Comments on RSPCA review on beak trimming in the paper" THE WELFARE OF LAYER HENS IN CAGE AND CAGE-FREE HOUSING SYSTEMS" by Dr Phil Glatz and Geof Runge

2.2.9 Beak Trimming

The RSPCA states that

Beak trimming, the partial removal of the tip of the beak, is one of the most common methods utilised by the poultry industry to control severe feather pecking (Petek and McKinstry 2010).

RSPCA have failed to mention that the control of cannibalism is the major reason why beak trimming is used in the Australian Layer Industry to prevent up to 20% mortality from cannibalism. Many birds in the flock are subject to cannibalism from non-trimmed birds which often leads to a horrendous death. The bird that is attacked has its flesh pecked, organs irreparably damaged and the bird bleeds to death. Therefore, the RSPCA should state that there is a need for birds to have their beaks trimmed or treated to avoid the horrific painful death from cannibalism.

The RSPCA states that

However, while beak trimming is relatively effective in preventing damage caused by severe feather pecking (Lambton et al. 2010), it is an invasive procedure, and heavily criticised from a welfare perspective (Gentle 1986; Freire et al. 2011).

Hot Blade Beak Trimming

Gentle (1986) and colleagues main concern with hot blade beak trimming was the development of neuromas. The potential of long term or chronic pain in birds trimmed with a hot blade at 6 weeks was described by Breward and Gentle (1985). Some welfare organisations and policy regulators particularly in the EU believe long term chronic pain is the major reason why beak trimming should be banned.

Breward and Gentle (1985) found that after the nerves were cut, micro neuromas (small tangled mass of nerves) developed and sent signals back to brain. The signals were interpreted as being like the pain responses from neuromas that humans developed after amputation of their limbs. Humans can experience sensations from the stump such as burning, pins and needles and other feelings from the body part that has been removed such as movement, itching and vibration often described as phantom limb pain.

Caution however, needs to be applied in the interpretation of the presence or absence of neuromas in terms of welfare of the bird. Research at the level of the spinal cord in birds needs to be undertaken to determine if neuromas in the beak result in chronic pain. In humans the incidence of severe phantom limb pain occurs in only 5 to 10% of the cases (Weinstein 1998). In humans however, the limbs have no ability to regenerate unlike in poultry. Beaks have an extraordinary ability to regenerate after moderate beak trimming. The neuromas that develop in poultry resolve as the nerves regrow back into the receptors in the beak allowing normal beak function.

Breward (1986) noted that neuromas were present three weeks after trimming but did not examine if the neuromas resolved over time.

However, Lunam (2005) also found that neuromas form in the beak when axons are severed during hot blade beak trimming in day old chickens but more importantly went onto find that neuromas did resolve. Lunam (2005) noted that scattered micro neuromas regressed with moderate trimming (one-half of upper beak; one-third of lower beak; 2 sec cauterisation) with previously severed nerves

establishing a connection with receptors in the beak. However, in the case of severe hot blade beak trimming (two-thirds of upper; one-half of the lower beak; 4 sec cauterisation) neuromas persisted and it is possible they discharged action potentials that may have been perceived by the bird as chronic pain.

These results were consistent with other workers and indicate that neuromas do form after hot blade trimming but resolved in birds moderately trimmed with sensory receptors and free nerve endings still present in the upper and lower beak. Neuromas only persisted in birds that had been severely trimmed when two-thirds of the upper and one-half of the lower beak was trimmed.

Gentle (1998) the EU advocate originally calling for a ban hot blade trimming in 1985 eventually agreed that neuromas do resolve, and he made a compelling case that hot blade should be allowed to be practiced in young birds using moderate trimming (Gentle, 1998). **The EU regulators and many of the welfare groups in the EU and Australia have continued to quote the early work by Gentle and not considered his later recommendations in 1998.**

Research previously by Glatz (1987, 1990) had identified that hot blade beak trimming birds at hatch and removing half of the upper beak and one third of the lower resulted in less stress to birds and better performance than beak trimming birds at older ages.

