Health and production management in growing and finishing pigs

Grower/finisher operations should be simple and efficient to operate. The production flows should be as simple as possible, with pig movements minimised, automated adlib feeder and drinker systems utilised and with simple effluent systems. Ideally sheds are fully slatted, preferably on 100% concrete slats, and have underfloor channel flushing or pull plug systems.

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Production flows in temperate and cool climates usually mean that pigs flow into the grower finisher sheds from a prior weaner stage, but in tropical climates wean to finish systems may be considered. Weaner pigs can do surprisingly well on slatted concrete floors, if those floors are well constructed and in good condition.

Most farms still have the separate weaner accommodation, with pigs moving into grower/finisher sheds at 8-10 weeks of age. Some farms may operate a separate grower and finisher accommodation to allow for more sorting of pigs at market, and this can work well for smaller continuous flow operations, or even for large operations if they are very healthy.

It has the advantage of maximising use of floor space at the expense of downtime for cleaning, drying and disinfection.

In situations where the health of the pigs is compromised by infections, or is at risk of infectious outbreaks, it is preferable to have batching and all-in all-out (AIAO) production.

Scale of operation

The scale and size of batching/AIAO production systems depends very much on the size of the production system and on targeted expansion programs: A practical target is to have a maximum of two weeks of production on each growout batch site, and to space those sites out.

The question arises: how far apart should they be? And the simple answer is: as far as

possible. Whether it is 50m or 500m or 3km, separating age groups improves disease control, aids in disease eradications, and improves management recording (discrete batches/sheds of pigs make recording pig inventory and feed inventory a simple matter).

Note that strategically placed or preserved remnant bushland or tree-lines will contribute to the positive effects of spacing by pushing airborne pathogen loads above sheds, and by creating turbulence which disperses and damages those pathogens.

Many multisite systems are in place in the USA, and sheds will often hold 2,400 pigs, usually with a central dividing wall resulting in two x 1,200 pig batches. This format results from the weekly output of a 5,000 sow breeder farm being 2,400 pigs (5,000 sows x 2.3 LSY x 11 pigs weaned divided over 52 weeks = 2,432 pigs/week).

Consider a smaller 1,000 or 1,200 sow breeder unit in Asia supplying 500 pigs per week: A simple flow from the weaners at 10 weeks of age (30kg) with average sales at about 22 weeks of age (110kg) could work with 7 x 1,000 pig sheds.

With the seven sheds, the oldest shed is full of 23 weeks of age and 22 weeks of age pigs when the last shed in the cycle is filled with the most recent batch of 10 week old pigs from the weaner.

The heaviest pigs from those sheds will have been picked out and have already gone to market, and the balance now have a minimum of several days to be sold out, thereby allowing three or four days of cleaning, disinfection and drying. Whether an extra 1,000 pig shed is needed to allow some empty time, and time to get some stragglers to market, will depend on average growth rates and the distribution curve of the final weights.

Stocking rates and shed areas

Stocking rates and shed areas can be designed to allow some flexibility in flows and numbers: for example, if we are targeting 110kg liveweight sales, allow a generous stocking rate for that weight. The minimum Australian standards are 0.71m^2 for 110kg animals, but I would usually try to target 0.8m^2. There will be times it is overfilled, and there will be times you need some downtime. Taking two weeks to fill a site is not a problem, those pigs all came out of the same farrowing sheds. Do not commingle pigs from different breeders to simply make up AIAO systems flow.
It has been repeatedly tried, usually with severe health problems. Minor differences in pathogen loads and in immune responses seem to compound and create a very unstable flow.

A system such as this will not always flow perfectly, with the vagaries of production numbers and in situations where herds are expanding, but that is not an issue. Sometimes batches may not fit and may flow over into the next shed and require some early sell outs, and in the most extreme scenario, to the point where the previous sale pigs are still there.

Ideally this situation is completely avoided, but if it is rare and occasional, in the event of a disease flare up, it is simply a matter of allowing that compromised batch to grow out, to sell them all (and the health problems with them), and clean up and start again with the next unaffected following batch that lands there. In the event of a disease problem occurring, it will then become very important to be strict on subsequent AIAO batches.

Shed sizes and pen sizes

Larger sheds work well in the USA, but in high challenge situations smaller sheds may

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improve herd health management. A 500 or a 1,000 pig place shed is currently my ideal setup for smaller systems.

