Review of behaviour and welfare issues, including range use and cover for free-range hens

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This is a Morrisons Farming Programme Publication
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Executive Summary

The scientific evidence for nesting, perching, dustbathing and foraging being important behavioural needs for hens is reviewed. The social and spatial needs of hens are complex and still poorly understood. Early rearing experience has a profound effect on subsequent behaviour and performance in the laying period, and this has been insufficiently investigated.

While scientific research has identified a number of requirements for good hen welfare, ways of achieving these in commercial practice are often unclear. There is particularly strong scientific evidence (including epidemiological studies of many commercial flocks) that good litter quality and widespread use of the range is essential for the welfare and good productivity of hens in free-range flocks. Our current monitoring of commercial flocks indicates that these are not frequently attained.

The following is a list (in no particular order) of some of the areas requiring investigation in order to achieve good hen welfare and aid management of free-range hens in commercial flocks.

1. Formal behavioural observations of nesting behaviour in communal nestboxes, in particular to determine whether all hens are able to gain access when and where preferred, and whether bullying is an issue that possibly leads to floor egg-laying. Risk factors for smothering need to be identified, in nests and generally.

2. Ways of reducing floor egg-laying that avoid restricting litter access and the use of nestbox lights (as these are associated with injurious pecking).

3. Methods and materials to improve litter quality. Specifically:
   a. Use of absorbent materials to reduce wet and capped litter.
   b. Substrates to enhance foraging behaviour.
   c. Trials of ‘feet scrapers’ inside and outside popholes to reduce wet mud in litter.
   d. Redesign of house layout to avoid litter areas being adjacent to popholes.

4. Effect of pophole design (size, shape, proportion of wall length, height from floor and ground, maximum distance from centre of house, protection from rain, etc) on:
   a. Number of hens using range.
   b. Litter quality.

5. Effect of providing three-dimensional cover on range on behaviour and range use.

6. Study of effect of different types of crop on range – and the extent to which crops can contribute to nutrition.

7. The ergonomics of housing design and layout requires study in order to develop systems that are:
   a. Safer for the birds, reducing the risk of collisions.
   b. Safer for humans, both during routine stock tasks and at catching during depopulation, and this includes air quality.
   c. Less dusty, as dust is a health hazard and may affect visibility and ease of movement.
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Introduction

Among the challenges facing modern free-range egg producers is getting hens to use the range and managing the range to reduce potential problems for hens that do use it. The difficulties associated with achieving a healthy and productive flock ranging fully may lead some – especially those used to the comparatively clean and relatively easily managed conventional cage system – to ask ‘Why bother?’. But there are many reasons to be optimistic. Fifteen years ago the ban on conventional cages in Switzerland, for example, improved management and control strategies have led to declines in viral disease, parasitic infection, notifiable diseases and injurious pecking in non-cage flocks, although there is an increase in coalisepticemia (Kauffmann-Bart 2009).

So this report begins by considering why free-range production systems have the potential to provide hens with good welfare, but also fully express their behavioural repertoire.

There is a large variation between flocks in the proportion of birds estimated to use the range and we look at the factors associated with this. Methods of encouraging hens to fully use the range and improving financial returns are then considered – both speculative and tried-and-tested.

Finally, we overview some of the current health, behavioural and management issues associated with free-range flocks, giving potential solutions to some of these challenges and highlighting where further work is needed to help resolve them.

Behaviour and needs of hens

In order to achieve good animal welfare, a range of principles need to be considered and the Five Freedoms are a widely used starting point (see http://www.fawc.org.uk/freedoms.htm). One of these is the freedom to express normal behaviour. Clearly ‘normal’ for the jungle fowl ancestors of modern hens is not exactly the same as ‘normal’ for modern genotypes, but they are surprisingly similar in their repertoire of activities, if not how much time they spend on each.

In evaluating and developing new housing systems for modern laying hens, animal behaviour and welfare scientists have been seeking answers to such questions as ‘What do hens want?’, ‘How much do they want it?’, ‘If they could have only one or two extra resources, which would they prioritise?’ and also ‘What would make this environment more attractive to hens?’ The starting point for much research has been how to improve the conventional battery cage, which, despite the hygiene and health benefits it generally confers, provides such a barren environment that hens are unable to perform and express most of their behavioural needs.

