



UPPSALA  
UNIVERSITY

*Animal farming in transition –  
the role of animal reproduction:*

## **Modern farming and domestic animal reproduction**

Proceedings from a symposium at the Vitebsk State Academy of  
Veterinary Medicine, the Republic of Belarus  
March 5-7, 2008

Renée Båge and Rastislau Kuzmich (editors)  
Uppsala, 2008

CRU Report 21



**CRU**

CENTRE FOR REPRODUCTIVE BIOLOGY IN UPPSALA

*Animal farming in transition –  
the role of animal reproduction:*

***Modern farming and domestic animal  
reproduction***

Proceedings from a symposium at the Vitebsk State Academy of  
Veterinary Medicine, the Republic of Belarus  
March 5-7, 2008

Renée Båge and Rastislau Kuzmich (*editors*)

Uppsala, 2008

**CRU Report 21**

*Supported by*

**SI.**  
Swedish Institute

**WELCOME to CRU's homepage!**

**[www-cru.slu.se](http://www-cru.slu.se)**

ISSN 1404-5915

ISBN 978-91-85911-35-6

©2008 CRU Report 21, Uppsala

Tryck: SLU Service/Repro, Uppsala 2008

## Contents

<b>Foreword</b>	5
<b>List of participants</b>	6
<b>Presentations:</b>	
Swedish animal farming – development during the last half century <i>Magnusson, U</i>	9
Breeding for high reproduction of pigs in modern production systems <i>Rydhmer, L</i>	10
Reproductive wastage in Swedish dairy cows <i>Båge R</i>	11
To the question of the etiology of endometritis and placentitis in cows <i>Kuzmich RG, Savateev AV</i>	12
Mycoplasmic endometritis as a cause of infertility in cows <i>Yatusevich D</i>	14
Treatment of acute endometritis in highly productive cows <i>Lavushev V, Lavusheva SI, Tsinevskij A2</i>	15
Cytological research of cervix and uterus in cows <i>Pileika V, Ribakov J</i>	17
Effect of yeast culture on milk production, metabolic and reproductive performance of early lactation dairy cows <i>Kalmus P, Orro T, Kask K</i>	18
Two treatment strategies of acute postpartum endometritis in high producing dairy cows <i>Jeremejeva J, Orro T, Kask K</i>	19
A comparison of the effectiveness of oestrous detection by radiotelemetric activity with milk progesterone measurements and visual observations <i>Mällo GK, Kaart T, Oherd P, Sveberg G, Reksen O, Ropstad E, Waldmann A</i>	20
Evaluation of the toxicity of feedstuffs contaminated with zearalenone and deoxynivalenol to sows reproductivity <i>Baliukoniene V, Bakutis B</i>	21
Influence of weaning to service interval on subsequent sows reproductive performance <i>Karvelienė B, Riškevičienė V</i>	22
Influence of modern farming on cows' reproduction in Lithuania <i>Rutkauskas A</i>	23
The influence of different keeping systems on the dairy cow productivity and reproduction in Latvia <i>Sematovica I, Lūsis I, Antane V</i>	24
Keeping system and reproduction of swine in the Republic of Latvia <i>Rimeicans J, Mangale M, Melbardis K</i>	25
Agricultural complex and veterinary service cooperation in year 2007 in Russia <i>Plemyashov K</i>	26
Veterinary aspects of longevity of economic use of highly productive cows <i>Fedosova N</i>	27
Preventive maintenance of infringements and regulation of reproductive function in highly productive cows <i>Fedosova N, Nikolaeva N</i>	29

Nonspecific resistance improvement and anemia prophylaxis of pigs <i>Volos A, Dmitrieva T, Bazenova N, Plemyashov K</i>	31
<b>CRU Publication Series</b>	33

## Foreword

The symposium of 2008, “Modern farming and domestic animal reproduction”, arranged at the Vitebsk State Academy of Veterinary Medicine in Belarus on March 5-7, is part of the network programme “Animal farming in transition – the role of animal reproduction”. We are proud to, for the first time, invite all network members to the Republic of Belarus and we are very grateful to Rector Anton I Yatusevich, Vitebsk State Academy of Veterinary Medicine, for generously offering to be hosting the symposium and inviting us to their facilities. Professor Nina Fedosova, St Petersburg, is especially appreciated for concerting the local organization of the symposium.

This is the second symposium arranged within the extended network that initially involved the three Baltic States and Sweden. The scientific cooperation has been running and successfully expanding since 1999 with the financial support by “*Visbyprogrammet*”, Swedish Institute, Stockholm. The following academic institutions are currently included in the network: The Veterinary Medicine Academy in St Petersburg, the Academy of Management and Agribusiness in St Petersburg, the Belarusian Academy of Agriculture, the Estonian University of Life Sciences, the Latvian University of Agriculture, the Lithuanian Veterinary Academy and finally, the Centre for Reproductive Biology in Uppsala, the Swedish University of Agricultural Sciences (SLU).

In modern farming, efficient production of meat and milk is of great importance and high reproductive performance is a prerequisite for this. In order to reproduce and produce according to the plan, the animal material needs to be critically selected and well managed. The need for competent advisors among animal scientists and veterinarians is increasing, and their counseling needs to be founded on solid, evidence-based advice. Besides optimized production, many other aspects have to be taken in account: e.g. animal health and welfare, food safety and effects of agriculture on the environment.

The symposium has attracted scientists deeply engaged in this area, and their presentations will lead to increased knowledge on consequences of modern farming on animal reproductive physiology and pathology. Our believe is that exchange of information between scientists will be beneficial for animal production in all countries in the Baltic region, and the meeting will create opportunities for further cooperation in this important topic.

On behalf of CRU’s Director Dr. Bodil Ström Holst and the national programme coordinators, Drs. Viktor Lavushev in Belarus, Nina Fedosova and Kirill Plemyashov in Russia, Kalle Kask in Estonia, Vita Riskeviciene in Lithuania, Vita Antane in Latvia, and Renée Båge in Sweden, we wish you welcome to take part of the interesting information from the symposium!

Uppsala and Vitebsk, February 2007

*Renée Båge and Rastislau Kuzmich* (editors)

## Participants

### BELARUS

Bobryk, Dzmitry	Vitebsk State Academy of Veterinary Medicine, Department of obstetrics and biotechnology reproduction in animals
Kuzmich, Rastislau	Vitebsk State Academy of Veterinary Medicine Department of obstetrics and biotechnology reproduction in animals
Lavushev, Viktor	Belarus State Agricultural Academy, Gorki, Mogilev region
Pileika, Viktor	Vitebsk State Academy of Veterinary Medicine Department of obstetrics and biotechnology reproduction in animals
Ribakov, Juri	Vitebsk State Academy of Veterinary Medicine, Department of obstetrics and biotechnology reproduction in animals
Yatusevich, Dzmitry	Vitebsk State Academy of Veterinary Medicine, Department of obstetrics and biotechnology reproduction in animals

### ESTONIA

Jeremejeva, Julia	Estonian University of Life Sciences, Institute of Veterinary Medicine and Animal Sciences, Department of Therapy, Tartu tjulia@emu.ee
Kask, Kalle	Estonian University of Life Sciences, Institute of Veterinary Medicine and Animal Sciences, Department of Therapy, Tartu kalle.kask@emu.ee
Mällo, Gret-Kristel	Estonian University of Life Sciences, Institute of Veterinary Medicine and Animal Sciences gret.mallo@emu.ee
Waldmann, Andres	Estonian University of Life Sciences, Institute of Veterinary Medicine and Animal Sciences waldmann@ut.ee

### LATVIA

Antàne, Vita	Clinical institute, Faculty of Veterinary Medicine, Latvia University of Agriculture (LUA), Jelgava vantane@cs.llu.lv
--------------	--





SWEDEN

Båge, Renée

Division of Reproduction, Department of Clinical Sciences, Faculty of Veterinary Medicine and Animal Science, SLU, Uppsala  
renee.bage@kv.slu.se

Magnusson, Ulf

Division of Reproduction, Dept of Clinical Sciences, Faculty of Veterinary Medicine and Animal Science, SLU, Uppsala  
ulf.magnusson@kv.slu.se

Rydhmer, Lotta

Department of Animal Breeding and Genetics, SLU, Uppsala  
lotta.rydhmer@hgen.slu.se

Ström Holst, Bodil

Centre for Reproductive Biology in Uppsala (CRU) and  
Department of Clinical Sciences, Faculty of Veterinary Medicine  
and Animal Science, SLU, Uppsala  
bodil.strom-holst@kv.slu.se

## Swedish animal farming – development during the last half century

Magnusson U

Department of Clinical Sciences and Centre for Reproductive Biology, SLU, Uppsala,  
Sweden

ulf.magnusson@kv.slu.se

Today about 2.5 % of the Swedish labour force is occupied in agriculture and forestry and there are some 80,000 farms of which 23,000 are full-time business. It is very common (74%) that the holdings are combined agriculture and forestry holdings, this likely reflects the fact that only 8% of the Swedish land is cultivated but 51% is covered by forest. Even so, milk production on family basis has traditionally been the core activity in Swedish agriculture. However, there have been tremendous changes in Swedish agriculture since WW II, this holds also true for the segment “animal farming”.

From 1951 to 2003 the numbers of people working in agriculture decreased by 80% from 869 thousand to 168 thousand. Similarly, the number of holdings with more than 2.0 hectare open land was reduced by 80% to year 2004. In contrast, large holdings (with more than 100 hectare open land) increased from 2500 to 6100 during the same period. For a similar time period, 1950 to 2006, there was a dramatic decrease in the number of holdings with dairy cows: from 268 thousand to 8 thousand!

