was conducted to establish the causes of PM in a convenience sample of Swiss farms. This report focusses on infectious causes of mortality.

Methods

Fifty carcasses of PM-calves (78% Holstein, 22% other) which had not consumed colostrum and 47 placentae (21 dairy and 2 beef farms; 1-12 calves/farm) were collected. Specimens were examined using the SOP designed by Mee[3]. To detect infections, samples from placenta, fetal abomasal contents, lung, liver, ear-notch and brain were examined for bacterial[4] and fungal[4] abortifacients, BVDV[5] and Neospora caninum[4]. Samples from placenta, lung, heart and larynx were examined histologically. Diagnosis of bacterial infection was based upon the 3 criteria described by Borel et al.[6]

Results

The majority of calves (46 singletons, 4 twins) were females (62%) and from primipara (78%) with a median gestation length and birth weight of 281 d and 39.4 kg, respectively. 82% of calves were assisted at birth. *Coxiella burnetti* infection [PCR and histologically confirmed: 6 cases; only PCR confirmed: 6 cases] was most commonly detected. Infection by *Streptococcus pluranimalium*, *Neospora caninum*, or co-infections was found in 1, 1 and 3 calves, respectively. An infection by pathogenic *Leptospira spp*. was suspected in 2 cases [PCR positive without histological lesions]. Histopathological findings suggested an infectious cause in 3 more cases, but no pathogen was detected. In total, 22 calves (44%) were confirmed or suspected to be infected.

Conclusions

This is the first detailed investigation of bovine PM in Switzerland. Over 40% of the investigated PM-cases were infected with notifiable abortifacients. The routine examination of PM-calves thus can help to detect unknown or early herd infections with these partially zoonotic agents and should be examined in the same way than abortions.

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A SIMMENTAL CALF SUFFERING FROM JUVENILE LYMPHOSARCOMA

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Introduction

A two month old male Simmental calf was referred to the University Clinic for Ruminants in Vienna. The owner reported enlarged lymph nodes.
At the first clinical examination at the clinic it showed pathological clinical signs like a reduced behaviour, respiratory rate was 56 breaths per minute, pulse rate 128 beats per minute, body temperature was 40.2°C and it showed bilateral, moderately harsh lung sounds. Additionally, the *Ln. mandibulares, Ln. retropharyngeales, Ln. inguinales, Ln. subiliaci* and *Ln. cervicalis superficialis* were extensively enlarged.

Methods

For further diagnosis a complete blood count and a bovine leukaemia virus (BLV) serum antibody ELISA test was carried out. In addition, a biopsy of the left *Ln. cervicalis superficialis* was performed. During the stay at the University Clinic for Ruminants the calf was symptomateously treated for coughing and increased body temperature. As the condition of the calf further deteriorated it had to be euthanized and a pathological examination was carried out.

Results

The blood count showed increased MCHC (Mean corpuscular haemoglobin concentration), RBC (Red blood cells), segmented neutrophils and basophils. Haemoglobin, Haematocrit, MCH (Mean Corpuscular Hemoglobin), MCV (Mean corpuscular volume), Lymphocytes and Eosinophils were decreased.
A BLV serum antibody ELISA test was negative and the histological result was consistent with a malignant lymphoma. The pathological examination showed a severe generalized lymphadenomegaly with up to fist-sized lymph nodes. The age of the patient as well as distribution of the changes is consistent with juvenile leukosis, also called sporadic juvenile lymphosarcoma.

Conclusions

Bovine lymphosarcoma is a lymphoproliferative disorder in cattle divided into the enzootic form (EBL) and the sporadic form (SBL) (Dubreuil et al, 1998). EBL generally affects adult cattle, and causes lymphadenomegaly (Jacobs et al, 2002). The aetiology of the sporadic bovine lymphoma is not known (Mammerickx et al, 1985). Because SBL cannot be linked to BLV as causative agent, SBL is considered non-contagious. SBL has been subdivided into the juvenile, the thymic and the skin form. In this case report, the calf was suffering from the juvenile form of the sporadic bovine leucosis. It was euthanized on day 25 after it was referred to the University Clinic for Ruminants in Vienna.

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VALUTAZIONE DI UN ENDOSCOPIO FLESSIBILE PER LA DIAGNOSI DELLA DERMATITE DIGITALE BOVINA IN SALA DI MUNGITURA

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Introduction

La dermatite digitale (DD) é una malattia infettiva e contagiosa del piede bovino, diffusa a livello mondiale. La diagnosi della DD é fatta tramite visualizzazione diretta delle lesioni della cute digitale. L'esame visivo diretto effettuato in un travaglio per pareggio degli unghioni é considerato il "gold standard" per la diagnosi della DD, ma ciò é messo in discussione. Un controllo efficace della DD, prevede una diagnosi precoce delle lesioni. Per questo, negli ultimi anni sono stati valutati diversi metodi diagnostici alternativi per una diagnosi precoce della DD. L'obiettivo del presente studio é quello di valutare l'accuratezza diagnostica di un endoscopio flessibile per la diagnosi della DD.

Methods

Lo studio é stato condotto in un allevamento di bovine da latte. I piedi posteriori sono stati considerati come "unità campionaria". Le lesioni sono state classificate in cinque categorie (M0, M1, M2, M3,M4, M4.1) come descritto da Berry. I piedi sono stati esaminati in sala mungitura utilizzando un endoscopio flessibile, e nelle successive 48-72 ore in un travaglio per pareggio.

L'accuratezza diagnostica dell'endoscopio é stata calcolata usando due metodi. Nel primo, l'accuratezza dell'endoscopio é stata calcolata considerando l'esame nel travaglio per pareggio come "gold standard", e usando un approccio statistico frequentistico. Nel secondo, l'accuratezza diagnostica dell'endoscopio e dell'esame nel travaglio per pareggio é stata calcolata considerando ambedue come "test imperfetti" e usando un approccio statistico bayesiano. Le lesioni sono state dicotomizzate in due categorie: assenza delle lesioni (M0) vs presenza delle lesioni (M1-M4.1)

Results

Sono stati esaminati 870 piedi. Usando l'approccio di tipo frequentistico la Se dell'endoscopio era del 64% (95%IC: 57%-69%), la Sp era del 91% (95%IC: 88%-93%), il VPP era del 78% e il VPN era del 83.5%. La prevalenza della DD era del 31%. Usando l'approccio di tipo bayesiano la Se dell'endoscopio era del 78% (95%ICr 62-98%), la Sp era del 95% (95%ICr 90-99%). La Se dell'esame nel travaglio per pareggio era del 87% (95%ICr 76-99%) e la sua Sp era del 82% (95%ICr 82-99%). La prevalenza delle lesioni della DD era del 30% (95%ICr 21-40%).

Conclusions

L'uso delle statistiche bayesiane permette di conoscere la prevalenza delle lesioni evitando il possibile errore di "classificazione" dovuto all'uso di due test "imperfetti".

L'endoscopio flessibile può essere utilizzato per la diagnosi della DD in sala mungitura, anche se bisogna considerare il rischio di avere molti "falsi negativi".

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ASSESSMENT OF A TOOL TO EVALUATE THE METHODOLOGICAL QUALITY OF LARGE ANIMAL SYSTEMATIC REVIEWS

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Introduction

Systematic reviews and meta-analyses (SRMAs) are considered the top of the evidence-based veterinary medicine. Little attention has been devoted about the quality of reporting SRMAs. In humane medicine A Measurement Tools to Assess systematic Reviews (AMSTAR) has been validated for assessing quality of SRMA reporting. It consists in eleven items with four possible answers for each of them: "yes", "no", "can't answer" and "not applicable". The sum of the answers "yes" represents the score of the "quality" of a systematic review (from 0 to 11). Our objective was to test the AMSTAR in the field of veterinary medicine for assessment of SRMAs.

Methods

A search on PUBMED was conducted (March 2017) to identify thirty studies (ten and twenty about respectively equine and bovine medicine). The papers were blindly evaluated by 3 different raters. The agreement among assessors was calculated using Kappa and Intra-class Correlation Coefficient (ICC) for the total AMSTAR score.

Results

The agreement among raters was moderate (k= 0. 40) to almost perfect (k=0. 88), and ICC was 0. 85 (CI= 0. 75-0. 92). The median (interquartile range) AMSTAR score was 4 of 11 (2-6). More specifically, items that were uncommonly reported were the specification of an a priori SRMA design, inclusion of both included and excluded studies, critical appraisal of included studies' quality, publication bias assessment and conflict of interests.

Conclusions

In conclusion, the AMSTAR can be used easily for assessment of quality of SRMAs reporting and may help for journal club preparation as well as for pointing SRMAs deficiencies.

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EFFECT OF CLOXACILLIN BENZATHINE IN DAIRY WATER BUFFALO AT DRY-OFF: PRELIMINARY RESULTS

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Introduction

The aim of the current study was to evaluate the effects of a dry-off administration of cloxacillin benzathine (Orbenin Extra®, Zoetis, Inc.) on udder health of Mediterranean buffaloes (MB) reared in a positive herd for *S. aureus*.

Methods

One-hundred quarters originating from 25 MBs were enrolled in the present investigation [52 as treated group (TG, receiving 0.6g of cloxacillin benzathine/quarter at dry-off) and 48 left untreated-control group (CG)]. All the quarters were sampled at dry-off and within 30 days in milk (DIM) to perform individual bacteriological milk culture and somatic cell count, according to National Mastitis Council (2017) guidelines. Udder health status has been classified according to Guccione et al. (2014). The following parameters have been evaluated at quarter level: overall prevalence positive quarter at dry-off and within 30 DIM, fresh quarters mastitis rate, prevalence of mastitis originating from dry period, dry period cure rate, dry period failure of existing mastitis to cure rate.

Results

The 42.3% of quarters (22/52) were *S. aureus* positive at dry-off in TG, while 31.2% (15/48) in CG; the 38.5% (20/52) and the 27.1% (13/48) showed mastitis in TG and CG, respectively. Within 30 DIM, 13.5% (7/52) and 22.9% (11/48) were recorded as positive quarters in TG and CG, respectively. Fresh quarters mastitis rate was minimum for TG (0/52), compare to 14.5% in CG (7/48). In TG, no cases of mastitis originating from dry period were observed (0/22), compared to 3/35 in CG (8.5%). A maximum dry period cure rate (100%-20/20) and a minimum failure of existing mastitis to cure rate (0%-0/20) were assessed in TG; the same indices gave the 46.1% of cured cases (6/13) and 30.7% as failed to cure (4/13) in CG.

Conclusion

The effects of cloxacillin benzathine were studied for the first time in MB at dry-off. Although based on preliminary data, the antibiotic shows a potential efficacy to reduce both prevalence of positive quarters for *S. aureus* and rates of mastitis. The use of cloxacillin benzathine may be hypothesized as support to improve the dry period management of MB's herd infected by *S. aureus*.

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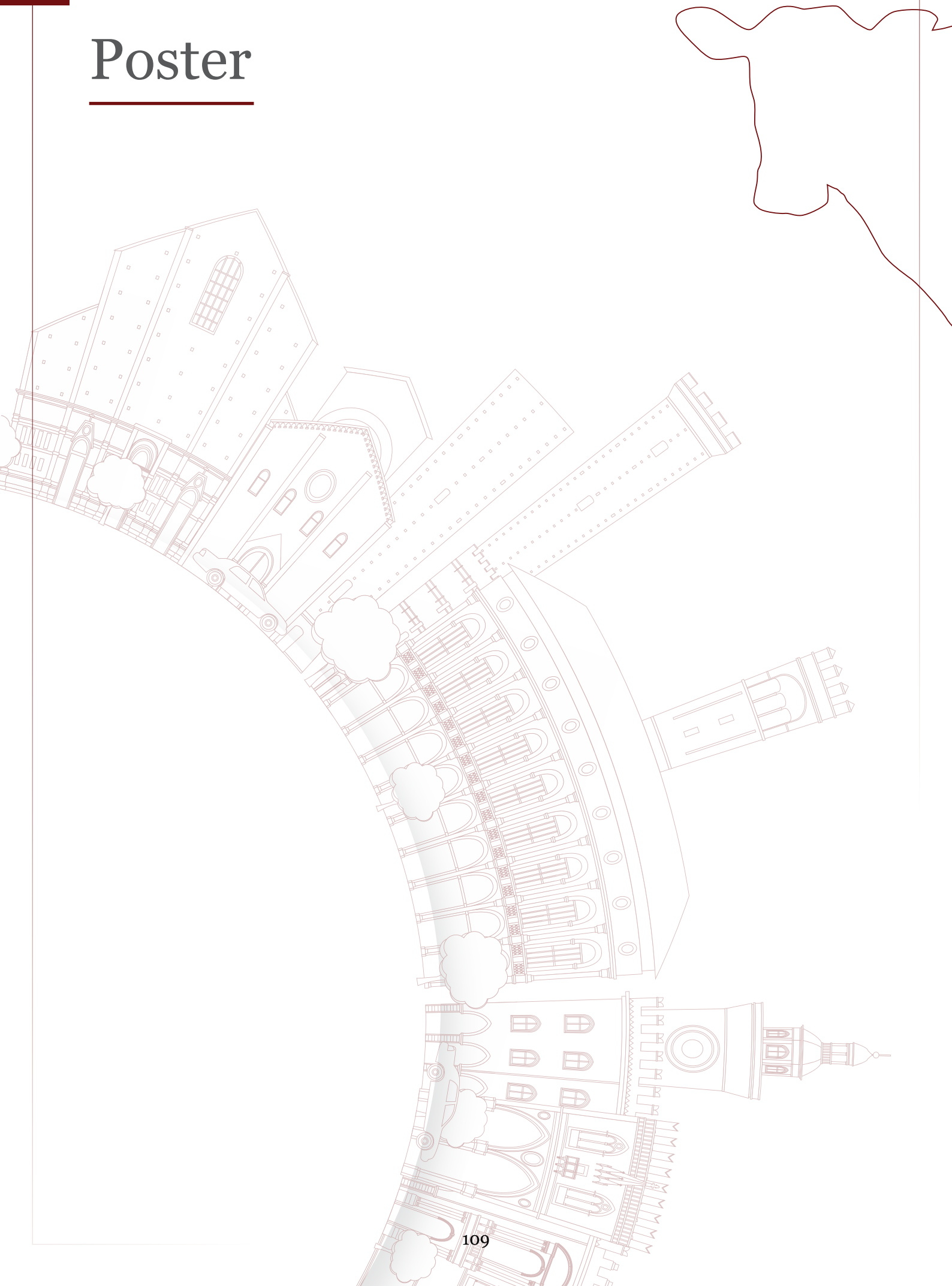
Poster



NITRATE/NITRITE POISONING IN DAIRY CATTLE FROM SANTA FE, ARGENTINA

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Introduction

Nitrate intoxication is in veterinary medicine most commonly related to the use of nitrate-accumulating plants for livestock forage. Of secondary importance as sources are nitrate or nitrite fertilizers and surface waters contamined by fertilizers or nitrogenous animal waste products (Davis, 1980; Knight, 1985).
Ruminants are particularly at risk of acute, fatal nitrate-nitrite poisoning. They are 10 times more sensitive to nitrate than monogastric animals because microorganisms in the rumen reduces nitrates to nitrites then ammonia for microbial growth (Nicholson, 2007). Nitrite is toxic to erythrocytes because it converts hemoglobin into methemoglobin, an oxidized form of hemoglobin, which cannot bind to oxygen.

Methods

In a rural property in the city of Ramona, in Santa Fe, Argentina, eight of 35 dairy cattle showing clinical signs of poisoning. Clinical examinations of affected animals and necropsy of the dead were performed. The suspected poisoning cows were immediately treated with 1% solution of methylene blue (10mg/Kg). The pasture was observed for the possibility of exposure to toxic plants or water.

Results

Affected animals presented weakness, ataxia, muscular tremors, cyanotic mucous membranes, respiratory disorders and progression to sternal decubitus. Death occurred after one day post treatment and, without treatment, in a few hours. At the gross pathology animals showed darkened blood (chocolate-colored) of difficult coagulation, petechiae and suffusions in heart, pulmonary emphysema and cyanosis of the mucous membranes and nipples.
In the pasture the presence of *Cynodon spp.*, *Chenopodium album*, *Conium maculatum* were detected.

Conclusions

Diagnosis of nitrate intoxication was based on observed clinical signs, chocolate-brown blood and exposure to the toxic plant. The intoxication occurred in a rainy period (November to January), that followed a drought season (May to October). The occurrence of a drought period followed by a rainy period is considered an important factor that results in the increase of nitrate concentration in the plants, causing an accelerated growth and absortion of toxic levels of nitrates (Riet-Alvariza, 1993; Cheeke, 1998; Radostits et al., 2007).

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DIARREA NEONATALE NEL VITELLO (NCD): ANALISI DEI PRINCIPALI FATTORI DI RISCHIO NELLE AZIENDE DI BOVINE DA LATTE DI PICCOLE-MEDIE DIMENSIONI DELLA PROVINCIA DI TRENTO

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Introduzione

NCD rappresenta una delle principali cause di perdite economiche nell'allevamento di bovine da latte. Numerosi studi sui fattori di rischio (RF) per la comparsa di NCD sono stati condotti negli allevamenti di grosse dimensioni (1); sono disponibili pochi dati sulle piccole/medie aziende di montagna. I risultati preliminari di questo studio considerano il grado di igiene/pulizia dell'allevamento come potenziali fattori di rischio per la presenza di NCD in stalle di piccole/medie dimensioni in Provincia di Trento.

