Subjek : Ternak - Reproduksi
Tahun 2004-2008 (92 judul)

Motozumi Matsui, Akio Miyamoto, Evaluation of ovarian blood flow by colour Doppler ultrasound: Practical use for reproductive management in the cow, The Veterinary Journal, Volume 181, Issue 3, September 2009, Pages 232-240, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2008.02.027.
(http://www.sciencedirect.com/science/article/B6WXN-4T53HRX-1/2/9c8ceaaf2132215bec90bf73488c1b38)
Abstract:
Transrectal real-time ultrasonography (US) has been developed as a research and practical tool in bovine reproduction. Non-invasive US observations have made it possible to provide real-time and serial analyses of ovarian morphological changes and fetal development and have generated new information on reproductive physiology during the bovine oestrous cycle and pregnancy. This has greatly contributed to an understanding of the real-time dynamics of follicular development. US has also allowed for more accurate diagnosis compared with rectal palpation in reproductive management in cattle. Practical applications of US include early diagnosis of pregnancy, identification of twin fetuses, detection of ovarian and uterine pathologies and determination of fetal sex.
In recent years, local blood flow has been analysed in individual ovarian follicles and the corpus luteum (CL) in the cow using colour Doppler US. From these observations, it has been found that (1) the blood supply to follicles is closely related to follicular growth, atresia and ovulation, (2) the blood supply to the CL increases in parallel with its growth, and (3) there is an acute increase in blood flow in the mature CL prior to luteal regression. Colour Doppler US may provide an estimate of the physiological status of follicles and corpora lutea. For example, images of blood flow can be used to assess the thickness of the follicular wall and provide a differential diagnosis of follicular and luteal cysts. Assessment of the area of blood flow in the CL using colour Doppler imaging may offer a useful adjunct in estimating CL function, which could be applied to the diagnosis of non-pregnancy and fetal loss. The number of small follicles which have blood flow at the start of gonadotrophin treatment may be a useful index to predict the superovulatory response.
With improvements in portability and cost-effectiveness, the evaluation of ovarian blood flow by colour Doppler US is likely to become widely used as a diagnostic tool for monitoring ovarian function in dairy cattle.
Keywords: Colour Doppler ultrasound; Blood flow; Ovary; Reproduction; Cow

Zhao Lu, Yrjo T. Grohn, Rebecca L. Smith, David R. Wolfgang, Jo Ann S. Van Kessel, Ynte H. Schukken, Assessing the potential impact of Salmonella vaccines in an endemically infected dairy herd, Journal of Theoretical Biology, Volume 259, Issue 4, 21 August 2009, Pages 770-784, ISSN 0022-5193, DOI: 10.1016/j.jtbi.2009.04.028.
(http://www.sciencedirect.com/science/article/B6WMD-4W91PYY-1/2/5398f478eda227afb2be5ea27af0c640)
Abstract:
Salmonella spp. in cattle contribute to bacterial foodborne disease for humans. Reduction of Salmonella prevalence in herds is important to prevent human Salmonella infections. Typical control measures are culling of infectious animals, vaccination, and improved hygiene management. Vaccines have been developed for controlling Salmonella transmission in dairy herds; however, these vaccines are imperfect and a variety of vaccine effects on susceptibility, infectiousness, Salmonella shedding level, and duration of infectious period were reported. To assess the potential impact of imperfect Salmonella vaccines on prevalence over time and the eradication criterion, we developed a deterministic compartmental model with both replacement

(cohort) and lifetime (continuous) vaccination strategies, and applied it to a Salmonella Cerro infection in a dairy farm. To understand the uncertainty of prevalence and identify key model parameters, global parameter uncertainty and sensitivity analyses were performed. The results show that imperfect Salmonella vaccines reduce the prevalence of Salmonella Cerro. Among three vaccine effects that were being considered, decreasing the length of the infectious period is most effective in reducing the endemic prevalence. Analyses of contour lines of prevalence or the critical reproduction ratio illustrate that, reducing prevalence to a certain level or zero can be achieved by choosing vaccines that have either a single vaccine effect at relatively high effectiveness, or two or more vaccine effects at relatively low effectiveness. Parameter sensitivity analysis suggests that effective control measures through applying Salmonella vaccines should be adjusted at different stages of infection. In addition, lifetime (continuous) vaccination is more effective than replacement (cohort) vaccination. The potential application of the developed vaccination model to other Salmonella serotypes related to foodborne diseases was also discussed. The presented study may be used as a tool for guiding the development of Salmonella vaccines.
Keywords: Salmonella; Imperfect vaccines; Epidemiological modeling; Parameter sensitivity analysis

O.D. Vergara, M.A. Elzo, M.F. Ceron-Munoz, Genetic parameters and genetic trends for age at first calving and calving interval in an Angus-Blanco Orejinegro-Zebu multibreed cattle population in Colombia, Livestock Science, In Press, Corrected Proof, Available online 21 August 2009, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.07.009.
(http://www.sciencedirect.com/science/article/B7XNX-4X24C86-1/2/a114806c5840e065119bbb51382ac0d0)
Abstract:
Genetic parameters and genetic trends for age at first calving (AFC), interval between first and second calving (CI1), and interval between second and third calving (CI2) were estimated in a Colombian beef cattle population composed of Angus, Blanco Orejinegro, and Zebu straightbred and crossbred animals. Data were analyzed using a multiple trait mixed model procedures. Estimates of variance components and genetic parameters were obtained by Restricted Maximum Likelihood. The 3-trait model included the fixed effects of contemporary group (year-season of calving-sex of calf; sex of calf for CI1 and CI2 only), age at calving (CI1 and CI2 only), breed genetic effects (as a function of breed fractions of cows), and individual heterosis (as a function of cow heterozygosity). Random effects for AFC, CI1, and CI2 were cow and residual. Program AIREMLF90 was used to perform computations. Estimates of heritabilities for additive genetic effects were 0.15 +/- 0.13 for AFC, 0.11 +/- 0.06 for CI1, and 0.18 +/- 0.11 for CI2. Low heritabilities suggested that nutrition and reproductive management should be improved to allow fuller expressions of these traits. The correlations between additive genetic effects for AFC and CI1 (0.33 +/- 0.41) and for AFC and CI2 (0.40 +/- 0.36) were moderate and favorable, suggesting that selection of heifers for AFC would also improve calving interval. Trends were negative for predicted cow yearly means for AFC, CI1, and CI2 from 1989 to 2004. The steepest negative trend was for cow AFC means likely due to the introduction of Angus and Blanco Orejinegro cattle into this population.
Keywords: Beef cattle; Criollo; Multibreed; Genetic trends; Reproduction

T. Sundberg, B. Berglund, L. Rydhmer, E. Strandberg, Fertility, somatic cell count and milk production in Swedish organic and conventional dairy herds, Livestock Science, In Press, Corrected Proof, Available online 14 August 2009, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.06.022.
(http://www.sciencedirect.com/science/article/B7XNX-4X0MPK6-1/2/8a407fa71f9e26f0b51ef12954d5de9c)

Abstract:
The share of organic dairy production in EU is increasing and this study describes the herd structure and cow performance in organic and conventional dairy production systems in Sweden. The data included records from 2 902 718 lactations, collected in organic (n = 471) and conventional (n = 13 976) herds between 1998 and 2005. Compared with conventional herds, the organic herds were larger and increased more rapidly in size. The replacement rate was slightly lower in organic herds and fewer Swedish Holsteins were used. The statistical analysis of cow performance in the first three lactations showed lower milk, fat and protein production in organic herds, but the increase in production from first to second lactation was larger when expressed in kg milk. Fertility was better for organically managed cows compared to conventionally managed cows, but the somatic cell count (SCC) was higher. However, at a given production level the fertility was slightly worse in organic herds while there was no difference in SCC. No interactions of importance were found between production system and breed for any trait.
The results showed that organic and conventional dairy production differed regarding herd structure and cow performance. However, the differences in fertility and SCC found were to a high extent explained by the lower milk yield in organic production and no breed was found to perform better in either system.
Keywords: Organic farming; Cow; Cattle; Reproduction; Udder health

M.A. Velazquez, I. Parrilla, A. Van Soom, S. Verberckmoes, W. Kues, H. Niemann, Sampling techniques for oviductal and uterine luminal fluid in cattle, Theriogenology, In Press, Corrected Proof, Available online 13 August 2009, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2009.07.004.
(http://www.sciencedirect.com/science/article/B6TCM-4X0F6D9-1/2/99019a7b7adf436d2fee611adb34e745)
Abstract:
Analysis of luminal fluid microenvironments in the reproductive tract is pivotal to elucidate embryo-maternal signaling mechanisms responsible for successful reproduction in mammals, including cattle. Besides facilitating production of an optimized medium for in vitro fertilization and embryo culture in assisted reproductive technologies, screening of luminal fluid constituents in the oviduct and uterus could also provide critical information for elucidation of mechanisms underlying developmental programming. A key issue in this type of research is the sampling of luminal fluids. In this review we discuss the sampling techniques available for bovine species, including a recent in situ technique developed with the Ghent device, which allows rapid recovery of measurable amounts of pure uterine luminal fluid with minimal disturbance to the donor animal.
Keywords: Luminal fluid; Oviduct; Uterus; Sampling; Cattle

G. Yague, F. Goyache, J. Becerra, C. Moreno, L. Sanchez, J. Altarriba, Bayesian estimates of genetic parameters for pre-conception traits, gestation length and calving interval in beef cattle, Animal Reproduction Science, Volume 114, Issues 1-3, August 2009, Pages 72-80, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2008.09.015.
(http://www.sciencedirect.com/science/article/B6T43-4TK47B8-5/2/e30b3e81f7a044963bf3406bda64ce1f)
Abstract:
A total of 5253 records obtained from 2081 Rubia Gallega beef cows managed using artificial insemination as the only reproduction system were analysed to estimate genetic parameters for days to first insemination (DFI), days from first insemination to conception (FIC), number of inseminations per conception (IN), days open (DO), gestation length (GL) and calving interval (CI) via multitrait Bayesian procedures. Estimates of the mean of posterior distribution of the heritability of DFI, FIC, IN, DO, GL and CI were, respectively, 0.050, 0.078, 0.071, 0.053, 0.037 and 0.085 and the corresponding estimates for repeatability of these traits were 0.116, 0.129, 0.147, 0.138,

0.082 and 0.132, respectively. No significant genetic correlations associated to DFI or GL were found. However, genetic correlations between the other four analysed traits were high and significant. Genetic correlations between FIC and IN, DO and CI were similar and higher than 0.85. Genetic correlations of IN-DO and IN-CI were over 0.65. The highest genetic correlation was estimated for the pair DO-CI (0.992) that can be considered the same trait in genetic terms. Results indicated that DFI can be highly affected by non-genetic factors thus limiting its usefulness to be used as an earlier indicator of reproductive performance in beef cattle. Moreover, GL could not be associated to the reproductive performance of the cow before conception. The other four analysed traits, FIC, IN, DO and CI, have close genetic relationships. The inclusion of IN as an earlier indicator of fertility in beef cattle improvement programs using artificial insemination as the main reproductive system can be advisable due to the low additional recording effort needed.
Keywords: Beef cattle; Cow fertility; Artificial insemination; Rubia Gallega; Heritability; Genetic correlation

B.L. McCormack, C.C. Chase Jr., T.A. Olson, T.H. Elsasser, A.C. Hammond, T.H. Welsh Jr., H. Jiang, R.D. Randel, C.A. Okamura, M.C. Lucy, A miniature condition in Brahman cattle is associated with a single nucleotide mutation within the growth hormone gene, Domestic Animal Endocrinology, Volume 37, Issue 2, August 2009, Pages 104-111, ISSN 0739-7240, DOI: 10.1016/j.domaniend.2009.04.001.
(http://www.sciencedirect.com/science/article/B6T62-4W919SY-1/2/9c7c2d541cb0f2e27187da384eb9b186)
Abstract:
Miniature Brahman cattle at the USDA ARS Subtropical Agriculture Research Station in Brooksville, FL have normal proportioned growth but are approximately 70% of mature height and weight when compared with Brahman cattle in the same herd. Pedigree analyses suggest that the condition is inherited through a recessive allele. The miniature Brahman cattle in the Brooksville herd have been used for studies of growth and reproduction, but the underlying causative mutation is unknown. Presumably, the miniature condition could arise from a mutation in the GH gene. The objective, therefore, was to clone the GH cDNA from Brooksville miniature Brahman cattle, compare its sequence to normal Brahman cattle, and test the biological activity of the native GH protein. Messenger RNA was isolated from the pituitary, and a cDNA for the protein coding region of the GH gene was amplified by reverse-transcription polymerase chain reaction (PCR) from each of 2 miniature Brahman bulls. The cDNA were cloned into plasmid vectors, and top and bottom strands were sequenced by automated DNA sequencing. The sequence of both cDNA clones derived from miniature cattle differed from Bos indicus GH (GenBank AF034386) at base number 641 because there was a cytosine (C) instead of a thymine (T). The C to T change encoded a mutation (threonine to methionine) at amino acid 200 (T200M mutation). The mutation was confirmed by sequencing of an additional 2 miniature cattle and comparing their sequence to 2 normal cattle. The threonine is located in the fourth [alpha] helix of GH and is 1 of 8 amino acids that participate in binding of GH to the GH receptor. Twelve miniature Brahman and 9 normal Brahman cattle were tested by using a restriction fragment length polymorphism analysis that employed the BsmBI restriction enzyme (specific for the mutated nucleotide). The 12 miniature Brahman cattle were homozygous for the mutation (-/-). Seven of the normal Brahman cattle were homozygous for the wild-type allele (+/+), and 2 were heterozygous (+/-). When tested in a cell-based bioassay, GH isolated from the pituitary of -/- cattle (n = 4) had approximately 60% activity when compared with GH isolated from the pituitary of +/+ cattle (n = 5). In summary, miniature Brahman cattle were homozygous for a single nucleotide polymorphism that encodes a mutation in an amino acid involved in binding of GH to the GH receptor. Cattle of normal size had at least 1 copy of the normal GH allele. Threonine 200 in bovine GH is required for normal growth in cattle.
Keywords: Growth hormone; Cattle; Miniature; Mutation

Suzanne Loret, Dorina Rusu, Benaissa El Moualij, Bernard Taminiau, Ernst Heinen, Guy Dandrifosse, Jacques Mainil, Preliminary characterization of jejunocyte and colonocyte cell lines isolated by enzymatic digestion from adult and young cattle, Research in Veterinary Science, Volume 87, Issue 1, August 2009, Pages 123-132, ISSN 0034-5288, DOI: 10.1016/j.rvsc.2008.12.002.
(http://www.sciencedirect.com/science/article/B6WWR-4VF0XYM-1/2/aaeaa0884ba671bd465333542851c1a0)
Abstract:
In the present study we developed an enzymatic approach (through the use of collagenase and dispase) to isolate bovine intestinal epithelial cells. Using this method, freshly isolated jejunocytes could be distinguished from simultaneously isolated colonocytes, as the jejunocytes specifically exhibited the small intestinal peptidase gene transcript, as well as an active alkaline phosphatase. The transformation of both types of cell suspension was performed by retroviral infection, using reproduction-defective viruses bearing the gene coding for the large T antigen of the leukaemia simian virus (SV40). The success of the transfection was demonstrated by (1) a significant increase in cell passage numbers (52-53 vs. 7 passages for non-transfected cells), (2) the detection of both the large T transcript and the large T antigen in transformed cells. Possible contamination and progressive substitution of bovine primocultures by non-bovine lineages available in the laboratory was excluded, as the transformed cells presented a bovine typical karyotype. Most transfected cells kept an epithelial morphology after transformation. They also maintained the expression of FABP and enterocyte specific enzymes (brush-border associated maltase and IAP). However, levels of specific activity of these enzymes were low, suggesting that cell differentiation is not completely achieved under the applied culture conditions.
Keywords: Jejunocytes; Colonocytes; Cattle; Transformation; SV40 LT

Wilson Castro Silva, Joao Ricardo de Souza Martins, Hellen Emilia Menezes de Souza, Horacio Heinzen, Maria Veronica Cesio, Mauricio Mato, Francine Albrecht, Joao Lucio de Azevedo, Neiva Monteiro de Barros, Toxicity of Piper aduncum L. (Piperales: Piperaceae) from the Amazon forest for the cattle tick Rhipicephalus (Boophilus) microplus (Acari: Ixodidae), Veterinary Parasitology, In Press, Corrected Proof, Available online 17 June 2009, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2009.06.006.
(http://www.sciencedirect.com/science/article/B6TD7-4WJBC1G-1/2/3c8f203d01876f4e45bcdf286b595f65)
Abstract:
The mortality of 14-21-day-old Rhipicephalus (Boophilus) microplus larvae, and the mortality and fertility of groups of engorged adult females exposed to different concentrations of hexane, ethyl acetate and ethanol extracts of spiked pepper (Piper aduncum) were evaluated, using a completely randomized design with five treatment groups, two control groups, and two replicates for the larvae and five replicates for the adult females. Similar methodology was used to investigate the toxicity of the essential oil hydro-distillate (94.84% dillapiole) obtained from the P. aduncum crude hexane extract. The LC50 of the hexane extract was 9.30 mg ml-1 for larvae and the reproduction reduction ranged from 12.48% to 54.22%, while 0.1 mg/ml-1 of the essential oil induced 100% mortality in larvae. Literature reports on natural products active against R. microplus were listed and compared with the results presented here. These results indicate that P. aduncum extracts, and particularly its essential oil, are potential alternative control agents for R. microplus.
Keywords: Cattle ticks; Rhipicephalus (Boophilus) microplus; Piper aduncum; Plants extracts

Bing Zhang, Elizabeth McGraw, Kevin D. Floate, Peter James, Wayne Jorgensen, Jim Rothwell, Wolbachia infection in Australasian and North American populations of Haematobia irritans

(Diptera: Muscidae), Veterinary Parasitology, Volume 162, Issues 3-4, 10 June 2009, Pages 350-353, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2009.03.012.
(http://www.sciencedirect.com/science/article/B6TD7-4VTVR4J-G/2/8f6a21b2de641420843d7b5a5b52d9f0)
Abstract:
Buffalo fly (Haematobia irritans exigua) is a major pest of beef and dairy cattle in northern Australia. Global warming is expected to increase the southern range of buffalo fly. Chemical control is compromised by resistance and may not be feasible in extensive production systems and there is rapidly growing market preference for beef and dairy products produced in low-chemical systems.
Wolbachia are vertically transmitted intracellular bacteria that can profoundly influence host reproduction and fitness and are of increasing interest for use in biocontrol programs. To determine whether Australian flies are infected with Wolbachia, buffalo flies were collected from 12 cattle herds around Australia and assayed by standard PCR for the Wolbachia wsp gene. H. i. exigua from Indonesia and horn fly (H. i. irritans) from Canada were also tested. All H. i. exigua samples tested were negative for Wolbachia infection whereas a very strong signal for Wolbachia was obtained from H. i. irritans.
Keywords: Haematobia irritans; Wolbachia; Diptera

A. Ahmadzadeh, F. Frago, B. Shafii, J.C. Dalton, W.J. Price, M.A. McGuire, Effect of clinical mastitis and other diseases on reproductive performance of Holstein cows, Animal Reproduction Science, Volume 112, Issues 3-4, June 2009, Pages 273-282, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2008.04.024.
(http://www.sciencedirect.com/science/article/B6T43-4SDX2SJ-2/2/d8170d494bf36035961103881c03c101)
Abstract:
The objective of this study was to evaluate the effect of clinical mastitis and (or) other diseases on reproductive performance in lactating Holstein cows. Cows (n = 967) from a commercial dairy farm were divided into four groups retrospectively: cows with clinical mastitis and other diseases (MD, n = 54), clinical mastitis only (M, n = 154), other diseases only (D, n = 187), and cows with no record of clinical mastitis or other diseases (H, n = 572). Days in milk at first service (DIMFS), services per conception (S/C), days not pregnant (DNP), the rate at which animals became pregnant over time and the proportion of cows that remained non-pregnant during 224 days of lactation were evaluated. Groups MD and M had greater ($P < 0.05$) DNP compared with H (155 +/- 15 and 140 +/- 5 vs. 88 +/- 2, respectively). Moreover, MD and M had greater ($P < 0.05$) S/C compared with H (3.0 +/- 0.4 and 2.1 +/- 0.1 vs. 1.6 +/- 0.1, respectively). The rate at which animals became pregnant over time was less ($P < 0.05$) for MD and M and tended ($P = 0.1$) to be less for D when compared with H. In addition, proportion of cows that remained non-pregnant by 224 days of lactation was greater ($P < 0.05$) in MD, M, and D compared with H. Cows with mastitis were also divided into three groups according to the day of occurrence of the first case of clinical mastitis: (1) clinical mastitis occurred before 56 days postpartum (MP1); (2) clinical mastitis occurred between 56 and 105 days after parturition (MP2); and (3) clinical mastitis occurred after 105 days postpartum (MP3) Regardless of the time of occurrence, DNP was greater ($P < 0.05$) for cows with mastitis compared with H. Time of mastitis occurrence affected S/C in that cows in MP2 and MP3 had a greater S/C compared with H cows ($P < 0.05$). Reproductive efficiency was decreased by the presence of clinical mastitis alone because a greater proportion of cows with mastitis remained non-pregnant over time. Moreover, a greater proportion of cows with mastitis or diseases remained non-pregnant by 224 postpartum. Furthermore, the negative effects on reproduction were exacerbated when cows experienced both clinical mastitis and other diseases.
Keywords: Dairy cattle; Clinical mastitis; Disease; Reproduction