Retrimming with a Hot Blade

An anatomical and behavioural study examined the effects of moderate hot blade beak-trimming of chickens on the day of hatch (one-half of upper beak; one-third of lower beak; 2 sec cauterisation) and **re-trimming** of 2mm of the upper and lower beak (1 sec cauterisation) at 14 weeks-of-age (Lunam, 2005). Sensory receptors and individual nerve fibres were observed near the tips of the retrimmed upper and lower beaks at 28 weeks-of-age. Sensory receptors and nerve fibres were observed in the dermis at the beak tip (Lunam, 2005). The hens returned to normal feeding and pecking behaviours (Jongman et al. (2008) and supported the microanatomy that the sensory input to the beak is restored after retrimming.

The findings on hot blade trimming by Glatz (1987, 1990) were recognised in the 1992 Australian Model Code of Practice for the Welfare of Animals. Domestic Poultry; i.e. day-old chickens should have no more than one-half the upper beak and one-third of the lower beak trimmed with a hot blade (*i.e. 3mm of upper beak and 2.5mm of the lower beak trimmed in day-old chicks and 10 day-olds should have no more than 4.5mm of the upper beak trimmed and 4.0mm of the lower beak trimmed).* This r*es*ulted in birds having 12mm of upper beak remaining at 18 weeks (i.e. 2/3 of beak) with a 2mm step to the lower beak.

In the 2002 Australian Model Code of Practice for the Welfare of Animals, Domestic Poultry specified that beak trimming of birds be conducted using an accredited trainer under an accredited training program in accordance with an agreed accreditation standard. Dr Phil Glatz was requested by RIRDC's Egg Program to develop an accreditation standard published in a training manual for hot blade beak trimmers and worked with TAFE, NSW, VIAS and PIRSA (see Bourke et al. 2002) to develop the standards in the manual.

The Code stated that beak trimming must be performed only by an accredited operator or under the direct supervision of an accredited trainer as part of an accreditation training program and must be performed only in accordance with agreed accreditation standards (in the training manual). The amount of beak to remove at various ages with the hot blade from beak trimmers to follow were illustrated in a graph in the training manual and were the same amounts recommended in the 1992

Code based on the work of Glatz (1987, 1990); i.e. 3mm of upper beak and 2.5mm of the lower beak trimmed at day-old and 10 day-olds should have no more than 4.5mm of the upper beak trimmed and 4.0mm of the lower beak trimmed). As discussed above it is critical to reinforce that the amount of beak to remove for hot blade beak trimming should not be linked to the IRBT method in the Australian Welfare Standards and Guidelines.

The recommendation that only 1/3 of the beak be trimmed early in the life of birds with a hot blade must be rejected as it will result in rapid regrowth of the beak, injurious pecking and subsequent mortality in birds and an increase in management costs.

IRBT

It is widely recognised that IRBT is a superior method of tipping the beak. Infrared beak trimming (IRBT) does not create an open cauterised wound as hot blade trimming does. After birds are treated the beak remains intact until 10-14 days of age, after which the treated portion sloughs off gradually or separates as the bird uses its beak. The IRBT system uses a non-contact, high intensity, infrared energy source to treat beak tissue in a bloodless procedure. An infrared lamp delivers an energy pulse that penetrates the hard-outer layer of the beak treating a pre-determined amount of tissue, which inhibits growth of the beak tip. The beak surface remains intact, protecting the treated soft tissue underneath.

The infrared machine has a fixture that is moulded to the shape of the bird's face. Fixtures are made to fit the head shape of each strain of chicken enabling repeatable treatment using different sized heads and beaks. Consistent treatment is achieved by selecting the appropriate lamp power and mirrors that focus the infrared heat source on the upper and lower beak. The optimal energy pulse power, exposure time and depth of treatment are determined by strain of bird and farm environmental factors.

Commercial hatcheries using the IRBT processor follow a quality assurance protocol to ensure the equipment is set up correctly and a consistent amount of beak is treated. The staff are trained to establish the settings on the machine; pick up, hold and load chickens on the machine correctly; monitor treatment application using quality control protocols and chick health after the process; consign treated birds to farms and follow up monitoring on the quality of beak treatment and behaviour during rearing and lay.

McKeegan and Philbe, (2012) showed that IRBT does not result in chronic pain or other adverse consequences for sensory function in the beaks of birds. They looked at that long-term effects of IRBT on birds up to the age of 50 weeks after 50% of the upper and lower beak was treated and found that re-innervation was visible, and no neuromas or abnormal proliferations of nerve fibres were observed at any age. Detailed beak measurement data indicated that the IRBT treatment had resulted in a 40% reduction in overall beak length when compared with control birds by 4 weeks of age.

