Estonian Higher Education Accreditation Centre

Evaluation of Research in Veterinary Medicine (4.5) in Estonia

Institutes evaluated

Estonian Agricultural University
Faculty of Veterinary Medicine

Evaluation dates
November 25-30, 2003

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Part I
General Overview

Introduction

At the request of the Estonian Higher Education Accreditation Centre, Tallinn (EHEAC), an evaluation team (hereafter named the "Evaluators") visited institutes in Estonia carrying out research activities in veterinary medicine (4.5). The evaluating team consisted of Prof. Graham Perry (University of Bristol), Prof. Terttu Katila (University of Helsinki), Prof. Andrew Tait (University of Glasgow), Prof. Felix Althaus (University of Zürich) and Prof. Wilfried Meyer (Veterinary School of Hannover).

The institutions to be evaluated were:
1) Estonian Agricultural University, Faculty of Veterinary Medicine
- Animal Health Research Group
- Animal Reproduction Research Group
- Parasitology Working Group, Department of Parasitology

The evaluators were provided in advance with self-assessment reports from the institutions, prepared by the members of their groups.

After a brief orientation meeting at EHEAC, the evaluators visited the institutions to be evaluated in Tartu during two days. At these meetings staff members of the various departments presented their work. During these presentations as well as during the subsequent discussions additional information about the research activities was provided. This included additional documents such as copies of published papers.

Approach to the evaluation
The evaluators were asked to:
1) Judge the activities of research and development in the units evaluated and the research topics implemented by them to ensure the governmental funding for internationally recognised research and development. The team was asked to concentrate on research units (university departments, laboratories) with specific comments to sub-units, groups if necessary.
2) Identify deficiencies in the activities of research and development units.
3) Give recommendations on the development concerning research and development and research areas to the state of Estonia.

The team received the following materials: A working schedule, principles and criteria for evaluation of the research units, evaluation guidelines for the ranking of research units, and self-evaluation reports created by the research units themselves.

On a first evaluation point, the ***quality of the research activities*** was considered. This assessment is largely based on the records of scientific publications.

Excellent	***The majority of the submitted works are at a high international level and virtually all others at a good international level***.
Excellent to good	*At least one third of the submitted works are at a high international level and many others at a good international level, these together comprise a clear majority.*
Good	***The majority of the submitted works are at least at a good international level and virtually all others at a fair international level***
Good to satisfactory	*At least one third of the submitted works are at a good international level and many others at a fair international level, these together comprise a clear majority*
Satisfactory	***The majority of the submitted works are at least at a fair international level***
Satisfactory to unsatisfactory	*A minority of the submitted works are at a fair international level*
Unsatisfactory	***None, or virtually none, of the submitted works are at a fair international level***

Regarding the grading of the research activities, the evaluation team was instructed by the EHEAC to reserve the term **excellent** for groups, which were found to be among the best 10% of the European groups in the corresponding field. Similarly, the term **excellent to good** should be used if the evaluated group was found to be among the best 25 % of corresponding European groups. The full scale comprised 7 levels, in addition to the highest ones the grades are **good, good to satisfactory, satisfactory, satisfactory to unsatisfactory,** and **unsatisfactory.**

Secondly, the ***over-all capability*** of a research unit was evaluated based on a the combined assessment of the following criteria (each graded in three levels):

	Grade 0	Grade 1	Grade 2
Originality/novelty of past and ongoing research activity	descriptive, no novelty	some novelty/originality	original/novel
The strategy and perspective of research	no or bad strategy, no or unclear perspective for further research	fair strategy and perspective for further research	clear strategy and very perspective for further research
Multidisciplinarity and relevance for other research areas	no multidisciplinarity, no relevant for other research areas	some multidisciplinarity, some relevance	good multidisciplinarity, good relevance for other research areas
The competence of research groups and their capability for development	low competence	there is competence, but no young postgraduate and postdoctoral students	there is competence and postgraduate and postdoctoral students
National and international co-operation	no particular national and international co-operation	some national/international co-operation	good or tight national/international co-operation
Success in applying for funds and grants	no particular success	fair success	applying successfully for grants and funds

Excellent - 12-10 (total grade), **Good** - 9-7 (total grade), **Satisfactory** - 6-4 (total grade) and **Unsatisfactory** - 3-0 (total grade). As the result of this assessment one of the four grades **excellent, good, satisfactory** or **unsatisfactory** was given for the group.

Thirdly, the ***implementation opportunities*** for the research results and their importance for the Estonian society were commented upon.

Finally, on a fourth evaluation point ***the critical comments and recommendations*** were asked to be given by the evaluation team.

Part II
General Comments
Introduction

We were informed by the Rector Prof. A. Karis and the Vice-Rector (Research) Dr. A. Koppel that the mission of the Estonian Agricultural University (EAU) is to guarantee sustainable use of the national natural resources and, particularly, to enhance rural development. However, to achieve this important national goal, it is necessary to transform the EAU from a traditional, purely agricultural university, into a university of life sciences reflecting European standards, especially satisfying the needs of the European Union (EU). We sought evidence that the recent restructuring of the university system would facilitate a vibrant research community active in areas of national and international veterinary science. The Faculty of Veterinary Medicine of the EAU should produce well-educated veterinarians that are capable of ensuring the health and welfare of nationally important domestic animals, as well as a high quality standard of farm products. This task, however, can only be fulfilled if it is backed by an effective scientific national research program that is, moreover, able to exploit various financial resources including international grants.

