

15th International Colloquium on Paratuberculosis (ICP 2022)

Dublin, Ireland
12-16 June 2022

ISBN: 978-1-7138-5232-2

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2022) by International Association for Paratuberculosis
All rights reserved.

Printed by Curran Associates, Inc. (2022)

For permission requests, please contact International Association for Paratuberculosis
at the address below.

International Association for Paratuberculosis
2015 Linden Drive
Madison, Wisconsin 53706-1102
USA

Phone: (608) 262-8457
Fax: (608) 265-6463

www.paratuberculosis.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

PATHOGENOMICS GENOTYPING AND MAP DIVERSITY INVITED SPEAKER

Invited Speaker for Pathogenomics Genotyping and Map Diversity	1
<i>M. Price-Carter</i>	

PATHOGENOMICS GENOTYPING AND MAP DIVERSITY AM SESSION (1)

Investigating the Initial Interaction Between MAP and the Host Using Bovine Intestinal Organoid Models	2
<i>R. Blake, K. Jensen, O. Alfituri, J. Hope, J. Stevens</i>	
Evidence for Local and International Spread of Mycobacterium Avium Subspecies Paratuberculosis Through Whole Genome Sequencing of Isolates from the Island of Ireland	3
<i>V. Perets, A. Allen, J. Crispell, S. Cassidy, A. O'Connor, D. Farrell, J. Browne, J. O'Mahony, R. Skuce, K. Kenny, S. Gordon</i>	
Examining the Evolutionary Trajectories of Mycobacterium Avium Subsp. Paratuberculosis in US Dairy Cattle Using Dimensionality Reduction Techniques.....	4
<i>S. Wells, Y. Wang</i>	
Involvement of M. Avium Ssp. Paratuberculosis Specific Genomic Regions LSP14/15 in Zinc Homeostasis.....	5
<i>E. Goethe, K. Laarmann, J. Luhrs, A. Gieseke, R. Goethe</i>	
Genetic Features of Mycobacterium Avium Subsp. Paratuberculosis Strains Circulating in the West of France Deciphered by Whole-Genome Sequencing.....	6
<i>C. Conde, T. Cochard, M. Branger, M.-N. Rossignol, C. Fourichon, A. Delafosse, A. Davergne, A. Joly, D. Ngwa-Mbot, L. Journaux, R. Guatteo, L. Schibler, J. Bannantine, F. Biet</i>	

PATHOGENOMICS GENOTYPING AND MAP DIVERSITY AM SESSION (2)

Phylogenetic Analysis of Mycobacterium Avium Subsp. Paratuberculosis in Australia	7
<i>R. Hodgeman, R. Mann, K. Savin, N. Djitro, S. Rochfort, B. Rodoni</i>	
Understanding the Role of Mycobacterium Avium Subsp. Paratuberculosis Pathogenicity Islands by Generating Gene Knockouts Using ORBIT	8
<i>S. Duffy, M. Behr</i>	
85 Complex Proteins as an Important Adhesion Factor of Mycobacterium Avium Subsp. Paratuberculosis in Bovine Sperm.....	9
<i>J. Caldeira, M. Moreira, E. Diaz-Miranda, J. Guimaraes, Y.-F. Chang, T. Zilch, W. Barbosa, A. Junior, J. Pena</i>	
Changes in the Fecal Microbiota of Calves Experimentally Infected with Mycobacterium Avium Subsp. Paratuberculosis.....	10
<i>M.-E. Fecteau, D. Beiting, R. Sweeney</i>	

PATHOGENOMICS, GENOTYPING AND MAP DIVERSITY POSTER PITCHES

Bio-Load and Bio-type Profile of Mycobacterium Avium Subspecies Paratuberculosis Isolates Recovered from Sheep and Goats Located in Himalayan Region.....	11
<i>A. Bhat, H. Malik, A. Mir, T. Hussain, K. Chaubey, S. Gupta, S. Singh</i>	
Whole-Genome Analysis of Mycobacterium Avium Subsp. Paratuberculosis IS900 Distribution Reveals Strain Type-specific Modalities.....	12
<i>C. Conde, M. Price-Carter, T. Cochard, M. Branger, K. Stevenson, R. Whittington, J. Bannantine, F. Biet</i>	
Deletion in Mce4 Gene Exacerbates Virulence of Mycobacterium Avium Subsp. Paratuberculosis.....	13
<i>M. Olivieri, R. Moyano, A. Nagel, M. Romano, N. Alonso</i>	
A Streptomycin Pre-Treatment Mouse Model of Mycobacterium Avium Subsp. Paratuberculosis Infection	14
<i>S. Duffy, A. Lupien, F. McIntosh, M. Behr</i>	

