

Dealing with tail biting

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Stating the obvious

Tail biting is not new to modern pig production. No one currently working with the pork industry can claim a time when tail biting did not exist as a topic of concern/discussion. During that time, the pig has evolved genetically, to some degree by natural selection, but largely through efforts of selective mating to improve fecundity and growth efficiency. Requirements in feed, feeding, management and health have subsequently changed to allow realization of the pig's full genetic potential, but always retrospectively as the species must show caretakers what changes are required.

It is important to differentiate tail biting from necrosis, to obtain an accurate diagnosis. The necrosis of ear tips or tails should be associated with poor perfusion of the tissue, and poor perfusion associated with septicemic health issues or mycotoxicity. In some cases, it may be difficult to differentiate. Perhaps necrosis led to an appealing target and a lack of sensitivity, allowing tail biting to rise to its own level of pathogenicity.

Tail biting is a vice, considered an inappropriate/undesirable behavior within a population. This is not a disease, though health may be a component. There is no tail biting vaccine as a preventative, no antibiotic inclusion to serve as treatment or preventative. Many treatments have been proposed and employed, all with varying levels of success, strongly suggesting there is no single cause for all episodes. It is essential to view tail biting as a multi-factorial process.

The mantra "pigs need feed, water and air" is particularly relevant to the topic of tail biting. Restricting any of these essentials could initiate a tail biting episode. However, in this context, comfort should be added as a fourth essential. It is not enough to provide feed, water and air; the pig needs access to ample quantities of these in a comfortable environment of minimal stress. The pig needs time and space to rest/relax unencumbered and undisturbed. Examples of an uncomfortable/stressful situation include wet floors, over-crowding, air temperatures too hot or too cold, drafts and stray voltage.

Understanding the complexities

Different motivations/types

To unravel the complexities of tail biting, it is helpful to recognize different types/motivations of the behavior. Three types have been proposed: two-stage, sudden-forceful, and obsessive.

- Two-stage biting is founded in the pig's natural foraging inclination and the reality that most modern production practices limit/eliminate that natural activity. Re-directed foraging activity due to limited substrates may initiate tail

biting which progresses from gentle explorations (stage 1) to damaging bites (stage 2).

- Sudden-forceful tail biting occurs when pigs exhibit aggressive activity due to frustration over limitations of feed, water or space.
- Obsessive biting behavior suggests an individual pig fixated on attacking tails, going indiscriminately from one to the next inflicting damage.

Possible detonators

"Trigger" might be used to identify the act or situation initiating the tail biting episode in a population. Recognizing the explosive nature (aggressive behavior and rapid spread through a population) exhibited in many cases, "detonator" may be a more appropriate/descriptive term. It is beyond the scope of this document to address all possible detonators, but the most-commonly-considered will be covered (Table 1) in the general framework of feed, water, air and comfort.

Right or wrong, nutrition is usually the first consideration when addressing tail biting. Details of the nutritional complexities are beyond the scope of this document. That said, the challenge of meeting the pig's nutritional needs is ever-changing as geneticists advance the rate and efficiency of growth, generation upon generation. Nutritionists bear the unenviable task of catch-up to identify and meet the changing array of ingredients or nutritional factors preventing the pig from reaching its genetic potential. No longer is it sufficient to identify a minimum level for some ingredient; the level must be adjusted for other components, digestive availability and intake changes. Protein levels, specific amino acids, minerals and ratios must be considered, with the understanding today's standards may soon be outdated. Ultimately, the goal is a consistent and adequate supply of a balanced diet which meets or exceeds the pig's rapid growth and changing needs.

Mycotoxins are often incriminated, though it seems more plausible to associate mycotoxins with poor circulatory perfusion and subsequent necrosis rather than tail biting per se. Further, while much is known about clinical manifestations associated with individual mycotoxicities through laboratory research, little is understood about the interaction of multiple mycotoxins, which is more likely in the real world.

