Heat Stress Management



The major poultry producing areas in India are subject to high environmental temperatures from April to June. I is customary for egg producers to experience increased heat-related mortality and reductions in egg production, bird feed intake and body weight growth for rearing-stage pullets during summer. An efficient heat stress management system is required to combat the negative effects of heat stress. Below mentioned are few management practices that can reduce the impact of heat stress on performance.

Heat and Humidity

It is not only increased temperature that causes discomfort to the birds, but the combination of temperature and humidity. The sum of ambient temperature in Fahrenheit ($^{\circ}F$) and relative humidity (RH) percent is called "Heat Stress Index." (e.g.: Temperature: $80^{\circ} F + 70\% RH =$ Heat Stress Index of 150).

Rule of Thumb: A Heat Stress Index of 160 and above is more likely to cause heat stress and negatively affect flock performance.

In general, environmental temperature rises during the day while %RH falls. The opposite effect occurs at night (temperature falls while %RH rises). Therefore, during the hot season, it is possible for birds to feel the effects of heat and humidity discomfort at any time during the day and night, depending upon the temperature and humidity in the location. It is difficult to regulate body temperature in extreme hot and humid conditions without additional care and management; hence it is important to measure the temperature and humidity at different periods during the day and night to adopt an ideal heat stress management program.

Tempe	erature	Percent (%) Relative Humidity														
°C	°F	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
46.1	115	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205
43.3	110	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200
40.6	105	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195
37.8	100	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190
35.0	95	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
32.2	90	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180
29.4	85	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175
26.7	80	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170
23.9	75	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
21.1	70	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
18.3	65	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155
15.6	60	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150
12.8	55	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145

Heat Stress Index

Heat Stress Index = Temperature °F + Percent (%) Relative Humidity

Bird comfort zone (Heat Stress Index < 140)

Begin taking heat stress reduction measures in the flock (Heat Stress Index = 140 to 160)

Heat stress conditions exist, take immediate measures to reduce heat stress in the flock (Heat Stress Index > 160)

Preparation for Summer Management

- 1. Orient new poultry sheds in an east-west axis to minimize solar heating.
- 2. Remove any unneeded metal objects from around the sheds (machinery, vehicles and other junk) which could radiate heat into open houses.

- 3. Remove the manure in the houses in February /March. Manure is a source of heat and its presence in the shed increases the shed temperature .
- 4. Adjust the number of birds in the cage to have an ideal stocking density (72 inches² per hen, with 1 nipple per 6 hens). The overcrowding of birds in cages increases the heat produced within each cage and limits air movement around the birds.
- 5. Roof Insulation Insulate the roof to reduce the heat radiation inside the shed. Use thatching material (rice straw, grasses or corn stalks) on the roof of the shed during the dry season to provide insulation from heat (Figures 1-2).



Fig 1: Roof thatching provides insulation to keep the shed cool



Fig 2: Effective use of thatching materials to reduce roof heating

Application of roof sprinklers with thatching can be utilized wherever water sources are adequate or Whitewash roofs to increase heat reflection.

- 6. Fans with foggers provide the most benefit for evaporative cooling. Do not sacrifice water supply to the birds to run foggers. Use good quality foggers, which give a fine mist. Check for proper working of foggers before the onset of summer.
- 7. Roof overhangs should be at least 1.1 m to prevent sunlight from shining into the sheds.
- 8. Open-ridged roofs (monkey roofs) allow heat to escape from the shed.
- 9. Grow vegetation and grass around the poultry sheds to cool incoming air and reduce the heat reflection into open sheds.
- 10. Drinking water tanks should always be inside the shed (Figure 3). If they are outside the shed and exposed to direct sunlight, the tank should be thatched to avoid direct sunlight (Figure 4) or painted white.



Figure 3. Water tank inside the shed keeps the water temperature cool.



Figure 4. Outside water tanks should be white, insulated and covered to avoid direct sunlight.



