was assessed on-farm using an open door test, with individual pigs identified as bold, intermediate or shy based on their willingness to exit the home pen. Muscle temperature and pH were monitored post-mortem, and meat quality was assessed in loin and ham samples collected at 24 h post mortem. The effects of management, gender and temperament on pork quality were analysed by mixed model ANOVA in SAS. Results showed that pigs from CS farms had lower initial ham temperatures than those from CL farms ($P = 0.039$). Compared to commercially-produced pigs, R pigs had higher drip loss in ham ($P = 0.049$) and tended to produce tougher meat with lower ultimate pH in ham and loin muscle ($P < 0.10$). Barrows produced loin muscle with higher initial temperature ($P < 0.001$), lower initial pH ($P = 0.019$), and lighter color (L*: $P < 0.001$) than gilts. Comparing the different temperaments, shy pigs had lower initial pH in ham ($P = 0.034$) and produced lighter meat (loin: $P = 0.020$, ham: $P = 0.033$) than bold pigs, and both bold and shy pigs produced more tender meat (loin and ham: $P < 0.05$), and higher drip losses in ham ($P = 0.030$) than intermediate pigs. Temperament by management interactions indicated that the effects of temperament on meat quality were greatest in commercial LH and R pigs. In conclusion, both the management and individual characteristics of pigs influence meat quality, and consideration of these effects could result in improvements in the quality and consistency of pork.

**10 Effects of floor space during transport and journey time on transport losses and physical indicators of stress in market-weight pigs.** C. M. Pilcher*[1], M. Ellis[1], M. J. Ritter[2], J. Brinkmann[3], C. L. Puls[1], O. F. Mendoza[1], A. Rojo[1], and B. A. Peterson[3], [1]*University of Illinois, Urbana*, [2]*Elanco Animal Health, Greenfield, IN*, [3]*The Maschhoffs, Carlyle, IL*.

The effects of floor space during transport and journey time on the incidence of transport losses at the plant were evaluated in a study involving 160 loads of pigs (BW 124.7 ±4.9 kg) using a split-plot design with a 2 × 6 factorial arrangement of treatments: 1) Journey Time (JT) from the farm to the packing plant (main plot) [short (<1 h) vs. long (3 h)] and 2) Transport Floor Space (FS) (subplot) (0.396 vs. 0.415 vs. 0.437 vs. 0.462 vs. 0.489 vs. 0.520 $m^2$/pig). The incidence of dead and nonambulatory pigs and the percentage of pigs in each test compartment exhibiting open-mouth breathing (OMB) and/or skin discoloration (SD) were recorded during unloading at the plant. The effect of FS on the incidence of OMB was dependent on JT (FS × JT interaction; $P < 0.01$). On short journeys, pigs transported at 0.396 and 0.415 $m^2$/pig had higher incidence of OMB than pigs transported at 0.462, 0.489, and 0.520 $m^2$/pig. Also, the incidence of OMB was greater for short than long journeys for every floor space. However, on long journeys, there was no effect of FS on the incidence of OMB. The frequency of SD was greater for pigs transported on short than on long journeys (2.08 vs. 1.30%; $P < 0.001$). Pigs transported at 0.396 $m^2$/pig had higher incidence of SD than pigs transported at 0.462, 0.489, and 0.520 $m^2$/pig, with 0.415 and 0.437 $m^2$/pig being intermediate. Of 17,652 pigs transported in test compartments, 0.24% died or became non-ambulatory during transport or during unloading. There was no effect of FS or JT on the percentage of pigs that were dead on arrival, nonambulatory/fatigued, or nonambulatory/injured at the plant. In summary, pigs transported for<1 h compared to 3 h exhibited higher incidences of physical indicators of stress during unloading at the plant; however, transport floor space and journey time had minimal effects on transport losses.

**Key Words:** transport, floor space, journey time

**11 Effects of pre-sorting on the stress response of market weight pigs during loading and unloading.** L. M. Gesing*[1], A. K. Johnson[1], K. J. Stalder[1], H. Hill[2], C. Feuerbach[2], M. Faga[2], R. Bailey[3], and M. J. Ritter[4], [1]*Iowa State University, Ames*, [2]*Iowa Select Farms, Iowa Falls, IA*, [3]*JBS Swift and Co, Marshalltown, IA*, [4]*Elanco Animal Health, Greenfield, IN*.