More recently Schwean-Lardner (a, b, c) supported the findings of McKeegan and Philbe, (2012). Various configurations of the infrared beak treatment equipment result in minor behavioural changes with minimal impact on comfort behaviours. Mortality from cannibalism was higher in non-trimmed control group. Schwean-Lardner et al (2017 a) examined various configurations of infrared beak treatment equipment on beak characteristics of various strains of white and brown egg birds.

At 3 weeks of age the reduction in upper beak length (relative to control group not trimmed) ranged from 33.6-42.4% for birds with one configuration (27/23) of IRBT. At 18 weeks the reduction in beak length had declined to a range of 17.7-22.9% for the 27/23 treatment.

For the alternative configuration of 25/23 for IRBT the reduction in upper beak length was 38.9-52.4% at 3 weeks and 20.3-34.1% at 18 weeks.

Therefore, it is important to note that IRBT of one-half of the beak at day old with various configurations of IRBT for white and brown and strains of layer chicks' results in upper beak length at 18 weeks of age that are 1/5 to 1/3 the length of control birds not trimmed. More importantly mortality from cannibalism was reduced using IRBT and did not result in chronic pain or other adverse consequences for sensory function in the beaks of birds. The recommendation that only 1/3 of the beak be treated at day old with IRBT must also be rejected as it will result in rapid regrowth of the beak and subsequent mortality in birds. Collectively, these results suggest that IRBT of day-old chicks is not associated with chronic pain and is the preferred method of blunting the beak to prevent cannibalism.

It is suggested RSPCA review the literature and examine the risk factors associated with development of chronic pain or persistent neuromas. For hot blade trimming the risk factors are the age of beak trimming, amount of beak removed and cauterization time. For IRBT the risk factors are lamp power settings, interface plates and/or mirror types, exposure time and depth of treatment.

Without these details it is difficult for the RSPCA to make an appropriate appraisal of any of the papers where birds have been trimmed using the HB and IRBT method.

What is more important concerning the current Industry best practice IRBT and HB beak trimming given the beak regeneration that occurs is the beak length and beak function of the birds much later after the process. Therefore, less emphasis should be placed by the welfare groups and Industry regulators on how much beak is removed at the time of hot blade trimming or treatment with IRBT. In addition, the birds have short-lived pain responses compared to the ongoing acute pain from feather removal and horrendous pain from cannibalism.

The RSPCA states that

A prohibition on beak trimming currently exists in Norway, Sweden and Finland, with heavy regulation and impending bans in others, including Austria, Belgium, Denmark, Germany, the Netherlands, and the United Kingdom (Van Horne and Achterbosch 2008; Petek and McKinstry 2010).

Many regulators in countries in the EU have used the early data of Gentle and colleagues in the 1980's to ban beak trimming without considering subsequent work conducted by Gentle in the 1990's when he agreed neuromas do resolve, and he made a compelling case that hot blade should be allowed to be practiced in young birds using moderate hot blade trimming (Gentle, 1998). In the EU some farmers can get away without beak trimming due to housing of birds indoors under low light intensity. In other cases, subsidy of the Industry allows EU farmers to cope financially with 10% mortality of hens from cannibalism. In the UK, IRBT is still allowed until the vice of feather pecking, and cannibalism can be solved. Research has been undertaken to eliminate feather pecking and cannibalism since the call for a ban on beak trimming was announced but no solution has been found. It is known that there are over 50 bird and management variables that may contribute to birds initiating a feather pecking or cannibalism attack (Glatz and Runge, 2017). Research has yet to identify how bird and management variables can be fully implemented in a flock to minimise feather

pecking and cannibalism. In some cases, a combination of factors in one shed in a farm may initiate cannibalism yet another set of factors may be responsible in another shed making it hard to control cannibalism.

Many birds in the flock are subject to cannibalism from non-trimmed birds which often leads to a horrendous death. The bird that is attacked has its flesh is pecked, organs irreparably damaged and the bird bleeds to death. Therefore, there is a need for birds to have their beaks trimmed or treated to avoid the horrific painful death from cannibalism. It would be a horrendous health and welfare issue if RSPCA banned beak trimming in Australia. The sustainability of the Egg Industry in Australia relies on using best practice IRBT in day old chicks and best practice hot blade beak trimming where IRBT is not available. In addition, there would be a considerable threat to food security in Australia and make eggs a luxury food rather than a staple. If beak trimming is banned in developing countries the efforts being made to improve the lives of expectant mothers, infants, children and families with access to high quality egg protein, and help boost their natural immunity levels would be jeopardised.

