Subjek : Nutrisi Ternak
Tahun 2004-2008 (68 judul)

Ariel Shabtay, Yitzhak Hadar, Harel Eitam, Arieh Brosh, Alla Orlov, Yaakov Tadmor, Ido Izhaki, Zohar Kerem, The potential of Pleurotus-treated olive mill solid waste as cattle feed, Bioresource Technology, Volume 100, Issue 24, December 2009, Pages 6457-6464, ISSN 0960-8524, DOI: 10.1016/j.biortech.2009.07.044.
(http://www.sciencedirect.com/science/article/B6V24-4X0W4KT-1/2/cf1d874208ece61b494ca102dca23a0f)
Abstract:
The aims of the current study were to follow: (1) the capability of the edible mushroom Pleurotus ostreatus to degrade cell wall components and soluble phenols of the olive mill solid waste (OMSW), and improve it for ruminant nutrition (2) the fate of oil and the lipid-soluble compounds tocopherols, squalene and [beta]-sitosterol in the fermented OMSW. A significant decrease in oil and lipid-soluble compounds with a concomitant shift in the fatty acid profile and degradation of soluble phenols took place already after 14 d. The utilization of lipids by the fungus shifted the degradation of the structural carbohydrates to a later stage, and significantly reduced the metabolizable energy of the OMSW. We propose that edible fungi with reduced lipase activity would preserve the energy and health promoting ingredients of the oil, and force the fungus to degrade structural carbohydrates, thus improving its digestibility.
Keywords: Pleurotus ostreatus; Olive mill solid waste; Cattle nutrition; Squalene; Phenols

A.A. Kimaro, V.R. Timmer, S.A.O. Chamshama, Y.N. Ngaga, D.A. Kimaro, Competition between maize and pigeonpea in semi-arid Tanzania: Effect on yields and nutrition of crops, Agriculture, Ecosystems & Environment, Volume 134, Issues 1-2, November 2009, Pages 115-125, ISSN 0167-8809, DOI: 10.1016/j.agee.2009.06.002.
(http://www.sciencedirect.com/science/article/B6T3Y-4WNWW2R-1/2/989854520baaeffd03a55e7a55d90932)
Abstract:
Productivity of maize-pigeonpea cropping systems is dependent on facilitative and competitive interactive effects on resource availability. Controlling these interactions may benefit farmers through increased productivity associated with optimized crop yields. Previous research on maize-pigeonpea culture in Sub-Saharan Africa has focused on yield and soil fertility, but provided inadequate information on the mechanisms of possible interspecific competition. We employed a factorial field experiment to examine yield and nutritional responses of maize and pigeonpea to cropping systems (sole maize, intercropping, and improved fallow), N and P fertilizer additions, and cattle manure additions in Dodoma, Tanzania. The study objectives were to assess competition between crops and to determine how manure or fertilizer inputs may mitigate such interactions to improve yields. Intercropping enhanced maize yield over sole maize only when fertilized, reflecting probable nutrient competition. Improved fallows alone or with fertilizers (1.2-1.6 Mg ha-1) increased maize yields over sole maize (0.6 Mg ha-1). These increases were attributed to pigeonpea facilitation through soil nutrient replenishment, reduced competition associated with sequential cropping arrangements, and added nutrients from fertilization. Combined fertilizer and manure applications also improved maize and pigeonpea yields. Plant nutrient diagnosis indicated primary and secondary P and Ca deficiencies, respectively associated with P-fixation and leaching of cations due to high soil acidity and exchangeable Al. Maize competed strongly in mixture suppressing biomass and grain yields of the unfertilized pigeonpea by 60% and 33%, respectively due to limited soil nutrients and/or moisture. These yield reductions suggest that the intercropped

pigeonpea did not recover from competition after maize harvesting that reduced competition. Optimizing yields of both maize and pigeonpea would require the addition of prescribed fertilizer when intercropped, but applications can be reduced by half under the improved fallow system due to alleviating interspecific competition.
Keywords: Fertilizer; Improved fallows; Manure; Soil fertility; Vector analysis

O.D. Vergara, M.A. Elzo, M.F. Ceron-Munoz, E.M. Arboleda, Weaning weight and post-weaning gain genetic parameters and genetic trends in a Blanco Orejinegro-Romosinuano-Angus-Zebu multibreed cattle population in Colombia, Livestock Science, Volume 124, Issues 1-3, September 2009, Pages 156-162, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.01.008.
(http://www.sciencedirect.com/science/article/B7XNX-4VJJWJT-3/2/0fd7c68332c4cba72e97dc34b92512ad)
Abstract:
Genetic parameters and genetic trends for weaning weight adjusted to 240 d of age (WW240), and weight gain from weaning to 24 mo of age (GW730) were estimated in a Colombian beef cattle population composed of Blanco Orejinegro, Romosinuano, Angus, and Zebu straightbred and crossbred animals. Calves were born and weaned in a single farm, and moved to 14 farms postweaning. Data were analyzed using a multiple trait mixed model procedures. Estimates of variance components and genetic parameters were obtained by Restricted Maximum Likelihood. The 2-trait model included the fixed effects of contemporary group (herd-year-season-sex), age of dam (WW240 only), breed direct genetic effects (as a function of breed fractions of calves), breed maternal genetic effects (as a function of breed fractions of dams; WW240 only), individual heterosis (as a function of calf heterozygosity), and maternal heterosis (as a function of dam heterozygosity; WW240 only). Random effects for WW240 were calf direct genetic, dam maternal genetic, permanent environmental maternal, and residual. Random effects for GW730 were calf direct genetic and residual. All relationships among animals were accounted for. Program AIREML was used to perform computations. Estimates of heritabilities for additive direct genetic effects were 0.20 +/- 0.003 for WW240, and 0.32 +/- 0.004 for GW730. Maternal heritability was 0.14 +/- 0.002 for WW240. Estimates of heritability suggest that selection for preweaning and postweaning growth in this population is feasible. Low direct and maternal preweaning heritabilities suggest that nutrition and management should be improved to allow fuller expressions of calf direct growth and cow maternal ability. The genetic correlation between direct additive and maternal additive effects for WW240 was - 0.42 +/- 0.009, indicating an antagonistic relationship between these effects. The correlation between additive direct genetic effects for WW240 and GW730 was almost zero (- 0.04 +/- 0.009), suggesting that genes affecting growth preweaning may differ from those influencing growth postweaning. Trends were negative for direct WW240 and GW730 weighted yearly means of calves, sires, and dams from 1995 to 2006. Maternal WW240 showed near zero trends during these years. Trends for calf direct WW240 and GW730 followed sire trends closely, suggesting that more emphasis was placed on choosing sires than on dam replacements.
Keywords: Beef cattle; Criollo; Multibreed; Genetic parameters; Genetic trends

T.M. Sullivan, G.C. Micke, R.S. Magalhaes, N.J. Phillips, V.E.A. Perry, Dietary protein during gestation affects placental development in heifers, Theriogenology, Volume 72, Issue 4, 1 September 2009, Pages 427-438, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2009.03.018.
(http://www.sciencedirect.com/science/article/B6TCM-4WK3YDF-1/2/b768d646837af8497070ffca4b641416)
Abstract:
The influence of nutritional protein during the first and second trimesters of pregnancy on placental measures at term and caruncle numbers in the uteri of adult offspring was determined in composite beef heifers. At artificial insemination (AI), heifers were divided by weight and composite genotype into four dietary treatment groups, identified by the level of protein

components fed during the first and second trimesters: high/high (HH), high/low (HL), low/high (LH), low/low (LL). Expelled placentas were collected and weighed, and cotyledons were dissected, counted, weighed, and measured. Uteri from mature female offspring were dissected at slaughter and caruncles counted. The number of cotyledons in the expelled placenta was increased by high dietary protein in the second trimester (P = 0.02) and varied with genotype (P = 0.03). Placental weight was influenced by maternal undernutrition during early gestation dependent on dam genotype (P = 0.001). Placental efficiency, as determined by calf weight:placental weight, increased with dam age (P = 0.03). Calf birth weight was closely associated with placental weight (P = 0.002) and cotyledonary weight (P = 0.001) and surface area (P = 0.04), but not with the number of cotyledons. Leptin concentrations during early (R = -0.29) and late gestation (R = -0.25) correlated with placental weight, and Insulin-like growth factor binding proteins throughout gestation correlated with the number of cotyledons (R = -0.28 to-0.33). The number of uterine caruncles in the nonpregnant adult offspring did not correlate with the dam's genotype, nutrition treatment, or cotyledon number in the expelled placenta.
Keywords: Cattle; Dietary protein; Fetal development; Nutrition; Placenta

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

B. Campion, M.G. Keane, D.A. Kenny, D.P. Berry, Evaluation of estimated genetic merit for carcass weight in beef cattle: Blood metabolites, carcass measurements, carcass composition and selected non-carcass components, Livestock Science, In Press, Corrected Proof, Available online 9 July 2009, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.06.003.
(http://www.sciencedirect.com/science/article/B7XNX-4WR0D4C-1/2/6fb8fa6243dc651343f3a94682cdef67)
Abstract:

In Ireland, a new beef genetic index has been developed. Growth rate is expressed as expected progeny difference for carcass weight (EPDCWT) and is estimated on an across-breed basis. Cross-breeding of dairy cows with both Aberdeen Angus and Belgian Blue beef sires is widely practised. The objective of this study was to compare blood metabolites, slaughter traits and carcass composition of progeny from Holstein-Friesian dairy cows and Aberdeen Angus (AA), Belgian Blue (BB), Friesian (FR) and Holstein (HO) sires. The AA and BB sires were selected, within breed, to be of either high (H) or low (L) estimated genetic merit for carcass weight. A total of 170 male progeny from spring-calving cows and 42 sires (10 AA, 13 BB, 7 FR and 12 HO) were artificially reared indoors and managed together until the end of their second grazing season when they were assigned to either a Light (560 kg) or Heavy (620 kg) slaughter weight. Blood metabolite concentrations were measured six times throughout life and feed intake was recorded during the first and second winter. Carcass measurements and selected non-carcass components were recorded after slaughter and the right side of each carcass was dissected into lean, fat and bone. Differences in blood metabolite concentrations amongst genetic groups were negligible although there were some effects of the prevailing level of nutrition. M. longissimus area scaled for carcass weight was 0.220, 0.221, 0.260, 0.255, 0.212 and 0.208 (SE 0.004) cm2/kg for AAH, AAL, BBH, BBL, FR and HO, respectively. Carcass measurements scaled for carcass weight were greater for L, AA, HO and the dairy strains than for H, BB, FR and the beef breeds, respectively. There was no effect of estimated genetic merit for carcass weight on carcass composition. Statistically significant interactions between genetic merit and beef breed existed for some traits with the genetic merit effect largely evident for AA only. BB and the beef breeds had more lean, less fat and more high value lean in the carcass than AA and the dairy strains, respectively. It is concluded that genetic group had little effect on blood metabolite concentrations but there were some feeding level effects. Estimated genetic merit for carcass weight affected carcass weight, m. longissimus area and carcass measurements scaled for carcass weight but the effects were confined to AA. There were large effects of beef breed and dairy strain on carcass composition.
Keywords: Beef breeds; Cattle; Carcass composition; Genetic merit; Growth

Mohammad Hosein Movassagh Ghazani, Aflatoxin M1 contamination in pasteurized milk in Tabriz (northwest of Iran), Food and Chemical Toxicology, Volume 47, Issue 7, July 2009, Pages 1624-1625, ISSN 0278-6915, DOI: 10.1016/j.fct.2009.04.011.
(http://www.sciencedirect.com/science/article/B6T6P-4W45WNR-1/2/815f75251466177c34dcc4086030e244)
Abstract:
Aflatoxin M1 (AFM1) appears in milk as a direct result of the ingestion of food contaminated with aflatoxin B1 by cattle. The role of milk in human nutrition is well-known. The aim of this study was to evaluate Aflatoxin M1 contamination in pasteurized milk samples in Tabriz city (Iran) by ELISA (Enzyme Linked Immunosorbent Assay). Fifty pasteurized milk samples from different supermarkets in Tabriz city were collected during 6 months (July to December 2008). AFM1 was found in 100% of the examined milk samples. Sixty-two percent of the samples had AFM1 greater than the maximum tolerance limit (50 ng/l) accepted by European Union. It can be concluded that AFM1 levels in the samples purchased in Tabriz city, appear to be a serious public health problem at the moment. To achieve a low level of AFM1 in milk, dairy cows' feed samples from various cows' herds must be controlled periodically for aflatoxin and kept away from fungal contamination as much as possible.
Keywords: Aflatoxin M1; Pasteurized milk; ELISA; Tabriz

T. Levital, A.F. Mustafa, P. Seguin, G. Lefebvre, Effects of a propionic acid-based additive on short-term ensiling characteristics of whole plant maize and on dairy cow performance, Animal Feed Science and Technology, Volume 152, Issues 1-2, 10 June 2009, Pages 21-32, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2009.03.010.

(http://www.sciencedirect.com/science/article/B6T42-4W1SGG6-1/2/81b5a4502cf6b4df223313ff6072ef58)

Abstract:
Dairy cattle producers occasionally face situations where it is necessary to open silos before the completion of ensiling process due to feed shortage. The objectives of this study were to determine the effects of a propionic acid additive (i.e., Solution Foin; 700 ml/L propionic acid and 300 ml/L NH4OH) on ensiling characteristics, aerobic stability and feeding value of short-term ensiled forage maize. Chopped whole maize was left untreated or treated with the additive. The additive was added prior ensiling at a rate of 5 L/ton (wet basis). Treated and untreated forages were placed in plastic silo bags, which were opened 1 day after ensiling and sampled daily for 30 consecutive days. Animal performance was determined using lactating cows fed total mixed ration with the major forage portion consisted of untreated or treated maize. The feeding study started 2 day post-ensiling. The additive reduced ($P<0.05$) yeast and mold populations between day 5 and day 14 post-ensiling. The largest differences were observed on day 10, where yeast and mold populations for untreated ensiled maize were 7.86 and 2.51 log colony forming unit/g, respectively, the corresponding values for treated maize were 4.35 and 0 log colony forming unit/g, respectively. The additive improved ($P<0.05$) aerobic stability between day 0 (by 159 h) and day 10 (by 33 h) post-ensiling. No differences in pH or concentrations of organic acids were observed between treated and untreated maize. Dry matter intake (average 23 kg/d) and milk yield (average 29 kg/d) were similar for cows fed treated and untreated maize. Solution Foin can be used to improve the aerobic stability of partially ensiled maize, likely by reducing yeast and mold populations. However, the additive had no positive effects on silage fermentation or dairy cow performance.
Keywords: Maize; Ensiling; Propionic acid; Yeast; Mold; Aerobic stability; Ruminant nutrition

S. Koonawootrittriron, M.A. Elzo, T. Thongprapi, Genetic trends in a Holstein x other breeds multibreed dairy population in Central Thailand, Livestock Science, Volume 122, Issues 2-3, June 2009, Pages 186-192, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.08.013.
(http://www.sciencedirect.com/science/article/B7XNX-4TK2VJP-3/2/4b46ec1ce429665027c162da734e2bca)

