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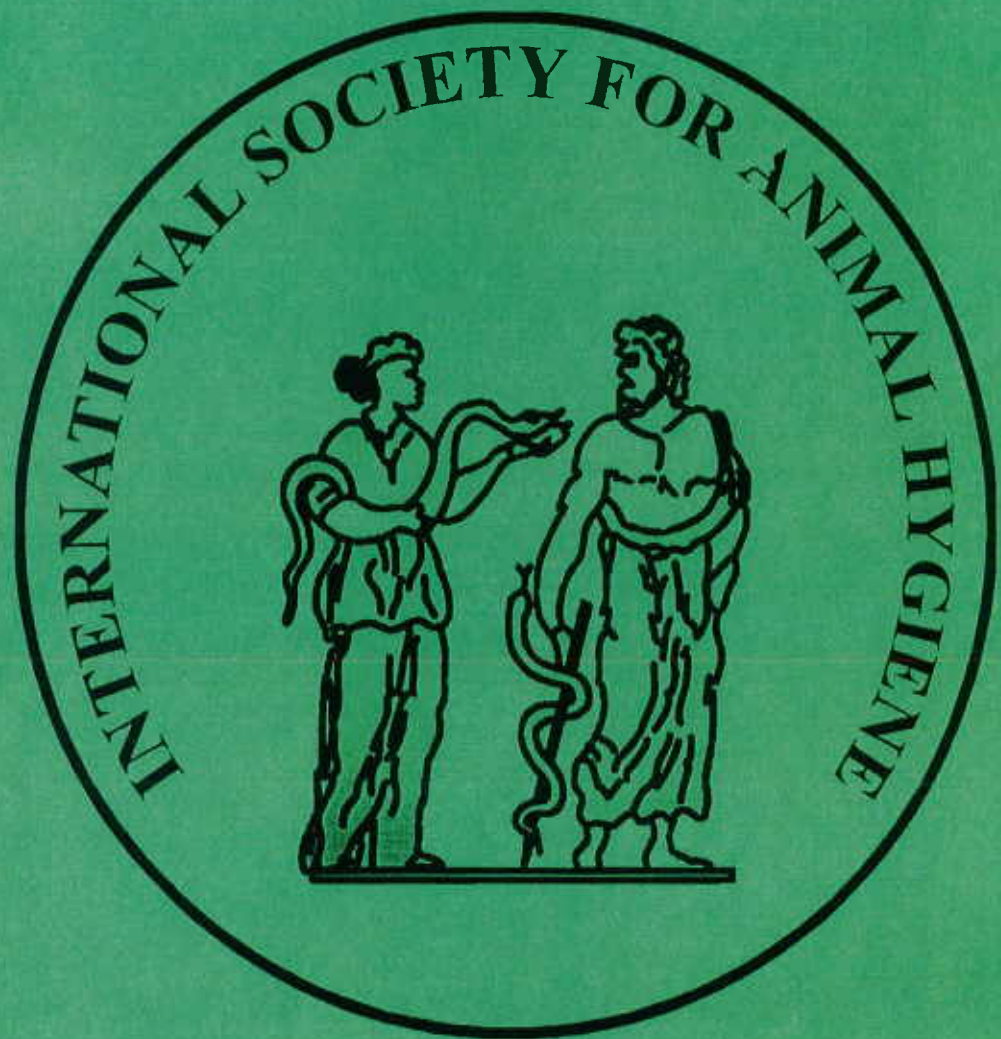
  
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# International Society for Animal Hygiene

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*Newsletter n° 5*



# Dear Members of the International Society for Animal Hygiene

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Dear Members of the ISAH

This is already the 5<sup>th</sup> Newsletter of our Society. The first lustrum! Thanks to the contributions of members of our Society in different countries we can send you an issue with actual information about developments in Animal Hygiene. Especially the contributions about "Teaching in Animal Hygiene" in the last 3 issue's is very valuable to become a view in the different approaches about the position of Animal Hygiene in the different Universities.

The realisation of this newsletter is thanks to the effort of our Secretary, Francois Madec, and his Institute. I hope, that many of you will use the opportunity to exchange knowledge about Animal Hygiene with other colleagues through this newsletters.

## Is "Animal Hygiene" clear ?

Animal Hygiene is a world wide comprehension with clear different definitions. The interpretation of Animal Hygiene varies from the very restricted area from cleaning and disinfection to the very wide definition of the animal and his environment. The inclusion of Animal Hygiene in the name of the International Society for Animal Hygiene is originating from the time of the foundation of the Society in 1970. This foundation was a co-operation between some former East European and some, German speaking, West European countries. The names "Tierhygiene" and "Zoohygienica" were the bases for the English translation to "Animal Hygiene". In the meantime our Society is extended to an International Society with country representatives in 47 countries all over the world. Through that we experience, that the comprehension "Animal Hygiene" is not recognised all ways in the local definitions as such. In some parts of the world animal hygiene in our definition is more connected with "environmental veterinary medicine" or "preventive veterinary medicine", while in other parts the science of animal hygiene is more covered by "animal health care" and "herd health care". In other countries the science of Animal Hygiene is very clear focused on "Environmental Protection" too.

So we have to put effort in explaining the field of animal hygiene to the other veterinary disciplines.

The definition of Animal Hygiene in the statutes of our Society is formulated as follows: "the field of animal hygiene includes the interaction between a-biotic and biotic factors of environment and domestic animals, especially food animals, with the aim to prevent diseases and to promote animal health and to ensure species-specific health and welfare needs of such animals". This does mean, that the interaction between the environmental conditions and the health and welfare of the animal is still the main topic of animal hygiene. But we recognise, that at the other side, the relationship between animal production and the environment has become increasing importance. Further we have to realise, that animal production takes place to produce food. Therefore the research and education in animal hygiene should realise environmental conditions and structures in animal production that not only prevent against outbreaks of diseases, but that should maintain well-being of animal and men and should avoid environmental pollution and human health risks too.