In considering all these aspects it is of critical importance to develop a research system at the Faculty of Veterinary Medicine that better educates and, frankly speaking, also provides better motivation and encouragement for young scientists. In addition, to achieve competitive research activity requires investment in equipment and infrastrucuture. Young scientists should have the opportunity to get to know research conditions in other countries, learn more about funding opportunities, and have an acceptable financial standard of living. In view of our experience during the presentations of the three groups under evaluation we would expect a Graduate School which could guarantee better working conditions for the group leaders to improve their own standard of research by, for example, reducing their standard time of teaching and to give them the opportunity to make use of sabbatical leave. It should be noted that scientists of international standing normally spend the majority of their time on research.

To highlight the actual situation, we want to inform about the prospective teaching load at the Faculty of Veterinary Medicine. The staff comprises 25 full time lecturers and 10 contract lecturers; to deliver the teaching course a further 23 lecturers from other faculties contribute. The average teaching load is 421 hrs per full time lecturer excluding examinations, exam marking and supervision of postgraduate students and is more than 30% higher than that at the University of Tartu. This was increased as a result of extending the course to six years. To deal with this the EAU proposes that an additional 9 staff are recruited from the graduates in the doctorate program. While we

accept that this is necessary to comply with EU requirements, we view the development with considerable concern as it will preclude the development of research as more teaching duties will be required rather than less.

We feel that there are good prospects for achieving a modern and more effective research system at the Faculty of Veterinary Medicine of the EAU based on a pool of young scientists, e.g. PhD students, assistants, etc. This could be clearly facilitated by the restructuring of the university teaching and funding system.

Part III
Evaluation of institutions and research groups

1. Animal Health Research Group: Monitoring of Dairy Cows' Health and Welfare *(Head: Prof. Jaan Praks)*

Research staff

Department of Animal Health

Jaan Praks, Prof., DScVM, since 01.09.2003 Professor Emeritus;
Andres Aland, Lecturer, DScVM, since 01.09.2003 Head of the Dept.;
Endla Palm, senior laboratory assistant, DVM.

Department of Infectious Diseases

Tiiu Saar, Head of the Department, Assist. Prof., DScVM;
Endel Aaver, Senior Researcher, PhD;
Jaagup Alaots, Assistant Professor, PhD;
Valentina Aigro, DVM, Virologist;
Ester Lauringson, Laboratory Assistant.

Estonian Veterinary and Food Laboratory

Arvo Viltrop, Deputy Director, DScVM, since 01.09.2003 Assist. Prof. in the Department of Infectious Diseases.

Main research fields

Most important keywords are disease incidence, environmental risk factors, suitability of different keeping technologies, viral and mastitis pathogens in herds. Main research topics include:

1. disease monitoring in dairy cows, determination of risk factors of diseases,
2. investigation into the suitability of different technologies for dairy cattle keeping,
3. automatisation of dairy cows' health control,
4. the nosological structure of the respiratory and enteric viral diseases of cattle in Estonia,
5. elucidation of biological character, antigenic and genetic variations of bovine herpesvirus-1 and bovine diarrhea virus,
6. the improvement of diagnostic methods for the determination of specific bovine herpesvirus-1 antibodies,
7. adaption of rabies virus with host ranges, elucidation of molecular epidemiology and transmission of the rabies virus.

Target-financed projects

"HYGIENE OF DAIRY CATTLE" (1997-2001). Principal investigator **J. Praks**. Principal researchers: M. Jalakas, K. Kadarik, T. Ööpik, K. Peterson, B. Aasmäe, A. Aland, P. Saks, T. Kaart, T. Tiirats. Cost of the project 1 065 500.- EEK

Grants and applied researches connected to the target-financed project "Hygiene of dairy cattle"
Research grants:
1. Estonian Science Foundation: 1985, 4109, 2680, 2897
2. Applied research projects financed by the Estonian Ministry of Agriculture:
    2a. "Monitoring of antimicrobial resistance of pathogens isolated from food producing animal and development of systematic evaluation programme"

1a. Grant 1985
The grant was inter-disciplinary. The following sub-theme was involved with the target-financed project:
"The model for monitoring the health of dairy herds" (1996-1999). PI: **J. Praks**. Principal researchers: A. Aland, I. Veermäe, V. Poikalainen. Total sum of the grant 565 000 EEK

1b. Grant 4109
"Health risk factors of dairy cattle in different keeping technologies" (2000-2003). Principal investigator **J. Praks**. Principal researchers: A. Aland, T. Kaart. Cost of the project 295 000.- EEK

1c. Grant 2680
"Impact of lactation on acid-base disorders in dairy cows" (1997-1999). PI: **K.Kadarik**. Principal researchers: K. Soidra. Cost of the project 156 000.- EEK

1d. Grant 2897
"Structure of bovine pelvis in connection with dystocia and development of suspensory apparatus of the bovine udder" (1997-2000). PI: **M. Jalakas**. Principal researchers P. Saks, E. Järv. Cost of the project 160 000.- EEK

RESEARCH GRANTS
1. Grant 2672
"Dynamics of the spread of animal virus diseases and control systems based on epizootological analysis" (1997-1999). PI **E. Aaver**. Principal researcher T. Saar. Cost of the project 320 000.- EEK

2. Grant 4122
The antigenic characterization of bovine paramyxoviruses, the distribution of infections and control (2000-2003). Principal investigator **E. Aaver.** Principal researcher T. Saar. Cost of the project 312 000.- EEK

3. Grant 1986
"The antigenic variation of the bovine viral diarrhoea virus in Estonia and its influence to the epizootic process" (1996-1998). Principal investigator **J. Alaots.** Principal researcher A. Viltrop. Cost of the project 210 000.- EEK