Thirty-three loads (~180 pigs/load) of market weight pigs (n=5802) were used in a complete randomized block design to determine pre-sorting effects on stress responses (during loading and unloading) and transport losses. This study was completed on three commercial grow-finish sites between December and March. Each site had two rooms with both treatment groups represented in each room. The pre-sorted (PRE) treatment had 292 pigs/pen (0.65 $m^2$*$pig^{-1}$). Internal swing gates were used to manually pre-sort market weight pigs from pen-mates ~18 h prior to marketing. The not pre-sorted (NON) treatment also had 292 pigs/pen (0.65 $m^2$*$pig^{-1}$) but pigs were not pre-sorted from pen mates prior to loading. During loading, pigs were moved in small groups using sort boards and electric prods if necessary, and loaded on straight deck trailers. Treatments were randomly assigned to a deck, pigs were provided with ~0.41 $m^2$*$pig^{-1}$, and transported ~1 h to a commercial harvest plant. During loading and unloading, the number of pigs displaying open mouth breathing (OMB), skin discoloration (SD) and muscle tremors (MT) were recorded. At the plant, dead and non-ambulatory pigs were recorded during unloading. Total losses were defined as the sum of dead and non-ambulatory pigs. Data were analyzed using Proc Glimmix of SAS. Lower ($P< 0.0001$) OMB and SD were observed at loading for PRE compared to NON pigs, but there were no differences for MT or non-ambulatory at loading or for stress responses at unloading. No differences existed between treatments for fatigued, injured, total non-ambulatory or total losses (NON=0.27 ± 0.09, PRE=0.33 ± 0.10). In conclusion, pre-sorting market weight pigs had some effect on reduced stress responses on farm. However, pre-sorting pigs prior to loading did not affect stress responses or transport losses at the plant.

**Key Words:** pre-sort, pig, transport loss

**12 Effects of Sirrah-Bios PRRSV-RS vaccine on mortality rate and finisher pig performance.** M. L. Potter*[1], S. S. Dritz[1], S. C. Henry[2], L. M. Tokach[2], J. M. DeRouchey[1], M. D. Tokach[1], R. D. Goodband[1], and J. L. Nelssen[1], [1]*Kansas State University, Manhattan*, [2]*Abilene Animal Hospital, P.A., Abilene, KS.*

A total of 1,561 pigs (4 d of age) were used to determine the effects of a porcine reproductive and respiratory syndrome virus (PRRSv) subunitvaccine, PRRSV-RS (Sirrah-Bios, Ames, IA), on mortality rate and finisher pig growth performance in a PRRSv-positive commercial herd. Pigs were randomly assigned by litter to either subunit PRRSv vaccinate or non-vaccinated control. Pigs in the vaccinate group received an intramuscular injection of 1 mL PRRSV-RS vaccine at processing and weaning (approximately 4 d after birth and 24 d of age, respectively). Vaccinate and control pigs were comingled in a single nursery. In the finishing phase, pigs were penned in a single commercial curtain-sided barn by treatment and gender (12 pens per treatment except for vaccinated barrows with 13 pens), with treatments randomly distributed across pens. Mortality was tracked from processing (4 d of age) to market (d 187 to 193). There was no difference between controls and vaccinates for cumulative mortality (21.5 vs. 20.6%, $P = 0.67$) or for mortality during any production phase (processing to weaning: 9.5 vs. 7.1%, $P = 0.08$; nursery phase: 9.3 vs. 9.2%, $P = 0.95$; finishing phase: 4.4 vs. 5.9%, $P = 0.20$). Pens of pigs were weighed 2-wk post-placement into

the finisher (d 0). At that time, control and vaccinated mean pig weights were not different (26.5±0.79 vs. 26.6±0.77 kg, $P = 0.90$). Overall, there were no gender × vaccine interactions ($P > 0.22$) for ADG, ADFI or G:F. From d 0 to 112, control and vaccinate pig performance was similar (ADG:0.89±0.012 vs. 0.87±0.012 kg, $P = 0.45$; ADFI: 2.43±0.037 vs. 2.43±0.036 kg, $P = 0.94$; G:F: 0.37±0.003 vs. 0.36±0.003, $P = 0.15$). This resulted in no difference ($P = 0.79$) in off-test (d 112) weights between control (123.3±1.75 kg) and vaccinated (122.7±1.72 kg) pigs. These data indicate that this subunit PRRSv vaccine did not affect finishing pig performance or mortality in this commercial herd.