## Sustainable Animal Production

Sustainable animal production does mean, that we are able to produce animal products without lasting damage to the environment. That includes, that we have to take care, that we return the essential elements like water, air and soil to the environment without dead load. Beside of that, we have to take care, that the by-products of animal production creates no animal and human health risks.

Animal Hygiene has to contribute to this target by research on environmental protection and animal waste management too. We have to realise that animal by-products does become animal waste only, when we can not solve this problems.

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# Teaching Animal Hygiene

## Teaching Animal Hygiene in the Federal Republic of Germany

By Prof. Dr R. BÖHM

### Introduction

Most chairs of "Animal Hygiene" developed from chairs originally founded for teaching "farm animal health care" to students of agricultural science. Besides anatomy and physiology clinical signs of illness as well as simple diagnostic and therapeutic methods were the subject of teaching. In the second half of the last century preventive methods on farm level came more and more into the focus of teaching and as animal production was intensified the aspects of environmental pollution had to complete the education besides the classical tasks on animal hygiene. In Germany agricultural faculties of the Universities of Bonn, Göttingen; Halle, Rostock, Stuttgart-Hohenheim and Weihenstephan have chairs held by veterinarians. In Berlin and Giessen the correspondent chairs of the veterinary faculty are supplying the agricultural faculties with teaching in animal hygiene.

### Overview on teaching activities

Most of the above mentioned institutes are involved in anatomy and physiology as well as healthcare for farm animals which are still subject of teaching besides animal and environmental hygiene. Generally different persons are teaching the above mentioned separate subjects. Table 1 gives an overview concerning the actual staff of the institutes.

Table 1

University	Professors	Scientific personal
Bonn	2	4
Göttingen	1 + 1	9 + 0
Halle	1	4
Rostock	1	1
Stuttgart - Hohenheim	2	7
Weihenstephan (TU Munich)	1	3

In this connection it should be focussed only on teaching activities in the fields of animal and environmental hygiene, anatomy and physiology should not be regarded here but other related subjects. Teaching may be divided into basic teaching contents given at nearly all of the above mentioned universities and special subjects only presented by one or two of the involved institutions.

### Basic tasks of teaching are

- Animate and inanimate sources of illness
- Infection, illness, basic epidemiology
- Immunity and immunisation
- Preventive healthcare, disinfection and pest control
- Regulations in the field of infectious diseases, drugs, meat inspection, animal transport, animal protection, slaughtering and rendering
- Hygiene in keeping cattle, swine, small ruminants and poultry



- Environmental hygiene in animal husbandry
- Infectious and non infectious diseases in farm animals

#### Special tasks given at some universities

- Diseases and hygiene in fish, bees and rabbit keeping
- Tropical animal diseases and hygienic measures in the tropics
- Animal behaviour and animal welfare
- Construction of animal houses
- Biologic safety and occupational health care
- Hygiene of waste management
- Herd health management
- Hygiene in alternative (biologic) agricultural production.

#### Amount of teaching and involved students

The amounts of teaching differs a lot between the involved universities as well as the course of studies to be served. The following courses of studies are covered by the above mentioned institutes

- General agricultural sciences as (ASc) - mainly for specialisation in animal science but in basic studies of plant production, agricultural engineering and agricultural economics too.
- Agricultural biology (AB) - mainly in courses of animal science but also in basic education of other branches of studies.
- Agricultural Ecology (AE)
- Agricultural Science of the Tropics (AScTr)
- Nutritional sciences (NSc)
- Food chemistry (FCh)
- Food technology (FT)

At this place no differentiation between classical course of studies leading to a diploma and the new invented BSc and MSc curricula is done, because contents of courses are in principle the same but lessons will be given at different points of time.

#### At the university of Bonn the following lectures are offered

General animal health care	1/Semester (ASc)
Physiology of animal performance and epidemiology	2h/Semester (ASc)
Diseases of farm animals	2h/Semester (ASc)
Preventive health care and quality management	2h/Semester (ASc)
Exercises in animal hygiene	2h/Semester (ASc)
Engineering and hygiene in waste management	2h/Semester(ASc)
Basics of hygiene	2h/Semester (NSc, FCh / FT)
Hygiene in food of animal origin I + II	4h/Semester (NSc FCh / FT)

Quality management in food industry	2 h/Semester (NSc, FCh / FT)
Exercises in quality management	1h/Semester (NSc, FCh / FT)
Animal hygiene in the Tropics and subtropics	2h/Semester (NSc)

#### In Göttingen the following courses will be offered only for ASc \*

Hygiene in animal husbandry and construction of animal houses	2h/ Semester
Hygiene in cattle production, general and environmental hygiene	3h/ Semester
Hygiene in poultry production	3h/ Semester
Course in animal hygiene	1h/ Semester
Hygiene in aquaculture	1h/ Semester
Seminar in animal hygiene and reproduction physiology	2h/ Semester
Infectious animal diseases in the tropics	2h/ Semester
Technopathic diseases	1h/ Semester
Basics of animal hygiene in the tropics	1h/ Semester
Animal protection	2h/ Semester
Control of vectors in tropical diseases	1h/ Semester
Control of endoparasites in the tropics	1h/Semester
Epizology in the tropics	1h/Semester
Demonstration concerning hygiene in poultry production	3h/Semester

\* teaching is done by two different institutes.