Thus there is widespread agreement that the welfare of the birds is unacceptable in this system. One of these is the freedom to express normal behaviour. Clearly ‘normal’ for the jungle fowl ancestors of modern hens is not exactly the same as ‘normal’ for modern genotypes, but they are surprisingly similar in their repertoire of activities, if not how much time they spend on each.

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Behavioural needs are those (instinctive) behaviours that hens appear to ‘need’ to perform – the activities are to a large extent ‘hard-wired’ into their brains. Behavioural needs can be equated with psychological needs, i.e. animals may experience suffering if they are unable to adequately perform relevant activities. These activities are so important to the birds that they will actually work hard to achieve them – for example, by pushing through a weighted door to gain access to a nest in which to lay. Aside from the vital functions of eating, drinking and resting, the priority behavioural needs of laying hens that have been scientifically established to date include nesting, perching, dustbathing and foraging. Hens also have a need for space, the size of which may vary with time and context, and includes both ‘personal space’ and sufficient room in which to perform certain behavioural actions and postures.

When evaluating housing systems, the presence of so-called ‘abnormal’ behaviour is also an important indicator. Cooper and Albentosa outline the reasons why abnormal behaviours could be important for welfare as follows. (Note – examples in parentheses are mine.) “Abnormal behaviours may be the nearest possible approximation of the ‘real’ behaviour (such as dustbathing). They may be apparently unrelated ‘time-fillers’ (such as idling or playing with nipple drinkers), or ‘displacement’ activities (e.g. rapid preening during aggressive encounters), which occur when the real behaviour is impossible to perform. Alternatively, they may be closely associated with the real behaviour but ‘redirected’ in some way (feather-pecking is generally agreed to be redirected foraging behaviour). The fact that they occur at all suggests that they may have some importance in themselves, even if we do not understand the reasons for their significance.”

Introduction

There is considerable evidence that hens place a high value on access to discrete, enclosed nest sites and that their priority to access one increases the closer they get to the time of egg-laying (oviposition). Hens show individual variation in pre-laying behaviour, including the number of visits to potential nest sites, the duration of time spent in them and the final choice of site. Floor-laying is more likely to occur in birds that have not found a suitable nest site and may be reduced if pullets have access to nest boxes before point of lay.

In the wild, hens tend to move away from flockmates and find a secluded and memorable place in which to nest on the ground. Thus some of the micro-environments on a range are potentially attractive as nest sites in which to lay eggs. From a management perspective, this is a costly choice as eggs may be predated, damaged, dirty and need to be manually collected. Thus, the indoor nest sites need to be sufficiently attractive that hens are willing to select them in preference to other sites. Social factors can influence nesting, whereby hens that select the more attractive sites (corners) may receive more aggressive pecks and thus stay for a shorter time, so often nestboxes are placed more centrally.

There has been little scientific work on communal nestboxes, but they appear to be satisfactory. It should be noted that failure to use a nestbox may have no welfare consequences for the hen. Small-scale experiments with birds in furnished cages have indicated that individual hens vary, with some choosing a particular floor type on which to lay while others lay consistently in the same location. Practical experience indicates that once birds are laying in the producer’s preferred location, they will tend to continue doing so – equally, floor-laying should not be allowed to develop into a habit.

There is evidence that keeping hens up off the litter and denying access to the range during their first few weeks is stressful to the birds and increases the risk of injurious pecking (i.e. feather pecking, vent pecking and cannibalism). This is in part due to the increased stocking density that results from such undesirable practices. Other management techniques can be used to encourage hens to lay in the nests and these include lifting hens off the litter at dusk and restricting access to the range during the early morning for the first few weeks of laying.

Perching

Hens instinctively roost high in trees at night to avoid predators such as foxes. In housing systems that provide perches, hens make good use of them, especially at night. Hens prefer to use the highest perches and generally return to the same perching location on consecutive evenings. In the absence of perches, hens choose to roost on the highest fixtures and fittings available, and this indicates that the motivation to roost high (in trees) is still present in modern genotypes. Thus, the provision of suitable trees, branches or even large shrubs/hedges outdoors is attractive to the hens, even if they are housed at night (in which case perches should be provided indoors).