CONTROL PROGRAMS AND EDUCATION INVITED SPEAKER

Invited Speaker for Control Programs and Education	15
<i>H. Barkema</i>	

CONTROL PROGRAMS AND EDUCATION PM SESSION (1)

Part 3: UK Approach to Johne's Disease Control -Top Tips for Effective Control.....	16
<i>P. Orpin, D. Sibley</i>	
Dynamics of MAP Infections in Small Structured Cattle Farms.....	17
<i>J. Khol, T. Liening-Ewert, L. Aubock, P. Ortner, J. Kossler, A. Tichy, M. Dunser, C. Mader</i>	
Predicting Positive ELISA Results in Dairy Herds with a Preferred Herd Status in a Milk Quality Assurance Programme for Paratuberculosis.....	18
<i>M. Weber, M. Aalberts, T. Dijkstra, Y. Schukken</i>	
The Irish Johne's Control Programme: A Qualitative Approach to Understanding the Motivations for Farmer and Veterinary Practitioner Engagement and Providing Information Effectively Through Co-Design to Improve Recruitment, Adherence, and Retention.....	19
<i>A. Burrell, M. Good, C. McAloon, D. Graham, S. More, L. Gavey</i>	
Part 1: UK Approach to JD Control -Farmer Engagement Using Low Cost Surveillance, Risk Assessment and Prevalence Prediction.....	20
<i>P. Orpin, D. Sibley</i>	

CONTROL PROGRAMS AND EDUCATION PM SESSION (2)

Changes in Johne's Disease Control Practices in Ontario Canada Between 2013 and 2019.....	21
<i>J. Imada, S. Roche, C. Bauman, D. Kelton</i>	
Raising Awareness on Paratuberculosis in Africa.....	22
<i>J. Okuni, J. Ssekitoleko, K. Eltom, W. Elmagzoub, S. Idris, E. Eltayeb, A. Amanzada, J. Omega, F. Tanneberger, L. Ojok, A. Wahed</i>	

Different Mycobacterium Avium Subspecies Paratuberculosis Burden Implies Different Aims of Johnes' Control Strategies in the Three Main Dairy Production Regions of Germany	23
<i>K. Donat, M. Krieger, A. Campe, I. Lorenz, S. Eisenberg</i>	

CONTROL PROGRAMMES AND EDUCATION POSTER PITCHES

Completing Herd Investigations Using a Mobile App with Links to Real-Time Data.....	24
<i>L. Citer, L. Gavey, P. O'Sullivan, D. Graham</i>	
A Preliminary Analysis of vRAMP Responses for Dairy Herds Entering the Voluntary Johne's Disease Control Programme in Northern Ireland During Its First Year of Operation	25
<i>K. Meek, S. Strain, N. O'Connell, I. Grant</i>	
Irish Johne's Control Programme Description and Progress	26
<i>L. Gavey, S. More, L. Citer, D. Graham</i>	
Important Role for Abattoir Monitoring and Vaccination in Control Programs for Bovine Paratuberculosis Due to Mycobacterium Avium Subsp. Paratuberculosis (Map).....	27
<i>I. Links, H. Dahmen</i>	
How Multiplex Diagnostics Can Help in the Rapid Screening of Johne's Disease: A Proposed Surveillance Method.....	28
<i>N. Gordon, J. Tejerina, D. Whittaker, H. Moore, R. Janeczko</i>	
Investigating the Dynamics of Johne's Disease in Dairy Herds After a Province Wide Voluntary Control Program in Ontario Canada	29
<i>J. Imada, S. Roche, C. Bauman, D. Kelton</i>	

DIAGNOSTICS AND DETECTION INVITED SPEAKER

Invited Speaker for Diagnostics and Detection	30
<i>V. Kapur</i>	

DIAGNOSTICS AND DETECTION AM SESSION (1)

Comparison of Herd-Level MAP Prevalence Based on F57 and ISMAP02 Target Genes	31
<i>L. Martins, K. Orsel, J. De Buck, H. Barkema</i>	
Evaluation of a Droplet Digital PCR (ddPCR) Assay for Detection and Quantification of Mycobacterium Avium Subsp. Paratuberculosis (MAP) DNA in Whole-Blood and Fecal Samples from MAP-infected Holstein Cattle	32
<i>G. Badia-Bringue, M. Canive, R. Casais, C. Blanco-Vazquez, J. Amado, N. Iglesias, R. Juste, M. Alonso</i>	
Evaluation of the Actiphage® Rapid JD Test as a Pre-Breeding Heifer Screening Tool in Endemically Infected Herds	33
<i>T. Geraghty, G. Caldow, G. Richardson</i>	
Development of LAMP Coupled LFD Kit for Rapid and Specific Detection of Mycobacterium Avium Subspecies Paratuberculosis in Field.....	34
<i>J. Sohal, M. Singh, M. Jain, S. Singh, A. Singh, S. Gupta, J. Reddy, R. Polavarapu, A. Kumar, D. Sharma, G. Aseri</i>	

