BEYOND THE BATTERY -

A Welfare Charter for Laying Hens

A

COMPASSION IN WORLD FARMING

Report by

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INTRODUCTION

The battery cage for egg-laying hens is perhaps the oldest of the intensive animal farming systems still in widespread use today. In the UK alone, about 30 million egg-laying hens are kept in this system which continues to be the subject of fierce debate.

A recent Report by the UK Government advisory body, the Farm Animal Welfare Council (FAWC) has added further fuel to the discussion. Whilst stating that "conventional battery cages should be phased out" (FAWC, 1997), FAWC see this as a long-term aim to be effected after further progress has been made with alternative systems. Compassion in World Farming (CIWF) believes that the suggested delay would be deeply regrettable and wholly unnecessary. This CIWF 'Welfare Charter for Laying Hens' demonstrates that the weight of evidence against the battery cage in terms of welfare is so compelling that urgent action is needed to phase out this system. Furthermore, it shows that such a phase-out, accompanied by a simultaneous raising of the welfare standards in alternative systems, would eliminate or control problems currently perceived in some of these systems through practical adjustments to management techniques.

CIWF's 'Welfare Charter for Laying Hens' is an attempt to take the debate forward - to go beyond the 'pros and cons' approach to welfare. It represents a positive analysis of the welfare needs of the hen and sets out the essential criteria which should be met by any husbandry system that is to offer truly high standards of welfare. It is hoped that this document will be met by all sectors of the debate in the same constructive spirit that it is offered.

The weight of scientific evidence supports the feeling amongst the general public that hens suffer in battery cages (Appleby, 1991). A recent opinion poll commissioned by CIWF shows that 89% of the British public believe that it is cruel to keep hens in battery cages (NOP, 1997). The battery cage has been condemned on welfare grounds by a succession of official bodies which include the UK House of Commons Agriculture Committee (1981), the European Parliament (1987), and the European Commission's Scientific Veterinary Committee (1992 and 1996). Yet the cage is still in widespread use. It must surely be time for change.

Leading UK poultry expert Dr Mike Appleby concluded a review of the scientific literature by stating that "Hens suffer in battery cages" and that their suffering is greater in this system than in well-run alternatives. Standard battery cages are usually so small that a caged hen is physically unable to stretch her wings fully. The highly restrictive and barren nature of the battery cage prevents hens from exhibiting most normal patterns of behaviour, such as foraging, dust-bathing, nesting and exercising. This has a detrimental impact on their welfare and can lead to abnormal behaviour.

In addition, inhibiting exercise leads to the development of bone weakness in caged hens. A recent study found bone fragility to the point where birds were experiencing bone breakages whilst still in their cages. This condition was responsible for more than a third of all mortalities in the caged layers studied (McCoy, Reilly and Kilpatrick, 1996). Denying hens exercise can also lead to a disease known as Fatty Liver Haemorrhagic Syndrome, in which hens die from a ruptured liver (SVC, 1996).

The Farm Animal Welfare Council's recent Report has recommended that hens in battery cages should be provided with a minimum space allowance of 600 cm^2 per bird within 5 years (FAWC, 1997). 600 cm^2 represents roughly the area covered by this A4 sheet of paper. The overwhelming inadequacy of this measure is demonstrated by the fact that hens in standard-sized battery cages will be no more able to stretch their wings fully with 600 cm^2 than with the current permitted minimum of 450 cm^2. This is not to deny the urgent need for reform, but is rather to emphasise that reform should be meaningful and far-reaching.

Fears that simple cage enrichment might be seen as an alternative to the standard battery cage were also fuelled by the FAWC Report. The term 'cage enrichment' covers the idea of putting facilities such as a perch, abrasive strip, nest box and/or dust bath into standard or enlarged cages. However, as CIWF's 'Welfare Charter' illustrates, enriched cages provide a restricted environment which prevents exercise and also make available a number of facilities which are unlikely to alleviate many of the welfare problems associated with standard cages.

It is clear that a more imaginative approach to alternative systems is needed if high welfare standards are to be achieved.

Loose-housed colony systems, where birds are kept in barns or moveable huts, particularly where they have access to the outdoors, provide the greatest scope for high welfare standards. These systems have the capacity to offer plenty of space and an enriched environment. Commercial systems of this nature have received criticism for an apparent 'need' to debeak the hens to prevent outbreaks of aggression and cannibalism. Whilst CIWF believes that such claims have been exaggerated, a proportion of colony systems are run at stocking densities and group sizes which CIWF considers are too high. These avoidable management mistakes appear to be motivated by attempts to compete in economic terms with battery cages and should be relatively simple to solve.

This Report shows that hens do not 'need' to be debeaked in order to control feather-pecking and cannibalism. These potential problems are more properly avoided through appropriate management, especially ensuring that stocking densities and flock sizes are kept to acceptable, welfare-friendly levels.

Battery cage protagonists often offer the system's feature of maintaining stable social groups or sub-divisions within the flock as a measure to avoid hen-to-hen aggression. However, it should be noted that loose housing systems too can maintain a flock in stable, sub-divided groups without recourse to restraint as in cages.

It can be seen that to achieve truly high standards of welfare, a 'whole systems' approach is needed whereby the total environment is designed, enriched and managed correctly. One factor which until recently has not been properly recognised is the importance of the strain or breed of hen used. Research work in the USA (Craig & Lee, 1990, for example), suggests that breed selection has a role to play in further reducing the risk of cannibalism. This should provide some useful pointers for the future in terms of how breed companies should make welfare criteria integral in their breeding programmes. It also illustrates the need to ensure that appropriate breeds are used to enhance the welfare potential of a particular system.

The fundamental difference between the battery cage and loose-housed alternatives can clearly be seen. Welfare problems in alternative systems can be addressed by improved design and adjustments to management techniques. However, the adverse welfare features of the battery cage are inherent in the system.

The European Union has recently recognised that animals are 'Sentient Beings' - capable of feeling pain and suffering - in a legally binding Protocol adopted at the June 1997 Summit meeting in Amsterdam. Hens are, of course, no exception.

In a paper looking at the needs of laying hens, Professor Broom (1992) concluded that "the welfare of hens in battery cages is too poor and a different system must be used." This Report demonstrates that changing to a different system is both possible and practicable. It must surely be down to policy-makers to take a lead on this issue. A different, more humane system is needed urgently to take us beyond the archaic battery cage as we head into the 21st Century.

ASSESSING WELFARE POTENTIAL

The welfare of egg-laying hens has long been the subject of much debate. This has stemmed largely from the widespread use of the battery cage for egg production and has tended to focus on the adverse effects of this system on bird welfare.

In the following paper, a *Welfare Charter* is proposed which sets out the essential criteria which should be met by any husbandry system for hens if it is to offer the potential for truly high standards of welfare.

It is important to acknowledge from the outset that high levels of stockmanship and management are prerequisites in any poultry farming operation. Nevertheless, the potential to achieve high standards of welfare are inescapably linked to, and limited by, the husbandry system employed. There are a number of factors which affect the welfare potential of any method of livestock farming. These include:

- Housing system - close confinement systems, such as the battery cage, or systems which otherwise restrict behavioural expression, are likely to offer low welfare potential.

- Breeding - animals that have been selectively bred for production traits at the expense of welfare criteria.

- Feeding regime - where animals are fed a diet which secures high production but may not be conducive to maintaining normal health and vitality.

