LAYING HEN CASE STUDY UNITED KINGDOM 1

An account of a programme in the process of successfully phasing out beak trimming without increasing problems of cannibalism

Sutton Barton Farm. Organic system which has addressed early problems of injurious pecking during the phasing out of beak trimming

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Introduction

Eggs from the Columbian Blacktail breed are marketed by Waitrose as a high welfare quality product, either free-range or organic. Organic production is managed by the Soil Association & Organic Farmers & Growers Partnership programmes, both of which follow Soil Association standards. Production is managed by Stonegate using contract farms. All Stonegate's alternative egg production is also produced to RSPCA Freedom Food standards.

Levels of beak trimming have been declining over the last decade. 85% of Columbian Blacktail flocks in general, and 100% of the organic flocks, are now managed without beak-trimming.

Policies designed to encourage farmers to manage their birds without beak trimming include:

- Farmers who don't beak trim are paid an extra 4p per dozen eggs
- An extension liaison worker is available full time to visit farms to help advise during any outbreaks of feather pecking or cannibalism, to collect data and to share best practice between layer and rearing farms.

Outbreaks of feather pecking and, more specifically, of injurious pecking and cannibalism can cause serious economic losses. More importantly, cannibalism outbreaks are traumatic for farmers and stockpeople as well as for the birds. The provision of an incentive encourages farmers to take the steps required to avoid injurious pecking without beak trimming. The availability of advice and support helps give farmers the confidence to give intact beaks a try.

As part of the "Raising the Standards" programme which Stonegate run for Waitrose, they organise four annual technical meetings for farmers, Stonegate and Waitrose staff which includes opportunities to exchange information about best practice. The vast majority of producers attend at least one of these meetings each year.

Waitrose and Stonegate are also funding research into improved rearer and layer management with Bristol University with a full-time PhD student involved in research. They are currently conducting a trial at Lawn Farm, Pewsey farm into dark brooder management. Chicks would naturally spend much of their first days or weeks in a dark nest supervised by their mother. The trial compares the effects of rearing small groups of chicks in the dark vs the light.

The previous PhD student, Sarah Lambton, studied the effects of a range of risk factors on gentle and severe feather pecking in Columbian Blacktail hens. This has found that a key risk factor for feather pecking related to the manufacturer of the feed, though the reasons for this were not entirely clear. The form of the feed was important – birds fed on mash were less likely to feather peck than those fed pellets. They hypothesised that deficiencies in fibre or protein content might be a factor.

The study found that good ranging reduced levels of both gentle and severe feather pecking. Conditions at rear were clearly also important; birds which arrived with feather pecking problems were more likely to experience severe feather pecking later on (Lambton, S.L., Knowles, T.G. Yorke, C and Nicol, C.J., 2010. The risk factors affecting the development of gentle and severe feather pecking in loose housed laying hens. Applied Animal Behaviour Science **123**: pp 32-42).

Substantial progress has been made since the time of the study. In 2005, half the hens were beak trimmed dropping to a little over a third in 2007 and 15% in 2009. This phase out of beak trimming has been achieved without an increase in severe feather pecking due to measures taken to improve health and welfare. Furthermore the additional measures taken in organic production, where the beak trimming ban was enforced some years earlier, have seen a substantial reduction in levels of severe feather pecking and cannibalism. Some of these additional measures are now also being trialled in the standard free-range production system.

Free-range production

Key welfare aspects of the free-range system aimed at reducing the risk of feather pecking include:

- Designing rearing systems which prepare birds for the environments they will meet on the laying farm
- Breeding a bird with docility and behavioural traits which encourage ranging and reduce feather pecking
- A rich environment to encourage appropriate foraging behaviour including the provision of litter in the sheds' scratching area and access to range
- Lower stocking densities inside (9 birds per square metre)
- Maximum group size of 3000 birds
- Careful attention to nutrition
- Health management including a programme including around 20 vaccinations during rear
- Good stockmanship and management.

Birds learn best when young. If the first time they meet a perch, a raised area of slats or an outdoor area of range is on arrival at the laying farm, it may take some time for them to learn how to use them. Since both transport to a new environment and the onset of lay are stressful for birds, this is a high risk time for the onset of feather pecking and cannibalism. This is especially so if the birds huddle together rather than make quick use of the various areas of the house and range. If they already know how to use slats, range and perch, this risk is much reduced. Stonegate believe that getting conditions right in rear is crucial to avoiding risk of feather pecking in the laying farm.

