The Paratuberculosis Newsletter

March 2008

An official publication of the
International Association for Paratuberculosis

Table of Contents

Notes from the Editor

This is the first newsletter with me as the editor and I hope you will all find it interesting. I have received several contributions, but I hope that more be sent for the upcoming issues. In the March issue you will find information from the association, information regarding recent and upcoming events, and interesting short scientific reports from Florida, USA. From the Czech Republic, I received summary statistics on publications regarding paratuberculosis. It appears that we publish a lot of information, so hopefully we will also be able to use all this information. The publication statistics provide a good example of a non-traditional sort of information. Please provide more, which may not fit into regular journals. I would guess that there is a lot of information out there that is not being published.
I would like to thank all authors for their contributions, and kindly remind you of the deadline for the next issue, which is: May 15, 2008.

Søren Saxmose Nielsen
Editor

DEADLINE FOR NEXT ISSUE: MAY 15, 2008.

A reminder will be sent in April.
If your contribution is > 250 words, please ask for guidelines on how to format the contribution prior to submission
All contributions should be sent to ssn@life.ku.dk
If you not received a receipt within a few days, please re-send!

1. IAP Business

Message from the President

I feel deeply honored to have been elected President of the International Association for Paratuberculosis. I want to thank those that have deposited their trust in me and hope that I can make myself worth of this trust. My predecessors have set very high standards. The work done by the first President, Rod Chiodini, was exceptional since it was him who almost single-handedly designed, wrote and registered the Laws and By-Laws of the IAP. He took the role of lawyer, financial advisor and scientific leader simultaneously to create the Association. The second President, Mike Collins, has been the reference for the IAP during the past 13 years travelling all around the world and keeping together our small scientific community during all those years. In this sense, his establishment of the IAP awards that bring together both ends of the IAP membership: the joining of the younger and the bond keeping of the older through Helping Hand and Emeritus awards will be a unique historical institution.

It seems as if my election comes as the final step in a renewal of the IAP Governing Board by which the officer positions have been transferred from Claus Buergelt, David Kennedy, Geoffrey deLisle and Elizabeth Manning to Ray Sweeney, Ivo Pavlik and Søren Nielsen. I want to thank all of them for having made it possible that we have arrived to here we stand now after 19 years of existence as an association. In these years, 7 Colloquia in four continents have advanced the knowledge in our field. Now we have a firm compromise for the next two colloquia in USA and Australia and an ongoing negotiation for holding the twelfth one in one of two alternative places in Europe. It was not so long ago when there was only one option for the next colloquium, and this must be interpreted as an increasing strength of IAP and a greater involvement of its members.

This year will be the 25th anniversary of the first Colloquium held in Ames, Iowa and I think it is important to point out that it was the first scientific meeting on paratuberculosis. That set the first milestone in the scientific history of this infection, 88 years after its first fully recorded report. At least two of the key figures that participated in that meeting have passed away (Richard S. Merkal and Jørgen B. Jørgensen) and several others have retired (Finn Saxegaard and Marie Françoise Thorel having being the first to receive the IAP Emeritus Awards). I think it is important to mention this, since one aspect where the IAP has a crucial role to play is in preserving the historic memory of the people that have contributed to the development of the field from a more personal perspective than their scientific contribution.

The technical aspects of the study of paratuberculosis have changed substantially during these years. At the Ames meeting there was not a single paper on molecular genetics, whilst nowadays the study of paratuberculosis is not understood without PCR, isolate typing, genetic susceptibility, or gene expression. I hope that we will continue keeping pace with the last scientific developments and thus bring light to a infection which I think has been historically neglected, but that might break the way to a new paradigm of human infectious diseases: the slow infections. Even though this model was proposed about 50 years ago by Bjorn Sigurdsson using paratuberculosis as one of the reference infections, it has not experienced a lot of progress in all these years. The understanding that eradication of the bacterial agent is not at reach with the current tools is a first step towards the assumption of this concept where infection is not equivalent to disease, and co-factors are even more important than the biological agent. Proof of this is that the fight against paratuberculosis objectives have shifted from the once widely accepted of eradication towards risk management and quality assurance. New ideas or re-assessed old ones like vaccination are needed to decrease the burden of paratuberculosis on the livestock industry and to decrease the epidemiological risks of widespread and unchecked contamination.

The organizative aspects of paratuberculosis research have also changed and adapted to the new style of large partnerships required by the complexity that a broader availability of technical means and perspectives have brought to science. Current research both in the USA and in Europe relies to a greater extent in a single large consortium which favors a

more goal-oriented research effort where the experts in the field propose and execute a research agenda. This favors deeper and more coordinated efforts, and I want to thank the leaders of JDIP, Vivek Kapur, and ParaTBTools, Douwe Bakker, for their commitment and offer them the full support of the IAP as an even larger though more relaxed coordinating entity.