Figure 5. Water tanks should be covered to avoid excessive heating from the sun.

Managing Flocks during the Summer Period



Figure 6. Shed using stir fans and foggers to reduce heat load.

1. Keep the birds' drinking water cool by flushing water lines in the afternoon. Water in the pipelines becomes hot in the summer. Birds drinking hot water are more prone to heat stress.

2. Do not disturb the birds during the daytime. Carry on the required handling early in the morning or during the night (beak trimming, transfer of birds and vaccinations).

3. Proper management of foggers is done by monitoring the temperature and humidity in the location. During the daytime, the temperature goes up, whereas the humidity will decrease. Foggers will cool best with this lower humidity and provide relief from heat stress (Figure 6). In the evening, humidity increases and the temperature decreases and hence running of foggers at night may increase humidity and cause increased heat stress to the birds. When the humidity is high, increased air movement using fans will help to reduce the negative

effect.

- 4. Adjust fogger run time to provide frequent short periods of fogging in the day time. If humidity is high during the night time hours do not use foggers.
- 5. Do not feed the birds or stimulate for feeding during the hottest part of the day. Make changes in the feeding schedule to feed early morning and late evening.
- 6. Use electrolytes and vitamin C in drinking water wherever possible.

Tips for Vaccinating Birds

- 1. Adjust the amounts of vaccine and medication volumes used for water treatments to reflect the increased water consumption of the flock during hot weather.
- 2. Maintain the cold chain of vaccines properly during storage and mixing of vaccination.
- 3. Vaccinate flocks during the cool hours of the morning.
- 4. Never withhold water prior to water vaccination during the summer.

Nutritional Management Tips

- 1. The most important effect of heat stress is reduced feed consumption followed by production loss. During the hot season, the daily energy requirement of the birds may actually drop but the requirements for protein, amino acids and vitamins remains the same. Hence, give more concentrated feed based on actual feed intake to compensate for reduced feed intake during the summer season.
- 2. Use oil at 2-3% in the feed as energy source. This will reduce the heat produced during digestion and improve appetite. Rice bran and vegetable oils can be added to replace corn.
- 3. Increase vitamins during the hot season to eliminate stress:
 - Vitamin A 800 IU/kg diet
 - Vitamin C 200 to 300 g/ton
 - Vitamin E 65 to 250 IU/kg diet
- 4. Do not use nicarbazin (anticoccidial drug) during warm weather in the rearing flock, as it can aggravate heat stress-induced mortality.

Stimulate Appetite during the Summer

- Provide a midnight feeding during summer to stimulate the appetite of the birds during the night. Give 1–2 hours of light for feeding during the night, leaving 3 hours of darkness before and after midnight lighting. Midnight lighting enables the bird to eat more in the coolest part of the day. 2 to 5 grams of extra feed consumption per bird can be expected from midnight feeding.
- 2. Midnight lighting could be practiced for the flocks in rearing from 6 weeks onwards to improve the appetite and minimize production loss from heat stress.
- 3. Adjust the lighting schedule to provide more hours in the morning. This will encourage more feed consumption when temperatures are cooler.
- 4. Optional: Feed wet mash in the afternoon. Proper management is required to prevent moldy feed.



Management with timers in the shed

Management without timers in the shed

The above program is a model and need to be adjusted based on the local climatic condition. For further more information please contact our technical service representative.

Treatment of the Heat-Stressed Flock

- In emergency situations, the flock can be sprayed with cool water to save the bird's life. Comatose birds are rarely saved.
- Potassium chloride, ammonium chloride and sodium bicarbonate (2-3 kg /Mt of feed) have been beneficial in heat-stressed flocks.
- During the hot season, colibacillosis (E. coli) is frequently seen, so use appropriate water sanitation procedures.

The key to minimizing the effects of heat stress is *anticipating* periods of high environmental temperatures and implementing appropriate *management* and *nutritional* measures prior to the rise in temperatures.