At approximately 60m long by 15.5m wide (for 1,000 head) with a single central aisle of 1.5m, sheds should be fully slatted, preferably with good quality concrete slats, and in tropical climates should be cooled in some manner.

Tunnel ventilation allows sheds to be built more closely together (say 10m spacing) but it is important to allow for natural ventilation in case of power failure (for example, solenoid drop curtains in hot climates).

Naturally ventilated sheds may be cooled with misters/sprinklers/drippers/fans and should be spaced 20m apart to allow for some crossflow ventilation.

A very low concrete outer base wall with steel bar panels allows ventilation with some huddle shelter, and automated thermostatically controlled curtains are essential.

The simplest structure is a centre aisle way with pens either side. In this scenario we end up with 10 pens of 50 pigs either side of a central aisle way, and dimensions of about 6m x 7m per pen.

At least four feeder spaces are needed, and I prefer to see 2 x tube feeders per pen, near to the front for easy visualisation, with a flat base plate tray, and nipples for wet dry feeding. These feeders flow well and allow easy visualisation of feeder function and feeder adjustment.

Adjustment is a matter of ensuring less than 50% of the flat steel feeder base is covered by feed at any time (ie, the pigs have feed, but are not filling the bowl and wasting feed).

Some of the new toggle feeders are perhaps superior, but ensure the base plate is easily visible from the aisle way, the feeder is easily adjusted, and in the event of a blockage it is easily cleaned. There should also be fence mounted bite nipple drinkers, at least five per pen. (The drinker target is one per 10 pigs, with a flow rate of one litre per minute)

Health issues

A consultant veterinarian is essential in the system from the very start to help establish a herd as disease free as possible, and during the production to ensure diseases and health constraints are diagnosed and controlled as early as possible.

Depending on the diagnostic results, vaccine and medication programs may be set up. Good vaccines are available for Mycoplasma hyopneumonia, and for porcine circovirus and in almost all cases will be used in herds which carry these problems.

In Asia PRRS is often a problem, and control of mycoplasma and circovirus and the use of AIAO production systems is necessary to make it manageable.

PRRS vaccines may also be used in breeding and in growing herds, but management and flow measures are essential to ensure vaccination program success.

As better respiratory disease control is developed, in terms of eradications, and in the use of AIAO flows combined with vaccination programs, ileitis (Lawsonia intracellularis) may emerge as a problem, and control by either pulse medication (usually one week in four to allow some exposure and subsequent natural immunity) or by vaccination is usually required.

Enterisol (Boehringer Ingelheim Animal Health) oral vaccine is effectively used on farms in Australia, especially in cases where minimal antibiotic usage is desirable.

Parts of Asia may also require foot and mouth and classical swine fever vaccination: These may be complicated programs depending upon the status and stage of the diseases on farm, and these are not discussed here.

Biosecurity audits and abattoir monitoring

Abattoir monitoring of slaughter pigs is a very useful way of monitoring these diseases, and other risks such as internal parasites and stomach ulcers. This should be carried out, recorded, reported and monitored by an experienced veterinary consultancy provider.

Given the great variation in systems and layouts, biosecurity audits by experienced veterinary consultancy providers are essential to set up and monitor biosecurity systems which are protective and practical for each individual system.

Feeding and nutrition

Feed is the biggest cost component by far in growing systems, and feed formulation, quality, delivery and feeding should be our major focus.

Accurate feed formulation (targeting nutritional requirement of each age group) and ensuring the feed goes correctly to each targeted age group is essential.

Measuring pig performance (weight, feed intakes, and carcase quality) is essential and this should be done in conjunction with a qualified and experienced nutritionist. Veterinarians and nutritionists must work closely together to implement and adjust nutritional and feeding programs.

Overall, nutrition is a huge topic in its own right, so we confine ourselves here to some comments on feeders and feed grind.

Details on wet/dry feeders and feeder spaces per pig

Wet/dry feeders may well prove superior in terms of FCR (kg of feed per kg of gain). Pelleted feed is usually preferable to mash, and usually performance improvement is seen using pellets through wet dry feeders.

Recent research using Crystal Springs wet/dry feeders with 20, 26 and 32 pigs per pen indicates best growth rates occurred with 10 pigs per feeder space, but feed efficiencies were improved at 13 and 16 pigs per head space, indicating wastage is less with higher feeder pressure (Table 1). It is reasonable to conclude that the mid range of 12-13 pigs per feeder space is a reasonable target.

