

The Paratuberculosis Newsletter

Issue 1: March 2021

The official publication of the International Association for Paratuberculosis



CONTENTS

Expanding membership. 15th ICP

Database of Paratuberculosis articles published in the last five years

Upcoming Events List of Johne's websites

Recent publications to March 2021

Job Vacancy: Principal Investigator - Mycobacteria Group Moredun Institute

Paratuberculosis Organism, Disease, Control 2nd Edition

Note from the Editor

Welcome to the March Newsletter. The LOC of the 15th ICP have decided that abstracts will need to be resubmitted as the Colloquium will have been delayed for two years and there will have been a lot of Johne's research carried out in that period. Also included in this issue are 2020 End-of-year financial report for the IAP, Paratuberculosis News, Database of Paratuberculosis articles published in the last five years, Upcoming Events, List of Johne's websites and the launch of the all new 2nd edition of "Paratuberculosis. Organism, Disease, Control", and a list of recent publications on paratuberculosis. Finally details of a very interesting job vacancy as Principal Investigator on Mycobacterial Diseases at the Moredun Institute. The next newsletter will be published in June. If you have any interesting items, please send them to me at editor@paratuberculosis.net

Best wishes,

Peter Muszowney

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Cover Photographs (from <https://midlothiansciencezone.com/research/moredun-research-institute/>).

The Moredun Group is seeking a Principal Investigator to join the Moredun Research Institute, which celebrated its centenary last year. You will perform novel research on Mycobacterial diseases of UK livestock, principally Johne's disease. You will be required to develop, maintain and manage a group working on research to control this disease from a variety of approaches. More details on page 19 or at <https://www.moredun.org.uk/careers/principal-investigator-mycobacteria-group>

Karen Stevenson, who is retiring from the post has agreed to write an article for the newsletter on "100 years of research on MAP in the Moredun Research Institute"

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Expanding membership.

As of June 2020, there are 178 members of the International Association of Paratuberculosis from 29 different countries. There are 39 countries with a population greater than 25 million that do not have a member. You will note later in the newsletter a list of recent publications on Paratuberculosis. There are a total of 89 publications, 15 from the United States of America, 14 Canada, 7 Spain, 6 Brazil, 5 from Australia, Germany and United Kingdom, 3 from Czech Republic, Italy, Japan and South Korea. There were also 2 publications from Netherlands, New Zealand and Saudi Arabia and one each from Chile, France, Hungary, India, Iran, Malaysia, Mexico, Nepal, Portugal, Slovakia, Switzerland, Turkey and Uganda. The authors of these articles will be written to inviting them to join if they are not already members and if they are from a country that does not have members asked to write a short paragraph for the next newsletter on the incidence of Johne's Disease and research carried out in their country. It would also be very helpful if each member could convince one of their co-workers to become a member of IAP.

#####



15th International Colloquium for Paratuberculosis

13 -16 June 2022

Céad Mile Fáilte

(one hundred thousand welcomes)



[@paratb2022](#)



[paratb2022](#)

Unfortunately due to the global pandemic the conference that was due to take place in June 2020 was postponed to April 2021. The committee has decided to postpone once more to June 2022. This decision was taken due to continued restrictions on gatherings/travel in Ireland and internationally. We apologise for any inconvenience this may cause but the health and safety of our speakers, delegates, organisers, and sponsors is of paramount importance to us.

We would like to thank our speakers, delegates, organisers, and sponsors for their continued support of the conference. We believe that we had put together a highly informative and innovative conference programme for 2020/2021 to benefit policy-makers, scientists and industry stakeholders.

Thanks to everyone's efforts we attracted a high number of delegates from a wide range of countries and so it is the committee's decision to postpone the conference again so we can meet in person to share our knowledge on Paratuberculosis.

In October 2020, the Local Organising Committee was faced with the decision of having to postpone again or to have a virtual conference in April 2021. It was decided by the LOC to go for a live conference in June 2022. We were delighted that the organisers of the 16th ICP in Jaipur, India agreed to this and have postponed their Colloquium until 2024.

