LAYING HEN CASE STUDY AUSTRIA 1

An account of the successful phasing out of beak trimming without increasing problems of injurious pecking

Toni's Freilandeier. Free-range Austrian hens in the snow with wintergarden in the background.

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Introduction

Austria has a thriving alternatives egg sector which includes:

- Over 3 million hens in barn systems
- Over one million hens in free-range systems
- Nearly half a million hens in organic systems.

Austrian laying hen population	**2005**	**2009**
Caged hens*	2,506,392	239,322
Barn hens**	945,249	3,252,801
Free-range hens	739,338	1,004,501
Organic hens	360,330	467,644
Total	4,551,309	4,964,268

** In 2005 approx 250,000 of the caged hens were in enriched cages, the rest in barren cages. All caged hens in 2009 are in enriched cages*
***Most barn eggs were produced in single-tier systems in 2005. Dr Niebuhr estimates that approximately 90% of the new systems developed between 2005 and 2009 are modern multi-tier systems.*

Data from Dr K.Niebuhr

It is often stated that the Austrian industry is untypical, being based on large numbers of small free-range and single tier barn systems. This is true of Austria's original alternative sector.

However, since the ban on the conventional cage was announced for 2009, together with the forthcoming ban also on the enriched cage from 2020, there has also been a rapid development of large scale multi-tier aviary systems to supply the standard egg market.

Beak trimming is rarely practised in either the traditional alternatives or the modern aviary systems. According to Dr Knut Niebuhr of the University of Veterinary Medicine, Vienna, the phase out of beak trimming was achieved without a long-term increase in feather pecking. Indeed, the measures taken to improve management and environments have seen a simultaneous reduction in injurious pecking at the same time as beak-trimming was phased out.

This case study tells the story of how beak trimming has been close to eliminated in Austria using the testimony of key figures involved in the process:

- Dr Knut Niebuhr, Institute of Animal Husbandry and Animal Welfare, Department of Farm Animals and Veterinary Public Health. University of Veterinary Medicine Vienna. Dr Niebuhr led the scientific project which managed the phase out, personally visiting most alternative Austrian laying hen farms to collect data and advise on the prevention of injurious pecking

- Professor Helmut Bartussek, Chair of the Austrian Farm Animal Welfare Council. Professor Bartussek played a key role in setting up the mediation process which led to the phase-out project
- Susanne Fromwald, consultant for GAN (Geselleschaft für Artgemässe Nutztierhaltung), the body which owns the certification label and sets the guidelines
- Ddr Patricia Velikay, Mediation Velikay und Partner. Ddr Velikay managed the mediation process which led to the set-up of the beak-trimming phase-out project.

History of alternative egg production in Austria

Testimony mostly collected by Susanne Fromwald

The alternatives sector expanded from the early 1980s, booming in the early 1990s, along with an increasing concern amongst Austrian consumers for animal welfare and natural food production. In the early days, units were generally small, with as few as a hundred or so hens per shed. Alternative production included free-range units and single-tier barn systems.

A certification body Kontrollstelle für Artgemässe Nutztierhaltung (KAN) was set up in 1995 to manage alternative production. Owned by three animal welfare organisations, Vier Pfoten (Four Paws), Wiener Tierschutzverein (WTV) and Verein gegen Tierfabriken (VgT) (along with a very low share of the European Egg Consortium (EEC)), it set up the label Tierschutz Geprueft (Animal Welfare Approved) for the marketing of high welfare eggs.

KAN was set up with three advisory boards incorporating scientists (Prof Helmut Bartussek was the first chair of this board), producers and packing companies.

The German certification body Kontrollierte alternative Tierhaltung (KAT) was brought in as a strategic partner. According to Dr Niebuhr, Austrian supermarkets wanted a second level to be available below Tierschutz geprüft without setting up a second certification body. An additional advantage was that exports to Germany required KAT certification.

Austrian supermarkets signed up to KAN certification, so that the vast majority of alternative production was sold under Tierschutz and especially KAT labels.

More recently, the ownership and certification of the labels has been separated. A new organisation called GAN (Gesellschaft für artgemäße Nutztierhaltung) has been set up which owns the label and sets the guidelines. KAN continues to carry out the certifications to those guidelines.

The development of beak trimming in Austria

According to Dr Knut Niebuhr, beak trimming was never commonly practised in Austrian cage systems (cannibalism was not then a major problem in Austrian caged production and beak trimming cost money), nor in early alternative production.

As alternative production increased, feather pecking and cannibalism became more of a problem, or were perceived to be more of a problem, in the early '90s. There is a belief in the industry that an increase in injurious pecking followed the ban on the use of animal products such as meat meal in poultry feeds following the BSE crisis. The rearing companies recommended the use of beak trimming to ameliorate the problem and levels of beak trimming in alternative production rose to around 45% by the end of the millennium.

