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Feather Pecking in Laying Hens: Environmental and Endogenous Factors

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Abstract

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Feather pecking, pecking directed to and damaging the feathers of other birds, is a behavioural disorder occurring in laying hens and other poultry species and breeds. Feather pecking is both a welfare and economic problem. Pulling out feathers causes pain, a higher risk of injuries and can trigger an outbreak of cannibalism. Extensive loss of feather cover is accompanied by increased heat loss that results in increased food consumption. The 1999 EU Directive laying down minimum standards for the protection of laying hens approved banning of conventional battery cages from 2012. Thus in the next few years major changes to the housing of laying hens in Europe will occur. Therefore there is an urgent need to develop feasible alternative housing systems. An increased risk of feather pecking is a main obstruction to the wide adoption of alternative housing systems, such as free range, aviaries or percheries. There is a continuous effort of many research teams in Europe and elsewhere to expand our knowledge of this behavioural disturbance and maximize the chances to solve the problem. In this review we have attempted to summarise the present status of knowledge about feather pecking. Hypotheses on causation (redirected ground pecking or dustbathing), environmental factors (feeding, lighting, housing, group size, density) and endogenous factors (sex, age, genetic factors, physiological control mechanisms) are discussed and possible ways of prevention via changing environment, management practices or genetic selection are pointed out.

Chicken, feather pecking, abnormal behaviour, cannibalism, housing systems

1. Introduction

Feather pecking (FP) is a type of abnormal behaviour in poultry that consists of pecking at feathers of other birds, sometimes pulling the feathers out and often eating them (Blokhuis and Wiepkema 1998). FP is both a welfare and economic problem. Pulling out feathers causes pain (Gentle and Hunter 1990), increases risk of injuries and can trigger an outbreak of cannibalism (Keeling 1995). Massive loss of feathers is accompanied by increased heat loss resulting in 10-30% increased food consumption (Glatz 1998).

FP is usually observed independently of the aggression-releasing situations (Hoffmeyer 1969) and therefore distinction must be made between FP and aggressive pecking. These behavioural categories have different morphology and underlying motivation. Aggressive pecking is oriented in a downward direction and targeted at head and neck. Aggressive pecks are rapid, vigorous and result in escape of the pecked bird or in a fight. Underlying motivation is connected with establishment of hierarchy (Keeling 1995). FP is targeted to the body, mainly to the rump, belly or tail feathers and has a clear repetitive structure of pecking and pulling feathers, i.e. has a compulsive rather than aggressive character (van Hierden et al. 2004a). FP is often without any reaction of a bird being pecked (Keeling 1995). Severely pecked bird (see classification below) may squawk and withdraw (Savory 1995).

Pecking behaviour has been classified by different authors into several behavioural categories, such as feather pecking, allopreening and allopecking (Vestergaard et al.

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1993), pecking, pulling, pinching and plucking (Wechsler et al. 1998), or allopreening, light pecking, aggressive pecks, pulling and toe pecks (Leonard et al. 1995). Keeling (1995) suggested division of FP into two categories - gentle and severe FP. Several authors have adopted this classification (Bilčík and Keeling 1999; Kjaer and Vestergaard 1999; van Hierden et al. 2002a). Gentle FP consists of pecking feathers of another bird without pulling or damaging it. Gentle FP occurs in bouts. Severe FP comprises pulling, damaging, plucking and often also consuming feathers of a peckee (bird being pecked). It is not performed in bouts but may occur in the sequences as single pecks given to several victims, or embedded in bouts of gentle FP (Keeling and Wilhelmson 1997). The target of feather pecks depends on the relative location of the pecking and pecked bird. While standing on the floor birds peck to the belly of other birds, and when the birds are on the perch, they peck more to the neck and rump (Bilčík and Keeling 2000).