When it comes to animal numbers and animal products there have been changes in different directions for different species during the last half of 20th century. The number of cattle decreased from 2.9 to 1.6 millions (44%), whereas the number of pigs increased from 1.4 to 1.8 millions (+31%). During the same period the beef production increased with 15%, the pork production with 75% and poultry with 700%! On the contrary, milk production decreased with 25% during the same period, even though the milk yield per cow has increased more than 100% during the last 40 years.

To summarize this development one may say that there has been a dramatic increase in productivity and mostly in production as well in the Swedish animal farming, especially during the first 20 years after WWII. This has been followed by a movement of people out of farm-work and many holdings have closed down. In parallel the size of the remaining holdings has increased, but still the family-run farm is still the most common in Swedish animal farming.

It is of course debatable which are the most important reasons for this development, but without any doubts there are some key milestones in Swedish agriculture: tractors were replacing horses on the farms after WWII; regulations in Swedish agriculture and the political goal of 80% food self-sufficiency were taken away by the government in the shift of the 80's and 90's; and Sweden joined the EU in 1995 with its very regulated agriculture policy.

Currently the world market prices, the EU-regulations and the consumers with demands for low prices and good animal welfare, and to some extent for so called organic products, are all important driving forces in the development of Swedish animal farming.

## Breeding for high reproduction of pigs in modern production systems

Rydhmer L

Department of Animal Breeding and Genetics, SLU, Uppsala, Sweden

lotta.rydhmer@hgen.slu.se

Although the breeding goal seems to be almost the same for all breeding organisations according to their annual reports, the selection traits differ. Two examples: Norsvin selects for age at 1st service, number of piglets born alive; number of teats, litter weight at 3 weeks and weaning to service interval. FABA selects for age at 1st farrowing, total number of piglets born, number of stillborn, mortality of liveborn and farrowing interval. Selection for increased litter size recorded as total number born has resulted in a large genetic change, but piglet mortality has also increased. Furthermore, selection for higher lean tissue growth rate seems to result in less developed piglets at birth. Thus, the current selection for leanness, growth rate and litter size provides a strong motive for including piglet survival in the genetic evaluation.

Low maternal ability accounts for a large part of sow culling. The increased piglet mortality led to a change of selection traits in Denmark a few years ago, from total born to number of piglets alive at five days of age. Almost all piglets not reaching weaning are stillborn or they are dying before day 5. Thus, Danbred takes the main part of piglet mortality into account with this selection trait. Different maternal behaviours, such as the sow's response to a screaming piglet, have been studied as alternative selection traits. Maternal behaviour is heritable, but complicated to record in a large scale. Fear of humans is an interesting trait, due to the genetic correlation between fear and piglet survival (more fear - lower survival).

High birth weight has been proposed as a selection trait, since the genetic correlation between birth weight and risk of being crushed is negative. The corresponding correlation between birth weight and stillbirth seems, however, to be positive (high weight - high mortality). There are both direct and maternal genetic effects on piglet survival, birth weight and early growth. The correlations between direct and maternal effects seem to be negative and therefore both components ought to be included in the genetic evaluation. TOPIGS in the Netherlands selects dam lines for low piglet mortality, including both the direct and the maternal component. TOPIGS also selects sire lines for low piglet mortality (direct effect).

Sows with a genetic capacity for high piglet survival and growth rate lose more weight during lactation. Thus, in a selection program aiming at high piglet survival and growth, attention should be paid to the sow's body condition at weaning. If not, reproduction problems and culling of sows may increase. In line with that reasoning, it is possible that pigs should be selected for higher voluntary feed intake during lactation, especially in a hot climate.

According to the Swedish animal welfare law, sows should be kept loose in the farrowing pens. In many other countries sows are confined in farrowing crates during the whole lactation period. It is not yet known whether there are important interactions between genotype and housing environment for maternal behaviour. The ability to respond to environmental changes, e.g. to altered housing and feed access, probably has a genetic background. When selecting animals for production, we generally create specialists, i.e. less adaptive individuals. What happens if we move pigs from indoor to outdoor production systems, or from Sweden to Belarus? If pigs have low adaptability to environmental changes, welfare as well as production results will be decreased. Selection for low environmental sensitivity is much discussed among geneticists today, but it is not yet included in the genetic evaluation.

## Reproductive wastage after artificial insemination in Swedish heifers and cows

Båge R

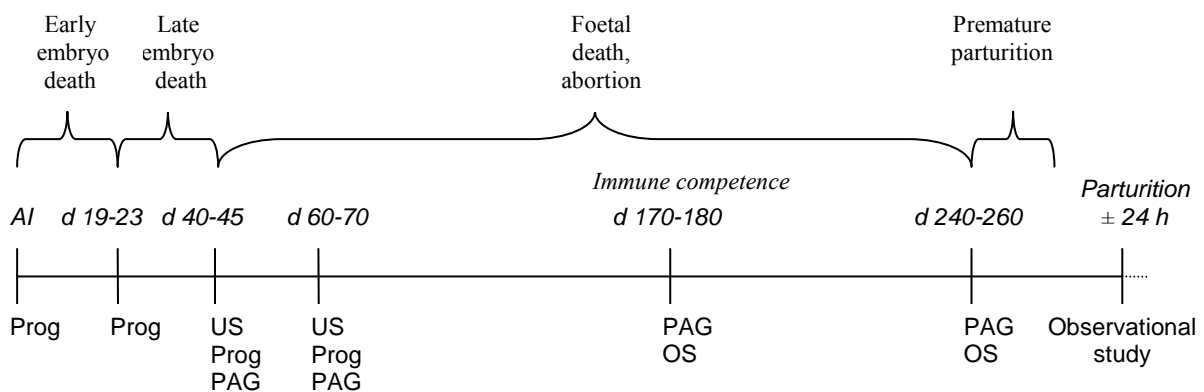
Division of Reproduction, Department of Clinical Sciences and Centre for Reproductive Biology, SLU, Uppsala, Sweden  
 renee.bage@kv.slu.se

Sweden has approximately 400.000 dairy cows in 7.000 farms, producing on average 9.314 kg milk per year, which is the highest production within EU. A majority of the cows, 96%, are inseminated, and 86% of the cows are registered in the national database where milk production, udder health and mastitis, fertility, diseases and veterinary treatments are recorded for individual animals. According to this database, dairy cow fertility is declining. Pregnancy rate per artificial insemination (AI) and calf survival is decreasing. The trend is the same globally. Pregnancy rate in the American Holstein breed is reported to be less than 40%, and some countries even report pregnancy rates lower than 25%, with a continuous decline of 0.5-1 per cent per year. In Sweden, primarily the Holstein breed is affected (fertility declines with 0.25 per cent per year) while fertility in the Swedish Red breed is maintained at a stable level.

The fact that Sweden has a unique national database for fertility and health and two well-defined dairy breeds, both with high potential for milk production but documented differences in fertility, creates good opportunities for investigations of causes for pregnancy loss after AI.

Accordingly, a field study has recently been initiated, with the aim to answer questions like: When and why is embryo or foetal death occurring? How large is the problem of stillbirth and why does it occur? How much is the male affecting the health of the calf and its viability at birth? Is it possible to use hormonal markers to monitor foetal vitality?

Two hundred heifers will be monitored according to the schedule below with hormone analyses and ultrasound examinations throughout their first pregnancy from AI until parturition, and the monitoring will continue through their second pregnancy as primiparous cows. Reproductive losses during pregnancy will be related to genetics, breed, parity, body condition, housing, management and milk yield.



Reproductive wastage after AI. Critical timepoints define early or late embryonic death, foetal death, premature parturition and stillbirth. Sampling scheme for progesterone (Prog), pregnancy-associated glycoproteins (PAG) and oestrone sulphate (OS) in blood and for detection of viable foetus by ultrasonography (US).

From stillbirth cases, biopsies from uterus and placenta will be subdued to RNA-extraction and gene expression analysis (microarray and real-time PCR) will be done for identification of over-expressed genes at stillbirth. Immunohistochemistry will reveal if the over-expressed genes produce proteins in the uterus. Finally, blood samples will be analysed for antibodies or circulating proteins against proteins that were over-expressed in females with stillborn calves.

## **To the question of the etiology of endometritis and placentitis in cows**

Kuzmich RG<sup>1</sup>, Savateev AV<sup>2</sup>

<sup>1</sup>The Vitebsk State Academy of Veterinary Medicine, <sup>2</sup>Institute of the Experimental Veterinary Named after S.M. Vyshelesky of the NAS, Belarus, Minsk, the Republic of Belarus

The long-term experience on diagnostics, therapy and prevention of endometritis in cows has demonstrated this pathology to be observed in animals on farms with the different status of feeding base and technologies applied in animal husbandry. On certain farms the morbidity of cows with the post-partum endometritis comes up to 60 % and over. Clinical observations have shown that a certain number of cows demonstrated the purulent-catarrhal exudate discharging from genitalia during the latest weeks of pregnancy. This points to the inflammatory process in the uterus. In this connection the question arises on the etiology and pathogenesis of the inflammatory process at this period.

By our studies we have stated that at the placental stage 7.1% of cows showed the retention secundines. Of all cases of the placental retention in 87% cows the knitting of the foetal and maternal parts of placenta has been marked; a complete retention has been marked in 63.3%, incomplete retention- in 32.1% cows and partial – in 4.7% cows. Besides, purulent-catarrhal exudate discharges from genitalia at the pre-partum stage has been observed which testifies the presence of the pathology in placenta.