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So this report begins by considering why free-range production systems have the potential to provide hens with good welfare and an environment in which they can not only meet their behavioural needs, but also fully express their behavioural repertoire.

There is a large variation between flocks in the proportion of birds estimated to use the range and we look at the factors associated with this. Methods of encouraging hens to fully use the range and improving financial returns are then considered – both speculative and tried-and-tested.

Finally, we overview some of the current health, behavioural and management issues associated with free-range flocks, giving potential solutions to some of these and highlighting those where further work is needed to help resolve them.

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Dustbathing

Dustbathing is a maintenance behaviour that improves feather condition by dispersing lipids. It also can dislodge skin parasites, which may then be eaten by other birds that are attracted to dustbathing hens. Given the opportunity, hens will dustbathe for many minutes on most days and this may result in the excavation of dustbathing hollows in favoured locations (see photos). Hens will work to gain access to peat or similar substrates with small and absorbent particles, in which to dustbathe – straw and woodshavings are less preferred. Longer dustbaths with all elements of dustbathing behaviour are performed in dust, peat and sand. A lack of appropriate dustbathing, particularly in early life, has been associated with damaged feather-pecking.

In general, hens may prefer to dustbathe on the range than in the litter area of the house, but the availability of suitable, dry litter indoors is also vital for hens to forage in as well as dustbathe. Roofed areas on a range enable hens to dustbathe in all weather. Indoor littered areas need to be kept dry and friable to enable dustbathing to occur, but doing so has the extra benefits of encouraging foraging behaviour and reducing levels of ammonia and other noxious gases.

Foraging

The principal purpose of foraging is to seek and ingest food, although it has incidental benefits such as helping to keep claws short, thereby reducing skin damage during encounters with other birds. Hens have an in-built need to investigate their environment for food by scratching and pecking at substrates. Even in wire-floored cages with a balanced, complete diet, hens will perform scratching behaviour while feeding. Foraging (i.e. seeking, finding and eating food) can occupy more than half the day in poultry that do not have access to other feed. They also tend to prefer to work for food rather than only accepting ‘free’ food from a feeder. Farmers will be familiar with hens ‘picking and choosing’ from mashed compound feeds rather than just eating indiscriminately.

Studies have shown that peat, sand and wood shavings are equally valued by hens for foraging, and there is some evidence that their preferences are learned young (i.e. during rearing). Hens have also been shown to be willing to pay a cost, such as squeezing through a narrow entrance, to access materials in which to forage. This is further evidence of the importance of this behaviour to the birds.

Poultry can derive nutrition from and eat a wide range of plants and invertebrates, including berries, seeds, grass and other leafy material, earthworms, spiders, slugs, beetles, ants and other insects. They will even eat mice. It is therefore desirable for the range area to be enriched with a variety of habitats (including trees, shrubs, log piles, etc) in order to provide the hens with this variety of choice and to give them ‘rewards’ for foraging, thus giving their foraging behaviour purpose and value. It is even possible that the positive feedback (from achieving the ‘goal’ of feed ingestion) could influence the motivational state of the hens and lead to a feeling of contentment and satisfaction. Although not formally tested, it is believed that hens can be healthier and more productive when balancing their own diet, and that giving them the freedom to express normal, natural behaviour will reduce stress.

Fully satisfying the behavioural need to forage is very likely to reduce the incidence of feather pecking which has been suggested by many authors to arise from misplaced or thwarted foraging.

Space allowance and social needs

There is inevitable interaction between social requirements, group size and space allowance. Whereas early experimental studies indicated that hens might prefer to have a personal space and therefore to space themselves out evenly, especially at higher-stocking densities, recent work indicates a more complex picture. Clearly hens will clump around resources such as feed, but their distribution around a house and range varies considerably according to design and layout, and their previous experience during rearing. The social dynamics of the group plays a part – for example one study of commercial flocks in single-tier aviaries at 7 birds/m² found increased stress, aggression and feather pecking compared with flocks housed at 12 birds/m². The hens at the lower-stocking density did not use the litter area as much and one could speculate that this was from fear of being exposed to bullies – yet clearly they did not escape them on the slatted area either. It was also suggested that if litter areas are not sufficiently attractive then the hens’ preferred location is near the feeders (i.e. on the slats). At 12 birds/m², some birds were perhaps ‘forced’ to use the litter areas by the lack of space on the slats.