Evaluation of the Bovine ATP-Binding Cassette Subfamily a Member 13 (ABCA13) as a Potential Biomarker for Sensitive Detection of Animals with Focal Pathological Forms of Subclinical Paratuberculosis.....	35
<i>R. Casais, C. Blanco-Vazquez, N. Iglesias, P. Vazquez, R. Juste, J. Garrido, A. Balseiro, M. Canive, J. Amado, M. Queipo, T. Iglesias, M. Alonso-Hearn</i>	

DIAGNOSTICS AND DETECTION AM SESSION (2)

A Novel 2-In-1 Culture System for the Isolation of Mycobacterium Avium Subsp. Paratuberculosis	36
<i>H. Dane, L. Stewart, I. Grant</i>	
More Insights About the Efficacy of Copper Ion Treatment on Mycobacterium Avium Subsp. Paratuberculosis (MAP). a Clue for the Observed Tolerance.....	37
<i>C. Tejada, M. Villegas, P. Steuer, . Salgado</i>	
Serum Metabolome Changes in Bovine Paratuberculosis by NMR Spectroscopy and Blood Indices.....	38
<i>N. Pozzato, A. Massaro, A. Tata, I. Pallante, M. Bottazzari, P. Fiorini, M. Pra, A. Stefani, V. Bertazzo, J. De Buck, R. Piro</i>	
The Fate of Heifers with 'low-Positive' Milk ELISA Results	39
<i>M. Weber, M. Aalberts, T. Dijkstra, Y. Schukken</i>	
Development of a Rapid Multiplex Immunoassay for the Early Detection of Mycobacterium Avium Paratuberculosis in Bovine Samples.....	40
<i>N. Gordon, J. Tejerina, D. Whittaker, R. Janeczko</i>	
Early Detection of Viable MAP Shedding by Dairy Calves Possible Using a Rapid and Sensitive Phagomagnetic Separation (PhMS)-QPCR Method.....	41
<i>K. Meek, S. Strain, N. O'Connell, I. Grant</i>	
Phage-Based Detection of Viable Mycobacterium Avium Subsp. Paratuberculosis in Milk and Faeces Superior to Faecal qPCR and Serum- ELISA for Identifying Shedding Animals in a Northern Ireland Dairy Herd.	42
<i>I. Grant, A. Foddai, E. Earle, J. Rankin, G. Watson, B. McInerney, S. Strain</i>	

DIAGNOSTICS AND DETECTION POSTER PITCHES (1)

Mycobacteriophage Characterisation: An Important Consideration for the Biocontrol of Mycobacterium Avium Sbsp. Paratuberculosis.....	43
<i>L. O'Connell, J. O'Mahony</i>	
Study on Prevalence of Mycobacterium Avium Subspecies Paratuberculosis (MAP) Infection in Suspected Diarrhoeic Buffaloes and Cattle Reporting at Clinics for Therapeutic Intervention	44
<i>S. Sharma, A. Gautam, S. Singh, K. Chaubey, S. Harihahan</i>	
Detection of MAP and M. Avium Co-Infection in North American Bison Using Actiphage	45
<i>W. Hartill, C. Evans, A. Hunyh, T. Perekhinec, B. Swift, C. Rees</i>	
Optimization of Actiphage for Detection of MAP in Different Hosts, Including Humans	46
<i>B. Swift, W. Handley-Hartill, A. Kubala, C. Evans, C. Rees</i>	

HOST RESPONSE AND IMMUNOLOGY INVITED SPEAKER

Invited Speaker for Host Response and Immunology	47
<i>Kumudika De Silva</i>	

HOST RESPONSE AND IMMUNOLOGY AM SESSION (1)

An in Vivo Vaccine Screening Model in Neonatal Calves to Investigate Parenteral Vaccine-Induced Mucosal Immune Responses to an Enteric MAP Infection	48
<i>A. Facciuolo, A. Lee, N. Rawlyk, S. Napper, A. Potter, V. Gerdts, H. Townsend, R. Hancock, P. Griebel</i>	
A Genome-Wide Association Study for Tolerance to Bovine Paratuberculosis Identifies Genetic Regions with Candidate Genes Involved in DNA Packaging, DNA Damage Response and Innate Immunity	49
<i>M. Alonso, M. Canive, G. Badia-Bringue, P. Vazquez, O. Gonzalez-Recio, A. Fernandez, J. Garrido, R. Juste</i>	
Dynamics of Immune Responses Following Immunization with a Live Attenuated Vaccine Against Johne's Disease.	50
<i>A. Talaat, M. Hanafy</i>	
Regionally Distinct Mucosal Immune Responses to MAP Infection in Discrete and Continuous Peyer's Patches of Young Calves at 2 and 12 Months Post- Infection.....	51
<i>A. Facciuolo, A. Lee, P. Cano, S. Napper, A. Potter, V. Gerdts, R. Hancock, L. Mutharia, P. Griebel</i>	
Characterising Immune Responses Following Vaccination of Calves with Live- Attenuated Strains of Mycobacterium Avium Subsp. Paratuberculosis	52
<i>R. Samani, J. De Buck</i>	