Pregnancy complications and genital illnesses in cows quite often lead to different changes in placenta resulting in its functional and structural disorders. This in its turn negatively influences the state of the foetus, and a certain specificity of changes in placenta depending on the character of disorder in the mother's body is often revealed. The degree and character of pathological state of placenta depend on the stage of pregnancy, the duration of exposure to pathogenic factors, the state of compensatory-adaptive mechanisms in the system the mother- placenta-foetus.

Changes in placenta may be acute or bear the long-lasting character. The former as a rule result in acute hypoxia or in the fetal intrauterin death. At long-lasting placental disorders the course of gestation period and state of foetus are different and depend on the degree of involvement. In recent years these disorders are united under the term “placental insufficiency”.

The presence of necrotic and inflammatory sites of various sizes in placenta can be found by ultrasonic diagnostics at the last month of pregnancy. The increased structural alterations, the layers of increased acoustic density, cysts and infarcts in the form of clearly outlined echo-negative formations have been found.

While investigating the etiology of placentitis of bacterial origin we studied scrapings taken in the site between the maternal and foetal parts of the placenta. Microorganisms *Str. foecalis* and *Str. agalaktiae*, *Staf. aureus* have been isolated. The presence of microflora and its pathogenity indicates the possibility of occurrence of placentitis in cows under the influence of the mentioned microflora and its toxins. However, not in all animals in placenta of which the microbes have been found placentitis of different stage has been diagnosed. This makes us think that there is another pathogenic factor causing the inflammatory process in placenta.

One can think that any pathological processes in pregnant cows contribute to cell damage and start compensatory mechanisms in the body in order to neutralize and evacuate produced endogenic toxic agents. When exposed to damaging factors for long, including external ones, the compensatory defensive reserves of the body are depleted and increasing metabolic disorders lead to the development of necroses in placenta.

As it is commonly agreed today, many of vitally important metabolic and physiological processes taking place in the body, largely depend on the free-radical oxidation. Free radicals are involved in supporting homeostasis, accumulation and biotransformation of the energy, provide defensive functions, in particular, detoxication of foreign compounds both of external and internal origin; they possess bactericide properties, affect the immune status. That is why to study the status of the free radical oxidation, at norm and pathology, to find the means of target effect influencing the rate of this process present an actual problem of scientific and practical importance for the development of scientifically grounded methods for prevention of placentites in cows.

We have determined a direct correlation between the increase of the free-radical reactions in the body of pregnant animal and the occurrence of this pathology. The state of peroxidation of lipid and the state of the antioxidant defense in the body of cows with dynamically developing inflammatory processes in placenta. It has been stated that in such cows the content of glutathionperoxidase had a three fold decrease at the 6 months pregnancy stage and the level of lipid peroxidation products in the blood serum has been increased (dien conjugates – 2.2 times, malon dialdehyde – 7.2 times).

## **Mycoplasmic endometritis as a cause of infertility in cows**

Yatusevich D

Department of Obstetrics and Biotechnology Reproduction in Animals, Vitebsk State  
Academy of Veterinary Medicine, Vitebsk, the Republic of Belarus

At the present stage of the development of cattle breeding, various forms of infertility in cows are essential factors restraining the normal reproduction of the cattle heard in the Republic of Belarus, postpartum endometritis being a main cause for this.

According to data of many researchers the postpartum period complications such as metritis has been registered in 10-40%, in a number of farms occurring as enzootics in a large number of cows after parturition. That is why to study causes of this pathology is of great scientific and practical interest.

Endometritis in cows more often occur because of infection of genitalia, breaking the mucous membrane, reduction of the uterus contractile function and slowing down of the involutionary processes in the postpartum period.

Many scientists consider pathogenic and conventionally pathogenic microflora to be of primary role in the etiology of endometritis.

So, by bacteriological examination of an inflammatory exudate from the uterus of the cows diseased with purulent catarrhal endometritis, about 130 kinds of cultures of microorganisms have been isolated.

The ability of Mycoplasma to produce various pathologies in cattle and other livestock was reported by many Belarusian and foreign scientists.

By our research we have stated that in the originating and development of the postpartum endometritis in cows the entering of conventionally pathogenic microflora into the uterus cavity, microorganisms of the genus Mycoplasma in particular, plays a great role, they lead to destructive changes in the endometrium, causing inflammation in the uteral mucosal membrane.

It has been stated, that in cows infected with mycoplasma the immunological deficiency, showing depression in cellular and humoral factors of a nonspecific resistance, suppression of the T-and B-systems of immune systems. This, in its turn, enduces a congenital background for the development of complications like inflammatory process in the uterus caused by bacterial microflora.

From a microbial association contained in the uterus cavity of cows diseased with postpartum endometritis, mycoplasma were isolated in 85.7% of cases. In 81.7 % cases of the postpartum endometritis associations of mycoplasma with other microorganisms were observed, and only in 18.3 % of samples monocultures were found. It also should be noted, that endometrites in the development of which microorganisms were involved as associations, took more severe forms as compared with the endometrites caused by monocultures. Persistent contractile dysfunction of the uterus have been noticed, periods of treatment were prolonged as well as sexual cycles recovery in affected animals.

Clearing of etiology and pathogenity of the post partum endometritis in cows made it possible to choose components and to develop a preparation "Floxametrin" possessing a high therapeutic efficacy (93.8%) for the treatment of cows with this pathology.

## Treatment of acute endometritis in highly productive cows

Lavushev V, Lavusheva S<sup>1</sup>, Tsinevskij A<sup>2</sup>

<sup>1</sup>Belarus State Agricultural Academy, Gorki, the Mogilov region, the Republic of Belarus

<sup>2</sup>Enterprise on Artificial Insemination Agricultural. Animals, Area Berestovitsky, Grodno, the Republic of Belarus

Barrenness of highly productive dairy cows causes to economy of Belarus significant economic damage, does not promote increase in a livestock for the expanded reproduction in cattle breeding.

In this connection the main role in the further intensification of dairy animal industries belongs to studying etiology of barrenness and normalization of reproductive function of highly productive dairy cows with gynecologic diseases.

Endometritis, developed on 3-5-C day after partum, foreign experts designate as toxic, thus emphasize a role of the given factor in patogeneze illnesses. At acute postnatal endometritis the level of an intoxication of an organism is rather high. It speaks, first of all that the basic patogen (Eschericha, Pseudomonas, Fusobacteria etc.) during ability to live produce cellular poisons – endotoxins. Besides sources of an intoxication of an organism are products of decomposition lohii, the rests placentum, fabric structures of a uterus [1].

Microbic and fabric toxins cause a dystonia of a uterus, breaking thus her evakuatory activity. On 5-7-® day after sorts in cows with endometritis the inflammatory processes resulting further to decrease efficiency of the first insemination, to increase in the period between partum, an index of insemination that finally results in infringement of a reproductive cycle.

Hence, rational therapy of cows with acute postnatal endometritis assumes use detoxification means of the general and local action.

Results of researches: Have preliminary lead gynecologic prophylactic medical examination of cows in an agricultural production of name Voronezkogo of area Grodenskoj Berestovitskogo of area. In research 840 cows are used. Average dairy efficiency of cows - 5 thousand kg milk.

Pathology of genitals have revealed in 234 cows (27.9 % from all livestock) including changes of morphology and function ovary- in 106 cows (12.6 %), atonia a uterus - in 92 cows (10.95 %), endometritis - in 84 cows (10 %). The diagnosis on Endometritis put in view of clinical attributes and the data klinikal researches of animals. Researches are executed on the cows who have shown clinical attributes of endometritis within two weeks after partum.

Before introduction of preparations from a cavity of horns of a uterus deleted a liquid and within 1-2 minutes did massage of a uterus. To cows 1 groups (control) 3 days intrametrum are triple with an interval entered a candle with furazolidon. To cows of 2 groups intrametrum with an interval 3 days entered ihglukovit in a doze of 10 ml. On 100 kg of alive weight. To cows 3 groups intrametrum with an interval 3 days entered richometrin (0.1 ml of/kg of weight of an animal), tilokar (50 ml. On one introduction), floksametrin (20 ml. On 100 kg of weight of an animal), hypodermically karbacholin. Miotik means (karbochilin) used for faster removal of exsudate from horns and a body of a uterus. The cow was considered to have recovered when the general condition of the uterus corresponded to that of a non-pregnant animal.

It is established, that duration of treatment of cows with endometritis in comparative aspect on groups had very high variability. Average duration of the period from the beginning of introduction of preparations before full recovery in cows 2 and 3 groups has made accordingly 26.3 and 17.6 days, that for 3.8 and 12.5 days it is less, than in cows of 1 group.



Frequency rate of introduction of preparations an animal of 2 and 3 groups has made 6.1 and 4.6 times, against 8.2 times an animal of 1 group. in all cows of 2 and 3 groups pregnancy has been registered within 80 days postpartum. Duration of the period from partum before fruitful insemination in cows 2 groups. Has made on the average – 52.7 days, in cows of 3 groups – 48.3 days, and in cows 1 group – 87.1 days.

The best results are received by the complex treatment directed on stimulation of protective forces of an organism, deducing inflammatory exsudate from the struck body, restoration of function of fabrics of a uterus, its increase contractile abilities and prevention of duplication of microbes.

