

768 Practices and perceptions of cow-calf producers regarding the National Animal Identification System. S. J. Breiner^{*1}, D. A. Blasi¹, K. M. Boone¹, T. C. Schroeder¹, and S. A. Grau², ¹Kansas State University, ²Beef Magazine.

The proposed U.S. National Animal Identification System (US-NAIS) has generated many concerns among beef cattle producers. The goal of the NAIS is to utilize 48-hour traceback in the event of an animal disease outbreak. The traceback would identify all animals that have had contact with the diseased animal, while linking an animal to its premise of origin. According to the Diffusion of Innovation theory, getting a new idea adopted, even when it has clear advantages, is often very difficult. However, by adopting innovations relatively sooner than others in their system, the theory shows marked benefits for innovators and early adopters, as well as a widening of the socioeconomic gap. A national study was conducted at Kansas State University to gauge beef producer acceptance and adaptability to implement the US-NAIS.

Participants were selected in the spring of 2006, from a mailing list of cow-calf producers with more than 100 head of cows. *BEEF*[®] Magazine provided the mailing list and a random sample of 1,000 producers was selected. The results show a knowledge gap between the proposed system and producer understanding. Producers were also divided on support for the proposed system. When ranking their level of support on a scale of 1 to 6, with 1 being strongly supportive and 6 being strongly opposed, 49% of producers showed some level of support and 48% showed some level of opposition. Data shows a mean of 3.53 with a standard deviation of 1.672. Data also highlights a lack of understanding of the regulations and implementation procedures among producers. The results of this study brought considerable insight into the current practices and perceptions of beef cattle producers, and will be used to develop educational materials to improve their understanding of this proposed program.

Key Words: Animal Identification, Beef Cattle Producers, Radio

Production, Management & the Environment - Livestock and Poultry: Livestock Production, Management, and Environment

Frequency Identification

769 Effect of littered systems on pollutant emissions into the air in gestating sows. C. Pineiro^{*1}, G. Montalvo², P. Illescas², and M. Bigeriego³, ¹PigCHAMP Pro Europa, SA, Spain, ²Tragsega, Spain, ³Spanish Ministry of Agriculture, Spain.

During the last decade, the approach to environmental issues related to animal production is changing, including concepts such as emissions to soil, water, air and proper use of energy and water. In the EU Reference Document (BREF, 2003) on Best Available Techniques (BAT) for Intensive Rearing of Poultry and Pigs several techniques were proposed for emissions abatement. In Spain, a project financed by the Spanish Ministry of Agriculture, Fisheries and Food was planned to evaluate the BAT proposed by the BREF under Spanish conditions. The aim of the present work was to assess one of the BAT proposed for gestating sows, the littered systems (straw based) using good practices (enough straw, changing the straw frequently, functional areas) on gas emissions. The study was performed in a commercial farm using 60 gestating sows housed in two different rooms during four weeks. In the first room, the reference system was implanted (total-slatted floor over deep manure channel and monthly removal); whereas in the second room, concrete floor was applied and 360 kg of straw were scattered over the floor (3 kg per sow and week). The concentration of the NH₃, N₂O and CH₄ (by means of semi-continuously monitoring using an Innova 1312 multi-gas monitor; SIR, SA, Spain) in each room were measured. The solid concrete floor system with straw reduced the average NH₃ (11%, P<0.05), and CH₄ (66%; P<0.01) in comparison with the reference system. However, N₂O emissions increased by 190% (P<0.001) in the littered system. From these results, we conclude that despite ammonia emissions are reduced, an important greenhouse gas (N₂O) is hugely increased. Moreover, associated costs were extremely high (extra costs was 47.6 - 55.4 euros/place and year for new installations, and 72.7 - 80.5 euros/place and year for existing installations) because of the cost of straw and the required extra labour. Hence, harmonization of this directive with others affecting animal husbandry (Council Directive 98/58 CE) should be carefully performed to avoid the impairment of environmental performance.