Abstract:
Genetic variability and genetic trends for 305-day milk yield (MY), 305-day fat yield (FY), and average 305-day fat percent (FP) were evaluated using monthly test-day records from first-lactation cows collected from 1991 to 2005 in 92 farms located in Central Thailand. Estimates of variance and covariance components and breeding values (EBV) were obtained using a multiple-trait animal model. Fixed effects were contemporary group (herd-year-season), calving age, additive genetic group as a function of Holstein fraction, and non-additive genetic group as function of heterosis effect. Random effects were animal and residual. Program ASREML was used to perform computations. Estimates of heritabilities were 0.38 +/- 0.10 for MY, 0.25 +/- 0.11 for FY, and 0.22 +/- 0.11 for FP. Although the difference between the mean MY for cows in 1991 and 2005 was 324.1 kg, the regression of mean cow EBV for MY on year was 6.5 kg/year. Differences between mean cow EBV for FY and FP in 1991 and 2005 and their corresponding regressions of mean FY and FP on year were all near zero. Similarly, mean EBV for sires and dams of cows also showed near zero trends during these years. A factor contributing to the near complete absence of genetic trends was likely the variety of criteria used by producers to choose sires and to keep dams in addition to EBV (e.g., availability of semen, reproductive ability, adaptation to hot and humid conditions). It also appears that high percent Holstein cows failed to reach their production potential under the management, nutrition, and hot and humid climatic conditions in this tropical region. Changes in nutrition and management would be needed for high percent Holstein cows to show an upward trend in Central Thailand.
Keywords: Cattle; Dairy; Genetic trends; Thailand; Tropical

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

Rebecca Phillips, Ofer Beeri, Eric Scholljegerdes, David Bjergaard, John Hendrickson, Integration of geospatial and cattle nutrition information to estimate paddock grazing capacity in Northern US prairie, Agricultural Systems, Volume 100, Issues 1-3, April 2009, Pages 72-79, ISSN 0308-521X, DOI: 10.1016/j.agsy.2009.01.002.
(http://www.sciencedirect.com/science/article/B6T3W-4VKVC2F-1/2/f331c355128d935724ecd284a85f2d30)
Abstract:
Spatiotemporal variability in forage quantity and quality requires that regular assessment is needed of the capacity for grasslands to support livestock nutritional requirements. Current methods for estimating grazing capacity are typically production-based and lack the forage quality data necessary to match nutrients in forage with livestock requirements in real time. This paper describes a method for estimating short-term grazing capacity for small (1-20 ha) paddocks using cattle nutrition and high spatial resolution forage data in Geographic Information Systems (GIS) for mixed-grass prairie. We define grazing capacity as the number of days a specific paddock will support the nutritional requirements of beef cattle. We integrate previously published methods for estimating cattle nutritional requirements, forage quality (crude protein) and forage quantity (phytomass) to estimate grazing capacity based on current standing-crop. The model utilizes high-resolution (<30-m) satellite imagery or field data to estimate short-term grazing capacity for small paddocks. Three versions of the model were evaluated on one paddock under cattle use in 2007. One version was parameterized using data collected on June 22 from the Landsat Thematic Mapper (TM), one version was parameterized using data collected June 23 from the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER), and one version was parameterized using data collected June 20 from field clippings. TM and ASTER versions underestimated grazing capacity by four days while the field version overestimated grazing capacity by one day. Results suggest integration of cattle nutrition and forage data in GIS could assist with stocking rate adjustments, but additional trials are needed.
Keywords: Landsat thematic mapper; Advanced spaceborne thermal emission and reflection radiometer; ASTER; Livestock; Grassland; Remote sensing; Grazing capacity

G.C. Micke, T.M. Sullivan, R.J. Soares Magalhaes, P.J. Rolls, S.T. Norman, V.E.A. Perry, Heifer nutrition during early- and mid-pregnancy alters fetal growth trajectory and birth weight, Animal Reproduction Science, In Press, Corrected Proof, Available online 1 April 2009, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2009.03.010.
(http://www.sciencedirect.com/science/article/B6T43-4VYXMM7-2/2/fa6737e5701727b7c6b8602e99edc33a)
Abstract:
Maternal nutrient intake during gestation can alter fetal growth. Whilst this has been studied extensively in the sheep, less is known about effects in the bovine. Composite-breed beef heifers were allocated to either a high (H/- = 76 MJ metabolisable energy (ME) and 1.4 kg crude protein (CP)) or low (L/- = 62 MJ ME and 0.4 kg CP daily) nutritional treatment at artificial insemination. Half of each nutritional group changed to an opposite nutritional group at the end of the first trimester (-/H = 82 MJ ME and 1.4 kg CP; -/L = 62 MJ ME and 0.4 kg CP daily), resulting in 4 treatment groups: HH (n = 16); HL (n = 19); LH (n = 17); LL (n = 19). During the third trimester all heifers were fed the same diets. Fetuses were measured at 4-weekly intervals beginning at day 39 of gestation. Calves were also measured at birth for physical body variables. Low maternal nutrient intake was associated with decreased crown-rump length at day 39 ($P < 0.01$) and increased thoracic diameter at day 95 ($P < 0.01$). Umbilical cord diameter was reduced in L/- fetuses in the first trimester ($P < 0.05$) but was greater in -/L fetuses in the second trimester compared to their respective H counterparts ($P < 0.05$). Calf birth weight was decreased in association with -/L maternal diets ($P < 0.05$). In conclusion, fetal development of cattle may be affected by maternal nutrition as early as day 39 of gestation. This may be followed by either compensatory fetal growth, or alternatively, preferential fetal tissue growth that is dependant upon maternal nutrition. Clearly, calf birth weight may be altered by maternal nutrition during mid-gestation.
Keywords: Beef heifers; Cattle pregnancy; Development; Fetal biometry; Nutrition

S. McDougall, K.I. Parker, C. Heuer, C.W.R. Compton, A review of prevention and control of heifer mastitis via non-antibiotic strategies, Veterinary Microbiology, Volume 134, Issues 1-2, Special Issue: Heifer and CNS Mastitis, 16 February 2009, Pages 177-185, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2008.09.026.
(http://www.sciencedirect.com/science/article/B6TD6-4TF2J2V-B/2/7e8d2865388ce6ecf629f2b995b15e26)
Abstract:
Clinical and subclinical mastitis is a significant problem in primiparous dairy cattle (heifers) with a higher prevalence and incidence in heifers than cows, especially early in lactation. Differences in management (e.g. nutrition, pasturing, no use of dry cow therapy) as well as differences in physiological status (e.g. continuing growth in heifers) are likely contribute to the observed differences between heifers and cows. These differences may result in the requirement for different approaches for mastitis management in heifers than for cows.
Mastitis is a multifactorial disease, hence control requires an understanding of the risk factors before effective interventions can be defined. Control strategies are aimed at reducing the incidence of new intramammary infections and eliminating existing infections. Potential strategies can include improved environmental and animal hygiene, application of internal and external teat sealants, prepartum application of teat antiseptics, prepartum milking and control of horn fly in environments where it acts as vector. Other less well-proven strategies to control heifer mastitis include management of heifers as a physically separate group from older cows and not feeding mastitic milk to calves.
It is concluded that several well-proven strategies are available to manage heifer mastitis. However, further research is likely to improve understanding of heifer mastitis and lead to novel managerial approaches to mastitis control in this age group.
Keywords: Heifer; Mastitis; Control; Teat sealants

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

Marcia Saladini Vieira Salles, Marcus Antonio Zanetti, Evaldo Antonio Lencioni Titto, Renata Maria Consentino Conti, Effect of monensin on performance in growing ruminants reared under different environmental temperatures, Animal Feed Science and Technology, Volume 147, Issue 4, 15 December 2008, Pages 279-291, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2008.01.008.
(http://www.sciencedirect.com/science/article/B6T42-4S26RRR-1/2/b0247507efe30ade2767491951a5bddd)
Abstract:
To evaluate the effect of monensin on the performance of growing cattle under different environmental temperatures, 24 male calves (81.9 +/- 7.7 kg mean weight and 100 days old) were distributed in a 2 x 2 factorial arrangement, contrasting 0 or 85 mg monensin/animal per day at 24.3 or 33.2 [degree sign]C (environmental temperatures). Monensin supplementation increased weight gain (P=0.036), improved feed efficiency (P=0.040), increased ruminal concentrations of volatile fatty acids (VFA; P=0.003) and decreased the molar proportion of butyrate (P=0.034); all effects irrespective of environmental temperatures. A temperature-dependent monensin effect was

detected on nitrogen retention (P=0.018) and N retained:N absorbed ratio (P=0.012). Animals fed monensin retained higher N amounts than those of the non-supplemented ones when the environmental temperature was 33.2 [degree sign]C. Environmental temperature and monensin supplementation showed an interaction effect on urine N concentration (P=0.003). Temperature did not affect N excretion in monensin-fed animals, but increased N excretion in the non-supplemented ones. Monensin increased the crude protein (CP) digestibility (P=0.094) for animals at both temperatures. In conclusion, monensin changes the metabolism of the heat-stressed animals by increasing rumen VFA concentration, digestibility and protein retention, thus improving food use and weight gain.
Keywords: Ammoniacal nitrogen; Digestibility; Feed efficiency; Nutrition; Volatile fatty acids; Weight gain

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

G.S. Coyne, D.A. Kenny, S. Childs, J.M. Sreenan, S.M. Waters, Dietary n-3 polyunsaturated fatty acids alter the expression of genes involved in prostaglandin biosynthesis in the bovine uterus, Theriogenology, Volume 70, Issue 5, 15 September 2008, Pages 772-782, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2008.05.048.
(http://www.sciencedirect.com/science/article/B6TCM-4SV6PBR-3/2/0c624f8e150e7e6109352cd541f69d80)
Abstract:
Nutrition plays a critical role in the regulation of cow fertility. There is emerging evidence that dietary long chain n-3 polyunsaturated fatty acids (LC n-3 PUFA) may act as specific regulators of some reproductive processes. In vitro studies suggest that the n-3 PUFAs, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) may play pivotal roles by suppressing the synthesis of uterine prostaglandin F2[alpha] (PGF2[alpha]) which is centrally involved in the control of the bovine oestrous cycle and in early embryo survival. The objective of the current study was to determine the effect of dietary inclusion of n-3 PUFA on uterine endometrial mRNA expression of key genes regulating PGF2[alpha] biosynthesis. Beef heifers were fed either a low (CON; n = 10) or high (HIGH PUFA; n = 10) n-3 PUFA diet for 45 days and endometrial tissues were harvested following slaughter. Following analysis, tissues within each dietary group were ranked on the basis of their PUFA concentrations and the highest (n = 7) and lowest (n = 7) within each of HIGH PUFA and CON, respectively, were used in gene expression studies. Endometrial n-3 PUFA concentrations were more than two-fold higher ($P < 0.05$) and EPA concentrations alone more than seven-fold higher ($P < 0.01$) in the HIGH PUFA than the CON group. Endometrial concentrations of arachidonic acid, were lower ($P < 0.001$) in the tissues from HIGH PUFA than

those from the CON group. Total RNA was isolated from all endometrial tissues and real-time reverse transcription (RT) PCR conducted to compare the relative expression of 11 genes with known involvement in uterine biosynthesis of 2-series prostaglandins. Expression of mRNA for prostaglandin E synthase (PGES) and peroxisome proliferator-activated receptors, PPAR [alpha] and [delta] was increased ($P < 0.05$) while mRNA expression of phospholipase A2 (PLA2) was decreased ($P = 0.06$) in the HIGH PUFA endometrial tissues. Expression of genes coding for the oxytocin receptor (OTR), phospholipase C (PLC), cyclooxygenase-1 (COX-1), cyclooxygenase-2 (COX-2), PGE2 9-ketoreductase (9-KPR), prostaglandin F synthase (PGFS), and the nuclear transcription factor, PPAR [gamma] was not different ($P > 0.05$) between HIGH PUFA and CON tissues. Overall the results indicate that key genes regulating uterine PGF2[alpha] biosynthesis can be regulated by dietary inclusion of LC n-3 PUFA which may influence uterine function and embryo survival.
Keywords: n-3 PUFA; Prostaglandin; Uterus; Gene expression; Cattle

Audun Korsaeth, Relations between nitrogen leaching and food productivity in organic and conventional cropping systems in a long-term field study, Agriculture, Ecosystems & Environment, Volume 127, Issues 3-4, September 2008, Pages 177-188, ISSN 0167-8809, DOI: 10.1016/j.agee.2008.03.014.
(http://www.sciencedirect.com/science/article/B6T3Y-4SG017R-1/2/fadfbd846472b5edee233faeed3d56c8)
Abstract:
An ideal agricultural system should both maximize food production and minimize undesirable effects on the environment. The long-term Apelsvoll cropping system experiment, located in southeast Norway, was used in this study, to compare yields, major N flows (in particular measured leaching/runoff losses) and the N loss-to-food production ratios (LFP-ratios) in six different cropping systems over a 4-year period. The experiment included three systems with cash-cropping (CA1: conventional arable farming; CA2: arable farming practice with environmentally sound management; OA: organic arable farming with 25% of the area as green manure, and three systems with both arable and fodder crops, representing mixed dairy production (CM: conventional farming practice with 50% grass-clover ley; OM1: organic farming with 50% grass-clover ley; OM2: organic farming with 75% grass-clover ley). The forage production was assumed to be used for milk and meat production, in amounts calculated on the basis of available feed and estimated requirements for dairy cattle. All farm produce (cereals, potatoes, milk and meat) was converted into metabolizable energy for human consumption. Organic cropping gave significantly lower yields than conventional cropping, for both arable and mixed dairy systems, most likely due to sub-optimal plant nutrition and the lack of plant protection in the organic systems. The average net energy production in CA1 and CA2 was 2.4-5.3 times greater than that in the other systems, which illustrates the energy costs of taking 25% of the area out of food production to produce green manure (OA) and the energy cost of including an extra trophic level in the nutrient chain (CM, OM1 and OM2). Only CA2 and CM appeared to have a balanced N budget, whereas the other systems all had N deficits, in particular CA1 and OA. The total N losses to drainage were largest from CA1, but not significantly larger than those from OA, which had the largest N runoff of the systems, most likely due to the green manure in its rotation. The conventional system with environmentally sound management (CA2) had the lowest LFP-ratios overall. Among the arable cropping systems, the organic system with 25% green manure (OA) had the highest LFP-ratios. The mixed dairy systems had generally higher LFP-ratios than the arable systems. Including leaching/runoff N losses in the LFP-ratio, CA1, CA2, OA, CM, OM1 and OM2 appeared to lose 0.6, 0.4, 1.1, 0.9, 1.2 and 1.1 kg N, respectively, per GJ of produced metabolizable energy for human consumption.
Keywords: Arable cropping systems; Cereal yields; Human nutrition; Food production; Loss-to-production ratios; Mixed dairy systems; Net energy production; Nitrogen budgets; Yields