#### At the university of Halle, the following teaching is done:

Animal hygiene and animal health	6h/ Semester (ASc)
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#### At the university of Rostock the following teaching is offered:

Environmental hygiene and animal health	6h/ Semester (AE)
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#### In Stuttgart Hohenheim the following courses are offered:

Introduction to animal and environmental hygiene	1h/ Semester (ASc+AB)
Basic animal and environmental hygiene	4h/ Semester (ASc+AB)
Diseases and health-care in farm animals	4h/ Semester (ASc+AB)
Special lectures in environmental and animal hygiene I	4h/ Semester (ASc+AB)
Special lectures in environmental and animal hygiene I	4h/ Semester (ASc+AB)

Special lectures in environmental and animal hygiene II	4h/ Semester (ASc+AB)
Animal hygiene in the tropics and subtropics	4h/ Semester (ASc+AB)
Biological safety, labour protection and environmental aspects	2h/ Semester (AB)
Lecture in biological safety in microbiology and genetically engineering	4h/ Semester (all curricula)
Animal protection and diseases of laboratory animals	4h/ Semester (ASc, AB, NSc)

**At the TU - Munich in Weihenstephan the following teaching is offered:**

Animal hygiene I + II	3h/Semester (ASc)
Diseases of poultry farm and laboratory animal	1h/Semester (ASc)
Hygiene of waste-water and waste recycling	2h/Semester (ASc, AB)

Agriculture in the tropics and subtropics	0,5h/Semester (ASc)
Actual problems in medical microbiology and hygiene	4h/Semester (ASc, AB, NSc)
Methods in medical microbiology and hygiene I + II	4h/Semester (ASc, AB, NSc)
Animal and environment	3h/Semester (ASc)
Diseases of cattle	1h/Semester (ASc)
Diseases of swine	1h/Semester (ASc)
Exercises in animal hygiene	3h/Semester (ASc)
Hygiene of feed-stuff	2h/Semester (ASc)
Exercises in waste-water and wastes recycling	2h/Semester (ASc)
Medical microbiology and hygiene	2h/Semester (NSc)
Microbial toxins in food	2h/Semester (NSc)
Application of microbiology and hygiene	2h/Semester (NSc)



## Teaching Animal Hygiene at the Warsaw Agricultural University (Poland)

By Prof. A. Kryński and Prof. E. Rokicki  
Department of Animal Hygiene

Department of Animal Hygiene has existed from 1952 as an integral part of Warsaw Agriculture University. Founder of this department was Prof. Edward Szyfelbejn (1903-1973), a veterinary physician. Presently the Department of Animal Hygiene is headed by Prof. Eligiusz Rokicki. Since many years the students of the Faculty of Veterinary Medicine and other faculties of Warsaw Agricultural University such as Faculty of Animal Science, Agriculture, Agricultural Economics as well as Agricultural and Forestry Engineering have studied animal hygiene in our department. Research carried out in the department mainly focus on estimation of hygienic value of different technologies of animal production and the influence of the conditions of animal breeding on farm productivity and health of animals. During the last years in the research activity of our department could be noted a new important direction. We have started to study the influence of various environmental factors (pollution, disturbance of mineral metabolism) on the health of animals and hygienic quality of products of animal origin.

In the past professor Szyfelbejn was of the opinion that animals health is a measure of human health – *Sanitas animalium pro salute hominis*. Thinking about classic definition of animal hygiene we should remember that "hygienos" means bringing the health in Greek. Nowadays this classical definition of animal hygiene has a wider and richer meaning. Presently we believe that animal hygiene is a discipline of the veterinary science carrying about influence of natural and artificial (antropogenic) environment conditions on the reaction and health of animals. It also means in the practice of veterinarian to undertake the prophylactic activities leading to elimination of factors adversely affecting the health of animals. As a result of that we expect the protection of animal health and indirectly human health.

The animal hygiene is a branch of interdisciplinary science bonding with chosen elements of animal science and veterinary science. This aspect is specially important in teaching students of veterinary medicine who should associate clinical problems with environmental factors. In last years especially important in teaching were the problems of animal welfare. Nowadays civilisation and technologies of animal production destroy the state of welfare. It is very often the initial reason for pathological processes in organisms of animals. The teaching and practical application of animal

hygiene should be implemented in the programs of professional specialisation of veterinarians. The hygienic problems are very important not only in the case of food animals but also in the case of small and companion animals.

Till now the future of Polish agriculture is unknown. Because of that the teaching animal hygiene is focused on principles of protection of herd health as well on various programs of sanitization for natural agriculture typical for Poland.

The subject "Animal hygiene" is taught at the Faculty of Veterinary Medicine during 7<sup>th</sup> semester of 4<sup>th</sup> year of the studies. It includes 15 hours of lectures and 30 hours of practical training.

The main subjects of lectures are:

- Introduction and aim of animal hygiene
- Abiotic and biotic factors of environment (radiation, air, soil, water, sewage)
- The principles of ecology of breeding animals
- Hygiene of pasture and animal-run
- Livestock building in aspect of veterinary prevention
- Hygiene in industrial production of farm animals
- Influence of mechanisation of animal production on the health of animals.
- The condition of animal transport in relation to UE standards
- Hygiene of feeding
- Legislation in animal hygiene in relation to UE standards
- Animals welfare as a aim of veterinary service and general principles of animal psychic hygiene
- Main principles of hygiene of companion animals
- Principles of prophylactic in farm and free living hunting animals.

The practical training is given in 15-persons groups. They are mainly laboratory practice. The main aim of instruction is to teach students how to estimate particular parameters using modern instrumentation. During the practical training the students also have 4 hours of field training in farms. During this training students should estimate the hygienic state of buildings for breeding animals



using various measuring methods. The main topics of practical training are as follow :

- Estimation of physical parameters of air (temperature, humidity, air pressure, air movements)
- Estimation of dust and bacteria concentration in air in building for animals
- Estimation of concentration of different chemical compounds of air (NH<sub>3</sub>, H<sub>2</sub>S, CO<sub>2</sub>)
- Chemical and biological estimation of water and sewage. Practical problems of disinfection of water.
- Estimation of intensity of solar radiation and natural and artificial light in farm buildings
- Calculation of ventilation value in farm buildings
- Calculation of thermal balance in buildings for animals
- Practical training in farm buildings projects
- Practical estimation of hygienic value of industrial made foods and concentrates. Hygienic evaluation of animals feeding.
- Practical principles of disinfection, disinfestation and rodent control.