Materiali e metodi

Un totale di 13 aziende di bovine da latte con storia pregressa di NCD (CA) e 15 aziende senza storia di NCD (CO) sono state incluse nello studio. Per ogni allevamento tramite sopralluogo ed intervista ad allevatore, sono stati raccolti una serie di dati tra cui: informazioni generali sulla stalla, pulizia degli animali/ambienti di stabulazione, gestione di sala parto/vitelli. Ad ogni categoria di animali (vitelli, manze e vacche) ed ambiente è stato attribuito uno *score* di pulizia (ottimo, buono, sufficiente, scarso). I dati raccolti sono stati informatizzati mediante Lime Survey (https://www.limesurvey.org).

Risultati

Per le categorie di animali, un giudizio di pulizia pari a buono/ottimo è stato attribuito al 9.1% dei CA e al 18.2% dei CO (manze), al 7.7% dei CA e al 20% dei CO (vacche), al 23.1% dei CA e al 54.4% dei CO (vitelli).
Per gli ambienti di stabulazione il giudizio buono/ottimo è stato assegnato al 18.2% dei CA e al 54.6% dei CO (manze), nel 38.5% dei CA e al 53.3% dei CO (vacche), al 53.9% dei CA e al 66.7% dei CO (vitelli). Nell' 89.3% delle stalle il vitello è allontanato dalla madre entro 3 ore dal parto, nell'89.3% delle aziende si disinfetta l'ombelico ed il 96.4% delle stalle utilizza il colostro fresco della madre: si riconosce dunque in generale l'applicazione di buone pratiche di conduzione dei vitelli e non si sono riscontrate differenze tra CA e CO in merito ai comuni RF nella gestione della vitellaia.

Conclusioni

Il presente studio ha messo in evidenza che i CO hanno dei livelli di igiene generali di animali /ambienti tendenzialmente migliori rispetto ai CA. La comparazione tra CA e CO per altri RF in particolare relativi alla gestione della vitellaia non ha evidenziato differenze tra i due gruppi. Queste permette di rafforzare l'ipotesi del ruolo chiave assunto dalla pulizia nell'insorgenza delle NCD.

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PRESENZA DI *CRYPTOSPORIDIUM* SPP., *ROTAVIRUS* GRUPPO A, *CORONAVIRUS* ED *ESCHERICHIA COLI* K99/F5 IN AZIENDE DI BOVINE DA LATTE DI PICCOLE-MEDIE DIMENSIONI IN PROVINCIA DI TRENTO, CON E SENZA STORIA DI DIARREA NEONATALE (NCD)

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Introduzione
NCD rappresenta una delle principali cause di perdite economiche nell'allevamento di bovine da latte. *Escherichia coli* (K99/F5; EC), *Rotavirus* di gruppo A (RO), *Coronavirus* (COR) e *Cryptosporidium spp*. (CRY), sono i più importanti patogeni che possono causare questa patologia nelle prime settimane di vita.

Materiali e metodi
Sono state incluse nello studio 13 aziende di bovine da latte con storia pregressa di NCD (CA) e 15 senza storia di NCD (CO). In ogni allevamento sono stati seguiti, per le prime tre settimane di vita, fino a 5 vitelli attraverso visita clinica e prelievo di feci. Sulla base delle informazioni riportate nella scheda clinica, gli animali sono stati classificati come malati (M) e sani (S), e le loro feci normali (N)/anormali (A). I campioni fecali sono stati esaminati tramite due test ELISA: *IDEXX® Rota-Corona-K99* ed *IDEXX® Cryptosporidium*.

Risultati
Si sono analizzati in totale 356 campioni di feci: 157 da CA e 199 da CO, prelevati da vitelli classificati sani (n=327) e malati (n=29). I campioni positivi ad almeno un patogeno rappresentano rispettivamente il 20.5% (67/327) dei vitelli S e il 41.4% (12/29) dei vitelli M. Dalla valutazione visiva, 281 campioni fecali sono stati classificati normali e 75 anormali, con percentuale di positività pari al 19.9% (56/281) dei campioni N e al 30.7% dei campioni A (23/75). Dei 79 campioni positivi, 33 (33/157; 21.0%) provenivano da aziende CA e 46 (46/199; 23.1%) da aziende CO. Nelle CA, il 75.8% delle positività è stato per RO (25/33), il 39.4% per CRY (13/33), il 3% per EC (1/33); le feci di 6 vitelli sono risultate positive sia per RO che per CRY. Nelle CO, il 63.0% delle positività è stato per RO (29/46), il 28.3% per CRY (13/46), il 6.5% per EC (3/46) e il 2.2% per COR (1/46). Dei 54 campioni positivi per RO, 13 (24%) sono stati riscontrati in prima settimana, 28 (52%) in seconda e 13 (24%) in terza. Dei 26 positivi per CRY, 19 (73%) sono stati individuati in seconda settimana e 7 (27%) in terza. *Escherichia coli* è stato isolato in 4 campioni: 1 (25%) in prima settimana e 3 (75%) in seconda. L'unico positivo per COR è stato isolato in terza settimana.

Conclusioni
I patogeni più frequentemente isolati sia in CA che in CO sono stati *Rotavirus* e *Cryptosporidium spp.*; non si sono evidenziate differenze importanti in termini di % di positività tra CA e CO. La settimana di vita in cui si è isolato il maggior numero di patogeni è stata la seconda. La condizione di anormalità dello stato delle feci può essere predittiva della presenza di un patogeno solo nel 30.7% dei casi mentre lo stato sanitario generale del vitello può esserlo nel 41.4% dei casi.

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EFFECTS OF BODY CONDITION SCORE IN LIVER INSULIN-SIGNALING OF DAIRY CATTLE DURING THE TRANSITION PERIOD

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Introduction

The transition period (TP) is the most critical stage in the lactation of a dairy cow, characterized by an increase of plasma non-esterified fatty acids (NEFA) and beta-hydroxybutyrate (BHB) with low glucose concentration. Previous studies have descripted the presence of insulin resistance during peripartum [1]. The aim of this study was to evaluate the insulin-signaling pathway and some plasma parameters during the TP in the in cows with different body score condition (BSC).

Methods

Sixteen grazing dairy cows, belonging to a commercial dairy farm, were classified using the 5-point scale [2] as high BCS (HBCS, ≥ 3.5, n = 8,) and low BCS (LBCS, < 3.5, n = 8). Blood and liver biopsies were sampled at -14, 4, 14 and 28 days relative to parturation. The concentrations of NEFA, BHB, glucose, triglycerides, insulin and liver triglycerides were spectrophotometrically measured. Also, the liver protein expression of relevant insulin signaling components: insulin receptor (IR), insulin receptor substrate 1 (IRS-1), protein kinase B (Akt) and phosphorylated protein kinase B (p-Akt), was measured by western blot.

Results

Cows in HBCS had higher NEFA concentration than LBCS ($p < 0.05$). In addition, we detected an interaction (BCS x time, $p < 0.05$) for glucose; concentration of this parameter increased at day 28 postpartum in HBCS group ($p < 0.05$). On the other hand, we also recorded an interaction (BCS x time, $p < 0.05$) for p-Akt; the protein expression was lower in HBCS than LBCS group at 28 days postpartum ($p < 0.05$). No differences were recorded in the other parameters ($p > 0.05$).

Conclusions

These results suggest that an alteration in liver insulin-signaling from cows with HBCS could contribute to the augment of glycemia. Besides, a lower insulin sensitivity could be associated with higher NEFA concentrations [3]. This knowledge could represent a useful tool to understand the metabolic behavior to optimize the health and milk production of dairy cattle during this period.

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COMPARISON BETWEEN STANDARD 5 D COSYNCH AND 5 D COSYNCH DELAYING 24 H THE PROGESTERONE DEVICE REMOVAL IN BEEF HEIFERS

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Introduction

In beef cattle hormonal protocols for timed artificial insemination (TAI) aim at getting the highest pregnancy rate (PR) with the minimal handling, with the 5d-Co-synch protocol1 as one of the most frequent protocols. Reducing length of the protocol improves PR, with TAI in cows 72h after progesterone device removal and in heifers after 56h[5]. This time lag between heifers and cattle supposes management difficulties. Therefore, the objective of this study was to compare the 5d-Co-synch protocol with 6d-Co-synch protocol in beef heifers.

Methods

Between September-2017 and February-2018, 187 beef heifers with different breeds, from 11 different Spanish farms TAI. Inclusion criteria for farms were: running adequate health programs (BVD and IBR), routinely stress scoring (scale 1 to 5)[2,3] and nutritional program with supplementation when needed. Individual inclusion criteria were: heifer for first AI, age ≥20 <22months, BCS≥3 (scale 1-5)[4] and presence of CL at the beginning of Co-synch. Heifers were randomly allotted to one of the two experimental groups: 5d-Co-synch [n=99; day0: 100µg GnRH i.m. (Cystoreline® CEVA Sante Animale SA, Libourne, France) +1.55g progesterone intravaginal device (PRID-delta®, CEVA); d5: 25mg dinoprost i.m. (Enzaprost®, CEVA), 500 U.I. eCG (SYNCROSTIM® 500 UI, CEVA) and PRID removal; d6: 25mg dinoprost i.m.; d8: AI+100µg GnRH i.m.] and 6d-Co-synch [n=88; (day0: 100µg GnRH i.m. +1.55g progesterone intravaginal device; d5: 25mg dinoprost i.m. and 500 UI eCG; d6: PRID removal; + 25mg dinoprost i.m.; d8: AI+100µg GnRH i.m.]. TAIs were performed by two blinded veterinarians, with frozen semen from thirty nine bulls. Pregnancy diagnosis were performed 30-50 days after TAI with ultrasound. Data were analyzed with IBM SPSS Statistics Base 22.0. Conception rates were analyzed with logistic regression analysis including confounding factors; distribution of nominal variables were assessed with Chi square and numerical variables with *t*-test.

Results

Heifers aged 20.05±0.36 and 21.5±0.36ms (P=0.005) and BCS was 3,30±0.03 and 3,30±0.06 (P>0.05), respectively for groups 5d and 6d. Conception Rate (CR) were not affected by breed (P=0.609), farm (P=0.767), stress level (P=0.289), bull (P=0.741), CC (P=0.281), age at TAI (P=0.23) or inseminator (P=0.293). There was a numerical difference (P=0.585) in the CR between the experimental groups with CR=58.6% (58/99) for 5d-Co-synch and CR=62.5% (55/88).

Conclusions

Therefore, the 6d-Co-synch can be used in beef heifers without worsening CR results, allowing the simultaneous management of heifers and adult cows.

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ECTOPIA CORDIS IN CATTLE

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Introduction

Ectopia cordis is a congenital anomaly defined as an abnormal position of the heart outside the thorax. Based on the position of the heart, ectopia is cervical, thoracic and abdominal. Among the different animals species *Ectopia cordis* seems to occur mostly in cattle. In this species the cervical *Ectopia cordis* accounts for the majority of the cases (Bowen *et al.,* 1962; Hiraga *et al.,* 1986).

Methods

The retrospective study was carried out on 6 newborn calves. The affected animals were both males and females, and of different breeds. Two calves were stillborn, three died during the first days of life, whereas the last survived for one month and a full clinical examination was possible.
All the animals underwent necropsy.

Results

All the subjects showed, in the cervical region or below the sternum, a globular formation of the size of a grapefruit, of parenchymatous consistency, moderately displaceable in the subcutis. In one calf, the pathological enlargement was pulsating, with a frequency and rhythmicity synchronous with the arterial pulse.
In five cases the heart was situated in the cervical area, and in one case outside the chest.

Conclusions

Ectopia cordis is a congenital heart disease wherein the heart is located outside or within the pleural cavity. This disease is classified into 3 types on the basis of the location of the heart: cervical, thoracic, and abdominal (Müller *et al.,* 1982). The pathogenesis is still unknown.
Cervical Ectopia cordis is likely due to fibrous adhesions between the pericardium and the surrounding tissues that inhibit the migration of the heart into the thoracic cavity (McGeady *et al.,* 2006).
Thoracic Ectopia cordis is due to a failure of the two embryonic sternal bands to come together (Amato *et al.,* 2000), although it has also been hypothesized that the lack of fusion of the sternum is secondary to the ectopia of the heart itself (Engum, 2008). In any case, the heart protrudes from the defective thorax and the pericardium is missing.
Finally, the rare *abdominal Ectopia cordis* is the consequence of the incorrect development of the transversal septum that produces a very large communication between thoracic and abdominal cavities (Engum, 2008).
The authors prompt practitioners and farmers to submit all cases of malformed calves to allow more in depth studies, as a lot of malformations may be caused by genetic defects.

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THERMAL IMAGING CAMERA CONNECTED TO A SMARTPHONE FOR SCREENING COWS WITH FEVER

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Introduction

The body temperature is central part of the veterinary diagnostic measures. The rectal temperature measurement using a thermometer is the conventional method and the gold standard to evaluate the body temperature. In relation to the alternating housing conditions of cattle, which changed from tethering to loose-housing systems, respectively to suckler cow husbandry, a non-invasive method to evaluate the body temperature would be desirable, with which it would be possible to screen a herd for animal with fever without direct contact [1]. The aim of this study was to evaluate the correlation between the rectal temperature and temperature measured non-invasively by an infrared (IR) camera attached to a smartphone.

Methods

In a first step, measurements were performed using a metal block, which was heated up to different temperatures (25-45°C). The precision of the measurement at different distances (0.5-5m) and at two different ambient temperatures (14.7 and 23.8°C) was determined. This was followed by a second step in which cows without fever (<39.3°C) were used to find the body part, where the IR measurement showed the best correlation to the rectal measurement. Therefore measurements at a distance of 0.5 and 1 m on muzzle, eye, flank, crown band, udder and, tail region were performed. At the 3 locations with the highest correlation, the measurements were then carried out again in febrile cows. Bland-Altman plots and kappa-tests have been performed and correlations were calculated.

Results

The highest correlation between the block temperature and the IR measurement was found with a distance of 0.5 m and 1 m ($r = 0.989$ resp. $r = 0.978$). The ambient temperature had significant effect on the accuracy of the measurements. The results varied more at colder than at warmer ambient temperature. The medial canthus of the eye ($r = 0.162$, $p < 0.00001$) and the muzzle ($r = 0.112$, $p < 0.0001$) showed the highest correlation to the rectal temperature. So, these two regions were selected for the last experiment. Therefore, 10 IR measurements on each of the two locations were done in febrile and non-febrile cows. A temperature of ≥ 39.3 °C was found in only 3% of the measurements on the medial canthus and 2.13% on the muzzle. After correction of the IR measurement using the bias calculated in the *Bland and Altman Plot,* it was possible to identify febrile cows with a sensitivity of 81.64% using the medial canthus of the eye and 87.83% using the muzzle. The specificity was 66.8 % for the medial canthus and 64% for the muzzle.

Conclusions

Although there is a high correlation between the IR measurements of the temperature of a metal block, there is a low correlation between the IR measurements at different locations on the animal and the rectal temperature. Possible reasons for this are on the one hand the influence of the distance between the IR camera and the measuring point and on the other hand the influence of the ambient temperature [2]. Probably more

important is the emissivity of the body surface depending on the coat quantity and length [3]. This could be the reason why the hairless parts of the body showed higher correlations. By correcting the measured values with the methodical bias, a very good detection rate of cows with fever could be achieved. Thus, although IR thermography cannot be used for accurate temperature measurement, it is suitable for searching for animals with fever quickly and easily in a herd without the animals having to be fixed or touched.

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MELANOCYTOMA IN A COW

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Introduction

In cattle, melanomas are rare and constitutes 1 to 6% of all tumors. Melanomas are neoplastic processes usually observed in the skin. They may be congenital or acquired, in the latter case however in young animals. Darkly colored cattle may be at risk; neither cutaneous site nor gender predilection has been apparent.

Methods

A 3 and half-year old Holstein cow was presented due to a mass hanging on the right lateral/dorsal region that had been observed for one year. In this time it increased in size.
A paravertebral anaesthesia with 2% Lidocaine was performed before the total surgical extirpation of the tumor. Tissue samples of the tumour were fixed in 10% buffered formalin, embedded in paraffin wax, sectioned at 4 µm and stained with hematoxylin and eosin (H&E) for histopathological examination.

Results

At the gross pathology the extirpated tumour was a 32 x 32 x 16 cm and the total weight was 10.5 kg. Cut section of the neoplasm was bright and blackish and it had a compact consistency with scattered areas of fine white streaks.
The hystological sections revealed a normal epidermis with focal slight hyperkeratosis while in the dermis, within an extensive, dense an pinkish collagenous matrix, there were many rounded to polygonal cells, sometimes fusiform, full of dark-brownish and granular pigments (melanin) within the cytoplasm and poorly visible nuclei. The cells were often arranged around small blood vessels. In other fields it was possible to observe elongated and fusiform cell, arranged in whorls. Numerous cells of other fields showed totally lack of melanin granules. Anisocytosis and anisokaryosis were moderate. Mitotic activity was low with 1 mitosis per 10 high-power fields.

Conclusions

On the base of the clinical, intra-operative and histological data, the diagnosis of melanocytoma was made. The term melanocytoma encompasses the benign forms of melanocytic neoplasms, whereas the term melanoma is used for the malignant forms (Goldschmidt *et al.*, 1998; Marcato *et al.*, 2015). The described tumour was considered benign on the base of the following findings: no other metastatic masses were clinically founded, the extirpated tumour did not infiltrate the upper epidermis and surrounding tissues, mitotic activity was very low and there was no evidence of lymphovascular invasion.
In the case described, the surgical extirpation of the benign tumor was complete. Unfortunately, after some months the cow died due to unknown reasons and was discarded without undergoing any post-mortem diagnosis. Therefore it was not possible to share the complete positive outcome of other scientific reports (Pravettoni *et al.*, 2003; Scanzani e Bellotti, 1990; Miller *et al.*, 1995).