L. Castillejos, S. Calsamiglia, J. Martin-Tereso, H. Ter Wijlen, In vitro evaluation of effects of ten essential oils at three doses on ruminal fermentation of high concentrate feedlot-type diets, Animal Feed Science and Technology, Volume 145, Issues 1-4, Enzymes, Direct Fed Microbials and Plant Extracts in Ruminant Nutrition, 14 August 2008, Pages 259-270, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.037.
(http://www.sciencedirect.com/science/article/B6T42-4PFFD14-1/2/c3fa5adbc9ad5798344b2e1722f00906)
Abstract:
Use of antibiotics as growth promoters in animal feeds has been banned in the European Union due to increasing concerns about the appearance of residues in meat and milk and antibiotic resistant strains of bacteria. Some essential oils (EO) modify rumen microbial activity and appear to be a `natural' alternative to modify rumen microbial fermentation. Effects of 10 EO (i.e., clove leave, hyssop, lavandin, lavender, thyme, oregano, rosemary, sage, savory, tea tree) were evaluated in in vitro 24 h batch culture of diluted rumen fluid [Tilley, J.M.A., Terry, R.A., 1963. A two stage technique for the in vitro digestion of forage crops. J. Brit. Grassland Soc. 18, 104-111] at pH 6.50. A 10:90 forage:concentrate diet (161 g/kg CP; 320 g/kg NDF; 380 g/kg starch on a dry matter basis) typically fed to beef cattle in a barley grain based beef system was used as substrate. Treatments were: negative control (CTR), positive control (10 mg/l of monensin), and three doses of each EO (5, 50, 500 mg/l). After 24 h, pH was determined in the culture fluid and samples were analyzed for ammonia N and volatile fatty acid (VFA) concentrations. Monensin increased VFA concentration, and propionate and valerate proportions, and decreased acetate and butyrate proportions, the acetate to propionate ratio and ammonia N concentration. Lavender oil did not modify rumen microbial fermentation and lavandin and oregano (500 mg/l) inhibited rumen microbial fermentation thereby decreasing VFA concentration, which suggests that these EO may not be beneficial in beef cattle nutrition. However, the lower doses of oregano oil increased VFA concentration by 39-56%. Thyme and savory oils increased VFA concentration, and decreased ammonia N concentration and final pH. The 500 mg/l doses of rosemary, hyssop, sage, tea tree and clove leaf oils acted similar to monensin by increasing propionate and valerate proportion, and reducing acetate and butyrate proportions and the acetate to propionate ratio without reducing VFA concentration. Clove leaf oil at 500 mg/l increased total VFA and was the only EO that increased final pH. Most of these EO modified rumen microbial fermentation and may allow manipulation of rumen fermentation to improve animal performance.
Keywords: Essential oil; Rumen fermentation

E.B.N. Graminha, A.Z.L. Goncalves, R.D.P.B. Pirota, M.A.A. Balsalobre, R. Da Silva, E. Gomes, Enzyme production by solid-state fermentation: Application to animal nutrition, Animal Feed Science and Technology, Volume 144, Issues 1-2, 23 June 2008, Pages 1-22, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.09.029.
(http://www.sciencedirect.com/science/article/B6T42-4R5G85C-2/2/1fd86a43b63f43a2b83db56412ba546e)
Abstract:
Many microorganisms that decompose lignocellulosic material are being studied as producers of enzymes to perform enzymatic hydrolysis of the lignocellulosic material present in residues from the agroindustries. Although the cellulose and hemicellulose present in these materials have their value for feeding cattle, their bioavailability requires breakdown of the bonds with indigestible lignin. Pre-digestion of such materials with ligninases, xylanases and pectinases (cellulase free) may transform the lignocellulosic substrate into a feed with greater digestibility and higher quality for ruminants. This review provides an overview of variables to be considered in the utilization of fungal plant-depolymerizing enzymes produced by solid-state fermentation from agricultural production residues in Brazil.

Keywords: Animal nutrition; By-products; Enzymes; Solid-state fermentation; Thermophilic fungi

S.A. Knott, L.J. Cummins, F.R. Dunshea, B.J. Leury, The use of different models for the estimation of residual feed intake (RFI) as a measure of feed efficiency in meat sheep, Animal Feed Science and Technology, Volume 143, Issues 1-4, Mathematical Models that Predict the Effects of Feed Characteristics on Animal Performance, 22 May 2008, Pages 242-255, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.013.
(http://www.sciencedirect.com/science/article/B6T42-4P47V2M-1/2/35534079eea342888e85e8831f37f9db)
Abstract:
The concept of residual feed intake (RFI), in determining differences among animals in converting feed into body tissue, was first raised in 1963. Feed efficiency is typically calculated as a function of liveweight gain (LWG) and feed intake (FI). Historically two versions of the same model were proposed, one where FI was adjusted for liveweight (LW) and LWG, and the other where LWG was adjusted for FI and LW. Variation in LWG or FI could then be partitioned into two parts; that which is expected and can be attributed to differences in FI or LWG; and that which is the residual portion, which is the deviation from the expected value based on regression, and therefore not accounted for by differences in FI or LWG. Based on this definition, it is the residual portion which is the measure of efficiency. Both within a livestock industry and between different livestock industries there is no set model for calculating RFI. This paper evaluated four models used to calculate RFI and one model used to calculate residual LWG (RLWG) at a standard level of nutrition. They were the main model currently in use in the Australian beef cattle industry (RFIB), the original models proposed in 1963 (RFI1963; RLWG1963); a French model which included ultrasound measures of muscle and fat depth (RFIF) and the use of the Australian feeding standards to calculate predicted intake and thus RFI (RFISCA). Using feed intake, liveweight and body composition data generated from the same group of sheep (n = 52) at two ages (6 mo, 13 mo), the relative merits of each model were evaluated and compared to the other models, to determine the most appropriate model to calculate RFI for sheep. For all the models except that used to calculate RLWG, over half of the variation in FI could be explained by the model. The amount of variation in FI accounted for depended on the parameters included and the dataset, with less variation in FI explained by the specific models in the older animals. The RFIF model, which included measures of body composition, accounted for the greatest proportion of the variation in FI and as such suggests that the inclusion of body composition parameters is likely to more accurately reflect true biological efficiency.
Keywords: Residual feed intake; Sheep; Model; Feed efficiency

J.D. Wood, M. Enser, A.V. Fisher, G.R. Nute, P.R. Sheard, R.I. Richardson, S.I. Hughes, F.M. Whittington, Fat deposition, fatty acid composition and meat quality: A review, Meat Science, Volume 78, Issue 4, April 2008, Pages 343-358, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.07.019.
(http://www.sciencedirect.com/science/article/B6T9G-4P7R8D5-5/2/9207a43d00ed100e5ee91ed47c0d0e3c)
Abstract:
This paper reviews the factors affecting the fatty acid composition of adipose tissue and muscle in pigs, sheep and cattle and shows that a major factor is the total amount of fat. The effects of fatty acid composition on meat quality are also reviewed. Pigs have high levels of polyunsaturated fatty acids (PUFA), including the long chain (C20-22) PUFA in adipose tissue and muscle. The full range of PUFA are also found in sheep adipose tissue and muscle whereas cattle `conserve' long chain PUFA in muscle phospholipid. Linoleic acid (18:2n - 6) is a major ingredient of feeds for all species. Its incorporation into adipose tissue and muscle in relation to the amount in the diet is greater than for other fatty acids. It is deposited in muscle phospholipid at a high level where it and

its long chain products eg aracidonic acid (20:4n - 6) compete well for insertion into phospholipid molecules. Its proportion in pig adipose tissue declines as fat deposition proceeds and is an index of fatness. The same inverse relationships are not seen in ruminant adipose tissue but in all species the proportion of 18:2n - 6 declines in muscle as fat deposition increases. The main reason is that phospholipid, where 18:2n - 6 is located, declines as a proportion of muscle lipid and the proportion of neutral lipid, with its higher content of saturated and monounsaturated fatty acids, increases. Oleic acid (18:1cis - 9), formed from stearic acid (18:0) by the enzyme stearoyl Co-A desaturase, is a major component of neutral lipid and in ruminants the same enzyme forms conjugated linoleic acid (CLA), an important nutrient in human nutrition. Like 18:2n - 6, [alpha]-linolenic acid (18:3n - 3) is an essential fatty acid and is important to ruminants since it is the major fatty acid in grass. However it does not compete well for insertion into phospholipid compared with 18:2n - 6 and its incorporation into adipose tissue and muscle is less efficient. Greater biohydrogenation of 18:3n - 3 and a long rumen transit time for forage diets also limits the amount available for tissue uptake compared with 18:2n - 6 from concentrate diets. A positive feature of grass feeding is that levels of the nutritionally important long chain n - 3 PUFA are increased ie EPA (20:5n - 3) and DHA (22:6n - 3). Future research should focus on increasing n - 3 PUFA proportions in lean carcasses and the use of biodiverse pastures and conservation processes which retain the benefits of fresh leafy grass offer opportunities to achieve this. The varying fatty acid compositions of adipose tissue and muscle have profound effects on meat quality. Fatty acid composition determines the firmness/oiliness of adipose tissue and the oxidative stability of muscle, which in turn affects flavour and muscle colour. Vitamin E is an essential nutrient, which stabilises PUFA and has a central role in meat quality, particularly in ruminants.
Keywords: Fatty acids; Meat quality; Pigs; Sheep; Cattle; Diets; Genetics; Lipid oxidation; Flavour

P.E. Almeida, P.S.D. Weber, J.L. Burton, A.J. Zanella, Depressed DHEA and increased sickness response behaviors in lame dairy cows with inflammatory foot lesions, Domestic Animal Endocrinology, Volume 34, Issue 1, January 2008, Pages 89-99, ISSN 0739-7240, DOI: 10.1016/j.domaniend.2006.11.006.
(http://www.sciencedirect.com/science/article/B6T62-4MR88XB-1/2/6db76b9726200ca4bb20d0e2dc10acbe)
Abstract:
Lameness is a multifactorial condition influenced by the environment, genetics, management and nutrition. Detection of lameness is subjective and currently limited to visual locomotion observations which lack reliability and sensitivity. The objective of this study was to search for potential biomarkers of inflammatory foot lesions that underlie most cases of lameness in dairy cows, with a focus on the sickness response and relevant endocrine, immune and behavioral changes. Serum and peripheral blood mononuclear cells (PBMC) were collected from eight sound and eight lame high-producing Holstein cows. Immune cell activation was investigated in PBMCs using a candidate gene approach in which the expression of pro-opiomelanocortin, interleukin-1beta, l-selectin, matrix metalloproteinase-9 and glucocorticoid receptor-alpha was measured via quantitative real time-RT-PCR. Endocrine changes were investigated by monitoring serum concentrations of cortisol and dehydroepiandrosterone (DHEA). Additionally, systematic behavioral observations were carried out to characterize a behavioral profile associated with a sickness response typical of this condition. Lame cows showed significantly lower eating (P = 0.01) and ruminating (P = 0.01) behaviors and higher incidence of self-grooming (P = 0.04) compared to sound cows. Lame cows also showed a 23% decrease in serum DHEA (P = 0.01) and 65% higher cortisol:DHEA ratio (P = 0.06) compared to sound cows. However, no significant differences were found in candidate gene expression between lame and sound cows. In association with sickness behaviors, serum DHEA concentration and cortisol:DHEA ratio are promising objective indicators of inflammatory foot lesions in dairy cattle and may be useful as diagnostic targets for animals in need of treatment.

Keywords: DHEA; Sickness response; Lameness; Cow; Pain

A.L. Jones, G.C. Lamb, Nutrition, synchronization, and management of beef embryo transfer recipients, Theriogenology, Volume 69, Issue 1, Proceedings of the IETS Pre- and Post-Conference Symposia: - Animal Models of Reproduction/Recent Developments in the Practice of Bovine Embryo Transfer, IETS 2008 Pre- and Post-Conference Symposia, January 2008, Pages 107-115, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2007.09.004.
(http://www.sciencedirect.com/science/article/B6TCM-4R113GR-1/2/05ff6c82167c3bccff39cc34d6854099)
Abstract:
A commercially viable cattle embryo transfer industry was established during the early 1970s. Initially, techniques for transferring cattle embryos were exclusively surgical. However, by the early 1980s, most embryos were transferred nonsurgically. For an embryo transfer program to be effective, numerous factors need to be in place to ensure success. Nutrition, estrous cycle control, and recipient management are all responsible for the success or failure in fertility for a given herd. Utilization of body condition scores is a practical method to determine nutritional status of the recipient herd. Prepartum nutrition is critical to ensure that cows calve in adequate body condition to reinitiate postpartum estrous cycles early enough to respond to synchronization protocols. Estrus synchronization for embryo transfer after detected estrus or for fixed-time embryo transfer without estrus detection are effective methods to increase the number of calves produced by embryo transfer. In addition, resynchronization of nonpregnant recipients effectively ensures that a high percentage of recipients will return to estrus during a 72 h interval and are eligible for subsequent embryo transfers. Numerous additional factors need to be assessed to ensure that the recipient herd achieves its reproductive potential. These factors include assessing the merits of nulliparous, primiparous, or multiparous cows, ensuring that facilities allow for minimal stress, and that the herd health program is well-defined and followed. Numerous short- and long-term factors contribute to recipients conceiving to a transferred embryo, maintaining the embryo/fetus to term, delivering the calf without assistance and raising and weaning a healthy calf.
Keywords: Embryo transfer; Estrus synchronization; Nutrition; Management; Recipient

R. Webb, P.C. Garnsworthy, B.K. Campbell, M.G. Hunter, Intra-ovarian regulation of follicular development and oocyte competence in farm animals, 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 S22-S29, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2007.04.036.
(http://www.sciencedirect.com/science/article/B6TCM-4NVK1PM-1/2/953e4e96547677f413e4d84fbdd012bc)
Abstract:
In both mono-ovulatory species, such as cattle, and poly-ovulatory species, such as pigs, the interactions among extra-ovarian gonadotropins, metabolic hormones and intra-ovarian growth factors determine the continued development of follicles, the number of follicles that ovulate and the developmental competence of the ovulated oocyte. FSH and then subsequently LH are the main hormones regulating antral follicle growth in both mono- and poly-ovular species. However, a range of intra-ovarian growth factors, such as insulin-like growth factors (IGFs) and bone morphogenetic proteins (BMPs), are expressed throughout follicle and oocyte development and interact with gonadotropins to control follicle maturation. In addition, environmental factors such as nutrition, including both the amount and composition of the diet consumed prior to ovulation, can influence follicle development and the quality of the oocyte. Recent progress in our understanding has resulted in the development of diets that enhance oocyte quality and improve pregnancy rate in both pigs and cattle. In conclusion, despite some species-specific differences, similar interacting mechanisms control follicular development and influence oocyte quality.

