

RECENT PROGRESS IN SWINE BREEDING AND RAISING TECHNOLOGIES

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ABSTRACT

The pig industry is in the midst of a major revolution in breeding and production. Batch breeding systems allow for disciplined and coordinated all-in/all-out programs. Boar control programs allows for rapid and effective mating of sows reaching speeds of 50 sows per hour for 2 stockpeople. The use of single breeding technologies allow for genetic progress to be accelerated as well as reducing time and cost of production. The advent of hyperprolific sows capable of weaning over 100kg at 27 days increases the potential pork production for the farm. Changing weaning to a Monday improves the attention to the pigs during the working week. Increasing numbers weaned per batch farrowing place, the use of enhanced boars and enhanced stockmanship will significantly improve Taiwan's position on the international stage.

Keywords: Batch Production, Real Time Results, Boar Control, Hyperprolific Sows, Single Serving, Stockmanship

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The New World – 12 weaned per batch farrowing place

The pig industry is in the midst of a major revolution in breeding and production. A major change in pig performance expectations has occurred over the last few years with the possibility of weaning 12 pigs having each turn of the batch farrowing place. This sea change places enormous pressure on the whole farm team's expectations.

Reduction in costs

The increase in numbers weaned increases the value of each batch farrowing place:

Batch Farrowing Place Relative Value

Yellow boxes can be customised

Number weaned per farrowing place	10	12	
Live weight	120		kg
Initial cost of production per kg dead weight	65.00		\$
New cost of production		57.96	\$
Cost of production per farrowing place	78000	83460	\$
Assuming feed costs are	65		% of total cost of production

This assumes that the “extra” piglets do not increase “fixed” costs – labor, health bills, water, electricity etc. But the reduction of cost by 7\$ per kg is substantial.

Expectations within the farrowing area

Stockpeople should value the sow and gilt more. Ensure that her comfort is assured. Check the water supply at least twice a day. Water is a critical requirement for adequate feed intake. Liquid feeding is an excellent choice during lactation. Monitor and adjust the feeding curve. Feeding curves are essential to get the most lactating feed into sows and gilts. Taiwan needs to realize production systems that will allow sows to eat 10-11kg per day of a typical lactation diet (18% protein, 1.1% lysine and 9.7KJ NE/kg) after day 18 of lactation. Farmers may be finding this almost impossible. A major change in the temperature management of lactation sows is required. Reduce the room temperature to provide the ideal environment for the sow/gilt (16-18°C). Gestation sow feeding needs to be adjusted to remove overweight and over-fat sows. Moving to once a day feeding trains the sow to eat more in one good feed. Feeding only in the evening releases the cooler morning for breeding routines. But the rewards of achieving good lactation feed intake are enormous. It is possible for weaned pigs to average 8.5kg resulting in a weaned output of 100kg per batch farrowing place at 27 days of age.

With an increase in litter size to a total born of 15, there is a requirement to provide enhanced stockmanship at the time of birth. As the value of each batch farrowing place increases, it is worth spending more time at each farrowing to increase the survivability of each piglet and ensure that colostrum is adequately supplied. Split suckling and individual animal care programs are essential. This increases the importance of vaccination and feedback programs. Some farms have moved their weaning to a Monday to use the main days of the week to concentrate on the weaners and farrowing house.

Expectations post-weaning impacts

Nursery and grow/finish

The increase in numbers weaned may put many nurseries into a stocking rate crisis.

All-in/all-out must be maintained. There are two possible ways around this predicament:

- Utilize the passageway within the nursery. Many nurseries still have a central passageway which is unused by the pigs. The passageway area is often 10-15% of the whole nursery. Ideally during the construction this should have been of the same flooring as the main pens, but modifying the pen layout allows the passageway to become part of the pig's accommodation.
- Streaming the smaller pigs. Place the smallest 10% of the pigs into separate accommodation. Obviously this requires the space elsewhere on the farm – but these streamed pig pens can be easily constructed. On many farms we have provided 8 weeks' worth of additional accommodation. This is to provide these pigs with additional accommodation to 30 kg. Thus the streamed pigs are 12 weeks old at 30 kg, whereas their brothers and sisters reached 30 kg at 10 weeks of age. These streamed pigs can be reintroduced into the finishing group – all-in/all-out by weight. This can reduce the spread of weights at finishing while still allowing the stocking densities to be accommodated.