HOST RESPONSE AND IMMUNOLOGY AM SESSION (2)

Identification of Genetic Regions Associated with a Low Mycobacterium Avium Subsp. Paratuberculosis Load Within Infected Monocyte-Derived Macrophages	53
<i>M. Canive, G. Badia-Bringue, M. Alonso-Hearn</i>	
Understanding the Invasion Dynamics of Mycobacterium Avium Subsp. Paratuberculosis (MAP)	54
<i>G. Baruta, H. Zhang, L. Alston, J. De Buck, S. Hirota</i>	
Uncovering miRNA Signatures of Resilience to Paratuberculosis Infection and Their Functional Relevance in Disease Progression	55
<i>K. Wright, K. De Silva, A. Purdle, K. Plain, S. Oehlers</i>	
Alternative Splicing of pre-mRNA Modulates the Immune Response in Peripheral Blood and Gut Tissues of Holstein Cattle Naturally Infected with Mycobacterium Avium Subsp. Paratuberculosis.....	56
<i>G. Badia-Bringue, M. Canive, J. Lavin, R. Casais, C. Blanco-Vazquez, M. Alonso-Hearn</i>	
Identification of Disease Tolerant and Susceptible Cows to Mycobacterium Avium Subspecies Paratuberculosis Infection for Genetic Analyses of Disease Resistance	57
<i>N. Bissonnette, D. Kelton, G. Fecteau, K. Tahlan, E. Ibeagha-Awemu, P. Griebel</i>	

HOST RESPONSE AND IMMUNOLOGY POSTER PITCHES

An Integrative Mendelian Randomization Analysis of Genome-Wide Association and eQTLs Studies Identified Novel Genes Associated with Bovine Paratuberculosis Susceptibility	58
<i>G. Badia-Bringue, M. Canive, N. Fernandez, P. Vazquez, J. Lavin, J. Bilbao, R. Casais, C. Blanco-Vazquez, J. Garrido, R. Juste, M. Alonso-Hearn</i>	
Peripheral Cellular Immune Responses in Mycobacterium Avium Subspecies Paratuberculosis (MAP) Infected and Vaccinated Goats: A Comparative Study	59
<i>S. Sharma, A. Gautam, S. Singh, K. Chaubey, S. Gupta</i>	

DIAGNOSTICS AND DETECTION POSTER PITCHES (2)

Validation of a IS900-QPCR Assay for the Detection of Paratuberculosis in Faeces According to the OIE “Principles and Methods of Validation of Diagnostic Assays for Infectious Disease”	60
<i>S. Russo, G. Galleti, A. Filippi, N. Arrigoni, C. Garbarino, M. Ricchi</i>	
Bayesian Accuracy Estimates of Environmental Sampling for Determining Herd Paratuberculosis Infection Status and Its Association with the Within- Herd Prevalence in Québec Dairies	61
<i>J. Sabogal, G. Fecteau, E. Dore, G. Cote, J.-P. Roy, V. Wellemans, S. Buczinski</i>	
Identification of Mycobacterium Avium Subsp. Paratuberculosis Using a Single-Chain Antibody Targeting the Cell Wall Lipopentapeptide L5P	62
<i>H. Bach, Y. Slavin, A. Gonzalez, C. Ganneau, S. Bay, F. Biet</i>	
Evaluating the Performance of Various Protocols for the Diagnostic Performance in Paratuberculosis IS900 PCR	63
<i>M. Jain, H. Gandhi, S. Mourya, A. Kumar, G. Aseri, D. Sharma, J. Singh</i>	
Herd Environmental Sampling for Detection of Mycobacterium Avium Subspecies Paratuberculosis in Pasture-Based Dairy Herds – Preliminary Results	64
<i>N. Field, J. Mee, C. McAloon</i>	

EPIDEMIOLOGY AND ECONOMICS INVITED SPEAKER

Invited Speaker Epidemiology and Economics	65
<i>F. Griffin</i>	

EPIDEMIOLOGY AND ECONOMICS AM SESSION (1)