Keywords: Ovary; Cattle; Pigs; Follicle; Growth factors; Gonadotropins

M.A. Galina, F. Osnaya, H.M. Cuchillo, G.F.W. Haenlein, Cheese quality from milk of grazing or indoor fed Zebu cows and Alpine crossbred goats, Small Ruminant Research, Volume 71, Issues 1-3, August 2007, Pages 264-272, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2006.07.011.
(http://www.sciencedirect.com/science/article/B6TC5-4KV3XX8-1/2/e0f1900c1bd58b18daba4d7cf5645638)
Abstract:
Sixty Alpine crossbred goats were pastured on 14 ha of shrub land and 14 Zebu cattle on 16 ha of a tropical Legume forest with grasses, both groups supplemented with a slow-intake urea mixture (SIUS). Milk production was sustained by the SIUS supplement, when forage growth was reduced, thus avoiding over-grazing of the rangeland, and production of cheese by the farmer was assured. Artisan cheese was made from the non-pasteurized raw milk. During the spring and summer of 2004, cheese quality parameters of fatty acid contents and nutroceutical components in cheese made from the milk of grazing Zebu cattle or Alpine crossbred goats was studied, and compared with cheeses manufactured of milk from indoor fed animals. Monoterpene and sesquiterpene contents in spring in grazed Zebu cheese were 460 and 520 ng/kg cheese, respectively, while indoor fed Zebu cattle had 126 and 210 ng/kg. Goat cheese monoterpenes were 480 ng/kg in the spring and 440 ng/kg in the summer on grazed animals. Sesquiterpenes content in goat cheese were 1200 ng/kg in the summer and 500 ng/kg in the spring on pasture goats. Fat content was lower in grazed Zebu cattle cheese at 13.6 g/100 g cheese and cholesterol was 70.5 mg/100 g cheese, compared to 17.5 g fat/100 g cheese and 79.1 mg/100 g cheese for indoor fed Zebu cattle. Grazing caused higher tocopherol contents in cheese from grazing Zebu at 127 mg/100 g DM, compared to 77 mg/100 g DM in cheese from indoor fed cattle. Grazing also increased the linoleic acid content in Zebu cattle cheese (173 mg/kg versus 140 mg/kg/cheese) but especially in goat grazing up to 183 mg/100 g cheese. Differences between spring and summer were similar. Cheese fat and cholesterol contents were lower for grazing goats at 12.3 g/100 g cheese and 63.2 mg/100 g cheese, compared to 16.9 g/100 g cheese and 80.4 mg/100 g cheese for indoor fed goats, respectively. Grazing caused higher tocopherol contents in cheese from goats at 211 mg/100 g cheese, compared to 87 mg/100 g cheese, respectively, in indoor fed goat cheese. The presence of omega 3 and 6 distribution, were mostly better in GG and GC. Values of the series omega 3 fatty acids were higher in GG. Alfa linolenic-ALA and oleic acids had the highest concentration in GG cheese. The omega 6 fatty acids (total linolenic, eicosatrienoic and archiodenic) were higher in GG as compared to the other cheeses. Finally for cis-4,7,10,13,16,19-docosahexaenoico acid (DHA) in both indoor made cheeses presented higher concentrations compared with grazed made cheeses. FAME total concentration subdivided in saturated and monounsaturated, were significantly higher for IG and IC from GG and GC ($P < 0.05$). For polyunsaturated FAME results were similar to all groups. For the total concentration of the [omega]-3 series, the highest values (0.06 g/100 g fresh cheese) corresponded to GG and GC. Finally, the relationship between [omega]-3:[omega]-6 averaged 3.48 in all groups. It is concluded that cheese from grazing animals was better in quality parameters for human nutrition than that produced from milk of indoor fed animals due to the botanical differences in the two feeding systems regardless of the species of animals.
Keywords: Goat; Zebu cattle; Cheese; Grazing; Cholesterol; Tocopherol; Terpenes; Indoor feeding

F. Napolitano, G. Caporale, A. Carlucci, E. Monteleone, Effect of information about animal welfare and product nutritional properties on acceptability of meat from Podolian cattle, Food Quality and Preference, Volume 18, Issue 2, March 2007, Pages 305-312, ISSN 0950-3293, DOI: 10.1016/j.foodqual.2006.02.002.
(http://www.sciencedirect.com/science/article/B6T6T-4JMKMSP-1/2/ac8c76580208897c9fa1f4bf4cd662b1)

Abstract:
The present study was aimed to study the effect of information about the welfare of Podolian cattle and their meat nutritional properties on beef acceptability for regular users and non-users of this particular beef meat. For both user groups, information induced a high expected liking. However, the information had a positive impact on the actual liking score when the product was tasted (an assimilation effect occurred) only for regular users. For these regular users the same level of expected liking and an assimilation effect were also observed in a second occasion. For the non-users, an information session where Podolian meat was tested after detailed information about production system and nutritional and sensory characteristics of this product was organised. After this training, the expected liking did not increase but the information had a positive effect on the actual liking score when the product was tasted (an assimilation effect occurred). Thus, information concerning animal welfare and nutrition may be used to differentiate meat in a mixed production system with competing industrialised and traditional farms.
Keywords: Podolian cattle; Beef; Information; Expectancy; Acceptance; Sensory; Animal welfare

L.W.D. van Raamsdonk, C. von Holst, V. Baeten, G. Berben, A. Boix, J. de Jong, New developments in the detection and identification of processed animal proteins in feeds, Animal Feed Science and Technology, Volume 133, Issues 1-2, Feed Safety, 1 February 2007, Pages 63-83, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.08.004.
(http://www.sciencedirect.com/science/article/B6T42-4KXDR65-1/2/a2724a277b3de23516cb3caca96c995f)
Abstract:
It is generally accepted that the most likely route of infection of cattle with bovine spongiform encephalopathy (BSE) is by consumption of feeds containing low levels of processed animal proteins (PAPs). This likely route of infection resulted in feed bans, which were primarily aimed at ruminant feeds, and were later extended to all feeds for farmed animals. The feed bans were expected to develop into a future enforcement of the 'species-to-species' ban, which prohibits only the feeding of animal-specific proteins to the same species. The species-to-species ban requires support of species-specific identification methods.
In the European Union, microscopic evaluation is currently the only accepted method for the detection and characterization of PAPs in feeds, since it is possible to detect contaminations at the requested level of 1 g/kg with hardly any false negative nor positive results. This method is predominantly focused on the presence and characteristics of bone fragments, although other structures, e.g. muscle fibres, may provide circumstantial evidence of the respective animal types. Recent developments are the identification of bone fragments at the level of classes (mammal versus bird versus fish), supported by image analysis of bone characteristics.
Detection of DNA and specific proteins are additional methods that can be applied for the identification of PAPs in feeds. DNA is known to be very specific for animal species and breeds, whereas proteins can also indicate the type of tissue. The latter aspect is important to differentiate between proteins that are authorised in animal nutrition from banned proteins. Improvements can be noted in recent years for both methods. For a proper application of polymerase chain reaction (PCR) to detect specific sequences of DNA, primer sets have been developed which amplify a DNA sequence shorter than approximately 100 nucleotides. Specific antibodies have been developed for protein detection of ruminant or bovine material. Recent results of various studies indicate that specific DNA and protein detection methods can detect PAPs at a contamination level of 1 g/kg. However, full validation of these methods still needs to be carried out.
Other methods such as near-infrared spectroscopy (NIRS), near-infrared microscopy (NIRM), near-infrared imaging, liquid chromatography (LC) and olfactometry techniques can and will be applied for the detection of PAPs. NIRS is a non-destructive method that can be applied on-line in feed production plants. Generally, the detection limit is still too high to be applied in official control laboratories. Nevertheless, industrial application is feasible. NIRM and near-infrared imaging are

techniques that allow collection of near-infrared spectra from individual particles. The level of detection is lower than 1 g/kg since it is based on the microscopic technique, in combination with the option of identification of the individual particles. LC is based on the detection and, if present, the ratio of different polypeptides. For example, carnosine is mainly present in mammals and anserine mainly found in birds. Olfactometry is based on detection of volatile non-specific agents. It is a non-destructive and fast technique. For both LC and olfactometry it appears that the presence of fish material masks the detection of proteins of land animals, even at a contamination level of 5 g/kg.
Since 2003 five different proficiency studies and ring trials have been organized. The first proficiency study, allowing the participants to apply their own protocol, revealed that correct microscopic detection of 1 g/kg of mammalian PAP in the presence of 50 g fish meal/kg was realised in 0.44 of the cases. However, a bench mark study organized in the same year showed that a microscopic detection of 0.98 can be reached provided the application of an optimal protocol and a sufficient level of expertise. More recent studies showed that training, the application of a decision support system and use of an improved microscopy protocol resulted in a higher sensitivity.
An attractive approach is the combination of the very low detection level of microscopy with identification by other methods. Several strategies for a combination of screening and confirmation methods are discussed in the present paper. The new developments in methodology will support current or new legislation (e.g. species-to-species ban, general application of fish meal).
Keywords: BSE; Feed ban; Animal proteins; Microscopy; PCR; Immunoassay; NIR; HPLC; Protein analysis

Cristina M.M. Alfaia, Matilde L.F. Castro, Susana I.V. Martins, Ana P.V. Portugal, Susana P.A. Alves, Carlos M.G.A. Fontes, Rui J.B. Bessa, Jose A.M. Prates, Effect of slaughter season on fatty acid composition, conjugated linoleic acid isomers and nutritional value of intramuscular fat in Barrosa-PDO veal, Meat Science, Volume 75, Issue 1, January 2007, Pages 44-52, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.06.013.
(http://www.sciencedirect.com/science/article/B6T9G-4KNMBB1-1/2/87e8ad34e3123ffb68e7e5effddc36d1)
Abstract:
This paper describes the influence of slaughter season on lipid content, fatty acid composition, conjugated linoleic acid (CLA) isomeric profile and nutritional value of fat in Barrosa veal from calves reared according to the specifications of the Protected Designation of Origin (PDO). Barrosa purebred calves (n = 27) were raised in a traditional production system and slaughtered in early autumn (October) and late spring (June). Barrosa-PDO veal only presented seasonal differences in the levels of some minor fatty acids and CLA isomers, as well as in the PUFA/SFA ratio. Based on the analysed grass intake indicators, it was shown that veal-PDO has similar values to pasture-fed cattle for both slaughter seasons. From a human nutrition perspective, intramuscular fat in Barrosa-PDO veal has a high nutritional value throughout the year, since CLA contents and the percentages of the c9,t11 isomer are relatively high, and the n - 6/n - 3 ratios are within the recommended values for the human diet.
Keywords: Veal; Fatty acids; CLA isomers; Meat quality; Production systems

Tim E. Carpenter, Mariann Chriel, Mette M. Andersen, Liana Wulfson, Astrid M. Jensen, Hans Houe, Matthias Greiner, An epidemiologic study of late-term abortions in dairy cattle in Denmark, July 2000-August 2003, Preventive Veterinary Medicine, Volume 77, Issues 3-4, 18 December 2006, Pages 215-229, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2006.07.005.
(http://www.sciencedirect.com/science/article/B6TBK-4KV3XJ3-1/2/c4058bb40e5492fa761e49572bfa0db0)
Abstract:

Abortion in dairy cows in well-managed dairies is not common but differences have been reported probably due to variation in animal health, nutrition and management, as well as difficulties in observing the aborted material. A 38-month study of 507 large Danish dairy herds revealed 3354 late-term abortions and 224,419 calvings were recorded. During the study period, a total of 3717 submissions were made to the Danish Institute for Food and Veterinary Research (DFVF). A broad spectrum of abortive agents was isolated but none were found to be statistically associated with abortions. The number of abortions in a month on a dairy was significantly ($P < 0.001$) associated with the number of cows in the third trimester but explained only 11% of the variability of the reported abortions. A total of 23 herds (4.5%) reported 531 abortions (15.8%). Although a marginally significant ($P = 0.11$) risk of increased abortions was found to exist in bovine viral diarrhea virus- (BVDV) infected herds, it could be at least partially explained by additional calvings in those herds. Temporal correlation between inseminations and abortions was statistically significant ($P < 0.001$) with the highest correlation ($r = 0.47$-0.51) after lagging abortions on insemination by 6-8 months. No indication of spatial clustering was detected for either specific-abortogenic pathogens or high aborting dairies using either Cuzick-Edwards' ($P > 0.17$) or spatial scan tests ($P > 0.23$). Ederer-Myers-Mantel test was applied to 3 years of data on the highest aborting dairies and showed that July had nearly double the expected number of maximum monthly abortions ($P < 0.001$). These findings provide further insight into the reported abortion pattern in Danish dairies and may facilitate planning future control programs.
Keywords: Epidemiology; Dairy cattle; Abortion; Denmark

Alex Evans, Finbar Mulligan, Nutrition and fertility in dairy cattle, Animal Reproduction Science, Volume 96, Issues 3-4, Nutrition and Fertility in Dairy Cattle, December 2006, Page 211, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2006.08.001.
(http://www.sciencedirect.com/science/article/B6T43-4KJM010-4/2/57553653c736445107f3a823d7b95a3e)

Karl A. Dawson, Nutrigenomics: Feeding the genes for improved fertility, Animal Reproduction Science, Volume 96, Issues 3-4, Nutrition and Fertility in Dairy Cattle, December 2006, Pages 312-322, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2006.08.009.
(http://www.sciencedirect.com/science/article/B6T43-4KJM010-B/2/316d1d3532953d9095c916d3fbfa1e3b)
Abstract:
The post genomic era will result in many new molecular tools for evaluating the factors influencing fertility and reproductive performance in domestic livestock and poultry. There is currently considerable interest and practical merit in examining the regulatory steps involved in the process of gene transcription. Currently, oligo-based and cDNA microarray techniques make it possible to understand many of the factors controlling the regulation of gene transcription and globally evaluate gene expression profiles by looking at the relative abundance of gene-specific mRNA in tissues. These techniques provide an unprecedented amount of information and are only now being used to examine key reproductive, developmental, and performance characteristics in cattle. They also promise to provide a tremendous amount of new information that can be used to understand and diagnose key issues that limit reproductive performance. The science of nutrigenomics has begun to use information obtained from basic studies of the genome to evaluate the effects of diet and nutrient management schemes on gene expression. Preliminary studies have shown the value of such techniques and suggest that it will be possible to use specific gene expression patterns to evaluate the effects of nutrition on key metabolic processes relating to reproductive performance. While the effects of nutrition on fertility are only partially understood, modern nutrigenomics will undoubtedly play a key role in developing strategies for addressing some of the limitations in reproductive performance.
Keywords: Fertility; Microarray; Nutrigenomics; Transcription; Oxidative stress

F.J. Mulligan, L. O'Grady, D.A. Rice, M.L. Doherty, A herd health approach to dairy cow nutrition and production diseases of the transition cow, Animal Reproduction Science, Volume 96, Issues 3-4, Nutrition and Fertility in Dairy Cattle, December 2006, Pages 331-353, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2006.08.011.
(http://www.sciencedirect.com/science/article/B6T43-4KKNDW7-1/2/a4ab4b8493b635cede3446061e9c85e8)
Abstract:
This paper presents a practical, on-farm approach for the monitoring and prevention of production disease in dairy cattle. This integrated approach, should be used in an interdisciplinary way by farmers, veterinarians, nutrition advisors and other relevant professionals for the improvement of animal health and welfare and producer profitability. The key areas that form the basis for this approach are body condition score management, negative energy balance, hypocalcaemia, rumen health and trace element status. Monitoring criteria are described for each of these key areas, which when considered collectively, will facilitate the assessment of dairy cow health with regard to clinical and subclinical disease. The criteria, which are informed by published scientific literature, are based on farm management and environmental factors, clinical data, milk production records, dietary analysis, and assessment of blood and liver concentrations of various metabolites or trace elements. The aim is to review the efficacy of production disease control measures currently in place, and if necessary to modify them or formulate new ones.
Keywords: Dairy cow; Herd health; Production disease; Nutrition