Note that the increase in weaning numbers may compromise the number of drinkers, feeding space and sleeping space and all of these facilities need to be reevaluated by the farm health team.

How do we capitalize on this new reality? Pig Flow Models

To achieve this increased level of production the farm needs to be well organized and disciplined. To create organization and discipline the farm needs to decide on a pig flow model which allows the farm to batch production achieving all-in/all-out.

The easiest pig flow model to set up, is when the farm is still on the drawing board. The aim of pig farming is to achieve production at a minimal cost given the opportunities. Maintaining health contributes significantly to reducing the cost of production and the only way to resolve and maintain health is to achieve absolute all-in/all-out. Unfortunately, the pig industry will cheat on all-in/all-out, (from time to time) and then hopes to “get away” without issues. However, nature has a way of making the farm pay. The more cheating that occurs, the more desperate cleaning protocols become, rooms are not rested and the pigs are overstocked or under-stocked, continuous flow starts or the equally ludicrous all-out only program. Health issues then occur, resulting in failure of growth and ventilation systems – the farm is on a negative health spiral.

Farms generally need to take a long hard look at their layout and design a layout that will:

- Minimize cost of production
- Allow for buildings to have at least a 24 hour rest between groups
- Repeatable over the whole 52 weeks of the year
- Create discipline and understanding of the needs of the farm by the stockpeople
- Predict gilt requirements and thus allow breeding targets to be set and easily reached – 52 weeks of the year – making allowances for summer infertility issues
- Produce repeatable outputs in meat supply – 52 weeks of the year. To allow for the summer infertility issues, the herd size should change over the year – bigger in summer and lower in winter. Therefore, farm assessments using “pigs/sow/year” are only valid for bragging rights – but have no significance in real cost control measures
- Produce a farm which is socially acceptable in terms of stockpeople time and holidays

Of course new farms are a novelty. Farms grow and while the farm was built with an ideal pig flow, with time new buildings are added, without pig flow being a consideration. The chaos then starts to build up.

Which weaning age should I pick?

The weaning age should be determined by the quality of the nursery and available feeds. A lactation shorter than 19 days reduces parity 1 sow’s production, lactations shorter than 17 days reduce parity 2 sow’s production – that is half the females on a normal parity structure herd. Sows older than parity 3 do not generally suffer a production reduction with short lactations.

Designing a pig flow model -Where should you start?

The finishing floor area should be the starting point. Unfortunately, many farms adopt a variety of finishing systems with different sizes and pen layouts. In addition, many farms have no idea of the size of the unobstructed floor area available for their pigs. Therefore, in practice, the farrowing area is a good start and allows the farm to at least achieve all-in/all-out to the point of weaning. If you do not practice all-in/all-out by weaning, you do not practice all-in/all-out anywhere.

What matters in the farrowing area?

To adopt all-in/all-out program the farm needs to create equal batches of sows within a recognized time period (the BATCH). The farm therefore needs to know

- How many farrowing places they have
- How many farrowing rooms they have
- How the farrowing places are distributed within these rooms

Pig Flow models to design the whole farm

The farm can then design around the farrowing area with estimations made for the space required for each group.

Example of the number of groups required dependent on the pig flow model

		4 week weaning				
Batch time		0.5	1	1.5	3	weeks
Gilt introduction	9 weeks intro.	18	9	6	3	
Gestation groups	16 weeks	32	16	11	6	
Farrowing groups	variable	10	5	3	2	
Nursery groups to	10 weeks old	12	6	4	2	
Finish groups to	24 week of age	28	14	10	5	

The farrowing groups have variable batch time dependent on the weaning age. Once the farm team has determined the number of groups required in each section, the number of animals that will be in each group can be easily calculated.

Examples of real farm layouts

The following are real farm solutions. The solution provided was that adopted by the farm health team, other options were available.