Last year (7-13 June 1999) the Faculty of Veterinary Medicine, Warsaw Agricultural University, was visited by group of experts of the European Association of Establishments for Veterinary Education (EAEVE). During this visit the EAEVE commission had a meeting and discussion with teaching staff of Animal Hygiene Department. The commission of EAEVE has noted in findings concerning animal production (animal breeding, nutrition and feeding, dietetics and animal hygiene) that the animal production taught in Warsaw includes most of the topics that feature in EU directions on veterinary training. It has also found that the teaching is well adapted to the Polish agronomic production.

The commission has also noted that such subjects as animal behaviour and animal welfare are not taught as separate courses but they are covered in the courses on animal breeding and animal hygiene during very few hours. It was also found that hours allocated in the subject "animal hygiene" have been reduced in recent years. EAEVE commission announced in the summary of suggestions of the final report on the visit to the Veterinary Faculty of Warsaw that there were no suggestions which, if not implemented, could prevent the teaching.

In other suggestions concerning animal production, including animal hygiene, the commission has found that teaching and practical application of animal welfare should be given a higher profile and greater coherency at the Veterinary Faculty and teaching of animal ethology should be reinforced. This subject is a part of animal hygiene course and as long as it is not a separate course in veterinary curriculum, we should pay more attention to this subject in teaching students of the Faculty of Veterinary Medicine.

Significant problem which should be taken into account is the necessity of implementation in curriculum the information on animal hygiene adjusted to the needs of small natural farms. It seems that most of the small farms in Poland should have a possibility to transform into natural farms, which will produce healthy food. Farms of this kind require a specific form of hygiene of animal production. Next years should show if the prognoses of EAEVE commission and our specialists concerning the direction of teaching animal hygiene are adequate to constantly changing conditions of animal production. Adequate teaching programs in this field are important to Polish agriculture if it is to meet challenges inherent in Poland joining the UE.





## **ANIMAL HYGIENE : WHAT DOES THAT MEAN ?**

**Dr. F. Madec, Secretary**

*Last February the Executive Board (EB) of the International Society for Animal Hygiene had a meeting in Boxtel (The Netherlands).*

*Different subjects were on the agenda and obviously the life of our society was the core of the discussions. We had an interesting debate about the field covered by ISAH and the current common meaning of Animal Hygiene. I have tried here to briefly mention some elements that came out. The debate is still open. Please don't hesitate to give your opinion. Our president also talks about it in the editorial of this issue.*

a) The field covered by the International Society for Animal Hygiene is mentioned in the statutes (chap 1, &2). The content of the paragraph of the statutes is not at 100% satisfying. But, up to now, despite we have been previously discussing the question at the EB, no change could be suggested. At the present meeting in Boxtel, key points were put forward. Looking at the contents of the papers presented at our last congresses we are dealing with :

- Animal health, animal welfare and disease prevention, at the herd level. In this respect mainly complex, multifactorial, environment depending diseases are focused on. Prevention is essentially based on the provision of a proper environment, clinical medicine is kept aside of our field.
- Animal-related public health (zoonoses, food safety in connection to animal production)
- Environmental protection in relation to animal production.

b) the problem is that the term "Animal Hygiene" does not currently make sense to the scientists in numerous countries where the modern meaning of "hygiene" is restricted to cleanliness, which is a small part of the field covered by ISAH. It is here worthwhile to notice that the initial meaning of the word hygiene was much broader than the current.

It comes from the greek "hugiainein": *to be in good health ; part of medicine dealing with the quality of the environment where humans are due to live (adapt and maintain this environment in an adequate state so as human health is safeguarded)*<sup>(1)</sup>. This broad acceptation was probably closer to the point of view of ISAH's founders, than to ours, especially in those countries of central Europe. Obviously this "old" definition when applied to animals fits better with our field of interest.

Unfortunately currently animal hygiene has no longer the same acceptance. The scientific community talks about "preventive veterinary medicine, herd health maintenance, population medicine, epidemiology, environmental protection... and none of these terms covers on its own the whole field of ISAH.

At the end of the discussion, it was suggested to keep the acronym ISAH but to add a subtitle beside it. The newsletter has started a series about teaching animal hygiene which can provide an interesting matter for further thoughts. All the members of the EB were asked to think of it and send proposals to the secretary. The subject will come again on the table in Maastricht. The EB has the feeling that a small change could positively clarify the situation about the field of our society.

<sup>(1)</sup> the definition is translated from a French dictionary, the "Larousse dictionary", 1972.





## Prospective ISAH 2000 Congress in Maastricht

Prof. Martin Tielen,  
President of the ISAH

The expectations of the *Xth International Congress on Animal Hygiene* from 2-6 July in Maastricht in the Netherlands are very prospective.

The scientific program of the congress is focused on 7 different topics. The different topics are concentrated mainly on one day, so participants in the surrounding countries of the congress venue can attend the congress for one specific day. In the opening ceremony on Sunday, July 2, there will be *opening speeches* from the Dutch State Secretary of the Ministry of Agriculture, Nature Management and Fisheries and the President of the International Society for Animal Hygiene. On Monday all attention is spend on the *Integrated Quality Assurance and Control in Animal Production*. Tuesday is focused on *Disease Control in safeguarding strategies and by control management of multi-factorial diseases*. Wednesday at least is focused on *Animal waste management and environmental protection*. On that day is whole day session spend on the *animal hygiene in companion and small animals* too.