Nurhan Unusan, Occurrence of aflatoxin M1 in UHT milk in Turkey, Food and Chemical Toxicology, Volume 44, Issue 11, November 2006, Pages 1897-1900, ISSN 0278-6915, DOI: 10.1016/j.fct.2006.06.010.
(http://www.sciencedirect.com/science/article/B6T6P-4KB6YWW-2/2/ab3d688fd909c79e7fe52e28eb4a61d4)
Abstract:
Aflatoxin M1 (AFM1) appears in milk as a direct result of the ingestion of food contaminated with aflatoxin B1 by cattle. The role of milk in human nutrition is well-known. The purpose of the study was to determine the levels of AFM1 in UHT milk samples in Central Anatolia, Turkey. The occurrence of AFM1 contamination in UHT milk samples was investigated by ELISA (Enzyme Linked Immunosorbent Assay) technique. A total of 129 samples of commercial UHT whole milk were analysed. The mean value was 108.17 ng/L. There was a high incidence rate of AFM1, with 75 (58.1%) milk samples being contaminated. Although 68 (53%) were below the limit, the remaining 61 (47%) were well above the limit permitted by the EU. Four of the samples exceeded the prescribed limit of US regulations. It can be concluded that AFM1 levels in the samples purchased in Central Anatolia Region, appear to be a serious public health problem at the moment. Dairy farmers must be educated by the government authorities on potential health consequences of aflatoxins.
Keywords: Aflatoxin M1; UHT milk; ELISA

S. De Campeneere, D.L. De Brabander, J.M. Vanacker, Milk urea concentration as affected by the roughage type offered to dairy cattle, Livestock Science, Volume 103, Issues 1-2, August 2006, Pages 30-39, ISSN 1871-1413, DOI: 10.1016/j.livsci.2005.12.007.
(http://www.sciencedirect.com/science/article/B7XNX-4JTRTPF-1/2/02f464174f98806139a9935016473839)
Abstract:
Milk urea content (MUC) is used to manage protein nutrition and predict nitrogen excretion of dairy cows. However, MUC might depend on the roughage type offered and hence, for comparable MUC values, different N-excretions might be found. To evaluate this, three diets were compared in

a feeding trial with 18 lactating Holstein cows in a Latin square design with as roughages 100% maize silage (treatment 100 MS), 50%/50% maize silage/prewilted grass silage (treatment 50 MS) and 100% prewilted grass silage (treatment 100 PGS). For all treatments, cows were fed to supply 105% of their net energy and digestible protein requirements and to have a daily rumen degraded protein balance (RDPB) intake of 100 g. This was only possible by feeding soybean meal as a protein corrector to 100 MS and 50 MS and by feeding citruspulp as an energy corrector in 100 PGS. The same balanced concentrate was fed to all groups. In a separate trial, N-balance was determined for both 100% rations.
In the feeding trial, the MUC of 100 MS (230 mg/l) and 50 MS treatment (214 mg/l) were significantly ($P < 0.001$) different from that of 100 PGS (171 mg/l). Cows on treatments 50 MS and 100 PGS ingested the same amount of RDPB (71 and 73 g/day), but when fed 100 MS cows ingested -16 g/day. After correction for differences in energy and protein supply, MUC of the 100 MS was 71 mg/l higher than that of 100 PGS.
N-balances indicated that total N-excretion (faecal, urinary and milk) was almost identical for both treatments: 392 for 100 MS versus 389 g/day for 100 PGS, as was environmental N-excretion (faecal and urinary): 259 for 100 MS versus 272 g/day for 100 PGS. However, the MUC content for 100 MS was significantly higher: 248 mg/l versus 180 mg/l for 100 PGS. From a correction for differences in energy and protein supply, this difference increased up to 84 mg/l between 100 MS and 100 PGS.
These results suggest that MUC is roughage dependent and that a system to predict N-excretion should account for these differences. Therefore the exact mechanism behind the determined roughage influence should be investigated further.
Keywords: Milk urea content; N-excretion; N-balance

P. Krausova, P. Kalac, M. Krizek, T. Pelikanova, Content of biologically active polyamines in livers of cattle, pigs and chickens after animal slaughter, Meat Science, Volume 73, Issue 4, August 2006, Pages 640-644, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.03.005.
(http://www.sciencedirect.com/science/article/B6T9G-4JH6C7N-2/2/75302dc63ebf67b80793a4d8acb37b66)
Abstract:
Dietary polyamines putrescine (PUT), spermidine (SPD) and spermine (SPM) participate in an array of important human physiological roles, including tumour growth. Physicians and dieticians thus need reliable information on polyamine contents in foods. However, data for livers are lacking. We determined therefore the content of these polyamines 24 h after slaughter in livers of young bulls, cows, pigs and chicken in 58, 19, 36 and 38 samples, respectively. Polyamines were determined as N-benzamides by micellar electrokinetic capillary chromatography. Mean PUT contents about 25 mg kg-1 were found in cattle livers, while very low or negligible contents were determined in livers of the other animals. Extremely high mean SPD contents of 122 and 161 mg kg-1 were found in livers of bulls and cows, respectively and mean levels of 32 and 57 mg kg-1 in livers of pigs and chicken. An opposite relation was observed for SPM. Its mean contents were 43, 35, 115 and 120 mg kg-1 for bulls, cows, pigs and chicken livers, respectively. Thus, livers of the tested animal species belong among foods with the highest polyamine contents. However, the contents ranged very widely, that makes application of the results for the control of human nutrition rather difficult. Polyamine contents in bovine blood were found to be below the detection limits of 2.1, 1.0 and 1.4 mg kg-1 for PUT, SPD and SPM, respectively. Thus, the blood content did not contribute to the substantial polyamine contents in bovine liver found in this study.
Keywords: Dietary polyamines; Putrescine; Spermidine; Spermine; Bovine liver; Pork liver; Chicken liver; Bovine blood

Peter Lebzien, E. Pfeffer and A. Hristov, Editors, Nitrogen and Phosphorus Nutrition of Cattle, CABI Publishing/CAB International, Wallingford, UK (2005) (305 pages, Hardback, price [pound

sign] 65.00 (US$ 120.00), ISBN 0 85199 0134)., Animal Feed Science and Technology, Volume 128, Issues 3-4, 28 June 2006, Pages 342-343, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.01.027.
(http://www.sciencedirect.com/science/article/B6T42-4JD1153-2/2/928b14fdef78be2f282d0e099a021f0e)

J.P. Dubey, D. Buxton, W. Wouda, Pathogenesis of Bovine Neosporosis, Journal of Comparative Pathology, Volume 134, Issue 4, May 2006, Pages 267-289, ISSN 0021-9975, DOI: 10.1016/j.jcpa.2005.11.004.
(http://www.sciencedirect.com/science/article/B6WHW-4K07N7F-1/2/11ef985b4a116a292bb78c0b71d0fc85)
Abstract: Summary
The protozoan parasite Neospora caninum is a major pathogen of cattle and dogs, being a significant cause of abortion in cattle in many countries. It is one of the most efficiently transmitted parasites, with up to 90% of cattle infected in some herds. The pathogenesis of abortion due to Neospora is complex and only partially understood. Losses occur after a primary infection during pregnancy but more commonly as the result of recrudescence of a persistent infection during pregnancy. Parasitaemia is followed by invasion of the placenta and fetus. It is suggested that abortion occurs when primary parasite-induced placental damage jeopardises fetal survival directly or causes release of maternal prostaglandins that in turn cause luteolysis and abortion. Fetal damage may also occur due to primary tissue damage caused by the multiplication of N. caninum in the fetus or due to insufficient oxygen/nutrition, secondary to placental damage. In addition, maternal immune expulsion of the fetus may occur associated with maternal placental inflammation and the release of maternal pro-inflammatory cytokines in the placenta. Thus N. caninum is a primary pathogen capable of causing abortion either through maternal placental inflammation, maternal and fetal placental necrosis, fetal damage, or a combination of all three. The question of how N. caninum kills the fetus exposes the complex and finely balanced biological processes that have evolved to permit bovine and other mammalian pregnancies to occur. Defining these immunological mechanisms will shed light on potential methods of control of bovine neosporosis and enrich our understanding of the continuity of mammalian and protozoal survival.
Keywords: cattle; Neospora caninum; neosporosis parasitic disease; review article

D.B. Carlson, M.S. Laubach, W.L. Keller, C.S. Park, Effect of prepartum compensatory nutrition regimen on metabolism and performance of dairy cows, Livestock Science, Volume 101, Issues 1-3, May 2006, Pages 251-261, ISSN 1871-1413, DOI: 10.1016/j.livprodsci.2005.11.017.
(http://www.sciencedirect.com/science/article/B7XNX-4JXS70Y-Y/2/4abe7844a25380bd59f47cd6cb3146a3)
Abstract:
The impact of closely controlled energy management during the dry period upon general peripartum metabolism and the subsequent lactation was evaluated in multiparous dairy cows. Eight lactating, pregnant Holstein cows were paired according to current milk production and body condition score and assigned to either the control or the stair-step compensatory nutrition (SSCN) regimen 16 weeks prior to expected calving date. Control cows were fed according to National Research Council [National Research Council., 2001. Nutrient Requirements of Dairy Cattle. 7th rev. ed. Natl. Acad. Sci., Washington, DC.] recommendations and for ad libitum intake during late lactation and the far-off dry period. The SSCN cows were subjected to dietary energy restriction [80% of net energy for lactation requirements (NEL)] during late lactation in order to maintain body weight, followed by realimentation (130% of NEL) during the far-off dry period to induce a compensatory response. A common diet was fed thereafter. The SSCN cows gained less body condition during late lactation and tended to gain more body condition during the far-off dry and transition periods than control cows. There was no difference in dry matter intake during the

prepartum transition period and early lactation. Milk yield was not affected by treatment. Serum nonesterified fatty acids (NEFA) were not altered by dietary treatment during late lactation and the dry period; however NEFA were lower in SSCN cows at week 4 of the subsequent lactation. Serum insulin was higher in SSCN cows 8 weeks prior to parturition (end of restriction), tended to be higher at 4 weeks (end of realimentation) before calving, and was also higher at week 12 of early lactation. An SSCN regimen stimulated body condition gain of mature dairy cows during the dry period, did not affect periparturient nutrient metabolism, and led to modest improvements in metabolic parameters later in the subsequent lactation.
Keywords: Compensatory nutrition; Periparturient; Transition; Dairy cow

J.J. Robinson, C.J. Ashworth, J.A. Rooke, L.M. Mitchell, T.G. McEvoy, Nutrition and fertility in ruminant livestock, Animal Feed Science and Technology, Volume 126, Issues 3-4, Feed and Animal Health, 9 March 2006, Pages 259-276, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.08.006.
(http://www.sciencedirect.com/science/article/B6T42-4H4T0TS-2/2/216a1f1f06762c0ce6a26c09d00c5ad0)
Abstract:
In this review fertility is taken to be the successful establishment of pregnancy. Nutritional effects on fertility therefore embrace the formation of the foetal gonads, their post-natal development, the timing of puberty and in multiple ovulating species, their ovulation rates. The interval from parturition to rebreeding, ovum quality, embryo development and embryo survival are the other major contributors to fertility. In each of these areas there have been significant advances. For example recent research in ewes has demonstrated that during its early development the foetal ovary is remarkably sensitive to maternal nutrition with subsequent lifetime effects on ovulation rate. The timing of puberty in both sexes and adult ovulation rates in ewes are influenced by post-natal nutrition. Nutrition during the period when ovarian follicles emerge from the primordial pool (approximately 6 months before they ovulate in ewes and 3-4 months in cows) can influence ovulation rate in ewes and oocyte quality in cattle. Donor nutrition, in particular selenium status, can affect the resilience of spermatozoa to freezing and thawing. In contrast to spontaneously ovulating animals in which high-plane feed immediately before ovulation enhances oocyte and embryo quality the opposite is the case in superovulated donor animals and those from which oocytes are harvested for in vitro embryo production. In high yielding dairy cows excessive negative energy balance reduces insulin and IGF-1 concentrations and increases growth hormone leading to delays in oestrous cyclicity and impaired oocyte quality and corpus luteum function. Recent research into diets specifically designed to stimulate insulin secretion, increase progesterone production by the corpus luteum and enhance the antiluteolytic mechanism is providing new opportunities for improving dairy cow fertility with associated benefits for suckling beef cows. The move to a more mechanistic approach in dealing with nutritional studies of fertility is providing information that can readily be adapted for the formulation of more efficient feeding strategies across a diverse range of ruminant species and production systems.
Keywords: Fertility; Nutrition; Ruminants

Robert J. Van Saun, Nutrient requirements of South American camelids: A factorial approach, Small Ruminant Research, Volume 61, Issues 2-3, South American Camelids, February 2006, Pages 165-186, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.07.006.
(http://www.sciencedirect.com/science/article/B6TC5-4GY8944-3/2/8fd6c03aaa7f2f8da8de6082cf722c99)
Abstract:
Literature describing digestive physiology and defining specific nutrient requirements for llamas and alpacas was reviewed. Using data from studies defining maintenance energy and protein requirements, llamas and alpacas have lower energy and protein requirements compared to other

ruminants; however, they have a greater protein requirement per unit of energy. This is consistent with observed differences in urea and glucose metabolism between camelids and other ruminants suggesting a reliance on protein catabolism to maintain blood glucose concentrations. Evidence suggests llamas and alpacas may have a greater requirement for Vitamin D, but no other evidence of significant differences in requirements between camelids and other ruminants. There are limited data defining other nutrient requirements or differences in requirements based on physiologic state for llamas and alpacas. In spite of limited data, a factorial approach to estimate nutritional requirements of llamas and alpacas was described. Defined maintenance energy and protein requirements were extrapolated to other physiologic states using beef cattle, sheep and goat data as templates. Models were developed to predict energy, protein, mineral and vitamin requirements for growth, pregnancy and lactation. Model development was based on determining beef cattle and sheep nutrient requirements on an amount per kg of body weight and assuming no inherent metabolic differences among species. An averaged value was calculated and used as a basis for defining requirements for llamas and alpacas. Amount per kg body weight requirements were converted to a recommended dietary nutrient density basis using an observed lower dry matter intake per unit body weight. Factorially derived models were in better agreement with North American feeding recommendations compared to predicted requirements using current North American-based requirement models. North American-based requirement equations over predicted energy and protein, resulting in required dietary nutrient densities in excess of practical feeding practices. The proposed factorial models need to be critically validated, but provides a starting point for discussion in advancing the study and application of llama and alpaca nutrient requirements. There are tremendous gaps in our knowledge of llama and alpaca requirements, requiring further basic research especially in the areas of neonatal and fetal growth and composition, lactational performance and mineral bioavailability.
Keywords: Llama; Alpaca; Nutrient requirements; Digestion; Nutrition