Breed is also key. The Columbian Blacktail hens (a cross including Light Sussex and Rhode Island Red) have been bred for traits such as docility as well as for production. One of the farmers we visited noted that the birds had become calmer over the years that he had been farming them. Group selection on the behaviour of flocks has also been part of the breeding programme for years. Mortality of sister groups is recorded and low mortality selected for. Videos are also now being used to record behaviour so they can select for lower levels of feather pecking.

Columbian Blacktails have always been slightly less productive than other commercial hybrids which may mean they are under less nutritional pressure to lay eggs, reducing the risk of

feather pecking. Individual eggs also weight half a gram less on average. The policy is to keep pace with increases in production, but not to catch up. Seven years ago we were told that a dozen Columbian Blacktail eggs cost an extra 10p per dozen to produce compared to standard free-range systems. Richard tells us that this has now been reduced to about 8p per dozen.

Enriched scratching area at Sutton Barton farm.

Feather pecking and cannibalism are displaced foraging behaviours. Providing access to range and a rich litter in the house encourages birds to forage appropriately. Straw is particularly good for indoor foraging since it is likely to contain interesting bits of food and well as adding to the fibre in the diet. Getting birds outside on range helps to space them out and reduce the stocking density in the shed – high stocking density is a particular risk factor for feather pecking. As a general rule, the lower the size of the group, the higher the proportion that will range.

Cannibalism can result from nutritional deficiency, especially of protein and key amino-acids such as methionine and lysine. Consuming each other's blood and tissues is, sadly, a rather effective means of obtaining protein that is missing from the diet. Good nutrition in both rear and lay is a key factor in preventing feather pecking. Flocks need to be of a good even weight once they reach lay, sufficiently high to sustain egg production without nutritional stresses which

could lead to severe feather pecking, and even so that nutrition can be adjusted in a way that meets the needs of all. Stonegate aims for 90% of birds to be within 10% of the target weights.

Any form of stress is likely to increase the risk of feather pecking which often follows disease outbreaks, for example E coli. Good people-animal relationships can also reduce stress. As in all farming, good stockmanship including empathy, conscientiousness and attention to detail are vital in reducing the risk of cannibalism.

Rearing systems with access to range, as are required for organic production (see below) are also being trialled for Waitrose free-range systems.

Organic production

The Soil Association bans all beak trimming. Since the risk of feather pecking and cannibalism can be higher in organic systems due to difficulties in ensuring sufficient protein and specific amino-acid content in the diet, particular care is needed to ensure the high welfare conditions required to avoid injurious pecking.

Additional steps required by the Soil Association that further reduce the risk of feather pecking include:

- A requirement to provide access to range as soon as possible and definitely from 12 weeks old
- A maximum group size of 2000 (and not more than 500 unless conditions including good bird health and welfare can be maintained)
- Aerial perches required both in rear and for laying hens
- A maximum stocking density of 10 birds/m^2 in rear and 6 birds/m^2 in lay
- A larger scratching area covered with litter or bedding.

Good ranging is key to reducing the risk of injurious pecking since it keeps the birds actively involved in appropriate foraging behaviour. If birds are already used to ranging by the time they reach the laying house at 16-18 weeks old, they continue to range on arrival. The even smaller group sizes are also helpful to ranging, partly perhaps since birds will have less far to walk beyond other birds as they head for the pop-holes.

Keeping hens in smaller groups and rearing them with outdoor access from an early age helps to encourage ranging.

A-frame perch at Sutton Barton farm. Perches protect resting birds from those which are foraging and help reduce the effective stocking density on the ground.

Aerial perches that are well above the ground or the raised slatted area of the shed enable birds that are resting to be out of the range of foraging birds, greatly reducing the risk that they will be pecked. Resting birds are less likely to peck each other since feather pecking is a foraging behaviour. According to Caroline Yorke, Stonegate's extension worker, "birds love to perch. (It helps them to) get out of the way." Along with access to range, Caroline believes that the provision of aerial perches also effectively reduces stocking density in the shed, again reducing the risk of feather pecking.

In the early days, organic birds were conventionally reared. Up to 20% of flocks could have cannibalism breakdowns. Caroline observed a great reduction in feather pecking and cannibalism problems as the organic system was phased in. "As soon as the organic system phased in, headaches have dissipated." Birds used to ranging and perching as pullets adapted much more quickly to the laying house.

The Soil Association also recommends that birds should be given access to fresh greens and turf from day 1. Birds should be reared on the same farm where they will spend their laying life. Where this is not possible, the stress of moving must be kept to a minimum.