### Papers

Scientists from all over the world did take the opportunity to send in papers for oral or poster presentation. In total 137 papers will be presented as an oral presentation. Eleven keynote lectures will be presented by international recognized keynote speakers in plenary sessions each morning at the beginning of the scientific programs. After this plenary meetings there will be up to 3 parallel sessions about the different topics of the day. Most of the parallel sessions are adopted by a company or organization and each session will start with a sessions lecture by a scientist closed connected to the subject of the session. By the adoption of a sessions the companies and organizations like to demonstrate their interest in a scientific approach of their activities.

The topic to the related posters of the day will be presented during the whole day in the lobby of the congress venue. These posters will be presented by the authors of the posters in a special poster presentation hour each day in the afternoon between 15.00 and 16.00 hour. All authors will be present at the site during that time. Over the 3 scientific days there will be presented 92 posters on that way.

### Participants

This scientific program does mean, that there is a marked opportunity for all scientists and practitioners in the field of animal hygiene to collect new knowledge and to exchange information and realize new contacts and cooperation. Based on the registration on this moment we expect about 275 scientists and 50 accompanying persons. This gives a good opportunity for individual contacts. Furthermore there will be some social events to give the congress participants the opportunity to meet old and make new friends in an informal environment. The last day is reserved for professional excursions and a final farewell program at the end of the day.

### PTF- Support

We did find sponsors giving us the opportunity to keep the costs as low as possible for the participants. But even then it worked out to be very difficult for young scientists from developing countries to attend the congress. Therefore the "Professor Tielen Fund" foundation was erected to collect money to give this young scientists the opportunity to participate. We received over 40 applications for financial support and could assign 26 young scientists with financial support. The young scientists from the European countries will receive free congress and lodging during 6 nights. The young scientists from "oversea" will receive an extra support for the traveling costs.

The Organizing Committee believes that they have realized a good scientific congress with a broad international participation out of 43 countries. We hope, that the participants will make the congress successful.





## **XI CONGRESS IN ANIMAL HYGIENE MEXICO**

**23 - 27 February 2003**

**By Prof Dr Jorge A. Saltijeral O.**

**T**he City of Mexico in next three years will be a reference point forced for those that work in the animal hygiene. Mexico City is the world's largest metropolis with 22 millions of people, the capital oldest in America founded in 1492, located 2245 meters on the level of the sea.

Mexico is too land of contrasts. That rich are filthy rich and the poor are filthy poor, that the rain forests are wet and the deserts dry. It is the mix of splendor and sacrifice that the names of Teotihuacan, Monte Alban evoke. It is the churches, altars and shrines that, as a result of the Spanish Conquest, sprang up in every city, town and village. It is the profusion of plant and animals as diverse as the land itself. It is the masterly murals of Rivera and Siqueiros seen in and on public building across the country.

Certainly there is enough variety in Mexico to satisfy every possible taste.

We are proud to say that Mexico has had the honor to host various international meetings as is the case of a World Veterinary Congress in 1970, Pan-American Veterinary Congress 1994 and soon Animal Hygiene Congress. In Mexico there are 34 schools of Veterinary, 1500 professors and 18 000 students. We are involving them in the next congress.

In this Spring the Organizing Committee of this congress will be constituted, in the Committee they participated, universities, governments and private sector.

Actually are 47 Country representatives in our Society, We hope in Mexico will be more represented countries. Your help to diffuse this Congress will be very valuable.

I am hopeful that the attendance to this Congress has a number high of participant and they give us the opportunity to offer them the traditional Mexican hospitality.  
See you in February 2003.



## NEWS FROM AUSTRALIA : REPORT ON THE PRDC/SARDI HYGIENE

### HEALTH AND PRODUCTION WORKSHOP BY DR COLIN CARGILL

*The workshop was organised by the Pig and Poultry Production Institute (a joint venture between the South Australian Research and Development Institute (SARDI) and Adelaide University), Roseworthy, South Australia, and the Unité Epidémiologie Porcine et Assurance Qualité, Agence Française de Sécurité Sanitaires des Aliments (AFSSA), Ploufragan, France. It was held at the SARDI Aquatic Sciences Precinct in Adelaide, Australia, on 2<sup>nd</sup> December 1999.*

*The keynote speakers were Professor Francois Madec (AFSSA), Dr Colin Cargill (SARDI) and Mr Thomas Banhazi (SARDI).*

#### Background information presented

One of the main aims of any pig production system is to reduce the prevalence of disease and its impact on herd production, as well as to improve the welfare of the pigs. Hence, it requires a mixture of management, housing and husbandry factors to provide an optimal environment for the pigs. This includes optimising air temperatures, surface hygiene, air quality and social interaction between the pigs.

The effect of poor shed environment on the physiology and immune system of pigs has not been adequately studied. However, several studies have demonstrated a link between disease prevalence and severity and shed environment (Donham, 1991; Madec *et al*, 1998; Cargill and Skirrow, 1997). It is now generally accepted that if an animal is stressed by its environment, its resistance to disease is lowered and the infective dose required to cause disease is reduced.

Over the past decade several strategies have been employed to reduce the spread of infection between groups of pigs and to improve the hygiene and air quality in sheds. These include batch farrowing and segregating growing pigs in strict age groups, and using all-in/all-out (AIAO) management systems (Gonyou *et al*, 1999).

#### The role of hygiene and air quality in herd health

Many of the diseases affecting modern pig production, including the common health problems of post weaning enteric disease and respiratory disease, can be classified as multi-factorial disease complexes (Madec and Leon, 1999). One of the features of this group of diseases is that they

require the presence of certain risk factors before clinical signs appear. The common risk factors include poor hygiene, poor ventilation, bad air quality, low or fluctuating air temperatures, overstocking, and diets deficient in essential amino acids and micronutrients. In general, the greater the number of negative risk factors, the more severe the disease.

