2nd EMP-meeting:
Systematic improvement of udder health and immunology research on mastitis

The 2nd meeting of the European Mastitis Panel (EMP) took place in Germany and was initiated by Jantijn Swinkels, Intervet Schering-Plough Animal Health who organized the meeting in close cooperation with Volker Krömker, University of Applied Science and Art, Hanover. 21 experts from 10 different European countries met from April 16th -17th, 2009 in Salzwedel, in the north-east of Germany. The EMP is the only platform in Europe where mastitis experts from all over Europe come together to exchange detailed inside information among the European countries on mastitis related topics. Important points of this meeting were systematic programmes to improve udder health on large farms, the interpretation of mastitis lab results and immunology research.

EMP members

Front row, left to right:
Klaus Fehlings (D), Andrew Biggs (UK), Nathalie Bareille (F), Luc Durel (F),
Theo Lam (NL), Reinhard Tschischkale (invited speaker, D)
2nd row, left to right :
Volker Krömker (D), Jantijn Swinkels (NL), Hakan Landin (S), Sarne de Vliegher (B),
Bärbel Kloppert (D), Andrew Bradley (UK), Laura Elvira Partida (SP)
Back row, left to right:
Jörgen Katholm (DK), Martin Behr (Intervet, D), Otlis Sampimon (NL),
Luc De Meulemeester (B), Paolo Moroni (I)
Absent: Invited speakers Alexandra Koch (D), Holm Zerbe (D)

Large farm with high personal specialisation

The two day meeting started with a visit on a dairy farm Saxony–Anhalt. Saxony-Anhalt, now a German federal state, which belonged to East Germany before the German reunification in 1990. On this large dairy 770 cows are milked and housed under optimal conditions. The local herd manager explained to the European group what challenges they had to face here after the political change in Germany in 1989: *"20 years ago we had 100 employees, but after the political system changed we had to make profit to survive, so we cut jobs. Today we do nearly the same work with only 29 employees. Everybody working on this farm is highly specialised, for example on feeding, milking or data analysis. We built a new barn in 2005 and invested in cow comfort and stress reduction for the animals. As a result we got a high yielding herd with good health performance. The fertility and udder health status is good. Every year we are able to sell high yielding heifers 50 days in milk. In the view of the low milk price these days (0,20 Euro/kg milk) this is our main business right now. We still work economically and we plan to increase the number of cows to 1000 in the next five years."*

The herd manager Frank Pieper explains the importance of cow comfort and stress reduction for a high yielding, healthy dairy herd.

Systematic control of udder health in large dairy farms

Alexandra Koch from the Animal Health Service in Saxony-Anhalt presented a complex, computer based, systematic udder health programme called "SESAM". As the goal is to improve the present udder health situation in Saxony –Anhalt (see figure 1) this program is applied on large farms (100-900 cows) to decrease the high somatic cell count in the herds. It is bases upon the 10-Point-Mastits-Programme (NMC, USA), but is adapted to farm specific problems, risk factors and financial situation and works more detailed on general health aspects and interdisciplinary topics like rearing or forage production. It follows a holistic approach to herd health and is not focussed on mastitis aspects only. The Animal Health Service collaborates with scientific institutions specialized on udder health, metabolism, feeding and experts for milking technique.