From this, we can see that the standard battery cage providing hens with a highly limited space and a wholly barren environment has, in the words of the European Commission's Scientific Veterinary Committee, "inherent severe disadvantages for the welfare of hens". In short, it is a system with low welfare potential. It can therefore be seen that even with the best stockmanship in the world, the welfare of hens in battery cages will be poor.

On the other hand, a free range system, for example, with its provision of space and enriched environment, so long as the other criteria outlined are satisfied, has a high welfare potential.

Welfare problems in alternative colony systems can be addressed by good management or improved design, whereas the adverse welfare features of the battery cage are inherent in the system.

Out of the above three factors, it is clear that it is the housing system used which has the major impact on the welfare of egg-laying hens. This compares sharply with broiler chicken production where breeding and feeding have an enormous effect.

However, it is worth bearing in mind that selective breeding has produced a modern hybrid hen that can produce over 300 eggs per year. Compare this with the 10 - 20 eggs per year produced by the hen's wild ancestor, the jungle fowl, and we can see clearly how far selective breeding has gone down the route of higher production. The burden that this puts on the bird's

physiology appears not to have been studied in detail with relation to welfare. However, it seems reasonable to suggest from the available evidence that reproductive disorders are a significant cause of laying hen mortality. In its 1996 Report, the Scientific Veterinary Committee wrote, in relation to reproductive disorders: "The high egg production may itself be a stressor which, in combination with a reduction in the immunological capacity due to a high level of oestrogenic hormones, may decrease the bird's general resistance to disease." (SVC, 1996).

Experts have also suggested that genetic selection for suitable breed types for certain housing conditions - a 'hens for systems' type approach - could help ameliorate problems with feather-pecking and cannibalism. Compassion in World Farming strongly believes that the use of less aggressive strains of hen should not be a substitute for, but an essential complement to the development of high welfare housing conditions.

THE EGG INDUSTRY

There are currently 33 million hens in the UK egg laying flock (CSO, 1995). The majority of these are kept in battery cages. However, increasing consumer concern about welfare issues in recent years has led to a progressive move towards a greater use of colony housing systems for hens.

About 11% of total egg production is now produced from hens kept free range, whilst 'barn' eggs from percheries account for 3%. (MAFF, 1995). This suggests that about 86% of the national flock is still in battery cages.

Main Egg Production Systems

a) The Battery Cage

This system consists of rows of metal and wire cages that can be arranged up to 6 tiers high. A typical cage measures about 50 cm. x 50 cm. and has a sloping wire mesh floor.

Current European legislation sets a legal minimum space allowance of 450 cm^2 per bird in battery cages (EEC 166, 1988). Up to 5 hens are therefore usually kept in each cage. Each hen has an average wingspan of about 76 cm.

Clearly, proper exercise is impossible in these conditions. The lack of space and barren environment in battery cages also prevent the hens from expressing most of their natural behaviours.

The battery cage has been condemned on welfare grounds by:

* The House of Commons Agriculture Committee, whose 1981 Report recommended a 5-year phasing out on a European basis.

* The Farm Animal Welfare Council which, in its 1986 Report to the government, said it disapproved of the battery cage. It stated that caged birds may be subject to chronic discomfort.

* The European Parliament, which in 1987 resolved that the use of the battery cage contravened the Council of Europe Convention on the Welfare of Animals Kept for Farming Purposes.

* The European Commission's Scientific Veterinary Committee, which in its 1992 and 1996 Reports concluded that the battery cage has inherent severe disadvantages for the welfare of hens.

Compassion in World Farming believes that, in view of the inherent disadvantages for hen welfare in this system, battery cages should be phased out urgently on a European-wide basis.

This action should be accompanied by a simultaneous raising of the welfare standards for alternative systems, taking into full account the criteria set out in this document.

b) The Perchery (Barn) System

In this system hens are kept on a colony basis in sheds which have raised perches or platforms available. A littered area of flooring is usually provided.

European egg marketing rules (EEC 1274, 1991) allow a maximum stocking density of 25 hens per square metre of available floor space, and stipulate that the house has at least 15 cm. of perch space fitted per bird. However, these rules are intended solely to standardise European marketing terms for eggs, and do not deal with welfare considerations.

c) The Deep Litter System

This system again houses hens on a colony basis, but the birds are kept at floor level. Perches are not provided. The flooring is generally partially covered with litter, whilst an area of slats or wire mesh is usually sited over a droppings pit or manure belt.

The maximum stocking density permitted by European egg marketing legislation (EEC 1274, 1991) is seven hens per square metre. Deep litter houses are also required to have at least a third of the available floor area covered by litter material, and a "sufficiently large" area for the collection of droppings.

d) Free Range System

Hens kept for free range egg production are often kept in Perchery or Deep Litter type houses but have access to the outdoors during the day. Free range hens can also be accommodated in relatively small groups in small moveable houses.

Free range producers are required by EC egg marketing law to ensure that housing conditions laid down for Perchery or Deep Litter systems are satisfied. In addition, hens must have continuous access during the day to an open air run which must not have a stocking density exceeding 1,000 hens per hectare. The outdoor area must also be "mainly covered with vegetation" (EEC 1274, 1991).

e) Enriched Cages

The term 'Enriched Cages' encompasses designs which range from standard battery cages with simple modifications such as a perch and/or an abrasive strip (for claw shortening), to larger experimental designs which may also incorporate a nest box and/or a dust bath. Due to the disproportionate interest shown in these systems recently, it is felt that an in-depth treatment would be appropriate here.

Development of these systems has continued since the 1970s. One of the early designs, known as the Elson Get-Away Cage, had perches, feeders and drinkers at 2 levels, and had a flat wire mesh floor with adjacent nest boxes.

Recent research work has continued with a new generation of designs known as Modified Enriched Cages (MECs). These have been developed largely at Edinburgh and Bristol Universities, with scaled-up trial work currently being conducted at ADAS Gleadthorpe Poultry Research Centre in Nottinghamshire. The cages in these trials measure 100 cm x 50 cm, have a maximum height of 60 cm and include perches, abrasive strip, nest box and a dust bath. Colony sizes of 5, 7 and 8 birds per cage representing stocking densities of 1,000 cm^2, 714 cm^2 and 625 cm^2 per bird have been trialed in this study (SVC, 1996).

The first MEC project at Edinburgh had the stated objective of "alleviating the welfare problems of conventional laying cages" (Appleby, 1994). CIWF believes that this goal has not been achieved on an experimental basis, and is less likely to succeed on a commercial scale. The root of this failure is embedded in the fact that MECs and other enriched cage designs are just that - small cages.

One of the major criticisms of the standard battery cage is that the hen's ability to exercise is completely thwarted. Lack of exercise leads to the development of bone weakness. MECs fail to address this problem. They provide a restricted environment in which hens "do not have freedom to carry out large-scale locomotion. This affects bone strength." (Appleby, 1994). MECs not only restrain the hens from exercising, but do this to an extent which results in bone weakness - an important indicator of both poor health and poor welfare.

The provision of adequate space for hens is one of the most important determining factors for good welfare. Space is not only needed for general exercise, but also to perform natural behaviours such as wing stretching, preening and turning without difficulty. The table on page 13 of this Report gives results of a study into the area used by hens to carry out certain behaviours. This suggests that the stocking densities used in many enriched cage trials provide inadequate space allowances. The Gleadthorpe trial stocking densities, for example, provide 625 cm^2, 714 cm^2 and 1,000 cm^2 of floor space per bird. The average area used by hens to wing-stretch, preen and to turn has been found to be 893 cm^2, 1,151 cm^2 and 1,272 cm^2 respectively (Dawkins and Hardie, 1989).

