Broiler Brooding Management

Population of birds in a shed
Proper no. of birds in a shed (stocking density) is essential for the success of a broiler production system. Factors such as climate, housing types, processing weight, and welfare regulations must be taken into account to assess stocking density. Improper stocking density can lead to leg problems, scratching, bruising and mortality. Additionally, litter integrity will be compromised. Thinning a portion of the flock is one approach to maintaining optimum bird density. A higher number of birds can be placed in a house and reared to two different weight targets. At the lower weight target, 20 to 50% of the birds should be removed to satisfy sales in this market segment. The remaining birds then have more space and are reared to a heavier weight.

Pre-Placement of chicks

Poultry Equipment
After confirming that the number of chicks to be placed meets equipment capabilities, install the necessary brooding equipment and check that all equipment is functional. Ensure water, feed, heat and ventilation systems are properly adjusted.

Bukhari
Verify that all bukhari working properly and no smoke out.

Temperature
Temperature ranges should be recorded daily and not deviate by more than 2°C. Houses should be preheated so that both the temperature and humidity are stabilized 24 hours before placement.

Ventilation of the shed
Minimum ventilation should be activated as soon as the preheating begins to remove waste gasses and any excess moisture. Seal air leaks to eliminate drafts on chicks.

Drinkers
• 14 to 16 drinkers/1000 chicks should be provided within the brooding area.
• Should be completely flushed to remove any residual sanitizer.
• Check for water leaks.
• Water must be clean and fresh.

Poultry Feeders
• Remove all water from cleanout prior to filling.
• Supplemental feeders should be provided for the first 7 to 10 days in the form of paper, trays or lids.
• Trays should be provided at a rate of one per 100 chicks.
• Supplemental feeders should be placed between the main feed and drinker lines and adjacent to the brooders.
• If using paper, the feed area should be a minimum of 25% of the brooding area. 50-65 grams of feed per chick on the paper is recommended.
• It is of utmost importance that the supplementary feeding system does not run empty as this will place stress on the chick and reduce yolk sac absorption.
• Supplemental feeders should be refreshed three times daily, until all the chicks are able to gain access to the main feeding system. This generally occurs at the end of the first week.
• Feed should be provided as a good quality crumble.
• Do not place feed or water directly under the heat source as this may reduce feed and water intake.

Litter
Ensure litter is spread evenly and that it is a minimum temperature of 32°C. If brooder stoves are used the litter temperature should be 40.5 °C under the heat source. Compress the litter around the automatic feeding system to improve accessibility. Litter temperature should be recorded before each placement. This will help to evaluate the effectiveness of pre-heating.

Chick Placement
Chicks from similar age flock sources should be placed in a house.
• Ensure no unexpected delays prevent chicks from being placed immediately upon arrival. Delays in placement can contribute to the dehydration of chicks, resulting in higher chick mortality and reduced growth rate.
• Ensure the proper numbers of chicks are placed in each house.
• Dim shed lights during chick placement to help calm the chicks and reduce stress.
• Chicks must be carefully placed and evenly distributed near feed and water throughout the brooding area.
• A number of boxes should be counted to check accuracy of chick count.
• Weigh the boxes to determine day old weight.
• Chick boxes should be removed immediately following chick placement.
• Lights should be brought to full intensity within the brooding area once all chicks have been placed.
• Monitor the distribution of the chicks closely during the first few days. This can be used as an indicator for any problems in feeder, drinker, ventilation or heating systems.

Characteristics of a good quality chick
• Well dried, long fluffed down.
• Bright round active eyes.
• Look active and alert.
• Have completely healed navels.
• Legs should be bright and waxy to the touch.
• Free of red hocks.
• Chicks should be free from deformities (i.e. crooked legs, twisted necks and cross beaks).

**Brooding Management**
The importance of the brooding period cannot be over emphasized. The first 14 days of a chick’s life sets the precedent for good performance. Extra effort during the brooding phase will be rewarded in the final flock performance. An extra gram of body weight at seven days of age will produce an additional six grams of body weight at 35 days of age. The brooding period will become of greater importance as growth rates increase. Check chicks two hours after placement. Ensure they are comfortable with the temperature.
• Chicks too warm will try to move away from heat, will be panting, will appear quiet and their wings may droop.
• Chicks too cold will crowd towards the heat, will huddle in groups and be noisy.
• Chicks at the correct temperature will be evenly spread, show varied behavior (eating, drinking, resting, and interacting) and will be softly chirping.