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EFFECTS OF *STAPHYLOCOCCUS AUREUS* IN-UDDER INFECTION ON WATER BUFFALO'S FARM PROFITABILITY

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Introduction

The goal of the present investigation was to assess for the first time the economic losses incurred by the farmer because of the negative impact of *Staphylococcus aureus* (*S. aureus*) on Mediterranean buffalo (MB) udder health.

Methods

Four-quarters pool samples were aseptically collected from 200 dairy primiparous MB according to National Mastitis Council (2017)[1] guidelines. All the samples were submitted to somatic cell count (SCC) analysis and bacteriological culture (BC). Udder health status was clinically classified according to Guccione et al. (2017)[2]. Daily milk yield were also recorded and average buffalo milk price of €1.15/L was used for the economic analysis.

Results

Forty-one of 200 samples (20.5%) were positive for *S. aureus*. Clinical mastitis (CM) due to the bacteria was recorded in 10/41 (24.3%) positive samples while subclinical mastitis (SCM) in 3/41 (7.3%). In CM and SCM no co-infections with other udder-specific bacteria were found. Intramammary infections (IMI) was found in 28/41 MB (68.2%). The mean values of SCC detected in MB affected by CM, SCM, and IMI due to *S. aureus* were 6.06±0.29 Log10cells/mL±SD, 5.47±0.10 and 4.82±0.23, respectively; 4.69±0.23 Log10cells/mL±SD were instead recorded in health animals (H). Statistically significant differences were found between mean values of SCC in CM and SCM ($P=0.0002$), between CM or SCM and IMI ($P<0.0001$), and between CM or SCM and H buffaloes ($P<0.001$). MB with CM caused by *S. aureus* had significantly lower mean daily milk yields (7.15±1.49 L/MB/day) as compared with H animals (13.87±2.64 L/MB/day; $P<0.0001$), MB with IMI (11.16±1.80 L/MB/day; $P<0.0001$), and those with SCM (10.33±0.68 L/MB/day; $P=0.001$). Compared to H animals, mean milk losses of 6.72 L, 3.54 L, and 2.71 L were recorded in CM, SCM and IMI MB, respectively. Mean economic losses were assessed as 7.70 €/MB/day for CM, 4.08 €/MB/day for SCM and 3.12 €/MB/day for IMI.

Conclusions

Clinical outcomes and negative effects on milk quality and milk yields confirmed as *S. aureus* can be cause of clear economic losses for MB's farmers. Ad-hoc udder health monitoring program against this pathogen should be perform to improve the animal welfare and MB's farm profitability.

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NON INVASIVE TREATMENT OF A METACARPAL SALTER HARRIS TYPE 1 FRACTURE IN A 10 MONTHS OLD CALF

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Key words: Cattle, Fracture, Salter Harris, fiber-glass cast

Salter Harris fractures are relatively common in calves, resulting from a selfinflicted trauma or from external factors, but not all the farmers are willing to spend money on them. External coaptation is often the best way to resolve bone fractures in cattle, since it is an economic treatment that gives satisfying results. A 10 months old male dairy calf was found lame and non- weight bearing on the right anterior leg. The bone was not exposed. After obtaining radiographs of the affected limb, a diagnosis of Salter Harris type 1 fracture was done. A fiber glass half limb cast was applied for three weeks two times. Radiographs were repeated between the two casts. After two months the fracture was completely healed without any complication. The calf was slaughtered at 18 months of age.

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RIGHT-SIDED CONGESTIVE HEART FAILURE ASSOCIATED WITH AN EXTENSIVE PLEURAL ABSCESS IN A COW

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Introduction

Clinical signs of right-sided congestive heart failure (CHF) in cows are due to traumatic pericarditis (TP), valvular endocarditis, cardiomyopathy or cardiac leukosis. Foreign bodies, such as wires or nails, can perforate the reticulum, diaphragm and pericardial sac causing pericardial effusion and cardiac tamponade. We describe the findings of an extensive pleural abscess secondary to traumatic reticuloperitonitis in a cow which compromised right heart function leading to CHF.

Case presentation

A four-year-old pregnant Friesian cow was referred to the Teaching Veterinary Hospital of Perugia University because of severe edema of the submandibular region and brisket. Clinical examination showed poor body condition, fasciculations of anconeus muscles, abduction of elbows and bilateral distension of the jugular veins. The rectal temperature was 39.3°C and respiratory rate was 39 breaths/minute. The heart rate was 100 beats/minute with normal rhythm. Chest auscultation revealed reduced lung sounds over the middle third of the lung fields on the left side and absence of heart sounds. On right site, increased breathing sounds and normal heart sounds could be auscultated. Withers pinch test was positive. Ultrasonographic examination of the right chest showed cardiac displacement against the right chest wall with compression of the right atrium and ventricle. Ultrasonographic examination of the left chest allowed to visualize a well-defined, encapsulated and anechoic fluid collection with multiple bright spots extending for up to 35 cm from the chest wall. The sonogram was typical of a pleural abscess and signs of right-sided CHF was considered secondary to compression of right atrium and ventricle. A thoracic drainage tube was placed and 25 liters of purulent exudate were drained. Ultrasonographic examination after positioning of thoracic drain showed no right atrium and ventricle collapse with normal cardiac function. Based on the antimicrobial susceptibility test, sulfadimethoxine and trimethoprim was administered. Signs of CHF in 7 days disappeared and after 14 days from admission the cow delivered a healthy bull-calf. X-ray examination was performed and a thoracic radiopaque long, thin foreign body cranial to the diaphragm was identified. Thoracotomy was performed to remove the foreign body but this was unsuccessfully located. Euthanasia was elected because of poor prognosis. At necropsy, a large pleural abscess containing a metal wire of 7 cm was seen. The abscess showed numerous adherences with the surrounding tissues.

Conclusions

Clinical signs of right-sided CHF in our case was due to the cardiac displacement and compression caused by an extensive pleural abscess. CHF in cows with hardware disease can be secondary not only to TP.

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UNIVERSITY OF BOLOGNA FIELD WORK ON BIOSECURITY AND ANIMAL WELFARE ASSESSMENTS IN SHEEP AND GOAT FARMS: RESULTS OF A 5-YEAR EXPERIENCE

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Introduction

Farm animal welfare and biosecurity have increasingly established themselves as major issues. Pursuing these principles leads to a lower use of drugs and vaccines, with benefits for animal health, the farm's economy and food safety. Therefore, practical teaching of these subjects in the Veterinary Medicine Degree Course represents a significant educational objective.

Methods

This is a 5-year retrospective study (2014-2018) on welfare and biosecurity of 56 sheep and goat farms of Emilia-Romagna region. The on-farm visits were carried out by groups of 4-8 final year students (for a total of 310 students), supervised by a teacher and an Official Veterinarian, during the professional practical training provided by the Veterinary Medicine Degree Course of the University of Bologna.

Biosecurity and welfare assessments were performed using the official protocols adopted by the Authorities in Emilia-Romagna region, but also evaluating the animal-based criteria included in the protocol developed by the national reference centre for animal welfare (CReNBA). The assessment was carried out by interviewing the farmer, checking the documents and the national database (BDN), inspecting the farm structures and the animals. When needed, laboratory exams were performed. At the end of the training, the students presented a report enlightening the farms' strengths and weaknesses and suggesting measures for improvement.

Results

The most recurring welfare failures were: lack or inadequacy of pens for injured or sick animals and of the partum area (66% of farms), inadequate number or malfunction of drinking troughs (59%), inadequate structures (52%), lack of training or shortage of stockpersons (34%), high prevalence of abscesses (27%), insufficient lighting of the resting area (20%), foot diseases (16%), paucity of feeding troughs (16%).

The most recurring biosecurity failures were: promiscuity of different species (58%), lack or inadequacy of quarantine premises for new entries (48%), no control of the way in to the farm (44%), no control plan against rodents (37,5%), lack of communication with the Local Health Authority (37,5%), poor hygiene conditions (27%), lack of a specific area for loading/unloading animals (23%), failure to update the loading/unloading log book (18%), no vaccination and deworming programs (16%).

The most recurring parasitic species where coccidia (80% of farms), strongyles (55%) and trichiura (23%). Serological tests showed positivity for Small Ruminant Lentiviruses in 41% and 30% of sheep and goat farms respectively.

Conclusions

The on-field teaching experience proved to be very useful for the acquisition of practical skills on biosecurity and welfare assessments by the graduands in Veterinary Medicine, in the role of both the Official Veterinarian, who verifies compliance to the law in force, and the farm veterinarian, who works in synergy with the farmer to improve biosecurity, health and welfare conditions. Furthermore, this 5-year experience allowed to collect a considerable amount of data on farming conditions in Emilia-Romagna region.

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EFFECT OF ANIMAL WELFARE IN DAIRY COWS AND WATER BUFFALOES BY MEANS OF RUMIWATCH® AUTOMATIC SYSTEM

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Introduction

Change of animal behaviors is one of the most important criteria for assessing animal welfare and health, although these concepts still far of being implemented in dairy Mediterranean buffalo (MB)[1]. The aim of the investigation was to compare walking and feeding beahviours indicative of animal welfare in cows and MB based on the output of a 3-dimensional accelerometer and a halter equipped with a pressure sensor [RumiWatch® (RW), ITIN+HOCH GmbH, Fütterungstechnik, Liestal, Switzerland].

Methods

Twenty nulliparous animals (10 cows and 10 MB) originating from similar breading systems were enrolled. All animals were monitored for 5 days (2 days-adaptation time, 3 days-acquisition phase). The following activities were evalueated: *lying bout, walking bout, standing bout, stand up, lie down, number of strides, lying time, walking time, standing time, upright time* with RW pedometer; while *rumination time, n° of cuds, n° chews during rumination, n° chews/cud, eating time* with RW halter.

Results

Similar findigs both in cows and MB were observed for:*lying time* (cows: 9.9h±2.4 SD; MB: 9.5h±2.5 SD), *standing time* (cows: 13.1h±2.2 SD; MB:11.6h±0.9 SD), *walking time* (cows: 56.7min±22.8 SD; MB: 61.7h±13.6SD), *upright time* (cows: 14.0h±2.6 SD; MB: 12.6h±1.0 SD), *stand up* (cows: 10.6times±3.1 SD; MB: 8.0times±2.3 SD), *lie down* (cows: 10.5 times±3.1 SD; MB: 8.3 times±2.5 SD), *lying bout* (cows: 10.5times±3.1 SD; MB: 8.3times±2.5 SD), *number of strides* (cows: 1483.5strides±626.4 SD; MB: 1341.5strides±311.6 SD), *eating time* (cows: 270.1min±103.9 SD; MB: 335.4min±299.6 SD), as well as for *n° chews during rumination* (cows: 27443±6319.4 SD; MB: 29083.9±3212.9 SD), *n° of cuds* (cows: 459±108 SD; MB: 497.3±72 SD) and *n° chews/cud* (cows: 59.1±3.7 SD; MB: 59.2±4.1 SD). A significant difference was found for *standing bout* ($P<0.05$; cows: 167.5times ±58.5 SD; MB: 230.1times±38.9 SD), *walking bout* ($P<0.05$; cows: 159.3times±59.2 SD; MB: 226.1times±40.4 SD) and *rumination time* ($P<0.05$; cows: 438.7min±100.7 SD; MB: 542min±33.5 SD).

Discussion:

Behaviours indicative of clinical welfare were compared in cows and MB. The results suggest that the novel device RW (pedometer and halter) allows to objectively establish these parameters, elucidating at the same time some differences between the two species useful to improve and differentiate the respective breeding systems.

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D'Andrea L, Guccione J, Alsaaod M. et al.(2017) Validation of a novel pedometer algorithm as indicator of animal welfare in a dairy Mediterranean buffalo herd. J Dairy Res 84:391-394

UN CASO DI FEBBRE CATARRALE MALIGNA IN UN ALLEVAMENTO DI BUFALA MEDITERRANEA ITALIANA (*BUBALUS BUBALIS*) IN UMBRIA

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Introduzione

La Febbre Catarrale Maligna (FCM) è una patologia sistemica cosmopolita che interessa molte specie di ruminanti domestici e selvatici. Ne sono responsabili alcuni virus del genere *Macavirus*. Fra i più caratterizzati l'*Alcelaphine herpesvirus-1* (AIHV-1) endemico nello Gnu (*Connochaetes sp*.) ed associato a FCM in Africa e in animali da zoo, e l'*Ovine herpesvirus-2* (OvHV-2), endemico in ovini e caprini e responsabile di FCM in bovini, bisonti, bufali, cervidi e suino in tutto il mondo. La malattia colpisce generalmente pochi soggetti, con quadri clinici che variano da un andamento iperacuto con decesso in 12-24h, fino alla classica sintomatologia con ipertermia, opacità corneale, scolo oculo-congiuntivale catarrale, lesioni erosive a carico del musello e del cavo orale. L'esito è infausto sebbene raramente sia possibile assistere alla guarigione del soggetto colpito.

Metodi

Nel periodo tra agosto e settembre 2014, in un allevamento misto di bovini, ovini, equini, suini e bufali sito in Umbria, sono stati introdotti 10 bufali maschi di età compresa fra i 2 e i 4 mesi. Da febbraio ad ottobre 2015 in 7 soggetti dei 10 di nuova introduzione sono comparsi progressivamente sintomi clinici caratterizzati da ipertermia ed inappetenza, scadimento delle condizioni generali, opacamento corneale, compromissione respiratoria fino al decesso, con decorso fra i 7 e i 15gg. Nel mese di ottobre 2015 è stato richiesto l'intervento dell'IZSUM per l'esame necroscopico dell'ultimo soggetto deceduto di 14 mesi di età e sopralluogo in stalla. Indagini istologiche, batteriologiche e molecolari sono state effettuate per accertamento della causa di morte.

Risultati

L'esame necroscopico ha evidenziato lesioni emorragiche a carico del cuore e della parete dei grossi vasi arteriosi con presenza di trombosi a carico dell'aorta a cui si associava abomasite ed enterite emorragica. L'esame istologico ha mostrato eventi disseminati di vasculite necrotizzante. I test diagnostici condotti su campioni prelevati in sede necroscopica hanno dato tutti esito positivo per FCM.

Conclusioni

La FCM è presente in Italia ma pochi sono i dati epidemiologici a disposizione relativi alla prevalenza nelle greggi e all'incidenza nelle specie sensibili, probabilmente a causa del ridotto numero di segnalazioni. Appare evidente come la promiscuità tra specie sensibili e soggetti portatori sia il principale fattore di rischio. Nel caso descritto, la presenza di ovini sia nell'allevamento di provenienza che in quello di destinazione è stata ritenuta la fonte di contagio, nonostante non sia stato possibile effettuare test diagnostici di conferma.

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HEALTH MANAGEMENT OF A SALMONELLOSIS OUTBREAK IN A DAIRY FARM

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Introduction

Salmonellosis is an important disease for both animals and humans. The main risk factors in cattle breeding are the introduction of carrier animals, poor hygiene and overcrowding.

Methods

In July 2017 an outbreak of salmonellosis occurred in a dairy cow farm of 494 lactating cows. *Salmonella enterica* serovar Typhimurium monophasic variant 4,[5],12:i:– was isolated from 6 fecal samples collected from cows with diarrhea. Based on a farm risk analysis (using the evaluation system proposed by CReNBA of IZSLER), a health management plan was implemented in order to improve the levels of external and internal biosecurity and animal welfare. Vaccination based on the autogenous vaccine made by IZSLER using the strain of *S.* 4,[5],12:i:– isolated in the farm was implemented. All cows, except for calf, have been vaccinated twice.
The results of the plan were evaluated during two visits (October 2017 and February 2018), measuring biosecurity and welfare levels and through microbiological investigations. In every visit were collected 11 environmental samples from different stables of the farm and 60 feces of asymptomatic cows to verify the prevalence of Salmonella. Bacteriology was performed using ISO 6579:2002/Amd 1:2007 method and serotyping using ISO/TR 6579-3:2014-07 method.

Results

The second visit showed, compared to the first one, an improvement of welfare (73.1% and 58% respectively) and biosecurity (46.8% and 37% respectively).
In the first inspection *S.* Agona and *S.* Typhimurium were isolated from 8 and 1 environmental samples, respectively, while in the second one *S.* Typhimurium was isolated from one sample collected in the lactation stable. Regarding microbiology investigations from the faeces, in the first inspection *S.* Typhimurium was isolated from 4 cows while in the second one the faeces resulted negative. *S.* Typhimurium monophasic variant was not isolated from samples collected in the 2 visits.

Conclusions

Biosecurity measures, hygiene and management play an important role in the epidemiology of salmonellosis. The frequent purchase of cows, the poor hygiene observed in the farm and the overcrowding were considered the most important outbreak's predisposing factors and could explain the variability of the isolated serotypes. The application of a health management plan, determined the disappearance of the clinical salmonellosis and the prevalence reduction in the farm. The plan coupled with the vaccination can represent the strategy to tackle salmonellosis outbreaks in dairy cow.