Dam and Environmental Transmission Routes on Mycobacterium Avium Paratuberculosis Infection in Calves	66
<i>E. Nunney, M. Crotta, K. Bond, M. Green, S. Van Winden, J. Guitian</i>	
Economic Premiums Associated with Mycobacterium Avium Subspecies Paratuberculosis-Negative Replacement Purchases in Major Dairy Producing Regions	67
<i>P. Rasmussen, H. Barkema, E. Beaulieu, S. Mason, D. Hall</i>	
Effects of Silirum® Based Vaccination Programs on Map Faecal Shedding and Serological Response in Seven French Dairy Herds.	68
<i>F. Corbiere, D. Guellouz, J. Cournet, C. Tasca, E. Dubaux, L. Foures, G. Foucras</i>	

Insights on Paratuberculosis in Cattle at a Regional Scale Using Data-Driven Modeling and Inference.....	69
<i>G. Beaunee, P. Ezanno, A. Joly, P. Nicolas, E. Vergu</i>	

Success of Paratuberculosis Control is Associated with Calf Mortality Rate in Dairy Herds.....	70
<i>A. Klassen, S. Sollner-Donat, E. Einax, K. Donat</i>	

EPIDEMIOLOGY AND ECONOMICS AM SESSION (2)

Mycobacterium Avium Subspecies Paratuberculosis (MAP) Elisa Tests on Milk to Predict Future Health and Culling in a Dairy Herd.....	71
<i>R. Sibley, P. Orpin</i>	

Exposure to Mycobacterium Avium Subsp. Paratuberculosis in Alpine Pastures (Northern Italy): Evaluation of Cattle and Red Deer (Cervus Elaphus) Contribution Through Environmental Faecal Samples.	72
<i>A. Filippi, C. Luzzago, M. Nava, A. Forti, S. Russo, F. Barsi, L. Corlatti, L. Pendrotti, A. Bianchi, M. Ricchi, . Ricchi, N. Arrigoni, C. Garbarino</i>	

Factors Associated with the Spread of Paratuberculosis in Hungarian Dairy Cattle Herds.....	73
<i>V. Jurkovich, M. Bakony, B. Vass-Bognar</i>	

Multi-Institutional Investigation for Determining the Status of Johne’s Disease in the Suspected and Apparently Healthy Population of Domestic Livestock Species: A Pan-India Study.....	74
<i>S. Singh, D. Chauhan, J. Sohal, K. Gunaseelan, A. Singh, K. Porteen, K. Chaubey, S. Gupta, P. Singh</i>	

Epidemiology of Johne’s Disease in the New Zealand Farmed Deer Industry 1980-2020	75
<i>S. Norton, M. Price-Carter, F. Griffin</i>	

EPIDEMIOLOGY AND ECONOMICS POSTER PITCHES

Seroprevalence of Mycobacterium Avium Subsp. Paratuberculosis in Austrian Goat Flocks.....	76
<i>J. Schrott, E. Sodoma, M. Dunser, A. Tichy, J. Khol</i>	

Understanding the Antibacterial Mechanisms of Copper Ion Treatment on Mycobacterium Avium Subsp. Paratuberculosis	77
<i>C. Tejada, M. Villegas, P. Steuer, M. Salgado</i>	

Molecular and Serological Survey of Mycobacterium Avium Subspecies Paratuberculosis in Ugandan Cattle	78
<i>J. Ssekitoleko, L. Ojok, E. Eltyayeb, A. Amanzada, K. Eltom, A. Wahed, J. Okuni</i>	

Johne’s Disease in New Zealand; the Study of a Milk Antibody Dataset	79
<i>R. White, S. Pryor, R. Thresher</i>	

PUBLIC HEALTH AND MAP IN THE ENVIRONMENT INVITED SPEAKER

Invited Speaker for Public Health and Map in the Environment.....	80
<i>M. Behr</i>	

PUBLIC HEALTH AND MAP IN THE ENVIRONMENT PM SESSION (1)

Heat Resistance of Mycobacterium Avium Subsp. Paratuberculosis: Inactivation Kinetics During the Production Process of Mozzarella Cheese	81
<i>F. Barsi, E. Cosciani-Cunico, S. Russo, E. Dalzini, A. Filippi, G. Cammi, N. Arrigoni, P. Daminelli, N. Losio, C. Garbarino, M. Ricchi</i>	
Effluent as a Herd-Level Screening Tool for the Estimation of Johne's Disease Prevalence Within New Zealand Milking Herds	82
<i>R. White, S. Pryor, R. Thresher</i>	
Presence of Mycobacterium Avium Spp. Paratuberculosis in Silage Collected on Commercial Cattle Farms	83
<i>S. Eisenberg, A. Campe, K. Donat</i>	

PUBLIC HEALTH AND MAP IN THE ENVIRONMENT PM SESSION (2)

