REPORT OF THE IDF GROUP OF EXPERTS ON MASTITIS

Three major publications have been produced by the Group in the past year. These are:

IDF Bulletin 211:
Bovine mastitis: definition and guidelines for diagnosis.
This document includes guidelines for the diagnosis of mastitis in experimental research, in observational studies, in survey and control programmes, and using bulk milk samples. There is also a chapter on the analysis and interpretation of the results of an international trial organised by the IDF Group of Experts on Mastitis. The document was drafted by a small subgroup under the chairmanship of Dr O. Klastrup. (Available from the IDF Secretariat for 800 Belgian Francs).

IDF Bulletin 215:
Machine milking & mastitis.
The document contains literature reviews on machine milking factors affecting mastitis (by Dr J. O'Shea) and the effect of machine milking on teat end condition (by Dr J. Harmann). A small subgroup, under the chairmanship of Dr J. O'Shea, discussed the literature reviews and drafted a further section on conclusions on the relationship between machine milking & mastitis for consideration and agreement by the IDF Mastitis Group. (Available from the IDF Secretariat for 1000 Belgian Francs).

IDF Bulletin 217:
Environmental influences on bovine mastitis.
The document contains chapters on the pathogenesis of mastitis, environmental influences on animal health, the external and internal environments, conclusions and recommendations, and also a large number of references. It was drafted by a small subgroup under the chairmanship of Dr O. Klastrup before submission to the IDF Mastitis Group. (Available from the IDF Secretariat for 1000 Belgian Francs).

The publication of these three documents was a fitting culmination to the eleven years chairmanship of the IDF Group of Experts on Mastitis by Dr Frank Dodd (UK). Dr Dodd retired from the Group following the Brussels meeting in December 1986. His patient chairmanship generated a friendly working spirit within the Group on which, during his tenure, representation had increased from 9 to 20 IDF member countries. Under his influence many works of reference have been published by the Group.

The second meeting of the Group was held in Uppsala, Sweden, when work on...
the guidelines for mastitis therapy trials was initiated with the major assistance of Dr. Thorburn (SE). This work is continuing and the Group plans to produce a discussion document for member countries in 1990.

The third meeting was held in Montreal, Canada, in conjunction with the World Veterinary Congress. An extremely successful international mastitis symposium was organized under the chairmanship of Dr. D. Barnum (Canada) & Dr. G. Fisher (Canada). The twin themes were the milking machine and mastitis therapy. A report on this symposium appears in the present Newsletter.

Other work of the Group which was continued during the year included publication of the fourth edition of the Mastitis Research Index, co-ordinated by Dr. G. Bakken (Norway), and discussion on several aspects of mastitis cell counting within the Cell Count Subgroup. The evaluation of diagnostic tests and a possible examination of mastitis in sheep & goats are two other subjects under discussion at present. The Group has recently made a recommendation that use of the international unit (IU) for benzylpenicillin should be discontinued and be replaced by the milligram (mg) in line with other antibiotics.

Finally, the future work of the Group was considered at the Montreal meeting and priorities have been given to immunity to mastitis, the evaluation of test disinfection and the products used, the influence of nutrition on mastitis, and the use of promotional material to publicize the economic cost of mastitis.

James M. Booth, Chairman
November 1987

Table 3 - The classification of quarters according to the number of times the same major pathogen was found in a series of 6 bacteriological tests, and according to their arithmetic mean cell count at the 6 tests. The data is shown separately for each of the 12 laboratories.

<table>
<thead>
<tr>
<th>No. of times pathogen found</th>
<th>No. of times pathogen Found</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

**Erratum**

IDF - Bulletin No. 211/1987

Bovine Mastitis - Definitions & Guidelines for Diagnosis

Please note that in tables 3 & 5 of the above mentioned publication the lines separating "infected" from "uninfected" have been mistakenly omitted. These two tables are key to the text and the missing dividing lines could lead to failure of interpretation.

*The order of the coded list of laboratories (A, B, C, etc.) is NOT the same as the order in Table 2.*
Table 5. - Allocating quarters to the "infected" and "non infected" categories by the reference method. An example is given of three of the possible partitions of infected and uninfected quarters for the results obtained by laboratory F. For the results given in Table 3 all possible partitions for each laboratory were examined and tested.