E. Castaneda-Gutierrez, S.H. Pelton, R.O. Gilbert, W.R. Butler, Effect of peripartum dietary energy supplementation of dairy cows on metabolites, liver function and reproductive variables, Animal Reproduction Science, Volume 112, Issues 3-4, June 2009, Pages 301-315, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2008.04.028.
(http://www.sciencedirect.com/science/article/B6T43-4SDX2SJ-5/2/8ce4c1653886f6c0a9b1d46bb2a072e9)
Abstract:
Multiparous Holstein cows (n = 58) were used to study the effects of peripartum dietary supplementation on metabolic status, liver function and reproduction variables. Diets for cows were as follows: (a) no supplementation (CTL), (b) prilled fatty acids as 1.9% of DM (PrFA), (c) calcium salts of long chain n-6 fatty acids as 2.24% of DM (CaLFA) or (d) daily topdressing with 769 g of 65% propylene glycol (PGLY). Supplements were fed during the last 21 days before expected calving except for PGLY that continued until 21 days after parturition. Ovarian activity was monitored by transrectal ultrasonography and days to first ovulation were recorded. Liver biopsies were obtained on day 8 and 21 postpartum and analyzed for triglyceride content and mRNA expression of pyruvate carboxylase, cytosolic phosphoenolpyruvate carboxykinase, carnitine palmytoyltransferase 1A, and peroxisome proliferator-activated receptor-[alpha]. At 71 days following parturition, stage of ovarian cycles was synchronized and at day15 of the cycle oxytocin was injected i.v., blood samples were obtained at frequent intervals, and analyzed for 13,14 dihydro, 15-keto PGF2[alpha] (PGFM). Milk production and milk components were not different among treatment groups. Cows in PGLY gained body condition score (BCS) prepartum and net energy balance prepartum tended to be greater, but was not different postpartum from other groups. PGLY supplementation increased plasma insulin concentration prepartum, but not during the postpartum period. No significant differences were observed in plasma concentrations of glucose, NEFA, and insulin-like growth factor or hepatic triglyceride content, but all supplements tended to decrease [beta] hydroxybutyrate postpartum compared to CTL cows. Abundance of mRNA of gluconeogenic and lipid oxidation genes was not different among treatment groups. Days to first ovulation and uterine PGF2[alpha] production in response to an oxytocin treatment were not significantly different among treatment groups. Peripartum supplementation did not result in the substantial improvement of metabolic profile in early lactation nor significantly affect days to first ovulation and PGFM response to an oxytocin treatment.
Keywords: Dairy cattle-propylene glycol; Prepartum fatty acids; Reproduction; Liver; Ovulation

A.T. Peter, P.L.A.M. Vos, D.J. Ambrose, Postpartum anestrus in dairy cattle, Theriogenology, Volume 71, Issue 9, June 2009, Pages 1333-1342, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2008.11.012.
(http://www.sciencedirect.com/science/article/B6TCM-4VTK5J9-1/2/5c505b125998b66f897256cc486c709e)
Abstract:
Fertility of the postpartum period is negatively influenced by the incidence of anestrus. The latter condition is characterized by the absence of estrous behavior, which may be an indication of suboptimal conditions (e.g., inadequate peripartum nutrition) or pathologic conditions (e.g., chronic debilitating diseases or uterine and ovarian diseases). Although initiation of ovarian follicular growth in the postpartum period is generally not affected, subsequent development (deviation) and the fate of the dominant follicle are the primary factors that affect reestablishment of ovarian cyclicity. Anestrus can be classified based on the three functional states of follicular development; that is, follicle emergence, deviation, and ovulation. Prevention of anestrus is preferable to treatment and can be achieved in part by maintaining a healthy periparturient period. To better understand the etiology of anestrus and its prevention, research is urgently needed in the following three areas: the role of peripartum disease conditions that influence reproduction, genes involved

in ovulation, and the influence of proteins (e.g., leptin) that appear to be important links between metabolic signals and the neuroendocrine axis.
Keywords: Dairy cow; Postpartum; Anestrus; Types of anestrus

A.T. Peter, H. Levine, M. Drost, D.R. Bergfelt, Compilation of classical and contemporary terminology used to describe morphological aspects of ovarian dynamics in cattle, Theriogenology, Volume 71, Issue 9, June 2009, Pages 1343-1357, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2008.12.026.
(http://www.sciencedirect.com/science/article/B6TCM-4VYW661-1/2/2484a63b805958e605bca4ec8c4482fb)
Abstract:
Veterinarians and scientists involved in applied and basic research in cattle require a lexicon of terms that is used uniformly so that diagnoses and inference of results between and among studies can be correctly interpreted and substantiated or negated and therapy and hypotheses can be formulated without unnecessary confusion and redundancy in treatments and experiments. This review provides a compilation of many of the classical and contemporary terms used in association with ovarian dynamics primarily during the estrous cycle in cattle, which can also apply to other reproductive states. While many classical terms used to describe healthy and diseased conditions associated with follicles and corpora lutea are still applicable today, there are some that have become antiquated (e.g., cystic corpus luteum, cystic ovarian degeneration, luteolysis, and granulosa cell tumor), due, in part, to advanced technology (e.g., ultrasonography) and a more thorough understanding of ovarian function. In this regard, older terms have been revised (e.g., corpus luteum with a cavity, follicular and luteinized-follicular cysts, structural and functional luteal regression, and granulosa-theca cell tumor) and newer terms have been coined (e.g., follicle deviation) and advocated herein. Defining and adopting terminology used in bovine reproduction that is clear, precise and understandable and available in a single source, is expected to make the exchange of clinical and research information and outcomes more effective, safe, and economical.
Keywords: Cattle; Terminology; Ovarian dynamics; Ovarian pathology

S. Spilovska, K. Reiterova, D. Kovacova, M. Bobakova, P. Dubinsky, The first finding of Neospora caninum and the occurrence of other abortifacient agents in sheep in Slovakia, Veterinary Parasitology, In Press, Corrected Proof, Available online 27 May 2009, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2009.05.020.
(http://www.sciencedirect.com/science/article/B6TD7-4WCTWXD-1/2/49613841149a2741fd2bf0c44783285a)
Abstract:
Neosporosis is an infection of animals caused by an intracellular coccidian parasite, Neospora caninum, closely related to Toxoplasma gondii. The parasite is one of important abortifacient agents of bovine abortions worldwide. The aim of the study was to detect the prevalence of anti-Neospora antibodies in dairy aborting sheep from two eastern Slovak regions and to compare it with the occurrence of other potential abortifacient agents. Sera of 382 sheep, mainly the Improved Valachian and Merino breed, were tested for the presence of anti-Neospora and anti-Toxoplasma antibodies by ELISA, anti-Leptospira sp. by micro-agglutination-assay and anti-Chlamydophila antibodies using the complement fixation test. The mean seroprevalence of N. caninum was 3.7% and of T. gondii, 24.3%. This phenomenon of higher susceptibility of sheep to T. gondii is in the opposite of N. caninum infection in cattle. Anti-Leptospira antibodies were observed in 2.9% of serum samples with titres from 800 to 1600, whereas IgG antibodies against Chlamydophila abortus were found in 13.6% with titres from 64 to 1024. Half of N. caninum positive sera were simultaneously positive for T. gondii and one sample for C. abortus. From examined abortifacient agents the most important, from the frequency point of view, were toxoplasmosis (24.3%) and chlamydiosis (13.6%). No significant association between the

frequencies of the abortions and mean seroprevalence of the abortifacient agents in Kosice region was determined. Likewise, no significant differences between the mean seroprevalence of neosporosis and toxoplasmosis in the two regions were detected. The first survey of neosporosis in aborting sheep from eastern Slovakia revealed a low prevalence resulting in a lower impact on reproduction losses in these small ruminants.
Keywords: Neospora caninum; Toxoplasma gondii; Chlamydophila abortus; Leptospira sp.; Sheep; Abortion; Slovakia

F. Dal Pozzo, K. De Clercq, H. Guyot, E. Vandemeulebroucke, P. Sarradin, F. Vandenbussche, E. Thiry, C. Saegerman, Experimental reproduction of bluetongue virus serotype 8 clinical disease in calves, Veterinary Microbiology, Volume 136, Issues 3-4, 12 May 2009, Pages 352-358, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2008.11.012.
(http://www.sciencedirect.com/science/article/B6TD6-4V1KMNY-2/2/8b319a81e756605e3601e51e25cbe57d)
Abstract:
Cattle are commonly subclinically infected following natural or experimental infection with bluetongue virus (BTV). The introduction of BTV serotype 8 (BTV-8) in Europe has been characterized by the manifestation of clinical signs in infected cattle. In order to study the pathogenesis of BTV-8 in this host, an animal model able to reproduce the clinical manifestations of the disease is required. In this work, two calves were subcutaneously and intravenously injected with a low passage cell-adapted strain of BTV-8. Both calves showed typical bluetongue clinical signs, including pyrexia, ocular discharge, conjunctivitis, oral mucosal congestion, development of ulcers and necrotic lesions on the lips and tongue, submandibular oedema, coronitis and oedema of the coronet and pastern region. A score was assigned depending on the severity of the lesions and a total clinical score was calculated for each animal daily and at the end of the experiment. Both calves became viraemic 24 h post-infection and seroconversion occurred between 7 and 11 days P.I.
In this study we present the development of a protocol of infection in calves able to reproduce the severity of the lesions observed with BTV-8 in field conditions.
Keywords: Bluetongue virus; Serotype 8; Cattle; Experimental infection; Clinical signs; Pathogenesis

Gili Koniak, Imanuel Noy-Meir, A hierarchical, multi-scale, management-responsive model of Mediterranean vegetation dynamics, Ecological Modelling, Volume 220, Issue 8, 24 April 2009, Pages 1148-1158, ISSN 0304-3800, DOI: 10.1016/j.ecolmodel.2009.01.036.
(http://www.sciencedirect.com/science/article/B6VBS-4VT236H-4/2/29c9b927ed41aa8d09c091af3968ff95)
Abstract:
Ecosystems of the Mediterranean basin are characterized by a heterogeneous and dynamic landscape mosaic of vegetation formations. This landscape has been shaped over millenia by disturbances associated with agropastoral land use: clearing, grazing and burning, and by regeneration processes of the natural woody vegetation. The ability to predict the effects of management decisions on the structure and composition of the vegetation is essential for present and future land management. To improve this ability we developed a hierarchical multi-scale, management-responsive model of vegetation dynamics.
The model was initially developed at two hierarchically nested spatial scales: 'cell' (1 m2) and 'site' (400 m2). The cell model was conceptually derived from a 'States and transitions' framework. Vegetation state in a cell was defined by the identity, age and height of the dominant plant functional type. Biological realism was enhanced by defining transition probabilities not as constants but as functions of variables that represent biological processes: reproduction, colonization, expansion, replacement, aging, mortality, grazing, regrowth after fire, and dispersal.

Up-scaling to the site was essentially done by averaging: vegetation state of a site was defined by frequencies of cells in different states. However, there was a feedback from site to cell by seed production and dispersal functions.
The model was parameterized and implemented for a study area in Mediterranean woody vegetation (garrigue) in Israel. The biological components and processes represented in the model are sufficiently general to allow adaptation to similar vegetation in other Mediterranean regions.
A series of simulation experiments over 100 years was carried out under different management scenarios defined by combinations of initial vegetation cover (cleared and control plots), cattle and goat grazing intensity and fire frequency. The results highlight the following trends:
- In most scenarios, initial cover has an effect even after 100 years.
- In the absence of any disturbance, vegetation becomes dominated by the two tallest woody functional types.
- Under extremely intense multiple disturbances (fire + goat grazing), the vegetation becomes dominated by Herbaceous plants.
- Scenarios of intermediate disturbance regimes often result in heterogeneous vegetation composition.
- Under most of the management scenarios examined, vegetation composition had not reached a steady state (or steady cycle of fire-regrowth) even after 100 years.
The model can be a useful tool for land managers by eliminating obviously undesirable scenarios and focusing on a limited set of desirable or acceptable scenarios.
Keywords: State and transition; Simulation; Grazing; Fire; Disturbance; Succession

R.F. Cooke, N. DiLorenzo, A. DiCostanzo, J.V. Yelich, J.D. Arthington, Effects of Fermenten(R) supplementation to beef cattle, Animal Feed Science and Technology, Volume 150, Issues 3-4, 14 April 2009, Pages 163-174, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2008.08.011.
(http://www.sciencedirect.com/science/article/B6T42-4TNTN49-1/2/8a336c2a4be6d0c6c40a17636eee1aa6)
Abstract:
Two experiments were conducted to evaluate a commercially available supplemental N source for beef cattle (Fermenten(R); Church & Dwight Co., Inc., Princeton, NJ, USA). The first experiment evaluated kinetics of in vitro NH3-N release using batch cultures of rumen fluid incubated with: control (no N added), soybean meal, urea, and Fermenten(R). Ammonia-N was measured at 0, 0.5, 2, 4, 6, 8, 12 and 24 h after incubation began. A treatment by time interaction ($P<0.01$) occurred in which, during the initial 2 h, Fermenten(R) cultures had the highest ($P<0.01$) NH3-N but, from 4 to 24 h, the highest ($P<0.01$) NH3-N concentrations were with urea-incubated cultures. The total increase in NH3-N concentrations from 0 to 24 h of incubation was less for Fermenten(R) ($P<0.01$) than for the soybean meal and urea. The second experiment assessed effects of Fermenten(R) supplementation on growth, blood parameters, voluntary forage intake and reproductive performance of beef heifers. Sixty heifers, stratified by initial body weight (BW), were randomly allocated to one of two treatments that consisted of iso-nitrogenous grain-based supplements containing either Fermenten(R) (72 g/kg, as-fed) or urea (9.7 g/kg, as-fed). Supplements were offered three times weekly at a rate of 2.4 kg of dry matter per heifer daily. Shrunk BW was measured on days 0 and 112 for calculation of daily body weight gain. Body volume measurements were completed on days 0, 28, 56, 84 and 112, whereas pelvic area was assessed on days 0, 56 and 112. Blood samples were collected on days 28, 56, 84 and 112 for analysis of metabolites and hormones. On day 56, 2 heifers, which were randomly selected from each pasture, were placed in individual feeding stations for 26 days to determine treatment effects on voluntary forage intake. On day 112, all heifers were grouped by treatment and exposed to bulls for 60 days. Fewer heifers offered the Fermenten(R) supplement attained puberty ($P<0.05$) and became pregnant during the study compared to heifers fed urea (0.60 and 0.93, respectively; $P<0.01$). Addition of Fermenten(R) to batch cultures of rumen fluid rapidly increased NH3-N

concentrations, whereas further increases occurred in a slower and steady rate. Beef heifers fed a supplement containing Fermenten(R) had similar growth and development, but inferior reproductive performance, than heifers fed a supplement containing urea.
Keywords: Ammonia; Beef heifers; Development; Fermenten(R); Reproduction

W.J. Nauta, T. Baars, H. Saatkamp, D. Weenink, D. Roep, Farming strategies in organic dairy farming: Effects on breeding goal and choice of breed. An explorative study, Livestock Science, Volume 121, Issues 2-3, April 2009, Pages 187-199, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.06.011.
(http://www.sciencedirect.com/science/article/B7XNX-4T9TCC4-1/2/357a11b08be2aacb69646ed1231a01f9)
Abstract:
Organic farming principles give rise to multifunctionality: different activities are combined at farm level to create ecological and economic synergies. These principles do however allow for different operationalisations and different farm development strategies, for example with regard to the use of external inputs or the decision whether or not to use advanced breeding technologies such as artificial insemination. Maintaining and improving diversity are therefore characteristic to organic farming. Since organic farming took off in the early 1990 s, many specialised dairy farms which tend to be more mono-functional in nature, have converted to organic, adding a new farming strategy to the diverse collection of farming strategies in organic dairy farming. All these farming strategies actually create different organic production environments for cows, which might result in different demands on selective breeding and breeding technology. This differential demand was explored in a survey, among 151 organic dairy farmers, on general farm strategy, milk production, breeding goal, choice of breed and approach to reproduction. Farmers were divided into one of two groups on each of three strategic options: a) diversification in farm business--Specialised Dairy Farming vs. Multifunctional Farming; b) intensity of milk production--Low Input vs. High Input Farming and c) naturalness of breeding--Farming with Artificial Insemination vs. Farming with Natural Service.
A pair-wise comparison within each strategic option showed that each pair differed significantly with regard to farm characteristics, farm goal and animal production goals. However, there were only minor or no significant differences within each pair with regard to overall breeding goal. For each strategic option, big differences were found within each pair as regards preferred cattle breeds and crossbreeds. Farmers in the Specialised Dairy Farming and High Input Farming groups preferred milk-type cattle (Holstein and Holstein crossbreeds), while farmers in the Multifunctional Farming and Low Input Farming groups preferred various native Dutch breeds. But even farmers with a similar strategy (within one group) differed strongly in their choice of breeds and crossbreeds. These results indicate that organic farmers are going through process of learning by doing, experimenting as they search for breeds or crossbreeds that are optimally suited to their farm environment and that best agree with their farm development strategy. In this, the growing preference for keeping bulls on the farm for natural service is remarkable.
Keywords: Organic dairy farming; Farming strategies; Breeding goal; Breeds; Crossbreeds

Tracy Livingston, Kristin Rich, Scott MacKenzie, James D. Godkin, Glutathione content and antioxidant enzyme expression of in vivo matured sheep oocytes, Animal Reproduction Science, In Press, Corrected Proof, Available online 11 February 2009, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2009.02.004.
(http://www.sciencedirect.com/science/article/B6T43-4VKDMV8-1/2/332e8c06b4eb4d2ba2ede523f0caf60f)
Abstract:
Retinoids play important roles in many diverse biological functions such as cell growth, morphogenesis, differentiation, and reproduction. Previous studies demonstrated that retinol

administration to ewes, followed by natural service, resulted in embryos with improved competence to develop under standard in vitro conditions (5% CO2 in air). Additional studies provided evidence that retinol may have some antioxidant effect by improving blastocyst development in cattle under atmospheric conditions (5% CO2 in air). Glutathione is an important non-protein, sulphydryl compound found in oocytes and embryos, which acts to decrease oxidative stress. The purpose of the present study was to evaluate the effects of retinol administration to ewes on the content of glutathione and glutathione-related and antioxidant enzymes in in vivo matured sheep oocytes. Briefly, ewes were administered retinol or vehicle during superovulation, and after 60 h the oviducts were removed and mature oocytes collected. Glutathione content did not differ significantly between oocytes collected from retinol-treated ewes (6.78 +/- 3.81 pmol/oocyte) and control ewes (6.38 +/- 1.58 pmol/oocyte). Transcripts encoding for manganese superoxide dismutase (Mn-SOD), copper zinc superoxide dismutase (Cu-Zn SOD), glutathione synthetase (GS), and glutathione transferase pi (GSTp) were detected in single ovine oocytes; however, semi-quantitative reverse transcriptase-polymerase chain reaction (RT-PCR) analysis did not reveal any significant differences in transcripts between oocytes from retinol-treated ewes and those from control ewes.
Keywords: Sheep; Vitamin A; Oocyte; Glutathione; Antioxidant transcripts

M. Djemali, S. Bedhiaf-Romdhani, L. Iniguez, I. Inounou, Saving threatened native breeds by autonomous production, involvement of farmers organization, research and policy makers: The case of the Sicilo-Sarde breed in Tunisia, North Africa, Livestock Science, Volume 120, Issue 3, Special Issue: Animal Genetic Resources, February 2009, Pages 213-217, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.07.011.
(http://www.sciencedirect.com/science/article/B7XNX-4T6KFKS-2/2/ff6691b8b25b59322e78081bc68f53f4)
Abstract:
The Sicilo-Sarde, the only native milking sheep in Tunisia and in North Africa has undergone a considerably population reduction from 200,000 ewes in 1995 to 25,000 ewes in the year 2000. Low sheep milk price and a shift to dairy cattle were among the reasons for this decline. The main objective of this study was to report on the impact of farmers organization, technology transfer and market on reversing the dramatic decline of this native dairy sheep breed to a promising livestock development model. Having at the grassroots a 'pioneer' who chose to form the Sicilo-Sarde breed association in 2003 was a key ingredient in the process of saving this breed from disappearance. Quick steps were first taken: Selling milk through the association allowed doubling its price in one year. A new legislation benefiting dairy sheep was introduced. A trilogy principle was followed where breed owners, researchers and policy makers interacted together to find optimum solutions that fit expressed needs of breed owners. An applied multidisciplinary research program was established and tackled major constraints faced by the breed in nutrition, management, reproduction, health, breeding and product development. Encouraged by an unsatisfied market and good prices, small farmers with a few cows started shifting to dairy sheep and poor new ones managed to get loans to purchase dairy sheep breeding animals. Based on a total of 7937 lactations recorded during the period 1997-2002, average milk yield, days in milk and suckling period were 89 kg +/- 47 kg, 139 d +/- 47 d and 104 d +/- 22 d, respectively. Given the low producing ability of the breed and the impossibility of importing proven rams for health considerations, frozen semen from 17 Sarda rams was imported from Italy and 1600 ewes from 12 flocks were inseminated by intrauterine in 2005-2006. Fertility, prolificacy, and mortality rates varied from 47% to 63%, 157% to 184% and 0 to 34%, respectively. The decline of the breed was stopped and reversed and members of the association and small farmers in the region will benefit from the produced offspring. While currently the association is accessed by more organized producers, it provides an opportunity for the integration of smaller, poorer producers to improve

their livelihoods. This case has inspired another group of farmers of a native sheep meat breed to form their own association to promote their breed.
Keywords: Sheep; Dairy; Sicilo-Sarde; Insemination; Fertility; Association

K. Orsel, A. Bouma, A. Dekker, J.A. Stegeman, M.C.M. de Jong, Foot and mouth disease virus transmission during the incubation period of the disease in piglets, lambs, calves, and dairy cows, Preventive Veterinary Medicine, Volume 88, Issue 2, Special Section: Schwabe Symposium 2007 - Field Disease Investigation and Population Health - A Symposium Honoring the Legacy of Dr. Clive C. Gay, Professor Emeritus from Washington State University, 1 February 2009, Pages 158-163, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2008.09.001.
(http://www.sciencedirect.com/science/article/B6TBK-4TP7H2J-1/2/eca7eb429fb45010900a1f5e46fb3dd8)
Abstract:
Transmission of foot and mouth disease (FMD) virus by infected animals may already occur before clinical signs are evident. Quantitative data for FMD transmission rates during this so-called high-risk period are currently lacking and would provide useful information to develop surveillance systems in which the number of new outbreaks is an outcome variable. In order to address this, we used experimental data to quantify transmission in cattle, swine and sheep during the non-clinical phase of the disease. Groups consisted of vaccinated or non-vaccinated animals of one species; half of each group was inoculated with FMDV, the other half was contact-exposed. We estimated the reproduction ratio Rnonclin using a mathematical SIR model. Rnonclin was defined as the average number of secondary infections caused by one infectious individual in its non-clinical phase. Animals not showing clinical signs shed lower amounts of virus than clinically affected ones. Therefore, we estimated transmission proportionally to the virus excretion.
Low estimates for Rnonclin in groups with non-vaccinated and vaccinated calves; 0.30 [0.03; 3.43] and 1.03 x 10-8 [0; [infinity]] respectively and 0.21 [0.02; 2.48] for the non-vaccinated and 0.16 [0.009; 2.96] for the vaccinated lambs, were observed. These results indicate that only few secondary infections are to be expected from infected calves and lambs when they are not clinically affected. In groups of non-vaccinated piglets estimates were Rnonclin = 13.20 [4.08; 42.68], and in vaccinated piglets Rnonclin = 1.26 [0.18; 8.96]. The estimate for Rnonclin for non-vaccinated dairy cows was Rnonclin = 176.65 [80.38; 388.24], whereas Rnonclin in the vaccinated groups could not be estimated. Our findings suggest that a large number of individuals might have been infected before clinical signs are noticed, especially in non-vaccinated swine and dairy herds. These findings suggest that after clinical recognition of FMD, priority should be given to trace back contacts with swine and dairy farms, as they may already have been infectious in the herd's incubation period.
Keywords: Foot and mouth disease; High-risk period; Transmission; Detection; Virus