4. Grant 3684
"The genetic variation among the strains of bovine viral diarrhea virus (BVDV) and the molecular epidemiology of the infection in Estonia" (1999-2000). PI: **J. Alaots**. Principal researcher A. Viltrop. Cost of the project 160 000.- EEK

5. Grant 4803
"Host specificity, molecularepidemiology and epidemiologic cycles of the rabies virus in Estonia" (2001-2003). PI: **J. Alaots**. Principal researcher A. Viltrop. Cost of the project 195 000.- EEK

APPLIED RESEARCH AND CONSULTATIONS
"Monitoring of antimicrobial resistance of pathogens isolated from food producing animal and development of systematic evaluation programme" (2001–2003). Financed by the Estonian Ministry of Agriculture. Principal researchers**:** B. Aasmäe, P. Kalmus

General Comments

Animal Health is a very important strategic area for the development of agriculture in Estonia. The evaluators felt that the Animal Health Group needs to be strengthened and that it could greatly benefit from a set of measures aimed at increasing the international competitiveness of the unit. Generally, the high level of teaching seems to distract from a more pronounced research performance.

Evaluation of Research Activities

The team of evaluators judged the overall quality of the research to be *satisfactory,* but the research output to be *unsatisfactory.* Hence, the overall rating according to the guidelines of the Estonian Higher Education Accreditation Centre is ***unsatisfactory***.

The criticism pertains to the fact that only 4 publications qualify as full research articles in refereed journals according to the international standards that were asked to be applied to the evaluation. The ranking as "CC publications" is not used as an evaluation criterion outside Estonia. The rankable publications are:

- Jalakas et al., Anat. Histol. Embryol. 29:51 – 61, 2000
- Jalakas Theriogenology 54: 1281 – 1284, 2000
- Aaland et al., Appl. Animal Behaviour Science 78: 43- 54, 2002
- Viltrop et al., J. Vet. Med. B 49: 263 – 269, 2002

Only the latter two publications are truly relevant to animal health, while the works of Dr. Jalakas are quite interesting but to people outside the animal health field (his work was also presented by the Animal Reproduction Group: in fact, the discovery of a hitherto unknown *Os interischidadicum* is quite spectacular and should have gone into a broad-spectrum high impact journal !)

The evaluation committee recognised that the Animal Health Group published 67 additional reports. These comprise congress papers, reports in Estonian journals, theses and monographs that get very limited attention outside Estonia. The problem is that such publications achieve little or no international recognition which is an important prerequisite for a profitable scientific exchange at all levels. For example, the international community should be made aware of the specific strengths of the Estonian Animal Health Group: the access to large herds and the potential availability of valuable data and material. Such an animal population is attractive for epidemiologist elsewhere who study the same herd health problems. If the Animal Health Group manages to get more attention from the international scientific community, it should become a partner in larger research consortia (e.g. of the EU) and thereby attract substantial research funding. This in turn would allow more recruitment of talented young scientists. Moreover, the group could gain more access to international exchange of academic personnel (sabbaticals of senior researchers, exchange of postdoctoral fellows, technology transfer etc.). Thus, publications in international journals become the starting point for a success loop in academic research.

Evaluation of Overall Capability
The team of evaluators judged the overall capability to be ***satisfactory***.

	Grade
Originality/novelty of past and ongoing research activity	**1.0**
The strategy and perspective of research	**0.5**
Multidisciplinarity and relevance for other research areas	**1.0**
The competence of research groups and their capability for development	**1.0**
National and international co-operation	**1.0**
Success in applying for funds and grants	**1.0**

The implementation opportunities for the research results and their importance for the Estonian society
Animal Health is a strategic area for the successful development of Estonian Agriculture. However, not all the animal health problems can be studied (or solved) within Estonia. A successful (and cost effective) strategy to improve the implementation of research results would be to strengthen international cooperation at all levels. Towards this goal, the group would have to focus on one (or very few) research topic(s) of national interest and strive to achieve a high level of research competence. If they manage to become opinion leaders in one subject of animal health, this could attract the interest of the international scientific community and bring a number of substantial benefits:

- Partnerships in EU research programs
- Larger source of research funding
- Opportunity to recruit more talented young scientist (also from other disciplines)
- Achieve a critical mass of scientific expertise
- Benefit from the input of visiting scientists
- Partnerships in international academic exchange programs

Another measure to be considered is the co-ordination of data collection, sampling and epidemiological assessment of the research results. Epidemiology has become a highly sophisticated discipline and the Animal Health Group should aim to intensify collaborations with professional epidemiologists on an international level. The group could both benefit and contribute to problem-solving and, ultimately, animal health in Estonia would profit from a continuous exchange of ideas, concepts and results. In a larger perspective, the group should aim to attract foreign researchers to perform studies on the large herds kept under standardised conditions. Thus, Estonia offers some unique research opportunities which are not available elsewhere. The potential benefit to Estonian agriculture is obvious.