<table>
<thead>
<tr>
<th>Arithmetic mean cell counts (thousands)</th>
<th>No. of times pathogens found</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Less than 125</td>
<td>9</td>
</tr>
<tr>
<td>125 to 250</td>
<td>38</td>
</tr>
<tr>
<td>250 to 500</td>
<td>32</td>
</tr>
<tr>
<td>500 to 1000</td>
<td>16</td>
</tr>
<tr>
<td>More than 1000</td>
<td>7</td>
</tr>
</tbody>
</table>

For partition A
Total uninfected: 102, 94, 11, 0, 0, 0, 0
Total infected: 0, 0, 10, 19, 7, 15, 28

\[
p = \frac{94 + (2 \times 11)}{6 \times (102 + 94 + 11)} = 0.0903
\]

\[
q = \frac{15 + (2 \times 7) + (3 \times 9) + (4 \times 10)}{6 \times (28 + 15 + 7 + 19 + 10)} = 0.2658
\]

Expected numbers using this \( p \) and \( q \) in binomial distributions (1) and (2)
- uninfected: 117, 70, 17, 3, 0, 0, 0
- infected: 0, 0, 4, 12, 24, 27, 12

\[X^2\] for observed and calculated uninfected quarters = 14.2
\[X^2\] for observed and calculated infected quarters = 39.3
the \[X^2\] total = 53.5

For partition B the \[X^2\] total = 13.9
For partition C the \[X^2\] total = 17.9

...of these three partitions B gives the closest fit between observed and calculated values.

J.M. Booth, Chairman
January 1988

A second questionnaire on mastitis cell counts was issued by the IDF Secretariat early in 1988 (questionnaire 988/A). Deadline for replies is 30 April, 1988. The IDF Mastitis Group is hoping for a greater response than obtained by the first questionnaire a year ago. Ten countries kindly replied on that occasion.

The questionnaire is an attempt to obtain information on the most common methods of presentation of national cell count data and, if possible, to obtain comparative cell count data. A summary of the information will be published in an IDF document if respondents grant their permission. Information is also being sought through this questionnaire on current uses of single cow cell counts.

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<table>
<thead>
<tr>
<th>Cell count/ml milk</th>
<th>pathogenic micro-organisms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>not isolated</td>
</tr>
<tr>
<td>&lt; 500 000</td>
<td>normal secretion</td>
</tr>
<tr>
<td>&gt; 500 000</td>
<td>non-specific mastitis</td>
</tr>
</tbody>
</table>

---

Page 9 (table)

Page 133:
The first word in line 15 should be changed from "reduces" to "increases."
MASTITIS NOTES
FROM MEMBER COUNTRIES

CANADA

MASTITIS SYMPOSIUM - CANADA - 1987

The campus of Macdonald College, McGill University (Montreal) was the site of the International Mastitis Symposium held August 14-15, 1987. The meeting sponsored by the Canadian Committee for Mastitis Control and Prevention, was organized by Dr D.A. Barnum, Dr George Fisher and assisted by members of the Faculty of Agriculture at Macdonald College.

The 300 persons from 22 countries who attended included veterinarians, dairy specialists, industry & mastitis research workers. The 21 speakers, coming from 9 countries, were international authorities on their subject which made the symposium so successful. In addition to the papers, 19 posters were presented on subjects relative to the themes of the Symposium.

Papers of the first day were related to the Milking Machine & Mastitis. Background papers - one on The Cow & The Machine by Murray Woolford focused on fundamental concepts involved in milk harvesting, cow performance, machine function and operator activity; while Graeme Mein discussed milk removal by the interactions between the teat and teat-cup liner. Liner slip and impact, hydraulic milking control within the teat-cup were considered in detail in their respective papers. A paper on modern technology of milk production in Israel was given by A. Saran as a tribute to the late Prof. R. Sagi.

In a paper considering "back-flushing" as a means of preventing spread of mastitis pathogens, T.W. Smith reported that while this procedure reduced bacterial population, it had no effect on number of infections caused by environmental pathogens. In a summary paper, A.J. Bramley assessed the relative importance of milking machine factors in mastitis. He reminded the audience that bacteria have means of entry independent of machine milking and that effective mastitis control will continue to require a co-ordinated package of hygiene, management, therapeutic and milking techniques.

The topics of the second day were related to Mastitis Therapy. The introductory paper by Frank H. Dodd considered the therapy historically with assessment for its role in mastitis control. In concluding he stated that "antibiotic therapy has played an important role in reducing losses caused by bovine mastitis ....", but in future it could be more effective with a more systematic approach to research on both the formulation of products and strategy of their use.

