ACTION ON ANIMAL HEALTH AND WELFARE

The welfare of hens in free range systems

DEFRA
Department for
Environment,
Food & Rural Affairs

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1. Introduction

Although free range systems are less intensive forms of egg production, the need for diligent and knowledgeable stockmanship is important if bird welfare is to be safeguarded and consistently high levels of performance are to be achieved. From practical experience it is clear that there are a number of potential problems to be addressed. This booklet is intended to highlight the welfare issues and to remind producers of the important key points in preventing and/or dealing with problems.

2. Designing housing for good bird welfare

Many of the potential problems that can create stress in alternative systems can be eliminated at the design stage. The following need to be considered when designing new houses:

Siting of Free Range Poultry Houses

The position of a house will influence how well the birds range over the pasture. Soil type and drainage will determine how likely the ground is to become fowl sick through the build-up of soil-borne parasites. The following points should be taken into account :

- If possible choose free draining, south facing, pasture to minimise the build up of worms and coocidial oocysts. Such pasture should also better retain grass cover.
- Ideally, houses should be positioned in the centre of the land area so that a series of radiating paddocks can be created around the unit. In some cases this is not possible because of local planning constraints or because of the limitations of power or water supplies.

- Siting houses at right angles to the prevailing wind slightly moderates the amount of wind entering the building through the popholes.
- It is important to consider access, not just during good weather, but also during weather conditions when gradients may make lorry access difficult.
- Range areas bordered by dense woodland will be more prone to fox problems.

Although the positioning of small, mobile houses may be less critical than that of large fixed buildings, the quality of the pasture is still important, as is the ability to move the houses regularly once they are on site. The maintenance of an adequate supply of electricity and water under all conditions is important. For example, there needs to be some means of preventing overground water pipes from freezing during winter, and/or contingency plans must be drawn up for keeping the birds supplied with water if the pipes do freeze.

Ventilation

The ventilation system needs to be such that the air change rate is adequate for the removal of bird heat from the building during hot weather. This is referred to as the *maximum ventilation rate*. It also needs to be able to remove stale, smelly air and humidity during periods of low ventilation during cold weather (*minimum ventilation rate*). Uniform, draught free, distribution of air within the building is important.

Ventilation can be achieved either by the use of powered fans or by natural forces. As a guide, maximum ventilation rate may typically be achieved using the equivalent of one 610 mm fan or by allowing 2.6–4.3 m^2 of inlet and outlet per 1000 layers, depending on the height difference between inlets and outlets. There needs to be some means of providing for minimum ventilation requirements - either using a cycle timer controlling one or more of the fans, or by having minimum settings on natural ventilation inlets and outlets.

A complement to a ventilation system is the house insulation. Without adequate insulation, the building will tend to overheat in the summer, which will stress the birds. Similarly, the

building will be cold and prone to condensation and damp in winter, which will also have an adverse effect on the health, welfare and performance of the birds. As a rule of thumb, a minimum of 100 mm of glass fibre (or equivalent) should be used in the roof and the walls, and an adequate vapour barrier (e.g. 1000 gauge polythene) incorporated to prevent deterioration of the material from condensation. This deterioration leads to reduced insulation efficiency.

Ventilation system design can be a fairly complex issue. It may be worth considering professional advice.

Fire Precautions

With the amount of electrical equipment and wiring in most poultry houses, coupled with the combustible nature of many of the structural materials, there is a risk of fire. This risk can be considerably increased where electrical equipment and installations have not been adequately maintained and/or where they have been subject to rodent damage. Specific detail on the design, construction and maintenance of free range and barn units to reduce fire risk is beyond the scope of this booklet, and professional advice should be sought as necessary. Guidance on the fire protection of farm buildings is given in BS 5502 (Code of Practice for Design of Buildings and Structures for Agriculture). There is also a DEFRA video on farm fires, which provides useful guidance on the subject. The address for BSI and DEFRA are both given in the Appendix.

- Make sure electrical equipment and installations are well maintained and inspected regularly.
- Do not allow circuits to be become overloaded by the addition of extra electrical equipment.
- Keep rodents under control at all times to reduce the risk of damage to cables.

- Do not allow smoking in the poultry houses.