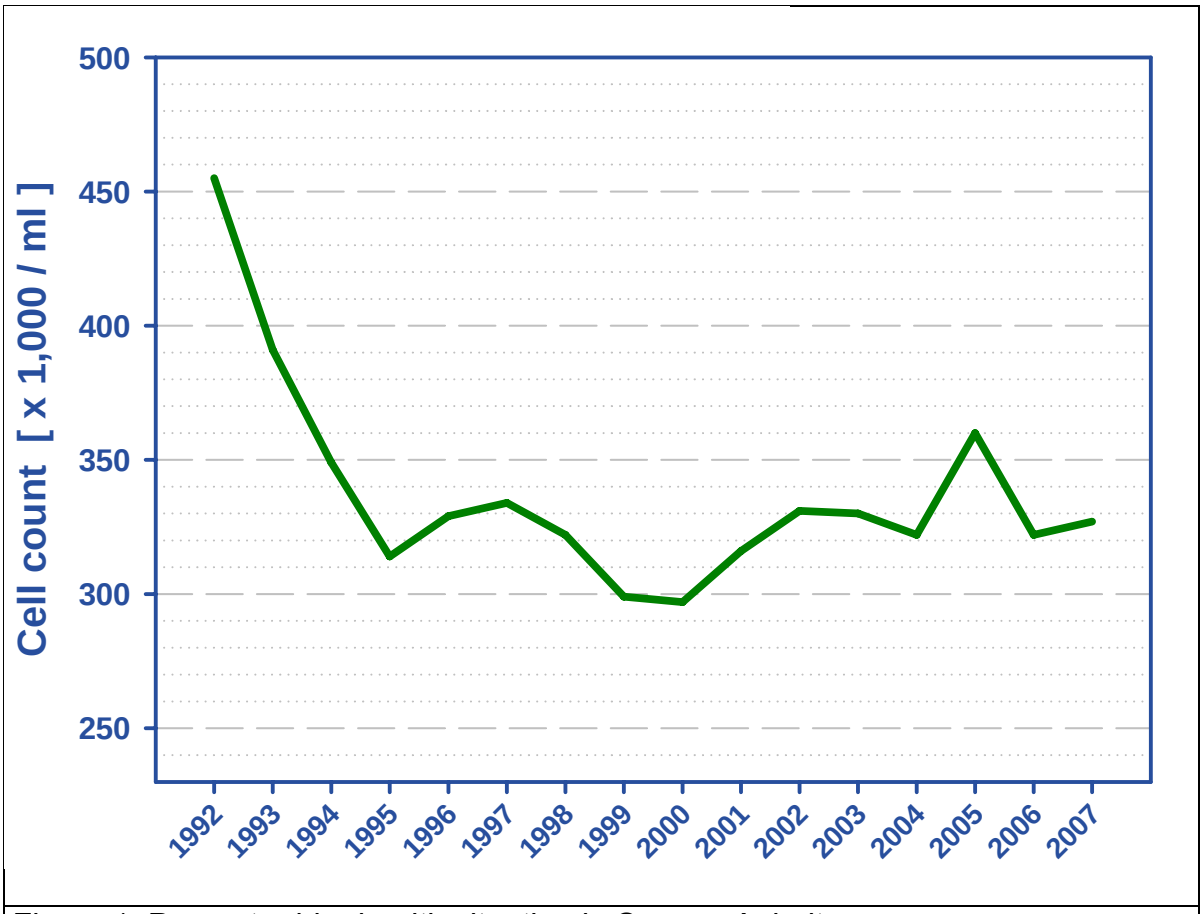


Figure 1: Present udder health situation in Saxony-Anhalt

Alexandra Koch presented the practical approach of a systematic udder health control program

Alexandra Koch: "*We prepare the farm visits in advance, then we spend four to five hours on the farm and afterwards we analyse data (see table 1). We use decision trees for various problems on different levels (e.g. increased heifer mastitis incidence, high rates of subclinical mastitis or teats with hyperkeratosis). They enable systematic action on specific problems and comparability of advisors recommendation. The actions and recommendations are farm specific, detailed and*

very well documented. The most important point is that we never give more than three recommendations to realize in the next four to six months."