How beak trimming was (largely) phased out

According to Dr Niebuhr, beak trimming was banned by the certification bodies but the ban was not executed. The rapid rise of beak trimming caused great concern to the animal welfare groups who owned the certification body KAN and wanted the ban enforced. At the same time, the producers were deeply concerned to prevent cannibalism which was not only a cause of economic loss but was traumatic for both hens and stockpeople.

Professor Bartussek proposed a mediation process to resolve the impasse. A professional mediator, Patricia Velikay, was appointed. A round table meeting was held including farmers, the rearing companies, packing companies, KAN representatives, scientists (including Dr Niebuhr and Prof Bartussek) and the animal welfare groups. The process of mediation was explained. After a frank exchange of views, the majority of participants agreed that a mediation process should be developed.

The mediator then set about identifying the key players. She chose three groups, farmers, rearers and animal welfare groups, each of which had to choose a representative. These representatives had a series of meetings to agree the structure of the key mediation sessions.

The key mediation occurred over five 40-minute meetings with the three voting representatives and three observers – a veterinarian, a representative of the certification label and a scientist (Dr Niebuhr). In between meetings, the representatives conferred with their constituencies.

According to Prof Bartussek, guidelines were developed at the beginning of the mediation process which included a folder with the scientific evidence that beak trimming was an animal welfare problem. Prior to this, many egg producers thought that beak trimming was akin to the cutting of finger nails. The report included diagrams showing that a bird's beak has fine nerves up to near the very tip of the beak (See Fig 1).

The mediation process came up with the following agreement. Beak trimming was to be phased out, with an agreed timetable of reduction, but steps were to be put in place to deal with the problem of feather pecking and cannibalism and to give farmers and rearers the confidence to manage hens without beak trimming.

The farmers agreed that:

- Those who continued to beak trim in the first years after the agreement was signed would pay an additional certification fee which would according to Prof Bartussek increase annually (according to Dr Niebuhr, this started at 14.5 euro-cents per hen in 2002, rising to 36.3 in 2004)
- This would create a fund which would provide an insurance scheme which compensated any farmer who lost birds to cannibalism as a result of keeping birds with intact beaks.

A project was set up and funded by the Austrian Ministry of Agriculture, Forestry, Environment and Water Management (Proj No 1313) which established guidelines for farmers and conducted a literature search to collect all information available concerning feather pecking and its causes an

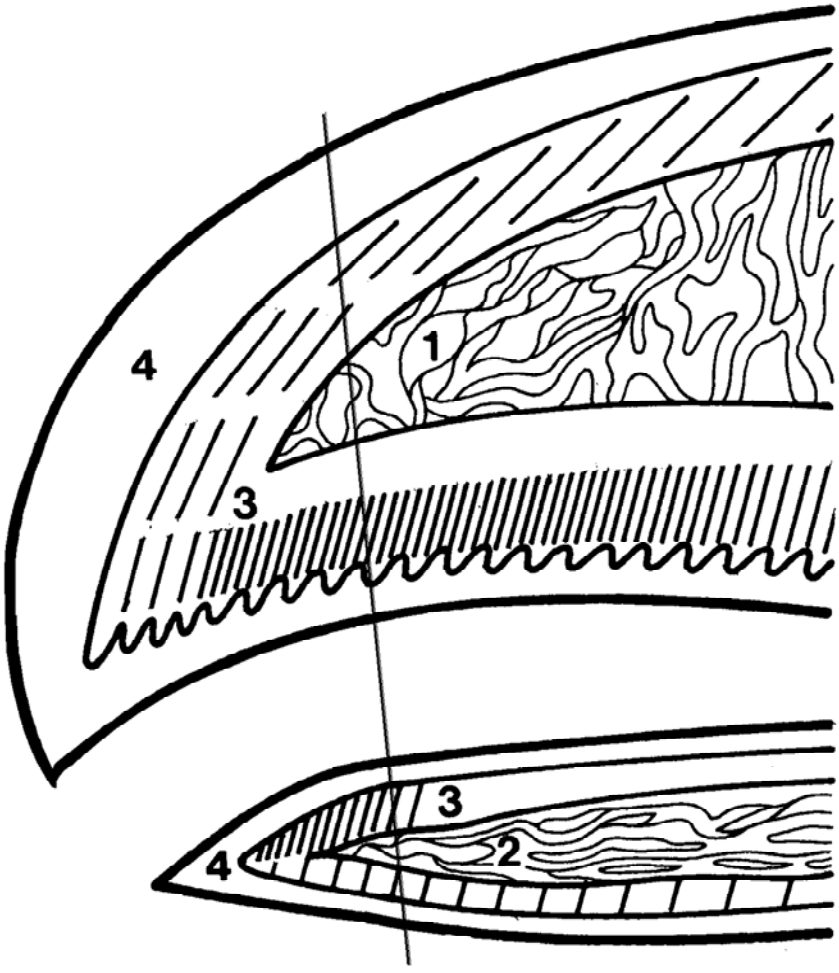

Fig 1. Section through hen's beak. Nerves are present in layers1,2 and 3.
Aus: Desserich, M., Fölsch, D.W. u. Ziswiler, V.: Tierärztl. Praxis 12 (1984).