A publication on the subject of Farm Fires (PB 0621) is available from DEFRA Publications. The Appendix gives further details on ordering.

Alarms, Failsafes and Generators

There is a statutory requirement for all houses which rely on automated equipment for ventilation to incorporate the following:

- An alarm which will give adequate warning of failure of the system to function properly. The alarm must have some form of back-up power supply (e.g. a battery), so that it will operate in the event of a failure of the mains supply.
- 'Additional equipment' or means of ventilation that will provide adequate ventilation in the event of a failure of the main system. The most appropriate way of meeting this requirement will vary according to individual circumstances and house design. In some situations, for example, having some additional doors or roof openings that can be utilised to ventilate the building by natural forces may be all that is required. In other cases, there may also be a need to incorporate a standby generator.

There is also a requirement to test the alarm system and check any additional emergency equipment at least once a week.

Layout of Equipment and Perches

Inadequate, poorly designed or poorly laid out feeders, drinkers, nestboxes and perches will create stress in the flock and will compromise both bird welfare and performance. There are a number of key issues to consider:

- Numbers of feeders, drinkers and nestboxes must meet the minimum requirements set out in relevant UK legislation.

- Perches should be arranged so that birds can move easily between them and the other equipment, thereby reducing the risk of collisions and subsequent bruising and/or other damage. Consideration should be given to minimising bird stress and downgrading during catching at the end of the laying period – can the equipment easily be removed from the pens or winched up out of the way ?
- Because of the importance of thorough cleaning between flocks, equipment, fixtures and fittings should be selected and installed for ease of cleaning. The ability to remove equipment and fittings in order to achieve a really thorough clean is usually the best option, although this is often not practicable in the case of nestboxes, perches and slatted floors. Where equipment is not removable, it is even more important to give some thought to how less accessible sections or areas of the nestboxes or slatted floors will be cleaned.

Lighting

Lighting should be designed and installed to give an even light distribution and should incorporate some means of adjusting light intensity to control aggressive pecking, should this begin to occur. Light fittings should be installed in a position where they will not be struck by the birds, or by the stock keeper working inside the house.

3. Routine husbandry

Training

No matter how good the design, without a skilled and knowledgeable stock person looking after the chickens, bird welfare and performance are never likely to reach the highest standard. Training can take a variety of forms and should be tailored to the needs and experience of the individual. Many agricultural colleges now offer training to NVQ level 2/3 standard in poultry husbandry, and courses can be on a day release basis. Learning stockmanship does not necessarily require attendance on a formal training course, provided that 'on the job' training is adequate and appropriate.

Pullet Rearing

Correctly reared, healthy pullets are essential prerequisites for successful egg production in alternative systems. Underweight, uneven pullets for example will be less able to adapt to life in the laying house, and will be more susceptible to stress leading to other welfare problems. It is important therefore that the specification for the pullets is agreed with the rearer at the time the birds are ordered. It is also good practice for the stock keeper to inspect the pullets at least once before delivery to check that all is well. Requirements for pullets destined for free range or barn systems are:

- Floor reared with access to perches and slats from an early age (e.g. from 10 days at the latest).
- Up to breeders target weight.
- (If required) beak trimmed at less than 10 days old.
- Comprehensive vaccination programme as advised by a vet.
- Wormed and resistant to coccidiosis.
- Reared to an agreed lighting programme.

The rearer should match rearing conditions as closely as possible to those that the birds will experience in the laying house. It is good practice, for example, for the drinker system used during rearing to be the same as that in the laying unit. Where this is not possible, the birds may need to be trained to use the unfamiliar drinkers in the laying house. This is particularly important in the case of birds switching from bell drinkers to nipples. Having the same, or similar feeding systems in the rearing house as in laying unit also helps to reduce the stress of transition between the two stages.

Inspection and Culling

One of the most important daily tasks for the stock keeper is to thoroughly check the birds for signs of ill health, injury or disease. This is best done first thing in the morning, and also last thing in the afternoon/evening prior to lights out. It is important that the whole of the flock is walked, and that no birds are missed. It is also important that the lighting is sufficiently bright that all the birds can be clearly seen. This can be achieved by turning the house lights up where there is suitable dimmer fitted, or alternatively, by using an additional row of inspection lights, or by hand-held torch.