2. Hypotheses on causation of feather pecking

Feather pecking is generally considered to be a redirected behaviour. There are two main hypotheses on causation of FP, the first one assuming that FP is derived from foraging (Blokhuis 1986) and the second one, assuming that it is related to dustbathing behaviour (Vestergaard et al. 1993; Vestergaard et al. 1997). Exact etiology, however, is not yet known.

The „foraging“ hypothesis is based on the fact that food searching in domestic fowl is expressed as pecking and scratching at the ground, even when food is supplied *ad libitum* in feeders (Savory 1995). Lack of foraging material (straw, wood shavings, sand, peat etc.) increases FP. It is clearly documented by experiments comparing frequencies of FP in barren environment without various pecking releasing stimuli (e.g. on slats) and on different types of litter (El-lethey et al. 2001; Huber-Eicher and Wechsler 1998). Frequencies of ground pecking significantly increased after feeding in both litter and no-litter (slatted floor) pens. However, FP increased after feeding in no-litter pen while there was no change in pecking at conspecifics in litter pen group (Blokhuis 1986).

The “dustbathing hypothesis” is on the other hand supported by the fact that diurnal rhythm of FP corresponds more to dustbathing than feeding (Savory 1995). Dustbathing was shown to occur with the highest frequency in the middle of the day (Vestergaard 1982). Intensive ground pecking and FP is commonly seen before and during bouts of dustbathing. FP occurs away from feeding places, and bright light increases FP and dustbathing but not feeding. One problem with dustbathing hypothesis is that it is relatively infrequent activity, and FP often occurs in absence of dustbathing (Savory 1995).

These two hypotheses might not be mutually exclusive, feeding and dustbathing may both act as releasers of pecking at non-food objects (Savory 1995). According to both the “foraging” and “dustbathing” hypotheses, redirection of pecks from substrate to feathers of other birds occurs as a result of misimprinting of proper substrate. This happens during early life and the association between pecking and substrate (e.g. for dustbathing) can be according to Vestergaard and Baranyiová (1996) established as early as on day 3 of life.

Another possible hypothesis is that FP has an underlying social component, rather than being a redirected behaviour. There are some non-aggressive pecks, directed towards other bird’s areas (anterior parts) inaccessible by autopreening, termed allopreening. These are non-damaging pecks connected with rank order similar to social grooming in mammals, but of less social significance (Wood-Gush and Rowland 1973; Vestergaard et al. 1993). Finding that FP did not correlate with pecking at feathers as an inanimate stimuli, but correlated with pecking in social context (Cloutier et al. 2000) is in favour of social motivation role in control of FP. FP is reported at very early stages, even 1 day after hatching,

when ground pecking is not yet fully developed and dustbathing hardly occurs (Riedestra and Groothuis 2002).

Yet another explanation of the origin of FP was suggested by McKeegan and Savory (1999), who suggests that FP develops as a consequence of feather eating. The presence of loose feathers on the floor may lead to feather eating in some birds. If there are no suitable feathers on the floor, attention may be redirected towards the feathers of conspecifics.

2. Factors affecting feather pecking

2.1. Nutritional factors

A deficiency of certain aminoacids (methionine, arginine), minerals (NaCl, Ca, Mg), protein and fibre is a factor known to influence incidence of FP (see Hughes and Duncan 1972 and Hughes 1982 for reviews). Savory et al. (1999) and van Hierden et al. (2004b) found reduced feather pecking damage after L-tryptophan dietary supplementation, while diet with increased level of methionine and cystine did not have any significant effects on FP (Kjaer and Sörensen 2002). Increasing protein level in the diet had a positive effect on plumage and lowered FP and cannibalism. Low level of protein in diet increases risk of FP and cannibalism, because feathers serve as compensatory source of nutrients deficient in food (Ambrosen and Petersen 1997). McKeegan and Savory (2001) tested individual propensity of hens known as peckers or nonpeckers to peck and eat fresh feathers in front of the cage. Feathers were attractive for both categories, but were more manipulated and eaten by pecker hens. There have been anecdotal reports on increased pecking damage related to a change in dietary protein source from mainly animal to mainly plant. However, Savory et al. (1999) and McKeegan et al. (2001) did not prove any significant effect of different protein sources on FP. Birds fed with pelleted food showed higher levels of FP in comparison with mash fed birds, probably because time saved by quicker food consumption could be spent by FP (Hughes 1982; Lindberg and Nicol 1994; Savory et al. 1999; El-lethey et al. 2000). Feeding frustration (the feeder covered with Perspex) did not facilitate FP (Rodenburg et al. in press).