In any event, it is likely that the design and layout of the houses was not ideal for the birds, leading to stress and unusual behaviour. This study found evidence that hens reared in smaller groups were less likely to pile up and smother each other during laying when they moved into larger flocks than those reared in larger groups.

Relatively little is known about the social priorities of hens (e.g. how they value belonging to different group sizes or different group compositions). Laying hens seem to be able to discriminate between different individuals within their own social group and to associate with familiar rather than strange individuals or groups of hens. Although the maximum number of flockmates that can be recognised by each hen is not known, it is thought to be slightly less than 100 individuals.

Free-range birds not only have greater space, but also the opportunity to escape from or to choose to be near specific birds in the flock, with the potential for reduced (social) stress and better welfare. Systems with a variety of habitats providing three-dimensional space offer even more scope for hens to escape from bullies, but whether or not they do has not been investigated by scientists.

Many interacting factors affect social dynamics and stress in laying flocks. Among these are the genotype of the bird, rearing experience, resource provision, house layout and management. An ongoing study at the University of Bristol is aiming to reduce injurious pecking in commercial flocks by altering resources and management to promote conditions associated with improved social and normal hen behaviour. Some will be discussed below, but key among them appear to be providing nipple, rather than bell drinkers, maintaining friable litter and encouraging good use of the range area by the hens.
Hens have been shown to work to gain access to perches and they may show signs of frustration when access to perches is blocked. It is thought that access to perches may reduce overall fearfulness in hens and this in part may be by giving subordinate birds somewhere to get away from bullying.

It is important for bird welfare that birds do not crash into perches when accessing them, as this is thought to be a significant cause of bone fractures, particularly to the keel bone. It is also vital that perches are not at a height that presents their vents to other birds at eye level, thereby increasing the risk of vent pecking and cannibalism. Feedback from an ADAS workshop held on 8 April 2008 was that providing trees (perches) on a range did not discourage hens from returning to the house at night; running the feed track can help to ‘call the birds in’.

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Range use

There is wide variation in range use – not only between farms but even between flocks on the same farm. A recent survey of 25 free-range flocks (ranging in size from 3,000–16,000 birds) in the UK found that the estimated use of a range in calm, dull weather was 15– 80% with a median of 30% and fewer birds seen out on the range in larger flocks. It is still not known whether the same individual birds regularly use the range or whether the majority of the flock uses the range for a small proportion of the day. Modern technology should assist with determining this. For example, a current project that has fitted RFID tags to some hens in a commercial flock has found over 50% of them using the popholes on one day and 75% over several days. Several other studies have found birds in smaller flocks using the range more than hens in larger flocks. This may in part be due to pophole design and the relative inaccessibility of popholes to hens in larger houses. As befitting a species that evolved in woodland glades and edges, hens appear to prefer filtered rather than bright sunlight. Some studies have reported that free-range hens venture less onto the range on bright sunny days, but if cover is provided as a more suitable habitat for hens and somewhere to hide from overhead predators, they will use the range in all weathers.

Influence of early rearing experiences

There is mounting evidence both from practical experience and scientific studies that the conditions in which chicks are reared affect their subsequent behaviour and use of resources such as nestboxes, perches and the range. Once chicks have imprinted on features of their environment within the first weeks of age, they show fear responses to novel objects; but those reared with increased visual complexity may show reduced fear responses. In general, the closer the design and enrichment facilities in the rearing environment equate to those in the laying environment, the better hens will adapt and use the resources. For example, floor-laying declines with age and may be reduced if pullets have access to nest boxes before point of lay. Provision of perches in the rearing environment aids hens to access raised nestboxes as the ability to learn to move in three-dimensional space declines with increasing age. Day 10 post-hatching is a critical stage in the development of locomotory and spatial abilities, with a temporary peak in perching behaviour. Further, early access to perches can reduce mortality attributed to cloacal cannibalism.

Rearing experience has also been shown to influence dustbathing. Young chicks develop preferences for familiar substrates and early experience has some influence on adult dustbathing preferences. Importantly, there is evidence that providing attractive foraging substrates during rearing may reduce the later development of feather-pecking. That said, adult hens remain flexible in their preferences and the provision of good, friable litter for adult birds is important whatever their previous rearing experience.