An important skill which comes with practice is the ability to recognise and identify abnormal behaviour in the flock. Until the stock keeper has acquired the necessary skills, advice should be sought from more experienced stock keepers or a veterinary surgeon.

Identifying birds with minor injuries or pecking is generally straightforward, and birds affected should be removed promptly to a suitable casualty pen where they can be given time to recover. Birds more seriously injured or considered to be unlikely to recover, should be humanely culled as soon as possible.

Where the flock shows signs of ill health or the onset of disease, and remedial action undertaken by the stock keeper is not effective, veterinary advice should be sought as soon as possible. It is often helpful in diagnosing disease if dead birds are retained for the vet to examine.

Beak Trimming

Feather pecking can be a problem in alternative systems. Left unchecked, it can lead to more aggressive pecking and ultimately, to cannibalism. The likelihood of feather pecking during lay can be reduced by making strenuous efforts to remove all form of stress. Nevertheless birds destined to be housed in alternative systems may need to have their beaks trimmed during rearing.

Beak trimming must be done by a suitably trained operator, and it should be performed when the chicks are less than 10 days old.

Disposal of Dead Birds

There are several reasons why the careful disposal of dead birds is an important part of the health management of alternative systems :

- Reduces the risk of disease spread back to the flock and other species.
- Reduces the likelihood of carcases being removed by scavengers, which can transmit disease.
- Reduces the risk of blow flies (*Caliphora sp*.), which can also transmit disease.

The most effective and reliable way of disposing of dead birds is by burning in a properly constructed incinerator fuelled by gas or oil and incorporating an after-burner. Disposal on an open bonfire tends to be much less reliable and creates dark smoke and odour. This method of disposal is NOT recommended.

Disposal of dead birds in a disposal chamber can be an acceptable alternative to incineration, but must be done in accordance with the guidelines set out in the Code of Good Agricultural Practice for the Protection of Water (DEFRA publication PB 0585, 1998).

Composting of carcases is not permitted under UK legislation.

Handling and Moving Birds

Careful handling of the birds during initial stocking and depletion will reduce the risk of stress, and will minimise the likelihood of injury or damage. Particular care needs to be taken at depopulation because catching the birds can be difficult, and the bone strength and elasticity of older hens is generally poorer than those of point of lay pullets. The following notes should be used as a guide :

- Remove as much of the equipment from the house as possible prior to moving birds in or out of the building. Make sure corridors and gangways are clear.
- Make sure that all staff involved in handling birds are suitably trained and adequately supervised - particularly in the case of inexperienced staff.
- Dim the house lights and work quietly and steadily.
- Catch birds with both legs and do not carry more than three birds in each hand.

More detailed advice on bird handling and transport aimed at maintaining high standards of bird welfare is contained in a joint industry code of practice on the 'Handling and Transport of End of Lay Hens', which can be obtained from a number of sources including the NFU and the British Egg Industry Council. Contact addresses for these two organisations are given at the end of the booklet.

Nutrition

Diet can exert a profound influence on bird welfare and performance, so it is essential that the quality and quantity of the rations are adequate. Feeding birds in alternative systems is generally regarded as more difficult than feeding birds in cage systems, because of the additional competition between birds for feeder space, and because of greater fluctuations in house temperature. Stock keepers need to be aware of the potential pitfalls that can occur as a result of inadequate nutrition, and of the measures that may be required to prevent or rectify them. Some points to bear in mind are :

- Make sure that feeding space is adequate and that the distribution of feeders allows good access by the birds. As a guide, a minimum of 10 cm of linear trough space, or 4 cm of circular feeder, per bird is recommended.

- Seasonal changes in temperature can exert a major influence on feed intake - particularly in poorly insulated houses. Food consumption can change by as much as 30–40 g/bird/day from summer to winter, which represents a challenge to the stock keeper and nutritionist in avoiding welfare problems and maintaining performance. Increasing the quantity of feed supplied to the birds during cold weather, coupled with seasonal changes in the concentration of nutrients in the diets, are the key details.