G.-W. Rathke, W. Diepenbrock, Energy balance of winter oilseed rape (Brassica napus L.) cropping as related to nitrogen supply and preceding crop, European Journal of Agronomy, Volume 24, Issue 1, January 2006, Pages 35-44, ISSN 1161-0301, DOI: 10.1016/j.eja.2005.04.003.
(http://www.sciencedirect.com/science/article/B6T67-4GC1RPM-1/2/9b620187793a0e370c34b03a0845406d)
Abstract:
Data from a field experiment (1995-2000) conducted on a fertile sandy loess in the Hercynian dry region of central Germany were used to determine the energy efficiency of winter oilseed rape (Brassica napus L.) as affected by previous crop and nitrogen (N) fertilization. Depending on the previous crop, winter oilseed rate was cultivated in two different crop rotations: (1) winter barley (Hordeum vulgare L.)-winter oilseed rape-winter wheat (Triticum aestivum L.), and (2) pea (Pisum sativum L.)-winter oilseed rape-winter wheat. Fertilizer was applied to winter oilseed rape as either calcium ammonium nitrate (CAN) or cattle manure slurry. The N rates applied to winter oilseed rape corresponded to 0, 80, 160 and 240 kg N ha-1 a-1.
Results revealed that different N management strategies influenced the energy balance of winter oilseed rape. Averaged across years, the input of energy to winter oilseed rape was highly variable ranging from 7.42 to 16.1 GJ ha-1. Lowest energy input occurred when unfertilized winter oilseed rape followed winter barley, while the highest value was obtained when winter oilseed rape received 240 kg N ha-1 organic fertilization and followed winter barley. The lowest energy output (174 GJ ha-1), energy from seed and straw of winter oilseed rape, was observed when winter oilseed rape receiving 80 kg N ha-1 as organic fertilizer followed winter barley. The energy output increased to 262 GJ ha-1 for winter oilseed rape receiving 240 kg N ha-1 as mineral fertilizer followed pea. The energy efficiency was determined using the parameters energy gain (net energy output), energy intensity (energy input per unit grain equivalent GE; term GE is used to express

the contribution that crops make to the nutrition of monogastric beings), and output/input ratio. The most favourable N rate for maximizing energy gain (250 GJ ha-1) was 240 kg N ha-1, while that needed for minimum energy intensity (91.3 MJ GE-1) was 80 kg N ha-1 and for maximum output/input ratio (29.8) was 0 kg N ha-1.
Keywords: Winter oilseed rape; Preceding crop; Nitrogen fertilization; Energy balance

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

P.G. Dunne, F.P. O'Mara, F.J. Monahan, P. French, A.P. Moloney, Colour of muscle from 18-month-old steers given long-term daily exercise, Meat Science, Volume 71, Issue 2, October 2005, Pages 219-229, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.11.014.
(http://www.sciencedirect.com/science/article/B6T9G-4GR9CW6-2/2/f18b75b56262ad1719c89112a66f0996)
Abstract:
Darker beef from pasture-fed compared with grain-fed cattle may result from differences in physical activity rather than differences in nutrition. The objective was to determine if steers that were exercised produced darker meat than non-exercised steers and whether any effect was muscle-related. Exercised steers were walked 4.41 km daily in a single bout, six days per week for 18 weeks at an average speed of 5.2 km h-1. All steers were fed grass silage on an ad libitum basis plus 6 kg concentrates. Following slaughter, muscle colour coordinates (`L' (lightness), `a' (redness) and `b' (yellowness) values) of M. longissimus dorsi (LD), M. semimembranosus (SM) and M. extensor carpi radialis (ECR) were recorded at 48 h postmortem and redness and yellowness were used to calculate muscle hue (`H') and colour intensity/saturation (`C'). The pH of all muscles was measured at 1.5, 3, 6, 22 and 48 h postmortem and LD samples were recovered (90 min postmortem) for glycolytic potential (GP) assessment. Exercise did not affect muscle lightness, yellowness, hue or colour intensity. However, LD was the darkest ($P < 0.001$) and SM the most saturated ($P < 0.001$) muscle. Exercise affected muscle redness in a muscle-dependent

manner (muscle x exercise, P = 0.038) whereby ECR became more red with exercise but LD and SM were unaffected. There were muscle x time (P < 0.001) and time x exercise (P = 0.045) interactions for muscle pH. The ECR muscle had the highest pH at all times. The exercised steers had higher (P < 0.05) LD muscle pH than control steers at 3 and 6 h postmortem. Exercise did not affect myoglobin concentration, which was muscle dependent, decreasing in the order: SM (6.72 mg/g) > ECR (6.33 mg/g) > LD (5.48 mg/g), which were all different (P < 0.001). Exercise had no effect on GP in LD muscle (111 vs. 99 [mu]mol/g for control and exercised steers, respectively; SED = 6.6 [mu]mol/g). It was concluded that although application of exercise did not affect muscle lightness and thus, did not cause `darker' meat, it did affect muscle redness in a muscle-dependent manner.
Keywords: Colour; Muscle; Steers; Beef; Exercise

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

J. Carol Petherick, Animal welfare issues associated with extensive livestock production: The northern Australian beef cattle industry, Applied Animal Behaviour Science, Volume 92, Issue 3, International Society for Applied Ethonolgy Special Issue, 2003 - A Selection of Papers from the 37th International Congress Abano Terme, Italy, June 2003, August 2005, Pages 211-234, ISSN 0168-1591, DOI: 10.1016/j.applanim.2005.05.009.
(http://www.sciencedirect.com/science/article/B6T48-4GCX19D-2/2/1bc9547886f7f5f7652e51d13c8feb02)
Abstract:

The animal welfare issues faced by the northern Australian beef cattle industry are similar to those faced by extensive livestock production industries in other countries. However, northern Australia is characterised by climatic extremes and large areas/distances and these factors, together with low management inputs, mean that the industry faces significant challenges to assure high standards of animal welfare. In this review, the following issues are discussed: behavioural restriction; `natural disasters'; nutrition; health; a number of aspects relating to human-animal interactions, particularly mustering (gathering/rounding up) and moving cattle, and the consequences for welfare of the timing and frequency of handling; `surgical' procedures; identification; transportation, including live export; and predation.

The use of cattle adapted to the northern Australian environment alleviates many potential welfare problems. In addition, significant improvements to animal welfare could be made very quickly with a few straightforward management changes, such as improved planning for extended dry periods and drought; wider use of conservative stocking rates and supplementary feeding; broader implementation of vaccination programs; and greater implementation of weaner training programs. Further, a dramatic improvement for very large numbers of cattle could be made through the selection and use of polled genotypes to eliminate horned cattle.

Research from Europe suggests that current Australian recommendations for the duration of land transportation journeys may be excessive and could compromise welfare, but further research under northern Australian conditions is required. Research and development is also needed in non-invasive alternatives to castration and spaying, but in the meantime the welfare of males could be improved by castrating earlier in the animals' lives. However, it is acknowledged that this would require major changes to current cattle management practices.

Further research and development is required in relation to animal handling, and in particular the type, timing and frequency of experiences with stockpeople and also, on the assembly and sea transportation of cattle. Finally, a moral question exists as to whether cattle should continue to be exported to a particular country for which there is strong evidence of inhumane treatment.

Keywords: Extensive livestock management; Animal welfare; Beef cattle; Animal production

R.W. Purchas, T.W. Knight, J.R. Busboom, The effect of production system and age on concentrations of fatty acids in intramuscular fat of the longissimus and triceps brachii muscles of Angus-cross heifers, Meat Science, Volume 70, Issue 4, August 2005, Pages 597-603, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.12.020.
(http://www.sciencedirect.com/science/article/B6T9G-4FMBKG6-2/2/63f4c4bbfb00d61c5073259ddbb0c736)

Abstract:

The concentrations of fatty acids were measured in intramuscular fat from the longissimus lumborum (LL) and triceps brachii (TB) muscles of Angus-cross heifers finished either on a high-concentrate ration in Washington, USA, (US cattle, n = 15) or on pasture in New Zealand (NZ cattle, n = 16). Half of the NZ cattle were of a similar age to the US cattle (NZAge) and half were of a similar weight (NZWt). Intramuscular fat levels were higher for the LL muscle and for the US cattle but only within the LL muscle ($P < 0.05$). Aspects of the fatty-acid patterns that are of relevance to human nutrition tended to favour the pasture-finished NZ cattle with lower n - 6/n - 3 fatty acid ratios ($P < 0.001$), higher concentrations of an anticarcinogenic conjugated linoleic acid (C18:2 c9,t11) ($P < 0.05$) and its precursor (trans-vaccenic acid, TVA) ($P < 0.01$), and lower levels of the 18-carbon trans monounsaturated fatty acids other than TVA ($P < 0.01$). Concentrations of 20 of the 22 fatty acids analysed differed significantly between the two muscles. When values were adjusted to a common intramuscular fat level by covariance, most of the group differences remained, but a number of the muscle differences became non-significant. For almost half the fatty acids considered, there was a significant interaction between treatment group and muscle, which indicates that the results for one muscle do not necessarily apply to other muscles, although the ranking of the groups was usually the same for both muscles.

Keywords: Beef; Intramuscular fat; Pasture finished; Fatty acids; Conjugated linoleic acid; Omega-3 fatty acids

S.K. Johnson, Possibilities with today's reproductive technologies, Theriogenology, Volume 64, Issue 3, Proceedings of the 2005 Annual Conference of the Society for Theriogenology, August 2005, Pages 639-656, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2005.05.033.
(http://www.sciencedirect.com/science/article/B6TCM-4GJM3FX-1/2/2db6eb501767b2de01a4131934d77e9d)
Abstract:
Reproductive efficiency is critical to economic viability for cow/calf producers; however, very few producers take advantage of available reproductive technologies that can increase profitability. Today, more opportunities are available for producers who want to capture value from known genetics. Through the use of artificial insemination (AI), the average producer has access to a wide range of high-accuracy sires that can be selected to match production goals. Systems to synchronize estrus and ovulation can now produce pregnancy rates to a single fixed-timed AI that are 10-15% greater than those of the previous generation. Increased age and weight of calves at weaning is sufficient in some situations to pay for the cost of synchronization and AI. As a result of synchronization, more cows calve early the next year and in subsequent years of synchronization. The breeding season can be shortened without reducing end-of-season pregnancy rates, since synchronized cows have one more chance to conceive than unsynchronized cows in a 22-25 day interval. Cow nutrition can be more economically and precisely managed with a shorter breeding period. Producers that establish AI programs now will be prepared to take advantage of newly identified superior genetics or other technologies, e.g. sexed semen, when they become available. Trends towards more value-based marketing and improvements in pregnancy rates from synchronization systems, make this a key time to be aware of the possibilities using reproductive technologies.
Keywords: Artificial insemination; Synchronization of estrus; Reproductive management; Pregnancy rates; Beef cattle

Marja Mikkola, Paivi Mantysaari, Niina Tammiranta, Jaana Peippo, Juhani Taponen, Effect of dietary protein on embryo recovery rate and quality in superovulated heifers, Animal Reproduction Science, Volume 87, Issues 3-4, July 2005, Pages 193-202, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.11.008.
(http://www.sciencedirect.com/science/article/B6T43-4F2V58G-2/2/5aee238dd99706322fb63c33dd263d89)
Abstract:
For almost 3 decades, superovulation and embryo transfer have been used in cattle breeding to increase the number of offspring from genetically superior female animals. Several factors including nutrition affect the number of transferable embryos recovered. We compared the effects of two different dietary protein levels easily achieved in practical conditions on embryo number and quality in superovulated heifers. Finnish Ayrshire heifers (n = 37) were allocated to isoenergic diets containing either 14% (D14) or 18% (D18) crude protein (CP). Estruses were synchronized, and the heifers were subsequently superovulated and inseminated using a standard FSH-protocol. Embryos were collected 7 days after inseminations (71-72 days after the beginning of the treatment period) by uterine flushing. The number of corpora lutea, and the number and quality of embryos were determined. Protein feeding did not affect superovulatory response, the number of embryos or the number of transferable embryos recovered. Proportionally more poor-quality embryos were found in group D14 than in group D18 (20.2% versus 13.2%, respectively, P = 0.053). It is concluded that a long-term moderate increase in the content of crude protein fed to energy-adequate heifers does not seem to affect superovulatory response and the number of embryos recovered, but it may be advantageous to the quality of embryos.

Keywords: Heifer; Superovulation; Dietary protein; Embryo quality

Joseph J. Nocera, Glen J. Parsons, G. Randy Milton, Alan H. Fredeen, Compatibility of delayed cutting regime with bird breeding and hay nutritional quality, Agriculture, Ecosystems & Environment, Volume 107, Issues 2-3, 20 May 2005, Pages 245-253, ISSN 0167-8809, DOI: 10.1016/j.agee.2004.11.001.
(http://www.sciencedirect.com/science/article/B6T3Y-4F3FF0S-1/2/26a0d10e2a6129f3dc1ca53a842d7ac9)
Abstract:
The breeding phenology of three grassland bird species was studied in managed hayfields of Nova Scotia, Canada: bobolink (Dolichonyx oryzivorus), savannah sparrow (Passerculus sandwichensis), and Nelson's sharp-tailed sparrow (Ammodramus nelsoni subvirgatus), under delayed hay cutting regimes (post-1 July). Weekly changes were monitored in several measures of hay nutritional quality (percent crude protein (CP %), acid detergent fibre (ADF), calcium (Ca) and phosphorus (P)). Timing of peak fledging was variable across years, but generally occurred in the first week of July. Delay of cutting by 1 week in late June or early July resulted in a small reduction in hay nutritional quality. However, that hay would still meet energy and CP % requirements for non-lactating beef cows. Regression models showed that a delay of 1.5 weeks (from 20 June to 1 July) in cutting translated to a mean decrease in CP % of 2.1. Conversely, this delay secured an increase in the rate of fledgling, from 0 to 20% for bobolink, 56% for savannah sparrow, and 44% for Nelson's sharp-tailed sparrow. Postponing cut by 1 more week (to a minimum of 7 July) gave the benefit of allowing maximum fledging rates for all species, while CP % lost 3.5. While this level of CP % is unlikely to support high maintenance periparturient cows and feeder/finisher cattle, it could be made profitable through mineral supplementation. ADF levels were considerably elevated, while Ca and P improved in the same time period. These trends show delayed hay cutting can be a viable option for farmers opting to conserve breeding birds on hayfields. The feasibility of delaying cut varies with a farm's specialization, and to a degree, breed kept. Such practices can be incorporated into a holistic approach to agroecosystem management.
Keywords: Bobolink; Breeding phenology; Crude protein; Fledging rate; Grassland birds; Hay cutting; Livestock nutrition

Pedro Veiga Rodrigues Paulino, Sebastiao de Campos Valadares Filho, Marcos Antonio Lana Costa, Mario Fonseca Paulino, Karla Alves Magalhaes, Edenio Detmann, Rilene Ferreira Diniz Valadares, Marlos Oliveira Porto, Kamila Andreatta, Validation of the 9-11th rib cut to estimate the chemical composition of the dressed carcass and of the whole empty body of Zebu cattle, Livestock Production Science, Volume 93, Issue 3, May 2005, Pages 245-253, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.10.005.
(http://www.sciencedirect.com/science/article/B6T9B-4F29SRF-1/2/eca5317a764f83a3909c6f2b140edf34)
Abstract:
This study was conducted to validate the 9-11th rib cut to estimate the chemical composition of the carcass and of the empty body weight (EBW) of Zebu cattle. Nineteen Zebu steers with initial body weight of 266.5+/-32.2 kg were used. Four steers were slaughtered at the beginning to compose the reference group; three were fed at maintenance level, and the remaining were allotted to different planes of nutrition (5.0%, 35.0% and 65.0% concentrate levels in the diets, DM basis). The 9-11th rib cuts and half of the carcasses were dissected and the weights of fat, muscle and bone tissue were recorded. The components fat, muscle and bone tissue from the 9-11th rib cut and from the half carcass were sampled and chemical analysis of fat, protein, water, ash and minerals determined. The 9-11th rib cut satisfactorily estimated the physical composition of the carcass, but not the chemical composition. The 9-11th rib cut appropriately estimated the chemical composition of the carcass in terms of protein, water, ash and macro mineral content. For the

percentage of fat and Ca, an over- and underestimation of 7.84% and 13.34%, respectively, were detected. Regression equations were fitted to estimate the percentage of fat and Ca in the carcass, and that of protein, water and ash in the whole empty body.
Keywords: Body composition; Carcass; 9-11th rib cut; Validation; Zebu cattle