Key Words: Gestating Sows, Ammonia, Littered Systems

770 Effect of different dietary strategies on productive performance and gas emissions in post-weaned piglets. G. Montalvo¹, C. Pineiro^{*2}, J. Morales², S. Godbout³, S. P. Lemay³, M. Belzile³, J. Feddes⁴, P. Illescas¹, M. Bigeriego⁵, and C. de Blas⁶, ¹Tragsega, Spain, ²PigCHAMP Pro Europa SA, Spain, ³IRDA, Canada, ⁴U. Alberta, Canada, ⁵Spanish Ministry of Agriculture, Spain, ⁶UP Madrid, Spain.

The objective of this study was to assess the effects of different dietary strategies on post-weaned piglets performance and gas emissions. Dietary strategies assessed were low-protein content (LP, 16.6%CP), soluble fibre through sugar beet pulp inclusion (SBP, 10%) and acidification adding benzoic acid (BA, 5%). A total of 80 piglets were fed on five different isoenergetic diets: control diet, LP, SBP, BA, and the combination of all (LP+SBP+BA) during four weeks. Ten environmentally-controlled chambers, each housing eight piglets (13.1 kg initial BW, F1 cross (Yorkshire × Landrace) × Duroc) were used to monitor: average daily gain, ADG; average daily feed intake, ADFI; gain:feed ratio, G:F, airflow rate, NH₃, CH₄, and N₂O concentrations. G:F differed among treatments, being higher in LP+SBP+BA groups (0.46 vs 0.55 kg/kg in LP+SBP+BA and control groups, respectively; P<0.05). This effect was due to both a lower ADG compared with SBP and BA groups (532 vs 628 as average g/d; P<0.05), and higher ADFI compared with that of the control group (1.16 vs 1.05 kg/d; P<0.05). Also showed higher ADFI than control group (1.15 as average vs 1.05 kg/d; P<0.05), but no differences were found in G:F or ADG among any individual dietary strategy and the control group. Ammonia emissions from the control diet were 0.9 mg/h/kg pig, and similar to the BA diet, but the LP, SBP and LP+SBP+BA diets had emission rates about 50% lower with respect to control diet (P<0.05). For CH₄, the control diet showed an emission of 0.851 mg/h/kg pig, whereas the LP diet decreased emission rates about 40% (P<0.05). Other treatments had not effect on the emission rates of this gas. Nitrous oxide emissions were similar for all treatments (around 0.017 mg/h/kg pig), except for LP+SBP+BA diets where emissions reached 0.028 mg/h/kg pig. These results show that changes in nutrition may help to control emissions to the atmosphere, without affecting animal performance.

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771 Cost of ammonia emissions abatement techniques in Spain. C. Pineiro^{*1}, G. Montalvo², P. Illescas², and M. Bigeriego³, ¹*PigCHAMP Pro Europa, SA, Spain*, ²*Tragsega, Spain*, ³*Spanish Ministry of Agriculture, Spain*.

The Integrated Pollution Prevention and Control Directive is mandatory in the EU from the first of January of 2007. The implementation of the best available techniques (BAT) to control emissions is a key concept to be implemented at farm scale. The objective of this study was to present a calculation on cost of every BAT under Spanish conditions. The information provided will allow defining the most cost-effective methods for reducing ammonia emission from Spanish farms. The calculation was carried out according to the methodology set out in the Reference Document on Best Available Techniques for Intensive Rearing of Poultry and Pigs, taking into account the economic life of the investment, deducting grants and including changes in performance. The costs were calculated for feeding techniques, animal housing, slurry storage and spreading techniques. Units used for assessing costs were \$/place per year for feed and housing techniques, and \$/m³ or tonnes per year for manure or slurry storage and manure or slurry spreading categories. All these costs have been expressed also as \$/kg pig produced, because in the pig sector it is more easily understood, and it is easier to calculate the cost for all of the production process. The basis for this calculation was 20 marketed pigs of 100 kg per sow per year. Further adjustments can easily be undertaken to reflect local conditions. Extra costs calculated for abatement techniques are listed next table. The standard concepts used and the transparency of the proposed methodology allows its implementation in other countries just using the appropriate figures for local conditions.