Clearly, the amount of space provided to hens by many designs of enriched cage is inadequate for the satisfactory enactment of hens' behavioural patterns.

CIWF believes that the ability for hens to perch, scratch/forage, dust-bathe and find a suitable nest site before laying is a fundamental aspect of promoting good welfare. Facilities need to be provided in any good hen-keeping system for these behaviours to be carried out. It should be remembered that hens naturally walk, run and even fly for short distances. The application of at least some of the furnishings of enriched cages (perches, abrasive strip and, in some designs, dust-bath) is questionable in both welfare and practical terms.

Perches - Most, if not all, enriched cage designs incorporate perches. It is important that sufficient perch space is provided for all individuals in the particular colony to perch at once. In the smaller cage designs (especially modified standard battery cages) this may not be physically possible at the stocking densities often used.

The height of the perch is also an important consideration "as a perch only 5 cm high is not considered as a perch and has no attractive nor repulsive value" to the birds (SVC, 1996). The SVC surmised that hens in standard battery cages, given the chance to perch, probably do so as it provides a different floor type, as opposed to any perception of a perch. This behaviour could perhaps be to escape the discomfort of the sloping wire floor which is standard in commercial laying cages.

Abrasive strip - In standard battery cages, hens' claws can grow too long and can become easily damaged by breaking (Appleby, 1991). This problem is due to lack of wear as ground scratching and foraging are completely thwarted.

An abrasive strip is often attached to the baffle plate of enriched cages to shorten claws and prevent overgrowth. However, this measure can simply be seen as tackling the symptoms rather than the cause of the welfare problem - the inability of caged hens to scratch and forage.

Hens will normally spend much of their day foraging. If opportunities to forage are not available, hens have been found to 'mis-direct' this behaviour into feather pecking (Blokhuis and Arkes, 1984). Whilst the provision of an abrasive strip in cages may avoid claw overgrowth, it will not provide an opportunity to express foraging behaviour for which hens are strongly motivated.

Dust-bath - Hens are strongly motivated to dust-bathe, a behaviour which helps to keep their feathers in good condition. Frustration of this behaviour is widely regarded as having an adverse effect on the hen's welfare (Baxter, 1994; Broom, 1992; SVC, 1996). CIWF believes the provision of dust-bathing facilities is important.

However, the practical constraints of enriched cages are unlikely to be conducive to the commercial provision of a dust bath. The Scientific Veterinary Committee reported that where a dust bath has been provided in MECs, "the litter (various types have been tried) is often quickly scratched out and needs frequent replenishment which is time-consuming and/or expensive." (SVC, 1996). Given this simple fact, it seems likely to prove impractical to provide dust bath facilities on a commercial basis. A commercial unit containing hundreds, if not thousands, of enriched cages arranged in multi-level tiers is likely to run into major dust problems as the hens naturally disperse the substrate. This could well cause environmental difficulties leading to severe human and animal health problems. However, the withholding of dust-bathing facilities would represent continued severe deprivation for caged hens, who have been seen to "vacuum dust-bathe" on the wire floor of battery cages (Baxter, 1994).

It has been suggested that the dust bath could allow hens to express their foraging behaviour. This assertion cannot be taken seriously until such time as it can be proven that the major difficulties relating to dust-bathing (foreseen above) can be overcome. Furthermore, foraging in a small dust bath could at best only be an empty imitation of true, purposeful foraging.

It has been shown that the current enriched cage prototypes fall short of alleviating the welfare problems of conventional cages. Further concern for the future stems from the fear that what happens in terms of environmental 'enrichment' and space allocation at the research and development stage is likely to be diluted in subsequent commercial practice.

CIWF believes that the potential for high welfare standards for laying hens will not be realised by the piece-meal approach adopted in the development of enriched cages. Efforts should be concentrated on more imaginative alternative systems which provide the freedom and facilities needed if the welfare of hens is to be truly protected.

WELFARE CHARTER FOR LAYING HENS

The elements considered by CIWF to be essential for the formulation of high welfare systems are outlined in the following discussion. These should not be taken as exhaustive, but as essential for a well-run high welfare system.

Housing

- Space allowances to permit natural movement and exercise.
- Small group and flock sizes.
- Adequate daytime light levels and natural light whenever possible.
- No permanent indoor housing.
- Daily access to the outdoors from an appropriate age.
- Sufficient overhead cover on outdoor range.

Physiology

- Adequate and appropriate feed.
- Permanent supply of clean, fresh drinking water.
- No non-therapeutic mutilations.

Ethology

- Ability to perform natural behaviours:

  a) Nesting
  b) Perching
  c) Scratching/foraging
  d) Dust-bathing
  e) Exercise

- Ability for all birds to feed simultaneously
- No overcrowding or isolation.

HOUSING

Space Allowances to Permit Natural Movement & Exercise

The provision of adequate space for housed hens is one of the most important determining factors for good welfare. Hens need to perform natural behaviours such as foraging, exercising, preening, dust-bathing and nest-building (Broom, 1992). Without sufficient space, the expression of these behaviours is likely to be restricted or inhibited with a detrimental effect on welfare. The Farm Animal Welfare Council (FAWC) stated in its report on laying hen welfare in colony systems "it is of great importance that adequate space is provided and where uncertainty exists the hen should be given the benefit of the doubt" (FAWC, 1991).

There have been a number of scientific studies aimed at finding the amount of space used by hens to perform certain basic behaviours such as ground-scratching and wing-flapping. The table below shows the results of a study looking at the area used by hens housed singly in litter-floored pens.

Area used by medium hybrid hens housed singly in small litter-floored pens (from Dawkins and Hardie, 1989). This compares to a standard allowance in battery cages of 450 sq cm per bird

	Area (sq cm)	
Behaviour	Mean	Range
Standing	475	428-592
Ground scratching	856	655-1217
Turning	1272	978-1626
Wing stretching	893	660-1476
Wing flapping	1876	1085-2606
Feather ruffling	873	609-1362
Preening	1151	800-1977

From these results we can see that the average space used by hens to perform these basic behaviours is shown to be between 475 cm^2 and 1,876 cm^2, although the top end of the range was up to 2,606 cm^2.

The permitted space allowances for laying hen systems in general use today do not compare favourably with those given above.

Battery cage	-		450 cm² per hen
Perchery	-	25 birds/m²	400 cm² per hen
Deep Litter	-	7 birds/m²	1,425 cm² per hen

It should also be noted that the space used by a hen to carry out these behaviours is not to be confused with that which is needed to perform them. For example, a caged hen may only physically occupy 1,876 cm² of space when it is wing-flapping, but the bird may actually need more than this to avoid hitting the sides of her cage (Baxter, 1994). A study by Bradshaw & Bubier (1991) looked at the preferences of hens for different sized enclosures and their propensity to carry out wing-flapping behaviour in them. It was found that an enclosure of 6,420 cm², which is three times greater than the area used to wing-flap, inhibited this behaviour in hens. Instead, the birds preferred an enclosure giving 13,550 cm² of space in which to wing-flap. The researchers concluded that "hens have a perception of the space required to wing-flap that is larger than the length of the outstretched wings" (Bradshaw & Bubier, 1991).

In addition, the values given above do not take into account behaviours which involve considerable movement such as walking, running, fluttering, flying and escape behaviour when faced with a challenge from dominant individuals.