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LA RINOTRACHEITE INFETTIVA DEL BOVINO: RISULTATI DEL PIANO DI GESTIONE NELLE RAZZE CHIANINA E MARCHIGIANA PER IL TRIENNIO 2015-2017

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Introduzione
La rinotracheite infettiva del bovino (IBR) sostenuta dal virus erpetico del bovino tipo 1 (BoHV-1), colpisce bovini domestici e selvatici; la trasmissione avviene prevalentemente per via respiratoria e genitale; gli animali con infezione latente sono considerati una fonte potenziale di infezione. La malattia a livello nazionale è controllata dal Piano di gestione (DM n.11100/2015) degli allevamenti di bovini delle 5 razze Italiane da carne iscritti ai Libri genealogici (LG), gestiti dall'Associazione Nazionale Allevatori Bovini da Carne (ANABIC), e coordinato dal Centro di Referenza Nazionale per IBR (CRNIBR). L'obiettivo del lavoro è stato quello di analizzare i dati dell'ultimo triennio riferiti ad aziende e capi di razza Chianina e Marchigiana.

Materiali e metodi
Gli esiti degli esami sierologici eseguiti nei capi bovini di età >12 mesi sono stati forniti dal CRNIBR e i dati relativi alle consistenze di allevamenti e capi dall'ANABIC. Per il triennio 2015-2017 sono state calcolate le prevalenze di aziende e capi con intervalli di confidenza al 95% (IC95%). Un allevamento è stato considerato positivo quando almeno un capo è risultato positivo.

Risultati
A livello nazionale, le medie delle consistenze dei capi e di allevamenti riferite al triennio, sono risultate di 44.878 bovini distribuiti in 1.418 allevamenti per la Chianina (il 90% circa ubicati in Umbria, Toscana e Lazio) e 51.798 capi in 2.154 allevamenti per la Marchigiana (circa l'80% situati nelle Marche, Campania e Abruzzo). La percentuale di adesione al Piano da parte delle aziende è risultata in media del 13% per la Chianina e del 9% per la Marchigiana. Le prevalenze aziendali nei tre anni per la Marchigiana sono risultate del 49% nel 2015 (IC95% 42-55), 58% nel 2016 (IC95% 50-64), 51% nel 2017 (IC95% 45-58) e per i capi 25% nel 2015 (IC95% 24-26), 27% nel 2016 (IC95% 26-28), 22% nel 2017 (IC95% 21-23); per la Chianina del 42% nel 2015 (IC95% 36-48), 42% nel 2016 (IC95% 35-50), 33% nel 2017 (IC95% 27-40) e per i capi del 22% nel 2015 (IC95% 21-23), 19% nel 2016 (IC95% 18-20), 21% nel 2017 (IC95% 20-22).

Conclusioni
La percentuale di adesione al Piano da parte delle aziende nel triennio ha avuto un andamento crescente, tuttavia rimane ancora bassa; è necessario un coinvolgimento e una partecipazione maggiore da parte degli allevatori. In generale nei tre anni il trend delle prevalenze è risultato altalenante, solo per le aziende di razza Chianina si è registrato nel periodo un andamento più lineare e decrescente.

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OCCURRENCE OF *EIMERIA* SPP IN DIARRHOEIC PRE-WEANED CALVES FROM NW SPAIN: INFLUENCE OF AGE AND FAECAL CONSISTENCY

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Introduction

Neonatal diarrhoea is a common process in suckling calves, leading to substantial economic losses in farms. Several bacterial, viral and parasitic enteropathogens, including *Eimeria* spp., could be involved. The main aim of this study was to determine the occurrence and intensity of oocyst shedding of *Eimeria* sppp in diarrhoeic pre-weaned calves and to identify the species found. Moreover, the potential influence of both age and consistency of faeces on the percentage of infection was assessed.

Methods

Non-formed faecal samples were collected from 157 calves younger than 30 days of age in 97 Galician (NW Spain) cattle farms. *Eimeria* oocysts were detected and quantified using a McMaster floatation method. Positive samples were selected and incubated in 2.5% potassium dichromate solution at room temperature for 10 days. *Eimeria* species were identified by morphometric analysis of oocysts.

Results

Overall, 10.2% of calves shed *Eimeria* spp oocysts; 12.4% of farms tested positive. The mean oocyst shedding was 4,420.4 oocysts per gram of faeces (opg), ranging from 50 to 434,000 opg. Nine species were identified; *E. ellipsoidalis* and the pathogenic *E. bovis* and *E. zuernii* were the predominant species, followed by *E. alabamensis*, *E. auburnensis* and *E. cylindrica*. *E. canadensis*, *E. subspherica* and *E. wyomingensis* were occasionally detected. All positive animals were infected by more than one *Eimeria* species, ranging from 2 to 6. The youngest calf excreting oocysts was 7 day-old, indicating an infection soon after birth. The percentage of calves shedding oocysts significantly increased with age (χ^2= 62.413; p< 0.001), from 1.2% in animals younger than 7 days to 59.1% in calves aged 22-30 days. In this sense, the low overall prevalence values found could be related to the fact that most of the sampled animals (74.5%) were under 2 weeks old. The prevalence of *Eimeria* spp was higher in pasty faeces (12.8%) than in watery stools (8.1%), but these differences were not significant (p> 0.05).

Conclusions

Our results reveal a low presence of *Eimeria* spp in diarrhoeic suckling calves from NW Spain. Nevertheless, their occurrence becomes very important as of the fourth week of life, with a predominance of the pathogenic species *E. bovis* and *E. zuernii*.

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EIMERIA SPECIES IN GOATS UNDER INTENSIVE MANAGEMENT SYSTEM IN NORTHWEST SPAIN

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Introduction

Goat dairy farms apply intensive production practices that favoured the infection by density-dependent parasites, like coccidian. Among *Eimeria* species described in goats, the most pathogenic are *E. caprina*, *E. christenseni*, *E. hirci* and *E. ninakohlyakimovae* (1). The objective of this study was to identify *Eimeria* species in goats of different ages under intensive production systems.

Methods

Faecal samples from 165 goats in 5 intensive production herds were collected in Galicia (NW Spain). Samples were processed by flotation technique to determine the presence of *Eimeria*. In positive cases oocysts were washed and divided in two pools, one for animals up to 12 months and the other for older animals. These pools were incubated in 2.5% potassium dichromate solution at 20ºC 10 days for sporulation. To differentiate species, oocysts were recovered by flotation in sucrose and measured under microscope; length, width and the presence or absence of micropyle were taken into account. Differences between proportions of the different species and age groups were valued the prop.test() function with the statistical language R.

Results

E. arloingi (51.5%) was the most prevalent species, followed by *E. ninakohlyakimovae* (17.0%), *E. alijevi* (11.75%), *E. aspheronica* (6.5%), *E. christenseni* (5.75%), *E. caprina* (4.75%), *E. hirci* (2.25%) and *E. jolchijevi* (0.5%). Prop.test() analysis showed *E. arloingi*, *E. ninakohlyakimovae*, *E. alijevi* in statistically different proportions; *E. aspheronica*, *E. christenseni* and *E. caprina* formed a homogeneous group, as occurred in *E. caprina*, *E. hirci* and *E. jochijevi*. Taking into account the effect of the age of the animals (<13 and >13 months) in the frequency of the *Eimeria* spp., statistical analyses showed that the prevalence of *E. arloingi* ($p < 0.001$) and *E christenseni* ($p = 0.007$) was significantly higher in the adult animals. On the other hand, the proportion of *E. ninakohlyakimovae* ($p = 0.002$), *E. alijevi* ($p = 0.027$) and *E. aspheronica* ($p = 0.047$) was significantly higher in the younger goats.

Conclusions

Eimeria arloingi is a low pathogenic species, frequent in adult animals, while *E. ninakohlyakimovae*, with high pathogenicity, affects more to young goats, which could be related to the presence of acute coccidiosis in lactating goat kids.

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Program for Consolidating and Structuring Competitive Research Groups (GRC2015/003 and 2017-PG117*, Xunta de Galicia, Spain)*

PREVALENCE OF BOVINE CALICIVIRUSES IN DIARRHOEIC PRE-WEANED CALVES IN NW SPAIN

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Introduction

Calf diarrhoea is a frequent issue causing severe economic losses in cattle production. Aetiology of diarrhoea includes a variety of bacterial, viral and parasitic agents; it is considered a plurietiologic process since coinfections are very common. In this sense, bovine caliciviruses as Bovine Norovirus (BNoV) and Bovine Nebovirus (BNeV) have been currently identified as emergent pathogens. For this reason, the aim of this study was to evaluate the presence of both viruses in diarrhoeic pre-weaned calves from Galicia (NW Spain), as well as to assess its possible relation with the age of the animals.

Methods

Faecal samples (n=148) of diarrhoeic calves under one month of age were used. For each sample, RNA was extracted (RNeasy PowerMicrobiome, Qiagen, Germany) and tested to determine BNoV and BNeV presence using two commercial qPCR kits (EXOone Bovine Norovirus oneMIX and EXOone Bovine Nebovirus oneMIX, Exopol S.L., Spain). The possible influence of the group of age of the animals (1, 2, 3 and 4 weeks) on the presence of each virus was evaluated by chi-square test; in addition, all positive samples for each virus was analysed for correlation between the obtained qPCR cycle threshold (Ct) and the days of age.

Results

Prevalences of BNoV and BNeV were 29% and 18.9% respectively, with 8.1% of coinfections. Regarding BNoV, no statistical association was found between the presence of the virus and the different groups of age (R^2=1.313; p=0.726); nevertheless, a positive correlation was obtained between the obtained Ct and the days of age of the animals (R^2=0.353; p=0.022), meaning that the youngest animals present the highest BNoV loads. In contrast, a significantly higher percentage of BNeV positive samples was found in animals of three and four weeks (R^2=9.084; p=0.028); however, no correlation was found between the BNeV load and the days of age (R^2=-0.082; p=0.698).

Conclusions

Bovine caliciviruses are common in samples from diarrhoeic calves of Galicia. The youngest animals present higher BNoV loads and BNeV is more prevalent in animals of 3-4 weeks of age. Since other pathogens could be involved in the appearance of diarrhoea, our results do not indicate that bovine caliciviruses were the causal agents of the process; nevertheless, given the high prevalence obtained, they should be taken into account in routine diagnosis.

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EVALUATION OF ANTHELMINTIC EFFECTIVENESS OF POMEGRANATE *(PUNICA GRANATUM)* PEEL EXTRACT IN SHEEP NATURALLY INFECTED BY GASTROINTESTINAL NEMATODES

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Introduction

Gastrointestinal nematodes (GINs) infection, caused by different genera of nematodes, remains one of the main constraints to small ruminant production in southern Italy and so maintenance of anthelmintic efficacy is important to ensure high levels of production and animal welfare[1]. The intensive use of synthetic anthelmintics for treating and control of GINs in sheep farms has leading, to the widespread development of resistance to one or more anthelmintics drug classes at the same time[2]. Because of the widespread resistance to synthetic chemical anthelmintics, there is a strong impetus to explore novel approaches for a more integrated management of these infections. For these reasons the aim of our study was to evaluate the effectiveness of vegetable extracts used in the local traditions for the treatment of GINs in sheep.

Methods

The study was conducted in sheep naturally infected by GINs in the Calabria region. For this study 40 sheep were selected and divided into 2 groups (20 animals per group) homogeneous by weight, physiological status and GINs eggs per gram (EPG) of faeces: **TPG,** treated orally, at double administration, with 50 ml of pomegranate *(Punica granatum)* peel extract and **CG,** untreated.

The timing was: D_0 the formation of groups, sampling feces and treatment with pomegranate extract, D_7 sampling feces, second treatment and evaluation anthelmintic effectiveness, D_{14} and D_{21} sampling feces and evaluation anthelmintic effectiveness. The faecal samples were examined using Flotac *double technique,* with flotation solution sodium chloride based (specific gravity = 1.200)[3]. The formulas used to evaluate the anthelmintic efficacy, FECR=100X(1-[EPGt/UPGc]), are recommended by the World Association for the Advancement of Veterinary Parasitology (WAAVP) to monitor drug efficacy against gastrointestinal nematodes in livestock based on the calculated the fecal eggs count reduction (FECR)[4].

Results

The results of the EPG mean FECR (%) for each group were:

TPG - D_0**:** 342 EPG; D_7: 174 EPG (49.85%); D_{14}: 150 EPG (55.75%); D_{21}: 163 EPG (48.25%).

CG - D_0: 345 EPG; D_7: 347 EPG; D_{14}: 339 EPG; D_{21}: 315 EPG.

Conclusions

Following the guidelines provided by the WAAVP the extract is insufficiently active. Although the results showed a low anthelmintic efficacy, a reduction 51% obtained with a natural extract is still an encouraging result. It is therefore necessary to carry out further studies increasing the concentration of administration of the extract, evaluating its benefits on milk production.

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RUMINATION TIME IN THE FIRST WEEK AFTER CALVING INFLUENCES MILK QUALITY IN SIMMENTAL DAIRY COWS

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Introduction

Recent studies highlighted the relationship between rumination time (RT) around calving and metabolic conditions in the first month of lactation (1-2). The aim of this study was to investigate changes of cow milk quality during the first month of lactation in two group with different level of rumination time.

Methods

Fourteen multiparous Simmental cows were categorized according to their RT average from 3 to 7 days in lactation (DIM): low-RT group (L; 7 cows) with RT<554.2 min/d and high-RT group (H; 7 cows) with RT>554.2 min/d (median value). RT was recorded by an automatic rumination-monitoring system (HR-Tag, SCR Engineers, Israel). Milk samples were collected at 7, 15, 21, 30, and 42 DIM. Milk components (fat, protein, casein, lactose, urea, and BHBA) and its coagulation properties (a30, k20, and RCT) were evaluated by MilkoScan FT+ (Foss Analytical, Denmark). All statistical analyses were performed with repeated-measures ANOVA using a mixed model (MIXED procedure; SAS Inst. Inc.). Significance was declared at $P<0.05$ and tendencies at $P<0.15$.

Results

The mean ± SD RT from 3 to 7 DIM of L and H group was 485.62 ± 64.77 and 612.20 ± 81.38 min/d. Milk BHBA was overall higher in L compared to H group ($P<0.05$) especially during the first 15 DIM ($P<0.05$). Urea concentration tended to be greater in H compered to L group ($P<0.15$) with values significantly higher at 15 and 21 DIM in H group ($P<0.05$). Although the concentration of fat is overall lower in H group, only at 7 DIM we observed that H had significantly higher values compared to L group. Lactose concentration was overall greater in H group ($P<0.05$), whereas no differences were found for protein and casein ($P>0.05$). Regarding milk coagulation properties, k20 was lower ($P<0.05$) and a30 tended to be higher ($P<0.15$) in H compared to L group. In addition, no differences were observed for RCT.

Conclusion

Our results demonstrate that RT in early-lactation dairy cows is related to milk quality and coagulation properties. Lower RT during the week after calving was associated to an overall decreased milk quality and impairment of coagulation properties. Further, milk from low-RT group had greater BHBA and fat content.

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SERUM HAPTOGLOBIN AND PROTEIN ELECTROPHORETIC FRACTIONS MODIFICATION IN BUFFALOES (BUBALUS BUBALIS) AROUND CALVING AND DURING EARLY LACTATION

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Introduction

Different physiological and pathological conditions can affect serum protein distribution and concentration. Acute phase proteins (APPs), such as haptoglobin, can provide valuable diagnostic information in detection, prognosis and monitoring the diseases in animal species[1]. The aim of this study was to evaluate the changes in the concentration of serum protein fractions and haptoglobin in clinically healthy dairy buffaloes during late pregnancy and early lactation.

Methods

Blood samples were collected from 30 buffaloes -7±5 days before expected calving; +7±5; +30±5 and +50±5 days after calving; milk samples were collected at the same postpartum time points. On serum samples, the total proteins, haptoglobin, albumin, α1-, α2-, β1-, β2-, γ-globulins,and albumin/globulin ratio (A/G) values were evaluated. On milk, fat %, protein %, lactose %, somatic cells score (SCS), milk yield and daily milk production (DMP) were assessed.

Results

Peripartum period significantly influenced ($P<0.005$) total proteins, albumin, haptoglobin, α2-, β2- and γ-globulins ($P<0.005$). Milk yield, DMP and Fat % statistically changed throughout monitoring period ($P<0.005$). Milk yield and DMP resulted positively correlated with total proteins, albumin, β2-globulins and A/G ratio; and negatively correlated with haptoglobin and α2-globulins.

Conclusions

Changes in serum protein electrophoresis, properly interpreted, can be one of the most useful diagnostic aids available to the clinician to monitor the health status of the buffaloes in order to promote well-being of the animal and to improve productivity[2].

Presented results may contribute to the improvement of the current knowledge about the serum protein electrophoretic pattern in Italian Mediterranean Buffaloes during the last phase of pregnancy and early stages of lactation.

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DETECTION OF INTRAMUSCULAR FAT USING TEXTURE ANALYSIS OF B-MODE ULTRASOUND IMAGES IN LIVING BEEF CATTLE

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Introduction

The estimation of the intramuscular fat could facilitate an evaluation of the fattening period correlated to the determination the meat quality in living beef cattle[1]. The aim of this methodological study is to elaborate mathematically predictive values of intramuscular fat using texture analysis.

Methods

28 Charolaise bulls were enrolled in the study. Ultrasonography of the *longissimus dorsi* was performed 7 days prior slaughter of the animals in the 7th intercostal space. Once slaughtered, 100 gr of longissimus muscle were collected in the same intercostal space. The determination of centesimal composition of the muscle was analyzed (Lipids%, Protein%, Ash% and Humidity%). Based on their lipid content (LC), 10 animals were considered as low-fat meat (Class 1, fat%=2.9-4.1), 8 animals as moderate fat content (Class 2, fat%=4.3 - 5.6) and 10 animals with higher fat content (Class 3, fat%=6.3-8.6). The ultrasound images were analyzed using an image texture software (MaZda v4.6)[2].

