PARITY FLOW TO OPTIMIZE NURSERY-GROW-FINISH PERFORMANCE, SOW PRODUCTIVITY, AND THROUGHPUT

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Segregated production is the common pig flow in the majority of herds and systems. The basis of segregated production is the Medicated Early Weaning research of Drs. Tom Alexander and Hank Harris. The basic principles of segregated production are maximizing maternal immunity for various disease agents, segregating pigs at weaning, and flowing pigs all-in/all-out. Alterations in the segregated production procedures and processes have been in response to implementation of large commercial systems, progression in our understanding of diseases, and attempts to optimize both sow and grow-finish performance. However, segregated production has not always met performance because of 1) PRRS; 2) large population influence on disease transmission and prevalence; 3) inability to maintain an established weaning age; and 4) variation in parity immunity. At the same time, segregated production has provided improvements in many areas that were not readily apparent during the initial adaptation. It has allowed larger sow herds, commingling, flowing sites all-in/all-out, reducing age spread, specializing labor, and logistical advantages in feed deliveries, records, etc.

The recent progression in segregated production is parity segregation. It is recognized that 1) Parity 0 animals often do not have colostral antibody levels equal to mature parity animals, and 2) mature animals are at lower risk of transmitting disease agents to the suckling pig population. By segregating piglets from Parity 1 litters away from piglets derived from Parity 2+ litters, health and growth performance of the offspring of the mature sow litters is dramatically improved. The initial implementation of parity flow was for PRRS stabilization/elimination (United States) or disease elimination (Denmark). Several systems have utilized parity flow within a single facility, while

other systems have used parity flow for the system as a whole. This system is designed to optimize reproductive, nursery, and grow-finish performance.

Sow Farms

- A Parity 1 herd maintains a lactation length of 22-23 days
  - Permits P1 pigs to achieve natural exposure to *Haemophilus parasuis* and *Streptococcus suis* while under maternal antibody protection (2, 3)
  - Weaning weights in P1s comparable to mature parities because of piglet age
  - Allows specialization of breeding technicians in Parity 0 and Parity 1
- Holding Parity 1s through five to eight weeks of gestation allows staggered deliveries to Farms B, C, and D
  - Minimizes transport risk
  - Allows isolation of pregnant animals on arrival at Farms B, C, and D
- Parity 2 and older have lactation length of 17-18 days
  - Maintains farrowing crate turnover
  - Achieves a minimum weaning age of 16 days on all pigs
  - Improves farrowing crate utilization by moving pregnant P1s as replacements to mature parity herds
  - Allows Parity 2 and older in the same population to optimize suckling piglet survivability

Parity-segregated flow is accomplished by placing one or multiple Parity 2+s into a nursery or wean-finish site at the time of weaning. The pigs from the Parity 1 litters are diverted into a separate nursery site. Benefits are illustrated in Figure 1.

A Parity 1 farm is used to breed, gestate, and farrow first litter animals. Animals are introduced, mated, gestated, and farrowed at this facility. After weaning, they can either be moved immediately to the recipient Parity 2+ farm or mated on the Parity 1 farm and held for a part of their second gestation. In this system, the Parity 1 farm sows can flow to either a single Parity 2+ farm or multiple Parity 2+ farms.

Sizing of these farms is based on the replacement rate for the system, the length of the second gestation in the Parity 1 farm, and the desired weaning age for both Parity 1 and Parity 2+ farms. The Parity 1 farm should be designed for approximately 20% of the farrowing capacity of the system. When sizing this system, approximately 20-25% of the flow of total space would be allocated to the Parity 1 flow and 75-85% to the mature sow flow. We do not have enough data at this time to understand whether less space can be allocated to mature sow flow because of improved growth performance.

There are significant health, production, and financial benefits to using parity-segregated flow in a pork production system. The health benefits include increased stability for respiratory disease and enteric pathogens in the pig flow from the mature sows. The production benefits are numerous and include improved average daily gain in pigs from Parity 2+ sows, specialization of labor, resulting in greater reproductive efficiencies in Parity 1 and Parity 2+ sows, reduced medication and vaccination cost through targeted interventions in the P1 flow, and more efficient utilization of nursery-grow-finish and wean-to-finish capacities through easier commingling of multiple sow farms. Our model is summarized in Figures 2 and 3.