The most effective appeared treatment by a complex method with use miotik means, richometrin, tilokar, floksametrin, ichglukovit. These preparations possess a wide spectrum antimikrobical actions, promote restoration of contractility to function and regeneration of a mucous membrane of a uterus in cows. Very well introduction of vitamin preparations and regular walks of cows during the winter-stall period promoted process of recovery.

The literature:

1. Porfirjev I.A. (2002). Complex gynecologic prophylactic medical examination of highly productive cows/Veterinary science, 12.

## **Cytological research of cervix and uterus in cows**

Pileika V, Ribakov J

Department of Obstetrics and Biotechnology Reproduction in Animals, Vitebsk State Academy of Veterinary Medicine, Vitebsk, the Republic of Belarus

It is well-known, that exact statement of the diagnosis has key value for appointment of effective treatment.

Practicing veterinaries for diagnostics of a condition of genitals can use only clinical methods. It is heavy to define and sub-clinical process.

Objective diagnostics is possible only by results of patho-anatomical research which at a live animal is possible only by studying an endometrial biopsy. However, biopsy – the method is labor-consuming. There is a problem of exact topography of a place of a capture of assay. Also there is a danger of drawing of a serious trauma to a cow at reception of a material for research.

It is supposed, that in overwhelming majority a case pathological process in a uterus is localized in endometrium, not mentioning below the located covers – muscular and serosa. But biopsy it is possible to receive only superficial endometrial section.

We have investigated a considerable quantity of biopsies. It has allowed us to draw a conclusion, that biopsy cannot reflect a condition of endometrium to the full. Precisely same representation about a condition of endometrium can be received at research of epithelium and cellular structure of contents of a uterus. That is enough cytological research of the material received from an epithelial surface of a cover of genitals.

In medical practice for a long time cytological examination of a vagina and vaginal parts of a cervix of a uterus also is widely used. The special device is applied to these purposes – a cytological brush.

We have taken a medical cytological brush for a basis and have designed the tool which allows receiving a material from a surface an epithelial cover of genitals of a cow (the vaginas, separate parts of a uterus). Thanks to this tool it is possible to define a place of a capture of test precisely. Now we are engaged in working out of a technique of cytological research which will allow to define the physiological status of a cow or to find out in it pathology in genitals. The given method can serve as alternative biopsy.

From a cytological material unguentums-impreses prepare and are imbued by various methods. At the heart of a technique of recognition of a physiological condition (a stage of a sexual cycle, end of postnatal restoration of genitals) and pathologies research of structure and the characteristic of cells integumentary epithelium, blood cells, the slime characteristic is put in pawn.

Small congestions of round cages are found out in healthy cows in dabs from an epithelium uterus cervix with is central the located kernels. Leukocytes are not present. Slime is not present or it is not enough of it. Slime is presented in the form of thin threads.

It is possible to allocate characteristic changes at cows with the chronic form catarrhalis endometritis. In a preparation in a considerable quantity round and flat epithelium cells are found out. In these cages of a kernel are wrinkled. Between epithelium cells settle down neutrophilic leukocytes. Their adhesion to the separate isolated epithelium cells is visible. Slime in a preparation has amorphous structure.

We consider that carrying out of cytological research is a perspective laboratory method of an estimation of a condition of genitals at cows. Naturally, this method demands the further perfection and preparation of the special cytological atlas for veterinary experts.

## Effect of yeast culture on milk production, metabolic and reproductive performance of early lactation dairy cows

Kalmus P<sup>1</sup>, Orro T<sup>2</sup>, Kask K<sup>1</sup>

<sup>1</sup>Department of Therapy, <sup>2</sup>Department of Environment and Animal Health, Institute of Veterinary Medicine and Animal Science, Estonian University of Life Sciences, Tartu, Estonia

kalle.kask@emu.ee

Based on growing concern over the use of antibiotics and other growth promoters in the animal feed industry, interest in the effects of microbial feed additives on animal performance has increased. Many strategies to optimize metabolic health and decrease energy output during early lactation have been evaluated. Direct supplementation of propylene glycol, undergradable starch and monensin have found positive effect of glucose production, but feeding dietary fat or specific fatty acids is utilized to increase milk production thereby increasing the depth and duration of negative energy balance (NEB). Supplementation of yeast culture has been used for over six decades and milk production response has been assigned by several researchers. In some studies, yeast culture have improved dry matter intake, milk yield and milk composition but, other studies found no significant impact. Energy balance of dairy cows itself has a key regulator of reproductive performance and changing of the overall metabolic status during the periparturient period can lead delayed resumption of ovarian activity and uterine involution. During the past decade, has been established that impairment of metabolic status, especially the prolongation of NEB as a factor associated with low reproductive performance in dairy cows. As the peak of NEB occurs in the early post partum (PP), many studies demonstrated that the nadir of NEB was related to the interval to first ovulation PP. The main objective of this study was to estimate the effect of supplementation of Yea-Sacc® 1026 (*Saccharomyces cerevisiae*) to milk production, metabolic status after and thus influence resumption of ovarian activity in early lactation of dairy cows. The experiment was carried out in the commercial tied-housing farm with on average 200 milking Holstein Friesian cows December 2005-May 2006. 46 multiparous holstein-friesian dairy cows were randomly divided into two groups, where one group received 10g Yea-Sacc (*Saccharomyces cerevisiae*) from three weeks before to 14 weeks after calving. The groups were fed total mixed ration with silages and concentrates. Milk recording data, blood samples for metabolic and milk progesterone (P<sub>4</sub>) samples for ovarian activity profile was taken. Uterine bacteriology and ovarian ultrasonography (US) was done and body condition score and clinical diseases occurrence was detected. For analysis collected data, statistical software Stata 9.2 and R was used to compute cox proportional hazard model and linear mixed model. The average milk production per cow was 32.7±6.4 in Yea-Sacc group and 30.7±5.3 in control group. It was not statistically significant (p=0.09). The production of milk fat (p=0.0011) and milk protein (p=0.0099) were significantly higher in Yea-Sacc group. There was no effect of treatment on BCS (p>0.05). The changes of body condition score were similar in both groups. Analyses of energy related metabolites in early lactation did not show significant differences between groups. The higher levels of BHB appeared from 14-28 days after parturition in both groups, while concentration of NEFA was more obvious in control group. According to US and P<sub>4</sub> results all cows in both groups ovulated during experimental period. Average resumption of ovarian activity (first ovulations) were detected on day 42 in experimental group and on day 47 in control group., which was not statistically significant. The bacterial elimination time from uterus did not differ between groups.

## Two treatment strategies of acute postpartum endometritis in high producing dairy cows

Jeremejeva J<sup>1</sup>, Orro T<sup>2</sup>, Kask K<sup>1</sup>

<sup>1</sup>Department of Therapy, <sup>2</sup>Department of Animal Health and Environment, Institute of Veterinary Medicine and Animal Sciences, Estonian University of Life Sciences, Tartu, Estonia  
tjulia@emu.ee

### INTRODUCTION

Acute postpartum endometritis (APE) is the biggest health problem what lead to prolonged calving intervals, reduced conception rates and increases culling. The aim of this study was to test the effect and success of different treatment models in case of APM. Profound and complex investigations of used treatment regimes was done using clinical investigations, uterine microbiology, acute phase proteins (APP) and conception rate results.

### MATERIALS AND METHODS

Experiment was carried out in commercial dairy farm. Multiparous Holstein dairy cows (n = 21) were divided into 3 groups, 7 animals in each group. Parturitions were induced in all cows, 2 weeks before term using PGF<sub>2α</sub> (1) (Dinolytic<sup>®</sup>, BI) for getting retained foetal membranes followed by APM (2). Treatment was started immediately when endometritis was diagnosed (3rd d PP). Group A was a control group with no treatment. Group B was treated according to strategy commonly used at the farm where experiment was carried out: intramuscular injections of Carbetocin (Hypophysin<sup>®</sup> LA) during 3 d and intrauterine administration of antibiotics (Metricure) on the 15th and 30th d PP). In group C intramuscular injections of antibiotics (Ceftifour, Exenell<sup>®</sup>) during 5 days was done followed by 2 injections of PGF<sub>2α</sub> (Dinolytic<sup>®</sup>, BI) with an interval of 12 h on the 8th d PP. For APP determination blood samples were collected twice weekly. Evaluation of general health status of animals, body T<sup>°</sup> and vaginal discharge (existence and character of secretion) was done daily. Uterine biopsies for bacteriological examination were collected once a week during 7 w PP. Animals who had not shown oestrous during 70 days PP were allocated to heat synchronisation and success of synchronisation was evaluated. Ovarian activity was monitored through the analysis of progesterone (P<sub>4</sub>) from milk samples taken 2 × a week.

### RESULTS AND DISCUSSION

Differences in body T<sup>°</sup> between groups were statistically significant. No statistical difference was found in vaginal discharge between groups. Highest incidence of bacteriological species was found during the first 3 w PP in all groups. Intensity of bacterial growth in uterine biopsies obtained from control group was higher during 2 first w PP. The most frequently isolated bacterial species were *A. pyogenes*, *F. spp.*, *Bacteroides spp.*, and *Enterobacter spp.* Levels of APP after parturition were high in all groups and decline to the baseline was seen after 3<sup>rd</sup> week PP. According to P<sub>4</sub> results resumption of ovarian activity was detected in all animals during 70 d PP. Pregnancy after the first PP insemination was diagnosed in all animals who were allocated to heat synchronisation. Results from this study indicate that there is no difference in impact of treatment or no treatment of APE.

