**A herb and legume sward mix increased ewe milk production and ewe and lamb live weight gain to weaning compared to a ryegrass dominant sward**

This study investigated the potential of a mixed herb sward to improve production of multiple-bearing ewes and their offspring compared to a ryegrass dominant sward. Forty four twin-bearing (twin) and 42 triplet-bearing (triplet) mixed-aged Romney ewes that were a maximum of 140 days pregnant (P140) were randomly allocated to one of two nutritional treatments being: a mix of chicory, plantain, white and red clover (Herb), or a ryegrass dominant sward (Ryegrass) to form the following groups: twin Ryegrass n = 22, triplet Ryegrass n = 20, twin Herb n = 22 and triplet Herb n = 22. Ewes and their lambs remained on these herbage treatments until 66 days after the mid-point of lambing (L66). By L66, ewes grazing the Herb treatment compared to ewes on the Ryegrass treatment were heavier (P<0.05; 70.9 ± 1.17 kg versus 66.1 ± 1.15 kg) and had higher (P<0.05) body condition scores (2.8 ± 0.07 versus 2.4 ± 0.07, respectively). Ewes grazing the Herb treatment produced more milk (P<0.05) at each of the three sampling periods (3137 ± 161.3 versus 2613 ± 148.1 at day 7, 3280 ± 148.8 versus 2483 ± 153.1 at day 14 and 3237 ± 131.8 mL versus 2428 ± 136.2 mL at day 21). Lambs from ewes grazing the Herb treatment were heavier (P<0.05; 17.55 ± 0.493 kg) and had higher (P<0.05) total lamb LW by L66 than Ryegrass lambs between birth and L22 (268 ± 16.2 g/day versus 245 ± 10.7 g/day). Herb triplet-bearing ewes produced more (P<0.05) total lamb LW by L66 than Ryegrass triplet-bearing ewes (45.70 ± 3.051 kg versus 28.26 ± 3.203 kg, respectively). Results demonstrate that a herb sward mix can improve multiple ewe and lamb performance compared to a ryegrass dominant sward [P.G. Hutton, P.R. Kenyon*, M.K. Bedi, P.D. Kemp, K.J. Stafford, D.M. West and S.T. Morris (Sheep Research Centre, College of Sciences, Massey University, New Zealand), *Animal Feed Science and Technology, 2011, 164(1-2), 1-7].

**Effects of different levels of coconut oil supplementation on performance, digestibility, rumen fermentation and carcass traits of Malpura lambs**

The influence of coconut oil (CO) supplementation (0, 25, 50 and 75 g/kg of concentrate) upon performance, nutrient utilization, rumen fermentation, blood biochemistry and carcass characteristics were assessed in lambs (4 males and 4 females in each treatment) between 15 d of age and 6 months. Lambs were allowed to suckle twice daily until 90 d of age. Concentrate and forage (*Ailanthus excelsa* leaves) were provided *ad libitum* for the duration of the experiment. Lambs were weighed at weekly intervals, and a metabolism study was conducted on six representative lambs from each group at 120 d of age to determine nutrient utilization and N balance. Blood samples and rumen liquor samples were drawn at 180 d to determine blood biochemical and rumen fermentation characteristics. At 6 months of age all the male lambs were slaughtered and carcass traits were evaluated. Coconut oil intake was 7.1, 13.8 and 18.8 g/d in three treatment groups compared to zero in control. Pre- and post-weaning gain was similar while dry matter intake was higher in both pre-weaning (L: *P*<0.001; Q: *P*<0.001) and post-weaning (L: *P*<0.001; Q: *P*<0.001) in control. Digestibilities of organic matter (*P*<0.013) and neutral detergent fiber (*P*<0.062) decreased and that of ether extract increased (*P*<0.001) linearly with increased CO supplementation. The N retention decreased linearly (*P*<0.001) with increasing CO supplementation. Concentration of total N and trichloroacetic acid precipitable N decreased at a decreasing rate (Q: *P*=0.051 and *P*=0.019, respectively) whereas ammonia N in rumen liquor decreased at an increasing rate (Q: *P*=0.003) with increased CO supplementation. Coconut oil supplementation linearly (*P*=0.006) reduced rumen protozoa population. Though the concentration of serum glucose was similar, serum cholesterol and non-esterified fatty acids increased linearly (*P*<0.05) with CO supplementation both pre - and post-weaning. Pre-slaughter weight, dressed weight, eye muscle area, and body fat were similar in all the lambs. Coconut oil supplementation up to 50 g/kg is optimum in lamb rations due to improved feed conversion ratio and production of a carcass with acceptable
characteristics. Higher levels of CO supplementation depressed growth and feed conversion due to its suppression of rumen protozoa and reduced fiber digestibility [R.S. Bhatt, N.M. Soren*, M.K. Tripathi and S.A. Karim (Division of Animal Nutrition, Central Sheep and Wool Research Institute, Avikanagar, Via-Jaipur, Rajasthan 304501, India), Animal Feed Science and Technology, 2011, 164(1-2), 29-37].