In short, it is clear that a reappraisal of the space allowances currently permitted for hens in the major husbandry systems is urgently needed.

The Battery Cage

The standard battery cage measures 50 cm x 50 cm and normally houses 5 hens with a space allocation of 450 cm²/per bird. Each hen has a wingspan of about 76 cm. Under these conditions it is clear that it is impossible for most normal patterns of behaviour to be carried out.

Battery hens also have their head movements restricted by the permitted height of the cage ceiling. The relevant EC Directive (EEC 166, 1988) specifies a minimum cage height of 40 cm over 65% of the cage area and 35 cm over the rest. However, Dawkins (1985) has shown that 25% of a hen's head movements take place above 40 cm. Battery cages render it impossible for hens to carry out a quarter of their natural head movements.

In a paper looking at the needs of laying hens, Broom (1992) concluded that "the welfare of hens in battery cages is too poor and a different system must be used".

Colony Systems

To comply with EC Egg Marketing Regulations (EEC 1274, 1991), hens in the perchery (barn) system can be stocked at a permitted density of 25 birds per m². Although birds in a perchery can make use of vertical space by means of perches or slatted platforms, this stocking density is still high.

If all hens in the house were to occupy the floor space at the same time, each bird would only have 400 cm² allocated to it. This clearly is not sufficient to allow free expression of basic behaviours. CIWF does not accept the argument that as a proportion of hens at any one time would usually be on the perches or raised area, this situation should be seen as theoretical. It is normal for hens to roost on raised perches at night and to spend much of their day foraging etc.

at ground level. It therefore seems reasonable to suggest that many of the hens perching above during the day could be trying to escape from the overcrowded flock below.

CIWF recommends that space allocations for hens in multi-level systems such as the perchery should be calculated on the basis of all birds occupying the floor at the same time. Due consideration must be given to the space needs of the birds to perform normal behaviours.

Deep litter houses, where the birds usually occupy the floor area, are currently permitted by EC egg marketing law to stock at a maximum density of 7 birds per m^2. This maximum equates to a space allowance of 1,425 cm^2 of floor space per bird. By comparing this space allocation with the table above showing the area used by birds to perform various behaviours, it can be seen that such a stocking density does not fully allow for the space needs of the hens. When the Brambell Committee wrote on this system in its report to Parliament in 1965, it pointed out that space per bird has "great bearing on the success of a unit" and recommended a minimum space allowance of 2½ft^2 (2,322 cm^2) per bird (Brambell, 1965).

As discussed later, in CIWF's view all housing for hens should have enough perch space available for the entire flock to roost at the same time, as well as adequate floor space per hen. Even where adequate perch space is provided, it would not be acceptable on welfare grounds to stock above a maximum of 7 birds per m^2. This is because the natural tendency for hens is to spend much of their day at ground level.

Indeed, if we are to give the birds the benefit of the doubt, it is preferable in welfare terms to provide a greater space allocation. We suggest that bird welfare would be greatly enhanced if the floor space allowance of 2,500 cm^2 per bird were implemented as recommended by the Farm Animal Welfare Council Minority Report (FAWC, 1991a). This should be fixed regardless of the amount of perch space or raised platforms provided.

Small Group and Flock Sizes

The domestic fowl's wild ancestor, the jungle fowl, lives in small groups of several females to one male. The formation of these small social groups has also been observed in feral domestic fowl, and is close to the conditions found in small old-fashioned farmyard flocks (Appleby *et al,* 1992).

The natural behaviour of hens is to flock in small groups in which birds can recognise each other, and to arrange themselves socially in an hierarchical pecking order. Appleby *et al* (1992) indicate that hens can recognise up to about 80 individual birds in a group. Duncan & Mench (1993) suggest that hens can form stable social groups of up to 96 birds. In large groups, it will be difficult or impossible for hens to recognise individuals within the flock (Appleby *et al*, 1992). Under these circumstances, it is unlikely that the birds could establish a stable hierarchy.

Appleby & Hughes (1991) point out that although the effects of birds continually coming into contact with strangers is unknown, where it has been studied in small groups, introducing strange birds results in adrenal hypertrophy, increased heart rate and increased aggression. Therefore, keeping hens in large groups could well lead to them experiencing stress through continual social encounters with unrecognised birds.

It has been found that in some houses hens may form themselves into sub-groups of the flock and show reluctance to stray into the space of another sub-group (Appleby *et al*, 1992). This

effect leads on to the importance of acknowledging that a 'flock' can be subdivided into 'groups'.

Clearly, the terms 'flock' and colony 'group' need to be clarified. It should be recognised that a flock can comprise more than one colony group of hens. For example, several small moveable houses may be kept within one field in which the hens have continuous daytime access to the outdoors. Each house can be seen as accommodating a single stable social group. The field, however, holds the entire flock.

Similarly, a larger housing unit may contain one flock of hens, but could be subdivided to ensure the integrity and stability of individual social groups. Thus, we can say that the two terms 'flock' and 'group' should not be interchangeable.

In this study, CIWF found no real consensus or data on what should be the maximum flock or group size in terms of good welfare. In 1991, the Farm Animal Welfare Council Majority Report recommended that ".... maximum flock size in a colony system shall not exceed 2,000 hens." (FAWC, 1991), whilst the Minority Report called for "group size to be kept as small as possible" (FAWC, 1991a).

The UK's leading independent organic farming body, The Soil Association, lays down standards covering organic food and farming for those farmers wishing to sell their produce under the Soil Association approved Symbol Scheme. These practical farming standards set a recommended maximum colony size of "not more than 100 laying birds per housing group." (Soil Association, 1996). This group size roughly equates with that which the science suggests is the upper limit to hens forming stable social groups.

The Soil Association standards also permit, but do not recommend, a maximum colony size of "up to 500 birds per housing group" for laying and fattening birds.

Soil Association organic Symbol Scheme producer Helen Browning, of Eastbrook Farm Wiltshire, provides an interesting case study regarding group size. The modern hybrid laying hens at Eastbrook Farm have been kept in group sizes of 150 - 200 birds. Birds were not debeaked (this mutilation is prohibited under Soil Association standards) and no problems were encountered with cannibalism or significant feather loss. The hens have been kept in small moveable houses with 1 or 2 cockerels per house. Ms Browning notes that where cockerels are housed with groups of hens, the hens behaved more calmly and showed fewer signs of aggression (Browning, 1997). Given good management, it is clearly possible in practice to keep hens in group sizes of more than 100 birds. However, a guiding principle should be to keep group sizes down to a minimum.

One of the major criticisms levelled at commercial colony systems is that birds are often kept in large flock sizes. This practice has been described by Appleby (1993) as one of the avoidable "management mistakes", along with excessive stocking densities and lack of adequate litter areas. It is now common for thousands of hens to be kept in one group, and this appears to be motivated by attempts to compete financially with battery cages by putting a high number of birds in each shed. This can be seen as an example of how 'intensive' management characteristics have been carried over to otherwise 'extensive' systems with possible adverse effects on bird welfare.

Large group sizes are one of the factors believed to cause outbreaks of feather pecking and cannibalism (Ranson, 1991). It is therefore important to keep group sizes to a minimum in order to avoid these difficulties. A maximum group size of 100 birds is advisable for optimum welfare. This can be achieved, for example, by keeping groups of hens in small moveable houses with daytime access to the outdoors. Another way could be to subdivide a flock into small groups within a single house, thus aiding the preservation of stable social groups.