### REFERENCES

- (1.) Kask, K., Gustafsson, H., Gunnarsson, A., Königsson, K., Kindahl, H. (2000) Reproduction in domestic animals 35 (3-4): 184-185.
- (2.) Kask, K., Gustafsson, H., Gunnarsson, A., Kindahl, H. (2000) Animal Reproduction Science 59 (3-4): 129-139.

## **A comparison of the effectiveness of oestrous detection by radiotelemetric activity with milk progesterone measurements and visual observations**

Mällo GK<sup>1</sup> Kaart T<sup>1</sup> Oherd P<sup>2</sup>, Sveberg G<sup>3</sup>; Reksen O<sup>4</sup>; Ropstad E<sup>4</sup>; Waldmann A<sup>1</sup>

<sup>1</sup>Institute of Veterinary Medicine and Animal Sciences, Estonian University of Life Sciences, Estonia; <sup>2</sup>Estonia Ltd, Estonia; <sup>3</sup>GENO, Norway; <sup>4</sup>Department of Production Animal Sciences, Norwegian School of Veterinary Science, Norway  
gret.mallo@emu.ee

The oestrous detection rate has fallen, in the modern dairy cow, due to reduced expression of oestrous behaviour. High yielding dairy cows have extended periods of anovulatory anoestrus caused by negative energy balance. Electronic devices have been developed to alleviate the need for oestrous detection by visual observation.

The aims of the present investigation were: 1) To evaluate the efficiency and accuracy of the activity sensor ALPRO<sup>®</sup> (ALPRO; DeLaval International AB, Tumba, Sweden) for detection of oestrus compared to ovulations/oestruses determined by milk progesterone (P4) profiles and visual observations; 2) To study the effect of resumption of ovarian cyclicity on the accuracy of oestrous detection by ALPRO.

Milk samples, from 42 multiparous cows on a 1,100 cow dairy herd with mean milk production of 8,112 kg, were taken twice weekly, commencing one week after parturition until either confirmed pregnancy or decision to cull. Concentrations of P4 in milk were measured by an enzyme immunoassay (Waldmann, 1999). Ovulations/oestruses were determined from milk P4 profiles and compared with the respective activity alarm lists of ALPRO Windows<sup>®</sup>. The limit values in the ALPRO<sup>®</sup> processor were set at 38, 50, and 60 for activity levels 1, 2 and 3, respectively. Visual oestrus observation was performed twice daily by two herdsmen. Delayed resumption of ovarian cyclicity was defined as the first measurement of P4 concentration >3 ng/ml occurring later than 50 days postpartum (PP).

A total of 144 ovulations/oestruses were detected using P4 profiles. Efficiencies for detection of oestrus by ALPRO, determined by comparing detected periods with the 144 ovulations were 24%, 10% and 31% for activity levels 1, 2 and 3, respectively, and 65% for all activity levels. During the observation period 260 oestrous activity events were registered by ALPRO of which 117 (45%) coincided with ovulations/oestruses determined from milk P4 profiles. Among cows in activity level 1, 28% were actually in oestrus. Corresponding values for activity level 2 and 3 were 45% and 87% respectively. Accuracy of oestrous detection by ALPRO in cows resuming ovarian cyclicity before 50 days PP was significantly higher ( $P < 0.001$ ), compared to cows which resumed ovarian cyclicity later than 50 days PP (53% and 29%, respectively). Oestrus was visually observed in only 21% of the ovulations/oestruses.

It was concluded that the efficiency of ALPRO for detection of oestrus was superior compared to visual observations. Delayed resumption of ovarian cyclicity postpartum had a negative effect on the accuracy of oestrous detection by ALPRO.

### References

1. Waldmann, A. (1999). Monoclonal antibodies to progesterone: characterization and selection for enzyme immunoassay in bovine milk. *Hybridoma*, 18(3), 289 - 296.

## **Evaluation of the toxicity of feedstuffs contaminated with zearalenone and deoxynivalenol to sows reproductivity**

Baliukoniene V, Bakutis B

Department of Food Safety and Animal Hygiene, Lithuanian Veterinary Academy, Kaunas,  
Lithuania

violeta.baliukoniene@lva.lt

A great part of infectious microorganisms of plant forage are various species of micromycetes. Various secondary metabolites of different chemical composition – mycotoxins – are synthesized and excreted into the environment by micromycetes. Recently it has been determined that toxins produced by *Fusarium*, *Aspergillus*, *Penicillium*, *Alternaria*, *Stachybotrys* and other genera of micromycetes are especially dangerous. It was estimated that aflatoxins, ochratoxins, deoxynivalenol, T-2 toxin, zearalenones, fumonisins, patulin and many other mycotoxins are particularly hazardous to animal and human health. Various information sources declare that mycotoxins possess carcinogenic, mutagenic, teratogenic, immunotoxic, haematopoietic, hepatotoxic, nephrotoxic qualities. Most usually sows' feedstuffs are contaminated with toxins produced by *Fusarium* spp. – zearalenone, or trichotecenes – deoxynivalenol. When these toxins are in feedstuffs they cause dangerous toxicoses to sows.

The purpose of this study was to determine the impact of feedstuff naturally contaminated with zearalenone and deoxynivalenol to sows and their fecundity.

The experiment was divided into three periods: the preparatory – I half of breeding, duration – 57 days; II half of breeding – 58 days; III – from farrowing to the weaning of piglets, 42 – 50 days.

15 Lithuanian White and Landrace breeds' sows (of second or third farrowing) were selected for the experiment. The sows were held in the same section that was divided into three parts, with five sows in each part. 5–7 days left to farrowing the sows were removed to the specialized farrowing rooms where they were held in individual composite stalls up till the weaning of piglets – of the age of 42 – 50 days.

In the preparatory period all the sows were given feedstuff, naturally contaminated with mycotoxins: zearalenone (ZEN) –  $500 \mu\text{g kg}^{-1}$ , deoxynivalenol (DON) –  $150 \mu\text{g kg}^{-1}$ , T-2 toxin -  $<7.5 \mu\text{g kg}^{-1}$ , aflatoxins -  $<1 \mu\text{g kg}^{-1}$ , ochratoxins -  $<1 \mu\text{g kg}^{-1}$ . Through all the experimental period the concentrations of the mycotoxins did not change, only the concentration of DON increased to  $1750 \mu\text{g kg}^{-1}$  in the middle of the experiment and retained the same to the end of testing. Feeding and keeping conditions were the same for all the sows.

The evaluation of the effect of the feedstuff contaminated with mycotoxins to sows fecundity and their immunologic qualities was based on the condition, fecundity, morphological and biochemical blood parameters. Fecundity of sows was evaluated in compare with the data on the fecundity of the fleshy type Lithuanian White pigs. The analysis sows and piglets morphological and biochemical blood parameters was performed by comparing the experimental results with the physiological standards.

Typical for mycotoxicoses symptoms were diagnosed after farrowing. Average sow fecundity was 5.3 piglets, piglet vitality was 71.5 %, piglet litter homogeneity – 36.8%. After sows were weaning piglets their blood lymphocyte content decreased by 7.7 %, monocyte contents – by 3.0 % in compare with physiological standards. It shows a decrease of natural sow immunity. Analysis of morphological piglet blood parameters indicated that they had deficiency of bone marrow function.

## **Influence of weaning to service interval on subsequent sows reproductive performance**

Karvelienė B, Riškevičienė V

Department of Infectious diseases, Lithuanian Veterinary Academy, Kaunas, Lithuania  
birutek@lva.lt

In big highly specialized pork production enterprises especially high attention is paid to herd reproduction. These enterprises use different feeding, keeping and handling conditions, rather limited movement of the animals, lack of natural sun light, high concentration of the animals, noise and other stress factors suppress defensive functions of the organism and its ability to adapt, disturb physiological functions. All these factors especially negatively affect reproductive processes in pigs. Disturbances of reproductive system in sows are mainly caused not by the direct infringements of the ovaries, but by the disturbances of hormonal regulation in the sow organism, caused by previously mentioned and other factors as well as by the unqualified management.

Swine herds attempt to optimize production by reducing the weaning to service interval (WSI). Some sows fail to resume oestrus cyclicity after weaning; however, the endocrinologic pathogenesis of these anoestrus sows is speculative. The capacity to return to oestrus following weaning, the onset of puberty and the ability to conceive and maintain pregnancy are affected by some factors: season, lactation length, daily feed intake, parity number. The incidence of increased weaning to oestrus intervals, post weaning anoestrus, decreased farrowing rate and decreased litter size become more frequent the earlier sows are weaned. These potential disadvantages need to be weighed against the potential increase in the number of litters/sow/year and improved health and growth rate of the pigs produced. The length of WSI influences subsequent reproductive performance and can be used to indicate the fertility in subsequent reproductive cycles. Variation is quite great for sows of all parities, but is most obvious in sows after weaning their first litter. Primiparous sows usually have a longer WSI than multiparous sows. Sows that take 7 to 10 days to return to oestrus after weaning often have decreased farrowing rates and litter sizes compare sows that return earlier. Numerous studies have found that an inadequate intake of energy or protein during lactation affects body fat and protein reserves and prolongs the WSI. Influence of photoperiod on weaning-to-oestrus interval also was found. Much of the variation is due to management and environmental effects; genetic variation also is important because the mean interval from weaning to first service differs among breeds and breed crosses. Studies showed that the length of WSI mostly was longer for purebred sow than crosses ones.