Crucially, the project set up a helpline which any farmer with injurious pecking problems could ring for emergency help and advice. This advisor was often Dr Niebuhr who visited with his team 309 laying and 240 rearing flocks on approximately 400 farms during the course of the project. His team visited all alternative Austrian farms during the project to collect data from rearing and laying farms concerning factors which affected feather pecking and cannibalism and provide advice.

According to Dr Niebuhr, approximately 85,000 euros were collected from farmers who continued to beak trim in the interim period and redistributed. However, he added that today "very seldom have there (been) flocks with injurious feather pecking to the extent that mortality is affected." During the phase-out, the combination of financial incentive, insurance and emergency help was crucial to providing farmers with the confidence to attempt to manage laying hens with intact beaks.

According to Prof Bartussek, the agreement phasing beak-trimming out was signed in June 2000. He adds that since 2005, there has been very little beak trimming in alternative husbandry in Austria. According to Fig 2, it dropped from a peak of just over 45% in 2001 to under 5% by 2005. It is currently just over 1%. The process of phasing beak trimming out took four and a half years from the signing of the agreement.

Levels of beak trimming started to drop after 2001 as the agreement took effect. This was followed by a small increase in both feather pecking and the more serious injurious pecking. However, as the project to address these problems advanced, levels of both dropped at the same time as beak trimming continued to be phased out.

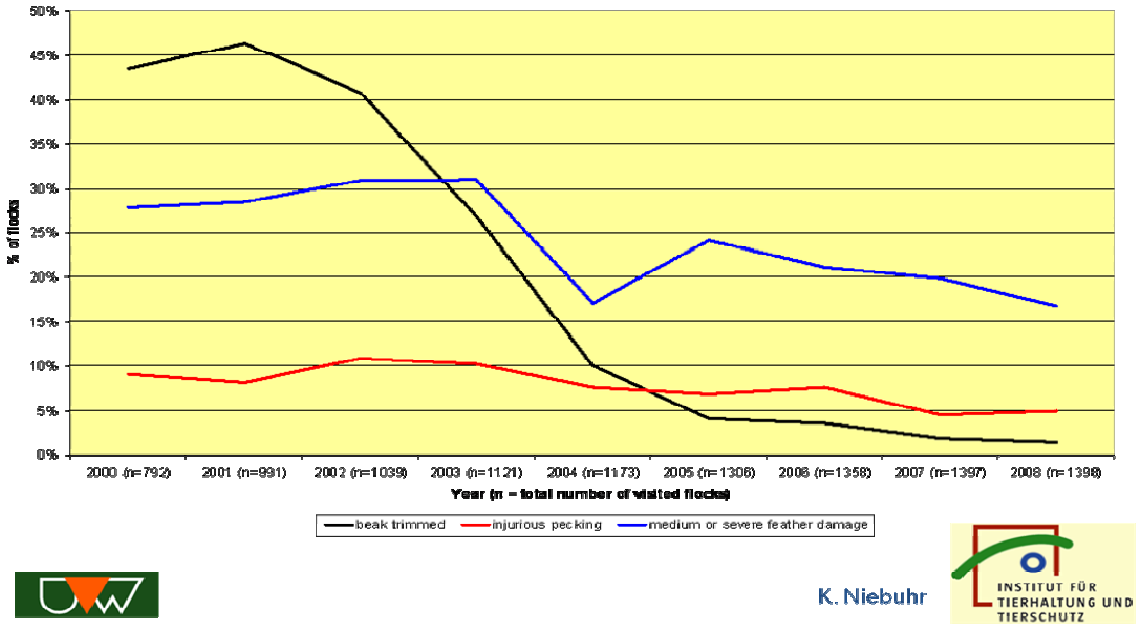

Fig 2. Levels of beak trimming and injurious pecking in Austria

Keeping beaks intact without injurious pecking

Lohmann-Brown hens in two systems: single-tier organic (left) and multi-tier barn (right). Aerial perches help protect resting birds from those which are foraging and reduce the effective stocking density in the foraging areas.

According to Dr Niebuhr, injurious pecking and feather pecking are multi-factorial in their origin. An integrated approach is required including:

- Suitable breeds
- Appropriate stocking densities in both rearing and laying houses
- Provision of raised perches
- Rearing systems with a similar layout to laying houses
- High protein diets, especially in the early stages of lay
- Control of weight gain, especially in rear
- A proper health plan including vaccination
- Good climate management, especially levels of pollutants such as ammonia
- Development of good human-animal relationships
- High levels of stockmanship and management including record keeping.

It is important that hens are bred for docility and against the tendencies towards feather pecking and cannibalism. In Austria, the breed Lohmann's Brown dominates the market, both in intensive and in alternative systems. A minority of alternative systems use the Lohmann's Tradition breed. We are told that other breeds are rarely used in Austria, despite the attempts of their salesmen.