How to increase range use and manage the range

A number of studies and practical experience indicate that the more diverse the outdoor area and the greater the number of features associated with a range of behaviours, such as exploration, foraging, dustbathing and shelter from predators/adverse weather, the more the hens make use of the range in terms of the area utilised and/or the proportion of hens using the range.

Formal studies of commercial flocks have shown greater and further ranging associated with the presence of trees or hedges, and with the provision of roofed boxes of sand towards the periphery of the range area. Numerous forms of cover are attractive to hens, as indicated by the photos. To give hens protection, many refuges are needed, particularly near to the house. In practice, we are finding it very important to view the range from the popholes, which is the hens’ perspective. A sea of mud or stones is hardly likely to entice them out. Furthermore, relatively narrow popholes patrolled by dominant hens are less likely to be used than easy access that extends the full length of the house.

Examples of range enrichment

Diverse habitats and shelters encourage range use

A wide pophole and good visibility of an attractive range will encourage hens to go out

Another consideration is the shape of the house and the maximum distance hens need to travel to reach a pophole. In very large, comparatively square houses, hens are not even likely to see or routinely pass a pophole. Moreover, although not formally confirmed for hens, it is usual for prey species to ‘flock together’ to achieve safety in numbers. Thus a single hen could be more likely to chose to remain with the majority of the flock be that indoors or outside.
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Influence of early rearing experiences

There is mounting evidence both from practical experience and scientific studies that the conditions in which chicks are reared affect their subsequent behaviour and use of resources such as nestboxes, perches and the range. Once chicks have imprinted on features of their environment within the first weeks of age, they show fear responses to novel objects; but those reared with increased visual complexity may show reduced fear responses. In general, the closer the design and enrichment facilities in the rearing environment equate to those in the laying environment, the better hens will adapt and use the resources. For example, floor-laying declines with age and may be reduced if pullets have access to nest boxes before point of lay. Provision of perches in the rearing environment aids hens to access raised nestboxes as the ability to learn to move in three-dimensional space declines with increasing age. Day 10 post-hatching is a critical stage in the development of locomotory and spatial abilities, with a temporary peak in perching behaviour. Further, early access to perches can reduce mortality attributed to cloacal cannibalism.

Rearing experience has also been shown to influence dustbathing. Young chicks develop preferences for familiar substrates and early experience has some influence on adult dustbathing preferences. Importantly, there is evidence that providing attractive foraging substrates during rearing may reduce the later development of feather-pecking. That said, adult hens remain flexible in their preferences and the provision of good, friable litter for adult birds is important whatever their previous rearing experience.

How to increase range use and manage the range

A number of studies and practical experience indicate that the more diverse the outdoor area and the greater the number of features associated with a range of behaviours, such as exploration, foraging, dustbathing and shelter from predators/adverse weather, the more the hens make use of the range in terms of the area utilised and/or the proportion of hens using the range.

Formal studies of commercial flocks have shown greater and further ranging associated with the presence of trees or hedges, and with the provision of roofed boxes of sand towards the periphery of the range area. Numerous forms of cover are attractive to hens, as indicated by the photos. To give hens protection, many refuges are needed, particularly near to the house. In practice, we are finding it very important to view the range from the popholes, which is the hens’ perspective. A sea of mud or stones is hardly likely to entice them out. Furthermore, relatively narrow popholes patrolled by dominant hens are less likely to be used than easy access that extends the full length of the house.

Examples of range enrichment

Diverse habitats and shelters encourage range use

A wide pophole and good visibility of an attractive range will encourage hens to go out

Another consideration is the shape of the house and the maximum distance hens need to travel to reach a pophole. In very large, comparatively square houses, hens are not even likely to see or routinely pass a pophole. Moreover, although not formally confirmed for hens, it is usual for prey species to ‘flock together’ to achieve safety in numbers. Thus a single hen could be more likely to choose to remain with the majority of the flock be that indoors or outside.
There are several dual-use options to consider for a range; integrating, for example, orchards or timber production with egg production. Many require up-front investment for long-term financial and environmental gain. More information can be obtained from FWAG, ADAS and other advisors, but note that there is more to consider than how other crops can provide a separate income stream or provide biodiversity. There is a need for studies to look at different types of plant cover in range systems and to weigh their cost benefits. For example, some crops may allow for reduced feed costs, but possibly unbalance the diet as a whole and affect egg production or quality.