- Birds in alternative systems tend to be more sensitive to marginal dietary deficiencies than birds in cage systems, and low levels of intake of some key nutrients can predispose the birds to pecking.

Diet formulation for birds in alternative systems is a specialist subject, and advice should be sought when necessary from a poultry nutritionist or suitable consultant.

Pest Control

Mouse and rat infestations are a constant threat to any poultry house because of the warm conditions, the abundance of food available and the very large number of potential harbourages and nesting areas. Uncontrolled populations of rats or mice can create panic and hysteria in flocks and can give rise to sudden, heavy mortality losses due to smothering. Rodents are also prolific carriers of a variety of infections of both poultry and humans.

In recent years, poultry red mite has become a serious problem in alternative systems. The presence of large numbers of red mite will increase stress levels in the birds and predispose them to pecking. Heavy infestations of red mite will cause anaemia and left unchecked will result in deaths.

The key to successful pest control is to adopt a proactive approach, using a range of strategies aimed at prevention. Whilst part of the control programme may involve using the services of a qualified pest controller, excellent on farm control can often be achieved if a thorough and systematic approach is adopted. Some of the elements common to both rodent and red mite control programmes are :

- Houses and equipment should be designed to minimise the number of harbourages, and pest-proofing features should be incorporated wherever possible. In the case of red mite, equipment such as feeders, nestboxes, perch frames etc. should be designed to minimise the number of cracks and crevices, since these are the favoured resting areas.
- Repairs to double-skinned walls and roofs should be carried out promptly to reduce the chances of rodents gaining entry to internal voids.

- A regular programme of inspections should be implemented so that infestations can be detected at an early stage. Keeping simple records of the inspections will help to identify increases in pest activity, and enable prompt early treatment. Treatments using the appropriate approved products should always be carried out in accordance with the label directions with due regard for the safety of both the birds and the operator.
- As far as possible use products with different active ingredients on a cyclical basis to reduce the risk of resistance developing. This is particularly important in the case of red mite control. It is important not to assume that poor levels of control are due to product resistance – in most cases unsatisfactory performance is due to shortcomings of the operator rather than the product.
- Good housekeeping is essential - particularly in the case of rodent control. Spillages of feed and broken egg etc. should be cleared-up promptly and rubbish and clutter should not be allowed to accumulate either inside or outside the house.
- Thorough cleaning and disinfection of the poultry house at the end of the laying period is also essential. In the case of red mite infestation, this may need to be followed by treatment with an approved residual acaricide once the house is dry, to delay the build-up of mite in the subsequent flock.

Records and Record Keeping

Record keeping is an important part of any system of livestock production. It is particularly important in the case of free range and barn systems as an aid to the early detection of potential problems. As a minimum records should be kept of mortality and culls, egg numbers, average egg weight (weekly), feed consumption, water usage and house temperature.

As well as these records, it is often a good idea to keep a daily diary. This is particularly useful where more than one person may be responsible for looking after the birds. Diary records might include the incidence of breakdowns or mechanical/electrical failures and the actions taken at the time. Entries might also include records of upsets or disturbances to the flock as a result of adverse weather etc.

4. Pasture management

Introduction

In free range laying systems, good pasture management is essential if the ground is to remain in good condition and the problems of poaching and the build-up of parasitic intestinal worms and coccidial oocysts are to be avoided. Worm infestation and coccidiosis can seriously compromise bird health and welfare. The signs of a worm infestation include a general loss of condition, diarrhoea, loss of egg size and numbers and possibly of yolk colour too. Gapeworm (*Syngamous trachea*) causes dyspnoea or 'gaping' and head shaking. Left untreated, heavy worm infestations will result in mortality. Many of the external symptoms and effects of coccidiosis are similar to those of worm infestation, although blood may also be present in the droppings. Low level infestations of worms and coccidiosis can increase stress in the flock and precipitate pecking.