Using two different one-way ANOVA and two linear discriminant stepwise analysis were used to compare the texture analysis data with muscle lipids% and centesimal composition parameters. Two regression equations capable of maintaining the highest number of variables and at the same time keeping the variance inflation factor lower than 10 for all included variables was assumed as predictive model.

The first equation (LIPpred1) predicts LP using both texture analysis parameters and all centesimal parameters; the second equation (LIPpred2) predicts LC using only texture analysis and lipid%.

Results

The mean LC in the meat samples was 5,17±1,47 gr. Predicted LC resulted 4,81±1,47 gr in LIPpred1 and 5,08±1,31 gr in LIPpred2**.**

The ROC analysis showed how LIPpred1 permits estimation of LC % in the muscle with a difference between predicted value and effective value of 0,3%. The sensibility of the test was higher than 95% and the specificity was higher than 90%.

A Bland-Altman plot was used to test the agreement between Extracted LC and Predicted LC. For LIPpred1 was 0.68 and 0.05 (with mean 0.37) while for LIPpred2 was 2.0 and -1.8 (with mean 0.1).

Conclusions

This research suggest that interfacing texture analysis could permit an estimation of intramuscular fat. Further studies are needed to validate the applicability of this method directly in field.

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DIAGNOSIS OF METABOLIC DISORDERS IN DAIRY COWS DURING EARLY AND MID LACTATION BASED ON CHANGES IN CHARACTERISTIC BLOOD BIOCHEMICAL INDICATORS

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Introduction

According to blood biochemical indicators, ketosis in cows may be diagnosed when the following values match the clinical signs: beta-hydroxybutyrate (BHB) > 1.2 mmol/l, glucose < 2.5 mmol/l, and triglycerides (TG) < 0.12 mmol/l, and blood values: non-esterified fatty acids (NEFA) > 0.7 mmol/l and aspartate-transaminase (AST) activity above 100 U/l, which is indicative of hepatic lipidosis. On that account, objective of this experiment is to diagnose the metabolic disorders of early and mid lactation dairy cows based on changes in characteristic blood biochemical indicators.

Methods

This experiment was conducted in a dairy Simmental herd diagnosed with a number of metabolic and reproductive disorders. Clinically healthy early lactation cows (n=15) in the first month of lactation (16 ± 9 days) and mid lactation cows (n=15) in the 3 to 5 month of lactation (114 ±28 days) were selected. Blood plasma of BHB, NEFA, glucose, TG concentrations and AST activity were determined by different colorimetric techniques using spectrophotometers (Cobas Mira and Gilford Stasar). Data were subjected to statistical analysis using the GLM model and t-test for difference of means between two independent groups.

Results

Cows in early lactation had significantly higher ($p<0.05$) levels of serum BHB, NEFA and AST, and lower glycemia ($p<0.05$) and TG ($p>0.05$) compared to mid lactation cows. High lipomobilization (NEFA >0.4 mmol/l) and subclinical ketosis (BHB >1.2 mmol/L) were detected in 6 (40%) and 14 (94.4%) early-lactation cows, respectively, and in none of the mid lactation cows. AST activities above 100 IU/l were detected in two (13.3%) early-lactation and none of the mid-lactation cows. TG concentrations below 0.12 mmol/l were found in 7 (44%) early-lactation and 2 (13.3%) mid-lactation cows. Glucose levels were below 2.5 mmol/l in 10 (66.6%) early-lactation and 5 (33.3%) mid-lactation cows.

Conclusions

Results on blood levels of glucose, TG, BHB, NEFA and AST in early lactation cows suggest metabolic disorders associated with ketosis, and some degree of hepatic lesions, probably due to fat infiltration. These serum biochemical indicators may have a key role in diagnosing metabolic disorders in early and mid lactation dairy cows.

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CHANGES OF SOME ENERGY METABOLISM BIOMARKERS THROUGHOUT THE TRANSITION PERIOD IN ORGANIC FARMS IN NW SPAIN

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Introduction

Organic dairy farming is a more sustainable animal husbandry method compared to the current intensive production system. In cows, the nutrition for organic production system is well-regulated by Council Regulation EU 889/08, although the effect of the approved feedstuff on internal balance is not well-established.
Our main goal was to study changes in metabolic biomarkers across the transition period in two organic dairy farms using different breeds.

Methods

70 healthy cows were enrolled from two farms (35 cows each): 1) Farm A: crossbreed Holstein-Friesian x Brown Swiss cows and 2) Farm B: Holstein-Friesian cows. These animals were blood sampled fortnightly from 62 days before expected calving until 100 days postpartum. Serum glucose, free fatty acids, and β-hydroxybutyrate were measured as indicators of energy status, and AST and GGT activities as markers of liver function. Results were analyzed statistically with general lineal models with repeated measures and Bonferroni corrections, considering farm, time and their interaction as fixed effects. Significance level was established at $P \leq 0.05$.

Results

Starting with energy metabolism, Farm B showed imbalances in the immediate postpartum that extended far into the peak of lactation. This was associated with a low dietary energy intake ç that kept the animals at risk of ketosis. In this sense, energy biomarkers were more stable Farm A, which suggests that the ration was administered according to the physiological demand of the animals. A similar effect was observed in the serum activities of AST and GGT, increasing in line with the energetic biomarkers in Farm B but not in Farm A, suggesting an increase in hepatic metabolic effort to adjust to the energy deficits in Farm B.

Conclusions

We have to obtain a deeper understanding of the effects of approved feedstuff on the animals' metabolism to avoid unexpected problems. Just a productive system itself cannot be the answer for the future without a thorough evaluation of its effects on the animals.

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INTER-OBSERVER AGREEMENT OF DIFFERENT DIGITAL DERMATITIS M-STAGES

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Introduction

Bovine digital dermatitis (DD) is a multifactorial infectious claw disorder, with a worldwide prevalence. It's characterized by an ulcerative, often painful, lesion at the hoof-horn junction of the hoof (Laven and Logue, 2006; Gomez et al., 2012). DD is associated with animal welfare concerns such as lameness (Bruijnis et al., 2012). M-scoring (Dopfer et al., 1997) is considered gold standard but needs to be accurate and precise. The objective of this study was to estimate the inter-observer agreement of students on DD with an experienced foot health investigator.

Material and methods

In May 2018, 23 photographs of the distal part of hind limbs were collected at the moment of routine claw trimming. These photographs showed different stages of DD at the hoof-horn junctions. Independent visual M-scoring was done by seven trained students, who had participated in a study on DD and an experienced foot health researcher, who's M-scores were used as a reference. The inter-observer agreement was estimated using Cohen's kappa coefficient (k). The results of the agreement analysis were interpreted according to Landis and Koch (1997): <0.00 poor, 0.00 – 0.20 slight, 0.21 – 0.40 fair, 0.41 – 0.60 moderate, 0.61 – 0.80 substantial, and 0.81 – 1.00 almost perfect.

Results

Table 1. Descriptive data showing the M-scores assigned to 23 photographs of digital dermatitis lesions by 7 scorers; the frequencies of correct and other classifications are shown, both for the number of M-scores assigned and the number of photographs that the scores were assigned to

The M-scores of the experienced scorer were used as reference

	Actual classification, count of scores given (23 photographs)						
Experienced scorer	M0	M1	M2	M3	M4	M4.1	**Total**
M0	16	7	0	0	0	0	**23**
M1	3	1	0	0	2	1	**7**
M2	0	0	58	0	0	1	**59**
M3	0	0	0	0	0	0	**0**
M4	11	1	1	0	14	3	**30**
M4.1	3	3	2	0	12	22	**42**
	33	**12**	**61**	**0**	**28**	**27**	**161**

Cohen's kappa coefficient of the seven students varied between 0.435 and 0.707.
Six students were in category 'Moderate' and one in category 'substantial'. The overall kappa value for agreement between all the observers was 0.514 (95% CI).

Conclusions

The results indicate that overall, there is a moderate agreement between the scoring of the students and the experienced claw-health researcher. This is useful information for future studies on DD and suggests that different observers can be used to collect data on DD status for the same study. However, there is still room for improvement of the agreement in scoring between the observers, by training observers more extensively.

References

Available on request

DIGITAL DERMATITIS LESIONS'PERSISTENCY AFTER REGULAR CLAW TRIMMING

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Introduction

Claw disorders in dairy cows are painful, resulting in decreased milk production and responsible for affecting animal welfare (Bruijnis et al., 2010, 2012). Claw disorders resulting in lameness does seriously affects the dairy industry's imago (Van Hertem et al., 2016). Claw disorders may have an infectious and a non-infectious background. Related to the prevalence and the soreness Digital Dermatitis (DD) is the most important infectious claw disorder in Europe with variation in prevalence of about 6% in Sweden until 30% in Southern Europe (Nielsen et al., 2013)
The objective of this study was to investigate the persistency of DD M-stages during in 6 herds regular claw trimming based on 2 observations with an interval of 6 months.

Material and methods

All HF dairy cows in 6 dairy herds in the region of GD Animal Health, were visually scored and the presence of pain reaction at palpation at the moment of regular claw trimming during autumn 2017 and winter/spring 2018, for the presence and stage of DD lesions. At the moment of presence of a lesion cows were treated topically by the claw trimmers in line with the claw trimmer and farmer's habits. Mean time between 2 claw trimmings was 6 months.

Results

The average number of cows per herd trimmed was 115 including non-lactating cows, in total the study population, (after exclusion of missing value) contained 934 hind claws.
Results are shown in table 1 and table2.

Table 1. M-score in autumn 2017 and M-score of the same cows 6 months later (n and %, n (total= 934 observations)

		M-score spring 2018				**Total**
		M0	M1	M2	M4	
M-score 2017	M0	441 (79,9)	6 (1,1)	27 (4,9)	78 (14,1)	552
	M1	13 (46,4)	1 (3.6)	3 (10,7)	11 (39,9)	28
	M2	35 (26,7)	4 (3,1)	43 (32,8)	49 (37,4)	131
	M4	55 (24.7)	9 (4,0)	25 (11,2)	134 (60,1)	223
Total		544	20	98	272	**934**

Conclusion

The results indicate that when claws are free of DD, most of those claws will be free of DD 6 months later (80%). But at the other hand the results indicate that when claws are infected and have an M2 stage, 33% of those claws will have a M2 stage 6 months later. Claws infected but in a chronic stage M4, 60% of those claws will have a M5 after 6 months later.

References

Available on request

SURGICAL TREATMENT AND OUTCOME IN APICAL PEDAL BONE (TOE) NECROSIS IN CATTLE

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Introduction

Infection of the apex of the pedal bone in cattle develops as a complication of thin soles, apical white line disease and toe ulcers *(1-5)*. In herds with endemic digital dermatitis infection, toe lesions are associated by a secondary infection by DD-associated *Treponema spp. (4, 5)*.

Methods

Case records of 30 cattle suffering from apical pedal bone necrosis in one or more claws per cow within the period 2006 to 2016 were evaluated retrospectively. The following data were analized: age, breed, sex of cattle, localization and extent of toe necrosis, the applied surgical treatment method and the final outcome.

Results

In 30 cattle of various breeds a mild to severe pedal bone necrosis was diagnosed in 33 claws, 19 of those (57.6%) were located on lateral rear claws. The mean age of all cattle was 58.3 months (±30.5). The 22 lactating cows were a median of 61 days in milk. All 30 cattle were lame, and in all 33 claws the necrotic area was located at the apical sole area. The radiological changes in 17 claws ranged from a slight osteolysis of the apical edge of the tip of the toe (n: 6), to osteolysis of the anterior third (n: 7), up to osteolysis of extended parts of the pedal bone (n: 4).
Surgical treatment of apical pedal bone necrosis was performed in 27 (84.4%) cattle. Different resection techniques (curette, Forstner drill, disc with steel knives mounted on an angle grinder) were applied. The overall success rate for resection of the tip of pedal bone was 81.5%, and 90% when including even cases with claw amputation *in toto*. The mean postsurgical life span of all 27 treated cattle was 26.6 (±22.1) months.

Conclusions

For the success of the applied resection techniques of the tip of the pedal bone an accurate cleaning of the claw, a strict aseptic surgical procedure and complete removal of all the infected bone tissue are mandatory *(1, 3)*. The reported long-term outcome of 26.6 months lead to the clear recommendation to bovine practitioners to apply these simple surgical techniques in their daily practice.

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RESIDUES OF B-LACTAM ANTIBIOTICS IN COLOSTRUM FROM DAIRY COWS

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Introduction

Reports on the risk of antimicrobial residues in colostrum of dairy cows after dry cow treatment (DCT) are rare in the scientific literature. One reason could be that the specificity of antibiotic residue screening tests is poor (Andrew, 2001), so that advanced and expensive laboratory methods are required. The aim of the present study was therefore to identify the risk of residues of antimicrobial substances in first milking colostrum of dairy cows after dry cow treatment.

Methods

Colostrum samples of the first milking after parturition from 286 cows on 30 farms were analysed by liquid chromatography–mass spectrometry (LC–MS) confirmation for the presence of b-lactam antimicrobials. According to the history obtained from the owner 200 cows underwent dry cow treatment, 79 did not; in 7 cases it was not known.

Results

Residues of b-lactam antimicrobials were found in 77 samples of cows treated with DCT, in 7 samples of cows not treated with DCT and in one sample were treatment was not known. Cloxacillin was found in 49 samples, in 34 (69 %) samples the concentration was above the MRL (30 mg/kg). DCT containing cloxacillin was used in 88 of the sampled cows, whereby four different commercial products were utilized (product: pos/neg): Cloxacillin – TS - 1000: 1/8; Cloxin – TS – Retard: 1/5; Orbenin Extra: 42/9; Wedeclox TS: 1/21. Other findings were: benzyl penicillin (n=8); amoxicillin (n=3); cephalosporins (n=9). In all but two cases where benzyl penicillin was found, the substance found did not correspond to the DCT used but were rather due to systemic treatment prior to parturition.

Conclusions

The presented study shows that residues of b-lactam antimicrobials are rarely found in first milking colostrum of dairy cows. An exception constitutes the use of Orbenin Extra (Zoetis Deutschland GmbH), a preparation containing cloxacillin which is specifically composed for long lasting presence and action in the udder after treatment. Therefore, colostrum harvested from cows treated accordingly bears a high risk of containing cloxacillin in a concentration above the MRL for milk. A weakness of this study is that the duration of the dry period is not known for individual cows and that only b-lactam antimicrobials were tested.

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HYGIENIC-SANITARY QUALITY OF BOVINE MILK PRODUCED IN LEÓN, SPAIN: FACTORS THAT DETERMINE ITS QUALITY

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Introduction

At present, it is sought to bring high quality products to the consumer. In milk, a quality product is sought, with an adequate physico-chemical composition and a good sanitary quality, represented by a low somatic cell count (SCC) and a low bacteriology. The quality is directly related to good management of the herd, with a balanced diet and the absence of diseases, including mastitis, which also involve large economic losses.

Methods

To assess the hygienic-sanitary quality (bacteria and CCS) of the milk, we selected 41 farms of dairy cattle from the province of León (Spain), producing almost 51 million liters, considering different factors that could influence the quality (valuation of the farm, presence of robot, bedding material, number of lactating cows, liters of milk produced and season of the year). The data was processed using the statistical software package R 3.4.2.

Results

The mean of somatic cells (SCC) and the bacterial count is 248 ± 114 x 10^3/ml and 30.0 ± 38.9 x 10^3/ml, respectively. Seasonality has a highly significant influence on the parameters considered. The highest values in bacteria have been found in winter and the lowest in autumn. Spring and summer are characterized by presenting higher SCR. The material bedding not influences the amount of bacteria present in the milk, while the RCS is influenced by the bedding material of the farm. We could not confirm a correlation between bacteriology and SCR.

Conclusion

The milk produced in the sampled farms is of good hygienic-sanitary quality, given that the parameters considered showed values within normality. Seasonality has a highly significant influence on most of these parameters.

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THE EFFECTS OF TRANSPORT STRESS ON IMMUNE PARAMETERS IN 2-4 WEEK OLD DAIRY CALVES WITH LOW AND NORMAL BODYWEIGHT

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Introduction

Gastrointestinal and respiratory diseases are the leading causes of morbidity and mortality in young calves. Especially in settings where calves are comingled and transported, like the veal industry, often intensive antibiotic treatments are needed which are increasingly criticized. Particularly lightweight calves appear predisposed to develop infectious diseases. Therefore, the objective of this randomized field trail was to determine the effects of body weight and transport stress on immune parameters in 2-4 week old calves.

Methods

Twenty one male dairy calves were allocated to 4 treatment groups: low body weight (≤ 46 kg), no transport (LC); low body weight plus transport (LT); high body weight (> 46 kg), no transport (HC) and high body weight with transport (HT). Transport duration was 2h. Animals were blood sampled before departure (0h), at arrival (2h) and 5h, 24h, 48h and 72h post transport. Analysis included determination of cortisol, white blood cell counts, electrophoresis, reactive oxygen species (ROS) production by neutrophils and monocytes, proliferation and cytokine release of peripheral blood mononuclear cell (PBMCs) after stimulation.

Results

Transport induced a significant increase in cortisol immediately after transport. Only the LT group showed a numerical rise in total white blood cells, neutrophils, lymphocytes and a significant rise in monocytes 5h after transport. Lightweight calves exhibited significantly lower serum concentrations of total protein and immunoglobulin (Ig). Only the LT calves showed a significant increased proliferation of PBMCs 24h after transport and exhibited a trend towards increased ROS production in neutrophils. Both low bodyweight groups demonstrated a significant increased cytokine production by PBMCs.