Table1: Control points analysed on farms	
Herd health variables	**Goal**
Culling rate	< 30%
Dead cow rate	< 5%
Rearing losses	< 5%
Special diseases	
Still birth rate (heifers/cows)	< 5 % / < 5%
Left displaced abomasum (LDA)	< 2%
Retained fetal membranes (RFM)	< 10 %
Metabolic risk factors	
Animal rate with butterfat-protein-ratio in milk < 1,0	< 5%
Animal rate with butterfat-protein-ratio in milk > 1,5	< 5%
Udder health	
Subclinical healthy cows (based on a SCC threshold on single cow level of 100.000 cells/ml)	> 60 %
Mastitis incidence	< 25 %
Heifer mastitis rate (1st > 100.000 cells/ml)	< 40%
New infections rate during dry period (based on a SCC threshold of 100.000 cells/ml)	< 15 %
Healing rate during dry period	> 50%

Customers-oriented mastitis lab

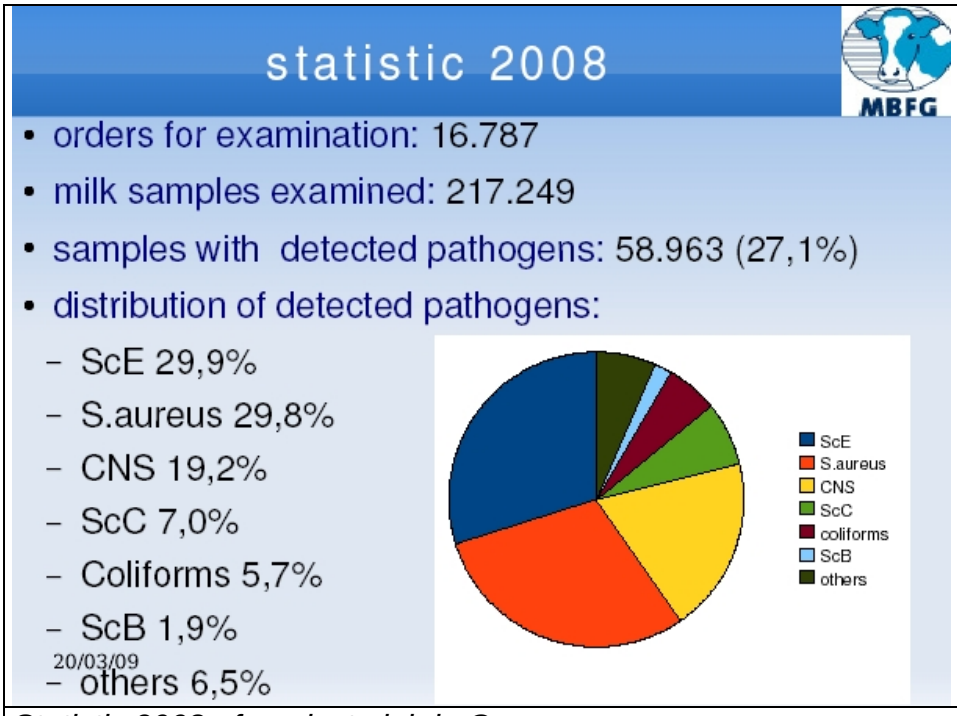
The daily routine of a private mastitis-lab (MBFG) was presented by Reinhard Tschischkale. The team of this lab is working nationwide, basically on the identification of mastitis pathogens.

Customers get telephone advise

Herd milk sampling must be organized perfectly

Reinhard Tschischkale gives recommendations to the herd manager

In 2008 they examined more than 200.000 quarter milk samples. Bacteriogical examination is done exclusively by three vets (see statistic 2008). Antibiotic sensitivity tests are routinely made for every pathogen identified. First results are given after 24 hours per fax. On basis of results vets and farmers get telephone advises every day. Additionally the MBFG-team offers farm visits and consulting in the northern part of Germany. Reinhard Tschischkale: "*We examine cows with clinical and subclinical mastitis and we take samples from every cow in a herd when we suspect contagious bacteria. The results of herd sampling are presented in sorted lists than can be used for treatment, culling and prevention methods.*"



Statistic 2008 of a private lab in Germany

During the discussion among the EMP-members it became clear that techniques used for diagnosis in the labs and interpretation of results differ greatly from country to country. The prevalence of bacteria is therefore difficult to compare between European countries.