Recommendations

- Focus research on one or two topics of major national interest and try to achieve excellence on a international level
- Capitalise on the strong points: excellent access to large herds in large barns

- Co-ordinate data collection, sampling and data evaluation procedures on a international level
- Research "marketing": publish in international refereed journals
- Efforts to publish in Estonian journals should be kept to the minimum required for government reporting and interactions with professionals at the front
- Aim at becoming a partner in larger EU research programs; consider other international sources of funding (DAAD, Wellcome Trust, EU-Marie Curie etc.)
- Encourage young investigators to spend some research time in international centers of research
- Try to involve an internationally recognised research leader to assist with the scientific development of the groups chosen research focus

2. The Animal Reproduction Research Group *(Head: Prof. Ülle Jaakma)*

Research staff

Jaakma, Ülle Professor (0.5), senior research associate (0.5) PhD

Valdmann, Andres (Senior Research Associate, MSc, Dr. Vet. Sc.); Kurõkin, Jevgeni (Senior Research Associate, PhD); Kask, Kalle (Associate Professor, PhD); Jalakas, Mihkel (Lecturer, MSc), Aidnik; Madis (Associate Professor, PhD); Tiirats, Toomas (Lecturer, MSc); Majas, Lembit (Research Associate, PhD); Padrik, Peeter (PhD student, MSc); Kavak, Ants (PhD student, MSc); Hallap, Triin (PhD student); Nahkur, Esta-Laine Lecturer (PhD student, MSc); Valdmann, Merle (Assistant, PhD student, MSc); Soidra, Kadri (Research Engineer (0.5) PhD).

Main research areas

- reproductive anatomy,
- reproductive physiology,
- deep intracornual insemination,
- estrus synchronization,
- embryotechnology,
- transvaginal follicle puncture and oocyte aspiration,
- semen evaluation,
- post partum period,
- ovarian activity,
- reproductive disorders,
- hormonal diagnostics,
- evaluation of herd reproductive status
- hybridoma technology
- hormone immunoassay methodology

Target financed projects

BOVINE AND EQUINE REPRODUCTIVE BIOTECHNOLOGY. Reg.no 0170124s98, duration 1998-2001. Project leader **Ülle Jaakma**, PhD. Funding 2, 289

million EEK. Principal investigators: J.Kurykin, PhD; A. Valdmann, Dr. Vet. Sc.; M.Aidnik, PhD; L. Majas, PhD. 3 PhD students.

The project consisted of 4 subprojects.

1. *Transvaginal puncture of ovaries and aspiration of oocytes without using ultrasound in live cows and heifers (PI: J.Kurõkin)*
2. *Studies on semen quality and fertility of Estonian Holstein dairy bulls (PI: Ü.Jaakma).*
3. *Application of milk progesterone content determination to the improvement of reproductive performance in high−yielding dairy herds (PI: A.Valdmann)*
4. *Biotechnology of reproduction in equine (PI: M. Aidnik).*

BOVINE AND EQUINE REPRODUCTIVE BIOTECHNOLOGY AND PATHOLOGY OF THE POST-PARTUM PERIOD. Reg. no 0172097s02, 2002-2006. In 2002 project funding amounted to 615,000 EEK. Project leader **Ülle Jaakma**, PhD.

Principal investigators: J.Kurykin, PhD; A. Valdmann, Dr. Vet. Sc.; M.Aidnik, PhD; K.Kask, PhD; M.Jalakas, MSc; T.Tiirats, MSc. Five PhD students.

The project consists of 8 subprojects that were designed to cover different aspects of reproduction in large animals.

1. *Evaluation and prediction of bull semen fertility using laboratory methods (Ü. Jaakma, T.Hallap, P.Padrik).*
2. *Morphology and developmental ability of oocytes and embryos collected from sub(in)fertile cows and superovulated embryo donors (J.Kurõkin, L.Majas, T.Tiirats, A.Valdmann).*
3. *Post-partum pathology of reproductive organs of high-yielding dairy cow as a reason for infertility (H.Kübar, M.Jalakas).*
4. *Physiological fertility parameters, metabolic disorders and embryonic mortality in dairy cows (A.Valdmann, T. Tiirats).*
5. *Assessment of post-partum reproductive performance in Estonian dairy herds and development of its monitoring model (K. Kask).*
6. *A study of the growth dynamics of bovine hipbones from the perspective of determining the optimum time for pregnancy (M.Jalakas, P.Saks, E.Nahkur).*
7. *Semen quality of the Estonian horse breeds (M.Aidnik, A.Kavak).*
8. *Deep intrauterine insemination and sex-sorted semen (Ü. Jaakma, M. Jalakas, M. Aidnik, J.Kurõkin, L. Majas, A.Valdmann, P.Padrik).*

RESEARCH GRANTS

1. INITIATION OF THE EQUINE ARTIFICIAL INSEMINATION PROGRAMME IN ESTONIA Estonian Science Foundation (ESF) grant No 1979, duration 1996–1999, total funding 360, 000 EEK. Principal investigator **Madis Aidnik**, PhD. Research associate: Ants Kavak, DVM.

2. QUALITY OF HORSE SEMEN AND ITS IMPACT ON THE FERTILITY OF ESTONIAN HORSE BREEDS. ESF grant No 4111, duration 2000–2003, total funding 220, 000 EEK. Principal investigator: **Madis Aidnik**, PhD. Research associates: Ants Kavak, DVM, MSc.

3. MORPHOLOGY AND DEVELOPMENTAL ABILITY OF OOCYTES AND EMBRYOS OF SUB(IN)FERTILE COWS AND EMBRYO DONORS, AND STUDIES ON BULL FERTILITY USING IN VITRO TESTS. ESF grant No 4807, duration 2001–2004, funding 750, 000 EEK (2001–2003). Principal investigator: **Ülle Jaakma**, PhD. Research associates: Jevgeni Kurõkin, PhD; Lembit Majas, PhD; Ilmar Müürsepp, Dr. Vet. Sc.; Peeter Padrik, MSc, PhD-student; Triin Hallap, PhD student.