Back in Tsukuba, I pointed out that one of the weaknesses of the IAP was the lack of colleagues from two of the larger countries in the World: Russia and China. Here, I want to ask those that might have connections with researchers from these countries to encourage their scientists to join the IAP.

Finally, I want to thank Eiichi Momotani and his team for a most enjoyable Colloquium in Japan where we have learnt both the differences and the similarities between the Western and Eastern lifestyles. Søren Nielsen and Alan Kennedy deserve also a congratulation for the feat they have accomplished by having prepared the Proceedings of the 9th ICP in half the time of any previous colloquia. Their effort and proficiency with last computing technologies have made it possible. The Proceedings will soon be publicly available once last minute technical arrangements are completed.

Ramon Juste
President

International Association for Paratuberculosis

Financial Report-- FY 2007 (1/1/07-12/31/07)

Treasury Account Balances

	Checking	Money Market	CD 5.05%	**Total**
Open Balance 1/1/07	$ 6,644.96	$55,567.58 **$** 4,120.11 (Buergelt account)	$50,000.00	**$116,332.65**
Close Balance 12/31/07	$10,705.70	$35,772.26	$52,599.91	**$ 99,077.87**

Receipts:

Dues	$10,750.00
Book Sales	$ 350.00
Interest	$ 3,442.32
Total Receipts:	$14,542.32

Expenditures:

Helping Hands/Merkal 9ICP registration	$ 5,152.73
Merkal Travel	$ 3,898.67
Helping Hands Grants	$10,000.00
9ICP miscellaneous expenses	$ 3,812.08
Website maintenance	$ 7,400.00
OJS subscription	$ 795.00
Credit card processing fees:	$ 738.62
Total Expenditures:	$31,797.10

--Revised 1/31/08 Raymond W. Sweeney, VMD; Secretary-Treasurer

Message from the Secretary/Treasurer

Members are reminded that the membership list can be viewed at our public website, www.paratuberculosis.org. However, your name will only appear if you chose to make your information public. You can edit your personal webpage, and select to make it public, by logging on to http://members.paratuberculosis.org

If you have forgotten your login information, you can retrieve it by first going to http://members.paratuberculosis.org/forgot

Also, members are reminded that your 2008 membership payment is due before April 1, 2008. You can also view your dues status at the http://members.paratuberculosis.org site.

Raymond W. Sweeney
Secretary/Treasurer

IAP Membership by Country

(list includes members who paid in 2007 but not yet paid for 2008)

Argentina	1
Australia	28
Austria	2
Belgium	2
Brazil	1
Canada	12
Czech Rep.	2
Denmark	8
France	2
Germany	5
Greece	2
Hungary	1
India	10
Iran	1
Ireland	6
Israel	2
Italy	5
Japan	7
Mexico	1
Netherlands	12
New Zealand	6
Nigeria	1
Norway	3
Portugal	1
Saudi Arabia	1
Spain	10
Sweden	4
Switzerland	1
Thailand	2
UK	12
USA	54
Total	**205**

2. Reports from Recent Events

TAFS/FAO/OIE Workshop on Paratuberculosis – Switzerland, November 2008

John Donaghy

Agri-Food & Biosciences Institute (AFBI), Belfast, N. Ireland.

A 2 ½ day workshop on bovine Paratuberculosis (pTB) / Johne's disease (JD) and its etiological agent (*Mycobacterium avium paratuberculosis* – Map) was held from November 26th – 28th in Switzerland. This meeting was organised by the Swiss foundation TAFS (Transmissible Animal Diseases and Food Safety, www.tafsforum.org, in collaboration with FAO (www.fao.org) and World Organisation for Animal Health (OIE) (www.oie.int). Many countries within Europe along with US, Canada, S. Africa, Brazil, Japan and China were represented through academia, public bodies, research institutes and industry.

The aim of this meeting was to bring together experts and stakeholders of the animal disease and farm level, as well as beef and dairy supply chain and to pursue the following objectives:

- To present facts about JD as an animal health issue in order to increase the awareness on the current knowledge about the disease, particularly diagnostic tools, epidemiology and risk management in animal populations;
- To determine the gaps along the food chain from a risk management perspective (both by public and private sectors) on possible food safety risks related to JD;
- To discuss the needs to prevent and control paratuberculosis in animals and to continue research in this field.