Table 1.

Techniques		\$/place/year	\$/t pig prod./year
Feeding	Low protein diet		
	+ amino acids	0.5 - 3.4	1.7 - 11.6
Housing			
Gestating sows	Reduced manure pit	7.5 - 8.9	2.8 - 3.9
	Littered system	62.5 - 105.7	23.5 - 39.7
Lactating sows	Manure pan underneath	23.0 - 48.9	2.9 - 6.0
Growers-finishers	Sloped manure channel	0.9 - 10.1	3.3 - 34.6
	Partially slatted floor	0 - 5.6	0 - 19.3
\$/m ³ /year			
Spreading (pig slurry)	Trailing shoe	1.2 - 1.8	15.1 - 23.1
	Band spreader	1.1 - 1.6	13.0 - 19.8
	Incorporation	0.3 - 0.8	3.8 - 10.0

Key Words: Cost, Ammonia Abatement, Pig

772 Influence of diet and genotype on performance of weanling pigs destined for natural label or commodity pork markets. A. F. Harper^{*} and M. J. Estienne, *Virginia Polytechnic Institute and State University, Blacksburg*.

Diet formulation and pig genotype are important factors in the production of pork for niche markets. Weanling pigs (n = 60; 9.71 ± 0.03 kg BW) were used to assess diet and sire breed effects on performance. Diet treatments were a 2-phase series of diets acceptable for natural pork labeling (no antibiotics or blood or meat products) or a

2-phase series of conventional nursery diets (contained blood and meat products in phase 1 and medicated with 27 ppm carbadox throughout). The factorial treatments were: the natural diet fed to Berkshire-sired pigs, the natural diet fed to terminal Hampshire-sired pigs, the conventional diet fed to Berkshire-sired pigs, and the conventional diet fed to terminal Hampshire-sired pigs. There were 5 pens of 3 pigs per pen for each treatment. Feed and water were provided ad libitum. Pig BW and feed intake were determined at d 9 (phase 1) and d 34 (phase 2). During phase 1 pigs fed the natural diet had lower ($P < 0.01$) ADFI (201 vs. 280 ± 15 g) and ADG (156 vs. 204 ± 9 g) than pigs fed the conventional diet. Over the 34-d trial there was no main effect difference ($P > 0.24$) in ADFI (803 vs. 844 ± 25 g), ADG (436 vs. 453 ± 10 g) or G:F (0.55 vs. 0.54 ± 0.01) for the pigs fed the natural or conventional diets, respectively. During phase 1 performance traits were not different ($P > 0.19$) between Berkshire- and Hampshire-sired pigs, but for the entire trial ADG tended to be greater for Berkshire-sired pigs (472 vs. 418 ± 17 g; $P = 0.11$). An interaction ($P < 0.05$) between diet and genotype was observed for ADG during phase 1. Hampshire-sired pigs fed the natural diet had lower ADG (123 ± 17 g) relative to Berkshire-sired pigs fed the natural diet (188 ± 17 g) or Berkshire-sired (208 ± 17 g) or Hampshire-sired (199 ± 17 g) pigs fed the conventional diet. Conventional diets produced superior growth performance during phase 1 but this advantage was not maintained for the entire 34-d nursery period. The interaction in ADG suggests that Berkshire-sired pigs may have greater potential to maintain a high level of performance than certain terminal-line sired pigs when less complex, antibiotic-free starter diets are fed.

Key Words: Pigs, Diet, Genotype

773 Loading gantry versus traditional chute for the finisher pig: Effect on transportation and packing plant losses. N. Berry^{*}, A. Johnson, K. Stalder, T. Baas, and L. Karriker, *Iowa State University, Ames*.