G. E. Meglia, A. Johannisson, S. Agenas, K. Holtenius, K. Persson Waller, Effects of feeding intensity during the dry period on leukocyte and lymphocyte sub-populations, neutrophil function and health in periparturient dairy cows, The Veterinary Journal, Volume 169, Issue 3, May 2005, Pages 376-384, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2004.02.003.
(http://www.sciencedirect.com/science/article/B6WXN-4C1FCJR-B/2/d7402d7dc6e22d41f7ed2cb578e5b197)
Abstract:
The objective of this investigation was to study (1) the numbers of leukocytes, (2) the proportions of lymphocytes expressing CD4, CD8, WC1, B or IL2R and (3) neutrophil phagocytosis and oxidative burst activity in blood around parturition in three groups of dairy cows fed different levels of a total mixed ration during the last eight weeks before calving. All cows were fed ad libitum during the first eight weeks of lactation. Serum concentration of the acute phase protein serum amyloid A (SAA), the milk somatic cell count (SCC) and disease incidence were also recorded. Special emphasis was given to the weeks just before and just after calving as dairy cows are known to be immune suppressed during this period.
Dry period diet had only minor effects on leukocyte numbers, and did not influence neutrophil phagocytosis and oxidative burst. In addition, no effect was observed on disease incidence or SAA concentrations. However, an increase in the proportion of B-lymphocytes and a decrease in the proportion of WC1+ T lymphocytes were observed after calving in cows fed high or low energy rations during the dry period, but not in cows fed a medium energy ration. The weeks just before and after parturition were characterised by neutrophilia, eosinopenia, lymphopenia and monocytosis, but time had no effect on neutrophil phagocytosis and oxidative burst. The proportions of CD4+, CD8+, B+ and IL-2R+ lymphocytes increased in early lactation relative to the mid dry period. In addition, the concentration of SAA increased dramatically at calving. The results emphasise the need for more studies to clarify the complex interactions between nutrition and immunity during the peripartum period in dairy cattle.
Keywords: Dairy cows; Dry period feeding; Leukocytes; Lymphocytes; Neutrophil functions; SAA

B.F. McNamee, V.B. Woods, D.J. Kilpatrick, C.S. Mayne, R.E. Agnew, F.J. Gordon, The prediction of the intake potential of grass silage in the supplemented diets of lactating dairy cows, Livestock Production Science, Volume 92, Issue 3, March 2005, Pages 233-240, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.08.015.
(http://www.sciencedirect.com/science/article/B6T9B-4DS6JND-1/2/6a3a8d5dc9292e29e817aaa4b9bd4d43)
Abstract:
This study was undertaken to develop models which could be used in conjunction with the near infrared reflectance spectroscopy (NIRS) analysis of grass silage to accurately predict the intake potential of grass silage when offered to lactating dairy cows as part of a mixed diet. Empirical models were developed with data collected from two large-scale studies carried out at the Institute. The models comprised of (1) a linear equation for converting the NIRS-based predicted intake of a given silage for beef cattle to dairy cows and (2) a model which corrected the intake potential of the grass silage for supplementary concentrates. Furthermore, a milk yield adjustment factor of 0.14 kg DM/kg milk was utilised to standardise milk yields. Both linear and exponential models were developed to describe the decrease in silage intake as concentrate intake increased, with y-axis intercepts corresponding to unsupplemented silage intakes (NIRS-based predictions for beef cattle adjusted for dairy cows) and common x-axis intercept of 168.0 (SE=20.50) and 203.8

(SE=5.64) g/kg W0.75, respectively, corresponding to concentrate intake when offered as a sole feed. A common r parameter (model curvature) of 1.0047 (SE=0.00397) was assumed for the exponential model. When the models were validated against the data from an independent study, the predictions from the two models were not significantly different, giving R2 values of 0.70. The intercept and slope from the linear model were 5.39 and 1.01, respectively, and the intercept and slope from the exponential model were 6.10 and 0.98, respectively. Both intercepts and slopes were not significantly different from 0 and 1, respectively. Ninety-three percent of predictions were within 10% of observed intakes in the validation data.
Keywords: Dairy cattle-feeding and nutrition; Predicted grass silage ad libitum intake; Concentrate supplementation; Empirical model; Substitution rate

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

J.W. Blum, Y. Zbinden, H.M. Hammon, Y. Chilliard, Plasma leptin status in young calves: effects of pre-term birth, age, glucocorticoid status, suckling, and feeding with an automatic feeder or by bucket, Domestic Animal Endocrinology, Volume 28, Issue 2, February 2005, Pages 119-133, ISSN 0739-7240, DOI: 10.1016/j.domaniend.2004.06.011.
(http://www.sciencedirect.com/science/article/B6T62-4CXKPYD-1/2/c36dc5c83941a248becbde5faa1b8edb)
Abstract:
Plasma leptin concentrations depend on energy intake and fat stores and are modified by hormones, such as glucocorticoids. We have measured plasma leptin concentrations in pre-term calves (born on day 277 of gestation) during the first week of life, in full-term calves (290 days of

gestation), fed similar amounts of nutrients with colostrum or a milk-derived formula, combined with or without dexamethasone treatment (to simulate a high glucocorticoid status), during the first five days of life, and in calves fed with an automatic feeder or by bucket or suckling on dams up to day 28. Leptin concentrations increased ($P < 0.05$) from birth to day 7 in pre-term calves. In full-term calves leptin concentrations were stable from day 1 to day 4 in colostrum-fed animals, but decreased ($P < 0.05$) and were lower ($P < 0.05$) if fed a formula with similar amounts of energy and macronutrients as colostrum. Concentrations increased ($P < 0.05$) from day 1 to day 2 in calves suckling on dams and then remained elevated, but did not change and were lower in calves fed with the automatic feeder or by bucket than in suckling calves. Dexamethasone only slightly elevated leptin concentrations. There was no episodic secretion pattern, and there were no consistent associations of leptin with various metabolites and hormones. In conclusion, plasma leptin in young calves with respect to effects of nutrition (low energy intake) and hormones (glucocorticoids) and in association with metabolic changes behaved differently from what is known in mature cattle.
Keywords: Plasma leptin; Colostrum; Suckling; Glucocorticoid;Young calves; Dexamethasone treatment

F. Montiel, C. Ahuja, Body condition and suckling as factors influencing the duration of postpartum anestrus in cattle: a review, Animal Reproduction Science, Volume 85, Issues 1-2, January 2005, Pages 1-26, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2003.11.001.
(http://www.sciencedirect.com/science/article/B6T43-4DCDD1W-1/2/8a14844163262af40ae30416f5178f7d)
Abstract:
Prolonged postpartum anestrus is a main factor limiting reproductive efficiency in cattle, particularly in Bos indicus and Bos taurus/Bos indicus cows from tropical regions, because it prevents achievement of a 12 month calving interval. During anestrus, ovulation does not occur despite ovarian follicular development, because growing follicles do not mature. Although many factors affect postpartum anestrus, nutrition and suckling are the major factors influencing the resumption of postpartum ovarian cycles, as they affect hypothalamic, pituitary and ovarian activity and thus inhibit follicular development. Under-nutrition contributes to prolonged postpartum anestrus, particularly among cows dependent upon forages to meet their feed requirements and it apparently interacts with genetic, environmental or management factors to influence the duration of anestrus. The nutritional status or balance of an animal is evaluated through body condition score (BCS), as it reflects the body energy reserves available for metabolism, growth, lactation and activity. There is a converse relationship between energy balance and time to resumption of postpartum ovarian activity; inadequate nutrient intake results in loss of weight and BCS and finally cessation of estrous cycles. Suckling interferes with hypothalamic release of GnRH, provoking a marked suppression in pulsatile LH release, resulting in extended postpartum anestrus. The effects of suckling on regulation of tonic LH release are determined by the ability of the cow to identify a calf as her own or as unrelated. Vision and olfaction play critical roles in the development of the maternal-offspring bond, allowing the cow to identify her own calf, and abolition of both senses attenuates the negative effects of suckling on LH secretion. Thus, the maternal-offspring bond is essential for prolonged postpartum suckling-induced anovulation, and the suppressive influence of suckling is independent of neurosensory pathways within the teat or udder.
Keywords: Anestrus; Body condition score; Cattle; Suckling; Postpartum

C. Castillo, J. L. Benedito, J. Mendez, V. Pereira, M. Lopez-Alonso, M. Miranda, J. Hernandez, Organic acids as a substitute for monensin in diets for beef cattle, Animal Feed Science and Technology, Volume 115, Issues 1-2, 1 July 2004, Pages 101-116, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2004.02.001.

(http://www.sciencedirect.com/science/article/B6T42-4C1NFM2-2/2/208545e0ec53f92501d85c9afe981357)
Abstract:
Feeding cattle high-grain diets has brought concurrent problems with ruminal acidosis. Grain overload in feedlot cattle has gained the most attention because of its economic impact. In fact, ruminal acidosis is second only to respiratory diseases, in depressing animal performance and production efficiency. Much of the past research has focused on effects of antimicrobial compounds (such as monensin) on ruminal fermentation; they have become management tools to prevent or to control ruminal acidosis. Despite beneficial effects of such compounds, in 2002 the European Commission proposed to ban on antibiotic growth promotants including monensin. This legislation has important economic implications in production cost of beef. Several nutritional alternatives to monensin have been studied in vitro with diverse results. This paper provides an overview of research with organic acids (malate and fumarate) for beef cattle as a substitute for monensin. Although these organic acids may be considered as feed additives, more research is needed about the effects of malate and (or) fumarate on beef cattle performance. Dietary factors such as forage:concentrate ratio, and forage or cereal grain type may alter the response to these additives. In addition, appropriate timing for supplementing with malate or fumarate must be studied.
Keywords: Malate; Fumarate; Beef cattle nutrition; Rumen fermentation; Feedlot

G. P. Nogueira, Puberty in South American Bos indicus (Zebu) cattle, Animal Reproduction Science, Volumes 82-83, Research and Practice III. 15th International Congress on Animal Reproduction, July 2004, Pages 361-372, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.04.007.
(http://www.sciencedirect.com/science/article/B6T43-4CFV6HJ-1/2/6ed0e4689907a1868966f3036776321f)
Abstract:
Puberty in Zebu heifers follows a pattern characterized by a decrease in the steroid feedback mechanism and an increase in LH concentration, which result in the first ovulation followed by a short estrous cycle and the onset of normal cycles thereafter. These events are similar to those observed in Bos taurus cattle but occur at a later age. The late onset of puberty is both genetic and environmental in origin and is reflected by the age at first calving that can be at 40 months of age or older in these animals. Age at puberty in Zebu heifers has been shown to have a high heritability. Consequently, selecting precocious heifers may be an effective means of reducing age at puberty in these animals and this approach is being adopted in commercial practice. Genetic selection is not the sole solution to the problem because environmental improvements are necessary, particularly in terms of improved nutrition. South American Zebu cattle are usually subject to sub-optimum nutritional and management conditions and, hence, exhibit late onset of puberty. Hybrids of Zebu and Bos taurus cattle exhibit heterosis in respect of the age of puberty with earlier onset than expected in crossbred animals. Recently, purebred South American Zebu cattle have been shown to have Bos taurus genes, indicating that there have been previous attempts to improve their productivity using this approach. It was concluded that the age at first calving in South American Zebu cattle can be reduced by exposing well-fed, yearling heifers to bulls and selecting, over several generations, those animals that become pregnant at an early age.
Keywords: Cattle; Bos indicus; Zebu; Puberty; Heifers; South America

M. G. Hunter, R. S. Robinson, G. E. Mann, R. Webb, Endocrine and paracrine control of follicular development and ovulation rate in farm species, Animal Reproduction Science, Volumes 82-83, Research and Practice III. 15th International Congress on Animal Reproduction, July 2004, Pages 461-477, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.05.013.

(http://www.sciencedirect.com/science/article/B6T43-4CNJ9Y4-5/2/b9dd8844275e476e9624d321e964b3f4)
Abstract:
Productivity in farm species is controlled by many factors, including ovulation rate. In cattle, single ovulations occur most frequently and in sheep (and goats) the number of ova released can range from one to many depending upon the breed, whilst the pig is polyovular. The processes of recruitment and selection determine the number of ovulatory follicles in all these species with FSH and subsequently LH playing major roles. GnRH-agonist models in which endogenous gonadotrophin secretion is suppressed and exogenous LH and/or FSH are administered at specific concentrations in defined patterns, are useful in all three species for elucidating the precise roles of specific hormones in stimulating follicular development. Differences in the hypothalamic-pituitary-ovarian feedback response lead to the differences in the number of ovulatory follicles, as does the pool of antral follicles from which the ovulatory ones are selected. Precocious development of follicles is also associated with more ovulations, as is the case with the Booroola due to the single gene acting through bone morphogenetic proteins (BMPs). It is well established that ovulation rate can also be influenced by exogenous hormone administration and by environmental factors such as nutrition. It has become apparent that these nuritional effects are mediated by a direct action at the level of the ovary, involving insulin, insulin-like growth factors (IGF) I and II and their binding proteins among other factors. These factors can also affect the quality of the oocyte and consequently embryo development and survival. Recently, the regulation of follicular angiogenesis has been shown to be important for the development of ovulatory follicles, particularly vascular endothelial growth factor (VEGF) which is produced primarily by the granulosa cells within the ovary and can be stimulated by gonadotrophins. Administration of VEGF has been shown to stimulate pre-antral follicular growth and increase the number of pre-ovulatory follicles. In summary both extra- and intra-ovarian factors are involved in the control of ovulation rate. Manipulation of the angiogenic process may also provide new opportunities for regulating the quality and number of follicles that ovulate.
Keywords: Follicle; Ovulation rate; Endocrinology; Growth factors; Angiogenesis

S. Landau, S. Friedman, S. Brenner, I. Bruckental, Z. G. Weinberg, G. Ashbell, Y. Hen, L. Dvash, Y. Leshem, The value of safflower (Carthamus tinctorius) hay and silage grown under Mediterranean conditions as forage for dairy cattle, Livestock Production Science, Volume 88, Issue 3, July 2004, Pages 263-271, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2003.11.011.
(http://www.sciencedirect.com/science/article/B6T9B-4BP3MHN-1/2/d6e648747d3496a7d4e8728c7eff0bb6)
Abstract:
The value for dairy cattle of safflower grown under Mediterranean condition was investigated in two experiments. In experiment 1, safflower hay was given ad libitum as sole food to four dry dairy cows. The DM ingested from hay was of medium CP and NDF contents (148 and 406 g kg-1, respectively). Values of in vivo and in vitro Tilley and Terry DM digestibility were 723 and 646 g kg-1 DM, respectively. In the second experiment, 19 cows were fed a total mixed ration (TMR) including 4 kg (as DM) of corn plus wheat (CW) silage, and another 19 received the same TMR, with safflower silage (S) substituted for CW silage, on the same DM basis, for 62 days. Diets were of similar NDF content (314 and 331 g kg-1 DM, for CW and S, respectively), but cows fed S consumed less DM than those fed CW (20.2 and 22.5 kg, $P<0.02$). Milk production (30.2 kg day-1), and the contents of fat (35.4 g kg-1), lactose (46.4 g kg-1), and urea (0.32 g kg-1) were similar between groups. Milk CP tended to be lower in S than in CW (31.6 and 33.6 g kg-1, respectively, $P=0.07$). Changes in body live-weight and condition score were not affected by diet. Safflower silage has the potential for widespread adoption as a feed in Mediterranean countries, if special characteristics such as protein degradability are taken into account to optimize its inclusion in TMRs.