If cannibalism or excessive feather loss should occur in a flock, CIWF believes that an immediate course of action to counter the problem should be to reduce group size to 100 birds maximum as soon as is practicable. This should help to establish whether overly large group size is a causal factor in the particular outbreak being dealt with.

CIWF believes that group sizes should be kept to a minimum (preferably of no more than 100 birds). Until further research is carried out in this area, the maximum permissible group size should be no more than 500 birds. It should be recognised that, if designed appropriately, more than one 'group' can be kept within a 'flock' or housing unit. Overall flock sizes should be kept within manageable proportions so as to protect the welfare of individual birds.

Adequate Daytime Light Levels and Natural Light Whenever Possible

Natural lighting has been described as one of the features of a sound housing system for hens in terms of welfare (Folsh, Sulzer & Huber, 1993). CIWF regards dim lighting as a serious environmental deprivation for hens. As an essentially diurnal bird, hens are particularly reliant on their sight. Adequate lighting is needed to ensure that hens can carry out their normal behaviours and are able to move safely around the house.

Lighting should be provided evenly throughout the house, avoiding restricted patches which can lead to welfare problems such as localised crowding (Appleby *et al*, 1992). In addition to any daytime provision, a source of lighting should be available to allow the flock to be inspected during the darkness period.

CIWF believes that the intrinsic value of natural light should be used whenever possible. Lidfors *et al* (1988) stated that "It is possible to keep hens in daylight when the systems provide adequate stimuli. In barren environments, daylight or more intense artificial light predisposes the birds to feather pecking and cannibalism".

We therefore support the recommendation of the FAWC Minority Report that "there should be natural light and that the littered floor area and the food troughs should be well lit". The report continued by stating that the lighting level at the feed troughs and litter area should be more than 200 Lux.

No Permanent Indoor Housing

Daily Access to the Outdoors From An Appropriate Age

Access to a suitable outdoor area is important in providing a varied physical environment for hens to explore. It provides them with further opportunities to express fully natural behaviours such as exercising and foraging. This latter behaviour would normally occupy much of a hen's daytime activity (Baxter, 1994) and an outdoor range is likely to allow hens to augment and vary their diet. The additional space provided can also help subservient hens to better escape the attentions of dominant individuals.

Houses should be designed in a manner which allows hens easy access to the outdoors during the daytime period. Some outdoor 'scratch' feeding is advisable to encourage as many hens as possible to make full use of the range available.

The hens should be allowed daily access to this outdoor area from an appropriate age.

Current European Community Egg Marketing rules (EEC 1274, 1991) lay down minimum standards for the production of eggs which are to be sold as 'Free Range'. These allow for a maximum outdoor stocking density of 1,000 hens per hectare of available ground.

CIWF considers this density to be too high and recommends an outdoor stocking rate of no more than 375 birds per hectare to be preferable. A stocking rate of 650 hens per hectare should be the absolute maximum permitted until further research is carried out in this area. Care should be taken with housing design to ensure that the available land is properly utilised throughout and that hens have easy daytime access to the outdoors. The land used should also be frequently rotated to prevent a build up of disease or mud.

Sufficient Overhead Cover On Outdoor Range

The domestic laying hen was domesticated from the Red Jungle Fowl at least 4,000 years ago. Despite the high degree of selective breeding in this time, the modern hen still retains many of her ancestor's natural behaviours.

The typical habitat of the Red Jungle Fowl is areas of forest and thick vegetation in its native tropical South East Asia. This contrasts strongly with the grassy paddocks provided for free range hens in Britain that are often devoid of overhead cover. This lack of cover may well cause some insecurity amongst the hens resulting in the birds showing an unwillingness to stray too far from the house. Hens can even be frightened by wild birds flying overhead which they mistake for predators.

The overall effect can be that the available range is used unevenly, and can lead to the birds' droppings saturating the ground surrounding the house.

Carruthers & Dorward (1990) studied the possibilities for keeping free range poultry under trees. Their report suggested that hens kept with tree cover on outdoor land may be encouraged to range more freely, using the available land more fully, and thereby distributing their droppings more evenly. Tree cover could also help to reduce temperature fluctuations and

provide shelter from strong winds and driving rain. It is also possible that this sheltering effect would encourage hens to spend a greater proportion of their day outside.

CIWF strongly recommends that hens are kept with sufficient overhead cover in the form of trees or similar vegetation wherever possible.

PHYSIOLOGY

Adequate And Appropriate Feed

For the maintenance of optimum health and welfare, it is essential that adequate feed appropriate to the nutritional needs of the hen should be readily available in an easily ingestible form. CIWF strongly believes that restrictive feeding practices or the withholding of feed for production reasons such as induced moulting should not be permitted. Feed should not contain artificial production enhancers. Artificial yolk colorants such as canthaxanthin would not be needed if a sufficiently rich and varied environment was provided.

Feed hoppers need to be well distributed throughout the hen house and should be provided generously to ensure easy access to food by the whole flock. The provision of additional feed outside would help to encourage hens to make greater use of any outdoor area.

Permanent Supply of Clean, Fresh Drinking Water

It almost goes without saying that clean, fresh drinking water must be constantly and freely available to the entire flock. Drinkers should be distributed evenly and generously throughout the hen house.

No Non-therapeutic Mutilations

The only commonly practised mutilation of laying hens is debeaking, which involves the partial amputation of the bird's beak. This is usually carried out using a red hot blade which slices off one-third to one-half of the upper mandible. Often a similar proportion of the lower mandible is also removed (SVC, 1996). This practice is often carried out routinely at the hatchery stage of the chick's life.

The MAFF Welfare Code for Domestic Fowls states that not more than one-third of the upper and lower beak may be removed (MAFF, 1987). Appallingly, references to more than one-third of the beak being removed in practice seem relatively commonplace. It therefore seems that this point is often being ignored.

Debeaking is used on hens kept in all systems - battery cages as well as colony systems (Appleby, 1991). It has been estimated that some 50% of hens kept in battery cages are debeaked (Elson, 1995), whilst the proportion in current commercial alternatives may be still higher.

The practice of debeaking hens is defended by the industry on the grounds that it is necessary to prevent feather-pecking and cannibalism. The act of feather pecking is widely regarded as the redirection of normal behaviours such as food or ground pecking, and involves pecking at and pulling the feathers of conspecifics. Feather pecking may predispose the birds to cannibalism, whereby the blood and tissue of flock mates are eaten, leading to serious injury or death in the victim. The following analysis adapted from the Compassion in World Farming Trust report "For Their Own Good" - A Study of Farm Animal Mutilations (Stevenson, 1994), shows that

other measures can, and should be taken to prevent these abnormal behaviours described by the industry as 'vices':

It is sometimes suggested that debeaking is similar to and no more painful than the cutting of fingernails or toenails for humans. This is a false analogy. The European Commission's Scientific Veterinary Committee (SVC) has described debeaking as a "serious mutilation". After examining the scientific evidence they concluded that the operation is painful and that birds may suffer persistent pain following debeaking due to the presence of neuromas (SVC, 1992). (A neuroma is a swelling on a nerve).

The SVC recommended that debeaking "should be banned as soon as practicable since it is known to cause pain both during and after the operation". This recommendation was reiterated in the SVC's 1996 Report on the Welfare of Laying Hens (SVC, 1996).