2.2. Physical environment

2.2.1. Light intensity

High light intensity enhances development of FP and cannibalism in laying hens (Hughes and Duncan 1972; Kjaer and Vestergaard 1999). Farmers routinely use low light intensities to prevent FP which, on the other hand, may restrict the movement of hens around the house and thus decrease their welfare status (Taylor et al. 2003). Surprisingly, Kjaer and Vestergaard (1999) found that low light intensity in poultry houses caused increased levels of stereotyped gentle FP. Supplement of UV light and presence of fluorescent or incandescent light during rearing period in turkey males did not suppress wing and tail pecking (Sherwin et al. 1999).

2.2.2. Housing system

Another extensively studied factor affecting FP is housing system. Since hens spend 94% of their time by foraging and eating (Dawkins 1989), the barren environment of battery cages does not offer enough stimuli and the outcome is higher level of pecking in cages than in pens (Hughes and Duncan 1972; Koelkebeck et al. 1987). It is generally accepted that plumage status is better on litter, because it presents a suitable substrate for foraging and dustbathing (Blokhuis 1989). Birds kept in pens with slats of plastic grid showed more FP than in pens with litter (Aerni et al. 2000; Huber-Eicher and Wechsler 1997; Huber-Eicher and Sebö Œ 2001a) and the plumage condition was also better in the presence of perches during rearing period (Wechsler and Huber-Eicher 1998). While some authors report that early experience of litter substrates reduced FP in adult hens (Huber-Eicher

and Wechsler 1997), others (Gunnarson et al. 1999) did not prove that. Deprivation of dustbathing raised FP in hens (Vestergaard et al. 1997), however, Huber-Eicher and Wechsler (1997) found that providing chicks with a sand area for dustbathing does not prevent developement of high rates of FP. Access to grassy free range tended to lower FP in ISA Brown and Lohman Selected Leghorn, while it enhanced FP in Danish Landrace (Kjaer and Sörensen 2002). Bestman and Wagenaar (2003) found that the use of outdoor run with vegetative or artificial cover resulted in low incidence of FP.

An alternative way to prevent FP is environmental enrichment. Scattering additional grain or straw on the floor (Blokhuis and van der Haar 1992), long cut straw or polystyrene blocks (Huber-Eicher and Wechsler 1997) or introduction of pecking devices (Jones and Carmichael 1999), all have proved to decrease incidence of FP. On the other hand, provision with operant feeders increased the incidence of FP (Lindberg and Nicol 1994).

2.3. Social factors

FP does not depend on dominance hierarchy as aggressive pecking (Wood-Gush and Rowland, 1973), although some authors reported more FP in higher ranking birds (Vestergaard et al., 1993).

Animals are able to change their behaviour through social transmission, by observing others. Involvement of social transmission in development of FP is unclear. Introducing feather pecking individuals into groups of 4 weeks old chickens started the development of FP and led to significantly higher frequencies of FP while less foraging behaviour was observed (Zeltner et al. 2000). McAdie and Keeling (2002) did similar experiment with high feather pecking (HFP) and low feather pecking (LFP) lines (see 3.6. Genetic factors). They confirmed social transmission only in cages (not in pens) and only for gentle FP.