An important aspect of multifactorial health problems is that their impact on the health and production of pigs can be reduced or eliminated by removing the risk factors. Improving husbandry, hygiene, air quality and the thermal environment in pig sheds, and manipulating pig flow and management will all have a positive effect.

Hygiene and air quality play an important role in the severity and impact of disease in growing pigs (Cargill and Skirrow, 1996; Madec and Leon, 1999). The airspace in conventional pig sheds and eco-shelters contains relatively large numbers of airborne particles which are a mixture of dust, dried dung, bacteria (living and dead), undigested nutrients, cells from the mucosa of the intestines, as well as skin dander and even dust and grain mites (Donham, 1995). Ammonia and other gases, as well as bacterial endotoxins, 1-3 $\beta$ -glucan and peptidoglycan, may also be absorbed into the particles. The smallest airborne particles (< 5 microns in diameter) are more correctly referred to as respirable particles, or respirable bioaerosols, and are inhaled into the lungs of both humans and pigs. Once in contact with alveolar tissues, many of the components of the bioaerosols trigger an inflammatory reaction, which compromises the pig's ability to destroy pathogenic bacteria (Robinson, 1994). Of equal importance is the fact that animals reared in a clean environment have a greater appetite and channel fewer nutrients to maintain this non-specific immune response (Klasing and Barnes, 1988).



## Examples of risk factors driving disease severity.

The adverse effects of sub-optimal temperatures on young pigs has long been recognised. In one study (Cargill, 1983), neonatal piglets from the same herd, and containing similar gut flora, were reared under five different climates, including warm-dry ( $29 \pm 2^\circ\text{C}$ ), warm-moist ( $29 \pm 2^\circ\text{C}$ ), cool-dry ( $21 \pm 2^\circ\text{C}$ ), cool-moist ( $21 \pm 2^\circ\text{C}$ ) and fluctuating -dry ( $21 - 29^\circ\text{C}$  over a 24 hour period). Piglets reared in a warm-dry environment had significantly less scouring compared with all other groups, and there was significantly more deaths in pigs reared in a fluctuating-dry climate than in the other groups. Temperature also influenced the development of aspects of gut immunity. The appearance of IgG staining cells in gut mucosa was delayed by 2.5 to 5 days in pigs subjected to cold and fluctuating temperatures when compared with pigs in a warm-dry climate, and the number of Ig staining cells present at day 28 in pigs reared in cold or fluctuating temperatures was reduced by 42%.

The effect of shed environment and husbandry practices on post-weaning enteric disease has also been demonstrated under experimental and field conditions (Madec *et al*, 1998). In this study, modifications were made to buildings to improve temperature control in sheds, and changes were made to husbandry and cleaning practices to improve hygiene in pens. The improvements to air temperature and to the cleanliness of pens reduced the severity and prevalence of post-weaning diarrhoea significantly. Factors that were found to increase the risk of post-weaning digestive problems included poor pen hygiene, poor air quality, sub-optimal temperatures in weaner rooms, low feed intake (especially in the first week post-weaning), low weaning weights, increasing pig numbers in pens (especially when pigs came from several litters), increased stocking rate (pigs/square metre) and reduced feed trough space/pig. Correcting the factors on a farm resulted in less post-weaning diarrhoea and mortalities, less antibiotic usage and improved growth rates.

The implementation of aged-segregated rearing (ASR) on existing continuous flow farms has also led to similar improvements in growth rates with reductions in the severity of respiratory disease (Cargill *et al*, 1997; 1999) and in the usage of antibiotics (Banhazi *et al*, 1999). Cleaning has been identified as a key factor in achieving the potential health and production benefits attributed to all-in/all-out systems (Cargill *et al*, 1998). In the latter report cleaning facilities between batches of pigs accounted for 80 to 90% of the growth rate improvements achieved. In a more recent survey, it was found that general hygiene, cleaning procedures, quality of slats, dunging patterns, type of shed management (continuous flow verse AIAO) and shed biomass ( $\text{kg pig/m}^3$ ) were closely related to the environmental air quality of the shed.

Although ventilation levels also influenced pollutant concentrations in sheds, it was only beneficial in clean sheds. In dirty sheds, increased ventilation resulted in worse pollution (Banhazi, unpublished). The effects of surface hygiene on air quality was even more marked with reductions of 50 to 70% in airborne bioaerosols in clean rooms compared with dirty rooms. It was also found that levels of airborne particles and airborne viable bacteria in all-in/all-out grower and finisher facilities were from 10% to 40% lower than in continuous flow accommodation.

Both stocking rate ( $\text{kg pig/m}^2$ ) and stocking density ( $\text{kg pig/m}^3$ ) also have a significant influence on surface hygiene and air quality in sheds (Madec and Leon, 1999; Murphy *et al*, 2000). It appears that stocking rate impacts on surface hygiene and that both surface hygiene and stocking density impact on air quality

### **Identifying the critical management and housing components for sustaining an ideal environment for pigs?**

The important issues that influence the physical environment include :

- manipulating pig flow and management;
- improving air hygiene by reducing ammonia levels;
- improving surface hygiene through cleaning and correcting dunging patterns;
- manipulating protein levels of the diets to reduce ammonia levels.
- improving effluent management and methods of effluent disposal.
- The key issues relating to effluent disposal include:
  - the availability of water;
  - the use of clean water;
  - alternatives to flushing, such as pit scrapers and pull-plug systems.

Issues affecting thermal comfort include improving temperature control with the use of insulation, controlled ventilation, cooling, heating and creating microenvironments.