The ICP 2021 Committee invites you to the 15th IAP Colloquium in Dublin, Ireland in June 2022. Delegates attending the conference can be assured of a productive and memorable colloquium, discover Irish heritage, culture and music and of course, experience the world renowned hospitality of Ireland.

Abstracts submitted/accepted for the 2020 conference have been cancelled. All authors are invited to re-submit new abstracts.

Abstract submission will open on 19th July 2021. Abstracts must be submitted through the online system by click the "Submit Abstract" button (which will be visible on the 19th July 2021) before the deadline of midnight 29th October 2021

Notification of Acceptance 16th February 2022

More details at <https://www.icpdublin.com/abstract>

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Upcoming Events

15th International Colloquium for Paratuberculosis

13th – 16th June 2022 Dublin, Ireland

Seventh International Conference on Mycobacterium bovis

7th - 10th June, 2022 Galway, Ireland

World Buiatrics Congress 2020

The 31st WBC has been postponed to September 4th - 8th, 2022.

16th International Symposium of Veterinary Epidemiology and Economics

August 7-12, 2022 in Halifax, Nova Scotia, Canada.

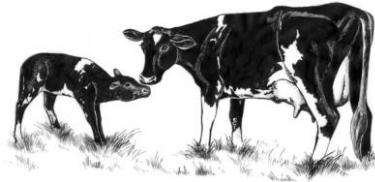
16th ICP 2024 Jaipur, India

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Database of Paratuberculosis articles published in the last five years

A searchable database of all the articles included in the Paratuberculosis Newsletter for the last five years is now available at <http://www.paratuberculosis.net/references.php>.

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International Association for Paratuberculosis

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Kennett Square, PA 19348 USA

Financial Report- December 31, 2020

	Checking	Money Market	PayPal	Total
Open (1/1/20)	\$34,875.81	\$14,347.28	\$ 2,582.83	\$ 51,805.92
Close Q2(6/30/20)	\$37,577.70	\$14,350.02	\$ 2,739.06	\$ 54,668.78
Final (12/31/20)	\$40,216.76.	\$14,350.74	\$ 790.56	\$ 55,358.06

INCOME

	<u>1/1/20 to 6/30/20</u>	<u>7/1/19 to 12/31/20</u>	<u>Annual Total</u>
Dues	\$ 2,995.00	\$ 720.00	\$ 3,715.00
Interest	\$ 2.74	\$ 0.72	\$ 3.46
Total	\$ 2,997.74	\$ 720.72	\$ 3,718.46

EXPENSES

	<u>1/1/20 to 6/30/ 20</u>	<u>7/1/20 to 12/31/20</u>	<u>Annual Total</u>
PayPal /Wire fees	\$ 136.88	\$ 29.44	\$ 166.32
Total	\$ 136.88	\$ 29.44	\$ 166.32

Respectfully Submitted,



Raymond W. Sweeney, VMD

Secretary-Treasurer

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List of Johne's websites

A subcommittee has been set up to review the ICP website. One of the suggestions was that a list of websites that give information about paratuberculosis in different countries should be included on the website. Here are a few to start the ball rolling but if your organisation has a website that you would like to see included please send details to editor@paratuberculosis.net

Argentina

- [Universidad Nacional de Mar Del Plata: Veterinary bacteriology research and diagnosis laboratory](#)

Australia

- [Animal Health Australia](#)
- [Australia and New Zealand Standard Diagnostic Procedures, April 2002](#)

Austria

- [Lymphatic fluid used for the first time to diagnose bovine paratuberculosis](#)

Belgium

- [Paratuberculosis control for milking herds](#)

Brazil

- [Animal Health Australia](#)

Canada

- [Johne's Education, Management and Assistance Program \(Ontario\)](#)
- [Beef Cattle Research Council](#)
- [Alberta Johne's Initiatives](#)
- [British Columbia Testing](#)
- [Canadian Johne's Disease Initiative](#)