Limited access to feed or water may be a detonator in either short- or long-term. A water line break or feed outage represents a short-term detonator. Insufficient feed pan coverage could be a longer-term factor. Limiting feeder space could be the deciding factor which is not manifest until pigs reach a certain weight or daily intake. Where feed access was restricted, one researcher identified 60% of tail biting occurred within 1 meter of the feeder. While

Table 1: Commonly considered “detonators” of tail biting

AREA	PREDISPOSED FACTORS	REPORT FREQUENCY
Management	Long Tails	+++
	Stocking Density	+++
	Temperature (Hot or Cold)	++
	Poor Air Quality	+++
	Drafts or Air Speed	++
	Fluctuating Temperatures	++
	Humid Environment and Wet Floor	++
	Genetics	+
	Sex	+++
	Floor Type	+
Nutritional	Inadequate Diets	+++
	Changes in Diets	++
	Low Salt	+++
	Water Availability	+
	Feed Form	+
	Feeding System	+++
Diseases	Greasy Pigs	+
	PRRS Skin Lesions	+
	Parasites	+
Labor	Personnel Trained	++

that may not address every episode, it emphasizes the need for access and the potential damage associated with feed outages. Water temperature, pressure and flow rates merit special attention, since restricted water intake will directly restrict feed intake as well.

Temperature can quickly influence comfort in some geographic regions or facility designs. In some countries, tail biting is a seasonal problem due to high summer temperatures and inadequate air circulation. Poor ventilation may cause hot or cold areas within a barn equipped with heating and mechanical ventilation during winter months and reduced air flows. Inappropriate air flows exacerbate gas (NH₃, H₂S, CO₂) build-up or high humidity and wet floors which are each a detonator in its own right by way of the pig’s discomfort.

Health certainly plays a role. Again, an accurate diagnosis is required. Is it tail biting or tissue necrosis? Disease challenges (e.g. PRRS or IAV) may cause a spike in tail biting activity directly causing discomfort or irritability or indirectly impacting feed or water intake. The veterinary audience is well trained and aware of disease options and manifestations as well as diagnostic strategies

and tools – those are addressed in detail through veterinary and animal husbandry articles, manuals and texts.

Pen or group dynamics may cause stress beyond simple space allocation. Group size or pen design influences the ability of the pig to escape a biting penmate. Mixing pigs upsets the group dynamic, leading to increased activity, aggression and tail biting.

Tail length may itself influence tail biting. Docking tails as neonates longer than ¼ inch may result in less tail biting than at ½ inch, but having variable length seems to yield the most tail biting damage.

Detonators collectively

With so many potential triggers or detonators for tail biting, the observer must be patient and astute to unravel the causative chain of events for a tail biting episode. Can one truly say there is a single event or circumstance that has initiated the behavior OR have multiple factors contributed until the collective conditions allowed the process to start, leaving one item to appear as the “smoking gun” or “straw that broke the camel’s back?” Correcting

Figure 1: PIC troubleshooting checklist

Combating Aggressive Behavior

An imbalance between the pig's needs and their environment results in aggressive behavior. This behavior is influenced by many factors, and an increase in adverse environmental conditions may increase the likelihood that pigs will resort to aggression.

Predisposed	PIC Recommendation
Tail Length	6.5 mm tail docking length at processing with minimal variation
Stocking Density	Wean-22 kg: 0.26 m ² /pig 22-35 kg: 0.34 m ² /pig 35-120 kg: 0.68 m ² /pig >120 kg: 0.70-0.74 m ² /pig
Temperature Management	Brooder and mat temperature in Comfort zone (35°C on surface) Check for Proper CFM for pig age and number of head Ensure adequate mister time in Summer <65% humidity
Air Flow & Quality	245 m/minute air speed from inlet openings & 90-120 m/minute tunnel speed average Avoid Drafts Clean Pit Fan, Temperature Probes and Fan Blades Correct pit management should be defined to avoid increasing harmful gases
Feeder Space	Nursery: 2.5 cm/pig Finisher: 5.0 cm/pig (dry feeder) 3 cm/pig (W/D feeder) Finisher: 12 pigs/hole & 38 cm/hole (wet/dry feed) 8 pigs/hole (dry feed)
Feeder Adjustment	1-7 days 70% = >50% Pan Coverage* 7 days to exit 50=>40% Pan Coverage* Finishing: 40= >30% Pan Coverage* Consider increasing pan coverage by 20% in phases where aggressive behavior is observed
<small>*Recommendations are contingent on meeting feeder space requirements</small>	
Feed Outage	Feeder with 24 h Feed capacity
Water Availability, Quality & Flow	1 drinker/10 pigs Flow – Nursery 0.5 L/min; Finisher 1.0 L/min Quality: Refer to PIC Wean to Finish Manual Page 47
Drinker Adjustment Height	Nipple at 90-degree angle= level with shoulder of smallest pig; 60-degree angle= 5.0-7.5 cm above shoulder of smallest pig; Bowl drinker= 40% of shoulder height of smallest pig
Nutrition	Diets that meet PIC nutrient requirements are formulated to mitigate tendencies for aggressive behavior. If aggressive behavior is observed, follow-up actions include: <ul style="list-style-type: none"> • Submit feed samples for proximate analysis • Consider increasing lysine, tryptophan, sodium, and energy levels • Consider increasing bulk density of the diet (lower inclusion of low bulk density ingredients, for example, wheat middlings or corn DDGS) or add fat to increase the energy density of the diet • Avoid abrupt changes in diets • Review mixer efficiency • Review feed mill batch sheets for dosage errors • Review mycotoxin levels Some anecdotal evidence indicates that the addition of magnesium oxide may minimize the issue.

