

# Management of unweaned piglets Short review

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This short review gives an overview of the current knowledge on potential early life risk factors and their impact on tail biting behaviour in later life.

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## 1 General introduction

The current conditions in which weaned pigs are kept are the most important in relation to the development of tail biting behaviour (Lange et al., 2021). Evidence for associations between management and housing during suckling and tail biting behaviour is scarce and contradictory (Prunier et al. 2020a). This short review gives an overview of the current knowledge on potential early life risk factors and their impact on tail biting behaviour in later life. However, further research is needed to finally evaluate the impact of the early life environment on the expression of tail biting in later life.

## 2 Background

A pig’s motivation to bite other pig’s tails can be aggressive and non-aggressive. In contrast to aggressive biting, non-aggressive biting is not motivated by competition over resources or agonistic interactions (Figure 2.1). In pig husbandry, tail biting is generally considered as non-aggressive biting and as an abnormal behaviour. It is also referred to as oral manipulating biting, where one pig manipulates another pig’s tail with its teeth (EU Commission, 2016; Prunier et al., 2020a). Especially in barren environments, in which pigs cannot express their natural behaviour, they redirect foraging and exploratory behaviour towards penmates (reviewed by Prunier et al., 2020a). From an animal’s point of view, this behaviour is normal, but redirected.

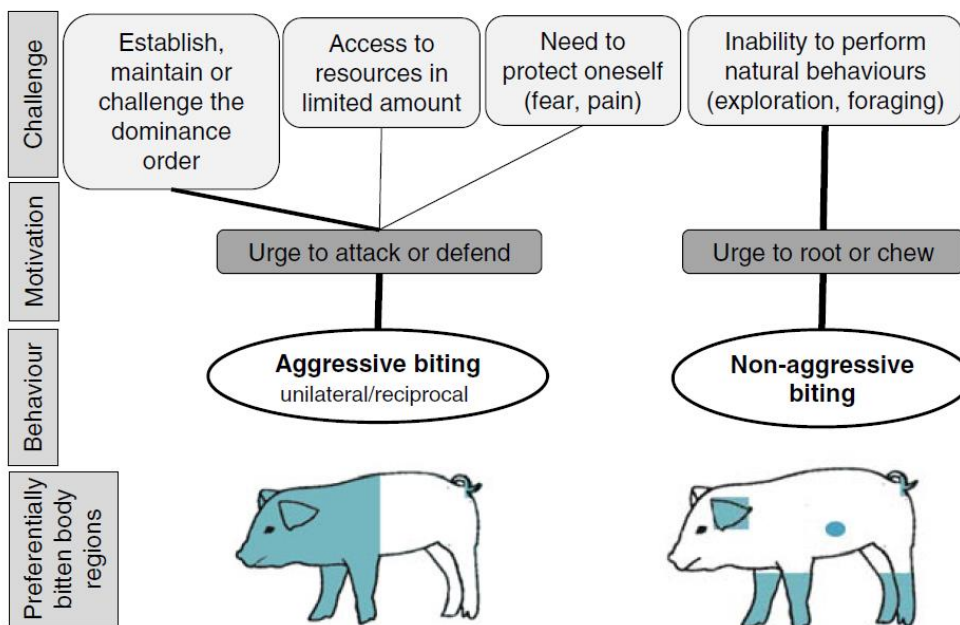


Figure 2.1: Motivation and affected body parts of biting behaviour (from Prunier et al. 2020)

Pigs that perform tail biting differ in their modes of biting. While some bite rather occasionally, others are described as “fanatical” biters. They seem hyperactive and bite one tail after another. The differences in individual tail biting pattern depend on genetics, personality and coping style of the individual, but may also depend on the prenatal and early postnatal environment (reviewed in Prunier et al. 2020a). In any case, tail biting can lead to severe injuries and causes welfare problems and economic losses (Hakansson & Houe,

2020). Under commercial conditions, scientifically-established risk factors for tail biting are e.g. space allowance, types of flooring, air quality, health status and diet composition (EFSA, 2022).