Although there is no data on this, Dr Niebuhr understands anecdotally that farmers who had tried other breeds experienced greater levels of problem with injurious pecking. Anecdotally he also understands that Lohmann's breeding programme has included group selection at high density with high light levels. The Lohmann's Brown breed is marketed as robust and also suitable for alternative systems (http://www.ltz.de/html/gb_page_100_2.htm). Hopefully, in time, a wider range of breeds will be available which have been bred for low levels of feather pecking.

EU derogations allowing stocking densities of up to 12 birds / m^2 until 2012 are not permitted in Austria. Stocking densities in multi-tier systems are permitted up to 9 birds / m^2. Simple single tier systems, whether barns or free-range, can stock at up to 7 birds / m^2. Those which provide A-frames with aerial perches can stock up to 7.5 birds / m^2 and those which additionally provide raised feeding platforms can stock up to 8 birds / m^2. Where an external wintergarden is provided (this is an additional covered scratching area external to the made shed with natural lighting and fresh air), stocking densities in the main shed can rise to 9 birds / m^2. In the label program “tierschutzgeprüft”, which covers approximately 1 million hens (including all organic hens), stocking densities are at least 1 hen lower than the stocking densities permitted by law.

Dr Niebuhr believes these stocking densities are essential for the prevention of injurious pecking. In practice, higher stocking densities seem to work better in multi-tier aviaries than in single tier barn and free-range systems. He was not entirely sure why. The area of the extra tiers is counted in the space allowance. Our observation of a multi-tier portal aviary system, which incorporated aerial perching on all its levels, was that it was a much more complex environment which required birds to be more active accessing resources. This may be an issue of enriched three-dimensional space.

Raised perches help to separate resting birds from those who are foraging, protecting those resting from feather pecking whilst also effectively reducing the stocking density in the foraging area. Additional wintergardens also tempt foraging birds away from the main barn, again reducing the effective stocking density and presumably providing a more rewarding foraging experience for active birds, so reducing the motivation for feather pecking. Some farms encourage early wintergarden use by scattering some food here as soon as birds are placed at the laying farm.

Rearing systems must prepare pullets for life in the laying house, in particular to ensure that birds actively use all parts of the house on their arrival. Nearly all Austrian pullets are now reared in multi-tier row systems which include slats and aerial perches.

3-week old pullets in the middle tier of the rearing system. Nearly all Austrian pullets are reared in multi-tier systems which prepare them to range on arrival at the laying houses.

Multi-tier system showing scratching area.

There are two management systems operated in multi-tier rear. In one the birds are effectively caged within the tiers for the first four weeks. Then the tiers are opened and all birds have access to a littered floor and to the other tiers. In the second system, which is more widely practised, the birds have access to the littered floor, and the tiers as they learn to access them, from the start. According to Christian Eichtinger, sales manager for Schropper (www.schropper.at), Austria's largest laying hen breeding company, they had fewer problems with the second system which allows proper foraging behavior right from the start.

According to Prof Helmut Bartussek, chair of the Austrian Farm Animal Welfare Council, who also previously chaired the scientific board of the certification body KAN, it is also vital to limit stocking densities at rear. Otherwise there is a risk that, when foraging, they will find that the main foraging opportunities are on the backs of their neighbours. Dr Niebuhr suggested that these were 28 birds per square metre in aviary rearing systems up till 10 weeks of age after which the density drops to 14. Prof Bartussek also stressed the importance of access to foraging material such as straw from day 1. Dr Niebuhr also stressed that it was vital that feather pecking does not occur at the rearing farms. Once the habit is learned it is likely to continue.

High protein diets and phased feeding are key to the success of the Austrian system according to Dr Niebuhr. These will contain up to 19% protein for the first most productive stage of lay (the protein will come from vegetable sources such as soya, supplemented by synthetic amino-acids such as lysine and methionine as necessary), dropping to 18.5% till week 50 and perhaps later to 18% or 17.5% to avoid excessive egg size. Dr Niebuhr tells us that these percentages are higher than nutritionists would advise, but that when they have tried lower levels they have had problems with injurious pecking. Dr Niebuhr also believes that it is important that weight gain in rearing flocks is crucial – "rearing flocks with lower body weight or large spread will always be problematic." The same view was expressed by rearing farmers we have met both in Austria and the UK. According to Prof Bartussek, ad libitum feeding for all birds in rear is a vital part of the Austrian system.

According to Dr Niebuhr, hens should weigh 1.5kg at the start of lay, rising to 2kg at 30 weeks. They should maintain or increase this weight throughout the laying period. Birds with good reserves will be better able to sustain egg production without metabolic stress. If birds are an even weight it is easier to adjust the nutritional regime for the benefit of all. Every four weeks, 100 birds in any flock should be weighed (some farms have automatic weighing machines which note the weight every time a bird jumps on to it).