Ensuring good levels of proteins and key amino-acids is especially important in organic production where soya is generally not available and synthetic amino-acids are not permitted. Higher protein rations may be required to ensure sufficient quantities of individual amino-acids. Organic rations often now include fishmeal.

For hens, Waitrose in conjunction with Stonegate have also measured welfare outcomes for the last two and a half years through its “Raising the Standard” Audit system for all Waitrose producers. For hens this includes measurements of mortality, feather cover and worm burden in addition to environmental indicators such as carbon footprint.

Additional advice given to farmers

When Waitrose and Stonegate made the decision to move away from beak trimming in the Columbian Blacktail systems, Stonegate appointed a full-time liaison person, Caroline Yorke, to visit farms sharing best-practice advice on managing birds with intact beaks to prevent feather pecking and cannibalism. The advice she gives includes:

- Taking steps to minimise stress, particularly around the time when birds pass from the rearing to the laying environment
- This includes making as few changes as possible when moving, for example not changing feed the moment the birds move to the laying house
- Take steps to get the birds ranging as soon as possible
- Health is essential to avoiding feather pecking and cannibalism. This requires good diet, potable water, broad spectrum vaccination and efficient ventilation
- It is crucial to get nutrition right
- Ventilation is important – provide fresh air without dramatic draughts; birds cope better with the cool than with heat
- Good litter is required. Straw is especially good behaviourally
- Lighting should normally be at least 10 lux. Natural light is especially good, but shafts of light can cause problems
- However, farmers should use the possibility of dimming lights as a management tool in the event of an outbreak
- If feather pecking breaks out, put extra enrichment in, make sure the diet is especially good
- Take similar steps in the event of any stress, for example if there is a disease outbreak
- Stockmanship is key – use your ears, eyes and nose.

According to Caroline, “every time there is a stress factor you have to be careful” since stress is a risk factor for feather pecking. She gave disease as one example. “Any disease entrance is a stressor that will lead to severe pecking.” In the event of disease extra time and care is needed

to ensure that other stresses are minimised. Diet needs to be exactly right. The environment needs to be enriched. If feather pecking breaks out, Caroline argues that the attention of the birds needs to be diverted, adding that you need to “give activity and redirect behaviour.” Bales of straw and hay can be added as an extra stimulus to encourage more appropriate foraging behaviour. Light is important for birds, but if serious feather pecking and cannibalism occur, dimming the lights is available as an additional management tool for containing an outbreak.

Unavoidable stresses need to be managed as well as minimised. A key risk time for stress is the period of transfer from rearing farm to laying farm followed by the onset of lay. A whole series of stresses are likely to hit the birds at the same time:

- Transportation from rearing to laying farm
- Any change in the environment between rearing farm and laying farm, eg provision of slats, raised feeding and drinking area, perches, access to outdoors, change in temperature or lighting conditions etc
- A change in diet from rearing ration to laying ration (which may need to be higher in protein and calcium, for example)
- The onset of lay itself with fluctuations in hormone levels, onset of new drives (eg finding suitable nesting sites).

Key to managing the stress involved at this complex time is either to prepare them for it in advance by providing a more complex rearing environment with a similar layout to that at lay and to provide an orderly transition whereby they adjust to one new change at a time. For example, if the diet is to be changed, give them a week to adjust to the new environment first but be sure to change the diet in good time before they come into lay.

Good stockmanship and the development of good human-animal relationships are vital for managing stress. Stonegate Production Director, Richard Kempsey, emphasises that “TLC and stockmanship are key to the kind of system we are operating.” Farmers are encouraged to spend time with their animals, calmly walking the sheds, especially after arrival at the laying farm. This human stimulus also helps to divert the attention of hens away from feather pecking. Encouraging hens into the nest boxes once they start to lay is also essential to reduce the numbers of floor eggs.

Nutrition is key, after all feather pecking and cannibalism are redirected foraging behaviours. The chickens need a diet which provides both nutritional and behavioural needs. Protein and key amino-acids are especially important nutritionally. Diets high in fibre and which take longer to eat (eg powdered mash rather than pellets) also help to provide for the behavioural needs. Provision of enriched litter (for example straw and hay which will have interesting tit-bits hidden in them as well as supplying fibre) and good range will also help to provide a hen’s behavioural needs for foraging as well as, possibly, some nutritional requirements.

Inquisitive birds investigating their visitors at Sutton Barton farm. Birds with good human relationships are likely to suffer less stress and are therefore less prone to feather pecking.