Updates were presented on 'The disease and its control strategies' (M. Collins & J. Lombard); 'A view from industry' (T. Jackson); OIE: Policy and recommendations on a global level (G. Bruckner); Map contamination, its detection and removal from animal products (I. Grant) and 'Analysis for detection and enumeration of Map in the dairy supply chain (J. Marugg & J. Rademaker).

Multidisciplinary breakout groups explored Map pathways of transmission within dairy and beef farms. Knowledge gaps and research needs associated with Map ecology on the farm and in the farm environment were identified. The breakout sessions exploring Map contamination at animal product level identified knowledge gaps at dairy and meat product level relating to levels of contamination, modes of transmission and effect of product processing on Map survival.

Overall, this was a very constructive meeting, well organized through TAFS and held in the beautiful surroundings of Unterageri. A more comprehensive report on the meeting is available at http://www.tafsforum.org/reports.html

Indian Seminar and Workshop on Johne's Disease

B. N. Tripathi

A two days National Seminar and Workshop on Johne's Disease was organized at the Division of Pathology, Indian Veterinary Research Institute, Izatnagar by Indian Association of Veterinary Pathologists, IVRI Chapter, and the Society for Immunology and Immunopathology during 8-9 Aug, 2007. Dr. B. N. Tripathi, Senior Scientist, and the organizing secretary of the Seminar presented a brief history and a critical appraisal of paratuberculosis work in India, which was followed by a series of lectures from eminent scientists.

The seminar attracted over 75 scientists, teachers and field veterinarians from various laboratories in India engaged in paratuberculosis and allied diseases research and diagnosis from medical and veterinary fields. There were four technical sessions on Pathogenesis and Immunology, Epidemiology, Molecular biology and Diagnosis, and a wet workshop on ELISA and PCR were conducted for the participants. There were a number of learned invited speakers from veterinary and medical fields, who presented their thought provoking lectures on Johne's diseae and allied diseases. It was realized that paratuberculosis is widely prevalent amongst cattle sheep and goats especially at organized farms in India.

The following recommendations were made during the plenary session, which were sent to the Indian Council of Agricultural Research, New Delhi for consideration:

(a) Pathogenesis: Host-pathogen interaction at molecular level studying the gaps in knowledge and research for improving understanding.
(b) Serological and molecular epidemiology of the disease in livestock as well as wild animals.
(c) Diagnosis: Evolving methods for early diagnosis with precision employing improved serological methods/reagents (specific antigens of MAP) and nucleic-acid based diagnostic techniques for sero-surveillance and laboratory confirmation.
(d) Development of vaccines (killed and new generation vaccines) as per OIE guidelines
(e) Develop a National Repository for MAP isolates.

3. Short scientific reports

Comparative Analysis of Different Map ELISA Tests

Elliot Williams, Gilles R.G. Monif, Claus D. Buergelt

Two USDA approved ELISA tests (Parachek® and IDEXX ®) have been used as a voluntary, herd management tool in making decisions as to which animals infected with *Mycobacterium avium* subspecies *paratuberculosis* (Map) needed to be removed from the herd.

Sixty-six serum samples obtained from an Infectious Disease Incorporated (IDI) affiliated dairy were initially tested by the Paracheck® ELISA test at the University of Florida State Diagnostic Laboratory at Live Oak. The sera were then forwarded to the University of Florida College of Veterinary Medicine Map Diagnostic Laboratory (UFCVM) where they were retested using the IDEXX® ELISA test and an in-house ELISA test. Seven cows were identified as being positive by all three tests: 6 by the Parachek® test, 6 by the IDEXX® test and 7 by the UFCVM test. The Parachek® and IDEXX® tests each failed to identify positive samples identified by the other.

The UFCVM ELISA test identified 11 additional dairy cows as being infected with Map. Both commercial ELISA tests identified only 6 of the strongly positive UFCVM test results. The UFCVM ELISA test is based, not on Map, but on *M. avium* 18. The failure of the Parachek® and IDEXX® tests to produce comparable results for these sera may be to their respective threshold for positivity being set too high (Table 1) and/or the need to more adequately address the genomic polymorphism between Map and *M. avium*.