Pig mortalities from the farm to the harvest facility have been estimated to cost the U.S. swine industry over 55 million dollars annually. The objective of this study was to determine if chute design affects the incidence of dead, injured or stressed pigs upon arrival at the packing plant. A total of 456 semi loads of crossbred finisher pigs (117.43 kg) from a single finishing site were collected. A two by two factorial arrangement of treatments was compared, with loading systems (prototype loading gantry [P] vs. traditional chute [T]) and pull (first pigs marketed or first pull [FP] vs. last pigs marketed or closeout [CO]). Pigs were loaded using standard procedures for pig handling and transportation. Performance measures evaluated were dead on arrival (DOA), stressed on arrival (SOA), crippled on arrival (COA), dead in plant (DIP), stressed in plant (SIP) and crippled in plant (CIP). Data were analyzed using PROC Glimmix of SAS where dependent traits were evaluated with a full model including load chute, load crew, barn, pull, load time per pig, travel time, hauler, average live weight, kill date, week, and month fixed effects and a harvest day random effect. All non-significant sources of variation were removed from the final analyses models. For all performance measures there was no loading systems (P vs. T) effect ($P > 0.05$). A pull effect ($P < 0.01$) for SOA's with more occurring at closeout than first pull (0.30 vs. 0.16) was identified. Month of marketing was a source of variation ($P < 0.05$) for SOA, DIP and SIP. Pull by load chute was a source of variation ($P < 0.01$) for DIP's with CO pulls from the P chute having fewer DIP's when compared to CO pulls from the T chute. Fewer DIP's were

observed in CO pulls from the T chute when compared to FP from the T chute. A trend ($P=0.06$) for DOA's was seen between loading systems and pull. Additional work is needed to further characterize the role that loading system plays in the incidence of both the fatigued and dead pig during transportation and at the packing plant.

Key Words: Finisher Pig, Loading Gantry

774 Effect of autosort technology on pork production measures.

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Limited data exist about the impact autosort technology, a relatively new management tool, has on pig performance measures. The objective of this study was to determine the effects that 3 different pen layouts incorporating autosort technology had on wean-to-finish performance. This experiment was replicated twice with 622 ± 13 cross-bred pigs per treatment in trial 1 and 615 pigs per treatment in trial 2. Treatments were food court (FC), water court (WC) and fast lane (FL) autosort floor layouts or conventional large pen (CV; control). Resources were zoned off in autosort treatments with 40% of total floor space zoned for food and water in (FC) and 20% zoned for water in (WC), respectively. For the (FL), food and water were distributed equally between 8 zones with 12.5% floor space per zone. Weights from automated scale units were recorded on a regular basis and production data was collected at slaughter. Performance measures included: mortality, average daily gain (ADG), days to market (DTM), and hot carcass weight (HCW) at market for the first two sorts from each treatment. In trial 1, carcass lean % data was also recorded from the first sort. Data were analyzed with Proc GLM procedure and Chi-Square in SAS. Pig ADG and DTM were similar among treatment groups. Pig HCW was similar across sorts. However, HCW overall ($P < 0.0001$) was less for the FC and WC pigs compared with the CV pigs. Pig HCW was greater for the FL pigs ($P = 0.0002$) than CV in trial 1, but the WC, FL, and FC ($P < 0.001$) were less than the CV pigs in trial 2. Percentage of pigs that died prior to shipping was greater in the FC ($P = 0.01$) and FL ($P < 0.0001$) treatments than CV pens. Percent carcass lean was similar among treatments. These data indicate that pig performance is similar among these specific autosort layouts when compared to large conventional pens but it seems possible that these systems can be improved to achieve the potential benefits of autosort technology. The food court, at this point, may be the best layout to attempt to modify in order to realize those potential benefits.