Chile

- [Publications of Miguel Salgado](#)

Colombia

- [Universidad De Antioquia](#)

Czech Republic

- [Veterinary Research Institute](#)

Denmark

- [Statens Serum Institut](#)

France

- [World Organization for Animal Health \(O.I.E\)](#)
- [Bovine Paratuberculosis Control](#)
- [Biology, Epidemiology and Risk Analysis in animal health](#)

Germany

- [Frederic Loeffler Institute](#)

Greece

- [Department of Veterinary Medicine, University of Thessaly](#)

India

- [ICAR-Central Institute for Research on Goats](#)

Ireland

- [Animal Health Ireland](#)
- [Report of the Scientific Committee of the Food Safety Authority of Ireland \(2009\)](#)

Italy

- [Istituto Zooprofilattico Sperimentale della Lombardia](#)

Japan

- [National Institute of Animal Health \(NARO\)](#)

Mexico

- [Universidad Nacional Autonoma de Mexico](#)

Netherlands

- [VeeproHolland](#)
- [GD Animal Health](#)

New Zealand

- [Johne's Disease Research Consortium](#) (New Zealand)
- [New Zealand Deer Industry.](#)

Norway

- [Norwegian Veterinary Institute](#)

Panama

- [Indicisat](#)

Saudi Arabia

- [King Faisal University College of Veterinary Medicine](#)

Slovenia

- [Veterinary Faculty, National Veterinary Institute, Ljubljana](#)

Spain

- [produccionanimal.com Interview with Valentin Perez](#)
- [interview with Joseba Garrido, Director of the Animal Health Department of Neiker-Tecnalia](#)

Switzerland

- [Federal Food Safety and Veterinary Office](#)

Thailand

- [National Institute of Animal Health \(NIAH\)](#)

United Kingdom

- [National Johne's Management Plan \(NJMP\) \(U.K.\)](#)
- [National Animal Disease Information Service](#)
- [PBD Biotech](#)
- [Vetstream](#)
- [Kaz Strycharczyk, of Black Sheep Farm Health gives advice on Johne's in Farmer's Weekly](#)
- [Action Johnes](#)
- [Scottish Agricultural College](#)
- [My Healthy Herd](#)

United States

- [Johne's Information Center \(University of Wisconsin-Madison\)](#)
- [Human Paratuberculosis Foundation, Inc](#)
- [USDA Animal and Plant Inspection Service](#)
- [U.S. Voluntary Bovine Johne's Disease Control Program.](#)
- [The Mycobacterial Diseases of Animals \(MDA\) multi-state initiative \(U.S.A.\)](#)
- [Johne's on the Cattle Site](#)
- [Overview of Paratuberculosis By Michael T. Collins from Merck Manual](#)
- [Center for Food safety and Public Health \(Iowa State\)](#)
- [Hato Sano \(Colorado State\)](#)
- [The Cattle Site \(Some interesting videos on Johne's\)](#)

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Recent publications to March 2021

Most of these articles were published between November 2020 and March 2021. A few articles had not been included in previous newsletters and are included here even though some were published in 2018 and 2019.

Ali Zeinab I., Hanafy Mostafa, Hansen Chungyi, Saudi Adel M., Talaat Adel M. (2021)
[Genotypic analysis of nontuberculous mycobacteria isolated from raw milk and human cases in Wisconsin](#)

Journal of Dairy Science Volume 104, Issue 1, January 2021, Pages 211-220
<https://doi.org/10.3168/jds.2020-18214>

AlQasrawi D, Naser SA. (2020)
[Nicotine Modulates MyD88-Dependent Signaling Pathway in Macrophages during Mycobacterial Infection.](#)
Microorganisms. 2020 Nov 17; 8(11):1804. doi: 10.3390/microorganisms8111804. PMID: 33212859

Ariel O, Brouard JS, Marete A, Miglior F, Ibeagha-Awemu E, Bissonnette N. (2021)
[Genome-wide association analysis identified both RNA-seq and DNA variants associated to paratuberculosis in Canadian Holstein cattle 'in vitro' experimentally infected macrophages.](#)
BMC Genomics. 2021 Mar 7; 22(1):162. doi: 10.1186/s12864-021-07487-4. PMID: 33678157