Good health is also crucial. The effect of disease on feather pecking has already been mentioned. To reduce the risk of disease, birds are subject to a vaccination programme from day-old to 16 weeks which according to Richard includes a “two-thirds insurance against major diseases.” The birds are also vaccinated against infectious bronchitis including two live vaccine primers which vary according to the strains prevalent at the time.

Stockmanship is partly about empathy and about knowing when there is something wrong with the birds so that action can be taken quickly. As Caroline put it “it is about using “ears, eyes and nose.”

FARM 1 - LAWN FARM, PEWSEY, WILTSHIRE.

Organic Columbian Blacktail rearer and layer farm.

Organic layers.

Gerald Osborne (farmer) and Rachel Rivers (stockperson) run a rearing unit with two groups of 2000 pullets and a laying unit with two groups of 2000 layers. The rearing unit supplies pullets for their own and two other farms. They have been farming organic Columbian Blacktail pullets and hens for 3 years. They have not experienced any outbreaks of injurious pecking or cannibalism, though there has been some “feather pulling”.

Rachel believes that the rearing system is key to achieving good welfare free from serious feather pecking. The farm aims to ensure that pullets are fully educated into the ways of adult life in the rearing environment, with the exception of egg laying, and that the transition from rearing to laying house is kept as smooth as possible.

In the rearing house, pullets are provided with access to :

- Outdoor access from week 8
- A concrete verandah from week 8
- Slats and perches from week 1.

According to Gerald, “letting them out early is key.” It is essential to ensure activity and ranging. Before the birds are let out at 8-10 weeks, they put trailers out to provide cover. “They start exploring, less if bright (or) too cold and windy. They end up everywhere”.

Rachel argues that if birds meet range for the first time in the laying house, it will take them till “22 weeks to properly use the range. Here they use range from day 1.” Later ranging increases the risk of feather pecking. As Caroline Yorke, Stonegate’s extension officer, added “the longer (the birds are) in, the more stay in, the worse the feather damage.”

Four-week old pullets. Encouraging birds to perch early helps prepare them for the environment of the laying shed. Note the green light they are reared in.

More generally, Rachel stated that “the layout of the rearing shed mimics the laying shed”. If birds meet slats and perches for the first time at the laying shed, they are unlikely to move around the shed. They won’t move freely along slats or fly into perches if they are not familiar with them. According to Caroline, use of range and perches effectively reduces the stocking density on the floor of the house at this most stressful period of their life when there is the highest risk of an outbreak on injurious pecking.

A wide range of stimulus helps birds to cope with stresses later on. Rachel tries to spend as much time with the birds as possible to help build up human animal relationships. She even takes office papers in with her to work on in the rearing sheds! When we visited, a radio was playing Classic FM to get the birds used to a range of sounds including the human voice. We wondered "why Classic FM" expecting that the sounds of classical music would be ideal for breeding calm birds. This wasn't the reason - "it's because we get good reception." Still, it must also help mask any other sudden noises.

The farm is near a military base so helicopters go over frequently. Birds are initially frightened by potential aerial predators such as helicopters, aeroplanes and balloons and they will head for cover. However, by the time they are laying "they got used to the helicopters – when one goes over they don't bat an eyelid. Initially they were spooked (by them)." Again, this experience is best learnt young so that by the time they reach laying age they are not discouraged from ranging.

The transition from rearing to laying shed is also kept as smooth as possible. The birds which go on to their own laying unit have a really short journey, in line with Soil Association organic recommendations. The birds stay in the same stable group. Being transferred at 16 weeks, they have 2 weeks to get used to the laying accommodation before starting to lay.

They are also kept on the same diet to minimise the stress of the change of environment. Rachel told us "I think it's best to keep the hens on the same ration." She noticed the problem of changing ration recently when the farm got snowed in and they had to use a different feed. To begin with the hens wouldn't eat it. Then they started to eat a little. Eggs were down and the birds were more aggressive and "squawky and flighty to each other." They were fine again once they were able to return to the normal diet the birds were used to.

Nutrition in rear is also vital to ensure that hens achieve a weight capable of sustaining production once in lay. Rachel impressed the importance of getting their appetite up early in rear. Food is available 24 hours a day. "Keep piling it in – don't make them finish it up." Not till later stages of rear does she ever allow the feed troughs to get near empty. Laying hens in good condition are less likely to feel the need to turn to their companions for a meal.