Determination of the percent of sows in anoestrus condition is important due to the fact that hormonal balance in these sows is completely disturbed. Growing follicles of normal sows excrete into the blood higher amount of estrogen which causes manifestation of oestrus, peak of LH concentration and ovulation. Due to the absence of FSH synthesis and secretion maturation of follicles in the ovaries is very slow or absent at all (anoestrus), estrogens are not synthesized or excreted, there is no ovulation, formation of corpus lutei, development and changes of endometrium, which is essential for oestrus cycle is disturbed. It is known that steroids participate in many processes of the organism, cause structural and functional changes in uterus tissues, and this action manifests through specific receptors. The main problem is to define whether the number and distribution of sexual steroids in uterus tissues is the reason or the consequence of disturbed reproduction? In order to elucidate this problem even partially it was predicted to find out frequency of anoestrus in pig herds, to define morphological changes and the distribution of estrogen (ER $\alpha$ ) and progesterone (PR-A) receptors in the uterus of sows with disturbed reproduction during the oestrus cycle and in case of pathological anoestrus state.

## **Influence of modern farming on cows reproduction in Lithuania**

Rutkauskas A

Laboratory of Animal Reproduction, Lithuanian Veterinary Academy, Kaunas, Lithuania  
arunas@lva.lt

The dairy industry throughout the world is going through a major transition. Adoption of modern dairy technologies has allowed the dairy manager to operate with a lower investment per cow, improve labor efficiency and improve the quality of life of the dairy farm owners and workers. This tremendous development, adoption and management of new production enhancing technologies, over the past few decades, has led to rapid increases in herd size and milk production levels. Herd sizes become bigger, but cows number decrease in Lithuania in the past ten years. This evidence becomes more intense, when we calculate total number of cattle.

All this period milk production per cow was increased. Cows' number was 557 thousand in 1996th, but this number became to 417.2 thousands in 2006th. Milk production per cow was 3604 kg and 5592 kg production per lactation, respectively. Many studies report a decrease in the fertility of modern dairy cows, when milk production increase.

If we look at conception rates of each herd, we will found that it differs not so much. Almost three-quarters of cows were normal (never treated for a reproductive disorder after calving), but reproductive disorders in the remaining of the cows were an important cause of reduced conception rates in these herds.

All these indexes results led to the question if the anoestrus problem is merely due to shortcomings in the management (e.g. failure to detect estrus) or whether it is typical to the modern high-yielding dairy cow herself. Moreover, when problems could really be designated as being typical to the high-yielding dairy cow, the next question arises as whether the anoestrus problems are caused by a lack of expressing heat symptoms by the cow, or by ovarian/uterine disorders leading to the symptom of anoestrus.

Using regular rectal palpations and ultrasonography, we found that small, inactive ovaries and not cysts were the most important reason of delayed cyclicity. Searching for the causes of prolonged luteal phases, in many cases an abnormal uterine content could be palpated, in some cases cysts-like structure on one of the ovaries was differentiate, while the others no specific reasons for this ovarian abnormality could be found. But not only delayed cyclicity is reason for infertility in modern farming. The rate of early embryonic loss in cows is also a major concern, vets more often make rectal palpation for pregnancy detection, but if we use ultrasonography more early, we will found, that in some cases we have early embryonic loss. Other reason is silent heat, when cow have not express signs of estrus and only vets can detect it by rectal palpation or ultrasonography.

It is clear that the reproduction of today's high-producing dairy cows differs from that of their ancestors. High-producing cows tend to have shorter estrous cycles, fewer standing events (of shorter duration), and higher rates of anoestrus.



## **The influence of different keeping systems on the dairy cow productivity and reproduction in Latvia**

Sematovica I, Lūsis I<sup>1</sup>, Antane V<sup>1</sup>

Research Institute of Biotechnology and Veterinary Medicine “Sigra”, LUA, Latvia

<sup>1</sup>Clinical institute, Faculty of Veterinary Medicine, LUA, Latvia

ivars.lusis@llu.lv

On 1 March 2007 there were 200 010 dairy cows in Latvia, which were located in 50878 herds. An average milk recording results in 2006 of standard lactation were: 5217 kg milk yield, 4.37% fat, 3.18% protein and 257 thousand somatic cells per millilitre of milk. The age of heifers at the first insemination was 16.2 months. The age at the first calving was 27.5 months. The calving to conception interval of all the recorded cows was on average 129 days, the number of the inseminations per calving was 1.8 times and dry period – 64 days.

Many approaches were used to increase the dairy animal production results. One of them is different keeping systems. Two main keeping systems for dairy cattle are used in Latvia: traditional tie-stall system with milking in the barn and modern free-stall system with milking in the parlour or, in some cases, milking robots.

The aim was to compare productivity and reproduction efficiency of dairy cows in tie-stall and free-stall system and find out veterinarians' opinion about the advantages and the disadvantages of systems. There were observed 12 dairy cattle herds randomly selected from both keeping systems.

Results and discussion: A statistically significant ( $p < 0.05$ ) increase of milk production from  $5088 \pm 200$  kg to  $5945 \pm 295$  kg per lactation and increase of protein content from  $3.17 \pm 0.02$  % to  $3.29 \pm 0.03$  % were registered in dairy herds where the keeping system of cows was changed from tied to untied. The somatic cell count decreased from  $269 \pm 34$  to  $187 \pm 36$  thousand cells/ml.

Studies were made also in herds without changing the keeping system. There were observed statistically lower somatic cell count in milk from cows that were kept untied in comparison with cows which were kept tied ( $187 \pm 36$  cells/ml and  $306 \pm 32.5$  cells/ml;  $p < 0.05$ ). There was a tendency toward higher number of artificial inseminations per gestation and longer calving to conception interval in untied cows comparing to tied ones ( $1.9 \pm 0.1$ ,  $1.7 \pm 0.1$ ;  $129 \pm 10.4$  days and  $118 \pm 4.6$  days, respectively;  $p = 0.08$ ). In Latvia there are only two farms with milking robots now. One of them introduced it in late 2006, another one in June 2007. Until now we do not have records about influence of robot system on productivity, milk quality and reproductive indices.

We have summarised experience of four practitioners about advantages and deficiencies of the free-stall system in comparison with tie-stall system. Advantages include: good expression of oestrus behaviour, less silent heats. It needs less people labour force and offers cleaner conditions of milking process in the parlour. Disadvantages include: more often trauma of legs, claws and udder, lameness, more abortions. Some problems can be avoided by cow dehorning to avoid hierarchy fights. It is difficult and takes more time to separate a particular cow for artificial insemination. To protect new born calves from trample, it is recommended to keep pregnant heifers separately from dry cows, especially, close to calving.

Conclusion: Free-stall system makes a positive influence on milk yield and quality, especially in herds where the keeping system was changed from tie-stall to free-stall.

Considering positive and negative aspects of free-stall system, we can conclude that there are good possibilities for effective and modern milk production; however, good management is also of great importance.

## Keeping system and reproduction of swine in the Republic of Latvia

Rimeicans J<sup>1</sup>, Mangale M<sup>1</sup>, Melbardis K<sup>2</sup>

<sup>1</sup>Clinical institute, Faculty of Veterinary Medicine, Latvia University of Agriculture, Jelgava,

<sup>2</sup>Pig-breeding farm "Vecauce", Latvia

jazeps.rimeicans@llu.lv

Till 1 March 2007 in Latvia, there were registered 3382 swine herds with 346993 pigs. Large swine breeding farms with more than 1000 pigs have 70.7% of all the registered pigs in the state.

As to the type of animal keeping system in Latvia, there are large-scale industrial pig raising enterprises containing more than 1000 pigs, and farm-stead with a smaller number of animals. Part of the large swine breeding farms (20%) are still functioning since the former USSR times and typically have partly automatic feeder and manual manure system. Nowadays modern swine breeding farms mainly characterised with automatic ventilation, liquid manure system, keeping pigs on a slatted floor, as well as keeping sows in cages. There are also computerised recording systems reflecting animal feeding, sow reproduction, pedigree data and veterinary medical issues (animal registration, vaccination, veterinary treatments). Artificial insemination of pigs is applied in 98% of cases in the large-scale enterprises. The semen of boars is obtained in four artificial insemination stations, as well as up to 15 on-farm stations. The swine oestrus synchronization is used in 20-30% of cases by administering prostaglandin preparations (Intervet PG-600). The affectivity of preparation reaches 60-70%, according to specialists' evaluation.

The aim of investigation was to find out reproductive performance in sows and culling reasons in the pig-breeding enterprise "Vecauce".

In 2007 there were registered 979 sows in the pig-breeding enterprise "Vecauce" of which in average 22.3 alive piglets were obtained per 2.22 litters, on average 10.1 piglets per litter. In total, 17000 bacon pigs were raised in the former year at the enterprise. The number of stillborn piglets were 1.1 per litter and those of mummies were 0.1 per litter, 10.8% of piglets died prior to weaning, but till the end of finishing 2.7% of pigs died, thus there were 13.5% of dead piglets totally. It was found out that 80% of sows farrowed after the first insemination. Lactation period in sows was on average 27.4 days, while abortions were observed in 5% of cases.

Summarizing the data on sow morbidity, it was established that most often metritis (80%), mastitis (10%) and metritisagalactia (18%) were observed in swine.

The observations showed evidence that 40% (350) of sows were culled per year. The main causes of culling in 2007 were fertility problems (70%), age of sows (15%), abortions (5%), as well as swine aggressiveness (snatching piglets) and early farrowing.

Investigations show that applying modern pig-breeding technology at the enterprise "Vecauce" the sow productivity is considerably higher in comparison with the average indices in Latvia.