Conclusions

Transport stress caused a different reaction of immune cells in low- and normal bodyweight calves. These functional changes in immune effector cells are most probably induced by the modulating effect of cortisol and can be found predominantly in underweight calves. The lower Ig levels, the increase in lymphocyte proliferation and the increased pro-inflammatory response after transport in lightweight calves might partly explain their increased disease susceptibility. Therefore, a good body weight before transport or a targeted care upon arrival for underconditioned calves might decrease disease susceptibility and the need for excess antibiotic treatment.

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A NOVEL EXPERIMENTAL MODEL TO INVESTIGATE THE PATHOGENICITY AND TERATOGENICITY OF SCHMALLENBERG AND AKABANE VIRUSES

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Introduction

Both Schmallenberg (SBV) and Akabane viruses (AKAV) have similar epidemiology, pathogenesis and clinical signs. *In vivo* research studies on teratogenic viruses in ruminants are expensive and time-consuming. These challenges can be mitigated by using small animal models such as embryonated chicken eggs (ECE). Hence, the aim of this research was to develop and test an ECE model of SBV and AKAV infection.

Methods

Two studies were conducted. In Study A, 0.2ml of undiluted cell culture-grown SBV ($10^{6.4}$ $TCID_{50}$/0.2 ml) was inoculated into the yolk sac of chicken embryos at 6 days [AA1] (n = 43) and 8 days (n = 41) of incubation. In Study B, groups of approximately 40 embryos were infected with SBV (n = 178) or AKAV (n = 177) at virus doses ranging between $10^{2.0}$ and $10^{6.0}$ $TCID_{50}$/0.2 ml at 7 days of incubation. Control embryos in both studies were inoculated with 0.2ml of sterile phosphate buffered saline (PBS). Chicken embryos were incubated at 37°C until day 19 of incubation when they were euthanised and submitted for necropsy. Embryos that died between day 7 and day 18 of incubation were also necropsied. Swabs of brain were collected from a sub-sample of 19 day old ECEs (both virus-inoculated and control embryos) at necropsy and tested for either SBV or AKAV RNA using qRT-PCR.

Results

Mortality was greater in embryos inoculated with SBV at 8-days (76%) compared to 6-days (47%), ($P < 0.01$). The prevalence of stunted growth (6-days: 37%; 8-days: 51%) and musculoskeletal malformations (6-days: 42%; 8-days: 41%), (arthrogryposis, skeletal muscle atrophy, contracted toes, distorted and twisted legs) did not differ between days ($P > 0.05$), however, the prevalence of these findings was significantly higher in virus infected embryos compared to controls. Mortality was greater in embryos inoculated with SBV (31%) compared to AKAV (19%), ($P < 0.05$), suggesting that SBV was more embryo-lethal. However, embryos infected with AKAV had a significantly higher prevalence of stunted growth (SBV: 46%; AKAV: 76%; $P < 0.05$) and musculoskeletal malformations (SBV: 18%; AKAV: 42%; $P < 0.01$), suggesting that AKAV was more teratogenic in this model.

Conclusions

These studies demonstrate that SBV chicken embryos infected with SBV demonstrated gross abnormalities consistent with congenital Schmallenberg disease as reported in ruminants. When SBV and AKAV were compared, SBV appeared to be more embryo-lethal. However, a significantly higher proportion of embryos infected with AKAV had stunted growth and congenital defects. There was no statistical difference in the prevalence of stunted growth or congenital malformations between embryos inoculated at 6 days or 8 days of incubation.

HOW COMMON ARE THE *CULICOIDES* SPECIES WHICH TRANSMIT BLUETONGUE AND SCHMALLENBERG VIRUSES?

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Introduction

The recent unprecedented emergence of arboviruses in northern Europe, such as SBV and multiple serotypes of BTV has highlighted Europe's susceptibility to exotic arboviruses transmitted by biting midges from distant geographic regions. However, there have been no studies on the *Culicoides* species composition and abundance on Irish cattle farms since the outbreak of SBV in 2012. Hence, an in-depth *Culicoides* entomology survey was conducted on sentinel farms.

Methods

Ten herds in the south of Ireland which were part of a Schmallenberg virus sentinel herd surveillance study (Collins et al., 2016) were monitored. Onderstepoort Veterinary Institute design ultraviolet light suction traps were used to collect insects fortnightly over a period of 16 weeks (21st July – 5th November; 8 catch collections/farm; 68 night collections). Following collection, insects were frozen (-20°C) then stored in 75% ethanol. Collections were initially sorted into *Culicoides* and non-*Culicoides* spp. using a stereomicroscope. *Culicoides* were identified morphologically to species level using the keys of Campbell and Pelham-Clinton (1960) and reference wing images (The Pirbright Institute, UK).

Results

A total of 23,929 *Culicoides* were collected. *Culicoides* were found ubiquitously across all sites; however, there was a large variation in the number of *Culicoides* collected on each farm (257 to 4,285 *Culicoides*). A total of twenty-one species of *Culicoides* were identified. The most abundant species identified were members of the *Culicoides obsoletus* (*C. obsoletus/scoticus*; 38%, *C. dewulfi*; 36% and *C. chiopterus*; 5%) and *Culicoides pulicaris* groups (*C. pulicaris*; 9% and *C. punctatus*; 5%) comprising 93% of all *Culicoides* collected. The number of species identified at each site varied from 10 to 15 species (mean 13). The six major *Culicoides* arbovirus vector species from the *Culicoides obsoletus* and *Culicoides pulicaris* groups were present on all ten farms.

Conclusions

The most abundant *Culicoides* species identified in this study are the putative vectors of a number of arboviruses in Northern Europe. The presence and abundance of these species highlight that disease transmission could (re-)occur following a new incursion of SBV or other exotic *Culicoides*-transmitted arboviruses into Ireland.

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VETERINARY, ADVISORY AND FARMER PERCEPTIONS OF THE MAIN CAUSES OF POOR DAIRY COW WELFARE

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Introduction

Herd size increased in Europe following milk quota abolition (2015). However, investment in farm infrastructure and changes in farm management may not have occurred concurrently due to low and volatile milk price. ProWelCow (DAFM RSF - A 14/S/890) is a desk-based project which aims to investigate risks to dairy cow welfare and to develop strategies to protect it. As a first step this study aimed to investigate the perceptions of key stakeholder groups on the main causes of poor welfare in dairy cows. Specifically, this study aimed to establish the changes in and opinions about such infrastructure/management issues on Irish dairy farms which have potential implications for cow welfare in the future expanded dairy herds.

Methods

A questionnaire was designed and piloted before use in the surveys. The survey was conducted with farmers (F; n=115) at two national farming events and cattle vets (V; n=60) at a national veterinary conference using a structured questionnaire, by interview. Teagasc dairy advisors were asked to complete the questionnaire themselves (A; n=48) at a national training event. Results are expressed as % of group surveyed. The 223 respondents were asked to identify the main causes of poor welfare in cows from the following list: lameness (L), social stress due to overcrowding (SS), mastitis, metabolic disorders, infectious diseases, poor body condition score (pBCS), cold stress and calving difficulties.

Results

Three main causes of poor welfare of cows differed in importance between all respondents (social stress: 25.9%, poor BCS: 16.7%, lameness: 15.3%; X^2= 7.5; (df= 2) p=0.02). SS, as a primary cause of poor welfare, was equally important for F, V and A (F: 7.9%, V: 8.3%, A: 9.7%; X^2= 0.5; (df= 2) p=0.8). pBCS was rated as a primary cause by the majority of F (F: 12%, V: 2.3%, A: 2.3%; X^2= 24.5; (df= 2) p <0.0001;), while L was rated as a primary cause by the majority of V (F: 6.9%,V:7.9%,A:0.5%).

Discussion

Stakeholders agreed about the importance of social stress as the main cause of poor welfare, which is perhaps surprising in dairy cows in pasture-based systems. There was a lack of consensus regarding poor BCS and lameness between stakeholders. This probably reflects the differing focus and areas of expertise between the three stakeholder groups. However, all listed issues are important causes of poor cow welfare in expanding, low-cost, pasture-based systems.

Conclusions

Given these results, further research is warranted focused on these identified primary causes of poor welfare in pasture-based dairy cows, both in Ireland and in the EU.

SOCIAL NETWORK ANALYSIS - A NOVEL APPROACH TO PARATUBERCULOSIS

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Introduction

The movement of live animals from farm to farm plays a primary role in the introduction and spread of infectious agents, especially MAP. Social Network Analysis (SNA) provides a methodology for the analysis and illustration of the relationship between the movements of animals and the transmission of a contagious pathogen associated with those movements. This study applied this novel epidemiological technique to MAP transmission at a national and international level.

Methods

A database of faecal MAP+ culture results of animals with persistent non-responding diarrhoea over 11 years containing 1220 confirmed (faecal culture) MAP+ animals, 1,089 herds and 1,413 movements was analysed using SNA. Data were organised in an adjacency matrix formed by a collection of nodes (herds) and an array of directed arcs (movements) linking the nodes (MAP network). Since infection with MAP normally happens early in life, a herd in which a MAP+ animal is born (herd of origin) was classified as 'source herd'. Quantification of how many 'source herds' are connected directly or indirectly between, within each component, represents a measure of disease transmission. Descriptive statistics of the network and nodes were calculated (infection chain, centrality indicators, geodesic distance, density, etc.).

Results

The network was fragmented into 415 components (sub-networks where nodes are connected within, but do not have ties with, other sub-networks) ranging from 1 to 50 nodes. Out of the 258 components with two or more nodes, 59 had two or more connected 'source herds' nodes, representing 23% of these subset and 14% of the total number of components. In addition, herds with high ingoing contact chain and in-degree showed strong association (asymmetric Rajski 0.63 and 0.60, respectively) with those source herds. Preliminary results show a significant association between source herds and disease transmission by the movement of MAP+ animals. It was also found that 179 MAP+ animals (110 of beef breed and 69 dairy; 163 females and 16 males) were connected by lineage.

Conclusions

SNA analysis provided a robust approach to assess disease transmission and identify those premises more likely to facilitate the spread of MAP (high ingoing contact chain and degree centrality), thus providing a framework for the development of a risk-based paratuberculosis surveillance program.

BORRELIA GENOSPECIES DETECTED IN *IXODES RICINUS* COLLECTED IN ROE DEER FROM NORTH-WESTERN SPAIN

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Introduction

Ixodes ricinus, the predominant tick species in Europe, can transmit important human diseases caused by *Borrelia* spp such as Lyme borreliosis or tick-borne relapsing fever. The aim of this study was to identify the species/genospecies of *Borrelia* in *I. ricinus* obtained from roe deer in NW Spain and to provide information on their prevalence. In addition, we intended to dilucidate the degree of coincidence between the genospecies identified in questing ticks and those found in roe deer.

Methods

The skins of 175 roe deer hunted in different Galician reserves (100 from the central-plateau area and 75 from the mountain) were examined for the presence of ticks. Adult male *I. ricinus* (*n*= 1,449) were collected and analysed in pools of up to ten ticks in order to detect *Borrelia* spp. DNA.

Results

All the roe deer examined were infested by *I. ricinus*. Sequence analysis allowed the identification of 4 pathogenic *Borrelia* genospecies belonging to the *B. burgdorferi sensu lato* (s.l.) complex (*B. afzelii, B. garinii, B. lusitaniae* and *B. valaisiana*), being responsible of the high seroprevalence of *B. burgdorferi* s.l. in roe deer. *B. miyamotoi,* belonging to the relapsing fever *Borrelia* group, was also identified. *B. garini* and *B. lusitaniae* were identified in ticks from both geoclimatic areas, whereas, *B. afzelii, B. valaisiana* and *B. miyamotoi* were only observed in the central-plateau area.

The analysis of ticks from roe deer gives a good estimation of *B. burgdorferi* s.l. diversity in questing ticks (1). However, more epidemiological studies must be carried out in order to establish the role of roe deer on the epidemiology of Lyme borreliosis and tick-borne relapsing fever. This work provides the first citation of *B. miyamotoi* in ticks infesting roe deer from Spain.

Conclusions

Despite roe deer have a limited utility as indicator of the presence of *Borrelia burgdorferi* s.l. in ticks from a particular area, gives a good estimation of the *B. burgdorferi* s.l. diversity in questing ticks in that area.

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Program for Consolidating and Structuring Competitive Research Groups (GRC2015/003 and 2017-PG117*, Xunta de Galicia, Spain)*

DRAMATIC EXPANSION OF MYIASIS CAUSED BY *HYPODERMA ACTAEON* IN ROE DEER IN CENTRAL SPAIN

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Introduction

The myiasis caused by larvae of *Hypoderma actaeon* is considered strongly specific of red deer (*Cervus elaphus*), with only sporadic reports in fallow deer (*Dama dama*) and roe deer (*Capreolus capreolus*). Since the first report of an infestation by *Hypoderma actaeon* in roe deer in 2016 in Central Spain (1), several cases have been detected in this area. Discarded the possibility of sporadic or accidental infection in this host, we proposed a study to determine the current prevalence and intensity of infection in roe deer hunted in this region.

Methods

In January 2018 a total of 96 roe deer from central Spain were examined for subcutaneous myiasis. All the animals were females shot in different preserves from Guadalajara (n=70) and Soria (n=26) provinces. Animals were skinned and the inspection for subcutaneous larvae was made by observation of the inner surface of the hides. Some larvae (n=133) were collected and placed into 70% ethanol for identification.

Results

The overall prevalence was high (69.8%) with an intensity of infection of 7.8±8.6 larvae/infested animal (range 1-40). This percentage was higher to the 44.8% observed previously in red deer in the same area (2), although the intensity of infection was lower (38.3±61.3). 77.1% roe deer from Guadalajara were infested with a mean of 6.5±7.1 larvae/infested animal (range 1-40) and the prevalence in Soria was 50% (12.8±12.4; range 1-39). All the larvae were identified as third instars of *H. actaeon*.

Conclusions

The high prevalence of *H. actaeon* observed in roe deer from central Spain, since the first citation two years ago, indicates a rapid expansion and adaptation of this parasite to roe deer.
Roe deer should be considered as an adequate host for *H. actaeon*, that traditionally had been considerd more adapted to red deer.

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SUBCLINICAL LAMINITIS AND SOLE ULCER IN DAIRY COWS

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Introduction

Subclinical laminitis is a multifactorial syndrome with complex pathophysiology and significant economic impact on dairy industry. One of the effects it has on the welfare of cattle is that it predisposes to the development of other lesions on the foot, predominantly sole ulcers and white line disease. The aim of the study was to investigate if the subclinical laminitis actually predisposes dairy cows to the development of sole ulcer.

Methods

The data used in this study were obtained on 220 Holstein Friesian dairy cows during two sessions of routine orthopaedic and claw trimming visits (autumn 2016 and spring 2017) as well as within a period between them when lame cows were treated. All of the cows were kept on manure solid bedding and fed TMR. The average milk year yield was 9000 kg. At the first visit the cows with subclinical laminitis were identified (LS group). The occurrence of the sole ulcer was checked at the following visits in all the cows. Statistical analysis was performed by running a chi-squared test to test a difference between sole ulcer incidence in LS and control (healthy) group.

Results

Out of the 220 dairy cows examined during autumn 2016 ten cows were affected by the subclinical laminitis (LS group; 4.55 %). 69 dairy cows were free of claw diseases (control group; 31.4 %). In the following orthopaedic controls the sole ulcer was detected in two cows from the LS group (20 %) and only in one cow in the control group (1.45 %). The difference in incidence of the sole ulcer between both groups was significant ($p<0.05$).

Conclusions

The results of this study indicate that there is an association between subclinical laminitis and prevalence of sole ulcer in dairy cows. Therefore, a dairy farm management should pay more attention to avoid all known risk for subclinical laminitis development on the farm to prevent higher incidence of lameness.

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THE SLAUGHTERHOUSE CAN SET UP EPIDEMIOLOGICAL DATA ON PARASITES

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Introduction
Nella diagnostica delle malattie parassitarie assistiamo alla massiccia affermazione di tecniche molecolari. Queste, a fronte di una maggiore sicurezza per l'operatore che non viene a contatto, se non in maniera molto ridotta, con materiale potenzialmente a rischio biologico, lasciano dubbi interpretativi sia sotto il profilo clinico, sia epidemiologico. Sembra che un osservatorio epidemiologico privilegiato come il macello sia ormai considerato desueto, quasi negletto. Eppure l'osservazione diretta dei parassiti o delle alterazioni nell'ospite, lascia spazio a pochi dubbi interpretativi. La registrazione dei dati patologici prevede un flusso di informazioni dirette alla competente Regione che a sua volta è tenuta a comunicarli al Ministero della Salute. Quest'ultima attività è favorita dalla istituzione dall'anagrafe bovina. Il mattatoio inoltre offre una duplice opportunità per sviluppare progetti di epidemiologia: quella fornita dalla elaborazione dei dati scaturiti dall'ispezione ufficiale e quella derivata da autonome ricerche su materiale acquisito dagli animali macellati. Nel corso degli anni abbiamo potuto utilizzare le informazioni parassitologiche provenienti da un piccolo macello della provincia di Bologna.

Methods
La prima esperienza ha riguardato l'analisi dei dati relativi all'echinococcosi cistica (EC) nel bovino con valutazioni relative al ceppo ed alla fertilità delle cisti. La seconda invece ci ha visto impegnati a valutare il parassitismo gastrointestinale dei bovini con tecniche coprologiche. I risultati hanno indotto ad approfondire l'argomento con una terza esperienza basata sulla ricerca diretta degli elminti in sede abomasale. Ciascuna indagine è stata avvallata dall'analisi statistica dei risultati.