Similarly the Farm Animal Welfare Council (FAWC, 1991) concluded that debeaking "is a serious welfare insult to the hen and can result in chronic pain for long periods after the operation". In 1997, FAWC restated that it views debeaking as "a major welfare insult." (FAWC, 1997).

The impact of debeaking on hen welfare is vividly illustrated by a study carried out by Gentle *et al* (1990). This found that amputation results in significant changes in the behaviour of the birds. After debeaking, the hens spent less time pecking and drinking than before. Gentle interpreted this as an attempt to guard a painful area of the body (similar behaviour can be seen in humans and other mammals).

Such guarding behaviour was also used by Gentle to explain why after amputation, hens reduced the amount of head shaking and beak wiping which they performed. Head shaking and beak wiping are associated with feeding and drinking; their purpose is to remove particles of food from the mouth or the surface of the beak. Indeed another study by Gentle has shown that partial beak amputation leads to feeding difficulties for hens (Gentle *et al*, 1982). In particular, food intake was reduced and this was accompanied by a fall in body weight.

We have already seen how debeaking leads to feeding difficulties and a reduction in pecking, head shaking and beak wiping. Another study found that after debeaking there was a decrease in the time spent feeding, drinking and preening, all activities which directly involve use of the beak (Duncan *et al*, 1989). The authors concluded that the substantial decrease in activities involving the beak suggests that the birds are suffering severe pain. This probably lasts for three to five weeks but may last longer.

Gentle *et al* (1990) added that it has been reported that partial beak amputation "results in long-term increases in dozing and general inactivity (Eskeland, 1981), behaviours associated with long-term chronic pain (Wall, 1979) and depression (Fraser and Quine, 1989)".

The evidence that debeaking causes pain is not just behavioural but also neurological. Gentle (1986) has shown that after debeaking extensive neuromas form in the healed stump of the beak. He concluded that the presence of neuromas together with abnormal neural activity raises serious welfare questions about debeaking. The neuromas may well be painful for the rest of the bird's life (Broom, 1992).

Chickens have nociceptors (sensory pain receptors) in the beak, with response characteristics similar to those of mammals (Gentle, 1989). Broom (1992) points out that, in the light of this, any trimming operation must be painful.

Gentle *et al* (1990) add that partial beak amputation is likely to be a painful procedure leading, amongst other things, to phantom and stump pain. Their results suggest that hens may experience some of the long-term painful complications seen in humans following amputation.

Indeed the case against debeaking has been implicitly accepted by the Ministry of Agriculture's Code of Practice (MAFF, 1987). This stipulates that debeaking "should be carried out only as a last resort". With so many hens (kept in all types of systems) being debeaked, it seems that this advice is, in practice, largely being ignored.

Alternatives to debeaking

Both the European Commission's SVC and FAWC have recognised that debeaking is not necessary.

The SVC has stressed that: "Hens should be housed and managed in such a way that beak trimming is not necessary" (SVC, 1992 and 1996).

A similar conclusion has been reached by Professor Donald Broom, Professor of Animal Welfare at the University of Cambridge (Broom, 1992).

FAWC (1991) too has concluded that: "beak trimming should not be necessary in a well-managed system where the hens' requirements are fully met", and recommended the immediate introduction of legislation to require the banning of all routine, non-therapeutic debeaking by 1996.

The provision of extensive litter areas combined with low stocking densities and low group and flock sizes could go a long way to reducing feather-pecking and cannibalism.

It has been found that feather-pecking is mainly performed when hens are unable to a) peck at the ground and b) dust-bathe.

In natural conditions hens spend long periods pecking at the ground for food. Where hens are unable to food-peck, that behaviour may be "mis-directed" into feather-pecking (Blokhuis and Arkes, 1984). FAWC's Minority Report on colony systems for laying hens (FAWC, 1991a) cites a number of studies showing that there is a considerable reduction in feather-pecking when other materials to peck at are provided (studies cited include Norgaard-Nielsen, 1989; Blokhuis, 1986).

Hens are strongly motivated to dust-bathe. It has recently become clear that when hens are prevented from dust-bathing, they may well re-direct that behaviour into pecking the feathers of fellow birds. For example, Vestergaard, (1989) found that birds who were provided with litter (which enables them to dust-bathe) and perches displayed more than 2.5 times less aggressive

pecking compared with birds kept without litter and perches. Broom (1992) has said "it seems that adequate litter on the floor can solve the feather-pecking problem".

FAWC's Minority Report (FAWC, 1991a) stressed that debeaking attacks the symptoms rather than the root causes of feather-pecking. Clearly if hens are kept on litter, they are able to peck at the ground and dust-bathe and thus two "root-causes" of feather-pecking are addressed in a positive manner.

Broom (1992) emphasised that in addition to providing environments with extensive litter areas, it is important to ensure a stocking density that is not too high.

In its 1996 Report, the SVC noted that cannibalism may be "most severe where there is a combination of large flock size and high stocking density" (SVC, 1996).

There is also evidence to suggest that breed selection and genetics have a role to play in reducing the incidence of feather-pecking and cannibalism. It has been shown that different strains of hen can react differently in terms of their behavioural patterns. According to the UK Farm Animal Welfare Council, there is evidence from the USA that genetic selection can reduce feather-pecking and cannibalism "significantly and substantially" (FAWC, 1997).

The results of one study, for example, indicated that the 'need' for debeaking would be greatly reduced "as soon as appropriate genetic stocks are identified" (Craig & Lee, 1990). The researchers considered that "Such stocks could then be kept in well-lighted housing without the stress commonly believed to be associated with beak trimming".

Given these facts, CIWF believes that the Government should bring pressure to bear on the relevant breeding companies to ensure that breeding programmes for laying hens pay full attention to welfare criteria.

It is essential, however, that the quest for, and use of, less aggressive strains of hen should be seen as a complement to (not a substitute for) the use and development of well designed, well managed alternative systems. Selective breeding should not be used as a kind of 'genetic mutilation' to make hens apparently suited to poor welfare conditions.

It is encouraging that the responsible, welfare-friendly approach to strain selection and development has been identified as one way to help tackle the multi-factorial feather-pecking problem. What is deeply worrying, however, is that FAWC believes that current breeding programmes may actually be making the problems of aggressive pecking worse instead of better (FAWC, 1997). Urgent action is called for by CIWF to evaluate and reverse this trend. It simply cannot be acceptable for parts of the industry to put the single-minded pursuit of higher production above concerns for animal welfare.

As mentioned in earlier sections, permitted stocking densities in many colony systems are too high and therefore have an adverse effect on bird welfare.

CIWF believes that the proper response to feather-pecking and cannibalism is not to mutilate the hens to make them fit unsatisfactory systems. Rather we should abandon the impoverished systems which currently dominate the poultry industry. Not only should the use of the battery cage be ended, so too should colony systems which stock birds at such high densities and in such large groups that welfare problems are inevitable.

Non-therapeutic mutilations of hens should not be permitted.

ETHOLOGY

That hens should have the freedom to express normal behavioural patterns is a fundamental aspect of promoting good welfare. Dawkins (1983) stated that "Deprivation becomes suffering when an animal is prevented (either through physical restraint or lack of suitable stimuli) from performing behaviour that it "wants" to do to such an extent that it experiences intense or prolonged unpleasant subjective feelings".

The provision of adequate space in itself, though vital, is not enough to provide for the behavioural needs of hens. What is needed is a whole systems approach where the total environment is enriched appropriately.