*NPARR* 2(2), 2011-0158, *Effects of sodium bicarbonate on diet selection and rumen digestion by growing lambs individually fed whole barley grain and a protein supplement at their choice*

A feeding and digestion study was completed to determine whether sodium bicarbonate supplementation modifies diet selection of whole barley grain and a protein supplement by lambs. The underlying hypothesis was that aversion to barley intake to avoid acidosis might explain overconsumption of protein. Sixty weaned lambs (15.1 ± 0.33 kg live weight (LW)) were allocated to one of three dietary treatments in 2 pens of 5 lambs by sex, according to a 3 treatments×2 sex factorial design. Treatments were whole barley grain and a pelleted protein supplement fed at choice either unsupplemented (U) or supplemented with sodium bicarbonate fed by free access on the side (BF) or incorporated into the protein supplement at 15 g/kg dry matter (BI). At the end of the growing period, 7 male lambs from each treatment (24.2 ± 0.13 kg LW) were moved to individual pens and slaughtered after 5 days of individual intake control to characterise rumen fermentation and determine digesta flow and microbial crude protein (CP) contribution to the abomasum, using C3 alkane and purine bases as flow and microbial markers, respectively. Intake of sodium bicarbonate was higher (*P*<0.005) when provided free access than when incorporated into the protein pellet (13.9 g/d vs. 5.0 g/d for BF and BI) but it did not affect dry matter intake (797 g/d) or average daily gain (328g/d vs. 289g/d for male and female lambs), although barley grain intake tended (*P*=0.052) to decrease in response to buffer addition. A lower (*P*<0.05) proportion of organic matter truly digested in the rumen (OMTDR; 0.53 vs. 0.61) and a trend (*P*=0.098) to increased efficiency of microbial CP synthesis (26.7gN/kg vs. 21.6gN/kg OMTDR) occurred when the buffer was offered free access compared to incorporation into the protein supplement, respectively. Neither rumen fluid pH nor ammonia concentration differed among treatments, but the total concentration of volatile fatty acids and molar proportion of acetate tended (*P*<0.1) to increase with buffer supplementation (174mM vs. 200mM and 46.8 mol/100 mol vs. 52.7mol/100mol). Sodium bicarbonate can modify rumen digestion, but failed to buffer rumen fluid pH and reverse the aversion to barley grain [A.R. Askar, J.A. Guada*, J.M. González, A. de Vega and C. Castrillo, (Departamento de Producción Animal y Ciencia de los Alimentos, Universidad de Zaragoza, Miguel Servet 177, 50013 Zaragoza, Spain), Animal Feed Science and Technology, 2011, 164(1-2), 45-52].

*NPARR* 2(2), 2011-0159, *Effect of ensiling triticale, barley and wheat grains at different moisture content and addition of* Lactobacillus plantarum (DSMZ 8866 and 8862) *on fermentation characteristics and nutrient digestibility in pigs*

The ensiling characteristics of barley, triticale and wheat grains at two different moisture levels, with and without the addition of lactic acid bacteria (LAB, Lactobacillus plantarum DSMZ 8862 and 8866) were determined after a 50-day storage period. In addition, the impact of the different ensiling techniques on the nutritional value was determined in pigs. In Experiment (Exp.) 1, mature grains were ground and water was added to adjust the moisture to 250g kg$^{-1}$ (low moisture content, LMC) or 350 g kg$^{-1}$ (high moisture content, HMC). Grains were ensiled in laboratory scale silos for 3, 10 and 50 days. In the HMC silos, pH declined within 3 days irrespective of LAB treatment. In the LAB treated LMC, pH declined after 10 days of storage, whereas pH of untreated grains remained unchanged. Lactic acid production was higher (*P*<0.05) in HMC than in LMC grains, with almost no acid production with the untreated LMC grains. Denaturing gradient gel electrophoresis analysis revealed that the composition of the bacterial communities changed when LAB was added.

Nutrient digestibility of HMC and LMC grains ensiled for 50 days with addition of LAB and untreated dry grains was determined separately for each grain in pigs. Digestibility was increased in LMC (crude fibre, crude protein, phosphorus) and
HMC (ether extract) wheat grains, whereas only ether extract digestibility was improved in HMC triticale and no differences were observed for barley. A higher ($P<0.05$) phosphorus digestibility was observed in LMC triticale and wheat as compared to the dry grains, likely due to reduced phytate-P after ensiling. The results show that cereals with a moisture content of 250 g kg$^{-1}$ can be ensiled successfully provided that LAB is added, and that under these conditions phosphorus availability is increased [R. Pieper*, W. Hackl, U. Korn, A. Zeyner, W.B. Souffrant and B. Pieper (Chair for Nutrition Physiology and Animal Nutrition, Faculty of Agricultural and Environmental Sciences, University of Rostock, Justus-von-Liebig-Weg 8, D-18055 Rostock, Germany), Animal Feed Science and Technology, 2011, 164(1-2), 130-134].