Results
L'EC del bovino negli anni 2009-2010 ha dimostrato una prevalenza dell'8.1% (430/5336) con una percentuale di fertilità dello 0.7% (12/1664). Quest'ultimo dato rispecchia l'origine del ceppo (G1), specifico del ciclo cane-pecora. In assenza di una strategia nazionale di controllo non stupisce che il dato di prevalenza rispecchi ancora quello evidenziato da Pellegrini e Cilli nel 1955.
Un'indagine coprologica del 2014 ci ha permesso di analizzare 392 campioni evidenziando la presenza di strongili e coccidi con una prevalenza generale del 46% (180/392). Un importante livello di eliminazione di elementi parassitari (200-1000) per grammo di feci, ha riguardato il 6% dei soggetti; maggiormente rappresentati i coccidi del genere *Eimeria*. Questi risultati hanno ispirato l'indagine successiva su 100 abomasi, all'interno dei quali è stata rilevata una positività del 13% per elminti: *Ostertagia*, *Trichostrongylus* e *Cooperia*.

Conclusions
Tutti questi risultati confermano come il macello possa ancora oggi rappresentare un'importante fonte di informazioni sulla diffusione ed evoluzione del parassitismo bovino.

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EPISODIO DI INTOSSICAZIONE DA GAS IN UN GRUPPO DI MANZETTE DA LATTE STABULATE IN VICINANZA DI FORAGGIO DI FRUMENTO APPENA INSILATO

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Introduzione

Viene descritto un episodio di intossicazione da gas, prodotto da frumento appena insilato, che ha coinvolto un gruppo di manzette di un allevamento da latte della provincia di Mantova.

Metodi

Il caso si è presentato nel mese di maggio del 2018 in un gruppo di 8 manzette di circa 10 mesi di età e del peso di 180-220 Kg di razza frisona. Le manzette erano stabulate in box adiacenti a elementi prefabbricati in cemento armato utilizzati come struttura di contenimento per l'insilamento orizzontale dei cereali. La forma clinica si è manifestata la mattina del giorno seguente all'ammassamento e alla copertura con film plastico di 20 ettari di trinciato di frumento. Tre manzette sono state trovate morte e altre 3 con gravi sintomi respiratori. Tutte presentavano una colorazione giallastra del pelo del dorso. E' stato effettuato l'esame necroscopico su due soggetti deceduti e inviati i visceri di una manzetta al laboratorio per accertamenti diagnostici.

Risultati

Le manzette con forma clinica grave presentavano sintomi caratterizzati da tosse, dispnea intensa e fuoriuscita di schiuma dalla bocca. A questi soggetti è stato somministrato un cortisonico per via parenterale ma con scarsi risultati e nel corso della giornata sono poi venute a morte. Le altre manzette, quelle con sintomi più lievi, immediatamente spostate in un altro luogo sono invece guarite completamente. All'esame necroscopico dei soggetti deceduti veniva riscontrato edema polmonare emorragico accompagnato da intensa congestione della mucosa delle vie respiratorie e evidente ispessimento gelatinoso dei setti interlobulari. Si notavano anche grosse bolle enfisematose nei lobi diaframmatici. Il pH misurato a livello della mucosa dei grossi bronchi del polmone inviato al laboratorio si attestava su un valore oscillante tra 5,8 e 6,0. L'esame istologico rilevava una mucosa bronchiale disepitelizzata, edematosa con emorragie recenti multifocali e una broncopolmonite caratterizzata dalla presenza negli alveoli di essudato fibrino-emorragico e nei bronchioli di numerose cellule desquamate e macrofagi. Gli esami per la ricerca dei più comuni patogeni respiratori batterici e virali davano esito negativo.

Conclusioni

Le notizie anamnestiche, i segni clinici e le indagini di laboratorio portano ad attribuire l'episodio descritto ad una forma di intossicazione da gas, ed in particolare da biossido di azoto (NO_2). Come riportato anche da altri Autori (1, 2), tale elemento si può sviluppare in quantità significativa nelle prime 24-48 ore dopo l'insilamento di cereali particolarmente ricchi in nitrati. Il biossido di azoto se inalato a livello della mucosa delle vie respiratorie reagisce con l'acqua e genera acido nitroso che, se prodotto in quantità significativa, può determinare bronchiolite obliterante e grave edema polmonare. Nel caso in esame, la concomitanza di più fattori (stabulazione degli animali adiacente al silos, assenza di una adeguata ventilazione, probabile elevato tasso di nitrati nel foraggio ecc.) ha generato il grave episodio di intossicazione descritto.

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SENSIBILITÀ AGLI ANTIMICROBICI IN CEPPI DI *STREPTOCOCCUS UBERIS* ISOLATI DA CASI DI MASTITI BOVINE CLINICHE E SUBCLINICHE DAL 2007 AL 2016

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Introduzione

Streptococcus uberis è uno tra i più comuni patogeni responsabili di mastite nella bovina da latte (1). Per avere a disposizione dei dati oggettivi su cui basare la scelta terapeutica, il veterinario buiatra, in caso di isolamento di *Strep. uberis* da campioni di secreto mammario, richiede spesso al laboratorio il test di sensibilità agli antimicrobici. Lo scopo del presente studio retrospettivo è stato quello di elaborare i dati relativi alla sensibilità agli antimicrobici di ceppi di *Strep. uberis* isolati da secreti mammari di bovine con mastiti cliniche o subcliniche e di valutarne il trend in un periodo di 10 anni.

Metodi

Sono stati analizzati i dati relativi a 5.335 ceppi di *Strep. uberis* isolati da campioni di secreto mammario conferiti presso la Sezione di Mantova dell'IZSLER nel periodo 2007-2016. La sensibilità agli antimicrobici in vitro è stata valutata mediante il test di diffusione in agar secondo Kirby-Bauer in accordo con gli standard del CLSI. Gli isolati di *Strep. uberis* sono stati classificati come sensibili, intermedi o resistenti rispetto a 9 antimicrobici: penicillina G, amoxicillina, amoxicillina/acido clavulanico, cefazolina, cefoperazone, cefquinome, tetraciclina, eritromicina e trimethoprim/sulfametossazolo. Il tasso di sensibilità agli antimicrobici di *Strep. uberis* è stato determinato, per ogni anno e per ogni molecola o associazione antimicrobica, mediante il calcolo del rapporto tra il numero dei ceppi risultati sensibili e il totale dei ceppi esaminati. L'andamento del tasso di sensibilità di *Strep. uberis* nel periodo in esame è stato valutato mediante il test del χ^2 per il trend. La soglia di significatività è stata definita con $P \leq 0{,}05$.

Resultati

Dall'analisi complessiva dei dati, la proporzione dei ceppi sensibili è risultata pari al 94,2% per amoxicillina/acido clavulanico, 91,9% per cefquinome, 89,3% per cefazolina, 85,5% per cefoperazone, 70,0% per penicillina G, 68,4% per amoxicillina, 67,3% per trimethoprim/sulfametossazolo, 44,1% per eritromicina e 22,4% per tetraciclina. Il trend del tasso di sensibilità, nei 10 anni presi in esame, si è dimostrato in crescita per 6 antimicrobici su 9 esaminati. Solo nei confronti della penicillina G e dell'amoxicillina la proporzione di ceppi sensibili ha dimostrato un trend in decrescita mentre per la tetraciclina si è mantenuto stabile.

Conclusioni

I risultati del presente studio evidenziano un buon tasso di sensibilità in vitro di *Strep. uberis* nei confronti delle cefalosporine e dell'amoxicillina associata con acido clavulanico. Inoltre, l'analisi del trend del tasso annuale di sensibilità depone per il fatto che *Strep. uberis*, nei 10 anni presi in esame, non abbia sviluppato specifici meccanismi di resistenza nei confronti di tali antimicrobici. E' auspicabile mantenere anche in futuro una continua sorveglianza dell'andamento della sensibilità di *Strep. uberis* nei confronti delle molecole, o associazioni di molecole, maggiormente impiegate in terapia.

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BOVINE RESPIRATORY DISEASE COMPLEX: RATES OF DETECTION OF MAIN RESPIRATORY VIRUSES IN NASAL SWABS

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Introduction

Bovine respiratory disease complex (BRDC) is a main health problem in cattle worldwide. Viral infections are crucial in predisposing bacterial colonization of the lower part of the respiratory tract. A rapid and sensitive detection of respiratory viruses is essential to manage BRDC outbreaks and minimize economic loss. A retrospective study was conducted to investigate the rates of detection of the major viral pathogens in nasal swabs collected from cattle affected by BRDC in Italy.

Methods

Nasal swabs, submitted from January 2014 to June 2018 to IZSLER Diagnostic Laboratory of Mantova from BRDC affected cattle, were considered for this study. Only samples tested for all the viruses of the respiratory test panel - Bovine Viral Diarrhea virus (BVDV), Bovine Coronavirus (BoCV), Bovine Herpesvirus-1 (BoHV-1), Bovine Respiratory Syncytical virus (BRSV), and Bovine Parainfluenza virus-3 (BPI3) - were included. Moreover, Influenza D virus (IDV) assay results were considered, when available. All viruses were detected by *Real-Time* PCR as previously described (2-5; 8).

Results

A total of 373 bovine nasal swabs were included in the study; 274 had been tested also for IDV. Pools constituted 81%. The samples came from 232 farms, placed in 27 provinces of Italy. Collectively 185 samples (49.6%) were negative for all the targets included in the test panel. BoCV was the virus most frequently detected (34.9%), followed by BRSV (12.6%), BoHV-1 (9.7%), BPI3V (9.7%), BVDV (8.1%). Overall, 13.5% of samples tested for IDV were positive, and in 4.4% the virus was the only detected. Restricting data to 185 samples from young calves the percentage of positivity for BoCV increased significantly (45.91%; $P<0.0001$).

Conclusions

Data demonstrate the effectiveness of *Real-Time* PCR analysis of nasal swabs for rapid diagnosis of viral respiratory infections. Data are coherent with other studies from different countries (1; 6; 7; 9). BoCV was the most detected virus (34.9%), with a significant higher positivity ($P<0.0001$) in samples collected from calves (45.91%). The lack of a vaccine against BoCV in Italy, and also in Europe, probably contribute to the high diffusion of this virus. Moreover, the study confirms the circulation of IDV in Italian cattle.

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A SURVEY OF THE GERMPLASM CRYOBANK OF THE ASTURIANA DE LA MONTAÑA CATTLE BREED

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Introduction

Asturiana de la Montaña is an autochthonous cattle breed in Asturias (North of Spain). Due to its cultural and social importance, the SERIDA (Regional Service for Food and Agriculture Research) keeps a semen cryobank of selected bulls. Only a few reports by us have focused on studying the post-thawing quality of the cryopreserved semen (Caamaño et al. 2017). Here we show a descriptive study of the cryobank, also testing the relationship of sperm quality with bull age and fertility (calving/inseminated, for first —heifers— and second artificial insemination, AI).

Methods

We assessed semen doses from 24 bulls (3 or 4 ejaculates, frozen with Bioxcell —IMV— and standard protocols), 3 straws per bull and ejaculate were thawed (37 °C, 30 s) and assessed by CASA (motility) and flow cytometry (viability, and acrosomal and mitochondrial status). Statistics (descriptive and linear models) were obtained with the R statistical package, including within and between %CV (estimates of the variability between ejaculates within bull, and between bulls, respectively).

Results

The table shows the descriptive statistics for sperm quality:

Parameter	Median	IQR	%CV within	%CV between
Total motility	40.9	32.8, 50.4	23.4	34.8
Progressive motility	30.2	22.8, 37.5	26.5	37.4
Viability	54.0	46.8, 62.1	17.7	25.4
Damaged acrosomes	18.5	15.3, 23.6	23.3	39.3
Active mitochondria	47.5	38.3, 53.7	20.0	29.3

Median bull age was 2.4 years (interquartile range —IQR— 2.2, 2.8). Reported fertility for 1st and 2nd AI were 60.6% (51.7, 64.3) and 54.3% (50.0, 59.3). No significant relationship was found between bull age, post-thawing sperm quality and fertility.

Conclusions

The post-thawing sperm quality of the Asturiana de la Montaña bulls was acceptable comparing to commercial dairy breeds. Using enough sperm numbers allow achieving good fertility and explain the lack of relationship with age and sperm quality. Developing specific protocols for this breed might allow higher post-thawing quality, enabling lowering sperm numbers per AI and maybe increasing calving rates. Between-bull variability suggests the presence of low-freezability males. Identifying these bulls and using specific protocols would allow improving the performance of the cryobank.

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RELATIONSHIP BETWEEN GROWTH PERFORMANCE AND SPACE ALLOWANCE IN BUFFALO CALVES FOR BABY BEEF PRODUCTION

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Introduction: The aim of this study was to evaluate the influence of space availability on welfare and production performance in Mediterranean buffalo calves.

Methods: The trial was carried out during the finishing period (62 days) on eight Mediterranean buffalo calves, divided into two homogeneous groups, according to age and weight. Animals were kept in free barns with different space allowance: the animals of the S+ Group (live weight 416.3±7.8) had 11.3 m2/head, while 3.1 m2/head were assigned to the S- Group (live weight 406.5±6.8). The calves were fed 7 Kg concentrate (CP 17.0% and fat 3.7%; meat forage units: 0.983) and straw ad libitum throughout the experimental period. To assess the growth perfomance, live weight was recorded 15 days apart. After the finishing period, the animals were slaughtered and the dressing percentage, meat percentage and carcass meat yield were registered.

Results: The average live weight recorded at the day of slaughter was 470±11.0 and 440±14 Kg in S+ and S- group respectively. The average increase of live weight throughout the experimental period was significantly ($P<0.001$) higher in calves from S+ group compared to S- group (53.7 vs 34.0 Kg in S+ and S- group respectively). Thus, a significantly higher daily weight gain was recorded in group S+ compared to group S- (0.76 vs 0.59 Kg/die, respectively in S+ and S- group). Despite a similar dressing percentage recorded between groups (ranging from 46 and 53% and from 46 and 51% for S+ and S- group respectively), calves in S+ group showed higher carcass weight (3225, 6 vs 1172,1 Kg; $P<0.001$) and higher meat percentage (68,75% vs 42,24%; $P<0.001$) compared to those in S- group.

Conclusions: It can be concluded that an improvement of animal welfare conditions, for the greater space allowance is particularly important in buffalo calves, to reduce the stress and improve the productive performance.

CRYPTOSPORIDIOSIS IN SLOVENIA

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Introduction

Cryptosporidium parvum is distributed worldwide and can infect several hosts, including humans. The first report on bovine cryptosporidiosis was published in 1971, but *C. parvum*, the main pathogen in cattle, is still a major concern among farmers and veterinarians. The reasons for this are that during its complex life cycle, which includes also autoinfection within the intestines, it challenges the immune response of a neonatal calf. It requires special methods for identification in faeces; it infects a large absorptive area of the predominantly small intestines, causing a malabsorption syndrome resulting in diarrhoea, which can severely affect health and productivity of calves. *Cryptosporidium* species are difficult to distinguish between pathogenic and non-pathogenic. Oocysts of the parasite are very stable in the environment of calves, remaining infective for prolonged time, requiring very small infective dose for establishing the disease. There are no licensed vaccines to prevent it. Halofuginone is the only registered medicine for the prevention and treatment of cryptosporidiosis in calves, and was shown to be beneficial both in experimental and natural conditions. The best control over the disease, which is very hard to eradicate from a cattle herd is currently achieved by strict hygiene, adequate provision of colostrum, preventive treatment, strict observation of calves and rapid recognition of cases, followed by isolation of clinically affected calves.

Methods

In the study, 2 to 21 days old calves, from 8 big dairy cattle herds (raring from 160 to 400 dairy cows) located in Slovenia, were sampled in order to establish if cryptosporidiosis is present and clinical features in neonatal calves. Fecal samples were screened for the presence of oocysts using cow side test FASTest® D4T bovine (Megacor, Austria) and laboratory test modified Ziehl–Neelsen stain (ZN stain).

Results

Cryptosporidiosis was present on all 8 tested farms. In 4 farms farm managers were not aware that they have cryptosporidiosis. The prevalence of *C. parvum* varied according to the age of animals and farm. *C. parvum* starts to appear in faeces of 3 days old calves. *C. parvum* was found both in diarrheic and non-diarrheic calves. Differences concerning the diarrhoea were observed also depending coinfection with other pathogens. There were some discrepancies in results between rapid test and modified ZN staining, which are discussed.

Conclusions

Strict control of cryptosporidiosis is necessary to prevent neonatal diarrhea in calves as well as because of it zoonotic potential. Based on results we think that cryptosporidiosis is underestimated as cause of neonatal diarrhea in Slovenia and that more problems with the disease will emerge in the future.

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BESNOITIOSI BOVINA: INDAGINE SIEROLOGICA IN AZIENDE LINEA VACCA-VITELLO IN EMILIA ROMAGNA, ANNI 2015-2018

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Introduzione

La besnoitiosi bovina (*Besnoitia besnoiti*) è considerata malattia emergente in Europa e provoca perdite economiche dovute al calo di produzione lattea, riduzione di incremento ponderale e deprezzamento delle pelli[1]. La diagnosi sierologica può essere effettuata in screening mediante test ELISA, con successiva conferma in immunofluorescenza (IFAT) o Western Blot (WB). Questo studio mira ad indagare la diffusione della besnoitiosi sul territorio dell'Emila Romagna tra il 2015 e il 2018.