EURCAW-Pigs established [six focus areas](#) for inspections on tail biting, based on the EU commission staff working document on the prevention of the routine tail-docking (EU Commission, 2016). Although tail biting is predominantly reported for weaned pigs (Edwards & Valros, 2020), studies have shown that in some cases its expression can be influenced by predisposing factors acting in early life (Prunier et al., 2020a). EURCAW-Pigs provided a review on “[Farrowing housing and management](#)” (Pedersen et al., (2020), describing management solutions for suckling piglets. These solutions focus mainly on handling of large litters and do not focus on prevention of tail biting. In the following, scientific knowledge on early life risk factors for tail biting will be described for each of the six focus areas.

### 3 Early life risk factors for tail biting

#### 3.1 Environmental enrichment

In commercial housings, suckling piglets live in a barren environment with limited opportunities for exploration, locomotion, social behaviour and play (Prunier et al., 2020b). This may lead to adverse consequences for pigs’ coping strategies in later life. Different studies report inconsistent effects of enrichment material in early life on the expression of tail biting in later life (Prunier et al., 2020a). Suckling piglets do use enrichment materials, however, to a lesser extent and more synchronously in comparison to weaned pigs (Docking et al., 2008). Not many studies have been carried out on enrichment material for suckling piglets to prevent tail biting later in life. However, one clear result is that when providing enrichment material in the pre-weaning environment it is imperative to keep on providing enrichment material after weaning (Prunier et al., 2020a).

#### 3.2 Pen structure

Farrowing pens are designed to reduce work investment and to ensure good performance (see EURCAW-Pigs Review “[Alternatives to farrowing crates](#)”, Pedersen et al., 2023), but they generally only provide minimum space to ensure basic needs in relation to parturition, suckling, eating, drinking and elimination. Other behavioural needs of sow and suckling piglets, as, for instance, nest building, social, locomotion and play behaviour, are not considered (Baxter et al., 2011). The impact of the farrowing pen design on the expression of tail biting in later life is not well investigated and the results are very contradictory. For instance, van Nieuwamerongen et al. (2015) and Kein et al. (2016) reported that early socialisation may reduce tail biting later in life, but Moinard et al. (2003) did not find a preventive effect of multi-suckling on tail biting in later life. Some studies indicate that more complex pen designs may reduce tail biting risk later in life (Kinane et al., 2021; Smulders et al., 2008), but some are cofounded with the use of straw bedding or not (Moinard et al., 2003). In contrast, (Gentz et al., 2020) and (Lange et al., 2021) did not find any effect of the farrowing pen design on the expression of tail biting in later life.

However, for early socialization, piglets can be mingled either due to free access to adjacent farrowing pens, whereby the sows remain in their pens, or in alternative housing systems, e.g. multi-suckling pens, where

different sows and piglets share a common group area (van Nieuwamerongen et al., 2014). Although, the scientific results are very contradictory, piglets benefit in general from early socialization due to the extension of the environment and the better adaptation to weaning stress in comparison to piglets from individual farrowing pens (Hillmann et al., 2003; van Nieuwamerongen et al., 2014).

### 3.3 Diet

Referring to Prunier et al. (2020a), there is some evidence that undernutrition during suckling may affect non-aggressive tail biting behaviour in weaned pigs. Undernutrition arises due to insufficient milk intake in large litters, an unhealthy dam or poor health status of the piglet itself. Management solutions to prevent undernutrition, thus may have an effect on tail biting behaviour later in life. In practice, piglets are often provided creep feed to improve piglet's weights (Tokach, 2020). Studies indicate that piglets who eat more solid feed before or at weaning may have a reduced risk for tail lesions after weaning (Middelkoop et al., 2019a; Middelkoop et al., 2019b).

Generally, management measures to ensure adequate nutrition of piglets are especially needed in cases with hyper-prolific sows. These measures include e.g. litter equalisation, split-suckling and cross-fostering. Cross-fostering provides social stress and can lead to hunger and hypothermia in piglets. Further it may increase tail biting risk after weaning (Prunier et al., 2020a). In some countries, when cross-fostering cannot be applied, these piglets can be transferred to an artificial rearing pen (e.g. "rescue deck") after they suckled colostrum from their dam. Artificially reared piglets often show abnormal behaviour like belly nosing of penmates (Rzezniczek et al., 2015). If this behaviour persists in later life, the risk of tail biting may arise. However, so far, no direct association between weaning age and tail biting risk has been identified (Grümpel et al., 2018; Naya et al., 2019; Prunier et al., 2020a).