Stefan Soback presented a background pattern on the principles of antimicrobial therapy. S.C. Nickerson in considering how host factors influence drug efficacy noted that bacteria are protected within body cells from some antibiotics and on the other hand drugs may inhibit leucocyte activity. Evaluation of mastitis therapy was an important topic being introduced by Ian Dohoo. He pointed out the various factors such as being tested under accepted principles in clinical trials (study populations, random allocation etc.) considering diagnostic errors and appropriate analysis. The final paper given by Roger Nazko on Measuring the Efficacy of Antibiotic Therapy continued on this theme with examples of treatment trials. The discussion on this topic was most stimulating.

Three papers dealt with strategies of treatment. M. White reported on experiences of the ambulatory clinic of Cornell with acute mastitis with systematic involvement. Ken Leslie discussed sub-clinical infections based on experience with reference to a paper submitted by Klastrup. Frank Dodd completed the series on dry cow treatment.

John Prescott discussed the usefulness of in vitro susceptibility testing and pleaded for a universal standardized method for mastitis pathogens. Antibiotic residues in milk as considered by W. Hoessen is concern for the dairy industry influencing formulations, the manufacture of dairy products and consumer effect. C. Miller considered the criteria used by governments and industry in products used in mastitis both in general and specific ways.

There was enthusiastic discussion on all papers with good rapport between audience and speakers. The informal discussions that took place at the breaks and meals were considered by many to be of great value.

The posters were of high calibre and while they were self-explanatory the reg-
ists did have opportunities to meet the authors.

Abstracts of the papers and posters were available at the meeting to all registrants. The papers will be published in full in the proceedings of the meeting as submitted by the speakers. Abstracts of the posters will also be included. The proceedings will be sent to all registrants. A limited number of additional copies of the proceedings will be made available.

For information on the purchase of the proceedings contact Dr D.A. Barnum, Dept. of Veterinary Microbiology & Immunology, Ontario Veterinary College, University of Guelph, Guelph, Ontario, Canada N1G 2W1.

Summer Mastitis
edited by
G. Thomas & H.J. Over, Dept. of Parasitology
U. Vecht, Dept. of Bacteriology, Central Veterinary Institute, Lelystad, the Netherlands
P. Narsen, Institute of Hygiene & Microbiology, Royal Veterinary & Agricultural University, Copenhagen, Denmark.
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Individual Cow Cell Count
The aim of this national survey was to provide information as to the situation concerning mastitis in the Netherlands. The results refer to 10336 cows on 227 farms. The cows were tested once for the occurrence of mastitis. The definitions of the International Dairy Federation were applied. The percentage of cows having mastitis in one or more quarters declined from 17.1 (1980) to 15.8 (now). As to the individual quarters, the figures are: mastitis 5.5%; secretion disorders 10.2%; latent infections 4.5%; healthy quarters 79.8%. Compared with 1980, the percentage of healthy quarters increased by 4.4, but the percentage of infected quarters increased by 0.5.

The cell counts have decreased, but the incidence of mastitis did not decrease proportionally. The control of Streptococcus agalactiae mastitis did have some success, especially in Friesland, Noord Brabant and Limburg. The farms showing a proportion of healthy quarters higher than the national average could be characterized by a number of circumstances such as the use of a milk pipe system, a contract for the maintenance of the milking machine, the vacuum of the machine < 50 kpa, a consistent application of dry cow therapy and teat disinfection, cubicle housing and a milking parlour.
The difference between black & white cows and red & white cows as to the percentage of healthy quarters, declined from 5.3 in 1973 to 0.5 now. The incidence of mastitis increases with the age of the cows, and cows with more than 8 lactations have less than 55% healthy quarters.
The larger farms with 30 or more lactating cows are in a better situation than the smaller ones with regard to the proportion of healthy quarters. However, the improvement in the mastitis situation since 1980 is especially due to the smaller farms on which the cows now had 9% more healthy quarters than in 1980.
The correlation between the mastitis situation and the monthly estimated herd milk cell count and the derivatives of the latter such as C3 count (the geometric mean of the last 3 counts), the C13 count (the geometric mean of the last 13 counts) and the C18 count (C13\(^2\times C3\)\(^{1/2}\)) varies from 0.49 to 0.63. None of the tested predictors appeared very successful as to their sensitivity and specificity in predicting farms with serious mastitis problems. In no case was the predicting value higher than 60%. The monthly estimated herd milk cell count is thus unsuitable to discover the farms with serious mastitis problems.

Sheep-Mastitis
The investigations on the state of health of the sheep udders and its relationship with productivity are carried out in the Institute of Biological Bases of Animal Breeding of Warsaw Agricultural University. The method of diagnosis of mastitis was worked out.
The differences between breeds and the role of the genetic variance in the suscep-
tibility of sheep to mastitis were found. This susceptibility seems to be connected with the morphological traits of the udder. These traits, particularly the width of the udder and the diameter of the teats, will be included into selection index to improve the shape and the wholesomeness of the udder. The analysis of the immunological factors conditioning the resistance of sheep to mastitis is planned.