## **Agricultural complex and veterinary service cooperation in year 2007 in Russia**

Plemyashov K

Department of Obstetrics and Gynaecology, Veterinary Medicine Academy in St Petersburg,  
Russia

kirill060674@mail.ru

Leningrad region includes 17 areas in which for today there are 52 breeding farms. For the period 2000-2007 the number of cattle is steadily reduced. That is why only for 7 years the number of heads has decreased from 200 up to 170 thousand, and the quantity of cows decreased to 18 thousand heads.

At the same time the quantity of yields of milk has considerably increased. In compare with year 2000, when the average yield of milk of one cow was 4850 liters of milk per year, in 2007 it had became already 6570 liters. Up to June 1, 2007, one cow could give 3870 liters, which exceeds parameters of the last year.

Infringements of reproductive function of the cattle now make one of the basic problems in the profitability of animal industry. Gynecologic diseases of animals in some farms reaches 90 %, the number of newborn calves is 77 heads on 100 cows.

During the last year the situation in many farms changed to the better, because of the state program of agriculture improvement. Most farms were supplied with new modern equipment and medicine. Except for that post degree training of veterinary specialists on the basis of obstetrics and gynecology department allows to introduce new techniques of diagnostics of gynecologic pathologies which have been hard to diagnose (ultrasonic diagnostics of structural changes in ovaries and uterus) earlier. Early visual ultrasonic diagnostics allows to determine not only pregnancy on early terms (about 30 days), but also to reveal fruitless animals having essentially reduced the service - period.

During the prophylactic medical examination of farms in 2007 there had been examined 87731 heads of cattle. There were found more than 40 thousand sick animals which are almost 50 % of the examined cattle. Including the retention of afterbirth is registered at 11390 heads (28 %), endometritis - at 21802 heads (53.6 %), ovary diseases - at 16.25 % of cows. The percent of medical efficiency was 70.4 %.

There were examined on mastitis - 299013 heads, and were find - 22069 (7.3 %), were treated - 21252 heads, were cured - 19884 heads. The percent (interest) of medical efficiency has made 93.56 %.

In connection with increasing of gynecologic diseases in cows and difficulties of their treatment, we offer and approve modern effective methods of diagnostics, prophylactics and therapy: laser therapy, veterinary homeopathy, use of latex milking glasses of a new sample, rectal ultrasonic diagnostics etc.

Certainly, communication of a farm and a HIGH SCHOOL, the program of postdegree training will allow speeding up introduction in agricultural production, scientifically proved, modern economic technologies and increase level of profitability in animal industries.

## **Veterinary aspects of longevity of economic use of highly productive cows**

Fedosova N

Academy of Management and Agrobusiness of the Russian Federation, St. Petersburg, Russia  
FNH@mail.ru

In Leningrad region of the Russian Federation the big livestock of genetically valuable dairy breeds of large horned livestock is concentrated. On the beginning of year there are 62500 cows of Black Motley and 13400 cows of Ayrshire breeds. Dairy efficiency of cows in the majority of the breeding enterprises makes 9000-10000 kg of milk on 1 cow. The created herd of cows can be used as breeding nursery for other regions of Russia. The enterprises are safe on infectious diseases, including from leukosis. However, small duration of productive use of cows (on the average 2.7 lactations) and low level of reproduction of a livestock negatively influence efficiency of dairy cattle breeding.

Rather short term of intensive industrial use of genetically valuable highly productive dairy cows demands annual input in the basic herd not less than 30 % of young animals that becomes impossible at low level of reproduction of herd. Reception of insufficient quantity of repair young growth from genetically valuable highly productive cows compels experts to include in group for reproduction of all available in an economy heifers, that narrows possibilities of selection of the best animals and reduces efficiency of selection-breeding work to a minimum.

Last years the steady tendency of decrease in number of cattle is marked. With increase in dairy efficiency in an organism of cows exchange processes raise. At action of adverse factors disease of cows increases and weaker posterity is born. Since 2000 the quantity of cows in Leningrad region has decreased 20 %.

Infringements of conditions of the maintenance and young growth feeding productivity of their insemination, well-being of pregnancy, parturition and the postnatal period negatively influences development of young animals.

The analysis of terms of insemination young animals in agricultural productions of Leningrad region testifies to infringements of technology of cultivation of young growth and preparation heifers to insemination. So, from the general number of heifers in random age on the beginning of year 32,6 % are inseminated aged till 18 months only, at the age of 18-24 months - 43.8 % and aged are more senior 2 years - 7.4 % of animals. There were not inseminated 16.2 % heifers, from them at the age from 18 to 24 months - 12.9 % and are more senior 2 years - 3.3 % heifers.

For realisation of genetically caused level of dairy efficiency of cows, it is necessary to support constantly high level of reproduction of herd, providing timely fruitful insemination of cows after partum and young animals age.

The first insemination of cows is spent on the average in 71-88 days after partum, and pregnancy after insemination is registered in 38 % of animals. Later insemination of cows after partum, basically, is connected with a pathological condition of genital organs, absence or silent display of sexual behaviour and influence of some other factors of technological character.

Mass barrenness and early rejection of cows are connected with infringement of exchange processes in an organism as a result of decrease in its biotone and easing neurohumoral regulation of processes of reproduction.

It is established, that in the diseased endometritis cows concentration of hormones essentially differs from that in animals with a normal current of the postnatal period. The maintenance of progesterone in the presence of first signs of endometritis twice exceeds absolute size of the given indicator in clinically healthy animals.

For correction and structure restoration of endometrium, functional activity ovary and a uterus used antiseptic preparations on the basis of an isotonic solution and cod-liver oil in a combination with honadoliberin and hormonal preparations.

At use of preparations concentration of progesterone in cows with a pathology decreases approximately to level of concentration of steroid in blood in healthy cows. About 19 days after parturition level of progesterone in endometritis cows increases and by 21 day exceeds in 2.5 times the steroid maintenance in blood of clinically healthy animals. The maintenance estradiol for 10 day after partum in the diseased endometritis cows makes  $24.56 \pm 1.42$  pg/ml. Then decrease in concentration of a hormone is marked and by 21 day steroid level again increases to  $20.9 \pm 2.59$  pg/ml. The parity of a progesterone and estradiol during the given period of research makes 1:19.

Concentration of cortison in blood of cows with signs of acute postnatal endometritis for 10 day after partum averages  $5.73 \pm 2.02$  ng/ml. In the subsequent, at restoration of function of endometrium, concentration cortisol decreases in 2.2 times and is supported at the given level with small fluctuations before fruitful insemination.

The maintenance thyreoid hormones in blood of ill endometritis cows are much lower, than in clinically healthy animals. At use of preparations the concentration of thyroxin increases by 21 day after partum, and the maintenance trijodthyronin decreases by the given period on 27.7 % in relation to initial level that testifies to low functional activity of a thyroid gland in the cows who were ill subsequently endometritis.

Sexual recurrence is restored in 92 % of cows, reproduction level increases with 46 % and premature rejection of cows decreases with 83 %.

Thus, hormonal correction and regulation of process of reproduction of cows provides preservation of their reproductive health, increase of level of reproduction, decrease in premature rejection and increase in duration of productive longevity of highly productive cows.

## **Preventive maintenance of infringements and regulation of reproductive function in highly productive cows**

Fedosova N, Nikolaeva N

Academy of Management and Agrobusiness NZ of the Russian Federation, Saint Petersburg, Russia

FNH@mail.ru

The decision of a problem of rhythmical reproduction of a livestock restrains a wide circulation of a pathology of pregnancy, parturition and the postnatal period in highly productive cows for which elimination in short terms till now it is not developed highly effective methods. Treatment of sick cows demands many means and time. Therefore, to questions of the control of a physiological condition of animals various stages of a reproductive cycle, preventive maintenance of infringements and regulations of reproductive function in highly productive cows should pay paramount attention. Taking into account it, before us the purpose has been put - to study preventive and therapeutic efficiency of complex use of preparations on character of current of parturition and the postnatal period in highly productive cows and to establish their influence on parameters of the subsequent reproductive ability of animals.

Researches carried out on the highly productive cows that have been picked up by a principle of conditional pairs - analogues in view of age ( $4.3 \pm 0.8$  years), live weight ( $573.6 \pm 14.3$  kg), a season of parturition (the winter period) and dairy efficiency ( $8572.7 \pm 792.8$  kg of milk one year). Groups of animals formed 1 month prior to prospective parturition. 14-17 days prior to parturition all animal after clinical inspection had been intramuscularly entered a vitamins-mineral complex of preparations.

With the purpose of preventive maintenance of a pathology of parturition and the postnatal period to cows of 1 group (74 cows.) during parturition unitary intramuscularly entered PG F 2-alpha, then into the first hours after removing a fruit intravenously entered 40 % a solution of glucose, 20 % a solution of calcium boroglukonat and 10 % a solution of calcium of chloride. For 1, 3, 5 day after parturition carried out blockade on Fadeev. With 1 for 5 day after removing a fruit in a cavity of a uterus entered ginobiotik.

To cows of 2 groups (68 cows.) in addition for 2 and 4 day after parturition entered ihglukovit.

To cows of 3 groups (65 cows) preparations entered under the same circuit, as cows of 1 group, but instead of ginobiotik with 1 for 5 day after parturition intrametrum entered furapen.

It is established, that the pathology of parturition was observed in animal all groups, however in cows of 1 group the given pathology was registered much less often, than in cows of 2 and 3 groups. Difficult parturitions are registered in 16.2 % of cows of 1 group, in 20.6 % of cows of 2 groups and 21.5 % of cows of 3 groups.

