COMMERCIAL EGG TIP . . .

THINGS TO REMEMBER TO PRESERVE EGG QUALITY DURING SUMMER.

It is well understood that a hen must eat a proper amount of energy, protein, and calcium in a balanced ration to produce eggs of optimum size and good shell quality. It is also well known that excessive heat during summer results in small eggs or eggs with poor shell quality. High environmental temperature reduces a hen’s appetite. Within limits, it is possible to reformulate feed to provide adequate protein and calcium at reduced feed consumption rates. However, if the hen house environment is overly warm, it may not be possible to adjust the feed formula enough to maintain egg size or shell quality in the face of low feed consumption.

Appetite reduction is not the only consequence of heat stress. Hens pant when they are too hot. Panting evaporates water from the respiratory tract, and cools a bird down because heat is absorbed in the conversion of water to water vapor. However, panting by hot birds also increases air flow through the lungs. Since gas exchange occurs when air passes through the lungs, carbon dioxide is removed from the blood at a higher rate than normal. Carbon dioxide is acidic in aqueous solution, so its removal at an increased rate changes the acid-base balance of the blood to a higher pH and carbonate ions become less available to form calcium carbonate, which is the major component of the egg shell. Excessive panting, therefore, can contribute to reduced shell quality.

Obviously, the key to maintaining egg size and shell quality during the heat of summer is to do whatever is possible to prevent birds from becoming overheated. For a hen house, this means keeping the house average temperature sufficiently low and minimizing variation of temperature around the house. Fan ventilated houses should be kept air-tight so that all incoming air enters through the air inlets, where it can be cooled if necessary by water evaporation. Solid-sided houses are easier to make air-tight than curtain-sided houses. Non-cooled air will be drawn through holes.
in walls or spaces around doors, creating hot spots. Air leakage also will reduce air velocity in a tunnel-ventilated house, leading to excessive temperature rise between inlet and fans. The insulation in the ceiling and wall should be maintained in good condition to limit penetration of heat from the outside. This usually means that a good rodent and pest control program be maintained because mice and beetles can be destructive to insulation. Cool cell pads should be kept clean to promote free flow of air. Summer is probably the most important time to keep fans clean and in good working order because this is the season of peak ventilation requirement. It is astonishing how much air flow is reduced by dust accumulation on fan blades and screens. Any deficiency of air flow at this time will make the interior of the house too warm.

If everything has been done to improve house temperature but shell quality is still a problem, some adjustments of feeding management may help. Hens preferentially consume calcium late in the day on egg formation days if given opportunity to do so. It also is known that the presence of calcium in the digestive tract during the time of shell formation (typically evening and night) can augment shell quality. Thus, some of the calcium source in the feed should be in particles large enough for hens to distinguish and preferentially eat on egg formation days. Feeders should be run periodically during the four hours before dark to encourage calcium consumption. Additionally, the lights can be turned on for an hour or two at midnight and the feeders run to encourage hens to eat during a cooler time of day, thereby getting them to ingest more calcium. If excessive panting is observed during the day, shell quality might be improved by replacing a portion of the sodium chloride in the diet with sodium bicarbonate, bearing in mind that the chloride requirement of the hen must still be met by the overall ration. This strategy will be effective only if hens eat the feed while shell formation is taking place (Dale, 1997. Another look at bicarbonate. July Commercial Egg Tip).

Finally, it is important to remember the relationship that phosphorus has with calcium metabolism. Dietary calcium is stored during the day in medullary bone and later released for egg shell formation. Since bone consists of calcium phosphate, a deficiency of dietary phosphorus can prevent deposition of dietary calcium into medullary bone, leading later to a deficiency of calcium for egg shell formation. Environmental concerns about phosphorus levels in poultry manure have led to attempts to reduce phosphorus content in feeds. This has been done by reducing the addition of available phosphorus and by adding the enzyme phytase to make the phytate phosphorus already in plant feed components more available to the bird. Some feed ingredients, such as meat and bone meal from different sources, can vary widely in phosphorus content. Also, the increase in availability of phosphorus in layer feeds supplemented with phytase may vary from 30-60% (Dale, 2000. Phosphorus status in laying hen feeds. January Commercial Egg Tip). In a reduced phosphorus feed, these variations may combine to make the actual margin of safety dangerously lower than expected. Reduced feed consumption during heat stress could tip birds into phosphorus deficiency, resulting in shell quality and other problems. It would be wise to increase the margin of safety for phosphorus in layer feeds during times of anticipated heat stress.

A. Bruce Webster,
Extension Poultry Scientist
County Extension Coordinator/Agent

**Consult with your poultry company representative before making management changes.**