Verandas

The comparatively modest cost of providing verandas is more than offset by their numerous benefits. They offer a halfway house between the indoor and outdoor environment, providing hens with light and fresh air while protecting them from extreme weather. Verandas buffer the house from wind, driving rain and muddy feet, thus improving the indoor environment and assisting with maintaining litter quality. Verandas may offer the hens additional resources such as sand pits for dustbathing, additional feeders and drinkers, more space and, potentially, somewhere to escape from aggressive hens. When closed, they offer protection from predators. The use of verandas is generally associated with reduced wear and tear on the range that is commonly found with direct pophole access. They may be particularly useful in introducing pullets to the outdoor environment without exposing them to the higher risk of (parasitic) infections from the range at a vulnerable age.

The Farming and Wildlife Advisory Group (FWAG) is able to provide information on increasing biodiversity, making the range more attractive to both hens and wildlife, and can develop tailored and costed plans specific to each farm together with information on grants. See www.fwag.org.uk

Examples of managing the range: attention to detail

- Grass must be kept short to avoid crop impaction and maintain access and attractiveness to the hens. (Note the trees to attract birds further onto the range, the stones to prevent mud and the wide popholes with covers to reduce rain entry to the house)
- Grazing other animals on the range appears to attract hens out and has the advantage of keeping the pasture short. Llamas and alpacas are gaining a reputation for keeping foxes away provided the range area is not too undulating or extensive – they need to be able to spot potential predators.
- Run-off pipes used to lead rainwater well out into the pasture
- Gutters should be fitted and be well maintained to avoid puddles and muddy areas adjacent to the house.
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Potential problems in free-range flocks

In this section we will consider a few issues from a practical perspective, drawing on the University of Bristol’s considerable experience monitoring free-range flocks during the past decade, the findings of experienced producers and, wherever possible, the scientific evidence.

House layout and enrichment

It is not the purpose of this report to consider the indoor environment in detail; however, a few points are worth mentioning in terms of design and operation. The trend is for complex multi-tier housing (personal communication from the two leading egg suppliers). This could lead to several potential welfare problems for the hens, which are harder to inspect in such systems. The more complex an environment with ‘furniture’ and other objects, the more difficult it is to catch the hens at depopulation, which could be stressful, exhausting and potentially lead to trauma for both birds and human catchers (L.J. Wilkins, personal communication).

It also becomes increasingly important to design the house to minimise the number of potential collisions (e.g. with other levels and perches) that hens may sustain while accessing resources. In free-range systems, the proportion of hens affected by fractures and the number of fractures they sustain during production is alarmingly high. Several recent studies have found well over half the birds affected and with aerial perches the number can rise to almost every hen. In theory, it could be possible to reduce this figure by using altered genotypes and reducing the production demand. In practice, though, it remains to deal with an increasingly osteoporotic bird that is increasingly susceptible to bone breaks during production. It is not easy to provide the physical resources hens require to meet their behavioural needs, such as perches, nestboxes and dustbathing/foraging areas, while maintaining a hygienic and safe environment.

There is a need for more work to improve the ergonomics of housing so that both birds and people can move around more safely. Aerial hygiene is a major issue that has had insufficient attention. It could be that a total rethink is needed. As one example, an unusual house to which we have had access over several years always has good friable litter, with hens dustbathing vigorously. The litter area is at one end of the house.

Biosecurity

While it is tempting for free-range egg producers to feel they have little control over pathogens and pests because the houses are open and the hens are exposed to wild birds and other agents, there is little or no evidence that this is the case. Good biosecurity may significantly reduce the risk of hens becoming infected. Careful management to reduce stress and build immunity will further reduce the possibility of hens becoming ill. Pasture rotation and management to avoid puddles forming can reduce the multiplication of parasites, particularly coccidia. The house itself should not be neglected in terms of routine hygiene. For example an investigation into the prevalence and sources of salmonella in hens found that for free-range flocks, swabs from nestboxes and perch/slat sites were consistently associated with infected flocks, and that dust was a major source of contamination. Although salmonellae were isolated from outdoor samples, the proportion of positive identification varied considerably.