**NPARR 2(2), 2011-0160, The use of glycerine in rations for light lamb during the fattening period**

One hundred and two Ripollesa weaned lambs (15 ± 1.7 kg BW; 45 ± 7.9 days of age) from two different lambing periods (Period 1 $n = 39$ and Period 2 $n = 63$) were used to study three different diets that included 0 g/kg, 50 g/kg or 100 g/kg glycerine in the concentrate. Lambs were fed concentrate (180 g/kg CP, 18.7 MJ of GE/kg DM) and barley straw ad libitum until the slaughter weight (25 SEM = 1.4 kg BW). Lambs were distributed in 9 pens per period in groups of 4 or 5 lambs (Period 1) and 7 lambs (Period 2) according to their weaning BW and age, and BW and concentrate and straw intakes as well as water consumption were measured weekly. Blood samples to determine glucose and insulin concentrations were obtained at 2 and 4 wk of the study, and carcass weight was recorded at the slaughterhouse. At slaughterhouse a sample of rumen mucosa of the caudal sac of the ventral zone was obtained to determine the number of rumen papillae, and a sample of the Longissimus dorsi from ten female lambs per treatment was obtained to analyse fatty acid profile of the meat. None of the parameters measured in lambs were affected by the glycerine content of concentrates. The only differences observed were in meat fatty acid composition. The C12 ($P=0.08$) and C17 ($P=0.06$) tended to be greater in lambs fed concentrates with glycerine than without glycerine. In contrast, total amount of C18:1 cis in muscle tended ($P=0.10$) to be greater in lambs consuming a concentrate without glycerine than in lambs receiving concentrates with glycerine. Glycerine can be included as an ingredient in lamb diets during their fattening period without impairing the growth of lambs, without reducing concentrate or straw intake, and without affecting blood metabolites, rumen papillae development, and the main fatty acids of *L. dorsi* muscle [M. Terré*, A. Nudda, P. Casado and A. Bach (Department of Ruminant Production, IRTA (Institut de Recerca i Tecnologia Agroalimentàries), 08140, Caldes de Montbui, Spain), Animal Feed Science and Technology, 2011, 164(1-2), 96-105].

**NPARR 2(2), 2011-0160, Effect of flavoring a starter in a same manner as a milk replacer on intake and performance of calves**

The effects of including the same flavor additive in a milk replacer (MR) and a starter to facilitate a sensorial association between the flavor of starter and that of the MR were explored in an attempt to encouraging calves to increase solid feed consumption around weaning. Twenty-two male Holstein calves (initial body weight=51.2±0.82 kg; age=22±1.6 d) participated in this study. All calves consumed the same starter during the first 34 d of study and were weaned at 42 d of study (65 d of age). The study finished 14 d after weaning. All calves received the same flavored MR and during the 7 d preceding weaning until the end of the study, half of the calves were fed a pelleted starter with the same flavor as that of the MR around weaning, whereas the remaining calves were offered the same starter without flavor. Starter and MR consumptions were registered daily, and BW recorded weekly. Overall, starter intake was not affected by flavor addition. However, calves with the lowest solid feed consumption before weaning (days 28–34 of study), numerically ($P=0.11$) consumed more starter following weaning when the starter was flavored compared with calves receiving plain starter. These calves also tended ($P=0.06$) to have a greater average daily gain during the 14 d following weaning compared with calves within the same low level of solid feed consumption but that consumed the unflavored starter. Flavoring calf starters in the same manner as MR might improve solid feed consumption and performance of calves with a low appetite for solid feed before weaning [C. Montoro, I. Ipharraguerre and A. Bach* (Department of Ruminant Production, IRTA (Institut de Recerca i Tecnologia Agroalimentàries), 08140, Caldes de Montbui, Spain), Animal Feed Science and Technology, 2011, 164(1-2), 130-134].

**NPARR 2(2), 2011-0161, Effect of flavoring a starter in a same manner as a milk replacer on intake and performance of calves**

The results show that cereals with a moisture content of 250 g kg$^{-1}$ can be ensiled successfully provided that LAB is added, and that under these conditions phosphorus availability is increased [R. Pieper*, W. Hackl, U. Korn, A. Zeyner, W.B. Souffrant and B. Pieper (Chair for Nutrition Physiology and Animal Nutrition, Faculty of Agricultural and Environmental Sciences, University of Rostock, Justus-von-Liebig-Weg 8, D-18055 Rostock, Germany), Animal Feed Science and Technology, 2011, 164(1-2), 96-105].
(Institut de Recerca i Tecnologia Agroalimentàries), Torre Marimón, 08140 Caldes de Montbui, Spain, Animal Feed Science and Technology, 2011, 164(3-4), 262-267].