Reducing the need for beak trimming in laying hens

Feather pecking

Injurious feather pecking is a major welfare problem in laying hens which can occur in all systems, but particularly in non-caged, and is considered an abnormal behaviour. The causes are multi-factorial, including genetics, environment, health and management; however insufficient opportunity to carry out foraging behaviour is widely accepted as a primary factor (Huber-Eicher and Weschler, 1997). Aggressive pecking, which is usually directed at the head, or allo-grooming are not considered in this context. Feather pecking can be gentle (low frequency aimed at the plumage or stereotyped high frequency aimed at the tail feathers) or severe, causing denuded areas in the plumage with the potential of leading to skin wounds, vent pecking and cannibalism (Savory 1995). Usually, a small number of hens in a flock initiate feather pecking, but its transmission throughout the flock is rapid via social facilitation.

Feather pecking is heritable and there has been some genetic success for selecting against the behaviour and against beak inflicted damage. Feather pecking and cannibalism occur in traditional and commercial breeds, and is highly breed specific (Hocking et al., 2004); Columbian Black Tail hens had least plumage damage out of eight hybrids studied by Bright et al. (2011). Different coping strategies have been linked to hens from high (HFP) and low feather pecking lines (LFP) (Rodenberg et al., 2004): HFP were considered proactive (struggle), internally motivated (inflexible), and more likely to develop routines, whereas LFP were considered reactive (passive), externally motivated (flexible), and perform a higher frequency of feeding and foraging behaviour. Locomotor activity (13-17 weeks) was significantly higher in HFP and lower in LFP than controls, and the distance travelled by HFP at a young age (5 weeks) was higher than LFP (Kjaer, 2009). The author suggests changes in locomotor activity are related to genetic changes in the lines (through selection) and describe a 'hyperactivity disorder model of feather pecking', which in combination with lack of adequate external stimuli makes some birds more prone to develop feather pecking than others. Using group selection techniques, where the focus is not only on individual performance but also on group performance, it is possible to reduce mortality due to feather pecking and cannibalism and improve overall group productivity (Nicol et al., 2013).

Feather pecking and cannibalism are major causes of hen mortality, whilst feather damage due to pecking leads to increased heat loss, inability to thermoregulate effectively, and potentially affects other behaviours such as preening. Dim light conditions and beak trimming are common methods adopted by industry to reduce its incidence.

Beak trimming

In order to control the level of feather pecking, one third to a half of the bird's beak is amputated (beak trimmed) using a red hot blade or infra-red beam. The beak is a complex functional organ with an extensive nerve supply and various receptors (Figure 1); trimming leads to tissue and nerve damage, as well as open wounds and bleeding if hot blade resection is used.

Beak trimming results in acute pain, irrespective of method (Cheng, 2006; Kuenzel, 2007; Marchant-Forde et al., 2008; Gentle, 2011), and a reduction in feed intake and growth rate for around 5 weeks post treatment (Honaker and Ruszler, 2004; Marchant-Forde et al., 2008). The stump may show physical irregularities and if conducted at an older age, neuroma formation is prevalent, along with a large number of spontaneously active nerve fibres (with regular, irregular and bursting discharge patterns), leading to chronic pain and behavioural modifications

(Cheng, 2006; Kuenzel, 2007; Gentle, 2011). Reduced environmental pecking, beak wiping and headshaking are commonly reported. The infra-red method is often considered a better option than hot blade resection because of the lack of an open wound. A greater level of acute pain is likely to be experienced by this method however, indicated by reduced physical activity, feeding and drinking behaviour in chicks beak trimmed this way compared to the hot blade (Marchant-Forde et al., 2008).

The Welfare of Farmed Animals (England) (Amendment) Regulations 2002, prohibited the use of beak trimming from 1st January 2011. However, in December 2010 Ministers concluded industry was not ready to operate with intact beaks and the ban could not be brought into effect. The Mutilations (Permitted Procedures) (England) Regulation 2007, was amended to allow beak trimming by the infra-red method (provided it is conducted < 10 days of age, no more than one third of the beak is removed, any subsequent haemorrhage is arrested by cauterisation), banning the use of the hot blade except for emergencies. The issue was reviewed, with a view to introducing a ban from January 2016, but again the government accepted industry advice that the risks of introducing a ban at this time were too great.

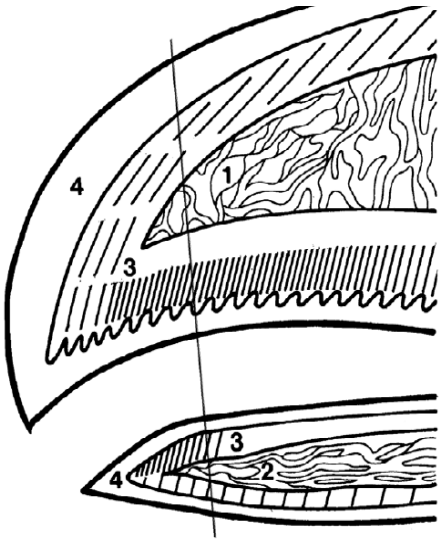

Fig 1. Section through hen's beak. Nerves are present in layers1,2 and 3.
Aus: Desserich, M., Fölsch, D.W. u. Ziswiler, V.: Tierärztl. Praxis 12 (1984).