Table 1. Correlation between UFCVM OD readings and positive Parachek® and IDEXX® ELISA tests

UFCVM OD	ParaChek® positive /total	IDEXX® positive /total
2.00-2.50 (positive)	0 / 4	0 / 4
2.51-3.50 (strong positive)	2 / 6	1 / 6
>3.51	4 / 8	5 / 8

Comparative Map ELISA Tests Done on Cows With Necropsy Documented Johne's Disease

Elliot Williams, Gilles R. G. Monif

The ParaChek®(R) Map ELISA test is used by the State of Florida Diagnostic Laboratory at Live Oak to identify the presence of antibodies to Mycobacterium avium subspecies paratuberculosis (Map). Due to repeated disparities observed between the ParaChek® Map test and a Map ELISA based upon Mycobacterium avium used by the University of Florida College of Veterinary Medicine (UFCVM), nine sera from cows with necropsy confirmed Johne's disease were tested at the respective institutions.The same serum specimens were tested at both institutions. The ParaChek® ELISA test identified one of the nine cows as being positive and one as suspicious (Table 1). The UFCMV ELISA Map test identified 6 out of the 9 cows with Johne's disease as being positive.

On the basis of restriction fragment length polymorphism analysis, some Map strains have been shown to be more M. avium-like than Map. The ability of a M. avium-based Map ELISA test to exceed the diagnostic accuracy of a commercially certified ELISA test is, more likely than not, primarily due to the ParaChek's threshold for positivity being set too high; however, the possibility that a component of test disparity is due to genomic polymorphism can not be dismissed.

Table 1. Comparison of ParaChek® and University of Florida's (UF) Map ELISA test results in cows with necropsy documented Johne's Disease

Cow#	ParaChek Score	ParaChek Interpretation	UF Map ELISA	UF Interpretation
4371	0.00	Negative	1.42	Negative
3594	0.00	Negative	0.49	Negative
2894	0.00	Negative	0.82	Negative
3302	0.00	Negative	2.13	Positive
3036	0.06	Negative	2.00	Positive
3306	0.00	Negative	2.00	Positive
3147	0.34	Negative	2.81	Strong positive
0205	0.87	Inconclusive	2.53	Strong positive
4496	5.44	Strong positive	2.50	Positive

Impact of Immunonutritional Dietary Additives on AGID Positive Cows with Johne's Disease

Elliot Williams, Gilles R. G. Monif

The demography of bovine infection due to *Mycobacterium avium* subspecies *paratuberculosis* (Map) is poorly delineated. Mycobacterial infection in humans and animals does not invariably result in disease. Post-infection recovery is mediated by host immunity which, when compromised, results in renewal of organism replication.

Two pregnant cows with Map positive agar gel immunodiffusion (AGID) tests and overt clinical Johne's disease were purchased and had ITN incorporated into their feed. ITN (Immunotherapeutic nutrition) is an oral formulation design to synergistically enhance the immune system. Map was cultured from fecal samples from both cows. Fecal samples were periodically collected and tested by both direct and nested Map polymerase chain reaction tests (FecaMap ®, Infectious Diseases Incorporated, Bellevue Nebraska).

Cow #1 had an initial body score of 2 and had significant diarrhea. On ITN supplementation of feed, her diarrhea general subsided. She was on ITN 51 days when she gave birth to a stillborn male and a live female calf that died shortly after birth. Postpartum, cow #1 again developed significant diarrhea. She rapidly deteriorated necessitating her being put down 29 days later. Four of the 11 direct fecal PCR tests done prior to parturition had been negative. All of the direct PCR tests done after parturition were positive.

Cow #2 (YL710) had an initial body score of 3.2 and moderate diarrhea. Over 69 days of ITN supplementation of her feed, her ELISA optical density readings diminished from an initial value of 2.39 (positive) to 1.24 (negative) just before the birth of a healthy appearing female calf on October 19, 2007. Postpartum, her ELISA immediately titer rose to 3.5 (high positive) and significant diarrhea again developed (Table 1).

The diarrhea responded with three weeks. Cow #2 was continued on ITN therapy for an additional 207 days. Of the last 11 direct fecal Map PCR tests, 9 of the direct and 4 of the nested were negative (Table 1). In the month prior to necropsy, none of the direct PCR test were positive as were the last three nested PCR tests. The decision to bring her to necropsy was predicated by cost consideration which were exacerbated by the scarcity of quality feed due to drought condition in Florida. At necropsy, the tissues reveal multi-bacillus status with the gastrointestinal tract with eosinophilia being present.

Given the severity of established disease, ITN supplementation did not reverse the established disease process in place; however, its ability to repeatedly arrest the diarrhea syndrome associated with the terminal stage of Johne's disease, to prolong the life of Cow #2, and to apparently reduce fecal shedding after prolonged ITN administration poses the question: what if ITN supplementation had been given to early infected, non B-cell stimulated and/or subclinical B-cell stimulated Map infected cows. Could enhancement of cell-mediated

immunity effect containment (accepted equivalent of cure for mycobacteria) and/or retard the progression of infection to disease?