The inherent risk in the system is movement of animals between sow populations. Each sow site has a crated isolation facility adjacent to the breeding/gestation facility. This flow manages the risk

of acute diseases, such as TGE, by providing for a two to three week isolation of pregnant Parity 1s before entering the mature sow populations. There will be risk to the system if PRRS occurs in the Parity 0 – Parity 1 herd. Performance is summarized in Figures 4, 5, 6, and 7.

FIGURE 1
Performance of P2-plus versus P1

- 0.88#/pig heavier weaning weights
- 2% lower WF mortality
- 0.05 higher Nursery ADG
- 0.07 higher Finisher ADG
- $1.26 lower drug cost per pig.

FIGURE 2
Model System

- Compare a 10,000 sow conventional flow system to a 10,000 sow parity flow system
- Conventional
  - 4 - 2500 sow units
  - Sow farm dedicated flow
- Parity Flow
  - 4 - Units : 1 P1 , 3 P2+
  - P1 flow separate, P2+ co-mingled.

FIGURE 3

	Conventional	P1	P2+
Number of Farms	4	1	3
Sows per Farm	2500	2500	2500
Total Sows	10000	2500	2500
Pigs per Week	4231	1106	3317
Number of Flows	4	1	1
Pigs/Flow/Week	1058	1106	3317
Site Size	2000	2000	2000
Fill Time	2	2	2
Cost per Pig Place	38	38	36

FIGURE 4

	Conventional	P1	P2	Parity
Wean Weight	10.5	11	11	11
Average Daily Gain	1.44	1.44	1.50	1.49
Market Weight	270	270	281	278
Feed Conversion Rate	2.55	2.55	2.47	2.49
Pigs Sold	210,100	54,912	167,325	222,237