Combating Aggressive Behavior

Additional Measures:

1. If a tail-biting problem occurs, promptly remove and treat the tail-bitten pig(s). This reduces the chance of infection and helps prevent the behavior pattern from being shared to other pigs.
2. Some chewable and destructible environmental enrichment or toys can be used to reduce pen-mate interaction.
3. Decrease light intensity to reduce activity.
4. If the biter is identified, the pig should be relocated to an exclusive area apart from the hospital pen.
5. Disease control is important. Viral outbreaks like PRRS or SIV may trigger vices.
6. Greasy pigs can be more susceptible to having vices.



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that final item alone may not resolve the overall problem since it does not adequately address the complex nature of the problem.

As an example, a disease outbreak (e.g. PRRS or IAV) in a naïve population might cause a spike in tail biting, but is that a direct or indirect cause?

- Did the disease itself cause a direct stress/discomfort in the herd resulting in greater aggressive activity
- OR did the disease restrict feed intake causing an essential ingredient shortfall in an otherwise adequate diet
- OR was the diet inherently inadequate and the disease simply exacerbated the manifestation
- OR would nutrition and health have been sufficient to prevent an episode but stockmanship did not properly and timely respond to changing environment?

What to do, what to do

Preventing tail biting requires caretakers address all the variables mentioned above and perhaps more. This is a daily obligation as a single and instantaneous detonator (e.g. feed outage) may alone be sufficient to initiate an episode.

Many treatments have been proposed and tried with variable success. Lack of success for one treatment in all situations is predictable/likely due to the variability of causative factors already

mentioned. Treatment is often unrewarding once an episode begins. Troubleshooting tail biting episodes is facilitated by checklists offered to the industry by PIC (Figure 1) and others.

Investigating or changing diet formulation is often the first treatment/response activity considered. Objectively, the formulation used should be compared to the most current recommendations offered by the industry or appropriate genetic supplier. Further, multiple feed samples should be analyzed to see if the prescribed formulation matches the feed in the feeder. Consider not only the current diet, but also previous diets received by that group of pigs.

Manipulative materials have been used both as prevention and treatment but do not truly address the underlying problem. Best results are seen when the materials are chewable, deformable and destructible. These are preferred over traditional “toys” such as chains or bowling balls because pigs lose interest in the non-destructible toys. Salt blocks are often utilized, simultaneously providing both increased salt intake (dietary change) and something formidable with which the pigs can interact.

Ultimately, identifying the underlying cause or detonator will require careful, time-consuming observation and likely well-targeted analysis of feed, water, health, environment and management.

Conclusion

Tail biting is a behavioral vice that has challenged modern pork production for decades. Discernment/distinction between necrosis and damage due to tail biting is important. It is particularly difficult to prevent or resolve this behavior because of multiple causative factors which interact in unpredictable combinations. Treatment is often unrewarding, so prevention becomes the priority, linked closely to patient, careful observation, husbandry

and management. In the end, it is both simple and complex. Pigs need feed, water, air and comfort. The existence of tail biting indicates one or more of those essentials is lacking.

References

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