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Welfare problems and how to recognise them

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Poultry perform well depending on their living circumstances. An understanding of their behavioural and physiological regulatory systems helps us to detect signs that individuals are failing to cope with housing and management conditions.

Every animal has a set of functional systems which allow it to survive and reproduce. These systems make possible the regulation of each aspect of body state so that, for example, body temperature is kept within tolerable limits, and adequate supply of food is found in an efficient way and the effects of hazards which might result in injury are minimised. Regulatory action may occur in response to a change in body state, but the action occurs very commonly before a predicted change occurs. For example, a hen may prepare itself: for cold conditions before the body is cooled; for nutrient depletion before body food stores are affected; or for escape before the danger appears. Laboratory studies indicate that animals have expectations about the results of their actions, for example, a hen which walks to a place which it knows to be at a higher temperature than its surroundings expects to raise its body temperature and a bird which pecks at something known to be a food item expects to be able to ingest it. If the expectation is not matched by the input from the senses then the bird is aware of this mismatch and there is a considerable effect on behaviour and physiology.

Aversive situations

The most obvious situations which are adverse for a chicken are those which lead to bodily injury due to trapping, falling, squashing, etc. or to attack by another bird. Other situations which are aversive may be grouped as involving lack of control by the bird over what happens to it, like:
- An injury which is foreseen by the bird but which cannot be prevented, for example, a peck from another bird from which there is no escape.
- Frustrating situations such as trying to peck at food when the food cannot be reached (*Figure 1*) or wanting to build a nest when no nest material is available.
- An action is carried out but either fails to achieve the objective or has unpredictable effects. Examples include an individual which is unable to prevent itself from over-heating or one which pecks at a drinker and gets an electric shock.
- In relatively stable conditions any sudden, unpredictable event. Human actions are often unpredictable so cage cleaning, handling, crating and transporting are often traumatic for poultry.

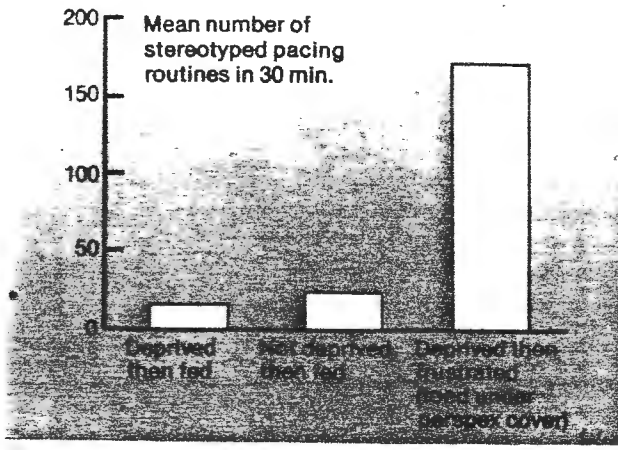
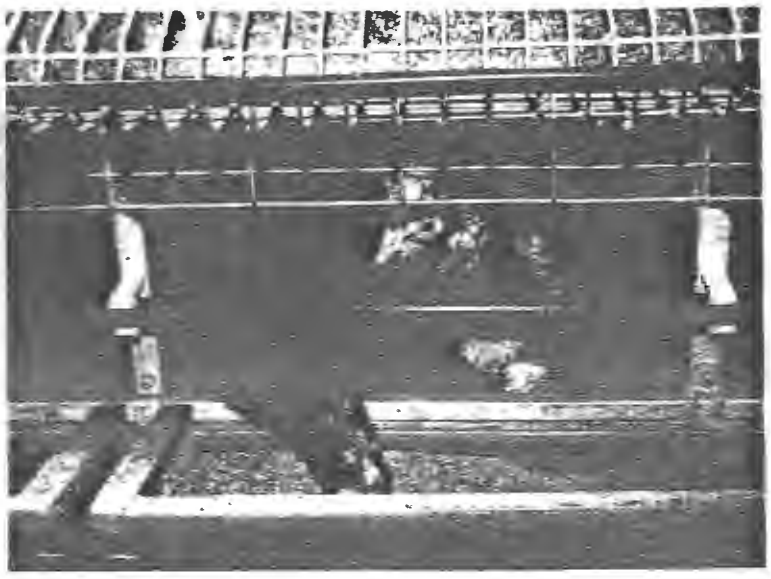


Figure 1 **Frustration** *due to a Perspex cover being put over food resulted in hens showing more stereotyped pacing and more attacks on a subordinate hen.*

What can be measured?