Key Words: Pig, Autosort, Production

775 Characterization of the acute-phase protein response following vaccination and weaning in beef steers.

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The objectives of this study were to assess the acute-phase protein response of beef steers following vaccination with two different vaccines and to determine if this response is additive to the weaning process. On d 0, 48 steers (Brahman \times British; avg. age = 7 mo) were randomly assigned to one of six treatments in a 2×3 factorial arrangement, including: weaning (WN) vs. no weaning (NW), and vaccination with One Shot[®] (1S; 2 mL s.c), UltraBac[®] 7 (U7; 5 mL

s.c.), or saline control (Control; 5 mL s.c.). Blood samples were collected on d 0, 1, 3, 5, 7, 10, 14, and 21, relative to weaning and vaccination, for determination of plasma fibrinogen, ceruloplasmin, haptoglobin, and acid-soluble protein (ASP) concentrations. During the course of the study, free-choice hay and a grain-based supplement (< 4.5 kg/d) were offered to WN steers, while NW steers remained with their dams. Compared to NW, WN had greater ($P < 0.05$) ceruloplasmin concentrations on d 3, and greater haptoglobin concentrations on d 3 ($P < 0.01$) and 5 ($P < 0.05$) (weaning treatment \times day interactions; $P < 0.01$). Among WN steers, average ceruloplasmin concentration was greater ($P < 0.05$) for 1S vs. Control and U7. Vaccination treatment \times day interactions were detected ($P < 0.01$) for fibrinogen, ASP, and haptoglobin. Fibrinogen concentrations were greater ($P < 0.01$) on d 1, 3, and 5, and tended ($P < 0.10$) to be greater on d 7 for 1S vs. Control and U7. Concentrations of ASP were greater ($P < 0.01$) on d 3 and tended ($P < 0.10$) to be greater on d 5 for 1S vs. Control and U7. Haptoglobin concentrations were greater ($P < 0.01$) for 1S vs. Control and U7 on d 1 and 3, but greater ($P < 0.05$) for U7 vs. Control and 1S on d 5. Data from this study imply that animals vaccinated with One Shot[®] experience a greater inflammatory response compared to animals vaccinated with UltraBac[®] 7 and saline control, and this response mainly occurs during the 5 d following vaccination. In addition, additive effects of vaccination on weaning were only observed for plasma ceruloplasmin concentrations.

Key Words: Acute-Phase Proteins, Steers, Vaccination

776 Efficacy of chlorate against *E. coli* O157:H7 and *Salmonella* Typhimurium in bovine feedlot soil mixture.

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Our aim was to determine if chlorate, temperature, or atmosphere affected pathogen viability in feedlot soil. Aliquots (1 g) of dried bovine feces/soil mixture (75:25 w:w) and 1 mL bovine urine were incubated in 10 or 20 mL glass serum vials with chlorate (0, 17, 33, or 67 ppm), at 6, 20, or 30°C, under aerobic or anaerobic conditions. Each vial was inoculated with 1 mL of a fresh bovine fecal supernatant mixed with overnight cultures of *E. coli* O157:H7 strain 933 (EC) and *Salmonella enterica* Typhimurium DT104 (ST) in an 8:1:1 ratio. Aerobic vials were weighed daily and evaporative loss replaced with distilled water. Anaerobic vials were capped with a butyl stopper and aluminum seal. Samples were collected on d 0, 0.5, 1, 3, 7, 14, 21, and 28; serially diluted in phosphate buffered saline; and plated on MacConkey and XLT-4 agars. Plates were incubated at 39°C for 24 h and pathogens were counted. A second study was performed using sterile feedlot soil and fecal supernatant, so that added EC and ST were the only live bacteria present in the cultures. In the first study, EC was not detected in any aerobic cultures by d 3 at 20°C and by d 1 at 30°C. At 6°C, EC was not detected at 67 ppm chlorate by d 21, but persisted through d 28 in the remaining cultures at \log_{10} 4 to 5.5 bacteria/mL culture. Aerobic cultures at all temperatures had no detectable ST by d 21 to 28. Pathogens in anaerobic cultures were detected in nearly all cultures at d 28, however, bacterial counts declined over time. In sterilized feedlot soil, results were similar. In both studies, there was no effect of chlorate on pathogen viability at the higher temperatures, but at 6°C there was an apparent chlorate dose-dependent decline in EC