According to Dr Niebuhr, "our laying hens are walking on a metabolic knife-edge, equivalent to a dairy cow producing 14,000kg of milk per year. Anything which makes them uncomfortable pushes them towards feather pecking or injurious pecking". Stresses such as disease are risk factors for injurious pecking. A good vaccination programme at rear, together with needle vaccination on laying farms, is an essential component of the Austrian system. Climate management is also important to reduce stress. Dr Niebuhr argues that birds generally cope

better with cold than with heat. Most important of all is to keep levels of pollutants such as ammonia down.

Light can also affect feather pecking and direct sunlight in the shed should be avoided – it is better reflected on to the ceiling.

Establishing a good human-animal relationship is another key requirement. Hens need to become used to human presence and other stimuli to build up a resistance to stress since nervous flocks are more prone to feather pecking. Some farmers use a radio to provide background noise including human sounds. Most regularly walk slowly and calmly through the sheds, especially at the start. A good measure of their resistance to stress is to see how easy it is to touch the hens without avoidance behavior. According to Dr Niebuhr, Austrian hens are generally well habituated to human presence and are easy to approach and to touch, a key sign of a good human-animal relationship. According to Dr Niebuhr, flocks where birds are easily touched have significantly lower levels of feather pecking (avoidance distance correlates with feather damage (r_s =0.431, P=0.002) in 50 layer flocks).

Dr Niebuhr would also advise the use of materials such as straw for enrichment, but notes that the new large barn systems often choose not to use straw for reasons of hygiene and their levels of injurious pecking can be amongst the lowest. For free-range systems, provision of wintergardens and encouragement of ranging is helpful.

Organic production


Organic system. Straw provides an excellent foraging medium to encourage positive natural behaviours in the scratching area. Wintergardens and range also help to occupy foraging birds and discourage feather pecking.

According to Dr Niebuhr, the greatest risk for injurious pecking is in organic systems where it can be harder to obtain feeds with reliable concentrations of protein and key amino-acids. This is a problem which could be addressed by the feed companies (eg by segregating sources of

organic potato protein, which has good levels of methionine, when making organic potato starch).

Austrian organic production rules require the following additional steps to improve welfare which are also likely to reduce the risk of injurious pecking:

- Stocking densities are lower (6 birds/m^2, 7 if a wintergarden is also provided in additional to the inside scratching area)
- Organic pullets are raised in systems which include aerial perches, wintergardens and access to range in season. This helps to ensure good ranging as soon as they arrive at the laying farm.

Further developments in the industry

The battery cage has been illegal in Austria since 2009. It is also illegal to build new enriched cages and current ones are to be phased out by 2020.

As a result, new large multi-tier aviary systems have been set up since around 2006 to supply the standard egg market. These are certified by KAT, so those which are supplying the Austrian market are not beak trimmed. Under the KAT standard they can house up to 24,000 hens per shed, broken down into smaller groups of not more than 6000 hens.

According to Dr Niebuhr, multi-tier aviaries are amongst the most successful in avoiding feather pecking and cannibalism. This is despite the lack of biological enrichment, the fact that the birds do not have access to range or wintergardens and that, for reasons of biosecurity, many do not provide straw in the littered area. Levels of mortality in multi-tier systems during lay in the period 2008-9 up till 50 weeks old (the period for which Dr Niebuhr has the most systematic data) are very close to Lohmann Brown's expected mortalities which incorporate figures for conventional systems.

These systems appear to avoid injurious pecking through a combination of:

- High protein diet with careful maintenance of weight in both rearing and laying flocks
- Use of docile breeds with high liveability (predominately Lohmann Brown hybrids)
- A maximum stocking density of 9 birds per m^2 (this includes the areas in the different levels)
- The inclusion of aerial perches in the tiers (multi-tier systems provide quite complex environments)
- Rearing systems which themselves contain multiple tiers to prepare birds for the laying shed
- Careful climate control (especially of levels of pollutants such as ammonia)
- Good health management
- Good human-bird relationships through frequent calm human-bird interactions.

All of these could be achieved in similar systems throughout Europe, particularly after 2012 when the stocking density throughout Europe will be reduced to 9 birds per m^2 for all alternative systems. Indeed, many producers already use these stocking densities in alternative systems.

Prof Bartussek contacted leading figures in the industry on our behalf. According to an egg producers representative, Franz Pazek, the system had worked really well. Key to the success of the system was good genetic lines, better management and ad libitum feeding in rear. Layers representative Walter Iber, of Lugitsch Company, said that it had worked well for the first three years due to such factors as changes in the genetics, reduction in the housing density at rear, additional perches and lower stocking density in single tier systems, conversion from litter housing to percheries, regular excrement removal, provision of enrichment eg Spruce brushwood, improved water supply and increased feed trough lengths. However, in his experience there had been some re-emergence of feather pecking in the last two years, possibly due to further changes in genetics, feed composition or due to some relaxation in management. However, it remained his view that this was still within tolerance levels.