Stocking density and stocking rate were identified as key factors that influenced both hygiene and thermal comfort, as well as social interaction between pigs.

The housing issues include shed design, repairs and maintenance, feed and water delivery.

### **Results and directions from the PRDC/SARDI Hygiene Workshop**

While it is important to understand the interactions between air (quality) and surface hygiene, and pig health and production, it is even more critical to find cost effective methods for managing the



problem. This was the theme of a Workshop sponsored by the Australian Pig Research and Development Corporation and the South Australian Research and Development Institute in Adelaide in December, 1999.

Participants at the Workshop agreed that accurate and practical methods for assessing air and surface hygiene, and cost-effective strategies to reduce or eliminate the problem at its source, are the key to solving the problem.

**Identifying the practical hurdles that prevent producers from adopting recognised improvements into housing design and management practices**

A lack of appreciation of the benefits that accrue from AIAO management systems and the knowledge of how to implement a new system in an existing facility were identified as major barriers for producers. Figures for the cost of conversion, and resultant cash flow scenarios are required, as well as the changes needed for managing the breeding herd, and marketing lightweight pigs from AIAO systems.

The lack of accurate and simple techniques for quantifying and assessing air and surface hygiene objectively was also identified as a major constraint. Unless producers are able to identify the deficiencies in their current production system, they will not be motivated to adopt new practices. Other barriers included the attitude and motivation of staff, mechanical failures in automated systems and a lack of time and technical expertise.

**Identifying the solutions to overcoming these hurdles**

Reliable data that demonstrated the cost:benefit of moving from continuous flow to all-in/all-out would significantly motivate producers. Although some data is available from previous research projects funded by PRDC, it needs to be broadened to actual whole farm studies. Incorporating data from hygiene and air quality studies into the AUSPIG model, would also enable producers to estimate potential improvements in production efficiency.

Accurate measurement of growth rate performance and health status is essential and these will be more easily achieved in a batching AIAO system. Identifying the reasons for variability in growth rate and how to manage tailenders is also important. However, although growth rate variability is more apparent in AIAO systems, it is significantly less than in continuous flow systems. One strategy for managing smaller pigs that fail to reach market weight on time is to provide alternate "overflow" accommodation using small straw based shelters.

A lack of expertise in artificial insemination and hormonal management of sows were seen as key factors preventing the move to batch farrowing.

Developing a simple "checklist" of housing, husbandry and management features, known to impact on hygiene and air quality, was seen as an accurate and practical way to solve problems.

An equipment list for assessing air hygiene is provided (Table 1). The "kit" would contain the equipment required to complete the assessment, together with forms that lead the producer through the assessment, could be developed to cover all aspects of hygiene and air quality.

**Strategies for solving problems**

Although further investigations are required to develop a full range of strategies that could be used to overcome air and surface hygiene deficiencies, several proven and potential strategies can be listed.

These include:

- meeting published targets for stocking rate and density;
- correcting dunging patterns by minimising draughts, fixing slats and confining wet areas to the slatted floor;
- cleaning empty pens before restocking;
- converting continuous flow to an AIAO management system to enable cleaning;
- improving effluent disposal with deeper pits or covering dung with water;

**Conclusions**

Data presented at the workshop confirmed that both air and surface hygiene have a significant impact on pig health and production, especially in weaner and fattening accommodation. A range of key risk factors have been identified and their effect on pigs validated under commercial pig production. Others are still to be identified.

While many strategies have been shown to have a positive effect on air and surface hygiene, it can be concluded that no single strategy should be promoted in isolation of other technologies. The greatest benefit will come from taking a whole farm or shed approach, listing the key features present that reduce air and surface hygiene, and establishing a plan to eliminate these features from the production system, in an ordered manner, as finance and time permits.

Table 1 - The basic "air hygiene kit" for consultants and producers

ITEM	METHOD	REASON/OUTCOME
Carbon dioxide	tubes	check ventilation (need 24 hr monitoring to assess ventilation)
Ammonia	tubes	check ventilation/effluent management
Air speed/movement	smoke tubes	assess ventilation/air turbulence
Dust/airborne particles	white tile with black lines	assess general dustiness
Temperature/humidity	temp/humidity data loggers	assess thermal conditions



## **An EU Symposium in Paris on Antibiotic Resistance in Bacteria of Animal Origin**

Dr Claire CHAUVIN  
Afssa Ploufragan, France  
(French Agency for Food Safety)

An European symposium entitled "Antibiotic Resistance in Bacteria of Animal Origin - Monitoring Strategies, Recommendations, Ways of Research" was organised in Paris at Pasteur Institute on the 29-30 November 1999, as part of a concerted action funded by the EU Commission. The main objectives were to discuss a way to harmonise the antibiotic resistance monitoring and to develop ways of research for a better understanding of the resistance mechanisms. About two hundred and twenty participants, biologists, physicians, veterinarians, researchers from twenty seven countries were present.

### ***Antibiotic resistance monitoring***

Three countries presented their specific programme :

Denmark initiated a global monitoring scheme in 1995: the Danish Integrated Antimicrobial Resistance Monitoring and Research Programme (DANMAP) which monitors both trends in resistance among bacteria from animals, humans and food and in consumption of antimicrobial drugs. The Spanish programme (VAV for "Vigilancia Antibiorresistencias Veterinaria") started in 1996 and it firstly implemented surveillance of sick animals. Bacteria from healthy animals and samples from the slaughter house were added in 1997 and 1998. In France surveillance of bacteria from animal origin is carried on through two types of networks. The first one gathers *Salmonella* strains and tests their antimicrobial susceptibility. The other collects antibiogramme data from veterinary diagnostic laboratories.

