



TYPES AND CLINICAL PRESENTATION OF DAMAGING BEHAVIOUR – FEATHER PECKING AND CANNIBALISM IN BIRDS

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Summary

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Behavioural disorders, including feather pecking and cannibalism, are a common problem in both domestic and wild birds. The consequences of this behaviour on welfare of birds incur serious economic losses. Pecking behaviour in birds is either normal or injurious. The type of normal pecking behaviour includes non-aggressive feather pecking – allopreening and autopreening. Aggressive feather pecking aimed at maintenance and establishment of hierarchy in the flock is not associated to feathering damage. Injurious pecking causes damage of individual feathers and of feathering as a whole. Two clinical presentations of feather pecking are known in birds. The gentle feather pecking causes minimum damage; it is further divided into normal and stereotyped with bouts; it could however evolve into severe feather pecking manifested with severe pecking, pulling and removal, even consumption of feathers of the victim, which experiences pain. Severe feather pecking results in bleeding from feather follicle, deterioration of plumage and appearance of denuded areas on victim's body. Prolonged feather pecking leads to tissue damage and consequently, cannibalism. The numerous clinical presentations of the latter include pecking of the back, abdomen, neck and wings. Vent pecking and abdominal pecking incur important losses especially during egg-laying. In young birds, pulling and pecking of toes of legs is encountered. All forms of cannibalistic pecking increase mortality rates in birds. Transition of various pecking types from one into another could be seen, while the difference between gentle, severe feather pecking and cannibalism is not always distinct.

Key words: cannibalism, damaging behaviour, feather pecking, injurious pecking, vent pecking

INTRODUCTION

The onset of damaging behaviour, such as feather pecking and cannibalism while rearing many birds at a place is an important problem compromising their welfare (Rodenburg *et al.*, 2008). This results in

serious economic losses in many European game farms raising wild birds in captivity for release and shooting (Draycott *et al.*, 2002; 2005). The relevance of the problem is also associated

with increased population of wild birds reared commercially for game meat production (Kuzniacka & Adamski, 2010; Kokoszynski *et al.*, 2011; Hrabcakova *et al.*, 2012). Despite the extensive research in the field, this bird welfare problem is still actual (Rodenburg *et al.*, 2013).

The aim of this review is to provide detailed classification of normal and injurious pecking behaviour in birds. It describes the different types of feather pecking with their definitions, clinical signs, and resulting damage (localisation) on plumage or tissues.

Feather pecking in birds is divided into normal (physiological) pecking and injurious (abnormal, non-physiological) pecking.

NORMAL (PHYSIOLOGICAL) PECKING

It could be either non-aggressive or aggressive.

Non-aggressive feather pecking

Non-aggressive feather pecking is an element of cognitive and social behaviour.

- Allopeening is a specific behaviour of birds, representing cleaning of the skin or feathers of another bird from the flock (Sedlackova *et al.*, 2004). Allopeening is harmless and often performed in a non-aggressive social context (Kjaer & Hocking, 2004).
- Autopreening is a specific behaviour of birds, involving cleaning/pecking own feathers or skin (Kjaer & Hocking, 2004).

Aggressive pecking

Aggressive pecking is a separate form of allopecking, accompanied with menacing behaviour, which is used to establish and maintain hierarchical bonds among birds

(Sedlackova *et al.*, 2004; Rodenburg *et al.*, 2013). In general, one bird from a flock dominates over another one (Glatz & Bourke, 2006). This behavioural category is associated to a different morphology and motivation, linked to hierarchy establishment (Van Krimpen *et al.*, 2005; Bozakova *et al.*, 2017) and serves for settlement of competitive interactions (Bozakova *et al.*, 2015; Daigle, 2017).