Table 1 Tabulation of direct Map PCR, nested Map PCR of cow #2, YL710

Date	Fecal PCR			AGID	Calf birth
	IS1-IS2	IS3-IS4	ELISA		
6 Aug 2006	neg	neg	NA	pos	
15 Aug 2006	pos	pos	2.39	neg	
18 Aug 2006	pos	pos	1.59	pos	
22 Aug 2006	pos	pos	1.53	pos	
31 Aug 2006	pos	pos	1.62	pos	
7 Sep 2006	neg	pos	1.03	pos	
14 Sep 2006	neg	pos	0.57	pos	
21 Sep 2006	pos	pos	1.71	pos	
28 Sep 2006	neg	neg	1.06	pos	
5 Oct 2006	pos	pos	1.2	pos	
12 Oct 2006	neg	neg	1.24	pos	
19 Oct 2006	pos	pos	3.5	pos	birth
26 Oct 2006	pos	pos	3.32	pos	
2 Nov 2006	pos	pos	2.9	pos	
9 Nov 2006	neg	neg	2.3	pos	
16 Nov 2006	pos	pos	2.31	pos	
22 Nov 2006	pos	pos	2.61	pos	
30 Nov 2006	pos	pos	2.66	pos	
6 Dec 2006	pos	pos	2.4	pos	
14 Dec 2006	neg	pos	2.8	pos	
22 Dec 2006	neg	neg	2.4	pos	
4 Jan 2007	neg	neg	1.2	pos	
11 Jan 2007	neg	pos	2.06	pos	
17 Jan 2007	neg	pos	2.52	pos	
25 Jan 2007	pos	pos	2.62	pos	
1 Feb 2007	pos	pos	2.4	pos	
8 Feb 2007	pos	pos	2.5	pos	
15 Feb 2007	pos	pos	2.11	pos	
22 Feb 2007	pos	pos	2.73	pos	
1 Mar 2007	pos	pos	0.69	pos	
8 Mar 2007	pos	pos	3.5	pos	
15 Mar 2007	neg	pos	3.3	pos	
22 Mar 2007	neg	pos	3.1	pos	
29 Mar 2007	pos	pos	2.8	pos	
5 Apr 2007	pos	pos	3.2	pos	
12 Apr 2007	neg	neg	3.8	pos	
19 Apr 2007	neg	pos	3.4	pos	
26 Apr 2007	neg	pos	2.6	pos	
3 May 2007	neg	pos	3.2	pos	
10 May 2007	neg	neg	3.4	pos	
17 May 2007	neg	neg	2.8	neg	
24 May 2007	neg	neg	2.8	pos	

Equine Granulomatous Enteritis Due to *Mycobacterium avium*

Barbara J. Sheppard, Ian Hawkins, Elliot Williams, Gilles R. G. Monif

A gelding male horse was brought to the University of Florida College of Veterinary Medicine (UFCVM) with anterior enteritis. At surgery, multiple transjejunal and ileal masses were identified. Because of necrotic jejeunum segments, elective euthanasia was undertaken. At necropsy, in addition to necrohemorrhagic enterocolitis, the animal had an underlying granulomatous enteritis and granulomatous lymphadenitis. The mycobacterium was identified by the USDA diagnostic laboratory at Ames Iowa as *Mycobacterium avium* using 16s rRNA.

At UFCVM, mycobacteria DNA was extracted from formalin fixed tissue and tested using base and nested primers based upon the IS*900* and IS*1311* insertion sequences. The P90-P91 based IS*900* primer pairs (GAA GGG TGT TCG GGG CCG TCG CTT AGG/GGC GTT GAG GTC GAT CGC CCA CGT GAC) which recognizes a 413 base pair sequence of Map IS*900* failed to recognize the isolate's DNA; however the J1-J2 IS*900* based nested primers (TGG ATG GCC GAA GAA GGA GAT TGG CCG/GTT GAG GTC GAT CGC CCA CGT GAC) did recognized the isolate's DNA as corresponding to *Mycobacterium avium* subspecies *paratuberculosis* (Map) (Figure 1). The isolate was identified by FecaMap ® nested IS3-IS4 primer pairings, but not its IS1-IS2 base primers (Figure 2). The FecaMap IS*1311* primers were designed to identify genomic polymorphism of pathogenic mycobacteria strains between *M. avium* and Map.

Beyond describing Johne's disease due to *M. avium* in a horse, amplification of the IS*900* insertion sequence resulted in cross identification with Map, suggesting polymorphism between *M. avium* and Map for this isolate.