Even in free-range flocks it is still important to change overalls and boot dip between houses, to limit visitors and to clean vehicle wheels and/or keep vehicles (such as feed delivery lorries) away from the hen houses and pastures. Rodent and predator control are an obvious priority and measures should be taken to limit access by wild birds to feed and housing.

Injurious pecking

As previously mentioned, the University of Bristol is currently developing a package to reduce the incidence of injurious pecking in commercial free-range flocks. It is not yet known which are the most effective measures in practice, and these could vary between farms. Interventions are being tailored to be specific to each farm in the trial. These suggested changes are all based on sound science from a thorough survey of the literature relating to feather- and vent-pecking or cannibalism. Results will be available by the end of 2011. Nonetheless, there is substantial scientific evidence that, among other interventions, the following measures could reduce injurious pecking:

1. Pullets should be reared in a similar environment to the laying house, aiming for a seamless transition, e.g. in drinker-type and lighting regime.

2. Buy in a uniform flock. Four studies have found that groups in which breeds and social groups have not been mixed showed less injurious pecking. A further study found that larger, heavier birds were more likely to be cannibals.

3. Access to litter and range should not be restricted, as 22 studies have found that providing materials specifically to encourage foraging behaviour increased foraging and reduced feather pecking, particularly the severe form.

4. As mentioned already, every effort should be made to encourage range use, as six studies found that increased range use is associated with reduced levels of injurious pecking.

5. There is strong evidence that feeding mash is preferable to pelleted feed, as hens can essentially forage while eating. A few other studies indicate that feed should not be restricted, but at the same time it is good practice to avoid running chain feeders too frequently, thereby ‘calling the birds in’ off range.

6. Increased dietary variety is beneficial, as five studies have found that providing extra insoluble fibre, such as whole wheat, maize silage, barley/pea silage or carrots reduced all types of injurious pecking, plumage damage and mortality.

7. Maintaining litter quality is key, as it is so important for foraging and dustbathing, which are essential behavioural needs. The evidence for this is overwhelming, as 48 studies over the years have found that maintaining good quality litter (i.e. dry and friable) increased foraging behaviour and decreased injurious pecking.

8. Do not use nestbox lights, as four studies have found that both feather-pecking and injurious pecking were reduced if lights within nest boxes were not used.

9. Use nipple drinkers, as three investigations have found use of nipple drinkers reduced the likelihood of featherpecking and vent-pecking. However, care should be taken that such drinkers cannot be used as low perches, which could put potential victims in the way of vent-pecking birds.
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Litter condition and pophole area management

One of the most relevant noxious gases for hens is ammonia generated from droppings and litter. This can potentially accumulate to aversive levels in all housing systems, particularly when ventilation rates are low. Hens in free-range systems could have relief during the day from exposure to ammonia and other chemicals that could potentially accumulate in their housing. If hens use the range well then a substantial proportion of their droppings will be outside, reducing the contamination indoors. Depending on flock use of the range, this has been measured at up to 45% of manure outside. In theory, ammonia levels indoors could be reduced; however, anecdotal evidence from farmers indicates that free-range hens can come in wet and it is harder to keep their litter dry (wet litter releases more ammonia). Potential solutions to the problem include not having the litter adjacent to popholes and using verandas.

As indicated in previous sections, having good, friable litter that preferably contains a variety of substances in which hens can forage is crucial to the welfare of both free-range and indoor non-cage systems. We have considerable evidence from our recent and ongoing studies that this is very difficult to achieve in practice. There is therefore a huge gap in terms of knowledge transfer. There needs to be an investigation into ways of maintaining good litter quality in commercial flocks. Most likely this would involve a three-pronged approach in terms of:

1. House design/layout
2. Types of litter material (including depth and variety)
3. Ways of managing the litter to maintain quality throughout the laying period.

References

14. AW0223 The effects of stocking rate on the welfare of laying hens in non-cage systems. Defra funded University of Bristol study available via: http://randd.defra.gov.uk
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Review of behaviour and welfare issues, including range use and cover for free-range hens

Dr Claire Weeks, University of Bristol, July 2010