Keywords: Dairy cattle; Nutrition and feeding; Unconventional forages; Compositae

P. M. Dawuda, R. J. Scaramuzzi, S. B. Drew, H. J. Biggadike, R. A. Laven, R. Allison, C. F. Collins, D. C. Wathes, The effect of a diet containing excess quickly degradable nitrogen (QDN) on reproductive and metabolic hormonal profiles of lactating dairy cows, Animal Reproduction Science, Volume 81, Issues 3-4, April 2004, Pages 195-208, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2003.09.008.
(http://www.sciencedirect.com/science/article/B6T43-4BG3T9S-1/2/e9ffea259cab5cc91bd1382edd97b0a0)
Abstract:
The objective of this experiment was to examine the effects of an excess intake of quickly degradable nitrogen (QDN) on metabolic and reproductive parameters in lactating dairy cows. Twenty-two lactating dairy cows were fed a total mixed ration once daily. The control diet was a typical ration for high producing cows in the UK (CP=17.5%, ME=11.8 MJ/kg DM). The cows were randomly divided into two groups, control diet (control; n=12) and excess QDN diet (QDN; n=10). The QDN group was fed an additional 250 g of urea per cow per day, from 10 days before insemination (day 0) until the end of the experiment, 17 days after the second insemination. Ten days before insemination, a synchronized oestrus was induced and the cows inseminated twice, 48 and 72 h after synchronization, with commercial frozen semen from a single sire. Ovaries were scanned using B-mode ultrasonography 10 days before insemination and then daily from 3 days before insemination. Eighteen of the cows (9 control and 9 QDN) were sampled more intensively to determine the pulsatile pattern of secretion of luteinizing hormone (LH) and growth hormone (GH). Cows were slaughtered 17 days after insemination, the reproductive tracts recovered and flushed to retrieve embryos.
The excess QDN diet resulted in elevated ($P<0.05$) plasma urea concentrations 3 days after starting urea feeding and these were maintained until the end of the experiment. However, the excess QDN diet did not significantly affect daily milk production or plasma concentrations of insulin and IGF-I. The QDN treatment did not significantly affect pulsatile patterns of secretion of LH and GH or the number of small (<0.5 cm diameter) and medium to large follicles (>0.5 cm diameter). Twenty cows ovulated following synchronization (control 11/12; QDN 9/10). There were no significant differences between the control and the QDN groups in the peak concentrations of oestradiol during the follicular phase or in the post-ovulatory pattern of plasma and milk progesterone secretion. Embryos and/or foetal membranes were recovered from 10 cows (5 control and 5 QDN). The results of the current study show that feeding excess QDN, as urea, for 27 days commencing 10 days before insemination had no effect on reproductive or metabolic hormonal parameters. Ovulation and the formation and function of the post-ovulatory corpus luteum were also unaffected by excess QDN. These data suggest that the harmful effects of excess intakes of QDN on fertility occur after 17 days following ovulation.
Keywords: Cattle feeding and nutrition; Urea feeding; LH; GH; QDN

J. E. Pryce, M. D. Royal, P. C. Garnsworthy, I. L. Mao, Fertility in the high-producing dairy cow, Livestock Production Science, Volume 86, Issues 1-3, March 2004, Pages 125-135, ISSN 0301-6226, DOI: 10.1016/S0301-6226(03)00145-3.
(http://www.sciencedirect.com/science/article/B6T9B-49WPNFX-1/2/346a0732eaaf59582ebc259cd2ee291f)
Abstract:
Genetic correlations between milk yield and reproductive measures in dairy cows are unfavourable. This suggests that successful selection for higher yields may have led to a decline in fertility. There is also evidence that an imbalance of nutrients, in either high genetic merit cows or those fed diets not matched to their performance, leads to poorer reproductive performance. Physiological reasons for the antagonism have not been elucidated. In this paper we examine the

complexity of genetic, nutritional, physiological and management factors of the yield versus fertility antagonism. To maintain or recover high fertility in modern dairy cows calls for a two-pronged approach involving both inclusion of fertility in broader breeding goals and adjustment to management practices.
Keywords: Fertility; Dairy cattle; Nutrition; Management; Genetics

D. G. Fox, L. O. Tedeschi, T. P. Tylutki, J. B. Russell, M. E. Van Amburgh, L. E. Chase, A. N. Pell, T. R. Overton, The Cornell Net Carbohydrate and Protein System model for evaluating herd nutrition and nutrient excretion, Animal Feed Science and Technology, Volume 112, Issues 1-4, Mathematical modeling of Animal-Plant interactions in Livestock Enterprises, 10 February 2004, Pages 29-78, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2003.10.006.
(http://www.sciencedirect.com/science/article/B6T42-4B8BNCN-1/2/91b665ba37a5efe73afb5b43a1ee83a2)
Abstract:
The Cornell Net Carbohydrate and Protein System (CNCPS) is a mathematical model that estimates cattle requirements and nutrient supply based on animal, environmental, and feed compositional information in diverse production situations. Predicted animal requirements account for different physiological states (lactation, pregnancy, and growth), body reserves and environmental effects. The CNCPS uses feed carbohydrate and protein degradation and passage rates to predict extent of ruminal fermentation, microbial protein production, post-ruminal absorption, and total supply of metabolizable energy and protein to the animal. The CNCPS has been used successfully on beef and dairy cattle farms to evaluate and formulate rations. In an evaluation with individually fed growing cattle, the CNCPS accounted for 89% of the variation in ADG with a 7.4% underprediction bias. When the CNCPS was evaluated with data from individual dairy cows where the appropriate inputs were measured and changes in energy reserves were accounted for, the CNCPS accounted for 90% of the variation in actual milk production of individual cows with a 1.3% bias. The model accounted for 76% of the variation in individual cow milk production with an 8% underprediction bias when energy was first limiting in high producing cows, and accounted for 84% of the variation with a 1.1% overprediction bias when protein was first limiting.
Keywords: Modeling; Simulation; Cattle; Nutrient; Requirement; Supply; Rumen

John P. McNamara, Research, improvement and application of mechanistic, biochemical, dynamic models of metabolism in lactating dairy cattle, Animal Feed Science and Technology, Volume 112, Issues 1-4, Mathematical modeling of Animal-Plant interactions in Livestock Enterprises, 10 February 2004, Pages 155-176, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2003.10.010.
(http://www.sciencedirect.com/science/article/B6T42-4B4HK76-1/2/2a97dac3e05040ad1a393d550a059348)
Abstract:
Models are representations of reality. The fields of nutrition, metabolism and biomedicine have used models to aid in research and its applications since before World War II. A model, or a modeling approach, to research may also be defined as an ordered way of describing knowledge of some `real' system. Such models have been useful in ordering our knowledge into practical systems to describe nutrient requirements of agricultural animals. The ability to describe metabolic transactions, and their resultant affects on nutrient requirements, is critical to the continued ability to raise food-producing animals in efficient ways around the world. Models of increasing complexity, ever grounded in validated research data, will continue to improve. The only way to eventually define the true complexity of the organisms that we are dealing with is to have an ordered model approach which, in a planned iterative fashion, asks complex questions and increases our knowledge with the clear answers we receive. A mechanistic, dynamic model of metabolism exists in the dairy cow (Molly, Modelling Ruminant Digestion and Metabolism.

Chapman & Hall, New York, USA, p. 469.) and allows testing of complex hypotheses on the nutrition of the dairy cow. A major area for which we still lack full understanding is metabolism in early lactation. A series of model challenges has determined that descriptions of basic processes (such as ion pumping, protein and fat turnover rates, and increased metabolic costs associated with increased intake) in this model are inadequate. Milk production can be described very well from feed inputs. However, errors in the biochemical transactions of viscera and muscle tissue result in excess energy accumulation in adipose tissue. A hypothesis, based on validated experimental evidence explicit in the Molly model, and on observations made since construction of the model, is that simulated rates of energy use in the viscera, probably due to the hormonal and nutrient intake changes that take place in early lactation, are too low in the model. A corollary hypothesis is that rates of energy use by the body, especially in protein turnover and its associated metabolic costs are also too low. Simulations increasing these energetic costs resulted in realistic reductions in body fat relative to observed experimental data. These hypotheses become the framework for continued experimentation and incorporation of new information into the model.
Keywords: Lactation; Mechanistic model; Body fat; Energy use; Dairy cows

G. F. W. Haenlein, Goat milk in human nutrition, Small Ruminant Research, Volume 51, Issue 2, Contribution of Goats to Mankind, February 2004, Pages 155-163, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2003.08.010.
(http://www.sciencedirect.com/science/article/B6TC5-49WMXM1-3/2/654dffe50e1e131477ccb7737a937baa)
Abstract:
Goat milk and its products of yoghurt, cheese and powder have three-fold significance in human nutrition: (1) feeding more starving and malnourished people in the developing world than from cow milk; (2) treating people afflicted with cow milk allergies and gastro-intestinal disorders, which is a significant segment in many populations of developed countries; and (3) filling the gastronomic needs of connoisseur consumers, which is a growing market share in many developed countries. Concerning (1), very much improvement in milk yield and lactation length of dairy goats, especially in developing countries must be accomplished through better education/extension, feeding and genetics. Concerning (2), little unbiased medical research to provide evidence and promotional facts has been conducted, but is very much needed to reduce discrimination against goats and substantiate the many anecdotal experiences about the medical benefits from goat milk consumption, which abound in trade publications and the popular press. Goats have many unique differences in anatomy, physiology and product biochemistry from sheep and cattle, which supports the contention of many unique qualities of dairy goat products for human nutrition. Concerning (3), a few countries like France have pioneered a very well-organized industry of goat milk production, processing, marketing, promotion and research, which has created a strong consumer clientele like in no other country, but deserves very much to be copied for the general benefit to human nutrition and goat milk producers. The physiological and biochemical facts of the unique qualities of goat milk are just barely known and little exploited, especially not the high levels in goat milk of short and medium chain fatty acids, which have recognized medical values for many disorders and diseases of people. The new concept of tailor making foods to better fit human needs has not been applied to goat milk and its products so far, otherwise the enrichment of short and medium chain fatty acids in goat butter, and their greater concentration compared to cow butter, could have become a valued consumer item. Also revisions to human dietary recommendations towards admitting the health benefits of some essential fats supports the idea of promoting goat butter. While goat yoghurt, goat cheeses and goat milk powder are widely appreciated around the world, goat butter is not produced anywhere commercially in significant volume.
Keywords: Goat milk; Nutritional value; Short and medium chain fatty acids; Cow milk allergy; Goat cheese; Goat milk powder; Goat butter

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

Andre Eggen, Jean-Francois Hocquette, Genomic approaches to economic trait loci and tissue expression profiling: application to muscle biochemistry and beef quality, Meat Science, Volume 66, Issue 1, January 2004, Pages 1-9, ISSN 0309-1740, DOI: 10.1016/S0309-1740(03)00020-2.
(http://www.sciencedirect.com/science/article/B6T9G-4834HXG-G/2/422bee88c26b19b46f2783b6f954ead1)
Abstract:
Genetic and environmental factors profoundly alter the phenotypes of animals. Nowadays, genomics allows large-scale analysis of gene characteristics (structural genomics) and expression (functional genomics). Genome mapping, comparative genomics and identification of quantitative trait loci and polymorphisms are the subject of active investigation to gain a better knowledge of the structure and function of genes. Gene expression profiling using DNA microarrays and proteomics holds great promise for the study of regulatory events which control the final biological functions. Combined with classical genetics and muscle biochemistry to form an integrative biology, these new approaches will bring a better understanding of complex traits and physiological processes. Major applications in meat science could be, for cattle, (1) the identification of new predictors of quality traits (for instance, tenderness), (2) the monitoring of beef quality (including traceability) through the production systems (nutrition level, growth path, grass-feeding), and (3) the improvement of animal selection (markers and gene assisted selection) which may also include quality traits.
Keywords: Genomics; Animal selection; Meat science; QTL; Mapping; Functional genomics

P. I. Rekwot, O. P. Akinpelumi, V. O. Sekoni, L. O. Eduvie, E. O. Oyedipe, Effects of nutritional supplementation and exposure to bulls on resumption of post-partum ovarian activity in Bunaji

(Bos indicus) cattle, The Veterinary Journal, Volume 167, Issue 1, January 2004, Pages 67-71, ISSN 1090-0233, DOI: 10.1016/S1090-0233(02)00266-6.
(http://www.sciencedirect.com/science/article/B6WXN-48FSWN9-1/2/38b96cab2117d880d1468d46a62085ba)
Abstract:
A total of 51 pluriparous post-partum Bunaji (Zebu) cows belonging to agropastoralists were involved in a 2x2 factorial experiment for a period of 180 days. The cows were assigned randomly at calving to four treatments: (1) grazing only (no supplementation) and exposure to bull (NSBE); (2) grazing only (no supplementation) and no exposure to bull (NSNE); (3) grazing plus feed supplementation (each cow received 600 g of 20.8% crude protein of whole cottonseed supplement per day) and exposure to bull (FSBE); (4) grazing plus feed supplementation and no exposure to bull (FSNE). Cows with an increase in milk progesterone (P4) concentration of [greater-or-equal, slanted]1 ng/mL from the weekly milk samples were used to analyse the number of days from calving to the time of resumption of ovarian activity. The mean interval from parturition to cyclic ovarian activity for FSBE cows was 95 days, compared to 119 days for the FSNE cows. Intervals to onset of post-partum ovarian activity were 24, 33 and 39 days which were significantly earlier in the FSBE cows, than the FSNE, NSBE and NSNE cows, respectively. Intervals to cyclic activity were 9 and 15 days earlier in FSNE cows than in NSBE and NSNE cows. By 150 days post-partum, 100% and 92% of the cows in the supplemented groups (FSBE and FSNE), had resumed cyclic ovarian activity compared with 75% and 69% for the unsupplemented cows (NSBE and NSNE). It is concluded that nutritional supplementation and exposure to bulls synergistically shortened the length of post-partum anoestrus in zebu cattle. The economic benefits of using exposure to bulls and cottonseed supplementation in this study to enhance early resumption of post-partum ovarian activity of cattle may serve as a management tool in tropical areas where livestock production has some constraints.
Keywords: Feeding and nutrition; Exposure to bulls; Post-partum ovarian activity; Zebu (Bos indicus) cattle