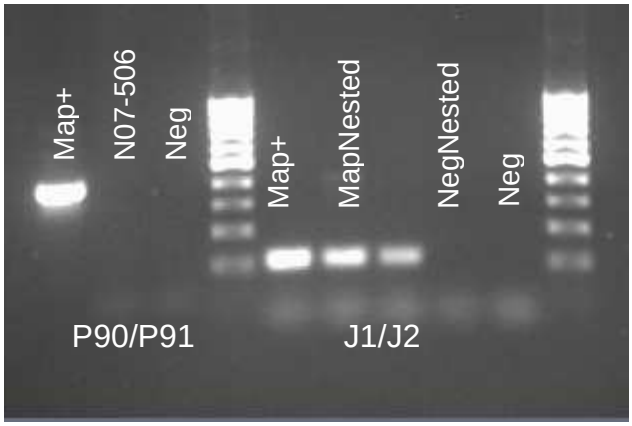

Fig. 1. Results of standard and nested Map PCR using IS*900*-based primers

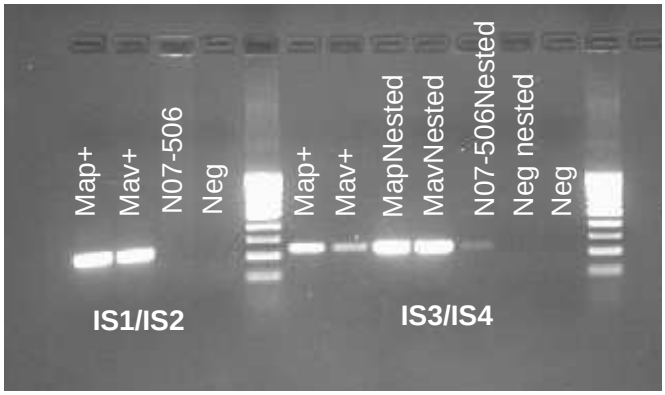

Fig. 2. Results of standard and nested Map PCR using IS*1311*-based primers

Publications on Paratuberculosis in 2005-2007

R. Pribylova, K. Hruska

Veterinary Research Institute, Brno, Czech Republic

Records on (PARATUBERCULOSIS OR JOHNE'S OR JOHNES) from the Web of Science® database (Thomson Scientific, Philadelphia, 14 February, 2008) were analysed, giving the following results:

In the period 2005-2007 (red columns in tables), 646 papers were published by 1815 authors, affiliated with 596 institutions from 57 countries and published in 168 periodicals. These numbers are higher in all parameters than those from the analysis for 2002-2004 (461 papers, 1273 authors, 419 institutions, 44 countries and 133 periodicals; blue columns in tables). In the 'Top 25' tables, those items that are new for 2005-2007 and which did not appear among the 'Top 25' in 2002-2004, are highlighted.

The results are summarized in the following tables:

1. TOP 25 most productive authors
2. TOP 25 most productive countries
3. TOP 25 most productive institutions
4. TOP 25 periodicals publishing papers on paratuberculosis

The number of papers published from 1990 onwards has increased several times (Figure 1). Eighty one papers were published from 1988 to 1990; 646 papers from 2005 to 2007. It is impossible to follow published data unless the bibliographic database Web of Knowledge is used. According to the Web of Science, papers on paratuberculosis were published in 168 journals from 2005 to 2007.

Finally, the most frequently cited papers are listed.

Table 1
TOP 25 MOST PRODUCTIVE AUTHORS

2002-2004	**2005-2007**		
1273	**1815**		
Position	Position		No. of records
7-10	1	BANNANTINE, JP	25
1-3	2	COLLINS, MT	23
1-3	3	STABEL, JR	20
1-3	4	PAVLIK, I	19
4	5	WHITTINGTON, RJ	16
11-14	6-7	KAPUR, V	15
25-33	6-7	WELLS, SJ	15
15-20	8-9	WATERS, WR	14
15-20	8-9	WHITLOCK, RH	14
6	10-12	BARTOS, M	13
	10-12	GARDNER, IA	13
15-20	10-12	PALMER, MV	13
	13	SREEVATSAN, S	11
15-20	14-15	GRANT, IR	10
	14-15	NIELSEN, SS	10
	16-21	BEHR, MA	9
	16-21	GRIFFIN, JFT	9
	16-21	JUSTE, RA	9
25-33	16-21	MANNING, EJB	9
	16-21	PAUSTIAN, ML	9
11-14	16-21	SVASTOVA, P	9
	22-30	EVANSON, OA	8
15-20	22-30	NASER, SA	8
25-33	22-30	ROWE, MT	8
	22-30	SCOTT, HM	8
	22-30	SECHI, LA	8
	22-30	SINGH, SV	8
	22-30	VANLEEUWEN, JA	8
	22-30	WEISS, DJ	8
	22-30	ZANETTI, S	8