4. GROWTH DYNAMICS OF BOVINE HIPBONES, AGE-RELATED CHANGES, AND BREED-RELATED PECULIARITIES IN THE PELVIC STRUCTURE – ITS RELATION TO THE OPTIMUM TIME FOR THE INSEMINATION OF HEIFERS AND DELIVERY. ESF grant No 4809, duration 2001–2004, funding 220, 000 (2001–2003). Principal investigator: **Mihkel Jalakas**, MSc. Research associates: Paul Saks, PhD, Esta Nahkur, MSc.

5. ASSESSMENT OF POST-PARTUM REPRODUCTIVE PERFORMANCE IN HIGH-PRODUCING ESTONIAN DAIRY HERDS AND DEVELOPMENT OF A POST-PARTUM REPRODUCTIVE PERFORMANCE MONITORING MODEL FOR ESTONIAN DAIRY HERDS. ESF grant No 4810, duration 2001–2003, total funding 325, 000 EEK. Principal investigator: **Kalle Kask**, PhD.

6. THE OVARY STRUCTURE IN HEALTHY AND INFERTILE COWS. ESF grant No 4099, duration 2000–2001, funding 100, 000 EEK. PI: **Hanno Kübar,** Dr. Vet.Sc., Professor emeritus. Research associate: Mihkel Jalakas, MSc.

7. PATHOLOGICAL CHANGES IN THE GENITAL ORGANS OF COWS CULLED DUE TO INFERTILITY. ESF grant No 4992, duration 2002–2004, funding 100, 000 EEK (2002-2003). Principal investigator: Hanno Kübar, Dr.Vet.Sc., professor emeritus. Research associate: Mihkel Jalakas, MSc.

8. COLLECTION OF OOCYTES FROM LIVE ANIMALS, THEIR DEVELOPMENT IN VITRO AND STUDIES ON THE FERTILITY OF COWS AND BULLS USING IVF METHODS . ESF grant No 3559, duration 1998–2000, total funding 875, 000 EEK. Principal investigator: **Ilmar Müürsepp**, Dr.Vet.Sc. Research associates: Ülle Jaakma, PhD; Jevgeni Kurõkin, PhD; Lembit Majas, PhD; Triin Hallap; Atso Jõks (1998–1999).

9. THE IMPACT OF FEEDING ON THE SECRETION OF METABOLIC HORMONES AND THEIR RELATIONSHIP TO REPRODUCTIVE EFFICIENCY IN DAIRY COWS. ESF grant No 4120, duration 2000–2003, funding 365, 000 EEK. Principal investigator: **Toomas Tiirats**, MSc. Research associate: Kadri Soidra, PhD.

10. PROGESTERONE CONCENTRATIONS AT FIRST INSEMINATION – THEIR RELATION TO THE REPEAT-BREEDING SYNDROME. A FIELD STUDY. ESF grant 3545, duration 1998–2000, funding 140, 000 EEK. Additionally supported by the Norwegian School of Veterinary Science, GENO, Norway. Principal investigator **Andres Valdmann** DrVetSc, Department of Reproductive Biology.

11. FERTILITY-LIMITING FACTORS IN ESTONIAN DAIRY CATTLE. ESF grant 4822, duration 2001–2004, funding 335, 000 EEK (2001–2003). Principal investigator **Andres Valdmann**, Dr.Vet.Sc.

AND

REPRODUCTION IN ESTONIAN DAIRY COWS: ANALYSIS AND STRATEGIES FOR IMPROVING FERTILITY. Research grant of the Estonian Ministry of Agriculture, duration 2001–2005, funding 2001– 325, 000 EEK, 2002– 325, 000 EEK and 2003– 524, 880 EEK. Principal investigator **Andres Valdmann**, Dr.Vet.Sc. Research associates: Jevgeni Kurykin, PhD; Andres Aland, MSc, DrVetSc; Toomas Tiirats, MSc; Merle Valdmann, MSc, PhD student.

These two studies and the above-described sub-project *Physiological fertility parameters, metabolic disorders and embryonic mortality in dairy cows* of the target-financed project "Bovine And Equine Reproductive Biotechnology And Pathology of the Post-Partum Period" (Reg. no 0172097s02), were united in order to resolve basic and applied questions of reproductive failure in dairy cows and to create strategies for the improvement of fertility and

General Comments

The research topics are modern and interesting for the international scientific community shown by the rapidly increasing numbers of peer-reviewed publications. During the years 1998-2003, a shift from descriptive types of study towards experimental research has taken place. At the same time, the researchers have changed their publication policy. In the recent years, they have increasingly submitted their manuscripts to international journals (e.g. the number of peer-reviewed publications doubled from 2002 to 2003) instead of national ones, which used to be the most

common and probably the easiest way to publish results. Increasing confidence within the group is changing the attitude and publication policy. Overall, the average number of peer-reviewed publications/year/person is not adequate. However, there are differences between the group members and a tendency for increased numbers in recent years. Right now the group is not known internationally, but active participation in international meetings and increased publication in peer-reviewed journals will change this in the future.

Research funds raised by the group have doubled during the last three years reflecting recognised professional competency and good leadership and planning of the projects. During the early part of the reporting period, the research was neither very productive nor of high quality, but improvement has been rapid and the future looks promising. An important reason for this development has been the decision to send young scientists abroad, to veterinary schools where research in reproduction of domestic animals is at a good international level. As a consequence, the graduate students have become better trained and specialists in their own area, and important international networks have been established. The group has been very successful in recruiting graduate students which is a prerequisite for continuation and improvement of the research. These strategies could act as a model for improvement of research performance across the Faculty.