Clinical signs. Aggressive pecking is directed at the head and the neck (Sedlackova *et al.*, 2004; Rodenburg *et al.*, 2013), but should not be confused with feather pecking behaviour (Rodenburg *et al.*, 2008; Bozakova *et al.*, 2012; Daigle, 2017). Pecking at the head by dominating birds is directed to other flock members with lower hierarchical ranks. In severe cases, bruises of the areas above the eyes, swollen wattles and ear lobes are observed (Glatz & Bourke, 2006). Aggressive attacks are fast energetic hits with beaks followed by escape of the victim or fight with the aggressor (Rodenburg *et al.*, 2013). Facial areas (Kjaer & Hocking, 2004), the head, comb, neck are most commonly affected. Hierarchical order could be changed when new birds are introduced, or if the dominating bird is wounded or defeated in a fight (Glatz & Bourke, 2006; Bozakova *et al.*, 2013). Feathers could be damaged, but aggressive pecking is not the main cause for feather loss (Kjaer & Hocking, 2004) and does not result in plumage damage (Sedlackova *et al.*, 2004; Rodenburg *et al.*, 2013).

INJURIOUS /ABNORMAL (NON-PHYSIOLOGICAL) PECKING

Injurious pecking is a general term denoting forms of gentle and severe feather pecking, cannibalistic pecking and vent

pecking (Lambton *et al.*, 2013; Birkl *et al.*, 2017). Injurious pecking could be damaging pecking, causing feather damage and plumage damage (Bright, 2009; Drake *et al.*, 2010; Nicol *et al.*, 2013).

Plumage damage

Injurious pecking is associated with plumage damage which may range from breakdown of feather tips to removal of feathers and appearance of large defeathered areas on the body (Lambton *et al.*, 2013). Although plumage damage is not the most reliable sign pointing at injurious pecking, it is usually easier to be detected than the behaviour itself. Plumage damage could occur due to feather wearing-off or aggression (Nicol *et al.*, 2013). There is a direct association between severe feather pecking and the degree of plumage damage (Lambton *et al.*, 2013). Feather pecking of high intensity could lead to rapid defeathering in most birds and that is why, additional feather pecking could not be evaluated on the basis of plumage status (Nicol *et al.*, 2013).

Feather pecking

This is a form of abnormal behaviour (non-aggressive behavioural disorder), in which one bird uses its beak to peck the feathers of another one (Sedlackova *et al.*, 2004; Daigle, 2017). Feathers could be pulled and often, eaten (Nicol *et al.*, 2013; Rodenburg *et al.*, 2013; Lambton *et al.*, 2015). Plucking of feathers causes pain (Cloutier *et al.*, 2000;), higher risk from injuries and outbreak of cannibalism (Nicol *et al.*, 2013). The extensive loss of feathers covering the body is accompanied with impaired flying ability and thermoregulation, resulting in increased feed intake by 10–30% from birds (Gilani *et al.*, 2013).

A typical feather pecking act is described and illustrated by Wennrich (1975). The bird performing a feather pecking act approaches slowly the victim from the back or from the side, aiming at its feathers. The victim initially ignores the act (Sedlackova *et al.*, 2004; Kjaer & Hocking, 2004), but persistent pecking could induce an injury (Glatz & Bourke, 2006) and depending on pecking severity, the victim vocalises and moves away (Sedlackova *et al.*, 2004). Feather pecking is directed at the body, mainly the posterior part, abdomen or tail feathers and shows a clear repetitive pattern of feather pecking and plucking, e.g. is of compulsive rather than aggressive nature (Van Hierden *et al.*, 2004a; Daigle, 2017).

Behavioural categories

In the bird flock, two main types of birds could be defined in terms of feather pecking: attacking bird and feather pecking victim. On the basis of individual experience, birds are divided in four behavioural categories (Daigle *et al.*, 2015). Severe feather pecking is used as a model, as it is easier to be visualised. Birds may behave as follows:

- feather peckers, performing severe feather pecking, but never receiving it;
- victims, which only receive pecks but never give them;
- neutral birds, which never receive and never give pecks; and
- feather pecker-victim, that are peckers and victims at the same time (Daigle, 2017).

GENTLE FEATHER PECKING

Gentle feather pecking is defined as light pecks on feather tips of another bird, without pulling or plucking of feathers (Parmentier *et al.*, 2009; Lambton *et al.*,

2013). It could be observed in young birds under the a form of investigatory social behaviour (Riedstra & Groothuis, 2002; Nicol, 2018) or could become a stereotypy. In both cases, feather damage is insignificant. Yet, the association between gentle feather pecking in young birds and severe feather pecking in adults is a problem (Newberry *et al.*, 2007; Rodenburg *et al.*, 2008).