Arrieta-Villegas C, Infantes-Lorenzo JA, Bezos J, Grasa M, Vidal E, Mercader I, Singh M, Domingo M, de Juan L, Pérez de Val B. (2020)
[Evaluation of P22 Antigenic Complex for the Immuno-Diagnosis of Tuberculosis in BCG Vaccinated and Unvaccinated Goats.](#)
Front Vet Sci. 2020 Jul 3; 7:374. doi: 10.3389/fvets.2020.00374. eCollection 2020. PMID: 32714950

Bannantine JP, Stabel JR, Bayles DO, Conde C, Biet F. (2021)
[Diagnostic Sequences That Distinguish *M. avium* Subspecies Strains.](#)
Front Vet Sci. 2021 Jan 28; 7:620094. doi: 10.3389/fvets.2020.620094. eCollection 2020. PMID: 33585607

Barden M, Smith RF, Higgins HM. (2020)
[The interpretation of serial Johne's disease milk antibody results is affected by test characteristics, pattern of test results and parallel bovine tuberculosis testing.](#)
Prev Vet Med. 2020 Oct; 183:105134. doi: 10.1016/j.prevetmed.2020.105134. Epub 2020 Aug 30. PMID: 32912605

Bassis S, Fischer S, Köhler H, Reinhold P. (2020)
[Acid-base variables in acute and chronic form of nontuberculous mycobacterial infection in growing goats experimentally inoculated with *Mycobacterium avium* subsp. *hominissuis* or *Mycobacterium avium* subsp. *paratuberculosis*.](#)
PLoS One. 2020 Dec 14; 15(12):e0243892. doi: 10.1371/journal.pone.0243892. eCollection 2020. PMID: 33315933

Bates A, Laven R, O'Brien R, Liggett S, Griffin F. (2020)
[Estimation of the sensitivity and specificity of four serum ELISA and one fecal PCR for diagnosis of paratuberculosis in adult dairy cattle in New Zealand using Bayesian latent class analysis.](#)
Prev Vet Med. 2020 Dec; 185:105199. doi: 10.1016/j.prevetmed.2020.105199. Epub 2020 Nov 10. PMID: 33229064

