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Poultry Well-Being: Mitigating Unavoidable Stresses and Preventing Avoidable Stresses

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The well-being of poultry is important to growers, integrators and consumers as production parameters (such as gain and feed:gain ratios) are negatively impacted by inadequate well-being. Moreover, sub-optimal well-being influences consumer confidence in the product and hence demand, together with price. Conditions for optimal well-being of poultry and livestock are described in the "Five Freedoms," compiled by the Farm Animal Welfare Council (2011). The Five Freedoms can be summarized as follows:

1. Freedom from hunger and thirst.
2. Freedom from discomfort.
3. Freedom from pain, injury or disease.
4. Freedom to express normal behavior.
5. Freedom from fear and distress.

In many ways, the Five Freedoms can be restated as freedom from the stress or stresses listed above.

Stress

When poultry are subjected to a short- or long-term stress, there is a physiological response. There is ultimately increased release of a hormone called corticosterone from the adrenal gland into the blood-stream. The corticosterone acts in the following manner:

- To change the metabolism of the bird.
- To depress immune functioning and, hence, the ability to respond to disease organisms.
- To reduce growth, as demonstrated by research from the University of Arkansas and elsewhere.

The increase in corticosterone release is due to stimulation by hormones from the brain [specifically both corticotropin-releasing hormone (CRH) and arginine vasotocin (AVT)] and from the anterior pituitary gland [adrenocorticotropic hormone (ACTH)]. For instance, feed restriction increases release of CRH. This in turn releases ACTH, and ultimately corticosterone is released.

Stresses can be categorized as avoidable stresses or unavoidable stresses that can be mitigated.

Avoidable Stresses

Some stresses can and should be avoided in order to assure the reputation of the industry and the products and to prevent stress-induced production impairment. These stresses, predominantly those listed in the Five Freedoms, are explained below.

- **Insufficiency of feed or a specific feed ingredient.** Inadequate feed may be due to a problem with feed in storage, breakdown of the auger systems or a lack of feeders. These problems are addressed initially by observation of birds.
- **Insufficiency of water or presence of contaminant(s).** Problems include the following: faulty nipples, nipples at the wrong height, air locks in line and contamination of water. These

problems can be addressed by testing, flushing lines and observation of birds.

- **Unacceptably wet litter leading to contact dermatitis.** This can be mitigated.
- **Sub-optimal temperatures and humidity with, in the extreme, heat or cold stress.** This can be overcome by appropriate ventilation, heating or cooling – for instance, using cooling pads.
- **Inadequate air quality with ammonia and dust levels reduced by appropriate ventilation.**
- **Diseases.** These can be combatted by good husbandry, vaccination and superior biosecurity programs (plus antibiotics when they are employed).
- **Parasites.** Ectoparasites (bedbugs, fleas, lice, mites and ticks together with flies and mosquitos) and endoparasites (nematode worms, etc.) can be controlled by appropriate chemicals coupled with regular evaluation of the birds and production parameters.
- **Overcrowding preventing birds being able to exhibit their natural behaviors.**

Unavoidable Stresses

It would seem that all stresses are avoidable, but this is not the case. An example of an unavoidable stress is vaccination where the birds are challenged with antigens. Vaccination should be conducted in a way to mitigate stress and to limit labor costs.

Conditioning the beak and toes is an unavoidable stress. The magnitude of the stress can be reduced by observing requisite standards.

Another unavoidable stress is harvesting broiler chickens and turkeys by a catching crew. The extent of the stress can be mitigated by suitable training and adequate supervision of the catching crew. An analogous situation is with shackling, where again the magnitude of the extent of the stress can be mitigated by suitable training and adequate supervision of the shacklers.

Another stress is transportation from either hatchery to the brooding areas of the poultry house or, later, from poultry houses to processing plant. Research at the University of Arkansas has demonstrated that approaches to mitigate the effects of adverse low or high temperatures (respectively in the winter and summer) are effective in combatting the ambient temperatures and providing an acceptable environment for the birds.

Fight or Flight

In a "fight or flight" situation, a bird, animal or person responds immediately to an acutely dangerous situation by either fighting or running away to stay alive. Bird well-being is commensurate with the absence of a "fight or flight" response at any stage during production.

The ability to either fight or flee is enhanced by physiological responses. These include increased blood glucose levels, increased heart rate, increased blood flow to skeletal muscles and decreased blood flow to the skin and intestines. The physiological fight or flight response is due to other adrenal hormones, epinephrine and norepinephrine (also known as adrenaline and noradrenaline).

Are there "fight or flight" situations in poultry production? The simple answer is yes, but they can be avoided. An example of a "fight or flight" situation is when predators attack birds in a free-range situation (inherent to organic production) or in backyard flocks. Moreover, within a flock there can be cannibalism. Both of these can be avoided. Netting can be effective in reducing the impact of predators such as hawks, foxes and other mammalian predators. Moreover, effective rodent control reduces losses from rats. Cannibalism can be reduced by preventing overcrowding, optimal light intensity and other aspects of good husbandry.

References

Farm Animal Welfare Council, 2011. http://webarchive.nationalarchives.gov.uk/20121010012427/http://www.fawc.org.uk/freedoms.htm. Accessed 3.30.18.

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