**Whole House Brooding**
Whole house brooding is generally limited to houses located in mild climates. The most important aspect to whole house brooding is to produce an environment without temperature gradients.

**Partial House Brooding**
Partial house brooding is commonly practiced in an attempt to reduce heating costs. By reducing the amount of space dedicated to brooding, one can conserve the amount of heat required and reduce energy costs. In addition, proper temperatures are more easily maintained in a small area. Individuals employing partial house brooding techniques have several different strategies for house division. Floor to ceiling curtains are most commonly used to divide a house. A solid 20 cm (8 in) barrier should be placed on the floor in front of the curtain ensuring that no drafts disturb the chicks. Partial house brooding can be managed similarly to whole house brooding with the use of a centrally located heat source and attraction lights.

**Attraction Lights**
With radiant type heaters, attraction lights, running centrally the length of the brooding area, are placed above the heat source to attract chicks to feed and water. Attraction lights are best used during the first five days following placement. At day five background lights should be gradually increased reaching normal whole house lighting by day ten.

**Floor temperature**
Whichever method is incorporated, the floor temperature is the most critical. Chicks do not have the ability to regulate body temperature for the first 5 days and thermo regulation is not fully developed until two weeks of age. The chick is highly dependent upon the manager to provide the proper litter temperature. If conditions are too cold, internal body temperature will decrease leading to stunted growth and susceptibility to disease.

**Proper Brooding**

Just right - *Constantly cheeping chicks*  
evenly spread
An excellent indicator of floor temperature is the temperature of the chick’s feet. By placing the feet against your neck or cheek one can readily learn how warm or cold the chick is. If the feet are cold, re-evaluate the heating systems and litter temperature. If they are comfortably warm, the chicks should be actively moving around the brooding area.

**Ventilation**

In addition to the proper temperature, ventilation needs to be considered. Ventilation distributes heat throughout the house and maintains good air quality in the brooding area. As chicks are more susceptible to air quality than are older birds, Ammonia levels should be kept below 10 ppm at all times. Young birds are also very susceptible to drafts. Air speeds as slow as 0.5 m/sec (100 ft/min) can cause a significant wind-chill effect on day old birds. If circulation fans are in use, they should be directed towards the ceiling to minimize downward drafts.

**Feed and water**

Ensure that both the feeders and drinkers are in adequate supply relative to the stocking density and are appropriately placed. Feeders and drinkers should be placed in close proximity to each other and within the “thermal comfort zone”.

**Bell drinkers**

- Height should be maintained such that the lip is at the level of the birds’ back.
- Frequent assessment and adjustment is essential.
• Must be cleaned regularly to prevent buildup of contaminants.
• Water should be 0.5 cm (0.20 in) from the lip of the drinker at day of age and reduced gradually after seven days to a depth of 1.25 cm (0.5 in) or thumbnail depth.
• All bell drinkers should be ballasted to reduce spillage.

**Feeder management**
Feed should be provided in crumb form and placed on trays, lids or paper sheeting for a minimum of 10 days following placement. Feeders should be raised incrementally throughout the growing period so that the lip of the trough or pan is level with the bird’s back at all times. The feed level within the feeders should be set so that feed is readily available while spillage is minimized. Chicks should be allowed to clean up the feed without running the feeder system empty to ensure buildup of fines does not occur after two weeks of age.

**Light**
Light intensity should be a minimum of 20 lux (2 foot candles) in the darkest place in the brooding area during the brooding phase.

**Feed and water intake assessment after placement**
Crop assessment is a useful tool to judge how effectively chicks have found feed and water. Randomly select chicks and gently palpate the crop the morning following placement. The crop should be soft and pliable. If the crops are hard, this is an indication the chicks have not found adequate amounts water. If the crops are swollen and distended with water, the chicks have not found enough feed.