The following discussion looks at the major behavioural needs which should be satisfied if a system is to have the potential for high standards of welfare. It is worth noting that all the behaviours mentioned below are completely thwarted in the battery cage.

Ability To Perform Natural Behaviours

a) Nesting

Hens have a strong instinct to find a suitable site and build a nest in the hours immediately before egg laying. This was supported by the 1996 Report of the Scientific Veterinary Committee which concluded that "Hens have a strong preference for laying their eggs in a nest and are highly motivated to perform nesting behaviour." (SVC, 1996). Studies have shown that they will carry out considerable 'work' to overcome obstacles to achieve a nest site. (Smith *et al*, 1990; Baxter, 1994).

If hens are deprived of a suitable nest site they will display abnormal behaviours which indicate frustration such as increased pacing and restlessness (Sherwin and Nicol, 1994) or abnormal behaviour in the form of vacuum nesting (Mills & Wood-Gush, 1985).

Appleby *et al* (1992) state "It is widely accepted that frustration of nesting is the most severe behavioural problem of hens in battery cages". Broom (1992) comments "The evidence that welfare is poor at this time [before egg laying] if no nest site is available is clear".

The provision of a suitable nest site is therefore essential for the welfare of the hen. It is also necessary to ensure that a sufficient number of well-designed nest boxes are available to enable easy access by the hens on a daily basis. In its report on colony systems, FAWC (1991) recommended that all hens should be given the opportunity to lay in a nest box. The report also suggested that boxes should be provided with a suitable substrate on the floor to encourage the hen's nesting behaviour, and that they should be designed so as to accommodate only one bird per box.

CIWF agrees with these FAWC recommendations, believing that all hens should have the opportunity to lay their eggs in suitable nest sites which allow and encourage the birds to perform natural nesting behaviours.

b) Perching

The normal behaviour of hens is to seek a high perch on which to roost at night. This instinct, no doubt, served their ancestors to escape the attention of predators.

On the farm situation, hens will begin to perch shortly before dark and can show considerable competition for favoured sites which tend to be the higher perches (Fraser & Broom, 1990). If there is insufficient perch space for the whole flock to perch when roosting at the same time, then this competitive behaviour can become 'vigorous' indicating that perching at night is important to hens (Appleby *et al*, 1992). The welfare of the birds is likely to be improved if this perching behaviour is not frustrated by the absence or lack of enough perch space.

In addition to satisfying the birds' behavioural need, Broom (1992) showed that the provision of perches has also been shown to promote greater leg strength. He went on to comment "It is clear that hens prefer to perch on something raised above the floor and derive some benefit from doing so". The SVC looked at perching in its report (SVC, 1996) and found evidence that all the hens in a flock perch for most of the night but perch "only rarely" during the day. The height of the perch is also cited as an important consideration "as a perch only 5 cm. high is not considered as a perch and has no attractive nor repulsive value" to the birds. The SVC surmised that hens in battery cages given the chance to perch probably do so as it provides a different floor type as opposed to any perception of a perch. This behaviour could perhaps be to escape the discomfort of the sloping wire floor which is standard in laying cages.

Current European Community rules on egg marketing (EEC 1274, 1991) specify that houses producing 'Perchery' or 'Barn' eggs should provide a minimum of 15 cm. of perch space per bird. There is no requirement for perches in deep litter or battery cages.

The modern hen has been found to measure between 16 cm. and 28 cm. wide (FAWC, 1991). In its report on colony systems, FAWC point out that hens can voluntarily bunch up on perches so that they take up only 13-14 cm. of perch per bird. The report subsequently recommended an allocation of at least 18 cm. of perch space per bird to allow all hens in a flock ready access to it. However, the Minority Report (FAWC, 1991a) stated "There is sufficient evidence on perch space to give the birds the benefit of the doubt. Therefore we recommend a minimum perch space of 25 cm. per bird".

CIWF believes that sufficient perch space of an appropriate design should be available to allow all hens in a flock the opportunity to perch simultaneously and without difficulty. We support the Minority Report view that at least 25 cm. of perch space per bird should be provided.

Perches need to be arranged carefully to avoid birds being soiled by droppings from birds above, unless a manure belt or similar apparatus is employed.

c) Scratching/foraging

As mentioned earlier, hens will normally spend much of their day foraging. One study found that domestic hens under more natural conditions spend 47.9% of their time during daylight hours pecking and scratching (Savory *et al,* 1978). They are clearly strongly motivated to peck and scratch at the ground in search of food. This behaviour can be accommodated in the farm situation by offering a well littered floor to the hen house, and by allowing access to a suitable outdoor area.

If opportunities to forage are not available, then hens have been found to 'mis-direct' this behaviour into feather-pecking. A study by Blokhuis and Arkes (1984) looked at the behaviour of hens divided into four groups; two housed on litter, and two kept without litter. A higher frequency of feather-pecking (and a more damaging character of pecking) was found in the non-litter groups. Most of these birds had severely damaged plumage. On the other hand, the plumage of the birds kept on litter was in perfect condition.

The authors concluded that "food pecking behaviour can easily lead to feather-pecking and feather eating. The hypothesis that this development is more likely when ground scratching and pecking are frustrated by lack of an appropriate litter substrate seems obvious. In the latter situation, feather-pecking evolves as 'mis-directed' ground-pecking. The results from the present experiments strongly support this view".

In battery cages, where ground scratching and foraging behaviour is completely thwarted, the hen's claws can grow too long through lack of wear. These can easily become damaged. (Appleby, 1991).

We can see that frustration of the motivation to forage can lead to abnormal behaviour (feather-pecking) and physical injury (broken claws). In order to protect the welfare of hens, CIWF recommends that all birds are given ample opportunity to express their natural foraging behaviour. Houses should be equipped with a substantial litter-floored area covered with an appropriate substrate. Small amounts of food grain could be sprinkled on this litter area on a regular basis to give further incentive to this behaviour.

Wherever possible, birds should have access to an appropriate outdoor area.

d) Dust-bathing

Hens are strongly motivated to dust-bathe, a behaviour which helps to keep their feathers in good condition. It involves the birds spraying themselves with dry dust or litter to remove excess oils from their plumage.

If hens are denied access to a suitable substrate for performing this behaviour over a prolonged period, as in the battery cage, for example, vacuum dust-bathing behaviour can develop, whereby hens will go through the motions of dust-bathing without a suitable substrate being present (Baxter, 1994). Expression of this abnormal behaviour indicates that frustration of the dust-bathing motivation must have an adverse effect on the hens' welfare. It has been found that after a period of being deprived of the ability to dust-bathe, "hens show compensatory dust-bathing, indicating relevancy for the bird." (SVC, 1996).

Recent evidence also suggests that preventing dust-bathing may well re-direct this behaviour into feather-pecking. Vestergaard (1989), for example, found that birds who were provided with litter and perches displayed more than 2.5 times less aggressive pecking as compared with birds kept without litter and perches.

Broom (1992) has described dust-bathing as a "highly preferred behaviour", the frustration of which is "a real deprivation for hens".

CIWF recommends that a significant proportion of the hen house should be covered with a litter substrate appropriate for dust-bathing. The FAWC Minority Report on colony systems (FAWC, 1991a) recommended that at least two-thirds of the floor area be littered. We support this recommendation.

e) Exercising

Hens need to have sufficient exercise (Broom, 1992). Adequate space is, of course, an essential requirement in satisfying this need, and is discussed fully above. Exercise encompasses a range of movement behaviours such as walking, running, wing-flapping, fluttering and flying.