Table 2
TOP 25 MOST PRODUCTIVE COUNTRIES

2002-2004	**2005-2007**		
44	**57**		
Position	Position		No. of records
1	1	USA	264
5	2	CANADA	54
2	3	AUSTRALIA	53
3	4	ENGLAND	47
4	5	GERMANY	34
17	6	SPAIN	29
15-16	7	INDIA	28
7	8-9	NETHERLANDS	27
14	8-9	NEW ZEALAND	27
8	10	CZECH REPUBLIC	21
10	11	SCOTLAND	21
6	12	DENMARK	20
20-21	13	FRANCE	19
11	14	NORTH IRELAND	18
15-16	15	ITALY	14
9	16	NORWAY	13
20-21	17-18	GREECE	11
18-19	17-18	JAPAN	11
22-25	19-20	BELGIUM	10
	19-20	BRAZIL	10
22-25	21	SWITZERLAND	9
	22-23	AUSTRIA	7
12	22-23	IRELAND	7
	24	SOUTH KOREA	6
22-25	25	CHILE	5

Table 3
TOP 25 MOST PRODUCTIVE INSTITUTIONS

2002-2004	**2005-2007**		
419	**596**		
Position	Position		No. of records
3	1	UNIV MINNESOTA	44
1-2	2-3	UNIV WISCONSIN	38
1-2	2-3	USDA ARS	38
8	4-5	UNIV CALIF DAVIS	23
6	4-5	UNIV SYDNEY	23
4	6	VET RES INST	20
20-25	7	IOWA STATE UNIV	19
	8-9	TEXAS A&M UNIV	16
12-16	8-9	USDA	16
12-16	10	UNIV PENN	14
7	11-12	CORNELL UNIV	13
	11-12	UNIV OTAGO	13
20-25	13	UNIV PRINCE EDWARD ISL	12
	14	UNIV GUELPH	11
	15-16	INDIAN VET RES INST	10
9-11	15-16	QUEENS UNIV BELFAST	10
	17-23	COLORADO STATE UNIV	9
	17-23	MCGILL UNIV	9
12-16	17-23	MICHIGAN STATE UNIV	9
5	17-23	NATL VET INST	9
17-19	17-23	UNIV CENT FLORIDA	9
	17-23	UNIV SASSARI	9
	17-23	UNIV TENNESSEE	9
	24-29	ARS	8
	24-29	MONTREAL GEN HOSP	8
12-16	24-29	NORWEGIAN SCH VET SCI	8
	24-29	UNIV COMPLUTENSE MADRID	8
	24-29	UNIV GEORGIA	8
	24-29	UNIV SASKATCHEWAN	8