Achieving all-in/all-out

Case history

Farrow to finish farm with 101 farrowing places. Three rooms 40 40 21

The farm weans at 4 weeks of age, but admits this was a little chaotic. Produced 1160 tonnes per year pork (120 kg live weight) but failed to achieve all-in/all-out.

Solution

Split the two rooms of 40 into 4 rooms of 20 to produce 5 rooms of 20. The extra farrowing place is not required. The division of the room of 40 was easy to achieve without affecting the ventilation system.

Pig flow model:

Batch time	Weekly
Weaning age	4 weeks
Farrowing house layout	20 20 20 20 20
Gilts pool requirement	22
Breeding females required per batch	25
Farrowing sows per batch	20
Numbers weaned per batch	200
Numbers sold per batch	190
Weight sold annually	1186 tonnes

Thus providing a more disciplined model, the farm can produce an extra 26 tonnes of pig meat. This is still only weaning 10 per batch farrowing place.

Providing social time for the family and achieving all-in/all-out in the nursery

Case history

Farrow to 30 kg farm with 48 farrowing places – 6 rooms of 8 crates. The nursery has accommodation for 230 weaners. The farm produces 80 to 100 pigs a week and does not practice all-in/all-out. The farmer was 56 years old and the son was not interested in farming.

Solution

The following aims were discussed:

The nursery requires 230 pigs – 23 a batch of farrowing places to wean (10 weaners per farrowing place). The farm was easily divided into a 3 week batch program weaning at 4 weeks of age.

Pig flow model:

Batch time	3 weeks
Weaning age	4 weeks
Farrowing house layout	8+8+8 8+8+8
Gilts pool requirement	9
Breeding females required per batch	29
Farrowing sows per batch	24
Numbers weaned per batch	240
Numbers sold per batch	233
30 kg pigs sold annually	4039




Thus the farm produced the same number of pigs but with more discipline, less effort and enhanced health for the weaners. The week the farrowing house was empty was utilized as the first nursery week, which produced an extra half week of growth on the sale product which was realized as extra payments on the weaned pig at sale.













Additional comments

The nursery was examined, and if the passageway and small pens were removed there was sufficient room to run 250 pigs to 30 kg in a big pen situation – which reduced cleaning time by 50%.

Breeding disciplines to fill the batch farrowing place

Once the farm has agreed a pig flow model, the batch breeding target needs to be achieved. This requires a review of the breeding method in use. The understanding of breeding physiology produces a breeding method that provides the farm breeding team with a method which is quick, disciplined and organized. The following montage described the method which is being utilized by many farmers in Taiwan.

Breeding area set up		
		
Note stall designs incorporating a boar hide. These are set up every third sow.	A rear gate which allows easy access to the rear of the sow and her back to aid stimulation.	Excellent lighting is essential for good mating.
		
Controlled boar exposure above gates	Boar crate which can be moved manually or motorized. Some farms train a boar to walk on a tether and lead.	
Note two separate boars are used to help stimulate the sow and keep both boars interested.		
Ensure – boars are housed 10m or more away from sows.	-the breeding area is clean and well maintained.	Safe breeding area for stockpeople.
Breeding routine		
		
Have all the equipment ready	Boar exposed to the sow	Good signs of estrus

		
Sow stands within 30 seconds	Apply the belt – numerous designs	Insert the catheter and semen pack
		
Attach the semen to the belt	The sow now self serves	
		
Some extra attention	Finish breeding	Bend catheter over
		
Move first boar introduce boar 2	Remove belt	Remove catheter and mark sow

Single serving

To adopt and achieve enhanced biological output the pig industry needs to accelerate its genetic improvement. This will allow the industry to achieve the 12 weaned per batch farrowing place, to produce pigs with improved food conversion, reduced carbon costs and produce carcass quality that reflects local and international customer requirements. Current breeding programs utilize two or even three artificial insemination (AI) matings after weaning to achieve an 82+% farrowing rate and producing a total of 14 pig born (alive and dead). Using the boar control program for batch farrowing it has been possible to get excellent results with just single serving. The system effectively reduces the boar power required by a factor of 2 - instantly increasing genetic improvement.