Detection of Mycobacterium Avium Subspecies Paratuberculosis in Environmental Samples from a Dairy Goat Farm in Germany	84
<i>C. Pickrodt, K. Donat, H. Kohler</i>	
Environmental Free-Living Amoebae Interaction with Mycobacterium Avium Subsp. Paratuberculosis.....	85
<i>A. Jessu, T. Cochard, A. Samba-Louaka, J.-L. Moyen, F. Biet, Y. Hechard</i>	
Cumulative Sensitivity and Specificity of Repeated Environmental Sampling and Milk-Pool Testing as Surveillance Methods at Herd Level in Large Low- Prevalence Dairy Herds	86
<i>K. Donat, A. Wichert, E. Einax, E. Kasbohm</i>	
Therapeutic Management of Mycobacterium Avium Subspecies Paratuberculosis Infection with Complete Resolution of Disease in Patients with Inflammatory Bowel Syndrome in India	87
<i>S. Gupta, K. Chaubey, P. Agarwal, A. Gautam, M. Singh, P. Singh, S. Singh</i>	

ADDITIONAL PAPERS

Combining Optimized Sample Extraction with Sensitive Detection Using Bactotype® MAP Real-Time PCR	88
<i>N. Tandon, C. Gaunitz, M. Labitzke, C. Engemann, O. Sasse, L. Moussi, F. Ullman</i>	
Evaluation of Fecal Culture, Fecal RT-PCR, Three Commercially Available Serum ELISA's, Complement Fixation and AGID Assays as Diagnostic Tools to Detect Mycobacterium Avium Ssp. Paratuberculosis in Dairy Sheep.....	89
<i>J. Cooper, J. Smith, N. Aulik</i>	
Detection of a Mycobacterium Avium Spp Avium in a Pudu and Muntjac in the United States.....	90
<i>J. Cooper, A. Talaat, A. Mutlow, K. Conley, N. Aulik</i>	
Detection of Antibodies Against Mycobacterium Avium Subspecies Paratuberculosis in Sera and Bulk Tank Milk Samples from French Goat Herds.....	91
<i>V. Thibault-Poisson, M. Thirion, L. Pineau, I. Bremaud, M. Tabouret</i>	
Interactions Between Mycobacterium Avium Subsp. Paratuberculosis and Staphylococcus Aureus and Streptococcus Agalactiae, in Epithelial Cells of the Bovine Mammary Gland - Mac-T.....	92
<i>J. Pena, D. Schwarz, A. Brasil, L. Oliveira, A. Silva, M. Moreira</i>	

Results of Fifteen Years Milk Quality Assurance for Paratuberculosis in Dutch Dairy Herds	93
<i>M. Weber, M. Aalberts, T. Dijkstra, Y. Schukken</i>	
Performance of Three Commercial ELISA Tests for Mycobacterium Avium Subsp. Paratuberculosis (MAP) Antibodies in Blood and Milk Samples	94
<i>I. Lorenz</i>	
Is Copper Ions Treatment Enough to Stop Mycobacterium Avium Subsp. Paratuberculosis (MAP) Infection Progression in Newborn Calves?	95
<i>M. Salgado, P. Steuer, C. Tejea, M. Moroni, C. Verdugo</i>	
Twenty-Five Topics to Be Considered in the Design of Paratuberculosis Control Programmes for Dairy Herds	96
<i>M. Weber, T. Dijkstra, M. Aalberts, Y. Schukken</i>	
The Biosecurity and Bio-Containment Risks Associated with MAP Infection and Prevalence in UK Dairy Herds	97
<i>R. Sibley, P. Orpin</i>	
Prediction of Clinical Paratuberculosis with RT-QPCR.....	98
<i>B. Vass-Bognar, W. Baumgartner, K. Fornyos, V. Jurkovich</i>	
Evaluation of Single Nucleotide Polymorphisms (SNPs) Associated to Genetic Resistance to Paratuberculosis in Marchigiana Beef Cattle.....	99
<i>P. Mazzone, L. Petrucci, M. Torricelli, S. Corneli, A. Di Paolo, C. Sebastiani, M. Ciullo, M. Sebastianelli, S. Costarelli, E. Scoccia, F. Sbarra, F. Gabbianelli, A. Valentini, G. Filippini, G. Pezzotti, M. Biagetti</i>	
Humoral Immune Response Against Mycobacterium Avium Subspecies Paratuberculosis Immunogenic Epitopes in Type 1 Diabetes Pediatric Patients	100
<i>M. Noli, G. Meloni, D. Cossu, S. Hossein, S. Jasemi, L. Sechi</i>	
Clinical Trial (phase II) of Vaccination with a Heat-Killed Local Strain of Mycobacterium Avium Subsp. Paratuberculosis	101
<i>R. Moyano, M. Olivieri, A. Nagel, X. Cuerda, M. Gravisaco, F. Pinedo, P. Sosa, G. Traveria, M. Alonso, M. Romano</i>	
Evaluation of a Direct Multiplex qPCR Assay and ELISA for the Diagnosis of Bovine Paratuberculosis in a Tuberculosis Endemic Area	102
<i>F. Jurado-Martos, I. Luque, C. Tarradas, B. Huerta, F. Cardoso</i>	
Association Between Bovine MHC II Haplotypes and Susceptibility Traits to Bovine Johne's Disease	103
<i>V. Garcia, R. Whittington, A. Thomas, C. Davies, J.-A. Toribio, K. Plain</i>	
Probiotic Bacteria Modulate Immune Responses to Paratuberculosis Vaccination	104
<i>M. Oyanguren, E. Molina, M. Mujika, A. Badiola, I. Ladero, N. Elguezabal</i>	
Optimization and Validation of Lateral Flow Assay for Rapid Diagnosis of Paratuberculosis.....	105
<i>M. Jain, M. Singh, A. Singh, S. Gupta, R. Polavarapu, A. Kumar, G. Aseri, D. Sharma, J. Sohal</i>	
Recombinant Johnin (rJohnin) Assay for the DTH Based Specific Diagnosis of Paratuberculosis	106
<i>M. Jain, A. Kumar, M. Singh, S. Gupta, R. Polavarapu, V. Singh, A. Kumar, D. Sharma, G. Aseri, J. Sohal</i>	