Jennifer Dorts, Catherine A. Richter, Maureen K. Wright-Osment, Mark R. Ellersieck, Barbara J. Carter, Donald E. Tillitt, The genomic transcriptional response of female fathead minnows (Pimephales promelas) to an acute exposure to the androgen, 17[beta]-trenbolone, Aquatic Toxicology, Volume 91, Issue 1, 18 January 2009, Pages 44-53, ISSN 0166-445X, DOI: 10.1016/j.aquatox.2008.10.002.
(http://www.sciencedirect.com/science/article/B6T4G-4TNWGR5-3/2/166aa5f66dace7db29573fdb063e70a2)
Abstract:
We investigated the genomic transcriptional response of female fathead minnows (Pimephales promelas) to an acute (4 days) exposure to 0.1 or 1.0 [mu]g/L of 17[beta]-trenbolone (TB), the active metabolite of an anabolic androgenic steroid used as a growth promoter in cattle and a contaminant of concern in aquatic systems. Our objectives were to investigate the gene expression profile induced by TB, define biomarkers of exposure to TB, and increase our

understanding of the mechanisms of adverse effects of TB on fish reproduction. In female gonad tissue, microarray analysis using a 22 K oligonucleotide microarray (EcoArray Inc., Gainesville, FL) showed 99 significantly upregulated genes and 741 significantly downregulated genes in response to 1 [mu]g TB/L. In particular, hydroxysteroid (17[beta]) dehydrogenase 12a (hsd17b12a), zona pellucida glycoprotein 2.2 (zp2.2), and protein inhibitor of activated STAT, 2 (pias2) were all downregulated in gonad. Q-PCR measurements in a larger sample set were consistent with the microarray results in the direction and magnitude of these changes in gene expression. However, several novel potential biomarkers were verified by Q-PCR in the same samples, but could not be validated in independent samples. In liver, Q-PCR measurements showed a significant decrease in vitellogenin 1 (vtg1) mRNA expression. In brain, cytochrome P450, family 19, subfamily A, polypeptide 1b (cyp19a1b, previously known as aromatase B) transcript levels were significantly reduced following TB exposure. Our study provides a candidate gene involved in mediating the action of TB, hsd17b12a, and two potential biomarkers sensitive to acute TB exposure, hepatic vtg1 and brain cyp19a1b.
Keywords: 17[beta]-Trenbolone; Fathead minnow; Q-PCR; Microarray

B.S. Durrant, The importance and potential of artificial insemination in CANDES (companion animals, non-domestic, endangered species), Theriogenology, Volume 71, Issue 1, 1 January 2009, Pages 113-122, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2008.09.004.
(http://www.sciencedirect.com/science/article/B6TCM-4TR97HP-2/2/3fd5b868a78989c19076518d209b5205)
Abstract:
Artificial insemination (AI) is the least invasive assisted reproductive technology, and is therefore of great interest to breeders of companion animals, non-domestic, and endangered species (CANDES). This most fundamental artificial breeding technique circumvents physical or behavioral impediments to natural mating and provides the means for genetic exchange between populations without transfer of live animals. In addition, because oocytes grow, mature and are fertilized in vivo and embryos are not subjected to in vitro culture conditions, AI eliminates the epigenetic effects on the female gamete that are inherent in more invasive assisted reproductive technologies. Although the management of CANDES differs significantly from current livestock husbandry practices, the cattle industry is a powerful example of the potential for AI to enhance the genetic health and sustainability of animal populations. Ultimately, successful AI requires sperm of adequate quality and quantity, oocytes that have attained nuclear maturation and cytoplasmic competence, operational gamete transport systems, accurate timing, and proper placement of sperm in the female reproductive tract. Increased understanding of semen collection, evaluation and preservation techniques, estrus synchronization and superovulation, estrus and ovulation detection, and insemination instrumentation is needed for each CANDES before AI success rates will approach those of the livestock industry. Concentrated, collaborative research in these areas must be encouraged among private breeders, universities and zoological institutions to realize the full potential of AI in the management of CANDES.
Keywords: Assisted reproduction; Companion animals; Endangered species

C.J. Morrow, L.M. Penfold, B.A. Wolfe, Artificial insemination in deer and non-domestic bovids, Theriogenology, Volume 71, Issue 1, 1 January 2009, Pages 149-165, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2008.09.001.
(http://www.sciencedirect.com/science/article/B6TCM-4TVFY6K-1/2/eb0a45b8bc135e22b8dd843d7d96fe83)
Abstract:
Artificial insemination technology has revolutionized the domestic cattle breeding industry and allowed for the dissemination of valuable genetics worldwide. This technology has been adapted for use in many other taxa for the conservation of threatened and endangered species, but its use

for the genetic management of small populations of deer, antelope and other non-domestic bovids has met numerous challenges and limited success. In practice, adaptation of domestic bovine AI protocols to other artiodactylids for genetic management has been limited by: (1) a lack of understanding of species-specific reproductive characteristics; (2) the inability to minimize handling stress; (3) pregnancy losses; and (4) regulatory challenges in semen importation. To date, AI protocols have been developed for seven species of cervid and 14 species of non-domestic bovids; recent developments in this technology has allowed greater use of AI for dissemination of genetics in farmed deer species. However, despite decades of research in the use of assisted reproduction for the conservation of antelope and other non-domestic bovids, even this simplest technique has not been used repeatedly for genetic management.
Keywords: Artificial insemination; Deer; Antelope; Estrus synchronization; Assisted reproduction

Vilas M. Vaidya, S.V.S. Malik, K.N. Bhilegaonkar, R.S. Rathore, Simranpreet Kaur, S.B. Barbuddhe, Prevalence of Q fever in domestic animals with reproductive disorders, Comparative Immunology, Microbiology and Infectious Diseases, In Press, Corrected Proof, Available online 19 December 2008, ISSN 0147-9571, DOI: 10.1016/j.cimid.2008.10.006.
(http://www.sciencedirect.com/science/article/B6T5H-4V5XP31-1/2/9f4fa4c0b3eaa5afd317792b8a362fc9)
Abstract:
The occurrence of Coxiella burnetii in animals with reproductive disorders was studied. A total of 920 samples (genital and faecal swabs, milk, urine and serum) were collected from cows (88), buffaloes (33), sheep (43) and goats (53) with a history of reproductive disorders and screened for C. burnetii by a PCR assay targeting the repetitive transposon-like region of C. burnetii (trans-PCR), real-time PCR, indirect immunofluorescence assay (IFA), enzyme-linked immunosorbent assay (ELISA) and isolation method. The overall prevalence of Q fever in animals with the history of reproductive disorders turned out to be 13.82%. The species-wise prevalence of Q fever among animals was observed to be 12.78% in cattle, 16.66% in buffaloes, 11.04% in sheep and 6.13% in goats. In comparison to IFA, the highest sensitivity (85.18%) was shown by both PCR assays followed by ELISA (74.07%) and isolation method (14.81%) whereas, isolation method was the most specific (100%) followed by both PCR assays (99.47%) and ELISA (98.44%). The high excretion rate of pathogen particularly in milk observed in the study posses a potential public health threat from infected animals.
Keywords: Animals; Coxiella burnetii; ELISA; IFA; Isolation; PCR; Prevalence; Les animaux; Coxiella burnetii; ELISA; IFA; Isolement; PCR; Prevalence

D.E. Holm, P.N. Thompson, P.C. Irons, The economic effects of an estrus synchronization protocol using prostaglandin in beef heifers, Theriogenology, Volume 70, Issue 9, December 2008, Pages 1507-1515, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2008.06.098.
(http://www.sciencedirect.com/science/article/B6TCM-4T5HHY3-3/2/b9254e1164ae19f0c88dc049432a28b7)
Abstract:
We estimated the effect of estrus synchronization on reproduction, production and economic outcomes in 272 beef heifers randomly allocated to a synchronized Test group or an unsynchronized Control group. The Test group received AI upon estrus detection for 6 days followed by PGF2 treatment of heifers that had not shown estrus by day 6 (PGF/6). In both groups AI was continued for 50 days, followed by a 42-day bull breeding period. Heifers were followed through their second breeding season and until they had weaned their first calves. Synchronization resulted in a reduction in median days to first insemination (8 vs. 11 in the Test and Control groups, respectively, $P < 0.01$) and median days to calving of calves born to AI (14 vs. 20, $P = 0.04$). There was no significant difference in pregnancy rate to the AI period (60.0% vs. 51.8%, $P = 0.18$), final pregnancy rate (82.2% vs. 83.2%, $P = 0.87$) or pregnancy rate to the subsequent

breeding season (96.0% vs. 95.0%, P = 1.00). Although mean calf weaning mass was not significantly different (207.0 kg vs. 201.4 kg, P = 0.32), the total mass of calves weaned in this study was 14,843 kg vs. 13,060 kg and the benefit: cost ratio for synchronization was 2.8. It was therefore concluded that a PGF/6 protocol may affect the total mass of calves weaned by changing days to calving, weaning rate, the ratio of male: female calves born and/or the birth mass of calves.
Keywords: Beef heifers; Cattle; Cost benefit; Estrus synchronization; Prostaglandin

M.A. Velazquez, L.J. Spicer, D.C. Wathes, The role of endocrine insulin-like growth factor-I (IGF-I) in female bovine reproduction, Domestic Animal Endocrinology, Volume 35, Issue 4, November 2008, Pages 325-342, ISSN 0739-7240, DOI: 10.1016/j.domaniend.2008.07.002.
(http://www.sciencedirect.com/science/article/B6T62-4T5HG3W-1/2/5c9214cc744dc2eba5e16522246122f1)
Abstract:
Insulin-like growth factor-I (IGF-I) plays a pivotal role in cattle fertility, acting as a monitoring signal that allows reproductive events to occur when nutritional conditions for successful reproduction are reached. However, endocrine IGF-I is not a predictor of reproductive events, but rather an indirect estimator of the suitability of the animal to achieve the reproductive event in question. Although measuring circulating IGF-I concentrations might not have any clinical application in the cattle industry, endocrine IGF-I screening will continue to be important for the study of interactions between nutrition and reproduction. In addition, endocrine IGF-I screening could be used as an ancillary test for the selection of cattle for high reproductive potential, especially in herds of high genetic merit for milk production, in which a decline in fertility has been identified.
Keywords: Endocrine IGF-I; Reproduction; Nutrition; Cause-effect relationship; Cattle

Louis-Marie Houdebine, Andras Dinnyes, Diana Banati, Juliane Kleiner, David Carlander, Animal cloning for food: epigenetics, health, welfare and food safety aspects, Trends in Food Science & Technology, Volume 19, Supplement 1, EFSA Forum: From Safe Food to Healthy Diets, November 2008, Pages S88-S95, ISSN 0924-2244, DOI: 10.1016/j.tifs.2008.07.004.
(http://www.sciencedirect.com/science/article/B6VHY-4T13CHJ-3/2/ff084cf4e854f700f9910a29dd7253c3)
Abstract:
Cloning via somatic cell nucleus transfer (SCNT) is a potential way for using validated genomes in farm animal breeding and to save endangered breeds or species. Although this technique is relatively inefficient and costly, it is envisaged to use it as an assisted reproduction technique. Despite numerous problems observed in the perinatal period, after some time clones appear normal although they may have kept some epigenetic modifications. Meat and milk from cattle and meat from pig clones and their offspring are substantially equivalent to conventional animals with no observed toxicity or allergenicity. Due to limited data, monitoring of clones and their offspring is recommended to detect whether there are unexpected long-term effects of cloning.

S. Childs, A.A. Hennessy, J.M. Sreenan, D.C. Wathes, Z. Cheng, C. Stanton, M.G. Diskin, D.A. Kenny, Effect of level of dietary n-3 polyunsaturated fatty acid supplementation on systemic and tissue fatty acid concentrations and on selected reproductive variables in cattle, Theriogenology, Volume 70, Issue 4, 1 September 2008, Pages 595-611, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2008.04.002.
(http://www.sciencedirect.com/science/article/B6TCM-4SN92CY-1/2/260f3f411563bd4bd9d9703047f9bfb5)
Abstract:
Reproductively normal crossbred beef heifers were individually offered a diet of barley straw and concentrate supplemented with one of four levels of a fish oil (FO) enriched supplement. Following

oestrous cycle synchronisation, blood samples were collected at appropriate intervals for the measurement of progesterone (P4), oestradiol (E2), fatty acids, insulin-like growth factor 1 (IGF-1) and metabolites. On days 15 and 16 of the cycle, oxytocin was administered intravenously and the prostaglandin F2[alpha] (PGF2[alpha]) response was measured as venous concentrations of 13,14-dihydro-15-keto PGF2[alpha] (PGFM). The heifers were slaughtered on days 17 or 18 of the oestrous cycle and endometrial tissue, rumen fluid and follicular fluid were collected for determination of fatty acid concentrations. In general there was no effect ($P > 0.05$) of diet on plasma P4 or E2 concentrations. Increasing FO supplementation increased CL diameter on day 7 post-oestrus ($P < 0.0001$) but had no effect on diameter on day of slaughter ($P > 0.05$). On day 15, PGFM concentration was greater on the highest level of FO supplementation compared to controls ($P < 0.05$), however, there were no differences between other diet comparisons ($P > 0.05$). There was no effect of diet on PGFM concentration on day 16 ($P > 0.05$). There was a strong positive relationship between plasma and uterine endometrial concentrations of both EPA ($R2 = 0.86$; $P < 0.0001$) and total n-3 PUFA ($R2 = 0.77$; $P < 0.0001$). IGF-1 concentrations increased on all diets and were greatest at the highest level of n-3 PUFA supplementation ($P < 0.05$).
Keywords: Fish oil; Reproduction; PGFM; EPA; DHA

M. Banks, G. Ibata, A.M. Murphy, J.P. Frossard, T.R. Crawshaw, D.F. Twomey, Bovine lymphotropic herpesvirus and non-responsive post-partum metritis in dairy herds in the UK, The Veterinary Journal, Volume 176, Issue 2, May 2008, Pages 248-250, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2007.02.005.
(http://www.sciencedirect.com/science/article/B6WXN-4NDDT78-3/2/56d0ddd33a79280c95337dbf7c570958)
Abstract:
Bovine lymphotropic herpesvirus (BLHV) was detected for the first time in the UK in December 2005 in a dairy herd suffering from chronic, non-responsive post-partum metritis (NPPM). A small-scale investigation was undertaken in order to determine whether this was an isolated case. Samples of vaginal exudates or vaginal swabs were collected from cows in 13 UK dairy herds with a history of post-partum metritis that had not responded to standard treatment regimes for this condition. Cows in 9/13 herds and 1/13 herds were positive for BLHV and bovine herpesvirus-4, respectively, by pan-herpesvirus polymerase chain reaction. No consistent pattern of infectious agents or nutritional/metabolic factors commonly associated with post-partum metritis was observed at the times of sampling. The detection of BLHV in association with NPPM indicates that further work is warranted to determine the impact this virus has on cattle health.
Keywords: Bovine reproduction; Infertility; Non-responsive post-partum metritis; Gammaherpesvirus; Bovine lymphotropic herpesvirus

Bin Zhang, Qiang Lin, Junda Lin, Xialing Chu, Junyi Lu, Effects of broodstock density and diet on reproduction and juvenile culture of the Leech, Hirudinaria manillensis Lesson, 1842, Aquaculture, Volume 276, Issues 1-4, 30 April 2008, Pages 198-204, ISSN 0044-8486, DOI: 10.1016/j.aquaculture.2008.02.003.
(http://www.sciencedirect.com/science/article/B6T4D-4RTM2V0-1/2/abeb736e744e55a935a2b21417c5afe8)
Abstract:
The leech Hirudinaria manillensis, Lesson 1842 is of much interest for clinical and medicinal use. In this study, the effect of broodstock density (5, 10, 15, 20, 25, 30 and 50 ind tank- 1) on the reproductive efficiency of H. manillensis was examined. After 4 months of culture, the number of cocoons produced was significantly different among the different broodstock densities ($F6, 34 = 4.560$, $P < 0.05$), but fertilization ratio was not ($F6, 34 = 1.319$, $P = 0.285$). The average number of hatchlings per cocoon (5.72 +/- 0.13 ind) and hatching rate (96.82 +/- 1.31%) of the cocoons in the 5 ind tank- 1 treatment were significantly higher than those of the other treatments. The 50 ind

tank- 1 treatment had the highest mortality of parent leeches (29.60 +/- 2.48%). The size and wet weight of the cocoons were significantly different among the treatments, with the 5 ind tank- 1 treatment having the largest cocoon size (standard length and diameter) and wet weight. The time of juvenile release from the cocoons did not differ significantly among the different broodstock densities ($P > 0.05$).
The effect of diet (FT1: live bullfrog, FT2: fresh cattle blood, and two blood plasma preparations FT3: NP-2002a and FT4: NP-2002b) on the feeding, growth and survivorship of the juvenile leeches was also studied. After 2 months of culture, juveniles in the FT2 (fresh cattle blood) treatment had the highest total food intake (13.11 +/- 0.07 g). Juveniles in the FT3 (NP-2002a) and FT1 (live bullfrog) treatments had a significantly high feeding ratio 95.00 +/- 1.16% and 91.33 +/- 1.20%, respectively. Percentage weight gain (WG) and specific growth rate (SGR) of the juveniles in the treatment FT4 (NP-2002b) were the lowest, at 168.52 +/- 15.82% and 1.64 +/- 0.10%, respectively. Juveniles in the FT3 (NP-2002a) and FT4 (NP-2002b) treatments had the highest survival rates, at 96.00 +/- 0.58% and 84.33 +/- 0.88%, respectively.
Keywords: Leech; Hirudinaria manillensis; Density; Growth; Survivorship; Reproduction

M.P. Milazzotto, P. Rahal, M. Nichi, T. Miranda-Neto, L.A. Teixeira, J.B.S. Ferraz, J.P. Eler, F. Campagnari, J.F. Garcia, New molecular variants of hypothalamus-pituitary-gonad axis genes and their association with early puberty phenotype in Bos taurus indicus (Nellore), Livestock Science, Volume 114, Issues 2-3, April 2008, Pages 274-279, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.05.006.
(http://www.sciencedirect.com/science/article/B7XNX-4P18BNM-1/2/a95ff737ede575bc625cb5407007e1af)
Abstract:
Endocrine system plays a major role in the control of reproductive functions which are regulated by the hypothalamus-pituitary-gonad axis and its interactions. FSH and LH receptor genes are expressed at the gonads and GnRH receptor gene is expressed at the anterior pituitary gland. Misense mutations of the FSH, LH or GnRH receptors, activating or inactivating their functions in mammals, are potentially useful to allow the understanding of the role of this group of gonadotropins in reproductive phenotypes as early puberty and birth interval length. In the present study, polymorphisms in bovine exon 11 and 3'UTR of LHR, exon 10 and 3'UTR of FSHR and GnRHR genes were characterized with some of them resulting in changes in the aminoacidic chain. These polymorphic sites were found in a Bos taurus indicus (Nellore) female population by means of PCR-SSCP and DNA sequencing. Association between nucleotidic/aminoacidic changes and early puberty were determined by Chi-square analysis. It was found association between FSHR 3'UTR polymorphisms at position 2181, 2248 and 2249 bp and early puberty phenotype ($p < 0.05$). The presence of these new molecular markers might be considered in further studies to validate its correlation with early puberty or other reproduction associated phenotypes in cattle breeds.
Keywords: LHR; FSHR; GnRHR; Early puberty; Bovine; Cattle

A.A. de Koeijer, O. Diekmann, M.C.M. de Jong, Calculating the time to extinction of a reactivating virus, in particular bovine herpes virus, Mathematical Biosciences, Volume 212, Issue 2, April 2008, Pages 111-131, ISSN 0025-5564, DOI: 10.1016/j.mbs.2007.04.002.
(http://www.sciencedirect.com/science/article/B6VHX-4NN0WJV-1/2/5521828db0260e34d44728afdf067314)
Abstract:
The expected time to extinction of a herpes virus is calculated from a rather simple population-dynamical model that incorporates transmission, reactivation and fade-out of the infectious agent. We also derive the second and higher moments of the distribution of the time to extinction. These quantities help to assess the possibilities to eradicate a reactivating infection. The key assumption

underlying our calculations is that epidemic outbreaks are fast relative to the time scale of demographic turnover.
Four parameters influence the expected time to extinction: the reproduction ratio, the reactivation rate, the population size, and the demographic turn-over in the host population.
We find that the expected time till extinction is very long when the reactivation rate is high (reactivation is expected more than once in a life time). Furthermore, the infectious agent will go extinct much more quickly in small populations.
This method is applied to bovine herpes virus (BHV) in a cattle herd. The results indicate that without vaccination, BHV will persist in large herds. The use of a good vaccine can induce eradication of the infection from a herd within a few decades. Additional measures are needed to eradicate the virus from a whole region within a similar time-span.
Keywords: Reactivating infection; Bovine herpes virus; Extinction

Surindra Suthar, Bioconversion of post harvest crop residues and cattle shed manure into value-added products using earthworm Eudrilus eugeniae Kinberg, Ecological Engineering, Volume 32, Issue 3, 3 March 2008, Pages 206-214, ISSN 0925-8574, DOI: 10.1016/j.ecoleng.2007.11.002.
(http://www.sciencedirect.com/science/article/B6VFB-4RDBYXB-3/2/40403090c98f6945132c642a2e462a65)
Abstract:
The post-harvest residues of some local crops, e.g. wheat (Triticum aestivum), millets (Penniseum typhoides and Sorghum vulgare), and a pulse (Vigna radiata) were subjected to recycle through vermicomposting by using the epigeic earthworm Eudrilus eugeniae Kinberg, under laboratory conditions. The crop residues were amended with animal dung; and three types of vermibeds were prepared: (i) millet straw (S. vulgare + Pennisenum typhoides in equal quantity) + sheep manure (1:2 ratio) (MS), (ii) pulse bran (Vigna radiata) + wheat straw (Triticum aestivum) + cow dung (1:1:2 ratio) (PWC), and (iii) mixed crop residues (mixing of all types crop residues, used in this study) + cow dung in 1:1 ratio (MCR + CD). The fourth treatment was cattle shed manure (CSM). At the end, ready vermicompost showed lower organic C content and higher concentrations of other important plant nutrients. Organic C content decreased in the order: MCR + CD (27.6%) > PWC (22.8%) > CMS (22.6%) > MS (19.4%). The ready vermicompost obtained from MCR + CD vermibed showed the maximum increase (% of initial level) in content of total N (143.4%), available P (111.1%) and exchangeable K (100.0%). The end product showed reduction in C:N ration between the ranges of 60.7% (CSM) and 70.3% (MCR + CD), at the end. The composting earthworm E. eugeniae exhibited the highest values of biological parameters: maximum mean individual biomass (1261.25 +/- 7.0 mg), biomass gain (955.84 +/- 11.03 mg), growth rate (10.62 +/- 0.10 mg wt. worm-1 day-1), cocoon numbers (87.67 +/- 6.51), and reproduction rate (0.66 +/- 0.01 cocoons worm-1 day-1) in CSM container, while MS vermibeds showed the lowest values of these parameters. During experimentation, the maximum mortality for E. eugeniae was recorded in MS (16.67 +/- 7.63%) followed by CSM > PWC > MCR + CD. Results indicated that the C:N ratio of the substrate drastically influenced the growth parameters of E. eugeniae, and it showed the close relations with maximum individual biomass gain (R2 = 0.96), individual growth rate (R2 = 0.82), and reproduction rate (cocoon worm-1 day-1) (R2 = 0.72), in different treatments. This study clearly indicates that vermicomposting of crop residues and cattle shed wastes can not only produce a value-added product (vermicomposting) but at the same time acts as best culture medium for large-scale production of earthworms.
Keywords: Crop residues; Cattle shed wastes; Earthworm; Vermicomposting; Eudrilus eugeniae; Cocoon; Vermicompost; C:N ratio

Z.P. McCuddin, S.A. Carlson, Vijay K. Sharma, Experimental reproduction of bovine Salmonella encephalopathy using a norepinephrine-based stress model, The Veterinary Journal, Volume 175, Issue 1, January 2008, Pages 82-88, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2006.12.014.