What results can be achieved through single serving?

Breeding	# bred	# farrow	FR %	Total born/sow
Single	2856	2555	89	13.9
Double	4066	3375	83	13.3

FR= Farrowing rate

What are the cost implications?

There is an obvious benefit in reducing AI purchases to achieve pregnancy. However, if the same (or even more) genetic cost be spent on utilizing boars of higher genetic merit to reduce feed conversion and enhance carcass quality major whole farm cost reductions have been achieved.

The major savings are:

- Reduction in feed usage by enhancing Food conversion ration (FCR) – how many kg of feed is required to make a kg of pork.

- Increasing total born

Minor advantages also include:

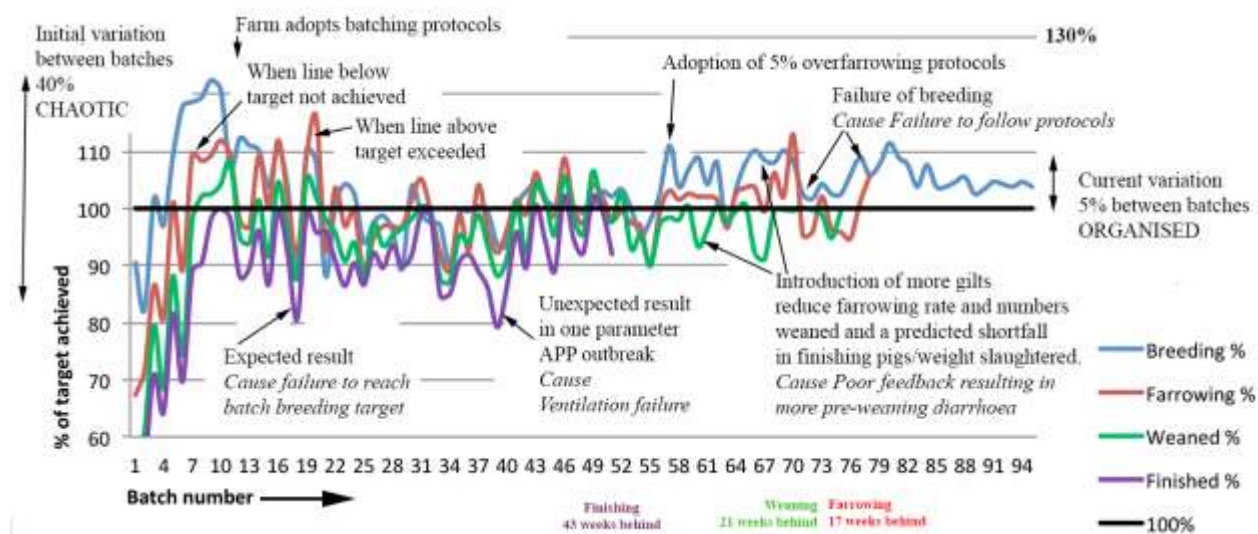
- Time to mate the sows
- Catheter and equipment costs
- Time to collect boars
- Need to house and feed extra boars for poor genetic merit.

Recording of events in real time

To monitor the batch system requires a rethink of recording systems. The use of large stockmanship boards recording real time events has revolutionized the farm's team's awareness of events on the farm.



These results can then be graphically tabulated to allow for analysis of the farm teams performance. The system has demonstrated the ability to increase production by encouraging the farm team to reach production targets, enhance team building and farm morale, reduce variability between batches and improve health. The system allows direct comparison between farms with different batching and farming systems.



CONCLUSION

There is a new world of pig production currently being built around 12 weaned per batch farrowing place. This new paradigm provides enormous opportunity for the pig industry and its advisors. There are significant advantages in cost control either through reduction in fixed costs producing finishing pigs or in feed costs by reducing the sow herd. The adoption of batch farrowing allows the farm to better organize and discipline the farm routines. With better monitoring systems the farm's teams can be encouraged and motivated. With single serving boar genetic improvement can be accelerated and time saved. It's exciting times ahead.

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