FIGURE 5

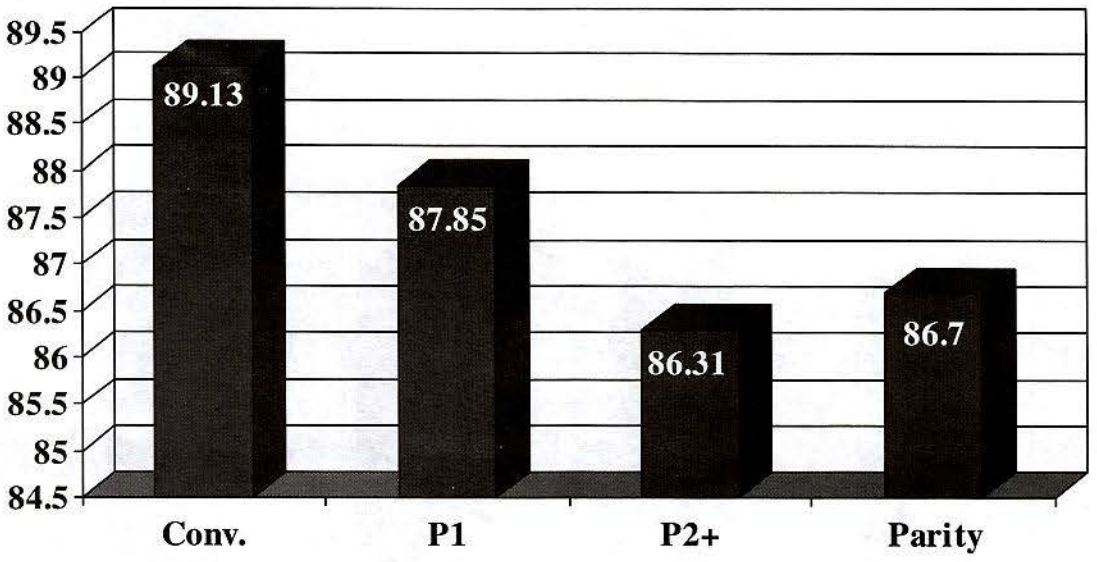


FIGURE 6

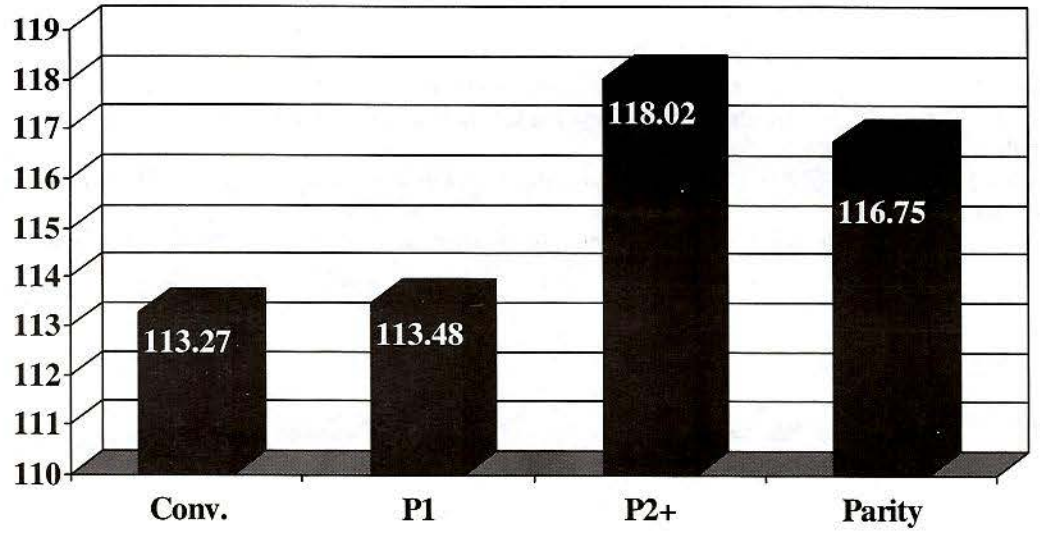
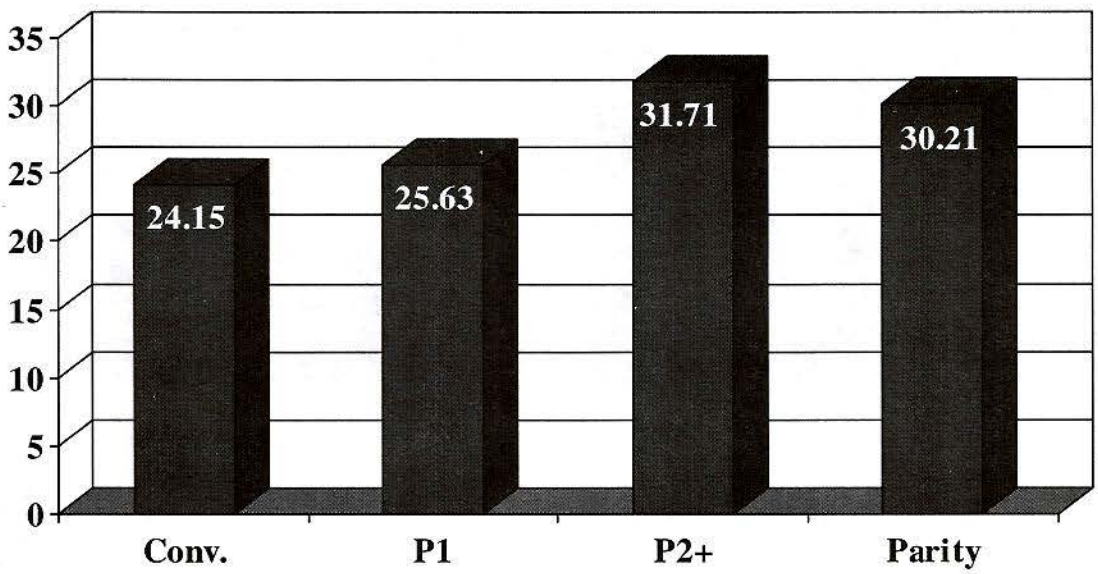


FIGURE 7



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