Clearly, standards of genetics, feed and management need to be maintained following any phase-out of beak-trimming. Nobody is suggesting that Austrian systems are free of feather-pecking, but that levels of the more serious injurious pecking including cannibalism have been reduced at the same time as levels of beak trimming. As Dr Niebuhr put it, “We haven’t got rid of feather pecking, we’ve reduced its severity.” It is seldom for flocks to have levels of injurious pecking that increase mortality. Most importantly, the steps required to manage flocks without beak-trimming actually managed to reduce feather pecking and cannibalism at the same time, creating a win-win situation which was also good for production.

Dr Niebuhr argues that the avoidance of feather pecking and injurious pecking in birds with intact beaks is a key measure of good welfare in laying hens. Provided that injurious pecking can be controlled, the phasing out beak-trimming is good for both production and welfare.

FARM 1 – FARM RECHBERGER, HARTBERG/STYRIA, AUSTRIA

Conventional and organic rearing farm

Farm Rechberger, Hartberg/Styria is a large rearing farm with both indoor aviary rearing and organic production, owned by Schropper- Austria's largest poultry breeding company.

The aviary rearing system:


Multi-tier rearing system designed to prepare pullets for the laying house environment.

The farm rears 30,000 pullets in each flock for placement in various laying systems, including single- and multi-tier aviaries and free-range. The rearing house is newly furnished with a multi-tier rearing system that 'prepares pullets for later laying installations' by giving them experience of perches and encouraging them to move around.

The key points considered for reducing feather pecking are:

- early access to a complex environment
- good human-animal interactions
- high protein diets and developing a good appetite prior to lay.

The rearing house consists of a multi-layered system, very similar to a layers' aviary. Initially pullets are kept to a single tier as they are too small to move between each 'floor'. However, Christian Eichtinger from the breeding company Schropper believes that the pullets should get access to the entire house as soon as possible as 'the older they become the less able they are to learn'. By four weeks of age, the birds are therefore given access to all tiers and most perches. If the birds are given access later, they may never learn to use the perches and may become "nervous" which Christian asserts makes them more likely to peck one another. By 6 weeks of age, most of the birds are making use of the entire system including the top perches.

When the birds are first given access to the whole rearing house, the stockman must spend considerable time moving the birds back to their 'feeding tier' from the floor so that they learn to move back there at night. Initially, around 30% of the birds need to be lifted to the correct tier.

This early, regular human interaction with the birds is said to make the birds calmer; an important factor in reducing feather pecking, according to the Christian.

The chicks are provided with long, unchopped straw on the floor of the aviary. The straw occupies the birds and by 5 weeks they have used their initial supply and the straw is replenished- twice during rear.

Feed is an important aspect of rearing. The chicks begin on a high protein (21-22%) diet made of ground pellets. Using ground pellets ensures that nutrients are equally spread throughout the feed and prevents the birds from selecting preferred textures or flavours that may arise in mash. The birds move onto chick feed with slightly lower protein only when they reach the correct weight- this may occur between 5 to 10 weeks. Using weight as opposed to age as a measure of when to change feed helps to prevent feeding a diet insufficient in protein. Pullet feed is fed *ad libitum* with the producers insisting that “getting their appetite up” is important to buffer the effects of stress they will experience around the move to the laying shed.

Organic rearing

The organic rearing shed houses 4800 pullets that will, in line with the organic standards, have access to both A-frame perches, a wintergarden and, later, free range. Giving birds access to perches, wintergardens and range early in life means that they are likely to use them readily on arrival at the laying farm, a stressful period in the birds’ lives where the risk of feather pecking is high. If perches are readily used, then resting birds will be protected from the pecking of foraging birds. Use of perches, wintergardens and range also helps to reduce the stocking density within the shed, further reducing the risk of injurious pecking.

The wintergarden was currently closed off because the farmer believed it was too cold, though Dr Niebuhr’s advice was that they would cope with this and earlier access would help reduce the risk of feather pecking later. In warmer weather, the pullets would also have access to range via the wintergarden. Perches are normally added sooner and were due to be added during the next week.

The breed is considered to be most important in this system, yet it uses the same breed as the more intensive aviary system; Lohmann Brown. Five years ago the farm had lots of problems with feather pecking in their organic flock and whilst breed and housing system hasn’t changed, Christian told us that the birds themselves have; the birds are reportedly much calmer. He told us “[I] wouldn’t use another bird in this system”.
Feed has also played an important role in the reduction in feather pecking. Christian believes that “the feed companies learned a lot in the past years”, although he also says that any change in feed, which may take place once or twice a year, can lead to problems.