Denying hens the ability to exercise leads to the development of bone weakness. This skeletal weakness was first described as Cage Layer Fatigue, following the introduction of battery cages in the USA. Leg strength has been shown to be 41% greater in floor-housed colony hens, for example, than in caged birds (Appleby, 1991). Gregory and Wilkins (1989) have found that up to 30% of battery hens suffer broken bones when being removed from their cages at end-of-lay and during transportation to the slaughterhouse.

A recent commercial scale study of caged hens found that 35% of all mortalities during the laying cycle were attributable to bone fragility, or what the researchers described as cage layer osteoporosis (CLO), (McCoy, Reilly and Kilpatrick, 1996). The CLO condition was diagnosed on the basis of a carcase having at least one fracture of the following bones: the ribs, sternum, humerus, radius, femur and tibia.

It is generally accepted that the main cause of bone weakness is the restriction of movement (SVC, 1996). Two other factors which are believed to exacerbate the problem are lack of minerals in the birds' diet and the demands of egg production on the modern high-yielding hen who can now lay over 300 eggs per hen per year.

Denying hens exercise is also an important factor responsible for a disease known as Fatty Liver Haemorrhagic Syndrome (FLHS). This production disease is mainly found in caged hens causing death in affected individuals from rupture of the liver. In addition to restricted locomotion, high levels of environmental temperature and stress are also factors related to FLHS (SVC, 1996).

Depriving hens of exercise not only frustrates their natural behaviours, but also leads to a higher incidence of bone weakness and Fatty Liver Haemorrhagic Syndrome. All hen-keeping systems must allow for full and adequate exercise.

Ability For All Birds To Feed Simultaneously

Appleby (1991) points out that hens kept in groups have a tendency to feed simultaneously. Where hens in barren conditions are prevented from feeding at the same time as their flockmates, frustration can result (Duncan and Wood-Gush, 1972).

This particular type of behavioural restriction can occur in battery cages which are usually too narrow to enable synchronous feeding. In colony systems, attention should be given to ensure easy access to an adequate supply of feeders.

CIWF recommends that all hens in a flock should have the opportunity to feed simultaneously.

Other examples of synchronous behaviours include drinking and roosting. For the latter, as discussed above, it is important that enough perch space is provided for all birds to roost simultaneously.

No overcrowding or isolation

It has been shown that the level of aggression between hens is low when they have plenty of space and also when they are very close together. The range of stocking densities likely to predispose to maximum aggression is between 824 cm^2 and 1,442 cm^2 per bird (FAWC, 1991a).

Al-Rawi & Craig (1975) studied the effects on social behaviour between hens kept at different stocking densities. It was found that aggression increased progressively as space allowance was decreased from 2,884 cm^2 to 824 cm^2 per bird. Interestingly, and somewhat surprisingly, aggression declined as space allowance was reduced further to 412 cm^2.

Baxter (1984) concluded from this that forcing hens in close proximity to each other (at 450 cm^2 per bird) is likely to disrupt normal social interactions and inhibits the expression of dominance behaviours as well as the resolving of social conflict through aggression.

In CIWF's view, this close confinement, as found in the battery cage, not only renders impossible most normal behaviours - exercising, foraging, etc. - but even prevents hens from expressing an instinctive response to such deprivation. Lower levels of aggression in close confinement should therefore be considered a situation where hens are even prevented from displaying a behavioural reaction symptomatic of a seriously impoverished environment.

It surely cannot be right not only to restrict the birds' activity to perform most normal behaviours, but also to deprive them so totally that even the ability to show symptoms of dire deprivation (such as aggression) are denied as well. This is not to say that hens should be kept in conditions where they are able and likely to express injurious and aggressive behaviour towards each other. Rather hens should be kept in an environment that fully meets their behavioural and other welfare needs, so more naturally reducing or avoiding aggression without recourse to mutilation or restriction. Attention to appropriate breed selection could also help in this endeavour.

It is important to ensure that hens have sufficient space to carry out normal behaviours without recourse to aggression.

It seems clear then that hens should neither be kept in close confinement nor in crowded conditions in a colony system. It is also important to observe the hen's natural inclination to be gregarious. Birds should not be kept in isolation without the companionship of their own kind.

SUMMARY OF MAIN CONCLUSIONS

* CIWF believes that, in view of the inherent disadvantages for hen welfare in this system, battery cages should be phased out urgently on a Europe-wide basis.

  This action should be accompanied by a simultaneous raising of the welfare standards for alternative systems, taking into account the criteria set out in this document.

* CIWF believes that the potential for high welfare standards for laying hens will not be realised by the piece-meal approach adopted in the development of enriched cages. Efforts should be concentrated on more imaginative alternative systems which provide the freedom and facilities needed if the welfare of hens is to be truly protected.

Housing

* CIWF recommends that a minimum indoor floor space allowance of 2,500 cm^2 per bird should be implemented as suggested by the Farm Animal Welfare Council Minority Report on Colony Systems (FAWC, 1991a). This stocking rate should be fixed irrespective of the amount of perch space or raised platforms provided.

* CIWF believes that group sizes should be kept to a minimum (preferably of no more than 100 birds) with a permitted maximum of no more than 500 birds. It should be recognised that, if designed appropriately, more than one 'group' can be kept within a 'flock' or housing unit.

* CIWF supports the recommendation of the Farm Animal Welfare Council Minority Report (FAWC, 1991a) that hens should be provided with "natural light and that the littered floor area and the food troughs should be well lit".

* CIWF recommends that an outdoor stocking rate of no more than 375 hens per hectare is to be preferred. A stocking rate of 650 hens per hectare should be the absolute maximum permitted. Care should be taken with housing design to ensure that the available land is properly utilised throughout, and that hens have easy daytime access to the whole of the outdoor area. The land used should also be frequently rotated to prevent a build-up of disease or mud.

* Hens should be allowed daily access to a suitable outdoor area from an appropriate age.

* CIWF strongly recommends that hens are kept with sufficient overhead cover in the form of trees or similar vegetation wherever possible.

Physiology

* Adequate feed appropriate to the nutritional needs of the hen should be readily available in an easily ingestible form. Restrictive feeding practices or the withholding of food for production reasons (such as induced moulting) should not be permitted.

* Clean, fresh drinking water must be constantly and freely available to the entire flock.

* Non-therapeutic mutilations of hens should not be permitted.

Ethology

* CIWF believes that all hens should have the opportunity to lay their eggs in suitable nest sites which allow and encourage the birds to perform natural nesting behaviours.

* CIWF believes that sufficient perch space of an appropriate design should be available to allow all hens in a flock the opportunity to perch simultaneously and without difficulty. A minimum perch space of 25 cm. per bird should be provided.

* CIWF recommends that all birds are given ample opportunity to express their natural foraging behaviour. Houses should be equipped with a substantial litter-floored area covered with an appropriate substrate to facilitate this.

* CIWF recommends that a significant proportion of the hen house should be covered with a litter substrate appropriate for dust-bathing. The FAWC Minority Report on colony systems (FAWC, 1991a) recommended that at least two-thirds of the floor area be littered. We support this recommendation.

* All hen-keeping systems must allow for full and adequate exercise.

* CIWF recommends that all hens in a flock should have the opportunity to feed simultaneously.

* Hens should not be kept in close confinement, or in crowded conditions in a colony system. It is also important to observe the hen's natural inclination to be gregarious. Birds should not be kept in isolation without companionship of their own kind.

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