Gonyou and Lou 2000 indicated that 12 pigs per feeder space was suitable to maximise production, and also demonstrated that provision of water at the feed point (ie wet/dry feeders) increased intakes and growth rates, but did not improve FCR in their trial situation. Pigs ate more quickly and occupied the 'wet' feeders for less time.

Effects of feed grind

Fineness of grind has been shown to have major effects on the feed efficiency of growing pigs, and it is likely most farmers have considerable gains to make here. Growing pig/finisher pig feeds are often seen with some very coarse grinds and undigested particles can be plainly seen in manure.

Fineness of grind should be monitored and quantified. Some excellent simple sieve systems are now available. Mash feeds can

Table 1. Recent research using Crystal Springs wet/dry feeders (Wastell et al, 2018).

Pigs/feeder space	10	13	16
Day 0 weight (kg)	27.5	27.5	27.5
Day 100 weight (kg)	129.7	129.4	128.4
Day 0-100 ADG	1.03	1.01	1.01
ADFI	2.62	2.52	2.55
GF (gain/feed)	0.39	0.40	0.40
FCR (feed conversion ratio)	2.54	2.50	2.52
Deaths/removals (%)	2.6	3.2	2.9

Grind	Fine	Medium	Coarse
Microns	500-600	combined	1000-1100
ADG	810	836	839
ADFI	1.706	1.770	1.805
FCR	2.51	2.64	2.66

Table 2. Effects of feed grind.

go into a simple sieve system, and pellet feeds will need to be put through a grinder, before being tested in the sieve. A finer grind can have large positive effects on feed efficiency but increases the risk of stomach ulcers.

Close attention to feed grind and to monitoring stomach ulcers is valuable. Stomach ulcers can be monitored in sheds (deaths, autopsies, symptoms of pale and/or poor condition pigs, and elimination of other possible causes) and at slaughter.

Work by Edwards 2014 indicated that a fine grind (500-600 micron particles) substantially improved the FCR of growing pigs between 40-100kg over diets containing coarse particles (1000 to 1100 micron). Growth rates were similar with the fine grind feed, but feed intakes were less, and therefore FCR was substantially improved.

Edwards noted that a 5% reduction in FCR equals a saving of 8.5kg of feed/pig calculated as a saving of approximately $3.80/head. This is equivalent to a $22.50/tonne reduction in the cost of feed.

Effects of stomach ulcers

The downside of the above-mentioned path to efficiency gains, is the added risk of stomach ulcers occurring in the pigs with subsequent production losses, and perhaps increased mortality.

Ongoing monitoring of the feed grind is essential; as work by Mavromichahlis et al 2000 indicated that wheat based diets with a grind of 400 microns resulted in a higher level of ulcerative stomach lesions.

Data from abattoir surveys carried out by Dunlop 2018 demonstrates that pigs with more severe gastric ulcer lesions grow significantly slower than their pen-mates, with a 15% reduction in birth to slaughter growth rates. This work suggests abattoir surveillance programs may be essential in obtaining optimum returns from more finely ground feed.

Monitoring feed grind with a Bygholm feed sieve is sufficiently accurate for the purposes of monitoring feed particle size and this instrument provides a clear visual image of the proportions of the various sized particles.

Summary, and the need for records

A simple production system allows more accurate and timely recording of essential growth and feed data. Accurate records of the growing and finishing stage are essential to monitoring and decision making processes concerning that portion of the herd which is consuming the majority of the feed budget.

Ideally mortality, feed intakes, and weights are monitored in at least several stages in weaner and grower production. We would prefer to see two stages of weaner data, and at least two stages of growing data (growing and finishing) measured to allow the calculation of FCR at each stage, but note that AIAO systems at the very least can provide an overall birth to finish or wean to finish calculation for each batch in the event we only have market weight data to rely on.

With AIAO batches records of consumption (or at least the delivery amount) of each type of feed by each batch combined with the average market or slaughter weight of the batch, then the calculations are simple. In non-batch systems, that data is difficult or impossible to extract.

Appropriate housing, health monitoring, and simple robust management systems with few moves, and expertly monitored feeds and feeders systems will ensure maximum profitability.

Health, nutrition and performance are inextricably intertwined and veterinarians, nutritionists and production advisors need to work closely as a team with farm management to ensure optimal efficiencies of all production parameters. ■

References are available from the author on request

Table 3. Effects of stomach ulcers.

Gastric ulcer score	Nil	Moderate	Severe	
Number of pigs	366	83	11	460
ADG (g/day)	489	457	415	-15%