Plumage status correlates with group size and is worse at higher density (Simonsen et al. 1980; Hughes and Duncan 1972; Savory et al. 1999). In groups with higher number of hens the likelihood of occurrence of higher number of peckers increases, thus rising the risk of FP (Hughes 1982). Bilčík and Keeling (2000) found that in groups of 15, 30, 60 and 120 hens at constant density, aggression and frequency of FP increased with group size.

2.4. Sex differences

Kjaer (1999) found significant differences between sexes in propensity to FP, with males pecking less than females. Odén et al. (1999) described positive effect of cocks in the flock on reduction of aggressivity, but no effect on FP behaviour. Contrarily, Bestman and Wagenaar (2003) found the presence of cockerels in the flock of hens to be a factor preventing FP. Leonard et al. (1995) observed more pecks directed at cockerels and also more pecking from cockerels, so they recommend separate housing of hens and cocks. Discrepancies between these works can be partially a result of different ages. Odén et al. (1999) and Bestman and Wagenaar (2003) studied adult birds whereas Leonard et al. (1995) observed birds before sexual maturity.

2.5. Age

Development of FP is considerably influenced by age (McAdie and Keeling 2002; Savory and Mann 1997). At an early age gentle FP is prevalent, whereas more severe forms can develop later, resulting in more deteriorated plumage in older birds (Huber-Eicher and Sebö Œ 2001b). Riedestra and Groothuis (2002) suggested that at an early age gentle FP serves as social contact, while FP later in life can reflect frustration from unacceptable environmental conditions or an unsatisfactory social situation.

2.6. Genetic factors

Various layer strains differ in their propensity to FP. Hughes and Duncan (1972) compared two light hybrids, the Thornber 808 and the Shaver 288, and one medium hybrid, the Thornber 909. Untill week 12 of age the Shavers pecked most, the 808's least and the

909's were intermediate; from weeks 13 to 18 the 909's pecked most and from weeks 19 to 21 there was a little difference. Kjaer (2000) found highest level of FP in ISA Brown as compared to Lohmann Selected Leghorn, Norbrid 41 and Lohmann Brown. Klein et al. (2000) observed more FP in Lohmann Selected Leghorn as compared to Dekalb hybrids. Higher incidence of FP in brown versus white lines was attributed to contrast between feathers and skin in brown (dark) feathered lines of hens that may attract more attention (Savory and Mann 1997).

Besides the strain differences there are also individual differences in pecking rates. It has been shown that only a small proportion of birds in the flock are responsible for the most feather damage. Bilčík and Keeling (2000) observed 8.3% of all birds to deliver severe FP and Keeling (1994) found that less than 9% were responsible for 50% of all severe pecks. Similarly Wechsler et al. (1998) classified only 12% of the birds as „high rate" peckers. It would be desirable to identify at an early age individuals with a predisposition to become feather peckers in adulthood and to exclude such birds from further breeding. Keeling and Wilhelmson (1997) showed that feather peckers perform more ground pecking. Bilčík and Keeling (1999) found similar correlation between severe FP and ground pecking. Feather pecker birds had also longer tonic immobility (Vestergaard et al. 1993). Jones et al. (1995) did not prove a predictive value of tonic immobility at a young age.

FP has moderate heritability. According to genetic studies it is between h^2=0.07 (Bessei 1986) and h^2=0.38 (Kjaer and Sörensen 1997). Rodenburg et al. (2003) estimated heritability of gentle FP to be h^2=0.12 at 6 weeks of age and h^2=0.15 at 30 weeks of age.

Bessei (1986) was one of the first who examined in detail genetic variation and relations between FP, feather loss and production traits. In the six genetic lines studied there was a positive correlation between pecking and being pecked. FP was positively correlated with fear, i.e. more fearful individuals pecked more. There was a tendency for higher production with increased FP, suggesting that selection for productivity may increase FP activity of layer strains. Kjaer and Sörensen (1997) studied genetic parameters of FP at different ages in White Leghorns. They found a low phenotypic correlation between FP and plumage quality and, contrary to Bessei (1986), no correlation between giving and receiving pecks. Body weight had a negative genetic correlation with performing FP. Hocking et al. (2004) using a multi-strain experimental design (13 traditional and 12 commertial strains) quantified the extent of between breed genetic variation and the genetic relationships among different measures of fear, sociality and pecking, including FP and cannibalism. There was extensive between breed (genetic) variation in FP, cannibalism and general pecking behaviour.

