healthy, well-feathered pullets with a calm yet 'robust' temperament in order to cope with changes in the environment and management, and to maximise the use of the range area (encouraging the birds' natural desire to roam). Minimisation of the stress associated with pullet transfer and transportation from the rearing house to the laying house, good stockmanship and conscientious and knowledgeable management, good housing design and layout of equipment and perches, and good quality litter may also decrease the risk of feather pecking.

The factors that may increase the risk of feather pecking are then discussed. These include changes in the environment when moving pullets from the rearing farm to the laying farm, changes in feed and in the environment (eg sudden or unexpected noises, excessive numbers of visitors, equipment malfunctions and breakdowns, predators etc), underweight and/or uneven flocks with large variations in bird weight (a desirable goal is for 80% of birds to fall within 10% of the mean weight), poor health status (pullets with a lower overall health status are seen as being less able to cope with the many challenges they receive during lay), disease and pest challenges (especially red mite and vermin, for which a list of requirements for control programmes is included), variations in light intensity and lighting patterns, sub-optimal nutritional intake, and birds coming into lay too early.

Included at the end is a list of all the relevant legislation relating to the guide, details of where further advice and information on animal welfare can be obtained, and a list of pertinent Defra publications, including details of where to obtain the 'Beak Trimming Code of Best Practice' in order to ensure that until 2011 the highest possible standards of welfare are maintained during beak trimming.

A guide to the practical management of feather pecking and cannibalism in free range laying hens 2005. Produced and published by Defra (Department for Environment, Food and Rural Affairs), Nobel House, 17 Smith Square, London SW1P 3JR, UK. 19 pp A4 paperback. Available free of charge from Defra Publications, Admail 6000, London SW1A 2XX, UK; email defra@iforcegroup.com. Also available at http://www.defra.gov.uk/animalh/welfare/pdf/featherpecking.pdf

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Heat stress in poultry

Heat stress can be a serious problem in poultry. In addition to causing suffering and potentially death, it may also result in decreased production. This new booklet produced by Defra details the main causes of heat stress along with practical measures that can be implemented to reduce its incidence, as well as methods that can be used to ameliorate its effects once it has occurred. As the booklet acknowledges, the recommendations contained within are based on current advice and husbandry practices; they are not exhaustive and should not replace expert advice, particularly when the farmer has specific concerns about a problem.

The booklet begins by describing how modern farming practices may contribute to the occurrence and prevalence of heat stress in UK flocks, citing changes to medication, nutrition and genetic characteristics, in addition to more regular occurrences of high (>30°C) temperatures and higher peak summer temperatures (as high as 38°C), as possible causes. The next chapter defines heat stress with the aid of a schematic diagram of the thermoneutral zone, indicating some of the behavioural changes that may occur as temperature increases and where welfare problems are likely to occur. The booklet then goes on to discuss how heat is produced and where external sources of heat (ie within the house) may arise. The methods through which birds lose heat and the behavioural modifications used to bring about heat loss by these methods are discussed, as are the methods by which heat is lost from poultry houses and how birds respond to increasing temperatures (including panting, acclimation to high temperatures and the effect of stocking rate).

Much of the booklet is concerned with measures that can be used to prevent the occurrence of heat stress. These include discussion of whether birds should be thinned prior to the advent of hot weather, the key features of housing that protect birds from hot weather (including the effect of insulation and ventilation systems together with recommended maximum ventilation rates), the effect of reducing feed intake or food removal, adjusting the diet and flock walking, and the importance of staff training and contingency planning.

A useful summary is provided at the end of the document which states particularly important measures which should be taken and points to consider. These are:

• "Provide adequate ventilation for the number of birds housed.

• Provide fast air speed over birds.

• High humidity increases the likelihood of heat stress in hot weather.

• Where possible, reduce stocking densities during hot weather both in the shed and during transport.

• Regularly maintain and test alarms and emergency ventilation equipment.

• Make contingency plans in advance so all know their respective roles and ensure that someone is available with authority to take action."

The booklet ends with details of where further information and advice can be obtained and a list of pertinent publications. A useful timetable of events that occur during heat stress is also presented, including specific actions which should be taken by the stockman and the anticipated response of the flock.

Heat stress in poultry: solving the problem 2005. Published by Defra, Nobel House, 17 Smith Square, London SW1P 3JR, UK. 24 pp A4 paperback. Available from Defra Publications, Admail 6000, London SW1A 2XX, UK. Also available at http://www.defra.gov.uk/animalh/welfare/pdf/hstress05.pdf

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