From the Pig to the Profit and Loss Statement : The Financial side of PRRS

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1.0 Introduction :

Since its first description in the U.S. as mystery swine disease in 1987 **(Dial and Parsons, 1989)** through today with its recognition as **PRRS**, this tiny virus has had a huge impact on the worldwide pig industry -- not only in terms of biological performance, but also through the resulting financial consequences **PRRS** has precipitated.

Anyone who has encountered **PRRS** is well aware of its often devastating acute impact on breeding herd performance (Figures to be included with the full paper) **(Polson et al., 1990)** and chronic performance drain in the post-weaning pig (Figure to be included with the full paper) **(Keffaber, 1993).** We have also become acutely aware of the financial consequences of **PRRS (Polson et al., 1992; Polson et al., 1994).**

2.0 The Financial Impact of **PRRS** in the Breeding Herd

Hoefling (1992) estimated the cost of an acute breeding herd outbreak in four herds to be $100, $170, $428 and $510 per breeding[1] female, respectively. **Polson et al, (1992)** described an acute four month outbreak in a 250 sow Minnesota herd, estimating the cost at $236 per breeding female for the year of outbreak. This loss was composed primarily of lost opportunity for revenues on 966 pigs that would have otherwise been produced has the herd performed at its baseline productivity levels (derived from the same period for the previous three years). This opportunity loss represented a reduction in pigs weaned per female per year of 3.8, and translated into a decrease in profits of $59,781 for the year of the outbreak, or a decrease in profit per cwt of $9.42 ($20.75 per 100 kg).

Using the margin-over-variable-cost (MOVC) method, Polson (unpublished data) has estimated that a one (1) percent decrease in farrowing rate equates to a potential loss of $6.00 to $9.00 per female per year, and a 0.1 pig per liter decrease in liveborn equates to a potential loss of $5.00 to $7.50 per female per year. These rules-of-thumb can be used to estimate losses where sufficient production information is available and a reduction in performance can be proven to be the result of **PRRS** virus infection.

[1] The term "breeding females" include both unmated females (maiden gilts) and mated females (gilts and sows mated one or more times in their life).

There are currently no published reports in the literature documenting costs, if any, of increased medication/vaccination costs due to the effects of **PRRS** and any secondary agents in the swine breeding herd.

3.0 The Financial Impact of PRRS in the Growing Pig Herd

Keffaber et al., (1992) reported on the effects of **PRRS** virus in nursery/grower pigs from two farms. These same farms were reported on by **Stevenson et al, (1992)** as involving both PRRS virus and salmonella cholerasuis. Both serologic titers and virus isolation were used to confirm the involvement of **PRRS** virus.

Herd No. 1: An acute outbreak of reproductive failure lasting three months began in April, 1989 occurred on a total-confinement 500 sow farrow-to-finish operation. **PRRS** virus infection was confirmed by IFA test, with 11/30 breeding animals and 21/30 market pigs testing positive (>1:20). While reproductive performance returned to pre-outbreak levels after three months, nursery mortality was reported as remaining elevated. For the 11 month preceding the outbreak, nursery mortality averaged 3.1%. For the 34 months following the outbreak, nursery mortality rose to 7.4% seen as a cyclical pattern of 5-6 months of low (3-5%) mortality followed by a 5-6 month period of higher (7-16%) mortality. Nurseries and grower/finisher buildings were described as continuous flow.

Herd No. 2: An acute outbreak of reproductive failure lasting three months began in May, 1989 occurred on a total-confinement 1000 sow farrow-to-finish operations. PRRS virus infection was confirmed by IFA test, with 18/30 breeding animals and 26/30 market pigs testing positive (>1:20). While reproductive performance returned to near pre-outbreak levels after three months, nursery mortality was reported as remaining elevated.

Summary: In both herds, intensive use of antibiotic therapy, commercial and autogenous vaccines, and other supportive therapy provided no significant long-term improvement.

Morrison (1993) observed that 6-week old pigs challenged intranasally with **PRRS** virus strain ATCC VR-23332 gained 5 pounds less than control pigs over a two-week observations period, equating to a reduction in average daily gain (ADG) for the period of 0.36 pounds/head/day. Clinical infection in these pigs was evidenced by rather mild clinical symptoms (slight fever, conjunctivitis, nasal discharge, and respiratory distress upon exertion).

These data are comparable with the change in ADG (0.37) observed by **Dee and Joo (1994)** on eight farms where performance is compared before and after partial (nursery) depopulation/repopulation (Tables to be included with the full paper).

Keffaber (personal communication) observed an increase in nursery mortality following a diagnosis of PRRS on a midwestern swine farm. For the 18 month period preceding the outbreak nursery mortality was 1.0% as shown on PigCHAMP® reports. For the 18 month period following the start of the outbreak, mortality rose to 2.8%. Each 18 month period involved over 13,000 pigs entering and leaving the nursery in the period.

Goreyca et al, (1994) described a 500 sow midwestern swine farm with a history of serious problems with PRRSV and *Streptococcus suis* in post-weaning pigs. **PRRS** was first clinically diagnosed in the herd in late 1991 (November), prior to the time when reliable serologic tests and virus isolation procedures were available. Since confirmatory tests have become available, **PRRSV** has been isolated from nursery pigs (December 1992) and antibody testing (IFA) of pigs have demonstrated seroconversion to **PRRSV** (October 1992), as detected by the immunofluorescent antibody (IFA) test. The farm has had a history of excessive nursery mortality and high veterinary/health product costs since PRRS was first clinically diagnosed (Figures to be included with the full paper).

During the two years prior to the initial clinical PRRS diagnosis (1990 and 1991) the herd's annual nursery mortality averaged 5.0% (1,018 pigs in two years) and whole farm veterinary/health costs were $3.50 per pig sold (Figures to be included with the full paper). During the two years following the diagnosis (1992 and 1993) the herd's annual nursery mortality averaged 8.8% (1,809 pigs in two years) and whole farm veterinary/health costs were $4.54 per pig sold. The increase in mortality, on average 379 pigs sold per year, represents a substantial opportunity cost -- potentially $7,584 per year (at a margin-over-variable cost of $20 per pig). The direct cost of veterinary care and health products for the whole farm represents an average additional cost of $10,404 per year.

Dee and Joo (1993) estimated an increase of 14-30 days to market as being attributable to **PRRS** in combination with secondary bacterial agents. They estimated an additional cost to finish such pigs at $7.50 - $15.00/pig marketed. **Dee and Joo (1994),** in a 600 sow herd, estimated the cost of an endemic **PRRS** nursery problem at $225 per sow per year. This cost estimate was based on a 10% nursery mortality, a 50% reduction in average daily gain, and a 33% rate of non-marketable pigs.

Polson et al, (1994) estimated that the difference between affected and non-affected pigs ranged from $0.73 per head placed on feed to $18.21 per head placed (Table to be included with full paper). As either ADG worsened or mortality increased, the observed difference in financial impact tended to increase. As the cost/ton of feed increased, the differences tended to decrease. As the sale price increased, the differences tended to increase.

There are some documented data and much empirical information suggesting that both acute **PRRS** outbreaks and chronic/endemic problems involving **PRRS** are very costly. It has also been suggested that, for some farms with otherwise high health status and/or harboring an isolate of **PRRS** virus of low virulence, that **PRRS** is of little production and financial consequence. There are very few published reports in the literature documenting costs, if any, of increased medication/vaccination costs due to the effects of **PRRS** and any secondary agents in the growing pig.