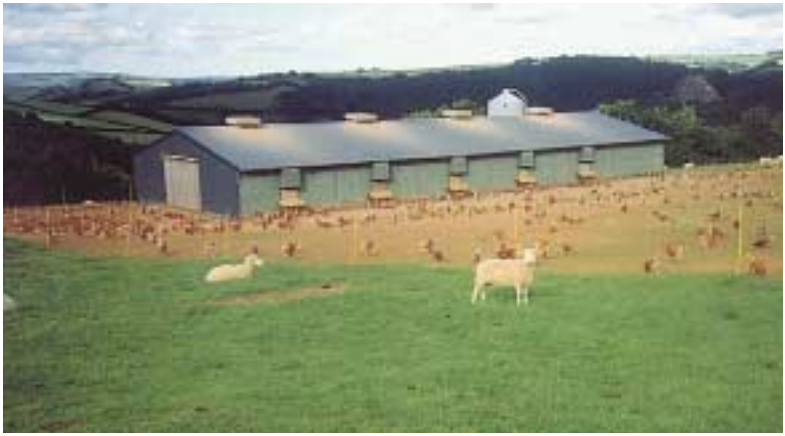
Both worm eggs and coccidial oocysts will survive for some time in the soil. This means that the threat of re-infestation is always present and will inevitably carry over to subsequent flocks. Although effective paddock management is the key to avoiding problems during lay, birds should be wormed before delivery and rearing programmes should enable the birds to develop resistance to coccidiosis through the use of coccidiostats in the feed and/or by vaccination.

Your vet will be able to help you to recognise the symptoms of worm infestation and coccidiosis, and provide advice on suitable control strategies and treatment options.

Management of Paddocks

The land surrounding the laying house should be divided into a series of paddocks which the birds are allowed to use for periods of up to 6 - 8 weeks each. The number of paddocks used will depend on the specific arrangement of the house in relation to the available area, but normally six paddocks is a practical compromise. Similarly, the length of time that the birds are allowed to use individual paddocks will vary depending on soil type, drainage, grass cover and weather conditions. A common-sense approach is required.

Paddocks should be maintained in good condition by the judicious use of chain harrows. This breaks up the soil surface and promotes good drainage and helps reduce the parasite burden by exposing the worm eggs to sunlight. The use of short, resilient grass varieties and clover are generally considered to be most appropriate for free range,



and the grass should be kept short to reduce the risk of crop impaction.

The area immediately outside the poultry house tends to suffer the greatest amount of damage, so the ground adjacent to the pop holes should be covered with large, rounded stones/pebbles or slats. As well as providing health and welfare benefits the birds' feet will be cleaned as they enter the building, which will help to reduce the number of dirty eggs produced. The incorporation of a covered verandah along the side(s) of the laying house is now common practice. It can be very beneficial as an aid to effective range management, and to welfare and production.

Providing shelters on the range area, perhaps with some trees, can encourage the birds out to range, and spread the wear on the pasture. Shelters also provide protection from the sun in hot weather and from rain and wind during inclement weather. Birds find open space a threat, as it increases the risk of being spotted by predators, so shelters and trees can provide the cover they need to feel safe.

Protection from Predators

Free range layers are attractive to predators. Foxes are the most frequent cause of problems, but mink, dogs and badgers can all cause damage and often kill or maim large numbers of birds – far more than they are able to consume. In addition to direct attacks on the birds, the presence of these predators can cause panic and hysteria in the flock. This can cause losses through smothering and trigger outbreaks of feather pecking.

Siting of the unit can influence the likelihood of such problems. Thick cover, such as conifer plantations, close to the range area will encourage foxes, and in some cases hens will be taken in broad daylight. Mink are now found in most areas, but they are most likely to be a problem near rivers and lakes.

Permanent fencing substantial enough to exclude foxes can be extremely expensive and is not normally warranted. Flexible electrified fencing powered by a mains transformer, will generally provide satisfactory levels of protection against most predators, and requires less attention than a battery powered unit. The fencing and energiser unit must be well maintained in order to continue to work effectively. Grass underneath the fence must be kept cut to prevent shorting, and regular checks should be made on the connections between sections of fence and the transformer. A fencing voltage tester is an essential piece of equipment.

5. Planning for problems and emergencies

Having contingency plans for dealing with problems or emergencies is an essential part of managing a free range or barn unit. The ability to be able to respond quickly to power failure or adverse weather conditions will limit the amount of stress placed on the birds and help to avoid drops in production. Some problems, such as freezing water pipes may be more likely on smaller units where the water supply pipes run above ground. Remote sites may be at greater risk of feed delivery problems during periods of bad weather - particularly when they are at high altitude. Some of the more common problems that can affect free range and barn flocks are :

- Disruption of power supply and/or fan or feeder failure.
- Adverse weather conditions and disruption to feed/water/electricity supply.
- Heat stress during summer.