Three main ways of monitoring can be described in all participating countries : zoonotic bacteria (*Salmonella*, *Campylobacter*), indicator bacteria (*E. coli*, *Enterococcus*) and specific pathogens (*Staphylococcus*, *Streptococcus*, *Pasteurella*). Even though assessment of the 12 European countries programmes points out differences (in bacteria which are considered, antibiotic tested, presentation of the results...) most programmes are similar in that disk diffusion, control strains and bacteria monitored tended to be similar. These findings suggest that it may be possible to harmonise monitoring programmes between different countries.

### ***Ways for further research***

There is urgent need to establish rational bases for a "prudent use" of antimicrobials. To restrict antimicrobial drug usage is not sufficient. Rational use must be based on current knowledge of the mechanism of resistance and of the action of the antimicrobial drug. Studies determining pharmacodynamic and pharmacokinetic properties of antimicrobial drugs were presented but this approach must be largely developed. Besides, alternatives to the use of antibiotics should be a better control of microbial diseases in animals as it was also exposed (by means of best hygiene and vaccination for exemple).

### ***Resistance epidemiology***

Routes of transmission of resistance *via* water and food plants have been less investigated than *via* meat products. Links between animals and humans were exposed showing that the prevalence of resistance in a population can be correlated to the veterinary use of antimicrobials. But risk is difficult to quantify in this state of the art. In an attempt to quantify the risk of diffusion, among hospitals for exemple, mathematical models have been recently developed. Their first results were given. They concerned the study of the emergence, spread and control of antibiotic resistance.

Abstracts of the communications are available on : [www.fougeres.afssa.fr/arbao](http://www.fougeres.afssa.fr/arbao) and full texts will be published in a scientific journal as a special issue in the next months.



# Ramiran : recycling of agricultural, municipal and industrial residues in agriculture network

In 1976, researchers from a number of European countries established a network on animal waste utilisation. It was restructured in 1990 to reduce the number of working groups to two and *ad hoc* expert groups were created to address specific issues. The last workshop on Animal Waste Management which was held in Gödöllő, Hungary, 8-10 October 1996, decided that the Network should, after twenty years of intensive work on animal waste management, change direction and include municipal and industrial wastes as these were increasingly spread on land and were also the cause of environmental pollution. The two topics of application techniques and environmental pollution had been major concerns of the network already. To reflect the inclusion of municipal and industrial wastes, the Network was renamed to the present RAMIRAN.

Among current activities of the Network are cooperation in the development of models and decision support systems, elaboration of a glossary of terms on manure and the conducting of a survey on solid manure management in Europe. A report is being elaborated on the content of heavy metals in manure. A database on research projects dealing with solid manure and identification of research gaps is also being elaborated. The need to compile information on existing guidelines and regulations, country by country, has been identified to be addressed as a future activity. Some participants of the Network are financed by an EU Concerted Action and a proposal for a research and technology development project is being drafted on the theme of hygienic quality of manure for the V Framework Programme.

The Eighth International Conference of RAMIRAN (Rennes, France, 26-28 May 1998) "Management Strategies for Organic Waste Use in Agriculture" was attended by 136 delegates from 26 countries. Proceedings of all presentations and posters are jointly published by FAO and CEMAGREF. The two volumes can be obtained from the coordinator. Previous publications of the Network can be found under the REU Technical Series.

## OBJECTIVES

The principal objective of the Network is the promotion and active exchange of information, knowledge, techniques and research results (including guidelines) on the recycling of agricultural, municipal and industrial waste in agriculture. The secondary objectives are to summarize and achieve concrete results by selecting priority topics decided during the biennial meetings and promote the distribution and application of these results.

## STRUCTURE

The Network is structured into the following Expert Groups:

- Gaseous Emissions - T. Misselbrook (United Kingdom)
- Solid Manure - H. Menzi (Switzerland)
- Heavy Metals - R. Unwin (United Kingdom)
- Hygiene - R. Bohm (Germany)
- Other Wastes - P. Balsari (Italy)

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Web page Cemagref Rennes (french) : <http://www.rennes.cemagref.fr>



## Announcements

*Remind that the newsletter is used as a tool for informing the members on different subjects related to animal hygiene. The letter is open for news coming from different countries. So please contact me and/or the members of the board if you have proposals.*

**Dr. F. MADEC Secretary**  
**f.madec@ploufragan.afssa.fr**

- ➡ 51<sup>st</sup> Annual meeting of EAAP (European Association for Animal production. 21-24 August 2000, the HAGUE, the Netherlands. Organizing committee : c/o S. Van der Beck CR DELTA PO Box 454 - 6800 AL Arnhem the Netherlands : Web : [eaap2000.wau.nl](http://eaap2000.wau.nl) - e-mail : [eaap2000@alg.vf.wau.nl](mailto:eaap2000@alg.vf.wau.nl)
  
- ➡ 2<sup>nd</sup> Congress of the European Society on Agricultural and food ethics  
24 – 26 August 2000.  
Venue : Royal Vet. and Agric. University. COPENHAGEN, DENMARK  
Updated information is available from the congress  
web site - <http://www.husdyr.kvl.dk/psd/eursafe.htm>
  
- ➡ 52<sup>nd</sup> Annual meeting of EAAP : Budapest (HUNGARY, 26 – 29 August 2001.  
e-mail : [Jgundel@atk.iif.hu](mailto:Jgundel@atk.iif.hu) - homepage : <http://www.atk.hu>
  
- ➡ XXI world Buiatrics Congress  
4 \_ December 2000, PUNTA del ESTE, Uruguay  
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Web : <http://Come.to/buiatrics2000>
  
- ➡ 9<sup>th</sup> RAMIRAN Workshop, 6 – 9 September 2000 in Italy  
(recycling of Agricultural, Municipal and Industrial Residues in Agriculture Network)  
General item : Technology transfer  
Web site : <http://users.unimi.it/~fsangio/fao/ramiran2000.html>