Keeling and Wilhelmson (1997) selected bi-directionally Hisex Brown hens using frequency of severe FP as selection criterion. In the first generation there were significantly different frequencies of FP between groups, but in the second generation there were not, probably due to small number of birds or differences in management between generations. Kjaer et al. (2001) divergently selected White Leghorns on the basis of number of bouts of FP per bird in one hour during three generations without use of inbreeding. Selected lines differed significantly in the third generation in frequency of FP, but not in level of aggression.

Divergent selection for high (HGPS) and low (LGPS) group productivity and survivability (Cheng et al. 2001; Cheng et al. 2003) affected also the frequency of aggressive pecking (pecks on the head) and damaging pecking (pecks on other regions of body), which were both higher in LGPS hens as compared to HGPS ones.

As a result of selection for other traits, variation in propensity to FP may increase. Blokhuis and Beutler (1992) described two genetic lines differing in the propensity to FP and these lines have later been used by several researchers (Jones et al. 1995; Korte et

al. 1997; Rodenburg et al. 2002; van Hierden et al. 2002a). High feather pecking (HFP) and low feather pecking (LFP) line differed significantly in frequency of gentle FP already at an early age (van Hierden et al. 2002a). Lines differed in orientation of explorative pecking on animate (HFP) and inanimate (LFP) stimuli, respectively. This means that LFP hens spent more time foraging – pecking and scratching in food and litter. HFP hens spent more time preening (Rodenburg and Koene 2003).

Jones et al. (1995) found that HFP hens are less socially motivated based on open-field tests. HFP hens showed more freezing and their latencies to vocalise and ambulate were longer than in LFP birds. A study with F2-cross of these two lines proved these results. Birds that were inactive in the open-field at young age were active in the open-field and showed a high level of pecking behaviour at adult age (Rodenburg et al. 2004).

A new approach, facilitated by the fact that in March 2004 the first draft of the chicken genome sequence has been deposited into free public databases (http://www.genome.gov/11510730), represents the use of molecular genetics. Several attempts have been made to identify genes involved in FP using quantitative trait loci (QTL) mapping approach. Jensen et al. (2003) failed to find any significant QTL for the performance of FP, but they found that plumage condition is associated with significant QTL coinciding with colour gene „Dominant white". Birds homozyous for the wild-type recessive allele were significantly more vulnerable to become a victim of FP (Keeling et al. 2004). On the other side, Buitenhuis et al. (2003a, b) detected a suggestive QTL for gentle FP at 6 weeks of age on chicken chromosome 10 (GGA 10) and at 30 weeks of age on GGA2. For receiving feather pecking at 6 weeks of age a significant QTL was detected on GGA1 and at 30 weeks of age on GGA5. Analysis of quantitative traits leads to the identification of two different types of genetic loci: causal mutations and non-functional genetic markers that are linked to QTL (indirect markers). These genetic markers can be used in future to select specifically against a high propensity to develop feather pecking.

2.7. Physiological control of feather pecking

2.7.1. Hormones and feather pecking

Experiments with implantation of gonadal hormones to pullets aged 12 weeks showed that administration of progesterone resulted in a moderate but significant increase of FP, while combination of progesterone with estradiol produced much greater increase in FP. This treatment simulates an increase of female sex hormone levels at the onset of lay (Hughes 1973). Although testosterone suppressed FP in pullets, on the other hand, it increased aggressive pecking and inhibited onset of lay (Hughes 1973). Cuthbertson (1978) similarly found testosterone to decrease FP in low doses, but in high doses as well as with combination with estradiol, it increased the feather damage.