**Good or bad brooding management indicator**
Seven-day weights are an excellent overall indicator of how successful the brooding management has been. Failure to achieve optimal seven-day weights will result in poor broiler performance. The target for seven-day body weights is four to five times that of day old weight. If this level of performance is not achieved, pre-placement and brooding management techniques should be critically evaluated.

**Brooding checklist**
Chicks should be visited as often as possible during the first week and on each visit the following items should be evaluated:
• Chick Behavior and their distribution
• Air quality
  ammonia levels < 10ppm
  carbon dioxide < 0.3%
• The house should be devoid of drafts
• Feed supply and quality
• Light distribution - 20 lux in the darkest place in the house
• Check temperature of chicks feet and crop fill

Next March 2007

**Growing Phase**
Broiler producers must place added emphasis on supplying a product that meets their customers’ specifications. Growth management programs optimizing flock uniformity, feed conversion, average daily gain, and livability are most likely to produce a product that meets these specifications and maximizes profitability. These programs may include modification of lighting and/or feeding regimes.

**Uniformity**
Uniformity is a measure of the variability of bird size in a flock. The coefficient of variation (CV) is commonly used to describe variability within a population. A low CV indicates a uniform flock whereas a high CV indicates an uneven flock. Coefficient of Variation
\[ CV\% = \frac{\text{standard deviation} \times 100}{\text{mean}} \]
To estimate the CV of a flock, divide the house into three sections. A random sample of approximately 100 birds from each section, or 1% of the total population should be weighed and the individual weights recorded. It is important to weigh all birds within the catch pen excluding culls. Birds should be weighed daily for the first two weeks of age and weekly thereafter.

**Flock Uniformity**
Lighting programs are a key factor in proper broiler management and are fundamental to optimal performance. Lighting programs are typically designed with changes occurring at predetermined ages and tend to vary according to the final target market weight of the broilers. Lighting programs designed to prevent excessive growth between 7 and 21 days have been shown to reduce mortality due to asclites, sudden death, leg problems and spiking mortality. Research indicates lighting programs which include continuous periods of darkness greater than 6 hours improve the development of the immune system. One standard lighting program will not be successful for all parts of the world. Therefore, the lighting program recommendations listed below should be customized based on the environmental conditions, house type and overall stockman objectives. Lighting programs inappropriately employed may impair average daily gain (ADG) and compromise flock performance. Careful observations of flock performance, nutrient density and intake are also important in designing lighting programs. Lighting programs are typically designed with changes occurring at predetermined ages and will vary according to final market weights. If accurate ADG information can be acquired, a program based on average weight gains is preferred. The amount of light and light intensity alters broiler activity. Proper stimulation of activity during the first 5–7 days of age is necessary for optimal feed consumption, bone growth and immune system development. Reducing the energy required for activity during the mid-portion of the growing period will improve production efficiency. Uniform distribution of light throughout the house is essential to the success of any lighting program. It is recommended that 20-60 lux (2-6 foot candles; FC) as measured at chick height, be used during brooding to encourage early weight gains. After 7 days of age or preferably at 160 grams body weight, light intensities should be diminished gradually to 5-10 lux (0.5-1 FC). Many different lighting programs are successfully used today. Programs exist to suit different management practices, processing weights, housing and equipment. The types of programs used are variations of the following:

- Intermittent schedules
- Repeated light and dark
- Step up and down of the darkness period during the life of the bird

The most popular and successful type of lighting program used today incorporates a single period of darkness where longer periods of darkness are used in the growing phase with gradual increases of light to full or near full light one week or more before slaughter. Research and the popular use of these programs provide substantial data resulting in a credible endorsement of efficacy.

**Lighting program benefits**

- A period of darkness is more natural and less stressful for the bird.
- The skeletal and cardiovascular systems are allowed to develop properly.
- Birds have higher levels of alkaline phosphatase, which is vital for good skeletal development.
- Energy is conserved during resting, leading to an improvement in feed conversion.
- The light/dark period increases melatonin production, which is important in immune system development.
- Bird uniformity is improved.
- Growth rate can be equal to or better than that of birds reared on continuous light when compensatory gain is attained.