Clinical signs. Gentle feather pecking could be characterised as gentle repeated pecks on the feathers of the tail, wings, back and neck of the bird (Daigle, 2017). It is usually manifested as bouts, and targeted birds show no response and do not recede (Rodenburg *et al.*, 2013). Many birds perform gentle feather pecking if allowed to dust bathing (Lambton *et al.*, 2010) or this behaviour could be from the allogrooming type. Gentle feather pecking could be observed when birds are not engaged with pecking on the ground or seeking food. It is frequently seen during growth and egg laying (Gilani *et al.*, 2013; Nicol *et al.*, 2013; Nicol, 2018).

Investigatory (normal) gentle feather pecking

Investigatory feather pecking (Newberry *et al.*, 2007; Rodenburg *et al.*, 2013) comprises gentle pecking from the part of another bird, most commonly to remove litter particles stuck on the plumage (Van Krimpen *et al.*, 2005) without removal or damage of feathers. It occurs suddenly and in bouts. Most commonly, it is imitative behaviour, when birds copy others' behaviour (Riedstra & Groothuis, 2002; Rodenburg *et al.*, 2008).

Stereotyped gentle feather pecking

Investigatory gentle feather pecking could become a stereotyped model of behaviour. Stereotyped gentle feather pecking is

characterised with high repetition frequency of pecking at the same site from one bird to another (Van Krimpen *et al.*, 2005; Newberry *et al.*, 2007) and could result in minimum feather damage (Glatz & Bourke, 2006; Nicol, 2018). Gentle pecking is often ignored by the recipient (Riedstra & Groothuis, 2002; Rodenburg *et al.*, 2008).

- *Feather pinching.* It represents approaching a bird from behind or from one side and gentle pinching of its feathers. This act usually causes minimum damage (Sedlackova *et al.*, 2004).
- *Feather pulling.* It is observed when the recipient is approached from behind or from one side and one of its feathers is slightly pulled (Kjaer & Hocking, 2004). Resulting damage of feathers is usually small (Glatz & Bourke, 2006).
- *Feather sucking.* A bird may suck the feathers of another bird, especially those of the tail. Although not causing serious damage, this behaviour could evolve into more serious pecking at the base of the tail (Glatz & Bourke, 2006).

Periods of manifestation

Gentle feather pecking in birds is usually observed during the growth period (Chow & Hogan, 2005) and may start from the first day after hatching (Riedstra & Groothuis, 2002). Plumage damage during that period is not present, as pecking is mainly gentle and birds molt several times before growth is completed (Van de Weerd & Elson, 2006). Low feather pecking levels (Rodenburg *et al.*, 2013) or slight plumage damage during growth pose a considerable risk from later damage of feathering as egg-laying period begins (Bestman *et al.*, 2009; Drake *et al.*,

2010), due to irregularly grown feathers, attracting other peckers (Nicol *et al.*, 2013).

SEVERE FEATHER PECKING

Severe feather pecking behaviour involves rigorous pecking and plucking of feathers of another bird, up to removal of feathers, to which the victim reacts (Parmentier *et al.*, 2009; Lambton *et al.*, 2013; Birkl *et al.*, 2017; Nicol, 2018). Severe feather pecking consists in pulling, damage, pinching, and often, consuming the feathers of the victim. It does not occur in bouts, instead is present as single pecks of several victims or is a sequel of gentle pecking bouts (Sedlackova *et al.*, 2004).

Clinical signs

Severe feather pecking is characterised as strong, rapid single pecks on the tail, vent and neck of the victim (Rodenburg *et al.*, 2013; Daigle, 2017). The localisation of feather pecking depends on the mutual position of pecker and victim. When the birds are positioned on the floor or on the ground, they have a better opportunity to peck on the abdomen, while if they are on a perch, pecking on the neck and tail is more common (Bilcik & Keeling, 2000). Victims of severe feather pecking usually demonstrate a behavioural response against the act of aggression either by withdrawing or entering in conflict with the attacker. If the severe pecking episode last rather long, the attacked bird surrenders to the pecker and falls into a state of immobility (Rodenburg *et al.*, 2013). Severe feather pecking may occur independently or as a ultimate stage of gentle pecking, because the pecker experiences pleasure from the act (Daigle, 2017).