Materiali e metodi

In 89 aziende linea vacca-vitello (67 localizzate a Forlì-Cesena, 11 a Bologna, 10 a Rimini e 1 a Ravenna) sono stati prelevati i sieri di bovini di età superiore ai 24 mesi: 2273 animali nel 2015 e 2219 nel 2018. I sieri sono stati analizzati con Kit ELISA PrioCHECK®Besnoitia Ab 2.0, secondo le istruzioni fornite dal produttore. Ai fini delle analisi gli esiti dubbi sono stati considerati negativi. L'allevamento è stato classificato positivo se includeva almeno un capo positivo.

Risultati

I risultati dell'indagine evidenziano un calo delle percentuali di positività sia a livello di aziende, sia di capi. Nelle aziende la percentuale di positività si riduce da 52,8% (47/89) nel 2015 a 31,5% (28/89) nel 2018. A Forlì-Cesena, le aziende positive sono diminuite da 43 nel 2015 a 26 nel 2018, con un solo allevamento positivizzatosi nel 2018. A Bologna tutte le aziende positive nel 2015 (3/11) sono risultate negative nel 2018. A Rimini la situazione è rimasta invariata (1 positivo/10 aziende), mentre l'unica azienda campionata a Ravenna è risultata positiva solo nel 2018. Considerando i capi, le positività variano da 23,2% (528/2273) nel 2015 a 16,6% (370/2219) nel 2018. I capi esaminati in entrambi gli anni sono 1395. Di questi, 190 (13,6%) si riconfermano positivi e 1016 (72,8%) si riconfermano negativi dopo tre anni. Nel corso del triennio, 64 (4,5%) capi si sono positivizzati, mentre 125 (8,9%) si sono negativizzati al test ELISA.

Conclusioni

Pur considerando i limiti del test ELISA (bassa specificità), i dati esposti evidenziano una riduzione delle sieropositività nel 2018 rispetto al 2015. L'analisi dell'andamento della malattia, come riportato in due recenti studi longitudinali[2,3] effettuati in allevamenti con infezione endemica, ha evidenziato una tendenza alla riduzione della sieroprevalenza in ELISA[2,3] e dei titoli anticorpali in IFAT[3] nell'arco di 2-4 anni. I risultati del nostro studio, condotto su un numero più ampio di aziende, risultano in accordo con quanto riportato in letteratura per popolazioni più ridotte.

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THE ASSESSMENT OF FARM LEVEL HEAT STRESS RISK IN A SCOTTISH DAIRY HERD

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Introduction

An increased focus has been placed on heat stress resulting in production losses, increased disease incidence and decreased animal welfare (Polsky et al., 2017). Temperature humidity index (THI) combines relative humidity and environmental temperature to estimate the risk of heat stress. Maximum THI thresholds at which animals demonstrate heat stress vary dependent on geographical location and climate type: THI62 (NRC,1971), THI68 (Collier et al., 2009) and THI72 (Armstrong 1994). Scotland has a temperate climate with average temperatures between 2°C and 20°C and relative humidity of 70-90% (Met Office, 2016). Currently, little data relate to the risk of heat stress to dairy cattle within the UK (Dunn, 2014). The aim of this study was to identify if THI thresholds were surpassed at farm level in a Scottish dairy herd.

Methods

A 500 cow Holstein herd in central Scotland was recruited. Cattle are housed indoors all year round, milked three times daily and fed a total mixed ration. Average yield is 9000L. HOBO™ data loggers (Model No.U12-012, Onset Computer Company, USA), were installed at a height of 2.5m, away from direct sunlight and drafts (Chamberlain, 2015) in four locations: high-yielding group, postpartum group, “close-up” dry cow, and collecting yard. Temperature and relative humidity data were recorded every 30 minutes between July 2017 and March 2018. All data were stored in Excel™ for descriptive analysis. The THI was calculated via $(1.8 \times T + 32) - [(0.55 - 0.0055 \times RH) \times (1.8 \times T - 26)$, (NRC, 1971).

Results

The maximum and minimum THI across all four locations was THI74 in July and THI35 in February. The THI thresholds were exceeded on 84 days for THI62; 38, THI68; 6, THI72 between July and September. The percentage of total time the THI exceeded threshold on days with potential heat stress varied up to 84%, THI62; 40%, THI68; 17%, THI72. Additionally, the THI recorded in the collecting yard increased by up to 15% whilst compared to other management groups during milking periods.

Conclusion

This study demonstrates that collecting farm level THI data could aid in herd health planning in temperate regions. These data suggest a risk of heat stress on this Scottish farm during the summer months and an increased risk of heat stress during milking times. These data are part of a larger ongoing study comparing THI thresholds beyond which production output and disease incidence start to deteriorate in Scottish dairy cows.

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DEMODEX BOVIS IN *BESNOITIA BESNOITI* CO-INFECTED DAIRY CATTLE

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Introduction

Demodex bovis is a mite that lives in hair follicles and sebaceous glands. It causes bovine demodicosis or demodectic mange. The disease is characterized by follicular papules and nodules, especially in forward body regions. Transmission occurs through close contact between animals, and mainly from infested dams to offspring.

Methods

During the clinical examination of cows seropositive to *B. besnoiti*, skin biopsies from the region of the neck were collected. An aliquot of the nodules was microscopically examined through compression between glasses. The material included in the nodule was washed with KOH 5% and observed under a light microscope. Another part was fixed in 10% buffered formalin and processed for histological examination.

Results

The clinical examination of two cows evidenced the presence of skin nodules of varying sizes (0.5-2 cm), widespread all over the body, in particular in the regions of head, neck, back and flanks. The compressed nodules did not reveal the presence of *B. besnoiti* tissue cysts, but a semi-solid yellowish content was found. The microscopic observation of this material evidenced the presence of mites recognized as *D. bovis*. Histology showed slight acanthosis and hyperkeratosis of epidermis and superficial dermatitis with oedema and macrophagic and eosinophilic infiltration. Cystic formations located in deep dermis were lined by a layer of metaplastic squamous epithelium and a severe infiltration of macrophages, plasma cells, eosinophils and lymphocytes. The material included consisted of degenerated and necrotic granulocytes with parts of hair, keratin flakes and sectioned mites.
In these animals a treatment with eprinomectine was attempted [1]. Two weeks later, these cows evidenced a clinical improvement: nodules were reduced in size and mites in there degenerated.

Conclusions

D. bovis was confirmed in two *B. besnoiti* co-infected cows from a dairy cattle farm in Northern Italy. Only scarce, not updated and scattered data are available concerning *D. bovis* in cattle in Italy [2]. The disease should be further investigated. Besides, the eventual interference of *B. besnoiti* with bovine demodicosis and/or other infectious diseases should be clarified, since bovine besnoitiosis is a chronic and debilitating disease that could possibly lead to immunodepression in infected animals.

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AGE REFLECTS ON THE OCCURRENCE OF BOVINE PERIODONTAL LESIONS

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Introduction

Bovine periodontitis is a progressive infectious process that causes cumulative alterations readily seen in slaughtered animals and herds raised extensively in several countries. The periodontal lesions that develop throughout the productive life of animals can be characterised by the formation of periodontal pockets, gingival recession, clinical attachment loss and premature loss of teeth. As a polymicrobial infection, its aetiology and pathogenesis are associated with the presence of a biofilm, periodontal pathogens and immune-inflammatory mechanisms. In periodontal disease, epidemiological studies are important to describe the health status of populations, elucidate the aetiology of the disease, identify risk factors, prevent its occurrence and design control measures. No published study has investigated the risk factors associated with the periodontitis in cattle or other ruminant species. In this context, the present study was conducted to evaluate some possible risk factors associated with the occurrence of periodontal lesions in cattle slaughtered in the West of Scotland.

Methods

From 250 cattle examined in an abattoir in the West of Scotland, 35 dental arches with periodontal lesions and 40 considered periodontally healthy were selected. Logistic regression analysis was used to evaluate the association between the independent variables, gender, age and breed with periodontitis.

Results

The average age of animals with periodontitis was 7.4 years (range 1.5 to 16.5 years) and for periodontally healthy animals was 2.9 years (range 1.4 to 10.6 years). A wide range of breeds was identified, the most prevalent being Limousin, Holstein-Friesian and Aberdeen Angus. For statistical analysis, the 75 animals were grouped into two categories, dairy (n=20) or beef (n=55) cattle. Age of animals was significantly associated with the presence of periodontal lesions. For every year of age, cattle were 1.53 times likely to have periodontitis ($p<0.001$). Gender was not significantly associated with periodontitis ($p=0.887$). Regarding the breed type, beef cattle were 0.36 times likely to have periodontitis compared to dairy cattle ($p=0.054$).

Conclusions

It is likely that bovine periodontitis has a significant impact on the welfare of affected animals, as it can be a painful, chronic condition leading to difficult feeding and consequent loss of body condition and weight, increased susceptibility to disease and reduced productivity. Oral pain may have only subtle effects on cattle behaviour, and thus the disease is easily ignored or neglected. Logistic regression analysis demonstrated that periodontitis lesions are more prevalent with increasing age of cattle. We hypothesise that increasing age may not represent a risk factor outright for the development of bovine periodontitis but may simply reflect the cumulative exposure over time to environmental risk factors.

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ANALISI DI FOCOLAI DI PATOLOGIA NERVOSA IN BOVINI NEL NORD-EST ITALIA DAL 2015 AL 2018

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Introduzione

Le patologie del sistema nervoso, sebbene nel bovino siano rare in confronto alle malattie di altri apparati, hanno diverse eziologie tra le quali disturbi metabolici, carenziali e agenti infetti. Le malattie neurologiche di origine virale sono poco comuni, mentre le forme batteriche sono più frequenti. Le lesioni riscontrate a carico del sistema nervoso centrale causate da agenti batterici possono essere: ascessi (*T. pyogenes* o *F. necrophorum*) o meningiti spesso derivanti da forme setticemiche (meningite suppurativa batterica neonatale da *E. coli* o *Streptococcus spp.* nel vitello). Tuttavia gli agenti batterici più importanti per la patologia nervosa bovina sono: *Listeria monocytogenes* e *Histophilus somni*. La listeriosi encefalica (*Listeria monocytogenes* e, secondo alcuni autori, *Listeria innocua*) difficilmente provoca lesioni macroscopicamente evidenti, occasionalmente si può vedere edema delle meningi o una lieve meningite.

Histophilus somni causa la meningoencefalite trombotica infettiva (ITME), un tempo denominata meningoencefalite tromboembolica. Macroscopicamente le lesioni sono solitamente evidenti: il liquor si presenta torbido per la presenza di fibrina e a livello encefalico vi sono foci necrotico-emorragici multifocali. Altri batteri come *Cl. perfringens*, *Cl. botulinum* e *Cl. tetani* provocano sintomatologia nervosa mediante l'azione di tossine che, tuttavia, non provocano lesioni visibili né macroscopicamente né microscopicamente a carico delle strutture del SNC [1, 2].

Materiali e metodi

L'obiettivo di questo studio è svolgere un'indagine sulla prevalenza degli agenti batterici nei casi di patologia nervosa bovina. Per questo motivo sono stati presi in considerazione gli esami autoptici svolti tra Gennaio 2015 e Giugno 2018 nel territorio di competenza dell'IZSVE in soggetti che all'anamnesi riportavano sintomatologia nervosa. A partire da questi sono stati analizzati i dati relativi all'esame colturale batteriologico a carico delle strutture del SNC, ricerca colturale selettiva per *Listeria spp.*, ricerca di *Listeria spp.* mediante esame immunoistochimico e ricerca mediante saggio di PCR di *Histophilus somni*.

Risultati

Nel periodo in esame sono stati analizzati 54 casi di cui 23 riguardano vitelloni da carne (42.60%) e 11 (20.4%) vitelli sotto i 6 mesi di età. In tutti i soggetti sono state eseguite ricerche batteriologiche con metodiche microbiologiche e ricerche specifiche in PCR per *Histophilus somni*, oltre che l'esame macroscopico e istologico in quasi la totalità dei casi, circa l'89% (48/54). In 36 (66.7%) casi le lesioni microscopiche riportavano forme di meningoencefalite di natura infettiva, mentre difficilmente si evidenziavano lesioni a livello macroscopico. L'esame microbiologico eseguito sulla totalità dei campioni ha riportato nel 50% (27/54) dei casi l'assenza di agenti patogeni, nel 26% dei casi (14/54) ha riportato polimicrobismo, *E.coli* nel 9% (5/54), *Histophilus somni* nel 7.4% (4/54) confermati successivamente con la metodica biomolecolare. Altri agenti riscontrati sono stati *Staphylococcus* spp. (1; 1.85%), *Streptococcus* spp. (1; 1.85%) e *Trueperella pyogenes*(1; 1.85%). La ricerca con metodica PCR di *Histophilus somni* è risultata positiva nel 38.9% dei casi (21/54), ma solo il 19% dei positivi (4/21) è stato confermato anche all'esame colturale. La ricerca specifica di *Listeria spp.* è stata eseguita in 43 casi (80%), con 13 capi risultati positivi (30%). La tipizzazione ha portato ad identificare la presenza di *L. monocytogenes* in 8 casi (62%), *L. innocua* in 4 casi (31%) e la concomitanza di entrambe in un solo caso (7%).

Conclusioni

L'analisi dei dati porta a considerare come le patologie nervose abbiano a tutt'oggi una forte componente infettiva e siano maggiormente colpiti i vitelloni da carne e i vitelli. Inoltre nella diagnosi risulta fondamentale l'ausilio dell'esame istopatologico in quanto il solo esame macroscopico molte volte non risulta essere esaustivo. La componente di Histophilosi sembra essere la più frequente e l'aiuto delle metodiche biomolecolari sembra indispensabile. Tali analisi hanno portato, inoltre, ad evidenziare dei punti critici nella normale *routine* diagnostica e quindi la difficoltà di sviluppare protocolli diagnostici uniformi per i laboratori, che consentirebbero di gestire meglio i dati raccolti.

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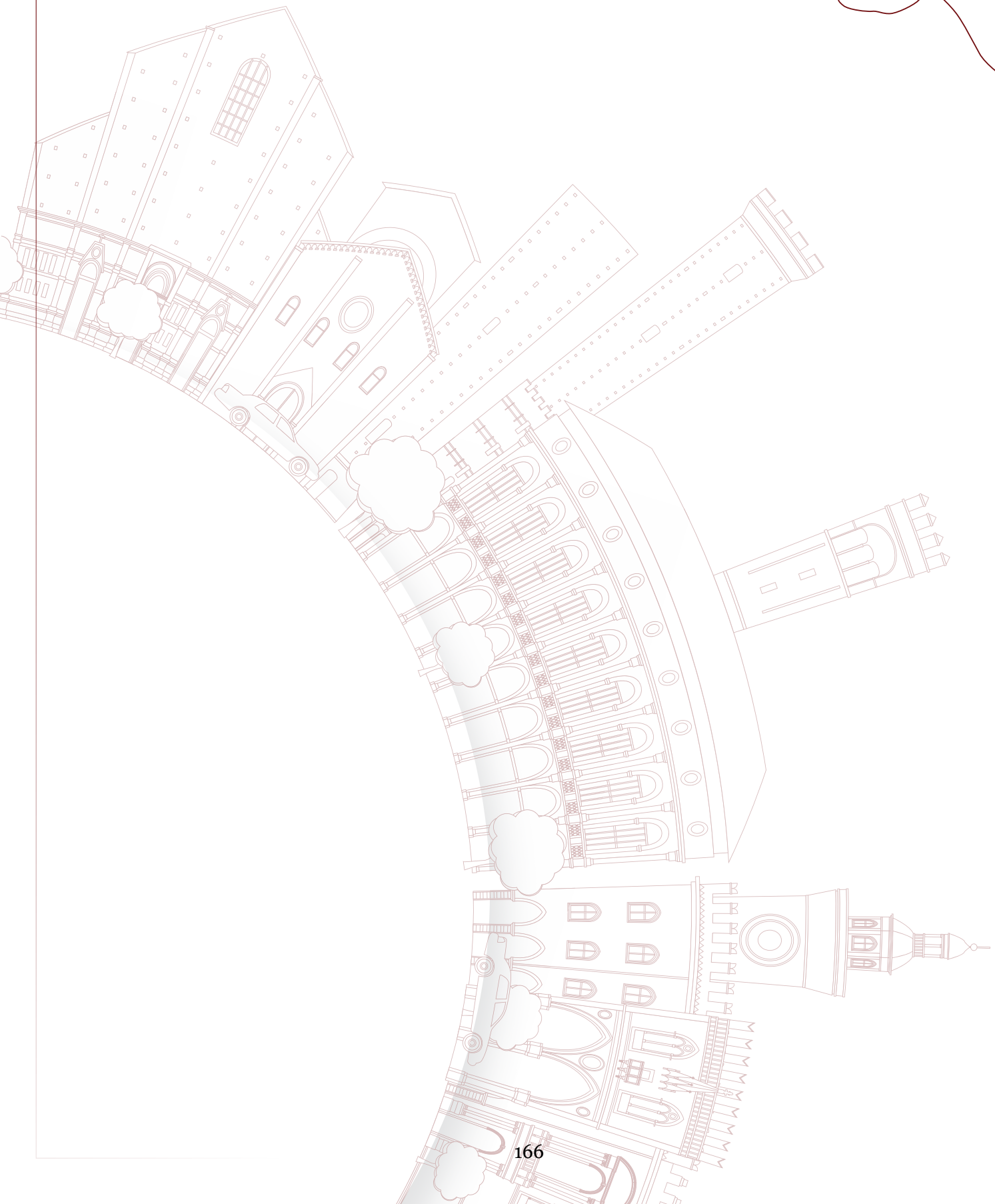

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