Penside Plate rELISA as ‘Herd Screening Assay’ for Onsite Diagnosis of Paratuberculosis	107
<i>M. Jain, A. Singh, S. Gupta, R. Polavarapu, A. Kumar, D. Sharma, G. Aseri, J. Sohal</i>	
A Team-Based Approach to Farmer Engagement in Johne’s Disease Control	108
<i>L. Citer, L. Gavey, D. Graham, E. Farrell, S. McElroy</i>	
Direct qPCR is Equally Sensitive as Liquid Culture for the Detection of MAP in Ovine Faecal Samples	109
<i>H. Koehler, C. Pickrodt, P. Mobius</i>	
Exploring the Best Peptide Regions of Secretome of Mycobacterium Avium Subspecies Paratuberculosis for Better Functionality and Binding Efficacy to Design Peptides Based ELISA.....	110
<i>S. Hariharan, K. Chaubey, P. Singh, S. Singh</i>	
No Evidence of Transmission of Mycobacterium Avium Subspecies Paratuberculosis from the Udder Skin into the Colostrum of Dairy Goats	111
<i>C. Pickrodt, K. Donat, U. Moog, H. Kohler</i>	
Evaluation of Four Tests (screening and Confirmatory) for the Presence of MAP Infection in the Spiked and Un-Spiked Milk Samples.....	112
<i>K. Chaubey, M. Singh, S. Gupta, P. Singh, A. Singh, D. Chauhan, S. Singh</i>	
Understanding the Antibacterial Mechanisms of Copper Ion Treatment on Mycobacterium Avium Subsp. Paratuberculosis	113
<i>C. Tejada, M. Villegas, P. Steuer, M. Salgado</i>	
A Novel Paraffin Slide Culture (PSC) Technique to Isolate and Characterize Non-Tuberculosis Mycobacteria (NTM).....	114
<i>M. Jain, S. Maurya, R. Narang, P. Narang, S. Rana, A. Kumar, G. Aseri, D. Sharma, J. Singh</i>	
Search for Bacterial Gut Microbiome Patterns and Factors Associated with Pathogenesis of Paratuberculosis in Goats	115
<i>P. Moebius, E. Liebler-Tenorio, H. Koehler, C. Pickrodt, T. Fuchs</i>	
Development of a Diagnostic Test to Identify MAP in the Blood and Tissue of Patients with Crohn’s Disease.....	116
<i>N. Rayment, A. Hermon-Taylor, B. Hudspith, R. Pickup, G. Rhodes, G. Agrawal, J. Sanderson, J. Hermon-Taylor</i>	
Developing a Novel Johne's Progress Tracker to Support the UK National Management Plan for Dairy Herds	117
<i>P. Orpin, N. Taylor, D. Sibley</i>	
Part 2: UK Approach to Johne's Disease Control -Utilising Web-based Tools to Enhance Farmer Engagement	118
<i>P. Orpin, D. Sibley</i>	
Achieving 93% Uptake with UK National Johne's Management Plan Using Commercial Drivers and Industry Support	119
<i>P. Orpin, D. Sibley</i>	
Performance Evaluation of an Indirect milk-ELISA for the Diagnosis of Mycobacterium Avium Subsp. Paratuberculosis in Individual Samples of Dairy Sheep	120
<i>A.-R. Attili, E. Bonacucina, M. Linardi, L. Pacifici, V. Ngwa, V. Cuteri</i>	