Branch of a placenta in physiological terms observed in 83.8 % of cows of 1 group, that on 5.9 % and 19.2 % it is more, than accordingly in cows of 2 and 3 groups. A principal cause of detention of a placenta was dense connection of a placenta as a result of inflammatory process. In that case the placenta did not manage to be separated completely even in the operative way.

The correlation interrelation between activity of patrimonial activity and detention of a placenta in cows is not established

Clinical attributes of a postnatal hypostasis of the udder are registered in 9 (12.2 %) cows of 1 group, 15 (22.0 %) cows of 2 groups and 12 (18.5 %) cows of 3 groups.

For 4-8 day after parturition registered development sharp postnatal endometritis in 20 cows (27.0 %) 1 groups, 22 cows (32.3 %) 2 groups and 25 cows (38.5 %) cows of 3 groups,

and clinical attributes endometritis have been registered in cows of all groups with a pathology of parturition.

All sick animals received conservative treatment under the standard circuits. Besides 4 groups of cows which, at revealing clinical attributes of sharp postnatal endometritis, intramuscularly entered timogen in a doze 20 mg / goal within 5 day has been allocated.

Timogen - peptidis a bioregulator with expressed immunomodulation effect.

For 9 day after an injection timogen marked increase in concentration of a progesterone in 2.5 times, cortisol - on 6.7 %, the general {common} fiber - on 9.8 %, scale - globulins - on 34.3 %, reduction of cholesterol by 21.9 %, albumin - on 22.3 %, beta-globulin- on 13.8 % in blood of cows and sharp reduction of quantity {amount} of pathogenic microflora in samples of vaginal liquids.

For 19 day marked increase an alpha - globulins on 5.7 %, a progesterone - in 7.4 times, estradiol - in 4.5 times and insignificant decrease {reduction} cortisol in blood and absence of pathogenic microflora in samples of vaginal liquids of cows.

After the first insemination pregnancy has been registered in cows of 1 group has made 75.6 %, in cows of 2 groups – 64.7 % and in cows of 3 groups – 56.9 % and in cows of 4 groups – 78.6 %.

Conclusion: Complex use of preparations before partum and early postpartum the period provides significant reduction of pathologies of reproductive function and increase of efficiency of the first insemination in highly productive cows

## **Nonspecific resistance improvement and anemia prophylaxis of pigs**

Volos A, Dmitrieva T, Bazanova N, Plemyashov K

Department of Obstetrics and Gynaecology, Veterinary Medicine Academy in St Petersburg, Russia

Maximum safety and decreasing of sickness rate for saplings are important factors of stable cattle breeding production and its biological value improvement.

There appear a lot of new veterinary medications that meets strong pharmacological requirements. Haemobalance, that meets international and Russian quality standards, is an example of new vitamins, minerals and amino acids complex. Components combination of Haemobalance is very effective for metabolism stimulation and stabilization of organism.

Clinical tests of Haemobalance were performed in pig farms near Saint – Petersburg, Russia. Suckling pigs and sows were tested.

During the tests nursing sows got 3 intramuscular injections (2.5 ml each) of Haemobalance during 3 days, one injection per day. Blood sampling was taken from an aural vein on the second day after the farrow. Factors of pigs' natural resistance were the quantity of erythrocytes and leucocytes, the level of haemoglobin and total protein. One week after the last Haemobalance injection the second biochemical and clinical blood tests were performed.

Biochemical tests of blood serum before Haemobalance injections showed disbalance of liver functioning, which is possibly related to high concentrated feed. Lack of iron in the blood of nursing sows and balance upset between calcium and phosphorus are illustration of wrong ration for pregnant and nursing sows.

As a result of Haemobalance injections the following positive changes were detected:

- level of total protein increasing;
- normalization of albumin – globulin ratio in proteins;
- calcium and iron level increasing;
- decreasing of level of transamines, such as ALT and AST;
- decreasing of SAB.

Blood serum tests showed 11,5% increasing of total protein level, that is the evidence of metabolism improvement. Increasing of iron level for 46,1% in physiological ranges is a direct result of Haemobalance application. It is significant that Haemobalance has a prolong effect.

After Haemobalance application, haemoglobin level increased for 21% comparing with control animals. The quantity of erythrocytes increased for 53.57% comparing with the value before Haemobalance application. Feebly marked iron – deficient microcytic anemia was detected in all animals, and it was cured by using Haemobalance in tested groups of sows. It is interesting that water for animal watering contained enough iron ions, but it was not assimilated well, possibly because of low level of vitamins and irreplaceable amino acids.

The second stage of Haemobalance testing was carried out with 76 newborn pigs (39 experimental and 37 controls). Experimental pigs got injection of 0.5 ml Haemobalance intramuscular, three times with 2 days interval between injections. As a result experimental pigs gained 3.1 kg, and control pigs gained only 1.5 kg in weight. Consequently, using of Haemobalance allows increasing live weight of pigs for 1.6 kg on the average.

So, tests proved that Haemobalance acts as immunoregulator for pigs and increases natural resistance of pigs. Positive effect of Haemobalance is confirmed by clinic and biochemical blood tests: levels of haemoglobin, erythrocytes are increased, leucoformulars become normal. Improvement of pigs' vitality was detected, haemopoiesis and erythropoiesis were stimulated, blood volume was recovered fast, and that was evident of oxygen transport improvement in pigs' organism.





## **CRU Publication series**

### **Report 1**

Proceedings of the Inauguration of the Centre for Reproductive Biology, 1997, by *Andersson H, Kindahl H, and Neil M (editors)*

### **Report 2 (In Swedish)**

Svinforskning vid SLU - Presenteras för Sveriges grisproducenter vid föreningens årsmöte på Ultuna 25-27 juni, 1998 by *Andersson K (editor)*

### **Report 3**

Advances in Canine Reproduction - Minisymposium at SLU, September 3, 1998, by *Linde-Forsberg C (editor)*

### **Report 4**

Sperm behaviour prior to fertilization in animals - Special symposium at SLU, November 16, 1998, by *Larsson B and Rodriguez-Martinez H (editors)*

### **Report 5**

Aspects of Equine Reproduction- symposium at SLU, April 15, 1999, by *Rodriguez-Martinez H (editor)*

### **Report 6**

Impaired Reproductive Performance in Postpartum Cows- symposium at SLU, May 26, 1999, by *Kindahl H, (editor)*

### **Report 7**

Dairy production in Estonia - Today and Tomorrow. Symposium at Estonian Agriculture University, Tartu, June 7, 1999, by *Tiirats T and Magnusson U (editors)*

### **Report 8**

Aspects of Ovine Reproduction - Special symposium at SLU, June 8, 1999, by *Söderquist L, Forsberg M and Rodriguez-Martinez H (editors)*

### **Report 9**

Symposium I: Reproduction in Aquatic Organisms

Symposium II: Bird Reproduction Symposium: Avian Fertility - Mechanisms and Application, by *Madej A, Waldenstedt L and Norrgren L (editors)*

### **Report 10**

Proceedings of the Inauguration of CRU: Reproduction and Our Environment, Uppsala November 4, 1999, by *Ulf Magnusson (editor)*

### **Report 11**

Feeding, metabolism and infections in farm animals with special reference on reproduction. Proceedings from a symposium at Estonian Agriculture University, Tartu, February 24-25, 2000, by *B Aasmäe, T Tiirats and U Magnusson (editors)*

**Report 12**

Sexual Biology from Fish to Humans. Proceeding from a symposium in Uppsala, May 18, 2000, by *U Magnusson, M Neil and M Olovsson (editors)*

**Report 13**

Hormones in the Environment and Animal Production - a Public Health Concern? Proceeding from a symposium in Uppsala, March 13, 2001, by *B Brunström and U Magnusson (editors)*

**Report 14**

Reproductive Failure in Farm Animals. Proceedings from a symposium at Estonian Agriculture University, Tartu, June 14-15, 2001, by *T Tiirats (editor)*

**Report 15**

Envirovet Baltic: Workshop on Ecosystem Health. Proceedings from a workshop in Saaremaa, Estonia, August 15-19, 2002, by *Börje K. Gustafsson and Ulf Magnusson (editors)*

**Report 16**

Farm animal reproduction: Reducing infectious diseases. Proceedings from a symposium at the Faculty of Veterinary Medicine, Jelgava, Latvia, January 22-23, 2003, by *Vita Antane and Ulf Magnusson (editors)*

**Report 17**

Farm animal reproduction: Conserving local genetic resources. Proceedings from a mini-symposium at The Faculty of Veterinary Medicine, Kaunas, Lithuania September 13-15, 2003, by *Renée Båge and Aloyzas Januskauskas (editors)*

**Report 18**

Reproductive techniques in conservation biology. Proceedings from a CRU seminar at SLU, March 18, 2004, by *Renée Båge (editor)*.

**Report 19**

Animal farming in transition - the role of animal reproduction: Mastitis symposium. Proceedings from a symposium at the St Petersburg Academy of Veterinary Medicine, Russia, January 10-12, 2007, by *Renée Båge, Nina Fedosova, Kirill Plemyashov and Maria Stakheeva (editors)*.

**Report 20**

Avian reproductive physiology. Report from a workshop at Hiiumaa/Dagö, Estonia, December 10-12, 2006, by *Mats Björklund and Mare Lohmus (editors)*.

ISSN 1404-5915  
ISBN 978-91-85911-35-6  
©2008 CRU Report 21, Uppsala

Tryck: SLU Service/Repro, Uppsala 2008