FP in laying hens may be associated with stress. Vestergaard et al. (1997) found that feather pecking was positively correlated with the plasma concentration of corticosterone. El-lethey et al. (2001) simulated chronic stress by feeding hens with food containing corticosterone. Corticosterone significantly increased the rates of FP in hens housed on litter but had no significant effect in hens housed on slats. On the other side Korte et al. (1997) compared levels of corticosterone in adult hens from the HFP and LFP lines and found higher levels of corticosterone in LFP hens than in HFP hens during both resting and manual restraint. Van Hierden et al. (2002b) obtained the same results with chicks from the same lines at the age of 14 and 28 days.

2.7.2. Neurotransmitters and feather pecking

Catecholamines have been implied in several behavioural pathologies in both human and animal species. The role of some neurotransmitters, including noradrenaline, serotonin (5-HT) and dopamine, in control of FP has been studied.

Korte et al. (1997) found that HFP line responded to manual restraint by higher plasma levels of noradrenaline than LFP line. On the other hand, Cheng et al. (2001) found no differences in plasma noradrenaline levels between HGPS and LGPS lines.

Dietary supplementation with tryptophan (5-HT precursor) increased 5-HT turnover in brain and led to suppression of FP (Savory et al. 1999; van Hierden et al. 2004b). Turnover of 5-HT in brain of HFP hens was lower than in LFP ones (van Hierden et al. 2002b). Decreased turnover of 5-HT after the treatment with 5-HT receptor agonist (S-15535) increased frequencies of gentle and severe pecking in HFP birds (van Hierden et al. 2004a). Plasma concentration of 5-HT in LGPS was lower in comparison with HGPS line (Cheng et al. 2001).

Among neurotransmitters hypothesised in control of FP dopamine has received recently the most attention. Bilčík (2000) tested the relation between the response of chicks to a single injection of apomorphine (mixed D1 and D2 dopamine receptor agonist) after hatching and feather pecking of birds later in life. He found a positive correlation between the combined score for pecking and pulling of own and opponent's toes (apomorphine tests were done in the presence of another non-treated chick of the same age) and the number of gentle pecks given in adulthood (Bilčík 2000). There was a significantly more enhanced locomotor activity in the HFP chicks treated at 29, 30 or 31 days of age with apomorphine than in the LFP line chicks after the same treatment (van Hierden et al. *in press*). There were no significant HFP vs. LFP line differences in D1 and D2 receptor densities in the brain using homogenate binding (van Hierden et al. *in press*). However, using quantitative autoradiography, minor differences in D_1 and D_2 dopamine receptor densities were shown in the medial and lateral striatum between Hisex Brown hens with high and low feather pecking frequency (Bilčík 2000). Feather pecking was significantly reduced by treatment with dopamine D_2 receptor antagonist haloperidol, while aggressive pecking was not affected by this treatment (Kjaer et al. 2004). Košťál et al. (2003) found that apomorphine stimulated floor pecking and head shaking in both adult peckers and non peckers (LSL), while gentle and severe FP as well as aggressive pecking were suppressed only in peckers. D1 antagonist SCH23390 suppressed and agonist SKF38393 caused a non-significant trend towards an increase in FP. Both D2 antagonist spiperone and agonist bromocriptine suppressed FP. However, the 60 min test was maybe not long enough for the manifestation of bromocriptine stimulatory effect (Košťál et al. 2003). Van Hierden et al. (2002b) found lower dopamine turnover in the brain of HFP hens as compared to LFP ones. A high dose of S-15535, which increased FP, increased also DA turnover in the hippocampus, archistriatum and the other parts of the forebrain in HFP hens (van Hierden et al. 2004a). LGPS hens were found to have higher plasma DA levels in comparison with HGPS hens (Cheng et al. 2001; Cheng et al. 2003).