Table 4
TOP 25 PERIODICALS PUBLISHING PAPERS ON PARATUBERCULOSIS

2002-2004 133	2005-2007 168		
Position	**Position**		**No. of records**
2	1	VETERINARY MICROBIOLOGY	36
3-4	2	PREVENTIVE VETERINARY MEDICINE	27
1	3	JOURNAL OF CLINICAL MICROBIOLOGY	24
13-14	4	APPLIED AND ENVIRONMENTAL MICROBIOLOGY	22
	5-6	JOURNAL OF ANIMAL SCIENCE	21
9	5-6	JOURNAL OF DAIRY SCIENCE	21
10-12	7	VETERINARY IMMUNOLOGY AND IMMUNOPATHOLOGY	19
	8	CLINICAL AND VACCINE IMMUNOLOGY	18
5-6	9	JOURNAL OF VETERINARY DIAGNOSTIC INVESTIGATION	17
7	10	INFECTION AND IMMUNITY	16
3-4	11-12	AUSTRALIAN VETERINARY JOURNAL	14
15-16	11-12	CATTLE PRACTICE	14
23-29	13	JAVMA-JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION	13
	14	INFLAMMATORY BOWEL DISEASES	12
17-18	15	GASTROENTEROLOGY	11
23-29	16	CANADIAN VETERINARY JOURNAL-REVUE VETERINAIRE CANADIENNE	10
	17-20	AMERICAN JOURNAL OF GASTROENTEROLOGY	9
23-29	17-20	AMERICAN JOURNAL OF VETERINARY RESEARCH	9
15-16	17-20	JOURNAL OF MICROBIOLOGICAL METHODS	9
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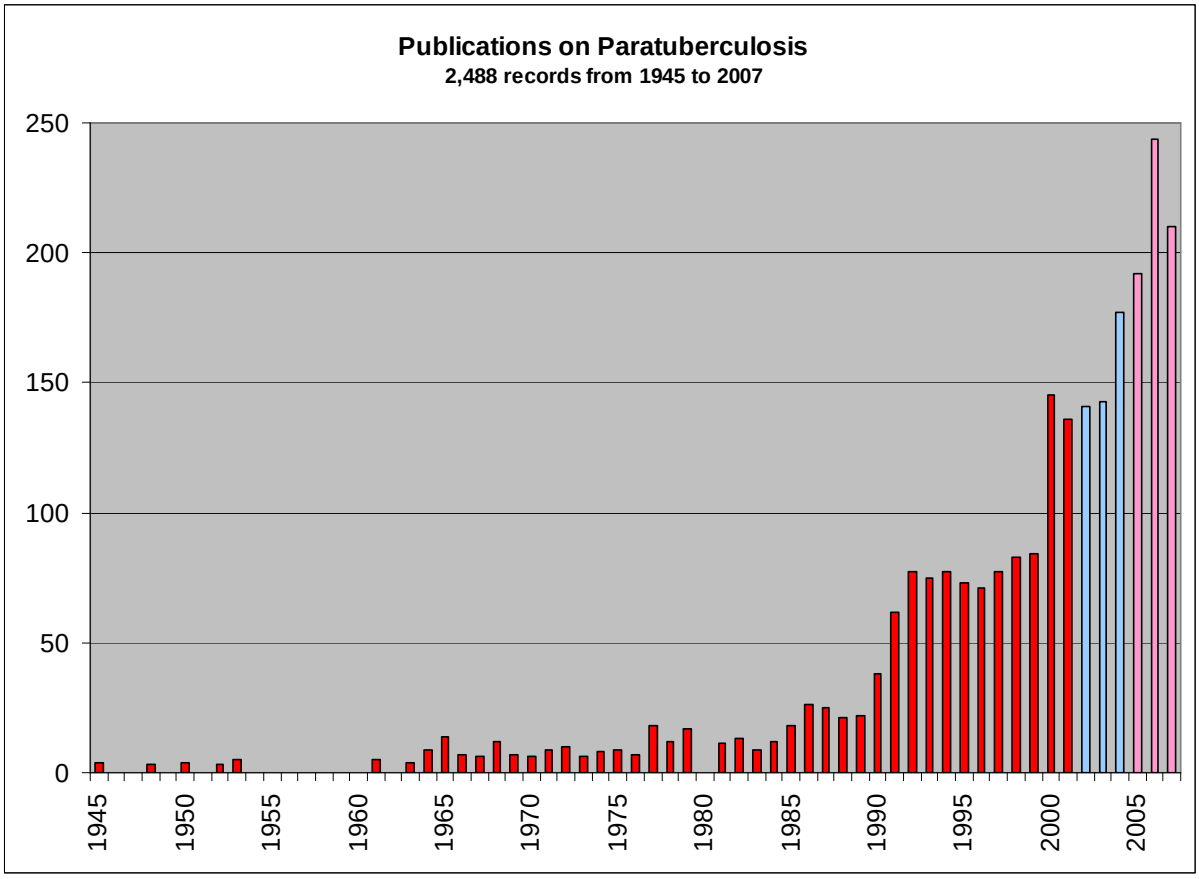
	21	NEW ZEALAND VETERINARY JOURNAL	8
	22-27	BMC MICROBIOLOGY	7
10-12	22-27	JOURNAL OF WILDLIFE DISEASES	7
	22-27	SMALL RUMINANT RESEARCH	7
23-29	22-27	VETERINARY JOURNAL	7
	22-27	VETERINARY PATHOLOGY	7
8	22-27	VETERINARY RECORD	7

Figure 1


Publications on Paratuberculosis
2,488 records from 1945 to 2007
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4. Paratuberculosis Calendar

Please report to Søren Nielsen (ssn@life.ku.dk) should you have knowledge of any events that you find relevant to include in the calendar.

2008

March 26 to 28, 2008. Annual Meeting of the Society of Epidemiology and Preventive Medicine (SVEPM), Liverpool, United Kingdom (http://www.svepm.org.uk/)

2009

July, 2009 (dates not final). 10th International Colloquium on Paratuberculosis, St. Paul/ Minneapolis, Minnesota, USA.

August 10-14, 2009. 12th International Symposium on Veterinary Epidemiology and Economics. Durban, South Africa (http://www.isvee12.co.za)

5. List of Recent Publications

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