

# Impacts of PRRSv challenge on hog production costs evaluated

**P**ORCINE reproductive and respiratory syndrome virus (PRRSv) has had a major impact on the global swine industry for more than 20 years.

The cost impact of PRRSv in the U.S. in 2005 was estimated at \$560 million (Neumann et al., 2005), and this increased to an estimated \$664 million impact by 2013 (Holtkamp et al., 2013). The authors acknowledged improvements in dealing with the cost of the disease in growing pigs, but these improvements were more than offset by increased losses in the breeding herd.

Recent research from Cornelison et al. (2018) investigated the impact of a PRRSv challenge on grow/finish pig performance, carcass cutout value and production economics.

Three commercial grow/finish barns, each with 1,000 pigs — Cambrough female (PIC 1050) x DNA (600 terminal sire) — were used to determine the effect of naturally challenging pigs with PRRSv on growth performance and carcass measurements. Each barn had an increased degree of PRRSv challenge, with low challenge (LCh), medium challenge (MCh) and high challenge (HCh) having 4.76, 5.49 and 6.20 log<sub>10</sub> PRRSv genomic copies per milliliter, respectively, at day 7 post-placement.

Pigs were harvested at approximately 120-133 kg and were on feed for 122-148 days, depending on the health challenge.

Growth performance was negatively affected by PRRSv challenge (Table 1), resulting in lower average daily gain and feed efficiency in pigs with the highest health challenge. Live-weight gain was reduced by 9% ( $P < 0.05$ ) and gain:feed by 4.7% ( $P < 0.05$ ).

When performance was expressed on a carcass basis, carcass gain was reduced by 18% ( $P < 0.05$ ), and carcass gain:feed was reduced by 6.7% ( $P < 0.05$ ). The rate of carcass gain was affected more so than the rate of total bodyweight gain, which is potentially indicative of an increased maintenance cost for pigs under a disease challenge (Williams et al., 1997a).

Furthermore, the within-treatment variation was increased in the HCh pigs compared to the LCh pigs, which is also consistent with previous findings (Holtkamp et al., 2013).

Market weight and hot carcass weight

## Bottom Line

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**KIM FRIESEN\***



were reduced ( $P < 0.05$ ) for HCh pigs compared to the LCh pigs (Table 2). The number of full-value pigs sold was reduced in HCh compared to LCh pigs by 9.8% and 21.0% for MCh and HCh, respectively, which correlates with poorer growth performance and the mortality associated with the PRRSv challenge.

The effects due to PRRSv were much greater in the current research compared to the data reported by Holtkamp et al. (2013). The degree of health challenge increased the days to market by 10 and 15 days for MCh and HCh pigs, respectively. The number of pigs sold was 2,141, 1,932 and 1,964 for LCh, MCh and HCh pigs, respectively, leading to fewer pounds sold as the degree of health challenge increased.

The MCh pigs had more secondary pigs sold compared to the LCh pigs; however, the number of HCh pigs was lower due to the increased mortality.

This reduction in pounds sold was reflected as increased mortality and morbidity and resulted in a \$9.46 and \$23.27 reduction in profitability for MCh and HCh pigs, respectively (Table 2). The difference between feed costs in LCh and HCh pigs was an increase of \$24.03 per pig, further compounding the revenue reductions associated with the health challenge in finishing pigs.

## Implications

The new data published by Cornelison et al. (2018) indicate that the effects of PRRSv on live performance, carcass characteristics and revenue per pig may be even greater than previously anticipated.