The animal reproduction group has grown significantly over the years as a result of its competitiveness in attracting funding. This gives the advantage of having people with different competencies widening the knowledge of the entire group. So far, there have been several small projects, which gives the impression of scattered rather than focused research planning. The group works in three separate laboratories in addition to the experimental farm and private farms which may promote division and isolation into separate groups. Concentrating the focus to core competence areas would strengthen the group.

The resources of the group appear to be adequate. Because of the larger group size, the individual members are not as heavily loaded with teaching compared to those in the other research groups. Once the reconstruction of the buildings is completed and the equipment funded by PHARE obtained, the material resources of the group will be at a satisfactory international level.

Evaluation of Research Activities
The team of evaluators judged the overall quality of the research to be ***good to satisfactory.***

Evaluation of Overall Capability
The team of evaluators judged the overall capability to be ***good.***

	Grade
Originality/novelty of past and ongoing research activity	**1**
The strategy and perspective of research	**1.5**
Multidisciplinarity and relevance for other research areas	**1.5**

The competence of research groups and their capability for development	**2**
National and international co-operation	**1.5**
Success in applying for funds and grants	**1.5**

The implementation opportunities for the research results and their importance for the Estonian society
The research topics are relevant and important for Estonian animal production and breeding.

Recommendations
International co-operation should be continued and increased. This should not only take place on individual level, but the group should actively look for research partners as well.

3. Parasitology Working Group, Dept. of Parasitology *(Head: Prof. Toivo Järvis)*

Research staff
Department of parasitology is a unit of the chair of infectious diseases in the Faculty of Veterinary Medicine of the Estonian Agricultural University: Doctor of Vet Med Sc, Prof. **Toivo Järvis** (1,0); Dr Vet Med Sc, Lecturer **Erika Mägi** (0,5); Technician **Ingrid Veske** (0,5); PhD in Biology, Senior Researcher **Heli Talvik** (1,0); Master of Vet Med Sc, Researcher **Illa Miller** (1,0); M of Vet Med Sc, Researcher Liina Laaneoja (0,5); Researcher Mare Sahk (0,5) and Master student Eva Lukjanov.

Main research areas
The research program of the Department of Parasitology (Faculty of Veterinary Medicine, Estonian Agricultural University) is established:

1. to provide a more holistic understanding of the population biology and dynamics of parasitic infections in livestock, wild animals and human populations, including zoonotic parasites;
2. to improve the control of animal parasitoses for health of animals and man and for decrease of environmental damage.

Target financed projects
ETIOLOGY, EPIDEMIOLOGY AND CONTROL OF PARASITIC DISEASES IN ESTONIA (target financed project No 0170166s98, 1998—2001, cost in total 2 470 000 EEK, 430 000 EEK turned over for investigations of bacterial and viral diseases). Leader: Prof. **Toivo Järvis**. Workgroup: Dr Vet Med Sc Arvid Kaarma, Dr Vet Med Sc Erika Mägi, Dr Biol Heli Talvik, M Vet Med Sc Illa Miller, researcher Mare Sahk, master student Liina Laaneoja and auxiliary workers

Working out integrate measures to control parasitic diseases in animal populations for human health and environment safety (project B2099LANH02, duration 2002—2005, cost 2002—2003 1010000 EEK). Leader: Prof. **Toivo Järvis**. Workgroup: Dr Vet Med Sc Toivo Järvis, Dr Vet Med Sc Erika Mägi, Dr Vet Med Sc Arvid Kaarma, Dr Biol Edoardo Pozio, Dr Med Sc Ants Jõgiste, Dr Biol Heli Talvik,

M Vet Med Sc Illa Miller, researcher Mare Sahk, researcher Liina Laaneoja and auxiliary workers.

Research grants

Investigations into most important zoonotic parasitic diseases (ESF grant 2616, 1997—999, cost 130 000 EEK). Leader: Prof. **Toivo Järvis.** Workgroup: M Vet Med Sc Illa Miller, master stud. Meelis Annus and master stud. Janina Siiman.

Investigation of epidemiology of more spread parasitoses and regulation of parasite populations with a special attempt to apply ecologically safe control methods to avoid contamination of animal products (ESF grant 3146, 1998—2001, cost 680 000 EEK). Leader: vet-med-doctor **Arvid Kaarma**. Workgroup: vet-med-doctor Arvid Kaarma, vet-med-doctor Erika Mägi, research worker Mare Sahk, veterinary surgeon Liina Laaneoja

Etiology, epidemiology and control of trichinellosis in Estonia. (ESF grant 4119, 2000—2003, cost 205 000 EEK). Leader: Prof. **Toivo Järvis**. Workgroup: Dr Vet Med Sc Toivo Järvis, Dr Biol Edoardo Pozio (Trichinella Reference Centre), M Vet Med Sc Illa Miller, Dr Med Sc Ants Jõgiste (Health Protection Inspectorate) and master student Eva Lukjanov

International projects

Improved Meat Production in the Baltic Region through Epidemiology-based Control of Trichinellosis — a Parasitic Zoonosis (FAO project TCP/RER/0065, 2000—2002, in total 248 000 USD for all project in Estonia, Latvija and Lithuania). National coordinator in Estonia: Prof. **Toivo Järvis**. Institutions involved in the project: 1. Dept. of Parasitology (Fac of Vet Med, Est Agric Univ).
2. Veterinary and Food Laboratory
3. Estonian Hunters Society a.o.