The RSPCA states that

Beak trimming is acutely painful. It stimulates nociceptors in the beak causing acute pain during the procedure (Breward and Gentle 1985), including during infrared trimming (Marchant-Forde et al. 2008; Janczak and Riber 2015), chronic pain in the stump of the beak if performed on older birds due to the formation of neuromas (Breward and Gentle 1985; Gentle 1986; Gentle et al. 1990),

The statement that beak trimming causes acute pain and chronic pain is a general view statement that needs to be justified by the RSPCA. First, they should discuss the anatomy and sensory innervation of the beak and second they should discuss the extraordinary ability of the beak to regenerate after hot blade beak trimming or beak treatment.

The chicken beak is a highly specialised organ containing salivary glands and taste buds to assist feeding and taste discrimination as well as thermoreceptors, mechanoreceptors and nociceptors that respond to thermal, mechanical and noxious stimuli. In addition, the beak is well innervated by sensory, parasympathetic and sympathetic nerves and contains numerous free nerve endings. The beak of birds has many encapsulated mechanoreceptors, the Herbst and Grandry corpuscles which are sensory structures that enhance fine tactile discrimination.

Many of these receptors remain in the beak after moderate HB trimming and the receptors make a connection with the nerves after hot blade trimming. The anatomy and innervation of the chicken beak and the effects of hot blade trimming, and re-trimming has been reviewed by Lunam (2005) and includes facts on regeneration of the beak after trimming and the risk factors associated with the development of chronic pain in birds. A reference on beak anatomy is Lucas and Stettenheim (1972).

It is important for reviewers to discuss the 3 pain phases bird may experience when they are beak trimmed with a hot blade (Cheng, 2005). Birds initial acute pain reactions to HB beak trimming and IRBT and are short lived as demonstrated by anatomical, electrophysiological and behavioural evidence. Acute pain (2h to a few days) results from stimulation of nociceptors (pain receptors) in the beak and follows a pain free period (up to 26h) normally associated with action by the birds' endogenous analgesia system (Cheng, 2005). The anatomical, electrophysiological and behavioural evidence strongly suggest that beak-trimming evokes acute pain for only a brief period.

In contrast, birds are subject to continual acute pain from non-trimmed birds pulling their feathers out. In addition, many birds in the flock are subject to cannibalism from non-trimmed birds which often leads to a horrendous death. The bird that is attacked has its flesh is pecked, organs irreparably damaged and the bird bleeds to death. Therefore, there is a need for birds to have their beaks trimmed or treated to avoid the continual acute pain over the lifetime of the bird from feather removal and the horrific painful death from cannibalism.

The third pain response and the potential of long term or chronic pain in birds trimmed with a hot blade at 6 weeks was described by Breward and Gentle (1985). Some reviewers and policy regulators particularly in the EU believe chronic pain is the reason why beak trimming should be banned.

Breward and Gentle (1985) found that after the nerves were cut, micro neuromas (small tangled mass of nerves) developed and sent signals back to brain. The signals were interpreted as being like the pain responses from neuromas humans developed after amputation of their limbs. Humans can experience sensations from the stump such as burning, pins and needles and other feelings from the body part that has been removed such as movement, itching and vibration often described as phantom limb pain.

Caution however, needs to be applied in the interpretation of the presence or absence of neuromas in terms of welfare of the bird. Research at the level of the spinal cord in birds needs to be undertaken to determine if neuromas in the beak result in chronic pain. In humans the incidence of severe phantom limb pain occurs in only 5 to 10% of the cases (Weinstein 1998). In humans however, the limbs have no ability to regenerate unlike the beaks in poultry. Beaks have an extraordinary ability to regenerate after moderate beak trimming. The neuromas that develop in poultry resolve as the nerves regrow back into the receptors in the beak allowing normal beak function.

Breward and Gentle (1985) noted that neuromas were present three weeks after trimming but they did not examine if the neuromas resolved over time.