(http://www.sciencedirect.com/science/article/B6WXN-4N4S68S-1/2/7336bec224e7a62bd668f21a7728a8e0)
Abstract:
Neurological disease represents a sporadic but serious manifestation of bovine salmonellosis that is thought to be related to systemic infection. Salmonella enterica serovar Dublin (S. Dublin) is the serovar most associated with systemic infection in cattle, although reports of neurological disease associated with S. Dublin or any other serovar are rare and usually anecdotal. This study reports the involvement of three strains of S. enterica, serovars Saintpaul, Montevideo, and Enteritidis, in Salmonella encephalopathies. Encephalopathies were reproduced in calves using a norepinephrine-based stress model. Neurological signs were not observed in calves infected with control strains of S. enterica, including S. Dublin, or in calves infected with clinical strains in the absence of norepinephrine. Therefore, norepinephrine may play a role in Salmonella encephalopathies.
Keywords: Salmonella; Encephalopathy; Bovine; Stress; Norepinephrine

G. Bobe, B.N. Ametaj, J.W. Young, L.L. Anderson, D.C. Beitz, Exogenous glucagon effects on health and reproductive performance of lactating dairy cows with mild fatty liver, Animal Reproduction Science, Volume 102, Issues 3-4, December 2007, Pages 194-207, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2006.11.003.
(http://www.sciencedirect.com/science/article/B6T43-4MFJJ80-2/2/85759cc1aba480935f19f0bfc79cd870)
Abstract:
Severe fatty liver, a metabolic disease of dairy cows in early lactation, results in decreased health and reproductive performance, but can be alleviated by treatment with i.v. injections of glucagon. Mild fatty liver in cows effects on health and reproductive performance were determined by treatment with 14-day s.c. injections of glucagon at 7.5 or 15 mg/day. Multiparous Holstein cows (n = 32) were grouped into Normal and Susceptible based on liver triacylglycerol concentrations (>1% liver tissue biopsy wet weight) at day 8 postpartum (day 0 = day of parturition). Susceptible cows (n = 24) were assigned randomly to three groups and s.c. injected with 0 mg glucagon [60 ml 0.15 M NaCl] [n = 8] (same for Normal cows), 2.5 mg glucagon, or 5 mg glucagon every 8 h for 14 days, beginning day 8 postpartum. Mild fatty liver resulted in an increased number of days with elevated body temperature during the injection period, an increased incidence of mastitis after glucagon treatment, increased days to first estrus and insemination, increased days before conception occurred, and decreased conception rate. In cows with mild fatty liver, glucagon (15 mg/day) decreased the number of days with elevated body temperature and the incidence of mastitis after hormone treatment. From these results, we suggest that mild fatty liver is detrimental to health and reproduction of dairy cows and, furthermore, that exogenous glucagon decreases some of these detrimental effects.
Keywords: Dairy cattle; Fatty liver; Glucagon; Health; Reproduction

L.M. Griffiths, S.H. Loeffler, M.T. Socha, D.J. Tomlinson, A.B. Johnson, Effects of supplementing complexed zinc, manganese, copper and cobalt on lactation and reproductive performance of intensively grazed lactating dairy cattle on the South Island of New Zealand, Animal Feed Science and Technology, Volume 137, Issues 1-2, 1 September 2007, Pages 69-83, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.10.006.
(http://www.sciencedirect.com/science/article/B6T42-4M936JT-1/2/6673f32e28d50baadbb204fc168f5117)
Abstract:
Five hundred and fifty-five healthy, pregnant, non-lactating Holstein-Friesian cows on an intensively grazed, commercial dairy were assigned to a study to determine effects of daily water treatment with Co glucoheptonate and amino acid complexes of Zn, Mn and Cu on lactational

performance, fertility and claw hardness. Cows were randomly assigned to treatment based upon eartag number. At approximately 35 days prior to calving, cows began receiving either a diet containing no supplemental Zn, Mn, Cu and Co or a diet which provided daily 360 mg Zn, 200 mg Mn, 125 mg Cu and 12 mg Co from complexed sources (CTM). Cows continued to receive their respective treatments through 230 days postpartum. Treatments were delivered via a commercial concentrate, precalving and postcalving, by dispersing CTM (liquid) into water troughs. Cows were milked twice daily, milk weights were recorded and samples collected six times during lactation. All reproductive events were recorded. Claws were examined on four separate occasions with liver and blood samples collected on three separate occasions during the study. Compared to the control, supplementing CTM increased (P<=0.05) yield of milk (17.5 kg/day versus 16.6 kg/day), milk energy (58.6 MJ/day versus 55.3 MJ/day), milk fat (0.78 kg/day versus 0.73 kg/day), milk crude protein (0.62 kg/day versus 0.58 kg/day) and milk solids (1.39 kg/day versus 1.31 kg/day). There was no effect of treatment on milk composition or somatic cell content of milk. Supplementing CTM reduced (P<=0.05) controlled internal drug releasing usage (16 cases/100 cows versus 26 cases/100 cows) and tended (P<=0.10) to reduce incidence of non-pregnant cows (13 cases/100 cows versus 18 cases/100 cows) and mastitis cases (23.8 cases/100 cows versus 29.9 cases/100 cows). Supplementing CTM increased Cu and Vitamin B12 status (P<=0.05) as indicated by liver Cu and serum Vitamin B12 content. There was no effect of treatment on claw hardness. Increasing Zn, Mn, Cu and Co intake of intensely grazed dairy cattle through CTM supplementation increased lactation performance, fertility and Cu and Vitamin B12 reserves.
Keywords: Complexed trace minerals; Grazing dairy cattle; Lactation; Reproduction

S. Boonprong, A. Choothesa, C. Sribhen, N. Parvizi, C. Vajrabukka, Relationship between haemoglobin types and productivity of Thai indigenous and Simmental x Brahman crossbred cattle, Livestock Science, Volume 111, Issue 3, September 2007, Pages 213-217, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.01.149.
(http://www.sciencedirect.com/science/article/B7XNX-4N4S13N-2/2/ed49db0395a15b28f9044e2dc9967a4f)
Abstract:
The relationship between the haemoglobin (Hb) type and reproduction and body weight was estimated in two different cattle breeds including 59 Thai indigenous and 51 Simmental x Brahman crossbred cows. Haemoglobin type was measured using cellulose acetate electrophoresis. Five haemoglobin types were present in indigenous cattle: HbAA (35.59%), HbAB (28.81%), HbAC (20.34%), HbBB (11.6%) and HbBC (3.39%). In the Simmental x Brahman crossbred cattle, three haemoglobin types, 50.98% HbAA, 45.10% HbAB and 3.92% HbBB, were present. The results revealed that Thai indigenous cows with HbAB type were heavier at birth, however, the best growth performance was recorded in HbAC animals. In contrast, calves carrying HbBB type were the lightest animals at birth and were the youngest group at first calving. This group of Thai indigenous cows was more than 4 months younger at first calving than the heifers with HbAA type. Simmental x Brahman crossbred cows with HbAA type were significantly (P < 0.05) heavier than the animals with HbAB type at birth as well as on days 200, 400 and 600 of age. Whereas, the animals with HbAB type gave birth to their first calf at a significantly (P < 0.05) younger age than those with HbAA type.
Keywords: Haemoglobin types; Production; Thai indigenous; Cattle; Growth rate

M.B. Wheeler, E.M. Walters, D.J. Beebe, Toward culture of single gametes: The development of microfluidic platforms for assisted reproduction, Theriogenology, Volume 68, Supplement 1, Proceedings of the International Conference on Farm Animal Reproduction - "From Egg to Embryo", International Conference on Farm Animal Reproduction, 1 September 2007, Pages S178-S189, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2007.04.042.

(http://www.sciencedirect.com/science/article/B6TCM-4NT24PN-7/2/9d324aa816d3ff96ab286df4b686ef29)
Abstract:
During the last few decades in vitro production of mammalian embryos and assisted reproductive technologies such as embryo transfer, cryopreservation, and cloning have been used to produce and propagate genetically superior livestock. However, efficiencies of these technologies remain low. For these technologies to become more commercially viable, the efficiencies must improve. Despite this importance of reproduction for the livestock industry, little progress in decreasing embryonic mortality has been made. The livestock industry has succeeded in achieving large increases in average milk production of dairy cattle, growth rate in beef cattle and leanness in swine but reproductive efficiency has actually decreased. For example, research has provided little progress toward developing an objective method to examine viability of a single living embryo.
At the same time, the growth of miniaturization technologies beyond integrated circuits and toward small mechanical systems has created opportunities for fresh examination of a wide range of existing problems. While the investigation and application of miniaturization technologies to medicine and biology is progressing rapidly, there has been limited exploration of microfabricated systems in the area of embryo production. Microfluidics is an emerging technology that allows a fresh examination of the way assisted reproduction is performed. Here we review the progress in demonstrating microfluidic systems for in vitro embryo production (IVP) and embryo manipulation. Microfluidic technology could have a dramatic impact on the development of new techniques as well as on our basic understanding of gamete and embryo physiology.
Keywords: Microfluidics; Embryo; Gamete; IVF; Embryo culture; Oocyte

P.J. Hansen, Exploitation of genetic and physiological determinants of embryonic resistance to elevated temperature to improve embryonic survival in dairy cattle during heat stress, Theriogenology, Volume 68, Supplement 1, Proceedings of the International Conference on Farm Animal Reproduction - "From Egg to Embryo", International Conference on Farm Animal Reproduction, 1 September 2007, Pages S242-S249, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2007.04.008.
(http://www.sciencedirect.com/science/article/B6TCM-4NNPCB6-3/2/be299d8a95f11ea036ad6f189527f6ca)
Abstract:
Heat stress causes large reductions in fertility in lactating dairy cows. The magnitude and geographical extent of this problem is increasing because improvements in milk yield have made it more difficult for cows to regulate body temperature during warm weather. There have been efforts to improve fertility during heat stress by exploiting determinants of oocyte and embryonic responses to elevated temperature. Among these determinants are genotype, stage of development, and presence of cytoprotective molecules in the reproductive tract. One effective strategy for increasing pregnancy rate during heat stress is to use embryo transfer to bypass effects of elevated temperature on the oocyte and early embryo. Pregnancy success to embryo transfer in the summer can be further improved by exposure of embryos to insulin-like growth factor-I during culture before transfer. Among the cytoprotective molecules that have been examined for enhancing fertility during heat stress are bovine somatotropin and various antioxidants. To date, an effective method for delivery of these molecules to increase fertility during heat stress has not been identified. Genes in cattle exist for regulation of body temperature and for cellular resistance to elevated temperature. Although largely unidentified, the existence of these genes offers the possibility for their incorporation into dairy breeds through crossbreeding or on an individual-gene basis. In summary, physiological or genetic manipulation of the cow to improve embryonic resistance to elevated temperature is a promising approach for enhancing fertility of lactating dairy cows.
Keywords: Heat stress; Dairy cow; Reproduction; Embryonic survival

M. Drost, Bubaline versus bovine reproduction, Theriogenology, Volume 68, Issue 3, Proceedings of the Annual Conference of the Society for Theriogenology, Proceedings of the Annual Conference of the Society for Theriogenology, August 2007, Pages 447-449, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2007.04.012.
(http://www.sciencedirect.com/science/article/B6TCM-4NN1TBT-3/2/7e43885ef1c320142730987c2bd2ef54)
Abstract:
Fertility in water buffalo (Bubalus bubalis) is considerably lower than that in cattle (Bos taurus and Bos indicus). Poor breeding efficiency is attributed to late onset of puberty, seasonality, poor estrus expression, and long calving intervals. Accurate estrus detection is a prerequisite for efficient reproductive management. Established reproductive management techniques in cattle can be successfully applied to water buffalo because of the similarities in the anatomy, physiology, and endocrinology of reproduction between the two genera.
Keywords: Water buffalo; Cattle; Reproduction; Technology; Management

H.J.W. van Roermund, D. Bakker, P.T.J. Willemsen, M.C.M. de Jong, Horizontal transmission of Mycobacterium avium subsp. paratuberculosis in cattle in an experimental setting: Calves can transmit the infection to other calves, Veterinary Microbiology, Volume 122, Issues 3-4, 21 June 2007, Pages 270-279, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2007.01.016.
(http://www.sciencedirect.com/science/article/B6TD6-4MWGFF4-3/2/30f420688dbc8d0c28583eb7932fef7b)
Abstract:
In September 2001, two subsequent transmission experiments both lasting 3 months were carried out to study cow-calf transmission of Mycobacterium avium subsp. paratuberculosis (Map) (Period 1), followed by calf-calf transmission of the infection (Period 2). Every 2 weeks, serum, heparinised blood and faecal samples were collected from all animals. After these experiments, the 20 calves were housed individually for more than 3 years to be able to detect the infection status and excretion pattern of each animal. In autumn 2004, the animals were inseminated, to observe a possible increase in faecal excretion of Map shortly before expected calving. One month before the expected calving date in 2005, animals were slaughtered and several tissues per cow and unborn calf were sampled for culture.
The results indicate that horizontal cow-calf transmission is readily achieved (Period 1). At the highest infection pressure (six shedding cows of which three high shedders in Period 1) all five calves excreted Map in their faeces during Period 1 (shortly after infection), and four of these calves during Period 2 (when the shedding cows were absent). After that, excretion became less frequently. Horizontal calf-calf transmission did take place (Period 2), as the four donor-calves infected two receiver-calves. Transmission rates during the 3 months periods were quantified as a reproduction ratio R. The R [95% CI] of cow-calf and calf-calf transmission were estimated as 2.7 [1.1, 6.6] and 0.9 [0.1, 3.2] new infections per infectious animal during 3 months.
Keywords: Transmission experiment; Paratuberculosis; Johne's disease; Mycobacterium avium subsp. paratuberculosis; Cattle

Surendra Suthar, Nutrient changes and biodynamics of epigeic earthworm Perionyx excavatus (Perrier) during recycling of some agriculture wastes, Bioresource Technology, Volume 98, Issue 8, May 2007, Pages 1608-1614, ISSN 0960-8524, DOI: 10.1016/j.biortech.2006.06.001.
(http://www.sciencedirect.com/science/article/B6V24-4KKWVMY-1/2/1b34ac5ba62eeceb098c75d1930f4ca0)
Abstract:
Potential of an oriental composting earthworm: Perionyx excavatus (Perrier) to decompose waste resources generated from agricultural practices (crop residues, farm yard manure, and cattle

dung) was studied for 150 days under laboratory conditions. At the end of experiment, all vermibeds showed significant decrease in their organic C content (~21-29%), while increase in total N (~91-144%), available P (~63-105%), and exchangeable K (~45-90%). P. excavatus showed maximum individual live weight (662.05 mg) after 120 days in MIXED (mixed crop residues + cow dung in 1:1) substrate. The maximum growth rate (mg worm-1 day-1) was between 3.79 +/- 0.08 and 2.35 +/- 0.16 on different substrates. The mean number of cocoon production was between 394.3 +/- 23.2 and 690.7 +/- 23.2 for different experimental beddings. MIXED bedding showed maximum reproduction rate (0.23 +/- 0.004 cocoons worm-1 day-1), whereas farmyard manure bedding (FYM) showed least value (0.15 +/- 0.002 cocoons worm-1 day-1). During vermicomposting, the total mortality in worms' population was recorded between 0% (in MIXED) and 21.7% (in Jowar straw (Sorghum vulgare) + millet straw (Pennisenum typhoides) + sheep manure in 1:1:2 ratio (JMS)). The waste decomposition and earthworm production was associated strongly with the quality of the substrate, especially with their chemical as well as biological composition.
Keywords: Agriculture waste; Vermicomposting; Perionyx excavatus; Crop residues; Fym; Cocoon; Biomass production; Cow dung; Sheep manure; C:N ratio

Hea Son Bang, Joon-Ho Lee, Young Eun Na, Richard Wall, Reproduction of the dung beetle (Copris tripartitus) in the dung of cattle treated with cis-cypermethrin and chlorpyrifos, Applied Soil Ecology, Volume 35, Issue 3, March 2007, Pages 546-552, ISSN 0929-1393, DOI: 10.1016/j.apsoil.2006.09.010.
(http://www.sciencedirect.com/science/article/B6T4B-4M93P5R-1/2/e03c99d8f90389f25a050d6150cc3cfa)
Abstract:
Fresh dung was collected from untreated cattle and cattle dosed with a spray-on formulation of high cis-cypermethrin and chlorpyrifos (2.1 g/cow), on days 1, 3, 5 and 7 post-treatment. The survival and reproduction of the dung beetle Copris tripartitus Waterhouse, when given this dung was assessed. Residues of high cis-cypermethrin and chlorpyrifos in dung collected 1 day after treatment were sufficient to inhibit oviposition by female C. tripartitus. However, there was no significant effect on egg-laying in dung collected at days 3, 5 or 7 days post-treatment. In a second generation of C. tripartitus, derived from beetles fed the dung from treated animals, residues in dung collected both 1 and 3 days after treatment were sufficient to inhibit oviposition, and residues in dung collected 1 day after treatment inhibited dung consumption by newly emerged adults of C. tripartitus. It is concluded that dung voided by cattle treated with a spray-on formulation of high cis-cypermethrin and chlorpyrifos have toxic lethal effects for 1 day post-treatment and sub-lethal toxic effects on ovarian condition and brood-ball production in dung voided at 1 and 3 days post-treatment. The potential ecotoxic effects of these compounds are discussed in terms of dung beetle activity and strategies for parasite control of cattle in the Korean environment.
Keywords: Dung beetles; Antiparasiticide; Reproduction; Synthetic pyrethroid

U. Kryger, C. Deschodt, A.L.V. Davis, C.H. Scholtz, Effects of cattle treatment with a fluazuron pour-on on survival and reproduction of the dung beetle species Onthophagus gazella (Fabricius), Veterinary Parasitology, Volume 143, Issues 3-4, 28 February 2007, Pages 380-384, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2006.08.021.
(http://www.sciencedirect.com/science/article/B6TD7-4KWK18C-4/2/8646ebd3bf193fc86565ff6d9898b28f)
Abstract:
While resistance against many other classes of acaricides has been described, products containing benzoylphenyl urea are currently still successfully used against the pesticide-resistant blue tick (Boophilus decoloratus) in South Africa. In order to assess any adverse impact of these tickicides on the important dung beetle (Coleoptera: Scarabaeidae) fauna, a bioassay was

undertaken on the ecotoxicological effects of a fluazuron (benzoylphenyl urea) pour-on formulation (Acatak(R)) on the survival and reproduction of the African dung beetles species Onthophagus gazella (Fabricius). The experiment yielded no significant differences in adult or larval survival, egg production, fecundity and fertility between the control and treatment group following three beetle generations over. These results suggested that treatment of cattle with the fluazuron pour-on formulation Acatak(R) was not detrimental to the selected dung beetle species in any notable way.
Keywords: Acaricide; Benzoylphenyl urea; Boophilus decoloratus; Dung beetle; Ecotoxicological effect; Fluazuron; Onthophagus gazella

Cheyney Meadows, Paivi J. Rajala-Schultz, Grant S. Frazer, Richard W. Meiring, Kent H. Hoblet, Evaluation of a contract breeding management program in selected Ohio dairy herds with event-time analysis: I. Cox proportional hazards models, Preventive Veterinary Medicine, Volume 77, Issues 3-4, 18 December 2006, Pages 145-160, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2006.04.016.
(http://www.sciencedirect.com/science/article/B6TBK-4KJDWPF-1/2/2fdea96e1b8999dd8c55fc0f6106c5b8)
Abstract:
An observational study was conducted in order to assess the impact of a contract breeding program on the reproductive performance in a selected group of Ohio dairies using event-time analysis. The contract breeding program was offered by a breeding co-operative and featured tail chalking and daily evaluation of cows for insemination by co-operative technicians. Dairy employees no longer handled estrus detection activities. Between early 2002 and mid-2004, test-day records related to production and reproduction were obtained for 16,453 lactations representing 11,398 cows in a non-random sample of 31 dairies identified as well-managed client herds of the breeding co-operative. Of the 31 herds, 15 were using the contract breeding at the start of the data acquisition period, having started in the previous 2 years. The remaining 16 herds managed their own breeding program and used the co-operative for semen purchase.
Cox proportional hazards modeling techniques were used to estimate the association of the contract breeding, as well as the effect of other significant predictors, with the hazard of pregnancy. Two separate Cox models were developed and compared: one that only considered fixed covariates and a second that included both fixed and time-varying covariates. Estimates of effects were expressed as the hazard ratio (HR) for pregnancy.
Results of the fixed covariates model indicated that, controlling for breed, herd size, use of ovulation synchronization protocols in the herd, whether somatic cell score exceeded 4.5 prior to pregnancy or censoring, parity, calving season, and maximum test-day milk prior to pregnancy or censoring, the contract breeding program was associated with an increased hazard of pregnancy (HR = 1.315; 95% CI 1.261-1.371). The results of the time-varying covariates model, which controlled for breed, herd size, use of ovulation synchronization protocols, somatic cell score above 4.5, parity, calving season, and testing season also found that the program was associated with an increased hazard of pregnancy (HR = 1.387; 95% CI 1.327-1.451).
The fixed and time-varying covariates models both found similar sets of predictors when analyzing the association of the contract breeding program with hazard of pregnancy. Both models identified a 30% or greater increase in hazard of pregnancy associated with use of the contract breeding program, suggesting that herds subscribing to the program achieved pregnancies in a more timely fashion.
Keywords: Dairy; Cattle; Reproductive management; Cox proportional hazards models

L. Mollema, P. Koene, M.C.M. de Jong, Quantification of the contact structure in a feral cattle population and its hypothetical effect on the transmission of bovine herpesvirus 1, Preventive Veterinary Medicine, Volume 77, Issues 3-4, 18 December 2006, Pages 161-179, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2006.05.014.