- *Feather pulling.* One bird pulls abruptly another bird's feather, and the victim reacts with pain, crying and

escape (Rodenburg *et al.*, 2008; Nicol, 2018) Feather pulling could lead to severe plumage damage, including bleeding from feather follicle (Kjaer & Hocking, 2004).

- *Feather plucking.* One bird may pluck a feather from another (Birkl *et al.*, 2017). Feather plucking could cause cannibalism after severe plucking of feathers with consequent cutaneous bleeding (Sedlackova *et al.*, 2004). This form may result in defeathered areas and wounds (Parmentier *et al.*, 2009).
- *Feather removal.* One bird removes feathers from another one (Kjaer & Hocking, 2004) causing serious damage of the plumage from feather removal and cutaneous bleeding (Glatz & Bourke, 2006).
- *Feather eating.* Birds peck the feathers of other birds and consume fluffy feathers from the floor, especially in young birds reared on floor (Birkl *et al.*, 2017). If feathers on the floor are lacking, birds focus their attention to peck and remove feathers of other birds, which results in injurious pecking (Markarian, 1998). The small number of feathers on the litter could be an early marker of feather pecking problem, as feather eating occurs where short feathers (<10 cm) are deficient. Long feathers are consumed when short feathers are not available. The birds are attracted from the superficial lipid layer of feathers and pecking around the gland at the base of tail (Glatz & Bourke, 2006). Sometimes, birds peck on tail feathers of other birds. In the area of the tail, severe cannibalistic injuries occur (Glatz & Bourke, 2006).

Effects from severe feather pecking

Severe feather pecking leads to substantial plumage loss (Drake *et al.*, 2010; Lambton *et al.*, 2010), skin injuries, increased risk from infections (Green *et al.*, 2000; Dinev *et al.*, 2013), reduced productive performance, enhanced food seeking and increased mortality rate (Nicol *et al.*, 2013; Rodenburg *et al.*, 2013; Nicol, 2018). Severe feather pecking could result in bald areas; if pecking at those areas continues, it could evolve into cannibalism, severe injuries and often, fatal outcome (Rodenburg *et al.*, 2008; Daigle, 2017).

Periods of manifestation

Episodes of severe feather pecking increase considerably at sexual maturity and beginning of laying (Gilani *et al.*, 2013; Nicol *et al.*, 2013). The association of gentle feather pecking in young birds and severe pecking behaviour in adult birds is alarming (Newberry *et al.*, 2007; Nicol, 2018). After the beginning of lay, gentle feather pecking tends to remain relatively stable or even decline with age, whereas severe feather pecking shows a tendency towards increased intensity during the entire egg laying period (Pöttsch *et al.*, 2001; Lambton *et al.*, 2010).

**CANNIBALISTIC PECKING
(CANNIBALISM)**

Cannibalism is defined as injury or consumption of an individual from the same species and is observed in many animal species (Daigle, 2017). In birds, it comprises pecking and laceration of the skin and underlying tissues of a bird from another bird from the same species (Cloutier *et al.*, 2000; Yngvesson *et al.*, 2004; Lambton *et al.*, 2015). Cannibalism is a

serious animal welfare issue in egg-laying domestic poultry breeds (Rodenburg *et al.*, 2009b) and in other avian species (Yngvesson, 1997), turkeys (Newberry, 1992), pheasants (Cain *et al.*, 1984), Muscovy ducks (Martin, 1991). In layer hens, cannibalism is one of primary causes of death (Pöttsch *et al.*, 2001) as even the victim survives the attack, wounds infections could be fatal (Dinev *et al.*, 2013).