list 1:

134 cows with at least on quarter with S. agalactiae (ScB)

number	SCC	Bacteria	SCC	Bacteria	SCC	Bacteria	SCC	Bacteria
00208	39	ScB	33	ScB	31	ScB + *ScE*	35	
00234	v.S.		v.S.		v.S.	ScB	535	
00235	1985	ScB	145		34		58	
00238	153		60		0		5396	ScB
00240	222	ScB	110		6627	ScB	471	
00249	3769		579		5763	ScB	v.S.	
00270	42	ScB	4280	ScB	125		94	

list 2:

22 cows with at least one quarter infected with S.aureus

number	SCC	Bacteria	SCC	Bacteria	SCC	Bacteria	SCC	Bacteria
04667	41		5		15		135	St. aur.
11035	6		2		12		287	St. aur.
11036	637	St. aur.	81		32		19	
11042	18		607	St. aur.	94		12	
11304	493	St. aur.	91		14		9	
11310	2055	St. aur.	35		45		64	
11324	243	St. aur.	360		131	St. aur.	311	

list 3:

42 cows wit at least one quarter infected wit environmental bacteria (S. uberis (ScE), coli, yeasts)

number	SCC	Bacteria	SCC	Bacteria	SCC	Bacteria	SCC	Bacteria
00368	25		v.S.	*Coli*	68		235	
00449	6		338	*Coli*	0		9	
00461	207		1731	*ScE* + KNS	201		204	
00468	4600	*ScE*	180		265		163	
04864	9455		6387	*ScE*	164		31	
11032	1266	*ScE*	90		125	KNS	14	
11054	116		262	*Hefen*	11		58	
11089	5		11	ScE	10		10	

Table 2: Lists with bacteriological (contagious and environmental pathogens), findings after herd sampling

E. coli triggers the acute immune defence in the udder - S. aureus does not
Holm Zerbe, managing director of the clinic for ruminants, veterinary faculty in Munich, presented forward looking research results on the immune defence of the udder. An infection of the udder with *E. coli* often results in an acute mastitis with severe clinical consequences. In contrast *S. aureus* infections are less severe and cause subclinical or chronic mastitis. The immune responses are very different depending on the pathogen species and knowledge about theses responses are still rather limited. Holm Zerbe and his study group tried to find out the molecular causes for these pathogen-specific effects. In their animal models they experimentally infected different quarters of the same cow with *E. coli*. All animals showed signs of acute clinical mastitis 12 h after challenge: increased somatic cell count, decreased milk yield, leukopenia, fever, and udder swelling. In a second model quarters were infected with *S. aureus* resulting in a subclinical mastitis 24h later. They could show that an *E. coli* infection induces proinflammatory and antimicrobial genes (TNFα, IL-8) and upregulates the expression of effector molecules (defensins) and pathogen recognition receptors. *S. aureus*, in contrast, did not significantly regulate the expression of any of these genes during the first 24 h after infection with pathogens and thereby severely weakened the acute immune response in the udder.
"These results could have an impact on treatment in future," the scientist explained.


Holm Zerbe's research focuses on the immune response of the udder

European network
All European members presented briefly the situation in their countries and commented on the presentations of the others. All topics were discussed intensively, but time was too short to answer all questions.
"We all have similar problems, but the solutions are often different. That is the point where everybody can learn a lot," one of the experts concluded.
The discussion among the members is going on even after the meeting as everybody is in e-mail contact. Some members visited others in their country and more visits are planned."

EMP-meeting 2010 in France
The 3rd EMP-meeting in May 2010 will take place in France. On invitation of the two French EMP-members Nathalie Bareille and Luc Durel the group will visit dairy farms and talk about the mastitis handling in France.

Hosts for EMP-meeting 2010 in France: Nathalie Bareille and Luc Durel

Further information is presented on the EMP-web site:
www.EuropeanMastitisPanel.eu