- Beinhauerova M, Slana I. (2021)
[Phage Amplification Assay for Detection of Mycobacterial Infection: A Review.](#)
Microorganisms. 2021 Jan 23; 9(2):237. doi: 10.3390/microorganisms9020237. PMID: 33498792
- Biemans F., Ben Romdhane R., Gontier P., Fourichon C., Ramsbottom G., More S.J., Ezanno P. (2021)
[Modelling transmission and control of *Mycobacterium avium* subspecies *paratuberculosis* within Irish dairy herds with compact spring calving](#)
Preventive Veterinary Medicine Volume 186, January 2021, 105228
<https://doi.org/10.1016/j.prevetmed.2020.105228>
- Burden Paul, Hall David C. (2021)
[Variations in the profitability of dairy farms in Victoria, Australia by different levels of engagement in bovine Johne's disease control](#)
Preventive Veterinary Medicine Volume 186, January 2021, 105210
<https://doi.org/10.1016/j.prevetmed.2020.105210>
- Byrne AS, Goudreau A, Bissonnette N, Shamputa IC, Tahlan K. (2020)
[Methods for Detecting Mycobacterial Mixed Strain Infections-A Systematic Review.](#)
Front Genet. 2020 Dec 21; 11:600692. doi: 10.3389/fgene.2020.600692. eCollection 2020. PMID: 33408740
- Caldeira Jéssica Lobo Albuquerque, Faria Ana Carolina Silva, Diaz-Miranda Edgar Andres, Zilch Tiago Jaquel, Caliman Sanely Lourenço da Costa, Okano Denise Silva, Guimarães José Domingues, Pena Junnia Luisa, Barbosa Wagner Faria, Junior Abelardo Silva, Chang Yung-Fu, Moreira Maria Aparecida Scatamburlo (2020)
[Interaction of *Mycobacterium avium* subsp. *paratuberculosis* with bovine sperm](#)
Theriogenology. 2021 Feb; 161:228-236. doi: 10.1016/j.theriogenology.2020.12.007. Epub 2020 Dec 9.
- Canive M, Casais R, Jimenez JA, Blanco-Vazquez C, Amado J, Garrido JM, Juste RA, Alonso-Hearn M. (2020)
[Correlations between single nucleotide polymorphisms in bovine CD209, SLC11A1, SP110 and TLR2 genes and estimated breeding values for several traits in Spanish Holstein cattle.](#)
Heliyon. 2020 Jun 30; 6(6):e04254. doi: 10.1016/j.heliyon.2020.e04254. eCollection 2020 Jun. PMID: 32642571
- Canive M, Fernandez-Jimenez N, Casais R, Vázquez P, Lavín JL, Bilbao JR, Blanco-Vázquez C, Garrido JM, Juste RA, Alonso-Hearn M. (2021)
[Identification of loci associated with susceptibility to bovine paratuberculosis and with the dysregulation of the MECOM, eEF1A2, and U1 spliceosomal RNA expression.](#)
Sci Rep. 2021 Jan 11; 11(1):313. doi: 10.1038/s41598-020-79619-x. PMID: 33432064
- Ceres KM, Schukken YH, Gröhn YT. (2020)
[Characterizing infectious disease progression through discrete states using hidden Markov models.](#)
PLoS One. 2020 Nov 20; 15(11):e0242683. doi: 10.1371/journal.pone.0242683. eCollection 2020. PMID: 33216809
- Collyer R, Clancy A, Agrawal G, Borody TJ. (2020)
[Crohn's strictures open with anti-mycobacterial antibiotic therapy: A retrospective review.](#)
World J Gastrointest Endosc. 2020 Dec 16;12(12):542-554. doi: 10.4253/wjge.v12.i12.542. PMID: 33362907

Cossu D, Yokoyama K, Sakanishi T, Kuwahara-Arai K, Momotani E, Hattori N. (2021) [A mucosal immune response induced by oral administration of heat-killed *Mycobacterium avium* subsp. *paratuberculosis* exacerbates EAE.](#) J Neuroimmunol. 2021 Mar 15; 352:577477. doi: 10.1016/j.jneuroim.2021.577477. Epub 2021 Jan 8. PMID: 33454553

Čurlík J, Lazár P, Iglódyová A, Barbušinová E, Šmiga L, Novotný J, Mojžišová J, Ondrejková A, Hromada R, Konjević D, Bhide M R, Drážovská M (2020) [Detection of *Mycobacterium avium* subsp. *paratuberculosis* in Slovakian wildlife](#) Pol J Vet Sci. 2020 Dec; 23(4):529-535. doi: 10.24425/pjvs.2020.134702.

Dassanayake RP, Wherry TLT, Falkenberg SM, Reinhardt TA, Casas E, Stabel JR. (2021) [Bovine NK-lysin-derived peptides have bactericidal effects against *Mycobacterium avium* subspecies *paratuberculosis*.](#) Vet Res. 2021 Jan 21; 52(1):11. doi: 10.1186/s13567-021-00893-2. PMID: 33478585

de Albuquerque P.P.F., Cezar R.D.S., Pinheiro Junior J.W., Nascimento G. Grazielle, Santos A.S., Mota R.A. (2019) [Occurrence of *Mycobacterium avium* subsp. *paratuberculosis* in coalho cheese in the State of Pernambuco, Brazil.](#) Arq. Bras. Med. Vet. Zootec. vol.71 no.6 Belo Horizonte Nov./Dec. 2019 Epub Dec 13, 2019 <https://doi.org/10.1590/1678-4162-10754>

de Albuquerque Pedro Paulo Feitosa, Brito Marilene de Farias, Samico- Fernandes Erika Fernanda Torres, Pinheiro Junior José Wilton, Mota Rinaldo Aparecido. (2020) [OCCURRENCE OF VIABLE MYCOBACTERIUM AVIUM SUBSP. PARATUBERCULOSIS IN BUFFALO COALHO CHEESE FROM ALAGOAS, BRAZIL](#)