Clinical signs

Feather pecking and especially the severe feather pecking damage the victim's plumage and result in cannibalism (Bright, 2009; Lambton *et al.*, 2015; Birkl *et al.*, 2017). The loss of feathers leads to appearance of denuded skin areas (Rodenburg *et al.*, 2013). Often, severe feather pecking is directed to featherless skin – the so-called bare area pecking (Van Krimpen *et al.*, 2005). It could progress into tissue pecking: a form of cannibalistic pecking affecting the skin and underlying tissues causing severe wounds (Van Krimpen *et al.*, 2005; Rodenburg *et al.*, 2013). Tissue pecking can ultimately result in victim death due to excessive blood loss and serious tissue damage (Freire & Cowling, 2013; Birkl *et al.*, 2017). Cannibalism outbreaks are easily recognised, and other birds are easily involved in the attack. Body areas are covered with blood, injured skin and wounds (Glatz & Bourke, 2006).

Vent pecking /cloacal cannibalism

Vent pecking is a specific form of cannibalistic pecking (Rodenburg *et al.*, 2008; Lambton *et al.*, 2013) and is defined as pecking at the skin and underlying tissues of the cloaca and adjacent abdomen (Yngvesson *et al.*, 2004; Lambton *et al.*, 2015; Birkl *et al.*, 2017). During vent pecking, opening of the abdominal cavity

and prolapse of internal organs often occur (Van Krimpen *et al.*, 2005). This type of cannibalistic pecking could develop in birds with good plumage (Newberry, 2004; Rodenburg *et al.*, 2008; 2013) and is more commonly seen in the beginning of the egg laying period (Pöttsch *et al.*, 2001; Nicol *et al.*, 2013; Rodenburg *et al.*, 2013).

Vent pecking is the most severe clinical form of cannibalism, associated with fatal outcome (Sedlackova *et al.*, 2004; Yngvesson *et al.*, 2004; Nicol, 2018). Pecking could be targeted at small fluffy feathers beneath the cloaca and close to tail base. After the birds taste blood, their cannibalistic habits could persist (Glatz & Bourke, 2006). Changes are observed on feathers and skin close to cloaca and its mucosa, and later – on underlying tissues and organs (Sedlackova *et al.*, 2004). Vent pecking could even lead to body cavity opening with internal organs prolapse and death (Markarian, 1998). Cloacal pecking is apparently not associated with feather pecking (Yngvesson *et al.*, 2004), but during the beginning of lay, it could lead to vent pecking (Pöttsch *et al.*, 2001). Vent pecking could result in prolapse of cloacal mucosa or distal part of the oviduct at the end of the egg laying period (Van Krimpen *et al.*, 2005). When the mucosa is damaged, for instance from laying an egg, from other birds or environmental factors, it becomes swollen and is not easily returned back in place after the lay. Under these circumstances, the cloacal mucosa is vulnerable to pecking and thus, vent pecking is triggered (Kjaer & Hocking, 2004).

Toe pecking and toe pulling

This is a specific form of cannibalism (Sedlackova *et al.*, 2004; Rodenburg *et al.*, 2013). It could be provoked by inten-

sive light that illuminates blood vessels of toes in day-old birds, by hunger, overheating and trimming of toe nails. This is a serious problem in young birds reared on dark litter and could result in increased mortality and reduced growth performance (Glatz & Bourke, 2006). Victims of feather pecking are more likely to suffer from toe pecking as well (Rodenburg *et al.*, 2013).

Self-pecking and self-mutilation

Self-pecking is when a bird pecks itself; yet if this behaviour becomes compulsive, it could result in injury (Glatz & Bourke, 2006). Self-mutilation is defined as injury caused by auto-aggression. Usually, birds peck/clean their feathers, but when the plumage, toes or the skin become damaged, pecking evolves into self-pecking or self-mutilation (Kjaer & Hocking, 2004).

CONCLUSION

Aggressive pecking should not be confused with injurious pecking forms, as it does not cause damage to plumage and is not compulsive. There is an association between manifestation of gentle feather pecking in young birds and the consequent development of severe feather pecking in adult birds. There is a direct relationship between severe feather pecking and the extent of plumage damage. The difference between gentle feather pecking, severe feather pecking and cannibalism is not always distinct. Transition of various pecking types from one into another could be observed.

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