Laying hens questionnaire – during lay	
Name of farm	Lawn Farm
Farmer	Gerald Osborne
Stockperson	Rachel Rivers
Description of system	Organic free-range hen rearing and laying system
Date/Time of visit	28th January 2010

Certification system	Soil Association Organic
Breed	Columbian Blacktail (primarily cross between Light Sussex and Rhode Island Red
Total flock size	4000
Group size	2000
Current age of birds	45 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	Approx 300 (some flocks up to 320) in production cycle of ?63 weeks
Stocking density at beginning of lay (numbers / m^2 indoors and outdoors)	6
Amount of feed per day per bird	132g in winter, 120-125 in summer. Feeding on range counterbalances extra energy used keeping warm and exercising
Feed composition, eg protein content, amino-acid supplementation, energy content, fibre content, phasing etc	Feed 95% organic. 17-18% protein. Includes fishmeal. Needs sufficient to ensure all amino-acids, esp methionine & lysine, are adequate
Mutilations	None
Litter	Straw in scratching area
Indoor environmental enrichment	Perches
Lighting regime indoors (min lux, variation through building, natural light provision)	Not bright. Fluorescent lighting
Outdoor environment (including provision of cover)	Area of tall grass, logs & tree trunks, company of Alpacas
Rearing environment	See next table
Transport rearing to layer unit (distance and time)	On same farm
Market	Waitrose
Health problems	E coli outbreak had occurred in this flock

Frequency of feather pecking, injurious pecking and cannibalism	Generally low, but some feather pulling in this flock following e coli outbreak
Welfare problems	Some aggression. Recently had been “flighty and squawky” following a brief change of diet when the farm was snowed in

Laying hens questionnaire – additional issues during rear	
Total flock size	4000
Group size	2000
Current age of birds	4 weeks
Proportion/no of males per group (if any)	None
Age at placement and placement at lay	16 weeks
Stocking density at beginning of rear (numbers / m^2 indoors and outdoors)	
Age of first access to range	8-10 weeks
Amount of feed per day per bird	Ad lib
Feed composition, eg protein content, amino-acid supplementation, energy content, fibre content, phasing etc	Includes fishmeal for protein and amino-acid composition
Litter	Sawdust
Indoor environmental enrichment	Perches, slats, pecking objects (eg plastic balls and spools). Radio with Classic FM was playing. In one corner a trial comparing natural dark with light rearing for small groups of chicks was being conducted.
Lighting regime indoors (min lux, variation through building, natural light provision)	Green light. Natural light once popholes opened at 8 weeks
Outdoor environment (including provision of cover)	Trailers palced to encourage early ranging
Transport rearing to layer unit (distance and time)	On same farm (NB also supplies 2 other farms with pullets)

FARM 2 - SUTTON BARTON FARM, CULLOMPTON, DEVON. ORGANIC COLUMBIAN BLACKTAIL LAYER FARM.

Dealing with feather pecking and cannibalism problems.

Yta Batchelor and hens

Hens kept in groups in smaller sheds

Ian and Yta Batchelor have been farming Columbian Blacktail hens organically for Waitrose since 2001.

Their first flock were not beak-trimmed, but they had problems with feather-pecking which they attributed to nutritional problems, probably related to protein and amino-acid content.

Their second flock were beak-trimmed to reduce the risk of cannibalism. At this stage, the Soil Association became stricter in the enforcement of the beak-trimming ban and their subsequent flocks have not been beak-trimmed.

Their third flock came to them with significant feather pecking and cannibalism problems on arrival. The first three weeks, according to Ian, were “a nightmare.” During this period they lost a hundred out of a flock of 1800 birds.

Straw litter and human company (in this case the photographer!) helps to keep hens occupied.

In attempting to deal with the cannibalism outbreak, they tried everything to occupy the birds to dilute the stress. They gave the birds access to the outside sooner than planned, within 2-3 days of their arrival. They added bales of hay and “toys” in the scratching area, for example ropes and scratching objects. Ian even placed breeze-blocks coated in molasses to divert the motivation to peck away from each other (he also hoped this might result in some beak-blunting). Straw bales were added near the pop-holes as windbreaks to encourage birds outside.

The birds were also quickly placed on a high protein diet. Ian’s memory is that synthetic amino-acids were still allowed at this stage, though they were later banned. (It should be noted that another organic Columbian Blacktail farm Compassion in World Farming visited in 2003 had obtained a derogation from the Soil Association to provide synthetic lysine to deal with a cannibalism outbreak – deaths dropped from 70 to 0 overnight).