The welfare of an individual is its state with respect to its attempts to cope with its environment. Welfare is bad when the individual is failing to adapt and cope, or is having difficulty in doing so. Some of the situations in commercial poultry systems which are adverse for the birds are very obvious in that birds are killed or prevented from growing. Others are less obvious and the measurable effects on the birds are more difficult to interpret. We are still learning about responses to adverse conditions but the major effects and types of responses are listed below, together with comments about measuring them:
- Reduced growth rate, egg production, or chances to survival.
- Increased incidence of disease. The welfare of a diseased bird is bad if the symptoms indicate that the individual is in pain or is having difficulty coping with the disease effects.
- Injuries resulting from the interaction of the bird with its physical surroundings or from attacks by other birds. The incidence and severity of these can be measured.
- The normal behavioural and physiological responses which regulate body state may be shown with high frequency, intensity or duration. For example, panting as a response to over-heating might occur at a high frequency for many hours and such frequencies can readily be measured.
- Panic responses may occur in conditions where they lead to injury, for example, hysteria leading to the breaking of feathers, wings or legs. Concealed observers, who do not affect the frequency or intensity of the behaviour can assess the incidence of panic behaviour in various conditions and upon presentation of various stimuli.
- Abnormal behaviour may reduce adverse effects on the individual whilst not removing the problem. One example is the occurrence of stereotyped behaviour, such as pacing, in conditions where some activity is frustrated. Another is the use of behaviour, such as pecking other birds, which harms others but which could have some alleviating effect for the pecker. The measurement of the extent of occurrence of pecking other birds or of stereotypies, such as pacing or head-flicking, requires careful description and definition of the activity and prolonged observation, perhaps using videorecording.
- Another behaviour change which may help in coping with the environment is to reduce the activity level and become unresponsive to environmental events. The effects of being unable to avoid an attack and of the unpredictability of attack may be much more aversive than the physical damage caused by the attack (*Photo*). Birds subject to such attacks usually show considerable behavioural abnormality, including lack of responsiveness to stimuli including pecks. Such a change may be temporary, so that the bird still feeds normally, or may be of sufficient



The hen on the right *is about to deliver a peck on the neck of the other. Such pecks are unavoidable in this feeding situation.*

duration to affect growth or egg production. Experimentation is needed to assess the degree of responsiveness with any accuracy although inactivity and lack of responses to events which occur during an observation period can be assessed without experimentation.
- It may be that some of the behavioural responses described above are associated with self-narcotisation using opiate peptides in the brain. The levels in the brain of these chemicals, which are also concerned with pain relief, can be measured, but only in dead animals at present. They can also be manipulated by the use of inhibitors. It is necessary to combine such procedures with behaviour measurement in order to obtain useful information about how much the animal is using the naturally occurring narcotics.
- Other physiological measures of short term responses to adverse conditions are the levels of adrenal hormones in the blood, heart rate and breathing rate. High adrenal hormone levels do not necessarily imply adverse conditions for they occur during active feeding or egg-laying. Long-term effects of housing conditions may be measured by assessing the activity of synthetic enzymes in the adrenal gland. Those birds which have previously had frequent adrenal cortex responses to the conditions should have higher synthetic enzyme levels. Other effects of high adrenal activity are adrenal enlargement and effects on the immune system. If the functioning of the immune system is impaired so that susceptibility to a disease is increased then this can be tested by disease challenge experiments.

Decisions about welfare

Since individuals vary in the methods which they adopt to attempt to cope with adversity, it is necessary to measure as many as possible of the indicators of adversity in order to assess a handling method or housing condition. A single indicator, such as reduced egg production or high frequency or stereotyped behaviour, shows that the individual is failing to cope or finding it difficult to cope with adverse conditions, but the absence of either indicator does not mean that conditions must be good.

When welfare indicators are measured, decisions about what is ethically acceptable must be taken. Whilst small scratches on the legs of hens in a particular housing system might be acceptable to most people, few would accept the frequent loss of toes or claws. Similarly, brief behavioural and adrenal responses once a week might be acceptable whilst prolonged behavioural and adrenal responses would be unacceptable, especially if they occurred frequently within one day or regularly every day. The duration of effects should also be considered, together with the severity of affects, where there is injury. Whilst a superficial skin abrasion may elicit no other responses, a broken claw might be intermittently painful over a long period. A deformed claw might result in frequent episodes of frustration, due to impairment of walking, and hence be bad for welfare. Foot damage and claw deformity and problems on wire floors with no abrasive strip. Wounds resulting from pecks by other birds must sometimes lead to considerable pain and all but the most trivial peck wounds would affect welfare adversely. Feather loss, due to feather pecking or abrasion, might not have much direct effect upon individuals when at a low level but can lead to temperature regulatory problems when extreme and may cause other discomfort which we cannot measure at present.

Importance of frustration

A particularly difficult problem is to assess the importance of frustration associated with confinement. Walking, wing-stretching, manipulating material with the bill, and dust-bathing are amongst the activities which would be frustrated if the hen in a battery cage wished to show them. Since their frequency is so high in hens given the opportunity to show them it seems likely that hens in cages are motivated to perform them also. At times when the birds are startled there is no doubt that running and flying would occur if possible and hens normally prepare for the necessity to show such behaviour at some time by practising the movements at intervals. The necessity for dust-bathing is likely to depend upon plumage condition.

Nest-building before egg-laying is carried out by most hens which can do it so it is not surprising that behavioural abnormalities and, probably, physiological abnormalities occur when it is not possible. Stereotyped pacing is a widespread indicator of bad welfare at this time (*Figure 2*). It seems more likely that those strains which show little pacing may use some physiological method of trying to cope rather than being unaffected by their inability to build a nest.

Another approach to welfare questions is to ask what is good for welfare rather than asking how we can detect what is bad. When a chicken is placed in a position where it can choose between alternative conditions it has been found to choose wire mesh floor rather than solid floor with holes in it and a larger cage rather than a smaller cage. Chickens also exhibit preferences for a certain light brightness and temperature when kept in conditions extensive enough for there to be a range of levels for such environmental variables. Such information is clearly of value when designing housing conditions, especially if it has been possible to assess how important a particular preference is to the bird. When comparing housing conditions and husbandry methods, however, it is more useful to look for indicators showing that individual birds are having difficulty coping with the situation.□

Figure 2 **The inability** *to build a nest before egg-laying can lead to much stereotyped pacing behaviour.*