The necessary measures will depend on the individual situation. What is important, however, is that contingency plans are drawn up before emergencies occur, and that staff are trained to deal with them. Although the risk of fire is probably very low, contingency plans should include a fire drill. A list of emergency numbers next to the telephone, together with written directions to the site for the emergency services, is a sensible practice.

Appendix

Sources of welfare advice

For advice on all veterinary and welfare matters, contact your private veterinary surgeon. General advice on welfare matters may be obtained from:

- The State Veterinary Service (Local Animal Health Office – address and telephone number in your local telephone directory).
- DEFRA operate a comprehensive web site with links to the animal welfare, publications and Farm Animal Welfare Council pages at www.defra.gov.uk
- Your local ADAS poultry consultant or other expert consultants, equipment manufacturers or suppliers.

Publications

DEFRA produce a number of publications on animal welfare which are available free of charge, unless otherwise stated, from DEFRA Publications, Admail 6000, London, SW1A 2XX, (telephone 0645 556000, or via the DEFRA website). Relevant publications include the following :

- *Codes of Recommendations for the welfare of livestock: Domestic Fowls* (PB 0076).
- *Farm Fires* booklet* (PB 0621).
- *Emergencies on Livestock Farms* booklet (PB1147).
- *Heat Stress in Poultry - Solving the Problem** (PB 1315).
- *Poultry Litter Management* (PB 1739).

The text of all welfare publications, together with details of other welfare publications are available on the DEFRA website.

*Training videos on these subjects are also available priced £8.25 each (including postage, packaging and VAT) from DEFRA Publicity Video Unit, Whitehall Place (East Block), London,SW1A 2HH. 0207 270 8866.

Other Useful Addresses

The British Standards Institution (BSI),
389 Chiswick High Road, London W4 4AL. 0208 996 9001

The Farm Animal Welfare Council, 1A Page Street,
London SW1P 4PQ (www.fawc.org.uk).
0207 904 6534

National Farmers Union, Agriculture House,
164 Shaftesbury Avenue, London WC2H 8HL.
(www.nfu.org.uk) 0207 331 7200

British Egg Industry Council, 2nd Floor,
89 Charterhouse Street, London EC1M 6HR.
(www.britegg.co.uk) 0207 608 3760

British Free Range Egg Producers' Association,
Sutton Farm, Claverley, Wolverhampton WV5 7BL.
(www.bfrepa.co.uk) 01746 710817

For further advice and information on farm animal welfare.

For advice on poultry welfare and on any outbreak of disease – consult your veterinary surgeon.

General welfare advice on poultry welfare may also be obtained from:

- The State Veterinary Service (Local Animal Health Office – address and telephone number in your local telephone directory).
- Specialist consultants.

Other publications available from DEFRA that may be of interest

PB Number	Title
0076	Codes of Recommendation for the Welfare of Livestock: Domestic Fowls
0621	Farm Fires: Advice on Farm Animal Welfare
1147	Emergencies on Livestock Farms
1315	Heat Stress in Poultry – Solving the Problem
1381	Guidance on the Transport of Casualty Farm Animals
1739	Poultry Litter Management
2531	Summary of the Law relating to Farm Animal Welfare
2594	Explanatory Guide to the Welfare of Animals (Slaughter or Killing) Regulations 1995

Copies of the above publications can be obtained, free of charge from:
DEFRA Publications
ADMAIL 6000
LONDON SW1A 2XX
Tel: 0645 556000

The Welfare of Farmed Animals (England) Regulations 2000 can be viewed on-line at www.legislation.hmso.gov.uk/si/si2000/20001870.htm

Printed copies (ISBN 0 110 792 904, Price £3.00) are available from HMSO.
Tel: 0870 600 5522 or contact any Stationery Office Bookshop/Agent.

DEFRA Publications ONLINE: www.defra.gov.uk/corporate/publications/pubfrm.htm

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