Laying hens questionnaire – Rear	
Farm	Farm Rechburger, Hartberg/Styria
Description of system	Indoor, intensive, multi-tier rearing system
Total flock size	30,000
Group size	
Current age of birds	4 weeks
Proportion/no of males per group (if any)	None
Age at placement and placement at lay	Leave rearing system at 17-18 weeks
Feed type (MJ/Kg)/ quantity per bird Type of delivery eg. Tracks, pan, scatter	Ground starter pellets (not mash- allows even distribution of nutrients) for first 5 weeks. Switch to chick feed at 5-10 weeks depending upon average weight of birds. Pullet feed from 8-10 weeks. Feed delivered via tracks
Amount of feed per day per bird	Pullet feed fed *ad libitum* 'to get appetite up before lay'
Feed composition, eg protein content, amino-acid supplementation, energy content, fibre content, phasing etc	Starter pellets – 21-22% protein, lower for chick/pullet feed
Veterinary visits (frequency)	Company vet will visit during vaccinations, approximately once every two weeks
Mortality and cull rates (at 70 weeks as well if kept longer)	Average of 1.5-2% for entire rear (17-18 weeks)
Litter, eg, type, depth, condition	Long straw on floor. Replenished twice during rear period
Indoor environmental enrichment	Perches from 4 weeks (higher perches from 42 days), straw
Lighting regime indoors (min lux, variation through building, natural light provision)	Artificial lighting (with phased switch off in the evening)
Frequency of feather pecking, injurious pecking and cannibalism	None seen

FARM 2 - FARM STUMPF, HARTBERG/STYRIA, AUSTRIA

Birds on upper tier of multi-tier barn system. At 60 weeks there is some feather damage, but very little injurious pecking despite the obviously sharp beaks.

Farm Stumpf in Hartberg/Styria farm is a modern, newly built intensive layer farm housing 22,000 hens in four groups of 5500. Feed is produced on-site and eggs are weighed and sorted on-farm. Some eggs are sold directly.

The layout of the house is known in Austria as a 'portal system'; a multi-tiered aviary in which the farmer is able to walk amongst the many layers.

The new building has only been in operation for three flock cycles and there has been some feather pulling, but very few cases of injurious pecking. The overall mortality was 5% so far; the farmer believed that this was an indication that 'not beak trimming definitely does not increase mortality' as it was a comparable figure to previous beak-trimmed flocks.

The multi-tier system is taken full advantage of by the birds who occupy all of the space provided. The multi-tier systems can, by law have higher stocking densities than single tier systems and it was clear to see why. The birds were able to move between the many levels and had perches on offer at different heights; they were therefore able to investigate different areas within the shed, escape any unwanted attention of other hens and to rest without being disturbed by active hens. The farmer believes that keeping the birds occupied is key to avoiding stress and subsequent feather pecking. When the birds are first placed in the aviary, he provides them with expanded mineral bricks for them to peck at. He believes that providing this at the start of placement reduces the stress they may otherwise feel in their new environment.

Hens in this system were observed displaying natural behaviours of dustbathing, perching and wing-flapping.

Walking through the flock at least four times each day helps to familiarise the flock to human presence and generate an overall calm; considered another key aspect in reducing stress and behavioural problems. It was certainly evident that the hens were not 'flighty' during our visit;

hens were keen to approach and investigate us and it was also easy for us to approach them without causing panic.

The farmer believes that weighing and sorting eggs on-farm gives him an advantage in being able to monitor the health of his flock. Any reduction in average egg size can be a good indicator of stress or health concerns. The farmer is more quickly able to respond to and mitigate such problems than if he were gaining the information from processors at a later date.

This system provided a good example of a large-scale, indoor system providing for the behavioural needs of the birds, whilst remaining profitable for the farmer. He told us 'I believe, for the next five years, this system is commercial'. He added 'it is important for the cage ban to remain to enable farmers like me to continue to make a profit'.

Laying hens questionnaire – during lay	
Name of farm	Farm Stumpf, Hartberg/Styria
Description of system	Intensive, indoor multi-tier barn system
Date/Time of visit	10th February, 2010
Certification system	KAT
Breed	Lohmann Brown
Total flock size	20,000
Group size	5000
Current age of birds	57 weeks
Proportion/no of males per group (if any)	None
Age at placement and start and end of lay	16 weeks
No of eggs per year/production cycle	Not known
Stocking density at beginning of lay (numbers / m^2 indoors and outdoors)	9
Feed type (MJ/Kg)/ quantity per bird	Corn silage produced on-site
Mutilations	None
Mortality and cull rates (at 70 weeks as well if kept longer)	Estimated 5% (at 57 weeks)
Indoor environmental enrichment eg perches, bales, forage, toys	Perches (multi-level) and expanded mineral bricks at start of placement
Lighting regime indoors (min lux, variation through building, natural light provision)	Not bright, artificial lighting with some natural uplighting form windows (provides 50% light at start of placement, before dimming to 35%)

Rearing environment	Multi-tier system
Number of stockpersons (person hours per day/week)	2
Frequency of checking birds	At least 4 times each day
Market	? and some eggs sold directly
Cost/Price	9 euro cent/egg excluding VAT Ignoring capital costs, 4.5 euro profit per hen; the farmer hopes to pay off the cost of the building in 5 years
Health problems eg Leg problems, injuriel	E coli outbreak had occurred in this flock- thinks this has made them more flighty
Frequency of feather pecking, injurious pecking and cannibalism	Feather pecking described as ‘medium’; injurious pecking ‘very low’.
Any welfare outcomes measured	

FARM 3 TONI'S FREILANDEIER ORGANIC LAYER FARM, AUSTRIA

Free-range hens in the snow with wintergarden behind (left). Inside the shed (right) showing pop-holes to wintergarden, scratching area, single-tier A-frame perches and nesting boxes.