(http://www.sciencedirect.com/science/article/B6TBK-4KYY3JV-1/2/d1611578d4b6041f5030c3274166f24e)
Abstract:
The organisation of animal populations in social groupings may play a crucial role in the transmission of any infectious disease that requires close contact. The objective of this study was to quantify the contact structure of part of the Heck cattle population in a Dutch nature reserve and its hypothetical effect on the transmission of bovine herpesvirus 1 (BHV1). The contact structure was quantified by observing the number of different animals with whom contact was made (i.e. the number of contactees) within a fixed time period. Two types of behaviour sampling methods, namely focal sampling and scan sampling were used to observe the contact structure. In this study only those contacts between individuals were observed that were assumed to be a proxy measure of an at-risk event for BHV1-infection. Two reproduction ratios (R), i.e. the average number of new cases caused by a typical infected individual, were estimated, one for the observed contact structure and another for a random mixing contact structure. The two reproduction ratios were then compared to study the hypothetical effect on BHV1 transmission.
The overall number of contactees was highest during summer and lowest during winter-spring. The contact structure of the homogeneous population did differ significantly from a random mixing contact structure, resulting in that the variation in the number of contactees was higher than under random mixing. Bulls, young bulls and cows had the highest number of contactees during, respectively, summer, autumn and winter-spring. From the analysis of the contingency tables it was clear that contacts between animal types did not occur at random during summer and autumn. For example, during summer more contacts than expected occurred between bulls and cows. This heterogeneity at animal type level was taken into account in the calculation for R, which resulted for the observed contact structure in higher estimates for R than for the homogeneous population.
When looking at heterogeneity at individual level it was found that during summer almost all individuals were observed together direct or indirect in the same group except for certain bull groups. During autumn and winter-spring almost all individuals were seen together in the same group when considering a long contact period of 14 days but the groups were fallen apart in smaller groups and solitary individuals for a short contact period of 5 days.
It could be concluded that based on the observed contact structure transmission would be favoured most during summer.
Keywords: Contact structure; Who mixes with whom; Feral cattle; Reproduction ratio; Bovine herpesvirus 1

Seerp Tamminga, The effect of the supply of rumen degradable protein and metabolisable protein on negative energy balance and fertility in dairy cows, Animal Reproduction Science, Volume 96, Issues 3-4, Nutrition and Fertility in Dairy Cattle, December 2006, Pages 227-239, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2006.08.003.
(http://www.sciencedirect.com/science/article/B6T43-4KJM010-1/2/52734b7112ce97fa24c251928b20ccff)
Abstract:
Reproduction in dairy cattle is negatively affected by a negative energy balance (NEB), a combination of the deposition or mobilisation of fat and protein. The mode of action of NEB on fertility is not always clear, but the severity, length, and probably also the nature of the NEB may be involved. Extensive mobilisation of fat is expected to have detrimental effects on liver function due to the accumulation of non-esterified long chain fatty acids, impairing the detoxification of ammonia into urea. Protein evaluation systems nowadays use the concept of metabolisable protein (MP) and distinguish between rumen degradable protein (RDP) and rumen undegradable protein (RUP). Mobilisation of protein itself does not seem to have negative effects on reproduction. However, when protein is extensively degraded in the rumen or used as an energy

source, metabolic residues like ammonia and urea will result. Such residues may exert metabolic effects that are often detrimental to reproduction and fertility. Ammonia is believed to play a role starting before ovulation, whereas urea mainly interferes negatively after fertilisation. But, urea is also believed to aggravate the severity of NEB and its effect on fertility by preventing or delaying the start of cyclicity. Besides, urea has been shown to lower the pH in the uterine fluid, giving rise to disturbances in follicular development and embryonic growth. It is recommended to limit the level of rumen degradable protein in the diet to 10% in the DM.
Keywords: Energy balance; Protein mobilisation; Fat mobilisation; Nutrients; Fertility; Urea; Ammonia

L. Avendano-Reyes, F.D. Alvarez-Valenzuela, A. Correa-Calderon, J.S. Saucedo-Quintero, P.H. Robinson, J.G. Fadel, Effect of cooling Holstein cows during the dry period on postpartum performance under heat stress conditions, Livestock Science, Volume 105, Issues 1-3, December 2006, Pages 198-206, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.06.009.
(http://www.sciencedirect.com/science/article/B7XNX-4KJTNW6-1/2/e54528d66a74508d28758fa6843041e8)
Abstract:
Two experiments were completed to determine whether cooling Holstein cows during their 60-day prepartum period improved their immediate physiological status as well as subsequent postpartum performance. In Experiment 1, 38 cows were divided into two pens that were not cooled, or where the cows were moved twice daily to be cooled by soaking until their body was completely wet. Prepartum respiration rate (RR) and rectal temperatures (RT) did not differ between groups, indicating that the cooling system was largely ineffective, which was consistent with differences that only numerically favored the treated group in postpartum productive (milk production, milk fat content and related response variables), and reproductive (services per conception and days open) performance. In Experiment 2, 52 Holstein cows were used over 3 years (n = 24 in year one; n = 12 in year two; n = 16 in year three) and cows were housed in pens either not cooled or cooled with water spray and fans. Cooled cows had lower RR and RT prepartum at 14:00 and 18:00 h vs. non-cooled cows, indicating that the cooling system was effective, and this was consistent with improved productive (milk production, milk fat content and related response variables), and reproductive (services per conception and days open) performance postpartum. In addition, there was a trend (P = 0.10) to higher birth weights of calves from cooled mothers (which was consistent with a numeric difference in Experiment 1). Use of effective cooling systems under hot and dry conditions during the dry period can improve postpartum productive and reproductive performance of Holstein cows.
Keywords: Dairy cattle; Heat stress; Dry period; Milk production; Reproduction

J.L. Yaniz, P. Santolaria, A. Giribet, F. Lopez-Gatius, Factors affecting walking activity at estrus during postpartum period and subsequent fertility in dairy cows, Theriogenology, Volume 66, Issue 8, November 2006, Pages 1943-1950, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2006.05.013.
(http://www.sciencedirect.com/science/article/B6TCM-4K717NN-1/2/c52eb7d134ceea07d10c15d4bb6874c4)
Abstract:
The postpartum period is critical for efficient reproduction, and certain features of the normal estrus cycle during this period have been associated with subsequent reproductive performance. The objectives of the present investigation were to evaluate the effects of environmental, production, and reproductive factors on walking activity at estrus as determined using pedometers during the first 50 days in milk (DIM) (study 1). In a second study, we tried to establish whether pedometer measurements recorded during this period could be used to predict subsequent fertility by considering the number of cows becoming pregnant before 90 DIM. We analyzed data derived

from 995 parturitions in a single herd. Detection of estrus was performed using a pedometer system. Variables were screened for associations with walking activity by analysis of variance (ANOVA) through generalized linear model procedures (PROC GLM). Increased milk production and parity, and a mean relative humidity (RH) higher than 95% were associated with lower pedometer measurements. A higher number of animals simultaneously in estrus rendered higher pedometer readings. No significant effects of the year, season, DIM, number of previous estruses, and climatic data other than high mean RH were observed. Relationships between pedometer measurements and other variables recorded during the first 50 days postpartum, and subsequent fertility were assessed by applying logistic regression models. We detected no significant effects of year, milk production, season, and mean activity increase at estrus on high fertility. The likelihood of pregnancy before 90 DIM decreased for each additional lactation and for cows in anestrus between days 0 and 50 postpartum. However, pedometer readings during the first 50 days postpartum were unable to accurately predict subsequent fertility.
Keywords: Dairy cattle; Walking activity; Estrous behavior; Pedometers; Fertility

C.K. Reynolds, Production and metabolic effects of site of starch digestion in dairy cattle, Animal Feed Science and Technology, Volume 130, Issues 1-2, Starch structure and digestibility: Basic aspects and new research, 30 September 2006, Pages 78-94, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.01.019.
(http://www.sciencedirect.com/science/article/B6T42-4JD1153-1/2/da55a24ac7d3a72eda029bfe900733e7)
Abstract:
Milk solids yield in modern dairy cows has increased linearly over the last 50 years, stressing the need for maximal dietary energy intake to allow genetic potential for milk energy yield to be realized with minimal negative effects on health and reproduction. Feeding supplemental starch is a common approach for increasing the energy density of the ration and supplying carbon for meeting the substantial glucose requirement of the higher yielding cow. In this regard, it is a long held belief that feeding starch in forms that increase digestion in the small intestine and glucose absorption will benefit the cow in terms of energetic efficiency and production response, but data supporting this dogma are equivocal. This review will consider the impact of supplemental starch and site of starch digestion on metabolic and production responses of lactating dairy cows, including effects on feed intake, milk yield and composition, nutrient partitioning, the capacity of the small intestine for starch digestion, and nutrient absorption and metabolism by the splanchnic tissues (the portal-drained viscera and liver). Whilst there appears to be considerable capacity for starch digestion and glucose absorption in the lactating dairy cow, numerous strategic studies implementing postruminal starch or glucose infusions have observed increases in milk yield, but decreased milk fat concentration such that there is little effect on milk energy yield, even in early lactation. Measurements of energy balance confirm that the majority of the supplemental energy arising from postruminal starch digestion is used with high efficiency to support body adipose and protein retention, even in early lactation. These responses may be mediated by changes in insulin status, and be beneficial to the cow in terms of reproductive success and well-being. However, shifting starch digestion from the rumen impacts the nitrogen economy of the cow as well by shifting the microbial protein gained from starch digestion from potentially absorbable protein to endogenous faecal loss.
Keywords: Starch; Dairy cattle; Site of digestion

M. Daniel Givens, A clinical, evidence-based approach to infectious causes of infertility in beef cattle, Theriogenology, Volume 66, Issue 3, Proceedings of the Annual Conference of the Society for Theriogenology 2006, August 2006, Pages 648-654, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2006.04.021.

(http://www.sciencedirect.com/science/article/B6TCM-4K1HDMN-1/2/90594ccf704be62f6aa23df1f812a953)
Abstract:
Infertility is the diminished or absent capacity to produce viable offspring. Infections that reduce ovulation rates, fertilization rates, embryonic survival rates, fetal survival rates or perinatal survival rates result in observed infertility in beef cows. Reproductive pathogens include Leptospira, Campylobacter, Hemophilus, Brucella, bovine herpesvirus-1, bovine viral diarrhea virus, Tritrichomonas foetus, and Neospora caninum. Infectious infertility can be prevented or controlled with appropriate surveillance, biosecurity, and/or vaccination. The objective of this review is to briefly summarize current scientific information to assist with adoption of surveillance methods, implementation of biosecurity and selection of appropriate commercially available vaccines.
Keywords: Infertility; Reproduction; Immunization; Vaccination; Cattle

Ronald B. Davey, John E. George, Robert J. Miller, Comparison of the reproductive biology between acaricide-resistant and acaricide-susceptible Rhipicephalus (Boophilus) microplus (Acari: Ixodidae), Veterinary Parasitology, Volume 139, Issues 1-3, 30 June 2006, Pages 211-220, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2006.02.027.
(http://www.sciencedirect.com/science/article/B6TD7-4JP9G3G-1/2/382cc7e0f964f17bf77b53ce4d5a0e1e)
Abstract:
The reproductive fitness of Rhipicephalus (Boophilus) microplus (Canestrini) strains resistant to organophosphate (OP), pyrethroid (P), or formamidine (F) acaricides was compared to an acaricide-susceptible (SUS) strain to determine whether the acquisition of resistance affected reproductive fitness in the resistant strains. The SUS strain females had a 3.0 days preoviposition period, a 12.1 days oviposition period, a 22.5 days egg incubation period, a mean of 3670 eggs per female, and a mean percentage egg hatch of 78.1%, which were all remarkably similar to these same parameters reported for this species throughout the world. The reproductive biology of the P-resistant strain (PYR) and the F-resistant strain (FOR) were, for the most part, similar to those of the SUS strain. In the few instances where statistical differences did occur there was little evidence that the variation had any biological basis that could be attributed to a reduction in fitness related to resistance to P or F acaricides. Although the comparison of reproductive parameters of the OP-resistant strain (OPR) and the SUS strain identified statistical differences between the mean egg incubation and oviposition periods, the magnitude of the differences was not sufficient to conclude that the OPR strain was biologically less fit than the SUS strain. However, the OPR strain produced 30% fewer eggs (2562 eggs per female) than the SUS strain (3670 eggs per female) indicating the acquisition of resistance placed the OPR at a selective disadvantage relative to the SUS strain. This coupled with a lower, though non-significant, egg hatch was used to predict there would be a reduction of at least 34.1% in larval numbers available to potentially re-infest subsequent cattle than were available from the SUS strain. These data may aid the development of management strategies that can be used to control OP-resistant ticks.
Keywords: Rhipicephalus; Boophilus; Reproduction; Resistance

H.S. Stahlhut, C.S. Whisnant, J.W. Spears, Effect of chromium supplementation and copper status on performance and reproduction of beef cows, Animal Feed Science and Technology, Volume 128, Issues 3-4, 28 June 2006, Pages 266-275, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.11.003.
(http://www.sciencedirect.com/science/article/B6T42-4HTCTKW-2/2/7d5174a7b2b919bd6413d4da1b9f1764)
Abstract:
Pregnant Angus (n = 83) and Simmental (n = 69) cows were blocked by age into three age blocks and then randomly assigned by breed within a block to one of two free choice mineral

supplements to determine effects of dietary Cr and Cu status on performance and reproduction of beef cows. Supplements consisted of: (1) control (no supplemental Cr) and (2) 40 mg Cr/kg of mineral (from Cr picolinate). Mineral supplements were formulated to contain all minerals typically supplemented to cattle diets with the exception of Cu. The study began approximately 75 days prepartum, at which time half of the cows in each treatment received a 25 g Cu oxide needle bolus. Blood was collected from 36 cows on days 0, 28, 58, 97 (approximately 20 days postpartum), 155, 210, and 279, and from 36 calves on days 196 and 279 for plasma Cu determination. Liver biopsies were taken on days 0 and 279 to determine initial and final liver Cu concentrations in cows. Plasma Cu concentrations were affected by Cu bolus x time ($P < 0.05$), breed x time ($P < 0.01$), and breed x bolus ($P < 0.01$) interactions in cows, and by a treatment x time interaction ($P < 0.05$) in calves. Liver Cu concentrations were affected by breed x time ($P < 0.01$) and Cu bolus x time ($P < 0.05$) in cows. Cows receiving a Cu bolus had higher ($P < 0.05$) plasma Cu on day 97, and higher ($P < 0.05$) liver Cu on day 279 relative to cows that did not receive a bolus. Simmental cows had lower ($P < 0.01$) plasma Cu at day 28 and at subsequent sampling days, and lower ($P < 0.01$) liver Cu on days 0 and 279 than Angus cows. Simmental cows that received a Cu bolus had higher ($P < 0.01$) plasma Cu concentrations than Simmentals that did not receive supplemental Cu. Supplemental Cr resulted in higher ($P < 0.05$) plasma Cu concentrations in calves on day 279 versus controls. Overall body weight loss and body weight loss postpartum in cows was affected by breed ($P < 0.05$) and treatment x block ($P < 0.01$). Overall and postpartum body weight loss was lower in Angus cows ($P < 0.05$). Chromium supplementation reduced ($P < 0.01$) overall and postpartum body weight loss in 2 and 3 years old cows, but not in older cows. Cows supplemented with Cr tended ($P < 0.06$) to have higher pregnancy rates than controls. Calf birth weights and weaning weights were not affected by Cr or Cu bolus. Results indicate that Cr supplementation may improve fertility and decrease postpartum body weight loss especially in young beef cows.
Keywords: Chromium; Cattle; Reproduction; Performance

Paulo Henrique Silva Guimaraes, Fernando Enrique Madalena, Ivo Martins Cezar, Comparative economics of Holstein/Gir F1 dairy female production and conventional beef cattle suckler herds - A simulation study, Agricultural Systems, Volume 88, Issues 2-3, June 2006, Pages 111-124, ISSN 0308-521X, DOI: 10.1016/j.agsy.2005.02.004.
(http://www.sciencedirect.com/science/article/B6T3W-4FV41XX-1/2/47dd701cdbd8c495e9447690804b68ba)
Abstract:
Three cow-calf production systems were compared using simulation: N (straightbred Nelore), AN (Nelore cows producing Angus by Nelore calves) and HG (Gir cows producing Holstein by Gir calves). All three systems produced their own straightbred replacement females. Male calves were sold at weaning and female calves in excess of those required to keep the herd size constant were sold at one year of age. In the base situation, F1 HG females were priced at twice as much as the price per kg of the beef male calves, according to present market values. Typical 1000 ha beef cattle farms were simulated for each system, based on Brachiaria brizantha pastures managed according to recommended practices. Herd dynamics were controlled by reproduction and survival. Literature figures on monthly pasture nutrient production, live weights and milk yield were used to estimate nutrient requirements to match stocking rate to nutrient availability in each system. For calving rate set to 0.8 in all three systems, the total numbers of cows for the N, AN and HG systems were, respectively, 803, 795 and 885 and the total live weight sold annually was 129,070, 133,120 and 127,680 kg. The annual economic return on investment was 5.21%, 5.81% and 10.84%, respectively, for the N, AN and HG systems. Reducing the relative price of the HG heifers diminished the economic superiority of this system over N and AN. The difference was zero when the price of HG heifers was reduced to approximately 1.2 times the beef calf price. This also happened when the calving rate of the Gir cows was set to 0.6 keeping N cows at 0.8 or higher.