However, Lunam (2005) found that neuromas form in the beak when axons are severed during hot blade beak trimming in day old chickens but went onto find that neuromas did resolve. Lunam (2005) noted that scattered micro neuromas regressed with moderate trimming (one-half of upper beak and one-third of the lower beak) with previously severed nerves establishing a connection with receptors in the beak. However, in the case of severe beak trimming (two-thirds of upper beak and one-half of lower beak) neuromas persisted and it is possible they discharged action potentials that may have been perceived by the bird as chronic pain.

These results were consistent with other workers and indicate that neuromas do form after hot blade trimming but resolved in birds moderately trimmed with sensory receptors and free nerve endings still present in the upper and lower beak. Neuromas only persisted in birds that had been severely trimmed when two-thirds of the beak was trimmed.

An anatomical and behavioural study examined the effects of moderate hot blade beak-trimming of chickens on the day of hatch and re-trimming of 2 mm of the upper and lower beak at 14 weeks-of-age (Lunam, 2005). Sensory receptors and individual nerve fibres were observed near the tips of the retrimmed upper and lower beaks at 28 weeks-of-age. Sensory receptors and nerve fibres were observed in the dermis at the beak tip (Lunam, 2005). The hens returned to normal feeding and pecking behaviours (Jongman et al. (2008) and supported the microanatomy that the sensory input to the beak is restored after retrimming.

Gentle (1998) eventually agreed that neuromas do resolve, and he made a compelling case that hot blade should be allowed to be practiced in young birds using moderate trimming (Gentle, 1988).

The findings on hot blade trimming by Glatz (1987, 1990) were recognised in the 1992 Australian Model Code of Practice for the Welfare of Animals. Domestic Poultry.

Glatz and Hinch (2008) showed that IRBT using a severe treatment resulted in neuromas which persisted to end of lay. The IRBT settings was subsequently modified by the vendor to eliminate chronic pain or adverse sensory function. The change in IRBT settings was examined by McKeegan and Philbe, (2012) and showed that IRBT does not result in chronic pain or other adverse consequences for sensory function in the beaks of birds. They looked at that long-term effects of IRBT on birds up to the age of 50 weeks and found that re-innervation was visible, and no neuromas or abnormal proliferations of nerve fibres were observed at any age. More recently Schwean-Lardner et al (2017 a, b, c) supported the findings of McKeegan and Philbe, (2012). Collectively, these results suggest that IRBT of day-old chicks, using the modified settings is not associated with chronic pain.

The infrared method is a more welfare friendly means of beak tipping. It is more effective at reducing beak regrowth and results in significantly fewer beak abnormalities. It is a non-invasive beak tipping technique which initially retains the beak tips allowing the bird to feed immediately after treatment. It uses advanced and precise technology utilising an infrared lamp which delivers an energy pulse which treats the hard keratin layer of the beak and a limited amount of the underlying soft tissue. The outer layer of the beak remains intact protecting the treated soft tissue underneath. The growth of the beak continues except at the site of the sharp beak hook thereby blunting the beak tips.

As mentioned above it has been shown that when birds are treated using the current industry best practice, infrared beak treatment does not result in chronic pain or other adverse consequences for sensory function. The infrared process allows adjustment for differences in strain, bird hydration levels, beak pigmentation, cranial size, beak shape, top and bottom beak symmetry and the environment into which the birds will be placed.

The RSPCA states that

Beak trimming is also likely to result in incomplete sensory feedback, which affects sensory perception (Hughes and Michie 1982).

To review the impact of beak trimming on sensory feedback in the beak it would be helpful for the RSPCA to review the anatomy and sensory innervation of the beak and discuss the extraordinary ability of the beak to regenerate after beak trimming or beak treatment. The risk factors associated with incomplete sensory feedback in birds that are beak trimmed with a hot blade are the age of hot blade beak trimming, amount of beak removed and time of cauterization. The risk factors associated with incomplete sensory feedback in birds that are trimmed with IRBT are lamp power settings, interface plates and/or mirror types, exposure time and depth of treatment.

Without these details it is difficult for RSPCA to make an appropriate appraisal of the sensory feedback where birds have been trimmed using the HB and IRBT method.

An anatomical and behavioural study examined the effects of moderate hot blade beak-trimming (half upper beak; one-third the lower beak) of chickens on the day of hatch and re-trimming of 2 mm of the upper and lower beak at 14 weeks-of-age (Lunam, 2005). Sensory receptors and individual nerve fibres were observed near the tips of the retrimmed upper and lower beaks at 28 weeks-of-

age and sensory receptors and nerve fibres were observed in the dermis at the beak tip (Lunam, 2005). The hens returned to normal feeding and pecking behaviours (Jongman et al. (2008) and supported the microanatomy that the sensory input to the beak is restored after retrimming.