A Pesquisa nos Diferentes Campos da Medicina Veterinária 3 pp 50-59;
doi:10.22533/at.ed.5462007127

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de Silva K. (2021) [Developing smarter vaccines for paratuberculosis: From early biomarkers to vaccine design.](#) Immunol Rev. 2021 Feb 23. doi: 10.1111/imr.12961. Online ahead of print. PMID: 33619731

de Souza Mariana Assunção, Soares Nicolle Pereira, Medeiros-Ronchi Alessandra Aparecida, Silva Brendhal Almeida, de Albuquerque Pedro Paulo Feitosa, Mota Rinaldo Aparecido, Lima Anna Monteiro Correia. (2020) [Intercurrence of Paratuberculosis in Intradermal Tuberculin Test Reactive Cattle](#) Acta Scientiae Veterinariae, 2020. 48: 1767. DOI: 10.22456/1679-9216.105931

Dow Coad Thomas, Chan Edward D. (2021)

[What is the evidence that mycobacteria are associated with the pathogenesis of Sjogren's syndrome?](#)

Journal of Translational Autoimmunity Volume 4, 2021, 100085

<https://doi.org/10.1016/j.jtauto.2021.100085>

Elsohaby I, Fayed M, Alkafafy M, Refaat M, Al-Marri T, Alaql FA, Al Amer AS, Abdallah A, Elmoslemany A. (2021)

[Serological and Molecular Characterization of *Mycobacterium avium* Subsp. *paratuberculosis* \(MAP\) from Sheep, Goats, Cattle and Camels in the Eastern Province, Saudi Arabia.](#)

Animals (Basel). 2021 Jan 28; 11(2):323. doi: 10.3390/ani11020323. PMID: 33525431

Facciolo A, Lee AH, Trimble MJ, Rawlyk N, Townsend HGG, Bains M, Arsic N, Mutharia LM, Potter A, Gerdts V, Napper S, Hancock REW, Griebel PJ. (2020)

[A Bovine Enteric *Mycobacterium* Infection Model to Analyze Parenteral Vaccine-Induced Mucosal Immunity and Accelerate Vaccine Discovery.](#)

Front Immunol. 2020 Nov 23; 11:586659. doi: 10.3389/fimmu.2020.586659. eCollection 2020. PMID: 33329565

Fawzy A, Zschöck M, Ewers C, Eisenberg T (2020)

[Development of a hierarchical typing approach for *Mycobacterium avium* subsp. *paratuberculosis* \(MAP\) and characterization of MAP field cultures from Central Germany.](#)

J Appl Microbiol. 2020 Nov; 129(5):1193-1206. doi: 10.1111/jam.14722. Epub 2020 Jun 14.

Fichtelova V, Kralova A, Fleischer P, Babak V, Kovarcik K (2021)

[Detection of *Mycobacterium avium* subspecies *paratuberculosis* in environmental samples from infected Czech dairy herds.](#)

Vet Med-Czech 66, 1–7.

Foddai, Antonio C.G., Watson Gary, McAlloon Conor G., Grant Irene R. (2021)

[Phagomagnetic separation-quantitative PCR: A rapid, sensitive and specific surveillance tool for viable *Mycobacterium avium* ssp. *paratuberculosis* in bulk tank and individual cow milk](#)

Journal of Dairy Science Available online 2 March 2021 <https://doi.org/10.3168/jds.2020-19626>

Grant Irene R. (2021)

[Bacteriophage-based methods for detection of viable *Mycobacterium avium* subsp. *paratuberculosis* and their potential for diagnosis of Johne's disease](#)