Dr Krystyna Małgorzata Charon, Institute of Biological Bases of Animal Breeding, Warsaw Agricultural University, Przejażdż. 4, 05-840 Biwino, Poland.

<table>
<thead>
<tr>
<th>Bacterial Isolate</th>
<th>1985/86 %</th>
<th>1986/87 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steph. aureus</td>
<td>64.1</td>
<td>68.4</td>
</tr>
<tr>
<td>Strep. uberis</td>
<td>14.7</td>
<td>14.9</td>
</tr>
<tr>
<td>Strep. agalactiae</td>
<td>4.7</td>
<td>6.4</td>
</tr>
<tr>
<td>E. coli</td>
<td>3.9</td>
<td>2.6</td>
</tr>
<tr>
<td>Strep. dysgalactiae</td>
<td>3.7</td>
<td>2.3</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>1.9</td>
<td>0.5</td>
</tr>
<tr>
<td>Others</td>
<td>7.0</td>
<td>4.9</td>
</tr>
</tbody>
</table>

J.M. Booth & T.J. Green (UK)
January 1988

UNITED KINGDOM

Opening of the Milking & Mastitis Centre (MMC)

Following the closure of the NIRD, the MMC was established at Compton as part of the Institute for Animal Disease Research. This new multidisciplinary group unites the research programmes on mastitis and machine milking previously in progress at 3 Institutes of the Agricultural & Food Research Council. New facilities have been constructed and were officially opened by Sir Stephen Roberts, Chairman of the Milk Marketing Board of England & Wales on the 19th June, 1987.

The research group, led by Dr John Bramley, has 20 staff of various disciplines including microbiologists, veterinarians, engineers, immunologists and physicists. The research covers epidemiology and pathogenesis of udder disease, effects of the milking machine, mathematical modelling of the action of the milking machine, sensing and robotics (see Mastitis Research Index).

MASTITIS PATHOGENS

Some results from an analysis of the main bacterial isolates from milk samples received at the Veterinary Laboratory of the Milk Marketing Board over two years are given in the table below.

The milk samples were mostly taken by farmers, after instruction on sample taking, and were approximately equally divided between clinical cases and suspected cases of subclinical mastitis. There were approximately 4,000 isolates in each year.

Sir Stephen Roberts unveiling the commemorative plaque.

Dr Bramley & colleagues describing the facilities of the new experimental parlour.
**VIIIth International Congress in Animal Hygiene 1988**

The International Society for Animal Hygiene will arrange its 6th international congress from the 13th to the 17th of June 1988. The meeting will take place at the Department of Animal Hygiene, Faculty of Veterinary Medicine, Swedish University of Agricultural Sciences, Skara, Sweden.

The main theme for the congress will be "Animal environment - Animal health". Under this heading different topics will be dealt with e.g. the role of environmental factors (management, buildings, climate, etc.) for the etiology of animal diseases, epidemiological and ethological methods for evaluation of connection between environmental factors and animal health and disease.

There will also be a section for free topics. Scientists and practitioners active in this field are invited to participate in this congress.

**Questions are answered by:**

**Secretariat, VI Int. Congr. Animal Hygiene; P.O.Box 348; S-532 60 Skara, Sweden.**

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**International Conference on Mastitis**

St Georgen/Längsee, Carinthia, Austria,
from May 29 - June 2, 1989

The scientific programme will cover following areas:

1. General aspects of mastitis
2. Current knowledge of cytological aspects of mastitis
3. General view of machine milking
4. Chemotherapy of mastitis
5. Immunology regarding mammary gland
6. Pathogenesis of mastitis
7. Diagnostic methods of mastitis

Scientists are invited to contribute to the scientific programme by presenting a paper or poster respectively on one of the subjects mentioned above. Short communications will be preferred.

**Registration and Registration fee (lunches, proceedings and housing included):**

Participants: 8. S 4,500,–
Accompanying persons: 8. S 3,000,–

Participation, paper or poster presentations should be addressed to:

**Congress Secretariat**

Prof. Dr. E. Glawischning
International Conference on Mastitis
II. Medizinische Universitätsklinik für Klaustiere der Veterinärmedizinischen Universität in Wien, Linke Bahngasse 11, A-1030 Vienna, Austria.
Phone: 0222 / 73 55 81 ext. 500, 501.