2.8. Feather pecking and cannibalism

FP raises the risk of cannibalism but does not necessarily lead to it. FP can trigger cannibalism after severe plucking of feathers and following bleeding from skin (Keeling 1995). Cloutier et al. (2000) found a positive correlation between the frequency of severe FP at flock mates and the frequency of cannibalistic behaviour. Fresh blood from FP inflicted injuries can attract other birds to consume it and this behaviour can be socially transmitted (Cloutier et al. 2002). It is important to notice that feather peckers and cannibals are not the same individuals in the group. Both cannibals and peckers are, however, more active than other flock mates (Keeling and Jensen 1995). The most serious type of cannibalism is vent pecking (Keeling 1995). It comprises pecking of feathers and skin in the vicinity of cloaca and cloacal mucosa and later also more profound tissues and organs. This can result in pecking out of the body cavity and death (Hughes and Duncan 1972; Keeling 1995). Vent pecking seem to be unrelated to the previous

existence of FP (Hughes a Duncan 1972; Gunnarson et al. 1999), but FP at the onset of lay can lead to vent pecking (Savory and Mann 1997; Potzsch et al. 2001).

3. Conclusions

In 1999 the European Commission approved the directive on the welfare of laying hens banning the battery cages from 2012. Enriched cages (which provide increased area and height, when compared with conventional cages, and a perch, nest box, and litter area) will still be allowed. As a consequence in the next few years major changes to the housing of most laying hens in Europe will occur. Similar changes in other countries will follow (Appleby 2003). Therefore there is an urgent need to develop feasible alternative housing systems. An increased risk of feather pecking is a main obstruction to the wide adoption of alternative housing systems, such as free range, aviaries or percheries (Green et al. 2000; Potzsch et al. 2001; Bestman and Wagenaar 2003).

FP is a multifactorial phenomenon. In this review we have tried to summarise current knowledge on environmental and endogenous factors contributing to its development. We put a special emphasis on physiological and neurobiological mechanisms of FP, which together with genetic and molecular approach represent in our opinion the most promising tools for the solution of the FP problem.

Ozobávanie peria u kúr znáškového typu: environmentálne a endogénne faktory

Ozobávanie peria, t.j. zobanie a poškodzovanie peria iných vtákov, je porucha správania objavujúca sa u nosníc a iných plemien a druhov hydiny. Ozobávanie peria je problém z hľadiska welfare a zároveň ekonomický problém. Vytrhávanie peria spôsobuje bolesť, zvyšuje riziko poranenia a môže vyústiť do kanibalizmu. Rozsiahla strata operenia je sprevádzaná nadmernými stratami tepla a tým aj zvýšeným príjmom potravy. Smernica EÚ z roku 1999 stanovuje minimálne požiadavky na ochranu nosníc a od roku 2012 zakazuje klasické klietkové technológie. V najbližších rokoch teda dôjde k výrazným zmenám v chove nosníc v členských štátoch EU. Preto existuje naliehavá potreba vyvinúť prijateľný alternatívny chovný systém. Ozobávanie peria je najvážnejšou prekážkou zavedenia alternatívnych systémov chovu nosníc, ako napríklad voľné ustajnenie, voliéry alebo systémy s možnosťou hradovania. Mnohé vedecké tímy v Európe aj mimo nej prispievajú k lepšiemu poznaniu problému a k jeho možnému riešeniu. V tomto prehľade sa pokúšame zhrnúť súčasný stav vedomostí o ozobávaní peria. V článku sú diskutované hypotézy o jeho vzniku (presmerované zobanie na zem a popolenie sa), vplyvy prostredia (výživa, osvetlenie, ustajnenie, veľkosť skupiny, hustota) a endogénne vplyvy (pohlavie, vek, genetické vplyvy, fyziologické regulačné mechanizmy). Zároveň sú spomínané možné spôsoby prevencie pomocou zmien podmienok prostredia, chovných postupov a genetickej selekcie.

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