Front. Vet. Sci. | doi: 10.3389/fvets.2021.632498

Gupta SK, Parlane NA, Luo D, Rehm BHA, Heiser A, Buddle BM, Wedlock DN. (2020)

[Self-assembled particulate vaccine elicits strong immune responses and reduces *Mycobacterium avium* subsp. *paratuberculosis* infection in mice.](#)

Sci Rep. 2020 Dec 18; 10(1):22289. doi: 10.1038/s41598-020-79407-7. PMID: 33339863

Hatake K, Rice JH, Parker K, Wu JJ, Turner A, Stabel JR and Eda S (2021)

[Electrochemical Detection of Serum Antibodies Against *Mycobacterium avium* Subspecies *paratuberculosis*.](#)

Front. Vet. Sci. 8:642833. doi: 10.3389/fvets.2021.642833

Husakova M, Kralik P, Babak V, Slana I. (2020)
[Efficiency of DNA Isolation Methods Based on Silica Columns and Magnetic Separation Tested for the Detection of *Mycobacterium avium* Subsp. *Paratuberculosis* in Milk and Faeces.](#)
Materials (Basel). 2020 Nov 12; 13(22):5112. doi: 10.3390/ma13225112.

Imada Jamie, Kelton David F. and Barkema Herman W. (2020)
[Epidemiology, Global Prevalence and Economics of Infection](#)
in "Paratuberculosis: Organism, Disease, Control, 2nd Edition (eds M.A. Behr et al.) CAB International 2020.

Jain Mukta,Singh Amit Kumar, Singh Manju, Gupta Saurabh, Kumar Amit, Aseri G.K., Polavarapu Rathnagiri, Sharma Deepansh, Sohal Jagdip Singh. (2020)
[Comparative evaluation of *Mycobacterium avium* subspecies *paratuberculosis* \(MAP\) recombinant secretory proteins as DTH marker for paratuberculosis](#)
Journal of Microbiological Methods Volume 175, August 2020, 105987
<https://doi.org/10.1016/j.mimet.2020.105987>

Juste RA, Geijo MV, Elguezabal N, Sevilla IA, Alonso-Hearn M, Garrido JM. (2021)
[Paratuberculosis vaccination specific and non-specific effects on cattle lifespan.](#)
Vaccine. 2021 Mar 12; 39(11):1631-1641. doi: 10.1016/j.vaccine.2021.01.058. Epub 2021 Feb 15.
PMID: 33597115

Karuppusamy S, Mutharia L, Kelton D, Plattner B, Mallikarjunappa S, Karrow N, Kirby G. (2021)
[Detection of *Mycobacterium avium* Subspecies *paratuberculosis* \(MAP\) Microorganisms Using Antigenic MAP Cell Envelope Proteins.](#)
Front Vet Sci. 2021 Feb 3; 8:615029. doi: 10.3389/fvets.2021.615029. eCollection 2021. PMID: 33614761

Keewan E, Naser SA. (2020)
[MiR-146a rs2910164 G > C polymorphism modulates Notch-1/IL-6 signaling during infection: a possible risk factor for Crohn's disease.](#)
Gut Pathog. 2020 Oct 15; 12:48. doi: 10.1186/s13099-020-00387-0. eCollection 2020. PMID: 33072191

Klopfstein M, Leyer A, Berchtold B, Torgerson PR, Meylan M. (2021)
[Limitations in the implementation of control measures for bovine paratuberculosis in infected Swiss dairy and beef herds.](#)
PLoS One. 2021 Feb 2; 16(2):e0245836. doi: 10.1371/journal.pone.0245836. eCollection 2021. PMID: 33529202

Kuenstner J Todd, Potula Raghava, Bull Tim J, Grant Irene R, Foddai Antonio, Naser Saleh A, Bach Horacio, Zhang Peilin, Yu Daohai, Lu Xiaoning, Shafran Ira (2020)
[Presence of Infection by *Mycobacterium avium* subsp. *paratuberculosis* in the Blood of Patients with Crohn's Disease and Control Subjects Shown by Multiple Laboratory Culture and Antibody Methods](#)
Microorganisms. 2020 Dec 21; 8(12):2054. doi: 10.3390/microorganisms8122054.