**Key Words:** pig, PRRSv, vaccine

**13 Effects of porcine circovirus type 2 (PCV2) and *Mycoplasma hyopneumoniae* (*M. hyo*) vaccine strategy and gender on commercial pig performance and carcass characteristics.** J. R. Bergstrom[1], M. L. Potter*[1], M. D. Tokach[1], S. C. Henry[2], S. S. Dritz[1], J. L. Nelssen[1], R. D. Goodband[1], and J. M. DeRouchey[1], [1]*Kansas State University, Manhattan*, [2]*Abilene Animal Hospital, P.A., Abilene, Kansas*.

A total of 1,993 pigs (7.4 kg and 25 d of age) were used to evaluate the effects of PCV2 and *M. hyo* vaccine strategies on performance and carcass characteristics. Vaccine strategies were: 1) 1 mL of CircoFLEX and 1 mL MycoFLEX (BI; Boehringer Ingelheim, St. Joseph, MO), administered together or 2) 2 mL Circumvent PCV and 1 mL Myco Silencer ONCE (IN; Intervet/Schering-Plough Animal Health, Millsboro, DE) administered as separate injections twice. Pigs, farrowed over 3-wk, were ranked by birth weight within litter and gender then randomly allotted to vaccine treatments. Pigs were vaccinated according to label at weaning (BI and IN) and d 22 (IN only). Individual pigs were weighed at weaning, d 22, 44, entry to finisher (Avg d 73), and off-test (Avg d 155) to measure ADG. Carcass data was obtained from a subsample of pigs. Data were analyzed with main effects of vaccine, gender, and their interaction with litter as a random effect. There were no vaccine × gender interactions ($P > 0.05$) for any responses. Overall ADG was greater ($P < 0.01$) for barrows than gilts (761 vs. 693 g) resulting in barrows weighing 10.8 kg more at off-test than gilts. After HCW adjustment, gilts were leaner (53.3 vs. 51.8%; $P < 0.01$) than barrows. During the nursery phase, IN-vaccinated pigs had decreased (564 vs. 578 g; $P < 0.01$) ADG compared with BI-vaccinated pigs with the largest negative effect after the second dose of IN vaccines (d 22 to 44: 618 vs. 651 g, $P < 0.01$). Finishing ADG was increased ($P = 0.04$) for IN-vaccinated pigs (871 g) compared with BI-vaccinated pigs (858 g). As a result, there was no difference ($P > 0.13$) in overall ADG, off-test weights (BI: 120.5 kg; IN: 120.2 kg), or HCW-adjusted lean percentage (BI: 52.6%, IN: 52.5%) between vaccine strategies. Wean-to-finish mortality rate was not affected (BI: 3.9%, IN: 3.3%, $P = 0.49$) by vaccine strategy. Although IN vaccines reduced nursery pig performance, vaccine type did not affect overall performance or carcass characteristics.

**Key Words:** growth, PCV2, vaccine

**14 Influence of halothane sensitivity on growth and meat quality in pigs.** R. O. Bates*, M. E. Doumit, N. E. Raney, E. E. Helman, and C. W. Ernst, *Michigan State University, East Lansing*.