General Comments: This is an active but small group working on important pathogens of animals and humans. The strengths of the group are: the high level of parasitological expertise, the relevance of the research to national priorities and their productivity in terms of publication output. The weaknesses are: limited expertise in new technologies and approaches, lack of a cohort of new PhD students, lack of modern epidemiological expertise and lack of a really forward looking and imaginative future plan. In terms of resources, two grants finish this year leaving a single grant extending into 2005. Currently an ESF grant on porcine parasites (including coccidia), has been submitted and a further grant will be submitted on the epidemiology of Trichinella.

There are unique opportunities for parasitological research in Estonia given the livestock management systems and strong co-operation with farmers; the results of these activities will be of interest at an international level as many of the problems are common but this needs to be exploited more fully, possibly by overseas training visits.

One of the main aims of the current research is the investigation of plant extracts as anti-parasitics. Although active extracts have been identified, it is unlikely that these could be developed as practical treatments, given the need for registration, establishment of dose response curves, quality control, etc. We considered that it was more important to investigate effective use of existing treatments and using these in ways that minimise environmental damage.

In terms of adequacy of resources, the development of new and refurbished laboratories as well as new equipment next year will be necessary to provide the infrastructure for the future. The group is currently well funded and, assuming the success of future applications, there should be sufficient support for the continuation of the research. The three areas of concern are access to international journals in

Parasitology, training links with laboratories applying 'state of the art' approaches to diagnosis and epidemiology and the lack of new postgraduate students.

Evaluation of Research Activities

The team of evaluators judged the overall quality of the research to be: ***satisfactory to unsatisfactory.*** There is an excellent overall volume of publication output with 9-refereed publications in international journals as well as 30 abstracts from international meetings and >50 publications in Estonian journals. The quality of the international outputs is reasonable but not outstanding in terms of comparable groups in Europe. More effort should be put into trying to publish data in peer-reviewed journals so that international recognition of the work in Estonia is achieved. It was noted that the level of publications had dropped in 2002/2003 and is a cause for some concern. This is also important for the future, as a high impact publication record is one of the criteria used by external agencies in deciding on funding applications. A national perspective would alter the rating of this group upward, as they are productive, particularly given their small size, and are undertaking research that has a high priority in terms of the importance of the problems caused by parasitic disease.

Evaluation of Overall Capability

The team of evaluators judged the overall capability to be: ***satisfactory.*** There are significant opportunities to investigate the epidemiology of a series of important parasitic diseases and to investigate optimal treatment regimes and protocols to reduce the impact of these diseases on livestock production as well as the risk of human infection, in the case of zoonotic disease. The group needs to invest in more modern approaches (molecular techniques, ELISA based serology, epidemiological design and modeling) in order to maximise the impact of their research and improve their international profile. A key factor in this regard will be training both of the current staff but more importantly new PhD students. There are problems in attracting such students and, although the prospects of new well-equipped laboratories will, in part, circumvent this, there is a need to 'modernise' the scientific approach as well. The expertise in parasitology is a critical resource and needs to be maintained, given the national importance of parasitic disease.

	Grade
Originality/novelty of past and ongoing research activity	**1**
The strategy and perspective of research	**0.5**
Multidisciplinarity and relevance for other research areas	**1**
The competence of research groups and their capability for development	**1**
National and international co-operation	**1**
Success in applying for funds and grants	**1**

The implementation opportunities for the research results and their importance for the Estonian society

There are very significant opportunities for the implementation of the research results in order to improve the control of parasitic diseases that clearly will have an impact on both human and animal health. The first stages of this implementation are taking place, based on the information supplied in the report, however no very clear future strategy

was presented. This area needs to be clearly thought through. The research strategy and approach covering epidemiology and new treatment protocols needs to be closely related to the practicalities of implementing new control measures.

Recommendations: There is some uncertainty in terms of the future staffing level of the unit and the likelihood of laboratory refurbishment and new equipment being obtained. This affects the recommendations. The following were considered as top priorities in order to maintain and develop the expertise and capacity in Parasitology that was considered essential for national needs:

- Increase the submission of data in relevant international journals.
- Acquire training/expertise in epidemiology and molecular parasitology through joint funding with other laboratories.
- Increase the number of post-graduate students to ensure the maintenance of existing skills and the development of skills in modern technologies.
- Exploit the funding opportunities (DAAD, Wellcome Trust, EU-Marie Curie, etc) to link with other European Laboratories and so acquire new skills.
- Focus on epidemiology and existing treatment regimes to implement more effective control measures.
- Ensure that refurbishment and equipping of laboratories takes place.

Parasitology is an essential discipline of both international and national relevance that needs to be nurtured and developed to equip it with the tools, approaches and technologies of the 21st century.

Part IV
Summary of evaluation

Three research groups were evaluated by the panel. Staff in two of the groups came from different Departments and it was not clear whether overall responsibility for research remains with the leader of the research group or the Head of Department(s). There was some additional research activity outside the three evaluated groups but this was not presented for review because we were informed it was of low importance and/or conducted by inexperienced scientists.

Recent Departmental restructuring and new appointments have influenced the outcome of the assessments. The ratings for research quality range from ***good to satisfactory*** to ***unsatisfactory.*** However, one group (Animal Reproduction) significantly improved publication output and grant income over the last two years and provides a model for the improvement of performance, quality and output. In another group, the opposite trends were noted. Caution should therefore be exercised since the overall ratings cover the review period 1998-2002 and different ratings could have been given if the review period only covered the last two years.