Reducing the need for beak trimming

It is possible to keep hens with intact beaks and not suffer significant problems with feather pecking. A substantial body of research has identified risk factors for feather pecking during both rear and lay, which can be translated into management strategies that can prevent and control feather pecking whilst simultaneously conferring welfare benefits (Nicol et al., 2013). A combination of measures is likely to be most effective – the more evidence-based management strategies adopted, the lower the levels of injurious pecking, plumage damage and mortality (Lambton et al., 2013). Consider:

Feed mash as opposed to pellets

Increasing the time taken for hens to feed can help to satisfy their pecking need and reduce feather pecking (Rodenburg et al., 2013). Feeding high-fibre, low-energy diets or roughages reduced feather pecking (Van Krimpen *et al*, 2005), as did feeding mash as opposed to pellets (Aerni et al., 2000; El-Lethey et al., 2000; Hartini et al., 2002; Lambton et al., 2010). A 15% diluted diet in rear was associated with better feather condition at 49 weeks (Van Krimpen et al., 2009). Minimising diet changes during rear may also reduce the risk of severe feather pecking (Gilani et al., 2013).

Enhance foraging opportunities

The quality and availability of a suitable foraging material is important for the provision of satisfactory foraging and the reduction of feather pecking. Provision of foraging opportunities is one of the most important factors in reducing feather pecking (Gilani et al., 2013). Foraging was enhanced and feather pecking reduced with long straw or polystyrene blocks compared to chopped straw or polystyrene beads (Huber-Eicher and Wechsler, 1998). The former substrates allowed birds to peck, tear, ingest and food-run with larger particles, whereas the latter substrates only allowed birds to peck and ingest. The scratch element of foraging behaviour did not appear

important; overall the behaviour was non-nutritive in value, but lack of availability led to frustration and a persistent increase in pecking (Huber-Eicher and Wechsler, 1998).

Environmental enrichment through simple string devices decreased feather pecking (McAdie et al., 2005); white string was preferred by the hens (Jones et al., 2000), whilst more complex enrichment via maize silage, barley-pea silage or carrots reduced severe feather-pecking and improved plumage quality (Steenfeldt et al., 2007).

Maximise use of the outdoor range

Increased use of the range is strongly associated with a reduced risk of feather and vent pecking in free range systems (Pötzsch et al., 2001; Lambton et al., 2010). The risk of feather pecking was high in flocks where <50% of the birds used the range on sunny days (Green et al., 2000), and lowered nine-fold if >20% of birds used the range on sunny days (Nicol et al., 2003). Maximising the use of the outdoor range is therefore important (see information sheet 3).

Trees are known to encourage ranging, and a minimum of 5% tree cover close to the house with good canopy coverage is advised to reduce the risk of feather pecking (Bright et al., 2011). There was a negative correlation between canopy cover and plumage damage at the end of lay, with the quality of canopy cover (i.e. degree of shade provided) apparently being more important than the absolute area of range covered (Bright et al., 2016). Flocks with poor canopy cover were more likely to have worse plumage scores at end of lay and more likely to have higher mortality (Bright et al., 2011) and higher rates of egg seconds (Bright and Joret, 2012).

Provide areas for resting and refuge

Providing perches reduced the risk of feather pecking (Lambton et al., 2010), and plumage condition was significantly better for hens with access to high (70cm above floor level) than low (45cm above floor level) perches (Wechsler and Huber-Eicher 1998). In addition, distinct resting or refuge areas were recommended (Friere et al., 2003), as inactive birds were more likely to become the targets of both gentle and severe feather pecking (Riber and Forkman 2007). Designing perches so that perching birds are never at head height for other birds is advised to reduce the risk of vent pecking (Lambton et al., 2015).

Provide early experience and match conditions in rear and lay

Rearing systems should be as similar as possible to the housing system used for the adult birds and pullets should be moved to laying facilities before 16 weeks of age (Janczak and Riber, 2015). Early access to litter reduced feather pecking or the chance of it occurring in lay (Bestman et al., 2009) by increasing foraging (Huber-Eicher and Sebö 2001) and stimulating ground pecking and dustbathing behaviours (Nicol et al., 2003). Providing perches in rear also significantly reduced the risk of cannibalism during the laying period (Gunnarsson et al., 1999). Early access to the range in free range systems and minimising differences between the rearing and laying environment are recommended (van de Weerd and Elson, 2006). Earlier access to the range was associated with reduced feather damage (Petek et al., 2015).

Pullets reared at a higher stocking density (34kg/m^2 compared to 21kg/m^2) in the first 4 weeks were associated with plumage damage in rear (Bestman et al., 2009), and went on to have damage in lay (90% of time); pullets with no damage in rear tended to have no damage in lay (71% of time). Feather pecking in rear is another risk factor for feather pecking in lay (Lambton et al., 2010; Gilani et al., 2013; de Haas et al., 2014).

The cost of intervention measures to reduce feather pecking

Producers were resistant to providing early litter access and avoiding nest box lights (Weeks et al., 2011a) and providing early access to range due to concerns about possibly creating problems with misplaced eggs (Palczynski et al., 2016). Provision of range access in the afternoon only (after the main period of egg-laying)

until laying is well-established is a compromise solution adopted by some farmers. The cost of interventions to reduce feather pecking need not be expensive. The predicted cost of interventions, taking into account the benefit of reduced mortality due to feather pecking and feed costs due to better feather cover, were 12p/hen for eight range shelters, 20p/hen for increased number of inspections and providing breeze blocks, and 12p/hen for adding straw bales to the litter area to promote foraging behaviour (Weeks et al., 2011b). Interviews with farmers suggest that, in general, they were keen to take on additional measures to address injurious pecking and did not see a financial barrier to adopting additional measures, regarding many of them as relatively cheap and cost-effective (Palczynski et al., 2016). When consumers are made aware of welfare issues related to beak-trimming and injurious pecking, it has been estimated using contingent valuation analysis that they would be willing to pay a price premium of 3% on top of the prevailing retail price of free-range eggs if these issues can be avoided (Bennett et al., 2016).

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