Toni's farm is an organic-certified free-range farm with houses containing no more than 3,000 birds in groups of no more than 1,500 (normally 600, only in one flock larger groups). The birds have access to a 'winter garden' a week after placement in the farm, before being given full access to range in the following week. There have been no feather pecking problems in the last five years.

"The best eggs under the sun." Toni Hupmann is a pioneer of alternative Austrian production with a genius for marketing.

Christian (co-creator of the Toni's brand) believes that reducing stress is key to preventing feather pecking. To minimise stress, it is considered that the following are necessary:

- good ranging behavior
- calm hens
- good human-animal interactions

Ranging outside (left) and in wintergarden (right) encourages appropriate foraging behaviour and reduces the risk of injurious pecking. Wintergarden has separate dust-bathing and scratching areas with dust-boxes for dustbathing and straw to encourage foraging in scratching area.

Ranging is encouraged by a combination of wintergarden and outside range. The wintergarden provides a semi-outdoor range with the security of cover plus some protection from the elements of an Austrian winter. Pullets should already be used to ranging in the wintergarden and range from their experience during rear. On arrival at the farm, some grain is scattered in the wintergarden to further encourage its use. Good ranging behaviour encourages foraging birds away from the temptations of feather pecking as well as reducing the stocking density within the shed.

When hens are first given access to the range (2 weeks after initial placement), a small amount of feed is scattered in the area directly outside of the winter garden. To encourage the hens to make full use of the range (they even venture outside in the snow!) trees have been planted to give cover in the more open areas.

Christian believes that having calm birds is key to reducing behavioural problems such as feather pecking. More than five years ago, the farm experienced some problems with feather pecking using the same breed as today. However, Christian is positive that Lohmann Brown breeding programs have successfully resulted in 'less flighty' birds; he said 'the breed is the same, but the birds are different; they are much calmer now'. He is sure this is part of the reason for the farm's current lack of any feather pecking problems.

Whilst breed is considered an important factor in the birds' temperament, stockmanship is also important. Up to four stockpeople may visit the same flock, but Christian believes that because

they ‘speak with the hens’ this has the beneficial effect of creating a good human-animal interaction. The hens are used to people and are not ‘flighty’ as they might otherwise be. Blue lighting is also used to achieve a similar aim.

Mortality rates could be reduced by providing additional protection against predators.

Laying hens questionnaire – during lay	
Name of farm	Toni’s Freilandeier
Farmer	Anton Hubmann
Description of system	Organic free-range laying system
Date/Time of visit	10th February, 2010
Certification system	Tierschutz and Aus Biologischer Landwirtschaft
Breed	Lohmann Brown
Total flock size	3,000 (per building)
Group size	1500
Current age of birds	40 weeks
Proportion/no of males per group (if any)	None
Age at placement and start and end of lay	18 weeks at placement, 19-20 weeks at start of lay
No of eggs per year/production cycle	Approx 290-300
Stocking density at beginning of lay (numbers / m^2 indoors and outdoors)	7 (due to winter garden provision)
Feed composition, eg protein content, amino-acid supplementation, energy content, fibre content, phasing etc	17-18% protein, soya maize, supplemented with methionine
Antibiotic use	None
Veterinary visits (frequency)	
Mutilations	None
Mortality and cull rates (at 70 weeks as well if kept longer)	Average 5% in current flock but could be as high as 10-15% due to predation
Main causes of mortality	Predators – foxes and birds of prey
Litter	Straw in scratching area and buckwheat husks in nest boxes
Indoor environmental enrichment eg. Perches, bales, forage, toys	A-frame perches, sand boxes (in winter garden~2.5m^2)
Lighting regime indoors (min lux, variation through building, natural light provision)	Some fluorescent lighting (half were blue lights- to make the birds calmer) and natural lighting from pop-holes
Outdoor environment (including provision of cover)	Newly planted trees plus woodland which the birds could gain access to
Rearing environment	Organic
Number of stockpersons (person hours per day/week)	4
Frequency of checking birds	At least 3 times daily

Transport rearing to layer unit (distance and time)	100-200 km
Transport to slaughter (distance and time)	150 km
Market	Toni's Freilandeier
Cost/Price	17.82 euro cent/egg
Frequency of feather pecking, injurious pecking and cannibalism	'no problems with feather pecking in the last five years'. Feather condition of current flock looked good