We have previously reported that a proportion of pigs, homozygous normal for HAL1843, were halothane sensitive and this was associated with poor meat quality when pigs were handled aggressively. This study was conducted to evaluate halothane sensitivity in HAL1843 normal pigs, and ascertain the association of halothane sensitivity with ADG and meat quality. A total of 363 pigs across four farrowing groups (REP), from seven Landrace sires and 38 Yorkshire-Landrace F1 dams, were tested at nine wk of age for halothane sensitivity using a closed system that delivered 5% halothane at 2 L/min for three (group 1) or two (groups 2-4) min. After 1 min limb rigidity (RIGID) was evaluated on a 1-4 scale, and limb tremors (TREM) and mid-section discoloration (MSD) were evaluated on a 1-3 scale with 1 indicating no reaction. Testing was repeated two days later. At 10 wk of age, pigs were moved to finishing pens and not moved again until marketing. Within REP, pigs were harvested in one of two groups and at marketing moved 91 m, weighed, tattooed, loaded and transported 550 km to a commercial harvest plant. After overnight rest pigs were harvested and loin muscle pH taken at 45 min (pH45) after stun. After an 18 hr chill, loin muscle pH (pHu), CIE L*, a*, b*, color (1-6) and marbling (1-10) scores and fluid loss percent (FLP) were collected. Generalized linear mixed models were used to estimate repeatabilities (REPEAT). On the binomial scale, REPEAT for RIGID for the front right and left legs were 0.24 and 0.31, respectively, while rear right and left leg REPEAT were 0.19 and 0.17, respectively. The REPEAT for front right and left leg TREM were 0.16 and 0.20, respectively. The ADG was not influenced by incidence of RIGID, TREM or MSD. Carcasses from pigs with RIGID scores of 1 vs those with higher scores had higher pH45 (5.97 vs 5.88; $P < 0.06$), similar pHu (5.47 vs 5.49; $P = 0.32$), lower FLP (4.6 vs 5.0; $P < 0.07$) and lower color score (2.08 vs 2.40; $P = 0.10$). Pigs exhibiting limb rigidity during halothane challenge had lower pH45 and higher fluid loss.

**Key Words:** pig, halothane, meat quality

**15 (Invited ASAS Animal Science Young Scholar) Effects of diet on behavioral and neurophysiological indicators of aggression in pigs.** R. Poletto*[1,2], B. T. Richert[1], R. L. Meisel[3], H. W. Cheng[2], and J. N. Marchant-Forde[2], [1]*Purdue University, West Lafayette,IN*, [2]*USDA Livestock Behavior Research Unit, West Lafayette, IN*, [3]*University of Minnesota, Minneapolis*.

Aggression can affect health, well-being, and profitability of pigs. Feeding ractopamine (RAC), a β-adrenoreceptor agonist, enhances growth but may heighten aggression. In contrast, tryptophan (TRP), the precursor for serotonin (5-HT), may lessen aggressive behavior in pigs. To test these hypotheses, we investigated behavioral and neurophysiological variables related to aggression. In study 1, 64 finishing pigs (16 pens/sex) were fed control (CTL) or RAC (5 mg/kg for 2 wk, then 10 mg/kg for 2 wk). Behaviors were evaluated, and blood and brain samples were analyzed with HPLC for catecholamines and 5-HT. Feeding RAC raised behavioral activity compared to CTL fed pigs (26.1 vs. 22.2 0.9%, $P < 0.01$). Gilts fed RAC had an increase in fight actions (54.9%) while actions decreased in CTL barrows (44.0%), CTL gilts (24.4%), and RAC barrows (10.0 %, $P< 0.05$); all subgroups engaged in fewer fights ($P > 0.10$). Regardless of dietary treatment, gilts' blood 5-HT was lower than barrows (2.4 vs. 2.0 ± 0.1 µg/mL, $P = 0.09$). Levels of 5-HT and its metabolite were lower in the brain of gilts and RAC-fed gilts, respectively, $P < 0.05$). Expression of 5-HT1B receptor gene was suppressed in amygdala of gilts compared to barrows, which showed an over- expression of the gene (−1.3 vs. 1.1 fold, $P < 0.05$). In study 2, 48 gilts (6/pen) were fed CTL or high-TRP (250% of CTL) diet for 6 d at 3 and 6 mo with social handling from 45 d to 6 mo. Behaviors were evaluated and blood samples were analyzed for TRP and 5-HT. High-TRP feeding raised blood TRP of gilts at both ages (3 mo. 180.7%, and 6 mo. 85.2%) and raised blood 5-HT in 3 mo. old gilts (20.3%) when compared to baseline measures ($P < 0.05$). The TRP enhanced diet also reduced total fights (14.8 vs. 22.8 ± 3.0, $P < 0.05$),