Keywords: Beef cattle; F1 Holstein x Gir; F1 Angus x Nelore; Nelore; Economic performance

Joze Grom, Peter Hostnik, Ivan Toplak, Darja Barlic-Maganja, Molecular detection of BHV-1 in artificially inoculated semen and in the semen of a latently infected bull treated with dexamethasone, The Veterinary Journal, Volume 171, Issue 3, May 2006, Pages 539-544, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2004.11.004.
(http://www.sciencedirect.com/science/article/B6WXN-4F6SSHH-1/2/2c259616d4733bcc5480fbe7da5b0060)
Abstract:
Two polymerase chain reaction (PCR) assays specific for glycoprotein B (gB) and glycoprotein E (gE) gene detection, respectively, were adopted for the detection of bovine herpesvirus-1 (BHV-1) in naturally infected bulls. The methods were tested on bovine semen artificially inoculated with BHV-1 and were compared with an optimised virus isolation method. Raw and extended semen samples were diluted in minimal essential medium (MEM) and spiked with equal dose of BHV-1. The extended semen was found to be more toxic for the cells than the raw semen, while the viral DNA could be detected by the PCR method in all tested dilutions of raw and extended semen samples. The sensitivity of both methods was compared also for BHV-1 detection in semen, nasal swabs and leucocytes of a seropositive bull in a different time period after virus reactivation with dexamethasone treatment. The sensitivity of virus detection by the PCR method was equivalent to that of virus isolation in cell culture. However, PCR was shown to be faster and easier to perform and may be a good alternative to virus isolation especially when bovine semen has to be screened for BHV-1 prior to artificial insemination.
Keywords: Cattle-male reproduction; Bovine herpesvirus 1; Semen; Diagnosis; PCR

Y. Xiao, D. Clancy, N.P. French, R.G. Bowers, A semi-stochastic model for Salmonella infection in a multi-group herd, Mathematical Biosciences, Volume 200, Issue 2, April 2006, Pages 214-233, ISSN 0025-5564, DOI: 10.1016/j.mbs.2006.01.006.
(http://www.sciencedirect.com/science/article/B6VHX-4JFGH1N-3/2/2ed30527faf7a84fc3990d3512b41cf9)
Abstract:
A multi-group semi-stochastic model is formulated to identify possible causes of why different strains of Salmonella develop so much variation in their infection dynamics in UK dairy herds. The model includes demography (managed populations) and various types of transmission: direct, pseudovertical and indirect (via free-living infectious units in the environment). The effects of herd size and epidemiological parameters on mean prevalence of infection and mean time until fade out are investigated. Numerical simulation shows that higher pathogen-induced mortality, shorter infectious period, more persistent immune response and more rapid removal of faeces result in a lower mean prevalence of infection, a shorter mean time until fade out, and a greater probability of fade out of infection within 600 days. Combining these results and those for the deterministic counterpart could explain differences in observed epidemiological patterns and help to identify the factors inducing the decline in reported cases of epidemic strains such as DT104 in cattle. We further investigate the effect of group structure on the probability of a major outbreak by using the stochastic threshold theory in homogeneous populations and that in heterogeneous populations. Numerical studies suggest that group structure makes major outbreaks less likely than would be the case in a homogeneous population with the same basic reproduction number. Moreover, some control strategies are suggested by investigating the effect of epidemiological parameters on the probability of an epidemic.
Keywords: Semi-stochastic model; Hybrid process; Epidemiology; Infection; Salmonella

A. Yilmaz, M.E. Davis, R.C.M. Simmen, Analysis of female reproductive traits in Angus beef cattle divergently selected for blood serum insulin-like growth factor I concentration, Theriogenology,

Volume 65, Issue 6, 1 April 2006, Pages 1180-1190, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2005.06.018.
(http://www.sciencedirect.com/science/article/B6TCM-4H21N7G-1/2/67e377e874213878a0b1f8e007cddb7f)
Abstract:
Insulin-like growth factor-I (IGF-I) is an anabolic polypeptide involved in reproductive performance in several species. The objectives of this study were to determine relationships of pregnancy rate, and age of heifers at puberty and at first calving with serum IGF-I concentration in Angus beef cattle. Data were obtained from an ongoing divergent selection experiment for IGF-I concentration involving purebred Angus cows. The IGF-I concentrations measured at Days 28, 42, and 56 of the 140-day postweaning test are abbreviated as IGF28, IGF42, and IGF56, respectively. Pregnancy rate did not differ between high and low IGF-I line females (P = 0.95; n = 2618), but high line heifers tended to be 4.02 +/- 2.18 days younger (P = 0.07; n = 281) at first calving. Residual correlations of age of heifers at first calving (AFC) with IGF-I measurements were not significant. The linear and quadratic terms for regression of AFC on IGF-I concentrations were also non-significant. Contrast analysis showed no difference in age at puberty between the high and low IGF-I line heifers (5.3 +/- 6.4 days earlier in the high line; P = 0.43; n = 51). Residual correlations of age of heifers at puberty with IGF28, IGF42, IGF56, and mean IGF-I were -0.30 (P = 0.03), -0. 22 (P = 0.12), -0.35 (P = 0.01), and -0.34 (P = 0.01), respectively. The observed relationships between female reproductive traits and IGF-I concentration in Angus beef cattle suggest complex and multiple roles for IGF-I in reproduction.
Keywords: Age at first calving; Age at puberty; Beef cattle; IGF-I; Pregnancy rate

Keith J. Betteridge, Farm animal embryo technologies: Achievements and perspectives, Theriogenology, Volume 65, Issue 5, Proceedings of IETS 2005 Satellite Symposium: Agricultural and societal implications of contemporary embryo-technologies in farm animals, 15 March 2006, Pages 905-913, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2005.09.005.
(http://www.sciencedirect.com/science/article/B6TCM-4HBTDCF-2/2/0767291bd377f060c61289e727ce2714)
Abstract:
Progress and changes in embryo technology in farm animals are briefly reviewed in terms of how well embryos can be made and used and what the subject has taught us about the maintenance of pregnancy and reproduction in general. Generalizations are made about the need to not accept dogma, how initially complex techniques always become simplified and thereby more applicable, and the need for the support of long-term and basic research. Personal views are offered on how best to prepare and motivate the next generation of scientists in the field, and the need for scientists to engage in the debate of how embryo technologies should be used responsibly in countering global inequalities.
Keywords: Embryo transfer; Cattle; Sheep; Pigs; Horses

J.C. Mariner, J. McDermott, J.A.P. Heesterbeek, G. Thomson, P.L. Roeder, S.W. Martin, A heterogeneous population model for contagious bovine pleuropneumonia transmission and control in pastoral communities of East Africa, Preventive Veterinary Medicine, Volume 73, Issue 1, 16 January 2006, Pages 75-91, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2005.09.002.
(http://www.sciencedirect.com/science/article/B6TBK-4HC6KMV-2/2/314486ffd44a2d0ad70eb22de3e8a1af)
Abstract:
Pastoral cattle live in highly structured communities characterized by complex contact patterns. The present paper describes a spatially heterogeneous model for the transmission of contagious bovine pleuropneumonia (CBPP) developed specifically for pastoral communities of East Africa. The model is validated against serological data on the prevalence of CBPP infection in several

communities of southern Sudan and against livestock owner information on community structure, livestock contact and cattle exchange. The model is used to assess the impact of alternative control strategies including mass and elective vaccination programmes, potential treatment regimes and the combination of vaccination and treatment in a single unified strategy. The results indicate that the eradication of CBPP using mass vaccination with currently available vaccines is unlikely to succeed. On the other hand, elective control programmes based on herd level vaccination, treatment of clinical cases or a combination of both vaccination and treatment enabled individual livestock owners to capture a large benefit in terms of reduced animal-level prevalence and mortality experience. The most promising intervention scenario was a programme which combined the vaccination of healthy animals with treatment of clinical cases.
Keywords: Contagious bovine pleuropneumonia; Modelling; Basic reproduction number; Participatory; Epidemiology; Policy-making

Ciro M. Barros, Marcelo F. Pegorer, Jose Luiz Moraes Vasconcelos, Bruno G. Eberhardt, Fabio M. Monteiro, Importance of sperm genotype (indicus versus taurus) for fertility and embryonic development at elevated temperatures, Theriogenology, Volume 65, Issue 1, IETS 2006 Pre- and Post-Conference Symposia, 7 January 2006, Pages 210-218, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2005.09.024.
(http://www.sciencedirect.com/science/article/B6TCM-4HCMS77-2/2/6e74a7b0f875b6bcd254f1e75080cf6d)
Abstract:
Heat stress has negative effects on bovine reproduction, particularly for European breeds (Bos taurus taurus) that are less thermotolerant than zebu cattle (Bos taurus indicus). Here, the evidence that spermatozoa and oocyte both contribute to early embryonic resistance to heat shock is demonstrated. In addition, the use of reproductive biotechnologies to improve bovine thermotolerance, are outlined by comparing data from taurus, indicus and crossbred genotypes.
Keywords: Heat stress; Bovine; Spermatozoa; Oocyte; Embryo

J.A. II V. Silva, I.B. Formigoni, J.P. Eler, J.B.S. Ferraz, Genetic relationship among stayability, scrotal circumference and post-weaning weight in Nelore cattle, Livestock Science, Volume 99, Issue 1, January 2006, Pages 51-59, ISSN 1871-1413, DOI: 10.1016/j.livprodsci.2005.05.022.
(http://www.sciencedirect.com/science/article/B7XNX-4J8C7C7-7/2/812bba14b7d7be3c15de438ce4e46992)
Abstract:
Improvement of female fertility has become of fundamental importance for profit maximization in the beef cattle herds. Consequently, animal breeding programs in Brazil have applied selection effort to traits related to reproduction as for scrotal circumference (SC), which is already incorporated to the selection routine of the breeders. However, studies have reported no favorable genetic correlation (rg) of SC with some fertility traits. Recently, stayability (STAY) has been used as means to better indicate and improve female fertility. Values for rg of STAY with reproductive and productive traits are not available in literature. Therefore, the objectives of the present study are to analyze the rg between SC and STAY and STAY with weight at 550 days (W550) in Nelore cattle. Data set of 55,682, 28,507 and 59,750 animals for STAY, SC and W550, respectively, were analyzed using two-trait animal model based on Gibbs sampling algorithm. The estimate of posterior rg between STAY and SC was 0.07 +/- 0.03, which can be considered as low and suggesting that STAY does not have sensible relation with SC. The rg of STAY and W550 was 0.15 +/- 0.01, considered low, although positive. It means that selection for W550 should not negatively affect STAY.
Keywords: Beef cattle; Genetic correlation; Growth trait; Reproductive trait

I. Martin Sheldon, D. Claire Wathes, Hilary Dobson, The management of bovine reproduction in elite herds, The Veterinary Journal, Volume 171, Issue 1, January 2006, Pages 70-78, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2004.06.008.
(http://www.sciencedirect.com/science/article/B6WXN-4D4D27G-2/2/0ed6020ae571c3b61b000bc5cfd3c8c9)
Abstract:
The management of bovine reproduction is the cornerstone of health provision in elite herds. Aims and objectives for reproductive performance should be herd specific and data to monitor progress should not only be frequently collected, but also analysed and reported. Strategic monitoring of animals should include a vaginal examination for evidence of uterine disease, as well as transrectal ultrasonography of the genital tract. There has been considerable advancement in our ability to intervene in the reproduction of cattle during the last 50 years. However, it is salutary to note that during this time fertility has consistently declined, despite increasing veterinary intervention.
Most elite herds use artificial insemination and success depends on accurate detection of oestrus expression, but this appears to be less overt than 25 years ago. In addition, half the cattle have abnormal oestrous cycles after parturition and conception rates are decreasing by 1% per year. Risk factors for abnormal oestrous cycles include puerperal problems, negative energy balance, which can be evaluated by body condition scoring, and uterine disease. Bacterial contamination of the uterus is ubiquitous after parturition in cattle and disease disrupts ovarian follicle growth and function. Reproduction is also disrupted by stress associated with clinical disease, pain or a sub-optimal environment. The challenge for veterinarians providing reproduction control programmes to elite herds is to transfer our knowledge of the problems underlying subfertility to the farm, in order to provide effective solutions.
Keywords: Bovine reproduction; Veterinary management; Infection; Stress; Nutrition

T.J. Parkinson, P.J.H. Ball and A.R. Peters, Reproduction in Cattle, Blackwell Publishing Ltd., Oxford (2004) ISBN 1405115459 [pound sign]32.50 (soft), 248p., The Veterinary Journal, Volume 171, Issue 1, January 2006, Page 190, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2005.07.013.
(http://www.sciencedirect.com/science/article/B6WXN-4H4T13V-1/2/77dacda19a25cb9d3e019ddbbd92ee13)

L. Mollema, F.A.M. Rijsewijk, G. Nodelijk, M.C.M. de Jong, Quantification of the transmission of bovine herpesvirus 1 among red deer (Cervus elaphus) under experimental conditions, Veterinary Microbiology, Volume 111, Issues 1-2, 30 November 2005, Pages 25-34, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2005.09.007.
(http://www.sciencedirect.com/science/article/B6TD6-4H9YC61-1/2/451df7747a2c8dc3f205d6baaea0e3aa)
Abstract:
Bovine herpesvirus 1 (BHV1) is endemically present in a cattle population that lives in a nature reserve in the Netherlands. Red deer (Cervus elaphus), living in the same nature reserve, can come into contact with the BHV1-infected cattle and could then become infected with BHV1. For the eradication of BHV1 in cattle, it is, therefore, important to know whether red deer alone can play a role in the transmission of BHV1. For that reason, we quantified the transmission of BHV1 among farmed red deer under experimental conditions. Two groups of ten animals were formed. In each group, five of these animals were inoculated with BHV1 and the other five served as contact animals.
Three inoculated animals in each transmission experiment became infected and none of the contact animals became infected. The one-sided 95% confidence interval for R [0.0-0.94] showed that limited transmission might occur among red deer. Based on these results, we would expect only minor outbreaks of BHV1 to occur in red deer populations. We concluded that BHV1 will

probably not survive longer than a few decades (several times the mean deer lifetime) in red deer populations. Consequently, it is not necessary for the eradication of BHV1 in cattle to eradicate BHV1 in red deer populations as well.
Keywords: Bovine herpesvirus 1; Inoculation experiment; Experimental transmission; Red deer; Reproduction ratio

Paul S. Valle, Eystein Skjerve, S. Wayne Martin, Rolf B. Larssen, Olav Osteras, Ola Nyberg, Ten years of bovine virus diarrhoea virus (BVDV) control in Norway: a cost-benefit analysis, Preventive Veterinary Medicine, Volume 72, Issues 1-2, Bovine virus diarrhoea virus (BVDV)control, 15 November 2005, Pages 189-207, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2005.07.017.
(http://www.sciencedirect.com/science/article/B6TBK-4H8FPJH-4/2/caee6b6b64c2310722f8b845c543b5ab)
Abstract:
A retrospective cost-benefit analysis was carried out on the Norwegian bovine virus diarrhoea (BVD) control and eradication strategy, for the years 1993-2003. Information regarding the control cost input parameters was gathered from the cattle industry (TINE Norwegian Dairies, GENO Breeding and AI association, and GILDE Norwegian Meat), The National Animal Health Authorities and The Veterinary Institute. We accounted for variable costs (both direct costs associated with the control, and those costs carried by the farmers as a consequence of the control program). The benefit was estimated as the difference between the assumed losses without control - represented overall as 10% increase of the observed 1993 BVD virus infection level - and the observed losses during the control period.
An estimate of the financial losses associated with the BVD virus (BVDV) infection was based on studies of the herd level effects on health, reproduction, and production in dairy herds with evidence of recent BVDV infection. We used a stochastic simulation model to account for the total uncertainty in both the control cost and financial loss estimates. The annual net benefits over the 10 years of BVD control were discounted to a 1993 net present value (NPV).
The median NPV of the BVD control, nationally, was estimated at 130 million NOK with a distribution of the NPV ranging from +51 to +201 million NOK (5th and 95th percentiles, respectively). Out of the total control costs the farmers and the farmer-owned industries (the co-operatives) had carried about 62% of these costs; however, the farmers were also the main beneficiaries. The Norwegian experience shows a robust cost-efficiency for a BVDV eradication strategy; this stands in sharp contrast to earlier studies where the results were not supportive.
Even though every cattle population and country is unique, the Norwegian findings and experiences should have wider implications.
Keywords: Bovine virus diarrhoea; Control; Eradication; Cost-benefit

P. Morand-Fehr, Recent developments in goat nutrition and application: A review, Small Ruminant Research, Volume 60, Issues 1-2, Plenary papers of the 8th International Conference on Goats, October 2005, Pages 25-43, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.06.004.
(http://www.sciencedirect.com/science/article/B6TC5-4H2PJNJ-2/2/bf60536502d6c50d8f483fc8d1ce8036)
Abstract:
This paper analyses the progress in recent research in goat nutrition since the last International Conference on Goats (Tours, 2000). This review reveals clear progress in the quality of papers, now similar to those on cattle or sheep, particularly on nutritional aspects in tropical areas. Topics dealt with in goat nutrition are feeding behaviour, particularly on pastures or rangelands, feed digestibility, tree leaf or by-product utilization, effects of nutritional factors on growth, milk and hair production, while nutritional adaptation to harsh environments, underfeeding, factors influencing energy consumption, quality of goat products (milk, cheese, meat) and reproduction performance along with the connection between nutrition and pathology require more attention. Goat nutrition in

a tropical environment follows the same physiological mechanisms as under temperate conditions, but genotypes can present specificities enabling a better adaptation to feeding conditions. Complete and precise information on the nutritive value of tropical forage, rangeland vegetation in accordance with the season, and new feed or by-products is still missing. Researchers in goat nutrition frequently use different methods, making it difficult to compare results from several research teams. Agreement on the methodology in goat nutrition is easier when the research teams are organized in networks at the national or international level. To be successful with technological transfer in goat nutrition, the message for the end users must be clear and well adapted. At the present time, we are short of review papers that provide an analysis of all results already published to establish quantitative relationships between variables, which can clarify the messages for the field. Methods of meta-analysis can be used to analyse the quantitative results from experimental data banks and to establish response laws and define limits of application. Finally, if we implement a research project on goat nutrition dedicated to application in the field, not only the research works but also the actions of technological transfer must be financed.
Keywords: Goat nutrition; Intake; Nutrition application; Feed utilization; Goat product quality; Research efficiency

Simone P. Breukelman, Otto Szenci, Jean-Francois Beckers, Hans Kindahl, Edu J.H. Mulder, F. Herman Jonker, Bert van der Weijden, Denes Revy, Karoly Pogany, Jose Sulon, Istvan Nemedi, Marcel A.M. Taverne, Ultrasonographic appearance of the conceptus, fetal heart rate and profiles of pregnancy-associated glycoproteins (PAG) and prostaglandin F2[alpha]-metabolite (PGF2[alpha]-metabolite) after induction of fetal death with aglepristone during early gestation in cattle, Theriogenology, Volume 64, Issue 4, 1 September 2005, Pages 917-933, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2004.12.016.
(http://www.sciencedirect.com/science/article/B6TCM-4FH0DJC-2/2/5f85ad86c97dd5e4381940f4d6e1f61f)
Abstract:
A higher incidence of fetal losses, especially after the use of artificial reproduction techniques, asks for more intensive monitoring of bovine pregnancies. In this study, a model for fetal death (FD) was created by administering the antiprogesterone aglepristone twice, at Day 47 and 48 of gestation (n = 5). Control heifers received the solvent (n = 5). The temporal relationships between changes in ultrasonographic appearance of fetal fluids and membranes, fetal heart rate (FHR) and peripheral plasma levels of pregnancy-associated glycoprotein (PAG) and PGF2[alpha]-metabolite as determined by radioimmunoassay associated with FD were monitored at eight hour intervals around treatment. For the analysis of plasma levels the period under study was divided into five epochs (T1: before injection of aglepristone/solvent; T2: from first to second injection; T3: from second injection to FD; T4: from diagnosis of FD to 56 h later; T5: from 56 h to 104 h after diagnosis of FD).
Control heifers produced healthy calves at term, but in treated heifers, FD occurred on average at 58 (range 48-80) h after first injection of aglepristone. Fetal death was always preceded by a visible reduction of the amount of allantoic fluid and by segregation of the allantochorionic membrane from the endometrium. FHR remained rather constant in both groups, but a (non-significant) drop in FHR around 8 h before FD was diagnosed in four of five treated animals. All fetuses were expulsed after FD. Levels of PAG remained constant or even slightly increased in controls, but decreased in treated animals from T2 onward: levels during T4 and T5 significantly differed from those during T1 and from values in controls during T4 and T5 ($P < 0.01$). PGF2[alpha]-metabolite levels did not change in the controls, but in the treated group they were significantly higher during T3 when compared to T1 ($P < 0.05$). After this increase, a sharp decrease in PGF2[alpha]-metabolite level occurred, reaching a significantly lower level at T5 when compared to control animals ($P = 0.01$). It is concluded, that FD induced by aglepristone is

preceded by ultrasonographic visible changes in fetal membranes and fluids and a rise in PGF2[alpha]-metabolite and is followed by a drop in PAG and PGF2[alpha]-metabolite.
Keywords: Fetal death; Aglepristone; Fetal heart rate; PGF2[alpha]-metabolite; Pregnancy-associated glycoproteins

M.W. Overton, Cost comparison of natural service sires and artificial insemination for dairy cattle reproductive management, Theriogenology, Volume 64, Issue 3, Proceedings of the 2005 Annual Conference of the Society for Theriogenology, August 2005, Pages 589-602, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2005.05.015.
(http://www.sciencedirect.com/science/article/B6TCM-4GDBT46-3/2/24bc56f3fd50a19ef3702427b7a5909c)
Abstract:
Despite the widespread popularity of artificial insemination, many dairymen still prefer the use of natural service sires due to a variety of reasons, including a common perception that it is easier to manage and less expensive than AI. Little has been done to estimate the explicit and implicit costs, including the probable loss of genetic progress associated with the use of natural service sires in dairy herds. A partial budget approach was used to stochastically model the expected costs and returns of reproductive management options in large, western, Holstein dairies. Option one was natural service sires managed using currently recommended approaches including breeding soundness evaluations, bull vaccination, and a rotational breeding system. Option two was an AI system using a modified Presync-Ovsynch timed AI program in conjunction with estrus detection and inseminations performed by a commercial route breeder. Stochastic variables in the model included the cost of the lactating ration and purchased bulls, as well as the value received for milk, market bulls, and net merit gains. All other variables were treated deterministically. Under the model's assumptions, the use of natural service sires averaged approximately US$ 10 more in cost per cow per year as compared to an AI program. Sixty percent of the time, AI was less expensive than using bulls. However, there was wide variation in expected differences in cost between the two systems with net merit estimates having the largest impact, followed by prices received for milk sold and market bulls.
Keywords: Natural service; Artificial insemination; Economics; Partial budget; Cost of reproduction

D.A. Zieba, M. Amstalden, G.L. Williams, Regulatory roles of leptin in reproduction and metabolism: A comparative review, Domestic Animal Endocrinology, Volume 29, Issue 1, Farm Animal Endocrinology Special Issue Part 1, July 2005, Pages 166-185, ISSN 0739-7240, DOI: 10.1016/j.domaniend.2005.02.019.
(http://www.sciencedirect.com/science/article/B6T62-4G05H4M-1/2/4428c73ae0aeab6bbba24328982a860f)
Abstract:
Leptin plays an important role in signaling nutritional status to the central reproductive axis of mammals and appears to be at least a permissive factor in the initiation of puberty. The expression and secretion of leptin are correlated with body fat mass and are acutely affected by changes in feed intake. Moreover, circulating leptin increases during pubertal development in rodents, human females and heifers. Effects of leptin are mediated mainly via receptor activation of the JAK-STAT pathway; however, activation of alternative pathways, such as MAP kinase, has also been reported. Although the leptin receptor (LR) has not been found on GnRH neurons, leptin stimulates the release of GnRH from rat and porcine hypothalamic explants. Moreover, leptin increases the release of LH in rats and from adenohypophyseal explants and/or cells from full-fed rats and pigs. In contrast, stimulation of the hypothalamic-gonadotropic axis by leptin in cattle and sheep is observed predominantly in animals and tissues pre-exposed to profound negative energy balance. For example, leptin prevents fasting-mediated reductions in the frequency of LH pulses in peripubertal heifers, augments the magnitude of LH and GnRH pulses in fasted cows, and

enhances basal secretion of LH in vivo and from adenohypophyseal explants of fasted cows. However, leptin is incapable of accelerating the frequency of LH pulses in prepubertal heifers, regardless of nutrient status, and has no effect on the secretion of GnRH and LH in full-fed cattle or hypothalamic/hypophyseal explants derived thereof. Similar to results obtained with LH, basal secretion of GH from anterior pituitary explants of fasted, but not normal-fed cows, was potentiated acutely by low, but not high, doses of leptin. Mechanisms through which undernutrition hypersensitize the hypothalamic-gonadotropic axis to leptin may involve up-regulation of the LR. However, an increase in LR mRNA expression is not a requisite feature of heightened adenohypophyseal responses in fasted cattle. To date, leptin has not been successful for inducing puberty in ruminants. Future therapeutic uses for recombinant leptin that exploit states of nutritional hypersensitization, and identification of genetic markers for genotypic variation in leptin resistance, are currently under investigation.
Keywords: Leptin; Hypothalamus; Adenohypophysis; Reproduction; Cattle

