Mathematical models that determine the optimal amino acid ratio of lactating sows based on milk production and maintenance needs suggest the valine requirement is 70% of lysine (ARC, 1981). However, empirical studies were used to develop the 1:1 ratio for valine:lysine listed by NRC (1988). This becomes a major concern when formulating high lysine (> 90%) corn-soybean meal lactation diets as valine becomes the first-limiting amino acid using the NRC ratio. Including 15% L-lysine HCl in lactation diets will cause valine to be the first-limiting amino acid in diets containing greater than 7% lysine.

Therefore, this experiment was designed to determine the influence of two valine to lysine ratios (A:1 or 1:1) on sow and litter performance. On a commercial swine farm, 132 sows were randomly assigned at farrowing to one of two experimental diets. A control diet was formulated to contain 9% lysine and 75% protein. In the second diet, L-valine replaced corn to provide 9% valine. All other amino acids were fortified at 110% of the ratio suggested by NRC (1988). Diets were corn-soybean meal based and contained equal amounts of all synthetic amino acids except valine. Litters were standardized within 48 h after farrowing. Sow feed intake was recorded and litters were weighed at birth and weaning (21 ± 2 days postfarrowing). Lactation diet (75% vs 90% valine) had no influence (P > 0.15) on litter birth weight (15.9 vs 15.8 kg), pig survivability (91.8 vs 92.7%), pig weaned per litter (10.12 vs 10.25), and daily sow feed intake (4.2 vs 4.2 kg). However, sows fed the 90% valine diet had increased pig (P < 0.09) and litter (P < 0.04) weaning weights (Table). These differences were magnified as the number of pigs weaned and sow productivity increased (40 vs 10 pigs). These results suggest that further research is needed to determine the valine requirement of high-producing sows. However, it appears that valine deficiencies limit the use of L-lysine-HCl in sow lactation diets and that diets formulated on predictions of amino acid requirements based on milk production and maintenance will underestimate the valine requirement of the lactating sow.

### Key Words:
Sows, Valine, Lysine.

### References

At the Western Research Farm, Castana, Iowa, sixty-two crossbred gilts were randomly allotted to one of four daily dietary treatments: 1) a control diet of 1.8 kg of corn-soy based diet (in dry lot), 2, 1.3 kg of corn (A70), 3) 7.7 kg of corn (A40), and 4) 2 kg of corn (A10). Gilts consuming A70, A40, and A10 diets also received 0.5 kg of monosodium phosphate and 0.01 kg of salt daily plus free access to fresh alfalfa for grazing. All gilts received their daily feed allotment in individual feeding stalls. The grazing gilts were provided shade, water and fed in a central drylot. Rings were placed in the noses of all gilts. Grahaming was 25 gilts per acre of alfalfa per week. The gilts were rotated to a new paddock after 7 d of grazing. The gilts were exposed to boars for 28 d, about 3 weeks prior to the beginning of the 42 d trial.

### Key Words:
Gilts, Alfalfa, Grazing.