Previous work from Williams et al. (1997b) suggested that the partial efficiency of energy utilization for body protein and fat accretion is not influenced by health challenge but that the increased protein accretion is driven from a greater lysine requirement to support the level of growth. The pig's potential for growth and protein accretion are affected by amino acid intake,

## 1. Effect of three health challenges on whole-body and carcass-based growth performance in grow/finish pigs raised under commercial conditions

Item	LCh	MCh	HCh	P-value
Start weight, kg	13.3	13.7	12.4	<0.001
Final weight, kg	129.1	130.6	130.6	0.354
Start weight CV, %	21.0 <sup>a</sup>	—	26.2 <sup>a</sup>	<0.001
End weight CV, %	12.2 <sup>a</sup>	—	15.5 <sup>a</sup>	<0.001
Avg. daily gain, kg	0.86 <sup>a</sup>	0.79 <sup>a</sup>	0.74 <sup>a</sup>	<0.001
Avg. daily feed intake, kg	2.05 <sup>a</sup>	2.00 <sup>a</sup>	1.83 <sup>a</sup>	<0.001
Gain:feed	0.42 <sup>a</sup>	0.40 <sup>a</sup>	0.40 <sup>a</sup>	<0.001
Carcass basis				
Avg. daily gain, kg	0.61 <sup>a</sup>	0.55 <sup>a</sup>	0.50 <sup>a</sup>	<0.001
Gain:feed	0.30 <sup>a</sup>	0.28 <sup>a</sup>	0.28 <sup>a</sup>	<0.001

<sup>a,b</sup>Means within a row and least square means lacking a common superscript differ at  $P < 0.05$

(Adapted from Cornelison et al., 2018).

## 2. Effect of three health challenges on carcass measurements in grow/finish pigs raised under commercial conditions

Item	LCh	MCh	HCh	P-value
Days to market	133 <sup>a</sup>	143 <sup>a</sup>	148 <sup>a</sup>	<0.001
Market weight, kg	129.3 <sup>a</sup>	132.6 <sup>a</sup>	132.6 <sup>a</sup>	0.040
Hot carcass weight, kg	93.5 <sup>a</sup>	98.2 <sup>a</sup>	97.6 <sup>a</sup>	<0.001
Yield, %	72.4 <sup>a</sup>	74.1 <sup>a</sup>	73.6 <sup>a</sup>	<0.001
Lean, %	55.1	54.8	54.8	0.428
Loin depth, mm	60.2	60.7	60.5	0.662
Fat depth, mm	18.1	18.6	18.5	0.235
Profit/pig marketed, \$	15.16	5.70	(8.11)	—

<sup>a,b,c</sup>Means within a row and least square means lacking a common superscript differ at  $P < 0.05$

(Adapted from Cornelison et al., 2018).

\*Dr. Kim Friesen is chief scientific officer at NutriQuest LLC.

with higher rates of protein accretion requiring greater lysine intake to support the growth and lean potential (Friesen et al., 1995).

Thus, the ability to achieve genetic potential is affected by health status as well as nutrient intake, and a poorer health status may lead to a lower requirement. The ability to capitalize on growth potential will be limited by the degree the pigs are challenged by viral pathogens, as illustrated in this work.

The economic effect of PRRSV continues to be a major drain on the U.S. industry, and the new data further illustrate the impact on top pigs sold and the lost revenue associated with mortality, morbidity and fewer top pigs. Management schemes have improved the ability to control the disease, but they have not stopped the spread of disease nor the economic losses associated with an outbreak.

Furthermore, the interaction between health and nutrition suggests that a healthier pig appears to have a greater nutrient requirement to support growth, and this may be accomplished through increased feed intake, but it may also require formulation adjustments to meet the greater nutrient needs.

## The Bottom Line

PRRSV continues to cost the U.S. swine industry significantly in the form of reduced revenues, as reported by Holtkamp et al. (2013), and the impact the disease has on grow/finish performance may be even greater than what has been previously reported. Losses associated with increased health challenge ranged from \$9.49 to \$25.32 per pig in the models that were published by Cornelison et al. (2018).

The magnitude of response will be further exasperated as volatile marketing conditions approach. Reduced pork prices and potential fluctuations in feed input costs will place a premium on managing health status in the months ahead. Optimizing formulations for best-cost performance will be critical to maintaining profitability.

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