Nicolas C. Friggens, Mizeck G.G. Chagunda, Prediction of the reproductive status of cattle on the basis of milk progesterone measures: model description, Theriogenology, Volume 64, Issue 1, 1 July 2005, Pages 155-190, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2004.11.014.
(http://www.sciencedirect.com/science/article/B6TCM-4F4NYR9-2/2/5d47124afee7d08758fbac0616e2f91b)
Abstract:
Reproductive management, in particular timely oestrus detection, is important for profitable dairy production. The aim of this study was to develop a biological model to predict reproductive state on the basis of milk progesterone measures. A number of additional inputs were incorporated to make use of other known effectors of reproductive performance that are not reflected in progesterone levels. These are: days from calving, breed, parity, signs of behavioural oestrus, insemination dates, pregnancy determinations, energy status, body fat status, milk urea content and reproductive disorders associated with calving. A dynamic, deterministic model was developed. It is designed to run each time a new trigger input (progesterone, behavioural oestrus, inseminations, pregnancy determinations) occurs using the current and previous values and can run in the absence of the additional inputs. The milk progesterone values are smoothed using an extended Kalman filter before being processed in the biological component of the model. The model predicts the reproductive status of the cow, which can be one of three mutually exclusive states: postpartum anoestrus, oestrus cycling, and potentially pregnant. The other model outputs are all reproductive status specific with the exception of days to next sample (DNS), which is calculated in each model run regardless of reproductive status. DNS is designed to feedback to the sampling system so that the frequency of milk sampling (i.e. progesterone measurement) can be varied according to the predicted likelihood of a future reproductive event, such as onset of oestrus cycling. The other model outputs are: risk of prolonged postpartum anoestrus, risk and type of ovarian cyst, onset of oestrus, likelihood of a potential insemination succeeding, and likelihood of being pregnant (following oestrus). The model was evaluated using three simulated datasets consisting of a timeseries of progesterone values centred on each of the three reproductive statuses and including relevant additional information. Test runs were carried out on the full datasets and then on reduced data. The data reductions were made by using only those values that would have been available if the model days to next sample function was used to control sampling frequency. The sensitivity of the model to noise in the raw progesterone data was examined by adding 1, 2, or 3 residual standard deviations (1.85 ng/ml) random variation to the original data and evaluating model performance. The model was found to be able to readily identify and distinguish reproductive states. A reduction in sampling frequency to 36% of original sample resulted in an average increase in days to detection of oestrus of 0.36. The addition of 1 S.D. noise did not cause additional oestruses to be detected and all oestruses were correctly identified. However, when 2 or 3 S.D. noise were added, the model found on average 1.4 and 3

extra oestruses. It was concluded that reproductive status can be predicted from milk progesterone values using a biological model and that such a model is robust to reductions in sampling frequency number and to a doubling in the random variation in the raw progesterone values. It therefore has the potential to provide the basis for a useful reproductive management tool.
Keywords: Anoestrus; Model; Oestrus detection; Pregnancy; Progesterone; Reproduction

C.A. Ramirez-Restrepo, T.N. Barry, Alternative temperate forages containing secondary compounds for improving sustainable productivity in grazing ruminants, Animal Feed Science and Technology, Volume 120, Issues 3-4, 28 May 2005, Pages 179-201, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.01.015.
(http://www.sciencedirect.com/science/article/B6T42-4FS5YP9-1/2/c868a7236c964134d36594dd283b8f2f)
Abstract:
The use of alternative temperate forages to improve the sustainable productivity of grazing ruminants, relative to grass-based pastures, is reviewed. Particular emphasis is placed upon forages containing secondary compounds for sustainable control of internal parasites, for increasing reproductive rate in sheep, reducing bloat risk in cattle and for reducing methane production as a means of lowering greenhouse gas emissions.
Of the forages reviewed, the herb chicory (Chicorium intybus) and the condensed tannin-containing legumes Lotus corniculatus L. and sulla (Hedysarum coronarium) offered the most advantages. Chicory and sulla promoted faster growth rates in young sheep and deer in the presence of internal parasites, and showed reduced methane production in other studies. L. corniculatus was not as effective as chicory and sulla in promoting growth of lambs in the presence of internal parasites. Grazing on L. corniculatus was associated with increases in reproductive rate in sheep, increases in milk production in both ewes and dairy cows and reduced methane production, effects that were mainly due to its content of condensed tannins (CT). Grazing ewes on L. corniculatus during mating and very early pregnancy may also reduce lamb mortality. However, there are no data on the effect of mating ewes, which are grazing chicory on their reproductive performance, an important omission. Risk of rumen frothy bloat in cattle grazing legumes is reduced when the forage contains 5 g CT/kg dry matter (DM) or greater. Gene transfer techniques aimed at achieving this for lucerne (Medicago sativa) have made progress, but CT concentration needs to be further increased from calculated values of 0.75-1.25 g CT/kg DM in the transformed plants. Bloat control may be achievable in genetically transformed legumes before increased amino acid absorption, as the concentration of CT required for bloat control is lower (5 versus 30-40 g/kg DM) than that required to cause increased amino acid absorption and is not affected by differences in CT structure.
Key plant characteristics for improved sustainable productivity are a high ratio of readily fermentable: structural carbohydrate and the presence of CT and certain other secondary compounds.
Taking into account both nutritional and agronomic considerations, chicory is considered one of the best emerging plants for grazing livestock, with L. corniculatus being more suitable for areas with dry summers and warm winters. Some of the agronomic limitations of L. corniculatus and sulla could be reduced by mechanical harvesting and their inclusion as a component in total mixed rations (TMR), instead of grazing.
Keywords: Forages; Chicory; Lotus corniculatus; Perennial ryegrass/white clover pasture; Parasite control; Reproduction; Secondary compounds; Sulla; Bloat safe; Methane reduction

F. Goyache, J.P. Gutierrez, I. Fernandez, L.J. Royo, I. Alvarez, Genetic analysis of days open in beef cattle, Livestock Production Science, Volume 93, Issue 3, May 2005, Pages 283-289, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.10.002.

(http://www.sciencedirect.com/science/article/B6T9B-4F14YWN-3/2/d87f011eb91d9ba3b5608909d2de4029)

Abstract:
The aim of this work was to analyse the genetic parameters affecting days open (DO) in beef cattle to evaluate its potential as criterion of selection. The present study characterises DO as a trait with considerable genetic variability, relative to that usually found for reproduction traits, especially for heifers and second calving cows. The estimates of heritability for the trait ranged from 0.091 for cows with 10 or more calvings to 0.197 for second calving cows. The genetic correlations estimated for DO in different parities are situated between 0.9 and 1, showing that the genes affecting the trait are substantially the same across parities of the dam. A substantial permanent environment (around 9%) seems to affect DO performance. Permanent environmental factors seem to be especially important in younger cows. Genetic correlation between DO and calving interval was positive and very high (1.0), while those between DO and gestation length and calving date were negative from low to moderate (-0.089 and -0.308, respectively). DO can be used in improvement programs of beef cattle as an early indicator of reproductive performance of the cow.

Keywords: Beef cattle; Asturiana de los Valles; Days open; Fertility; Heritability; Genetic correlation

D.S. Hammon, G.R. Holyoak, T.R. Dhiman, Association between blood plasma urea nitrogen levels and reproductive fluid urea nitrogen and ammonia concentrations in early lactation dairy cows, Animal Reproduction Science, Volume 86, Issues 3-4, April 2005, Pages 195-204, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.08.003.

(http://www.sciencedirect.com/science/article/B6T43-4DCDD1W-3/2/dc93aa00f1c5a14c4a336c9457686995)

Abstract:
Two experiments were conducted to study the relationship of blood plasma urea nitrogen (PUN) concentrations with NH3, urea nitrogen, K, Mg, P, Ca, and Na concentrations in fluid of preovulatory follicles (experiment 1) and the relationships of PUN concentration and stage of estrus cycle with ammonia and urea nitrogen concentrations in uterine fluids (experiment 2) in early lactation dairy cows. Mean PUN levels were used to distribute cows into two groups: cows with PUN >= 20 mg/dl (HPUN), and cows with PUN < 20 mg/dl (LPUN). In experiment 1, blood and follicular fluids from preovulatory follicles of 38 early lactation dairy cows were collected on the day of estrus (day 0) 4 h after feed was offered. Follicular fluid NH3 was higher (P < 0.01) in HPUN cows (339.0 [mu]mol/L +/- 72.2) compared to LPUN cows (93.9 [mu]mol/L +/- 13.1). Follicular fluid urea N was higher (P < 0.001) in HPUN cows (22.4 mg/dl +/- 0.4) compared to LPUN cows (17.0 mg/dl +/- 0.3). PUN and follicular fluid urea N were correlated (r2 = 0.86) within cows. In experiment 2, blood and uterine fluids were collected from 30 cows on day 0 and on day 7. Uterine fluid NH3 was higher (P = 0.05) in HPUN cows (1562 [mu]mol/L +/- 202) than in LPUN cows (1082 [mu]mol/L +/- 202) on day 7, but not on day 0. Uterine fluid urea N was higher (P < 0.001) in HPUN cows than in LPUN cows on day 0 (26.9 mg/dl +/- 1.3 and 20.4 mg/dl +/- 0.7) and day 7 (26.5 mg/dl +/- 1.1 and 21.4 mg/dl +/- 1.1). There was a correlation (r2 = 0.17) between PUN and uterine fluid urea N within cows. The results of this study indicate that high PUN concentrations were associated with elevated NH3 and urea N concentrations in the preovulatory follicular fluids on the day of estrus and in the uterine fluid during the luteal phase of the estrous cycle in early lactation dairy cows. Elevated NH3 or urea N concentrations in the reproductive fluids may contribute to reproductive inefficiency in dairy cows with elevated plasma urea nitrogen due to embryo toxicity.

Keywords: Cattle; Urea; Ammonia; Reproduction; Uterus

L. Molteni, D. Meggiolaro, A. De Giovanni Macchi, L. De Lorenzi, P. Crepaldi, S. Stacchezzini, F. Cremonesi, F. Ferrara, Fertility of cryopreserved sperm in three bulls with different Robertsonian translocations, Animal Reproduction Science, Volume 86, Issues 1-2, March 2005, Pages 27-36, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.05.024.
(http://www.sciencedirect.com/science/article/B6T43-4D09H94-1/2/d117421f263a49aebb734e25743c3228)
Abstract:
The fertility of three bulls carrying different Robertsonian translocations (rob(1;29), rob(14;17) and rob(26;29)) was evaluated. Oocytes-cumulus complexes obtained from slaughterhouse-derived ovaries were matured and then fertilised in vitro with frozen/thawed seminal material from the above mentioned subjects, and from control bulls with normal karyotype. An assessment was first made of the concentration, vitality and acrosome integrity of the seminal material to be sure that possible differences in the results of the in vitro fertilisation experiments were not due to seminal material quality. The results of the experiments, evaluated by the percentage of cleaved embryos and blastocysts per cleaved embryo, indicated that the three bulls carrying Robertsonian translocations had similar fertilising power and semen qualitative parameters to the controls. These data suggest that neither gametogenesys impairment nor decreased spermatozoa fertilising capacity is responsible for the reduced fertility in bulls with Robertsonian translocations. What the data do confirm is that the observed in vivo hypofertility for karyologically abnormal bulls is mainly due to early embryonic mortality.
Keywords: Cattle-male reproduction; Male sterility; Chromosomal translocations

J.C. Petherick, A review of some factors affecting the expression of libido in beef cattle, and individual bull and herd fertility, Applied Animal Behaviour Science, Volume 90, Issues 3-4, March 2005, Pages 185-205, ISSN 0168-1591, DOI: 10.1016/j.applanim.2004.08.021.
(http://www.sciencedirect.com/science/article/B6T48-4DFK8RV-3/2/4570d2142804c5db9ca6cb213128c20d)
Abstract:
This paper examines some of the factors that affect the expression of libido in beef cattle, focusing on the male and the free-ranging situation. The ways in which bull libido is assessed and the relationship between libido test results and fertility are discussed. Genetics play a role in determining libido, but there are many environmental factors affecting its expression, and a number of these factors influence sexual activity in both tests of libido and paddock mating. Herd fertility is multi-factorial and, consequently, it is difficult to draw definitive conclusions about the relationship between libido and fertility. Multiple males increase the expression of libido, but it is uncertain whether this translates into improvements in herd fertility. However, there are consequences for individual bull fertility, as there is ample evidence of inherent differences between bulls. Male:female ratios appear to have minor effects on libido and fertility. Anecdotal evidence indicates that multiple matings with the same or different bulls may reduce the duration of oestrus. Social relationships between bulls can affect the expression of libido, with subordinate bulls being inhibited by the presence of dominant bulls. There is evidence that dominant bulls may achieve more matings at pasture, but this is not necessarily shown in their fertility. Older bulls show greater expression of libido in tests and appear more efficient in serving, although these changes may reflect greater sexual experience. Provided bulls are sexually mature and physically able to mate, age per se appears not to affect fertility, but age interacts with dominance, which can influence fertility. There is evidence of breed differences in expression of libido, but this appears not to be demonstrated in fertility. There is anecdotal evidence that bulls and females prefer to mate with similar genotypes/phenotypes with implications for fertility. Limited research on thermal and nutritional effects indicate some adverse consequences for libido of climatic extremes for unadapted bulls and of over-feeding, but not under-feeding. Limited research has investigated the effects on libido and fertility of multiple stressors associated with relocation; relocation to

dramatically different environments has long-lasting detrimental consequences for fertility. Too few studies have been conducted to draw conclusions about the effects of topography and herd dispersion on libido and fertility. Temperament is likely to affect the expression of libido when animals are put into new situations, but this has not been critically researched. In the light of this review, the implications for managing cattle to optimise fertility are discussed and suggestions made as to areas where further research is needed.
Keywords: Beef cattle; Libido; Fertility; Sexual behaviour; Cattle reproduction; Bull

J.C. Hobson, T.F. Duffield, D. Kelton, K. Lissemore, S.K. Hietala, K.E. Leslie, B. McEwen, A.S. Peregrine, Risk factors associated with Neospora caninum abortion in Ontario Holstein dairy herds, Veterinary Parasitology, Volume 127, Issues 3-4, 28 February 2005, Pages 177-188, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2004.09.025.
(http://www.sciencedirect.com/science/article/B6TD7-4DTKP77-1/2/de92359a23620f8ce4288372813179f1)
Abstract:
The objective of this epidemiological study was to identify risk factors for Neospora caninum-related abortions in Ontario Holstein dairy herds. A total of 88 herds, consisting of 5080 cattle, and utilizing Dairy Herd Improvement (DHI) services, were divided into three groups. Case (n = 30) and first control (n = 31) herds were selected from 1998 and 1999 fetal abortion submissions to the Animal Health Laboratory, University of Guelph, that were histopathologically positive or negative, respectively, for N. caninum. A second control group (n = 27) was selected from multiple sources of herds sampled within the previous 4 years that had a low seroprevalence (<7%) to N. caninum. Between May and December 1999, all available cows on all farms, in parity one or greater, were blood sampled. The sera were then analyzed for antibody to N. caninum using a kinetic ELISA. A survey administered at the time of sampling recorded information on housing, animal species present, manure management, reproduction, biosecurity practices, wildlife observations, peri-parturient cow management, herd disease history and nutrition. Production and other herd parameters were obtained from DHI records. Logistic regression indicated that the following parameters were positively associated with a N. caninum abortion in a herd: the N. caninum herd seroprevalence (OR = 1.1), the total number of dogs on a farm (OR = 2.8), the frequency that dogs were observed defecating in mangers (OR = 2.8), the number of horses on a farm (OR = 3.1), the observed annual rate of retained fetal membranes (OR = 1.2) and the observed annual rate of cows returning to estrus after pregnancy confirmation (OR = 1.2). Factors negatively associated were the frequency of stray cats and wild canids observed on a farm (OR = 0.4 and OR = 0.7, respectively) and the housing of heifers on loafing packs (a housing pen divided into feed manger, scrape alley and bedded pack areas, OR = 0.1).
Keywords: Neospora caninum; Serology; Risk factor; Abortion; Cow; Dog

P. Christensen, C. Hansen, T. Liboriussen, H. Lehn-Jensen, Implementation of flow cytometry for quality control in four Danish bull studs, Animal Reproduction Science, Volume 85, Issues 3-4, February 2005, Pages 201-208, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.04.038.
(http://www.sciencedirect.com/science/article/B6T43-4D99CJ4-1/2/0080034bef801ddc8a88312d782b8387)
Abstract:
A flow cytometric method for simultaneous determination of sperm concentration and viability has recently been developed. In 2001, four Danish bull studs purchased flow cytometers and eight technicians were trained for routine analysis of raw and frozen-thawed semen. After initial training of the technicians, an experiment was carried out to document the precision of the system. The aim was also to assess if flow cytometric determination of sperm concentration could result in a more uniform production of semen doses. Results of this experiment showed high precision in the determination of sperm concentration and coefficients of variation were 3.5 and 2.4% for raw and

frozen-thawed semen, respectively. Sperm viability was also assessed with high precision and coefficients of variation were 0.9% for raw semen and 1.7% for frozen-thawed semen. Furthermore, the experiment showed that package of semen doses after flow cytometric determination of sperm concentration in the raw semen results in a significantly smaller variation in the number of sperm per dose. In the second experiment, frozen semen was exchanged between the participating studs and were analysed by flow cytometry as well as by microscopic assessments by the eight technicians. Results show that the average correlation between technicians were 0.38 for motility assessments while flow cytometric agreement between technicians was significantly higher (average correlation was 0.86 for sperm viability and 0.92 for sperm concentration). The experiment also showed very high agreements between assessments within lab technician (correlations r = 0.98 (sperm concentration) and r = 0.99 (sperm viability)). Experiment 3 revealed that straws from the same batch varies in both concentration and viability. It is concluded that flow cytometric determination of sperm concentration and viability can be used to improve semen assessment by AI studs and result in a better quality control.
Keywords: Cattle-male reproduction; Semen; Evaluation; Flow cytometry; Viability; Concentration

Niels M. Schmidt, Henrik Olsen, Mogens Bildsoe, Vincent Sluydts, Herwig Leirs, Effects of grazing intensity on small mammal population ecology in wet meadows, Basic and Applied Ecology, Volume 6, Issue 1, 27 January 2005, Pages 57-66, ISSN 1439-1791, DOI: 10.1016/j.baae.2004.09.009.
(http://www.sciencedirect.com/science/article/B7GVS-4DXSRF2-1/2/9ea729c6073b4d776d9acc20ca3ef28f)
Abstract: Summary
Livestock grazing is common management practice in wet grasslands. However, knowledge of its effects on small mammals is limited. We studied the influence of grazing intensity on small mammals in general and field voles Microtus agrestis in particular in two Danish wet meadows, 1998-2000. Generally, grazing livestock had a negative effect on the peak biomass of small mammals, and the negative effect increased with grazing intensity, irrespective of whether pens were grazed by cattle or by sheep. More detailed analyses, however, revealed that an intermediate grazing intensity (approximately 400 kg ha-1 as maximum livestock biomass) actually seemed to benefit small mammals. This grazing intensity generally held small mammal biomasses and field vole population sizes that were similar to or larger than those on the ungrazed control, and markedly larger than those on the more heavily grazed pens. Additionally, field voles in the intermediate grazing intensity had more foetuses. Though a number of parameters may contribute to the observed patterns, we suggest that these primarily are caused by the livestock removing vegetation cover, thereby influencing the number and size of patches with high, dense vegetation in the vicinity of grass that is rejuvenated by grazing.Zusammenfassung
Die Viehbeweidung ist eine verbreitete Wirtschaftsform auf nassen Weiden. Dennoch ist die Kenntnis ihrer Auswirkung auf Kleinsauger begrenzt. Wir untersuchten den Einfluss der Beweidungsintensitat auf Kleinsauger im Allgemeinen und Wuhlmause Microtus agrestis im Besonderen auf zwei danischen nassen Weiden von 1998 bis 2000. Weidevieh hatte generell einen negativen Effekt auf die Spitzenbiomasse der Kleinsauger und der negative Effekt nahm mit der Beweidungsintensitat zu, unabhangig davon ob die Verschlage von Schafen oder Rindern beweidet wurden. Eine detailliertere Analyse lie[ss] jedoch erkennen, dass eine mittlere Beweidungsintensitat (ungefahr 400 kg pro Hektar als maximale Viehbiomasse) anscheinend Kleinsauger fordert. Diese Beweidungsintensitat hatte eine Biomasse kleiner Sauger und eine Wuhlmauspopulationsgro[ss]e zur Folge, die vergleichbar oder gro[ss]er als die der unbeweideten Kontrollen und wesentlich gro[ss]er als die der viel starker beweideten Verschlage war. Daruber hinaus hatten die Wuhlmause bei der mittleren Beweidungsintensitat mehr Foeten. Obwohl eine Anzahl von Parametern zu den beobachteten Mustern beitragen kann, vermuten wir, dass sie vor allem dadurch verursacht werden, dass Vieh die Vegetationsdecke entfernt und dadurch die

Anzahl und Gro[ss]e der Flecken beeinflusst, die hohe und dichte Vegetation aufweisen und in Nachbarschaft zu Gras liegen, das durch die Beweidung verjungt wird.
Keywords: Biomass; Diversity; Insectivora; Livestock; Meadow; Rodentia; Survival; Reproduction