Ladero-Auñon I, Molina E, Holder A, Kolakowski J, Harris H, Urkitza A, Anguita J, Werling D, Elguezabal N (2021)
[Bovine neutrophils release extracellular traps and cooperate with macrophages in *Mycobacterium avium* subsp. *paratuberculosis* clearance](#)
bioRxiv preprint doi: <https://doi.org/10.1101/2020.12.30.424791>

Leão Célia, Oliveira Ana J., Cruz Catarina, Amaro Ana, Pinto Carlos, Inácio João, Botelho Ana. (2021) [Evidences of *Mycobacterium avium* subsp. *paratuberculosis* infection in ruminants from an intensive dairy production region](#)

Revista Portuguesa de Ciências Veterinárias (2021) 116 (617)

Links Ian J., Denholm Laurence J., Evers Marilyn, Kingham Lloyd J., Greenstein Robert J. (2021) [Is Vaccination a Viable Method to Control Johne's Disease Caused by *Mycobacterium avium* subsp. *paratuberculosis*? Data from 12 Million Ovine Vaccinations and 7.6 Million Carcass Examinations in New South Wales, Australia from 1999-2009](#)

bioRxiv preprint doi: <https://doi.org/10.1101/2021.01.20.427421>

Ly A, Sergeant ESG, Plain KM, Marsh I, Dhand NK. (2021)

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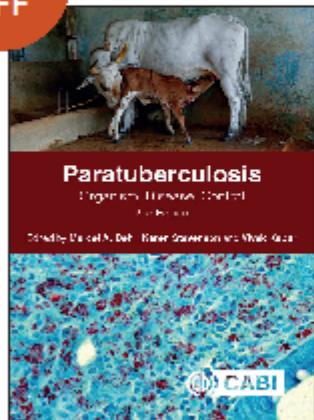
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Contents

- | | |
|---|---|
| 1: Epidemiology, Global Prevalence and Economics of Infection | 12: Paratuberculosis in Sheep |
| 2: <i>Mycobacterium avium</i> subsp. <i>paratuberculosis</i> in Animal-derived Foods and the Environment | 13: Paratuberculosis in Goats |
| 3: Paratuberculosis and Crohn's Disease | 14: Paratuberculosis in Deer, Camelids and Other Ruminants |
| 4: Genetics of Host Susceptibility to Paratuberculosis | 15: Infection of Non-ruminant Wildlife by <i>Mycobacterium avium</i> subsp. <i>paratuberculosis</i> |
| 5: <i>Mycobacterium avium</i> Complex | 16: Experimental Animal Models of Paratuberculosis |
| 6: Comparative Genomics and Genomic Epidemiology of <i>Mycobacterium avium</i> subsp. <i>Paratuberculosis</i> Strains | 17: Immunology of Paratuberculosis Infection and Disease |
| 7: Molecular Genetics of <i>Mycobacterium avium</i> subsp. <i>paratuberculosis</i> | 18: Cultivation of <i>Mycobacterium avium</i> subsp. <i>paratuberculosis</i> |
| 8: Proteome and Antigens of <i>Mycobacterium avium</i> subsp. <i>paratuberculosis</i> | 19: Diagnosis of Paratuberculosis by PCR |
| 9: Host–Pathogen Interactions and Intracellular Survival of <i>Mycobacterium avium</i> subsp. <i>paratuberculosis</i> | 20: Immune-based Diagnosis of Paratuberculosis |
| 10: Drug Susceptibility Testing & Antimicrobial Resistance in <i>Mycobacterium avium</i> subsp. <i>Paratuberculosis</i> | 21: Paratuberculosis Control Measures |
| 11: Paratuberculosis in Cattle | 22: Paratuberculosis Vaccines and Vaccination |
| | 23: Development of New Paratuberculosis Vaccines |

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