### 3.4 Competition over resources

Access to colostrum and milk is an essential resource for suckling piglets, but may be limited in large litters (see EURCAW-Pigs Review "[Farrowing housing and management](#)", Pedersen et al., 2020). In large litters with more piglets than functional teats of the dam, the teat order cannot be achieved or maintained and piglets will continue to compete for teats. The competition for teats is accomplished by increased fighting with aggressive biting, which leads to severe facial and carpal joint lesions in piglets (Chou et al., 2022). Competition for teats will lead to delayed or completely missed milk intakes in piglets with potential adverse effects on liveweight (Alonso-Spilsbury et al., 2007). Thus, individuals in large litters may suffer from undernutrition and poor growth and are faced with cross-fostering. Undernutrition and cross-fostering may contribute to tail biting in weaned piglets. However, the knowledge about the general impact of large litter size on tail biting is scarce and more research is needed (Prunier et al., 2020a).

### 3.5 Thermal comfort and air quality

Newborn piglets are vulnerable to low temperatures. Their lower critical ambient temperature is above 34°C, which is below the room temperature (22-24°C) often prevalent in farrowing housings (see EURCAW-Pigs Review “[Farrowing housing and management](#)”, Pedersen et al., 2020). Typically, piglets are offered an external heat source in the first days after birth, to ensure thermal comfort in the lying area. However, in cases with larger litters or when the thermally comfortable lying area is too small to include the entire litter, piglets can suffer from hypothermia, especially in the first days after birth. The impact of hypothermia on the expression of tail biting in later life has not been scientifically addressed, but potentially affects the occurrence of tail biting via the effect on growth (Edwards, 2002; Kammersgaard et al., 2011). Vitali et al. (2020) reported that low temperatures in the creep area were associated with more hanging and tucking tails in piglets, which is considered as early sign for tail biting behaviour.

EFSA (2022) mentions poor air quality as one important factor that increases tail biting risk in weaned pigs. However, scientific knowledge on the impact of poor air quality on tail biting is scarce generally, because it is difficult to study in practice (reviewed by Valros, 2018). There is limited information on air quality and specific thresholds which may increase the expression of tail biting, but levels above 10-15 ppm ammonia are considered to negatively affect animal health (EFSA, 2022). Thus, good air quality should be ensured for all life stages of pigs, even in suckling piglets.

### 3.6 Health status

Health status is recognized as affecting tail biting behaviour in pigs. A poor health status can cause tail biting and vice versa (EFSA 2022). Valros (2018) reviewed, that tail biting is associated with the occurrence of respiratory diseases, rectal prolapses, locomotory disorders and a high level of post weaning mortality on pig farms. However, measures to reduce tail biting refer mostly to post-weaning piglets, but high mortality rates pre-weaning ( $\geq 18\%$ ) seem also to be associated with an increased risk for tail biting behaviour after weaning (Grümpel et al., 2018).

The suckling period is considered as a very sensitive phase. Especially in cases with hyper-prolific sows, piglets are faced with many animal welfare risks, as for instance high piglet mortality, hypothermia and teat competition. For suckling piglets, tail lesions were already observed (Vitali et al., 2020). Furthermore, tail necroses have been proposed to cause are tail biting in weaned pigs, and have been observed already in newborn piglets (Reiner et al., 2019).

Management measures to prevent predisposition of tail biting should start already pre-weaning and should include the increase of survival and growth in large litters as described by Pedersen et al. (2020) in the EURCAW-Pigs review “[Farrowing management and housing](#)” (link to review). Furthermore, a genotype with lower litter sizes will contribute to a reduced piglet mortality and less teat competition (EFSA, 2022).

## 4 Conclusion

Tail biting is a multifactorial problem and different aspects can contribute to the expression of tail biting. The suckling period is a very sensitive phase in piglet production and piglets, especially from large litters, are highly challenged in early life. Risk factors such as undernutrition, social stress due to competition, and cross-fostering are suggested to increase tail biting behaviour in later life (Prunier et al. 2020). These factors mostly relate to hyper-prolific sows with large litter sizes. Thus, preventive measures should focus on the management of large litters or the avoidance of hyper-prolific sows with large litter sizes. Further, more research is needed to investigate possible effects of thermal comfort, air quality, health status, acute stress and the housing environment to prevent the expression of tail biting in later life.

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