A. M. Padula, K. L. Macmillan, Oestradiol-17[beta] responsiveness, plasma LH profiles, pituitary LH and FSH concentrations in long-term ovariectomised Holstein cows at 24 h, 48 h and 21 days following treatment with an absorbable GnRH agonist implant, Animal Reproduction Science, Volume 85, Issues 1-2, January 2005, Pages 27-39, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.03.006.
(http://www.sciencedirect.com/science/article/B6T43-4CKFKPJ-1/2/d8a8a5ac891cd776f5e2dcdee600e512)
Abstract:
Non-lactating OVX Holstein cows (N = 34) were used to investigate the effect of s.c. placement of an absorbable GnRH agonist implant (Ovuplant(R); deslorelin 2.1 mg, Peptech Animal Health, Australia) on the relationship of plasma LH, oestradiol responsiveness and pituitary LH content. On the day of implant insertion (Day 0), one group (OVU-48h; N = 5) received Ovuplant(R) and had blood samples collected at hourly intervals to characterize the LH response, while a second group (CON-48h; N = 5) remained untreated and acted as controls. Blood samples were collected every 10 min over 6 h from CON-48h and OVU-48h, at 24 h post-implant insertion. These cows were then slaughtered at 48 h post-implant insertion and their pituitaries recovered. Another group received Ovuplant(R) (OVU-21d+E2; N = 10) or were left untreated (CON-21d+E2) and 21 days later were injected i.m. with 0.5 mg 17[beta]-E2. Blood samples were collected every 10 min for 4 h on the day before E2 injection to characterize LH pulse frequency and amplitude. Beginning 14 h later, blood samples were collected hourly for 12 h to characterize the expected LH surge. These cows were slaughtered and their pituitary glands recovered and assayed for LH and FSH content.
Peak plasma LH concentrations (59+/-19 ng/ml) were measured after 30 min of Ovuplant(R) insertion. They had returned to pre-treatment levels by 7 h. By 24 h post-implant insertion, OVU-48h plasma LH profiles were characterized by reduced LH pulse frequency (0.23 +/- 0.09 pulses/h versus 0.75 +/- 0.26 pulses/h; OVU-48h versus CON-48h; $P < 0.05$). The cows that received Ovuplant(R) had lower LH pulse amplitude, LH pulse frequency and mean LH concentrations after 20 days. Injection of 0.5 mg 17[beta]-E2 induced an LH surge in every one of the control cows with their peak concentrations measured 18 h post injection. No increase in LH was detected in any Ovuplant(R) treated cows. Pituitary FSH content was reduced in Ovuplant(R) treated cows after 48 h, but not that of LH.
In conclusion, absorbable deslorelin implants induced a substantial but temporary release of LH, but even 21 days later their LH profiles were characterized by marked suppression of pulsatile LH and an absence of response to E2. These results suggest the implant has prolonged biological activity.
Keywords: GnRH agonist; Cattle-endocrinology; Reproduction; LH; FSH; Ovariectomy; Deslorelin

L. Sylla, G. Stradaioli, E. Manuali, A. Rota, R. Zelli, L. Vincenti, M. Monaci, The effect of Mycoplasma mycoides ssp. mycoides LC of bovine origin on in vitro fertilizing ability of bull spermatozoa and embryo development, Animal Reproduction Science, Volume 85, Issues 1-2, January 2005, Pages 81-93, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.03.007.
(http://www.sciencedirect.com/science/article/B6T43-4CNGPVS-1/2/3289301aeff31324f1edfc2b41a7a260)
Abstract:
Several Mycoplasma species may adversely affect bovine spermatozoa viability and embryo development. Mycoplasma mycoides ssp. mycoides large-colony (LC) has been isolated from naturally aborted bovine fetuses and from bull semen. The objective of this study was to evaluate whether M. mycoides ssp. mycoides LC contaminated bovine ejaculates could (i) impair in vitro

fertilizing ability of bull spermatozoa, (ii) impair embryo development, and (iii) evaluate potential spread by reproductive technologies. In the present study, spermatozoa of 10 fertile bulls were contaminated with M. mycoides ssp. mycoides LC, at a final concentration of 1.5 million CFU/ml and incubated for 60 min before evaluating spermatozoa motility and acrosome reaction inducibility with calcium ionophore. In addition, in vitro contaminated semen of a bull previously shown to have a good in vitro fertilizing ability, was used in an IVF procedure. Embryo development stage on Day-7 of culture was evaluated. Spermatozoa and embryos at morula and blastocyst stages were routinely processed for transmission electron microscopy observation. Both mean total and progressive motility decreased ($P < 0.01$) upon spermatozoa incubation with Mycoplasma. One-hour incubation with calcium ionophore increased the percentage of acrosome-reacted spermatozoa, although Mycoplasma contamination reduced calcium ionophore treatment efficacy ($P < 0.05$). Ultrastructurally, Mycoplasma microorganisms appeared as moderately electron-dense sphere-shaped particles, adhering to cell membranes. Sperm mid-piece sections showed numeric aberrations of the central singlets such as nine + zero or nine + one of the axonemal complex. Further morphological abnormalities included partial or total absence of dinein arms and radial fibers, with lack of the bridge and the central ring in 35.00 +/- 4.20% of contaminated cells, whereas these abnormalities were not observed in uninfected ones. The IVF trials showed that two-four cell blocks were higher ($P < 0.05$) in the infected group. Ultrastructure of Day-7 contaminated embryos showed Mycoplasma particles adhering and infiltrating the outer layer of the zona pellucida. Our investigations suggest that M. mycoides ssp. mycoides LC contaminating the bovine ejaculate induced adverse effects on in vitro spermatozoa-fertilizing ability and embryonic development. Some satisfactory quality transferable embryos could be produced in contaminated IVF systems. This could imply a potential transmission of this microorganism through reproductive technologies.
Keywords: Cattle-male reproduction; Mycoplasma mycoides ssp. mycoides LC; Spermatozoa; In vitro fertilization; Embryo

T. C. Loh, Y. C. Lee, J. B. Liang, D. Tan, Vermicomposting of cattle and goat manures by Eisenia foetida and their growth and reproduction performance, Bioresource Technology, Volume 96, Issue 1, January 2005, Pages 111-114, ISSN 0960-8524, DOI: 10.1016/j.biortech.2003.03.001.
(http://www.sciencedirect.com/science/article/B6V24-4C2NKWW-4/2/1ff1b95899a1510a813f69ea912e4cd8)
Abstract:
Vermicomposting is commonly adopted for the treatment of livestock organic wastes. In the present study, two types of livestock manure were used for culturing of the earthworm, Eisenia foetida. Each treatment group consisted of six replicates and worm vermicasts were examined after 5 weeks. The concentrations of total C, P and K in goat manure vermicasts were higher than those in cattle manure vermicasts. Cattle vermicasts had a higher N content than goat vermicasts but the C:N ratio of fresh manure was higher than that of vermicasts for both materials. Earthworm biomass and reproductive performance, in terms of number of worms after 5 weeks of experiment, were higher in cattle manure than in goat manure. The cocoon production per worm in cattle manure was higher than in goat manure. However, the hatchability of cocoons was not affected by manure treatments. In conclusion, cattle manure provided a more nutritious and friendly environment to the earthworms than goat manure.
Keywords: Livestock manure; Vermicast; Earthworms; Eisenia foetida

A. J. Ziecik, G. Bodek, A. Blitek, M. Kaczmarek, A. Waclawik, Nongonadal LH receptors, their involvement in female reproductive function and a new applicable approach, The Veterinary Journal, Volume 169, Issue 1, January 2005, Pages 75-84, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2004.01.002.

(http://www.sciencedirect.com/science/article/B6WXN-4BYRSR0-2/2/66d943d7feddd4d1410ea6fb0a6c3049)
Abstract:
Luteinising hormone (LH) and human chorionic gonadotropin (hCG) share a common receptor in gonadal cells. The receptors have also been detected in several nongonadal but reproduction-associated tissues of pigs, cattle, and other species including the uterus (myometrium, endometrium), oviduct, cervix, blood vessels, mammary gland and other tissues. The main role of LH/hCG receptors in the myometrium is stimulation of growth and hyperplasia, and relaxation of uterine motility; hCG also boosts blood flow in the uterine artery. LH and hCG can increase production of prostaglandins in the endometrium, oviduct, and blood vessels.
We suggest that the preovulatory surge of LH plays an important role in controlling oviductal contractions. Awareness of LH binding to many tissues of the female reproductive tract and integration with embryonic factors may lead to the elaboration of new strategies for improved reproductive efficiency in domestic species.
Mammary glands also possess LH/hCG receptors through which gonadotropins can affect the metabolism of steroid hormones and could play an inhibitory role in mammary carcinogenesis and in the growth of breast tumours. A novel approach to target and ablate carcinoma cells through LH receptors is described.
Keywords: LH receptor; Uterus; Oviduct; Cervix; Cancer

W.Y. Ayele, M. Bartos, P. Svastova, I. Pavlik, Distribution of Mycobacterium avium subsp. paratuberculosis in organs of naturally infected bull-calves and breeding bulls, Veterinary Microbiology, Volume 103, Issues 3-4, 15 November 2004, Pages 209-217, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2004.07.011.
(http://www.sciencedirect.com/science/article/B6TD6-4D98KM5-1/2/3975f569e43d84b1b8c5596468fe4bea)
Abstract:
Paratuberculosis, caused by Mycobacterium avium subsp. paratuberculosis, has particular importance in cattle due to the resulting chronic diarrhoea, weight loss, decreased production, infertility and eventual death. While faecal oral route of infection is generally recognised, reports about semen-derived infection are rare. The objective of this work was to assess whether M.a. paratuberculosis may disseminate from the gastrointestinal tract to reproductive organs, and compare this event between naturally infected bull-calves and breeding bulls. Ten bull-calves, aged 6-28 weeks and four breeding bulls were tested by serology, faecal and tissue culture, IS900 PCR and RFLP. In seven bull-calves M.a. paratuberculosis was isolated predominantly from mesenteric lymph nodes (75%); isolates from mucosa of the intestine constituted 25%. In three breeding bulls, M.a. paratuberculosis was isolated both from intestinal mucosa and mesenteric lymph nodes. Head and mediastinal lymph nodes, liver, spleen and semen of bull no. 1 (Holstein-Friesian); testes and epididymis of bull no. 2 (Piemonte); testes, epididymides and seminal vesicle of bull No. 3 (Hereford); and seminal vesicle of bull No. 4 (Simmental) tested positive by culture. Hot-start PCR revealed M.a. paratuberculosis in semen, seminal vesicle and intestinal tissue where culture isolation was difficult. Isolates from bull-calves and breeding bulls were of RFLP types B-C9 and B-C1, respectively. Bull-calves born in infected herd can be sources of infection when later used for natural mating or artificial insemination. Sub-clinically infected bulls release M.a. paratuberculosis into semen, consequently infecting the uterine environment of cows.
Keywords: Mycobacterium paratuberculosis; Cattle; Reproduction; Artificial insemination; Germ cells; Johne's disease; Infertility

C. R. Barb, R. R. Kraeling, Role of leptin in the regulation of gonadotropin secretion in farm animals, Animal Reproduction Science, Volumes 82-83, Research and Practice III. 15th

International Congress on Animal Reproduction, July 2004, Pages 155-167, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.04.032.
(http://www.sciencedirect.com/science/article/B6T43-4CP13P5-1/2/723a6b34d617147fe32f145042806249)
Abstract:
The recently discovered protein, leptin, which is secreted by fat cells, has been implicated in regulation of feed intake or energy balance and the neuroendocrine axis in rodents, humans and large domestic animals. Leptin was first identified as the gene product found to be deficient in the obese (ob/ob) mouse. Administration of leptin to ob/ob mice restored reproduction as well as reducing feed intake and causing weight loss. The leptin receptor (LR) which has been cloned and is a member of the class 1 cytokine family of receptors, is found in the brain and pituitary of all species studied to date. Neuropeptide Y has been proposed as the primary mediator of leptin action in the hypothalamus to regulate luteinizing hormone (LH) and growth hormone (GH) secretion. In vitro studies using both hypothalamic explants and pituitary cell culture provided evidence that supports a direct action of leptin at the level of brain and pituitary gland in the pig, but only the pituitary in cattle. Central administration of leptin increased LH secretion in the fasted cow and ewe, but not in control fed animals, indicating that metabolic state is an important factor in modulating the hypothalamic-pituitary response to leptin. Changing serum leptin concentrations and leptin mRNA expression were associated with onset of puberty in heifers and gilts. Thus, leptin appears to be an important link between metabolic status and the neuroendocrine axis.
Keywords: Neuroendocrine; Leptin; Gonadotropin

M. C. Lucy, S. McDougall, D. P. Nation, The use of hormonal treatments to improve the reproductive performance of lactating dairy cows in feedlot or pasture-based management systems, Animal Reproduction Science, Volumes 82-83, Research and Practice III. 15th International Congress on Animal Reproduction, July 2004, Pages 495-512, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.05.004.
(http://www.sciencedirect.com/science/article/B6T43-4CMMTJ8-1/2/5711849cc0385558473885219c334ca1)
Abstract:
Hormonal interventions have been used to increase the probability of estrous detection and insemination, and to increase pregnancy rates of dairy cattle under a variety of management systems. The present review addresses the basic principles of hormonal intervention and presents typical examples that illustrate the methodology. The hormones used to control the estrous cycle mimic the reproductive hormones found within the normal cow. Most estrous synchronization systems employ a method for controlling follicular wave development, promoting ovulation in anestrous cows, regressing the corpus luteum in cyclic cows, and synchronizing estrus and (or) ovulation at the end of treatment. A wide range of reproductive systems are in place on dairy farms. In most herds, a non-intervention period is practiced where postpartum cows are observed estrus estrus. Cows not observed in estrus are then treated. A number of studies in pasture-based and confinement systems have demonstrated net benefits of whole-herd synchronization. Despite the advantages of whole-herd reproductive programs, their uptake has been inconsistent globally. The benefits of a timed artificial insemination (AI) system increase under conditions of poor estrous detection rate and poor conception rate. The unpopular nature of timed AI programs in pasture-fed cows relates to high rates of estrous detection and conception for pasture-based dairying. Regardless of production system, some cows must be re-inseminated because they are not pregnant after first insemination. The presence of 'phantom cows' (non-pregnant cows that do not return to estrus) creates a serious reproductive challenge for both pasture-based and confinement-style operations. Early pregnancy diagnosis and second insemination timed AI may reduce the effects of phantom cows on dairy herds. Fundamental research into anestrous, the

hormonal control of the estrous cycle, and early pregnancy detection should elucidate new methods that can be used to strengthen reproductive programs on dairy farms.
Keywords: Reproduction; Dairy; Estrous synchronization

J. E. P. Santos, W. W. Thatcher, R. C. Chebel, R. L. A. Cerri, K. N. Galvao, The effect of embryonic death rates in cattle on the efficacy of estrus synchronization programs, Animal Reproduction Science, Volumes 82-83, Research and Practice III. 15th International Congress on Animal Reproduction, July 2004, Pages 513-535, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.04.015.
(http://www.sciencedirect.com/science/article/B6T43-4CK1X8V-1/2/88056fce794d36e63685876d462c9a28)
Abstract:
Reproductive failure in inseminated cattle results from poor fertilization and embryo survival. Recent studies utilizing dairy and beef cattle indicate that fertilization rates are higher for nulliparous dairy and beef heifers and nonlactating beef cows than lactating beef and dairy cows and nonlactating dairy cows. Several factors affect fertilization rates, but the greatest impact was observed for high producing cows under heat stress, when fertilization was only 55%. Once fertilization has occurred, the fate of a successful pregnancy is then determined by the survival of the embryo and fetus. Losses of pregnancy are characterized by early embryonic death, which occurs prior to the period of corpus luteum (CL) maintenance in the cow at days 15-17 of the cycle, and late embryonic death, which occurs from CL maintenance to the end of the differentiation stage, at approximately 42 days of gestation. After 50 days of gestation, pregnancy losses are less frequent and characterize fetal death. Most pregnancy losses occur prior to the period of maintenance of the CL, but in high producing lactating dairy cattle, substantial losses continue to occur up to 42-56 days after insemination. Several factors affect pregnancy losses in cattle, such as compromised oocytes, which result in poorly developed embryos incapable of cross-talking with the endometrial epithelial cells, to inadequate uterine environment and infectious agents resulting in death of the embryo from undernourishment. Recently, studies have indicated that anovulation/anestrous, the metabolic status of the animal, some dietary ingredients, as well as occurrence of diseases, predispose the cow to experience embryonic and fetal death. Although some insemination protocols might impact embryo survival, when timed AI has been implemented properly, it has not influenced embryonic or fetal death in cattle. Improvements in reproductive programs in the future will have to focus on enhancing fertilization rates and minimizing embryonic losses to optimize conception rates in dairy and beef cattle.
Keywords: Embryo mortality; Estrus synchronization; Reproduction; Dairy cows

Shawn R. Tatman, Don A. Neuendorff, Timothy W. Wilson, Ronald D. Randel, Influence of season of birth on growth and reproductive development of Brahman bulls, Theriogenology, Volume 62, Issues 1-2, July 2004, Pages 93-102, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2003.07.027.
(http://www.sciencedirect.com/science/article/B6TCM-4BNW395-3/2/1ec5f7a000ed59393d7c03342bdaa90f)
Abstract:
Seasonal effects on reproduction are more dramatic in Bos indicus than Bos taurus cattle. This experiment evaluated reproductive development of fall- (n=7) versus spring- (n=10) born Brahman bulls to determine if season of birth affects reproductive development. Measurements of growth and reproductive development began after weaning and continued at bi-weekly intervals until each bull reached sexual maturity. Different stages of sexual development were classified according to characteristics of the ejaculate and included first sperm in the ejaculate, puberty (>=50x106 sperm/ejaculate), and sexual maturity (two ejaculates with >=500x106 sperm/ejaculate). Average daily increases in all measured traits were similar in fall- and spring-born bulls and there were no

differences in age, body weight, scrotal circumference, or paired testis volume between groups at first sperm or puberty. However, fall-born bulls were older (P<0.05) than spring-born bulls at sexual maturity (553 days versus 481 days, respectively) as the interval between puberty and sexual maturity was longer (P<0.05) in fall- than in spring-born bulls (82 days versus 54 days, respectively). The prolonged interval between puberty and sexual maturity in fall-born calves coincided with a short photoperiod (winter) whereas the short interval between puberty and sexual maturity in spring-born calves coincided with a long photoperiod (summer). In conclusion, season of birth affected sexual development; photoperiod might be involved in regulating testicular function immediately after puberty in Brahman bulls.
Keywords: Brahman; Bulls; Puberty; Season

Matthieu Lesnoff, Geraud Laval, Pascal Bonnet, Karine Chalvet-Monfray, Renaud Lancelot, Francois Thiaucourt, A mathematical model of the effects of chronic carriers on the within-herd spread of contagious bovine pleuropneumonia in an African mixed crop-livestock system, Preventive Veterinary Medicine, Volume 62, Issue 2, 26 February 2004, Pages 101-117, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2003.11.009.
(http://www.sciencedirect.com/science/article/B6TBK-4BGHJ06-1/2/295b54304a14883121100b8aec0be6d2)
Abstract:
Contagious bovine pleuropneumonia (CBPP) is a respiratory disease of cattle; CBPP is caused by Mycoplasma mycoides subsp. mycoides small colony. CBPP is a major cause for concern for African countries (because of mortality, animal-production losses and cost of control). The clinical form of the disease is the more infectious (contagion occurs essentially through coughing). However, chronic lung lesions with viable mycoplasmas can persist in recovering cattle. Animals presenting these lesions might have a time-delimitated infectious phase. Such carriers are suspected to generate field outbreaks (although this hypothesis remains debated). We investigated the potential quantitative effects of these chronic carriers on the within-herd CBPP spread. Data were collected during a longitudinal field herd survey in a mixed crop-livestock system in the Ethiopian highlands. Two stochastic Markov-chain models' outputs (seroconversion dynamics, basic reproduction ratio R0, cumulative clinical incidence and risk of herd infection) were compared given different hypotheses on the carrier infectiousness. The late seroconversions observed in the field data were fitted correctly only for the highest carrier infectiousness we considered (mean chronic duration of 1 year and carriers 50-times less infectious than clinical cases). Although sensitivities (in terms of disease impact in the herd) were in general negligible when the carrier infectiousness was low (e.g. when carriers were assumed to be 1000-times less infectious than clinical cases), they rapidly became important when the infectiousness increased.
Keywords: Contagious bovine pleuropneumonia (CBPP); Within-herd spread; Markov-chain model; Chronic carriers; Ethiopia

G. F. W. Haenlein, M. A. Abdellatif, Trends in small ruminant husbandry and nutrition and specific reference to Egypt, Small Ruminant Research, Volume 51, Issue 2, Contribution of Goats to Mankind, February 2004, Pages 185-200, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2003.08.011.
(http://www.sciencedirect.com/science/article/B6TC5-49V7C52-1/2/33a0d957adf3e6c50fc0ea8919aea5f5)
Abstract:
Livestock numbers have changed around the world during the past decade; dairy cattle +1.3%, buffaloes +9.4%, beef cattle +5.1%, sheep -10.8%, goats +21.3%, chicken +26.6%, while the numbers of people increased by 12.1% during that time. In Egypt the population dynamics tells a different but interesting situation: dairy cattle -5.3%, buffaloes +12.1%, beef cattle +50.0%, sheep +29.9%, goats +32.8%, chicken +126.3%, while people numbers increased by 17.8%.

Nevertheless, there is a shortage of protein and calcium from animal sources produced in Egypt in comparison to nutritional requirements, and there is an increasing gap between dairy products produced domestically and the amount consumed. Production improvements can be achieved by using new genetic technology; by changing nutritional management towards greater intensification; by adopting elevated housing systems for better internal parasite control; by using body condition scoring for improved reproduction; by using linear type appraisal for better selection of heritable traits; by supplementing veterinary services with mail order supplies and paramedic training; and by seeking Extension Service support and workshop participation. Justification for greater intensification comes from research in many countries, which has demonstrated higher net income to small ruminant farmers when changing from extensive systems of management even in developing countries.
Keywords: Dairy goat production; Dairy sheep production; Small ruminants; Production improvement; Egypt

Outi Ruottinen, Tiina Ikonen, Matti Ojala, Associations between milk protein genotypes and fertility traits in Finnish Ayrshire heifers and first lactation cows, Livestock Production Science, Volume 85, Issue 1, January 2004, Pages 27-34, ISSN 0301-6226, DOI: 10.1016/S0301-6226(03)00123-4.
(http://www.sciencedirect.com/science/article/B6T9B-48Y08FX-1/2/eac43c580aad77ac03d99719c09408a7)
Abstract:
Effects of composite [beta]-[kappa]-casein genotypes and [beta]-lactoglobulin genotypes on age at first insemination and length of service period of 17,059 Finnish Ayrshire heifers, and on days from calving to first insemination and length of service period of 17,869 first lactation cows were estimated. A mixed linear model under an animal model was assumed. The effect of the [beta]-[kappa]-casein genotypes on days from calving to first insemination (DFI) was statistically significant. The difference in DFI between the rare extreme [beta]-[kappa]-casein genotypes A1A2BB and A1A2EE was about 19 days (0.75 phenotypic standard deviation), but the standard errors of the effects of these genotypes were large. Between the most frequent [beta]-[kappa]-casein genotypes the differences in DFI were negligible. The other reproduction traits studied were not affected by composite [beta]-[kappa]-casein genotypes or [beta]-lactoglobulin genotypes. Based on the results presented in this study, selection based on [beta]-[kappa]-casein and [beta]-lactoglobulin polymorphism should thus have no substantial impact on fertility of Finnish Ayrshire heifers and cows.
Keywords: Milk protein; Genotype; Reproduction; Finnish Ayrshire; Dairy cattle