The overall capability ratings show two groups in the ***satisfactory*** range and one group in the ***good*** range. These ratings are higher than those for quality of research and indicate that there is significant promise for the future provided certain key weaknesses are addressed and new strategies and approaches adopted. Further progress is therefore required with the restructuring if these improvements are to be continued.

The restructuring follows a change in University research culture to a more progressive approach. There is a need for research leadership at a Faculty level to assist the groups in achieving higher status, quality outputs and access to new sources of funding. This could be achieved by appointing a research-active senior member of staff as Dean or as Vice-Dean with overall responsibility for research. Unfortunately the age structure within the Faculty makes it difficult to identify such an experienced candidate but recent improvements in one research group suggests a possible solution. The next few years are critical and such an appointment should address the Faculty research needs as the highest priority.

Part V
General recommendations

There was little evidence of well-defined and realistic research strategies which is a serious shortcoming if international funding is to be successfully obtained. It also has implications for the recruitment of young staff wishing to develop research careers. A clear strategy for future research activities is therefore vitally important. An annual output of twenty-five veterinary graduates is insufficient to provide a supply of postgraduates with good research potential for the Veterinary Faculty. If research activities are to expand then recruitment will have to be sought from other scientific disciplines within the EAU or alternatively from other Universities both in Estonia or abroad. The age structure within each of the three research groups means that without an increase in the recruitment of young staff there is a serious risk that the Faculty will not be able to maintain a viable research platform over the next five years. The policy of using retired staff as researchers should be reviewed at the University level because this both financially inhibits the recruitment of young staff and the introduction of new approaches and technologies.

The application for EU approval for the EAU veterinary undergraduate program highlights the need for more teaching staff. The University should ensure that the teaching requirements are fully met. A shortage of teachers could lead to an increase in staff teaching loads and restrict the time available for research. In order to ensure international standing for all three groups the Faculty should ensure that teaching loads of existing staff are reduced.

There is a clear need to recruit more young researchers and the undergraduate teaching program should contain an element of research appreciation to stimulate potential researchers. It will also be necessary to create a career structure if they are to be attracted. They will then need support with appropriate in-house training in research methodology, experimental design, statistics etc. The establishment of a Graduate School could facilitate this but additionally it should also monitor the quality of on-going research since there appears to be no formal structure or authority with responsibility to do this.

There was only a small number of publications in internationally recognised peer-refereed journals. This is a serious deficiency since that is one accepted criterion for measuring research quality. Papers should be submitted to Journals with international standing as well as aiming for the highest possible impact factors. CC Journals are not always regarded as indicators of high quality research. Some staff indicated that they preferred to publish in Estonian journals because it was quicker however those papers

will not have much impact internationally because of both language and restricted circulation.
The library subscribes to 14 veterinary related journals, 5 of which are electronically accessible. This is much less than would be expected in a Faculty with international research aspirations
The establishment of an external Advisory Board with some members from Scandinavian and other countries with internationally recognised research reputations, could help the Faculty address many of the problems identified. This Board would advise on a range of issues including opportunities for funding, identification of international research groups for possible future collaboration, the development of large integrated research programs, research training needs etc.
All three groups demonstrated some originality but there was an emphasis on descriptive research and deficiencies in the development of hypothesis-driven science. This reduces the likelihood of attracting international funding or invitations to join international groups as full collaborating members. The Advisory Board could also advise on the development of future research strategies.
There was marked variation in the extent to which the three groups adopted a multidisciplinary approach to their research. In 2 of the groups this should not be a problem since members were drawn from different Departments but the opportunity to exploit this was not always evident. Collaboration with biomedical colleagues in Tartu University, who should also be represented on the Advisory Board, would be beneficial for some research programs and must be encouraged.
The EAU Research Board should assume responsibility for the quality of research proposals and the development of structured research programs. It should encourage the submission of proposals which attract sufficient funding to permit the execution of high quality research projects. Fewer successful applications and more funds per grant might enable better quality of research to be conducted.
None of the groups gave evidence that they had attempted to attract funding from international sources outside Scandinavia. Specific funds do exist and there is a need to ensure that the research leaders are fully informed about their existence and methods of application. This is a clear role for the Deans Office. The appointment of a Vice-Dean (Research) is again indicated.
The successful attraction of funds from international sources will only be achieved if the grant awarding bodies are satisfied that the staff are sufficiently competent. The research groups are currently upgrading their laboratories through refurbishment and the acquisition of much new equipment. It will be necessary for the staff to become experienced in techniques of, for example, molecular biology. Encouragement should be given to staff to undertake training visits to laboratories in other countries where experience can be gained and reputations established. This could enhance the prospects of successful research funding.
The recommendations can be summarised as follows:

At University level

- try to change the incentive system such that research excellence receives more encouragement than teaching
- the University Research Board should be more pro-active in promoting the submission of high quality research proposals
- aim for 3 publications in peer reviewed journals as a PhD requirement university-wide

- provide adequate funding to ensure the library receives more scientific journals

At Faculty level

- establish a Scientific Advisory Board for the Veterinary Faculty with annual reporting routines
- try to recruit top leaders of pertinent veterinary research fields to spend a research sabbatical at EAU
- reduce the teaching load through implementation of more modern teaching methods extensively used in EU Veterinary Schools and thereby release more staff time for research
- try to establish a program where foreign Professors with a high profile come to EAU for a short teaching period; this will initiate more international contacts, expose teachers and students to the leading scientists and generate new opportunities for exchange
- try to reduce the teaching burden for young researchers with proven research competence; facilitate their efforts to hire graduate students
- for future appointments to the Deans Office consider a research active scientist who has proven success in international science

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