The sheds were walked regularly, especially mid-morning around lay when hormone levels fluctuate causing stress. Frequently walking the birds adds stimulus, helps to keep them

occupied and diverts them from injurious pecking. It also helps to build up good human-animal relationships which reduces stress.

Ian subsequently discovered that this flock had had feather pecking problems during rear at 12 weeks old, four weeks before transfer to the laying farm, following disturbance by aircraft. It would have been better practice to have been told this before the birds were transferred. If he had known that the flock had problems, he would also have dimmed the lights early on as an additional management measure.

After three weeks, a combination of the measures taken and the adjustment of birds to the stress of transport to a new farm and the onset of lay led to a gradual reduction of feather pecking and cannibalism problems.

Subsequent flocks have had fewer problems. They have arrived without previous pecking problems. Presumably the move towards more enriched rearing facilities in organic rearing will have helped. Additionally, Ian believes that work done on the genetics of the Columbian Blacktail has made the birds calmer over the years.

It may also be significant that, in common with Austrian practice, the diet in early lay is particularly high in protein (19.19% protein, 0.39% methionine). They don't need to eat each other to obtain their protein requirements! For the first week after arrival at the laying farm at 16 weeks old, they remain on the rearing diet which they are used to (16% protein), then they move to the new early lay diet. At 35 weeks the diet is adjusted to one with 16% protein to avoid the laying of over-large eggs.

Ian believes that it is important to eliminate potential stress points as early as possible before they start laying significantly. Allow a brief adjustment to their new environment, but then get them used to all environmental changes before they come into lay. Birds are kept for a week on the diet they were used to on rear, but then they transfer to the laying diet a week or two prior to the onset of lay. Lighting periods, 10 weeks per day at rear, are extended slowly from 12-14 hours over a 2-3 week period. Lighting time is extended by turning lights on automatically early in the morning – Soil Association rules require a natural dusk. The hens reach commercial egg production levels at around 23 weeks old.

Birds are kept in for a 2-3 days to adjust to their new home, but then they are allowed out and are actively ranging before they come into lay. Routines such as letting-out time and feeding time are settled early. Once they are ranging well, Ian adjusts them to possible stresses by driving a quad bike over the range. The purpose is to ensure that, by the time they reach the stresses and hormonal fluctuations which occur around lay, they have already become adjusted to their new environment.

Ian has stuck with shed sizes that house 600 birds. He is happy that this results in really good ranging, so he hasn't gone to bigger groups. Birds in smaller groups can often more easily access the popholes. As Yta put it, "they haven't got anyone to say don't come out."

Their most recent flock arrived with some feather pecking problems. Yta told us they responded by letting them outside immediately without waiting for the usual 2-3 days for adjustment.

Initially they had access to a limited amount of range which was gradually extended. Levels of feather pulling have died down significantly, though there is some.

Laying hens questionnaire – during lay	
Name of farm	Sutton Barton
Farmer	Ian and Yta Batchelor
Description of system	Organic free-range hen rearing and laying system
Date/Time of visit	28th January 2010
Certification system	Soil Association Organic
Breed	Columbian Blacktail (primarily cross between Light Sussex and Rhode Island Red)
Total flock size	3000
Group size	600
Current age of birds	44 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	85% from 23-75 weeks old = 310 eggs in one year
Stocking density at beginning of lay (numbers / m^2 indoors and outdoors)	6
Amount of feed per day per bird	125-135g fed ad lib
Feed composition, eg protein content, amino-acid supplementation, energy content, fibre content, phasing etc	Feed 95% organic. 19% protein during peak lay. Then reduced back to 16%.
Antibiotic use	No. Oregano oil as vit supplement; probiotic “biomoss” used
Veterinary visits (frequency)	1 per year and when needed

Mutilations	None
Mortality and cull rates (at 70 weeks as well if kept longer)	7-8%. Minimal culling
Main causes of mortality	Smothering, gut problems
Litter	Straw bales in scratching area
Indoor environmental enrichment	Straw bales, perches
Outdoor environment (including provision of cover)	Open field, largely bare. A few artificial shelters
Number of stockpersons (person hours per day/week)	Ian, Yta and helper who collects eggs
Frequency of checking birds	3 times per day
Transport rearing to layer unit (distance and time)	3 hours
Transport to slaughter (distance and time)	4.5 hours
% Dead on arrivals (for either)	1 in last flock
Market	Waitrose
Frequency of feather pecking, injurious pecking and cannibalism	A little feather pulling since arrival from rear. Got worse then better
Welfare problems	Some feather pulling. Occasional mild aggression