In Contrast to Successfully Detecting Viable MAP from Blood Using a phage/qPCR Assay Within 48 Hours, by Two Years Routine Mycobacterial Blood Culture Provides No Clinically Useful Information.....	121
<i>R. Greenstein, L. Su, J. Stabel, I. Grant, A. Foddai, S. Brown</i>	
Proteomic Analysis of Sera from Holstein Friesian Cows with Different Pathological Forms of Bovine Paratuberculosis (PTB)	122
<i>A. Leon, M. Munoz, N. Iglesias, C. Vazquez, A. Balseiro, F. Corrales, S. Ciordia, F. Milhano, R. Casais</i>	
Evaluation of Diagnostic Tests for Mycobacterium Avium Subsp. Paratuberculosis Following a Single Screening of Animals in Herds Endemic with Johne’s Disease	123
<i>E. Ramovic, R. Cannon, D. Yearsley, M. Griffin, D. Prendergast, T. Clegg, D. Hand, E. Nighallchoir, B. Markey, J. Egan</i>	
Longitudinal Study on Mycobacterium Avium Subsp. Paratuberculosis Antibody Kinetics and Excretion in Dairy Sheep Using Blood, Milk and Faeces Throughout the Lactation Period	124
<i>A.-R. Attili, E. Bonacucina, M. Linardi, L. Pacifici, L. Galosi, V. Ngwa, V. Cuteri</i>	
Joint Control of Bovine Tuberculosis and Paratuberculosis – the Case for and Against.....	125
<i>R. Whittington, S. Eisenberg, F. Griffin, A. Michel, E. Schwan, K. Stevenson, M. Webber</i>	
Isolation of Novel Lytic Bacteriophages with the Potential to Be Used for Detection of Viable Mycobacterium Avium Subsp. Paratuberculosis.....	126
<i>H. Dane, L. Stewart, I. Grant</i>	
The Silent Sleep of Intramacrophage Mycobacterium Avium Subspecies Paratuberculosis	127
<i>J. Stevens, K. Jensen</i>	
Factors Affecting the Likelihood of a Positive or Negative Mycobacterium Avium Subspecies Paratuberculosis (MAP) Faecal PCR Result in ELISA Seropositive Or Inconclusive Animals in Irish Herds – Preliminary Results.....	128
<i>N. Field, J. Mee, C. McAloon</i>	
Performance of the Molecular Diagnosis Using qPCR IS900 for the Detection of Mycobacterium Avium Subspecies Paratuberculosis in Cattle Feces in Chiriquí, Panama.....	129
<i>F. Acosta, D. De La Hoz, C. De La Guardia, A. De Souza, D. Sambrano, A. Garcia, D. Candanedo, D. Palacios, S. Madrid, V. Polanco, A. Prichard, A. Villarreal, M. Jaen, J. Pitti, C. Nader, A. Goodridge</i>	
Single Nucleotide Polymorphisms Genotyping of Cattle from Uganda and Sudan and Their Connection to Mycobacterium Subspecies Paratuberculosis Infection in Ugandan and Sudanese Cattle	130
<i>J. Okuni, J. Ssekitoileko, W. Elmagzoub, S. Idris, M. Mpumwiire, M. Kisekka, L. Ojok, A. Amanzada, E. Eltyayeb, K. Eltom, A. Wahed</i>	
Lessons from the Irish Johne’s Control Programme	131
<i>L. Gavey, D. Graham, S. More, L. Citer</i>	
Genetic Typing of Mycobacterium Avium Subsp. Paratuberculosis Strains Isolated from 14 Cows Shedding High Levels of MAP in the Provinces of Quebec and Ontario Herds	132
<i>A. Byrne, K. Tahlan, S. Ollier, T. Cochard, F. Biet, N. Bissonnette</i>	
Bayesian Estimation of Sensitivity and Specificity of Fecal Culture, Fecal PCR and Serum ELISA for Diagnosis of Mycobacterium Avium Subsp. Paratuberculosis Infections in Egyptian Sheep	133
<i>J. Sabogal, I. Elsohaby, A. Selim</i>	
Evaluation of Associations Between MAP-C Or MAP-S Genotypes and the Severity of Histo-/pathological Abnormalities of Infected Cattle, Red Deer and Sheep from Germany and New Zealand.....	134
<i>M. Price-Carter, M. Gautam, P. Biggs, M. Weber, H. Koehler, C. Heuer, P. Mobius</i>	

Author Index