McKeegan and Philbe, (2012) showed that IRBT does not result in adverse consequences for sensory function in the beaks of birds which was supported by the recent work by Schwean-Lardner et al (2017a,b,c).

The RSPCA states that

If too much of the beak is removed during trimming it can lead to feeding problems and increased mortality. If too little is removed, the beak can re-grow rapidly and the effectiveness in minimising severe feather pecking is reduced.

The RSPCA need to provide details of the amount of beak removed which is responsible for the feeding problems and increased mortality. The statement infers initially that mortality occurs when birds are trimmed and that when more beak is remove mortality increases. RSPCA provide no information on the amount of beak removed after hot blade trimming that will result in rapid regrowth of the beak. It is well known in the Australian Industry that HB trimming of 1/3 of the beak will result in rapid regrowth of the beak and birds will revert to feather pecking and cannibalism and therefore birds need to be retrimmed. For IRBT, birds that only have one-third of their beaks treated will also need to be retrimmed with a hot blade. Therefore, it is difficult to understand why under Australian conditions the recommendation is to remove or treat 1/3 of the beak when birds are first trimmed. Cleary the early work of Gentle in the 1980's is still being used by regulators and welfare groups when he found hot blade trimming of 1/3 of the beak of 6-week-old birds resulted in neuromas which may have resolved if he examined the neuromas later in the birds life.

The RSPCA states that

It is currently unknown exactly how beak trimming affects severe feather pecking.

The main purpose of trimming the beak is to blunt the beak tips to reduce the ability of the bird to feather peck and rip tissue out of other birds. The RSPCA did not report the amounts of beak removed or treated but suggests the reasons for birds not pecking is learned inhibition, incomplete sensory feedback and chronic pain. The RSPCA did not report the amounts of beak removed or treated when discussing learned inhibition, incomplete sensory feedback and chronic pain.

However, these suggestions have been proven otherwise when best practice hot blade beak trimming is used. An anatomical and behavioural study on birds that had been hot blade trimmed at day old using best practice recommended in the beak trim training manual and re-trimming of 2 mm of the upper and lower beak at 14 weeks-of-age (Lunam, 2005) showed that sensory receptors and individual nerve fibres were present in the tips of the retrimmed upper and lower beaks and sensory receptors and nerve fibres were observed in the dermis at the beak tip (Lunam, 2005). The hens returned to normal feeding and pecking behaviours (Jongman et al. (2008) and supported the microanatomy that the sensory input to the beak is restored after hot blade trimming and retrimming.

The infrared method is a more welfare friendly method of beak tipping. McKeegan and Philbe, (2012) showed that a best practice method of IRBT does not result in chronic pain or other adverse consequences for sensory function in the beaks of birds. They looked at that long-term effects of IRBT on birds and found that re-innervation was visible, and no neuromas or abnormal proliferations of nerve fibres were observed at any age. Recent work by Schwean-Lardner et al (2017a, b, c) on

IRBT treated birds compared to non-treated birds showed no differences in sensory responses in the beak including other behaviours such as drinking, resting, feather ruffles, head scratches, leg stretches and walking. IRBT has shown that when birds are treated using the current industry best practice, infrared beak treatment does not result in chronic pain or other adverse consequences for sensory function.

The main reasons therefore why birds don't feather peck is that their beak is blunt, and their damaging pecks are less affective.

The RSPCA states that

In a study of 25 free-range farms, Whay et al. (2007) found no effect of the extent of beak trimming on severe feather pecking, body condition or feather loss at 70 weeks of age, and Blokhuis et al. (2007) reported that beak trimming did not affect plumage damage.

RSPCA report no effect on free range farms of the extent of beak trimming on feather pecking, body condition or feather loss nor did beak trimming affect plumage damage. What needs to be reported by the RSPCA is the actual level of beak trimming used in the studies by Whay et al. (2007) and Blokhuis et al. (2007). If only 1/3 of the beak has been tipped the beaks will regrow and birds will engage in pecking. However, if the bird is trimmed with a hot blade using Australian recommendations and IRBT recommendations for free range birds then the extent of pecking will be minimized.