**Key points to consider when using a lighting program**

- Test any lighting program before making it a policy.
- Provide 24 hours of light on the first day of placement to ensure adequate feed and water intake.
- Turn the lights off on the second night to establish off time. Once set, this time must never change. Birds get accustomed to when the off time is approaching and will "crop" up and drink before the lights go off.
- Use a single block of darkness in each 24-hour period.
- Start increasing the dark period when the birds reach 150-160 grams.
- The darkness should be provided at night to ensure the dark periods are truly dark and that adequate inspection of the flock is possible during the day.
- The lighting program should be adjusted according to the average body weight. Past flock experience should also be considered.
- The dark period should be increased in steps and not in gradual hourly increases.
- Reducing the dark period before catching reduces "flightiness".
• The focus of the broiler light program is to control body weight gain from 7-21 days of age and to promote compensatory weight gain at a later period of time.
• If thinning is practiced, it is good policy to reintroduce 6 hours of darkness the first night after depopulation.
• During heat stress, the birds should be allowed to eat at night and may require a reduction in the dark period.

Examples of lighting programs are listed below and are to be used only as guidelines. The type of lighting program used will be based on flock history and performance experience. The body weights listed below are for straight run (as hatched) broilers. Genetics, nutrient density, feed intake and management programs may significantly impact results and must be considered when modifying a lighting program. Though a higher level of management is required, customization of a broiler lighting program is ideal.

**Lighting programs for open sided housing**
• When natural light is increasing, extend the day length in the evening hours to allow birds time to eat when it is cooler.
• When natural light is decreasing, extend day length in the morning hours.
• Lighting programs involving natural light will be variable depending on the time of the year and the latitude of the farm.
• Light intensity recommendations are for artificial light only and taken between the house wall and the feed line closest to the wall.

**55+ Grams (0.12 lbs) Average Daily Gain**

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<tr>
<th>Age (days)*</th>
<th>Wt (g)</th>
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Days Prior to Slaughter:**

| 20-15       | Natural + 4 | - | 5-10 |
| 15-12       | Natural + 6  | - | 5-10 |
| 10-6        | 23           | 1 | 5-10 |

Till Market: 23 1 5-10---10-20***

**50+/- Grams (0.11 lbs) Average Daily Gain**

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Days Prior to Slaughter:**

| 20-15       | Natural + 6 | - | 5-10 |
| 15-12       | Natural + 8***  | - | 5-10 |
| 10-6        | 23           | 1 | 5-10 |

Till Market: 23 1 5-10---10-20***

**45+ Grams (0.10 lbs) Average Daily Gain**

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Days Prior to Slaughter:

| 15-12       | Natural + 8**** | - | 5-10 |
| 10-6        | 23           | 1 | 5-10 |

Till Market: 23 1 5-10---10-20***

*Age at which to make light change. If thinning a flock, follow the program for the whole flock. After the flock is thinned, revert back to Natural Day Length plus 6 hours for the remaining birds. 6-7 days prior to processing the remaining flock, increase light to 23 hours with 1 hour darkness. 24-48 hours prior to catch, increase light intensity to 10-20 lux to acclimate birds for catch. Depending on the time of the year and the
latitude of the farm, this additional 8 hours of light may equal 24 hours of continuous light, however, adjust added light amount so that there is a minimum of 1 hour of darkness.

Lighting programs for solid side wall or dark curtain broiler housing

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*Age at which to make light change. Gradual dimming of light from 20-60 to 5-10 lux. If birds are brooded in partial house, wait until birds are in full house to begin dimming light. If thinning a flock, follow the program for the whole flock. After the flock is thinned, revert back to 18 hours light:6 hours dark for the remaining birds. 6-7 days prior to processing the remaining flock, increase light to 23 hours with 1 hour darkness. 24-48 hours prior to catch, increase light intensity to 10-20 lux to acclimate birds for catch.

**Finishing Phase**

The finishing phase occurs 7 to 10 days prior to processing. This period of time may be used to adjust body weights while preparing for catching and processing.

**Target weight assessment**
Beginning at 7 days prior to catch, body weights and flock uniformity should be evaluated frequently. (See section on Uniformity page 24). Average daily gain assessments are necessary to establish the flock’s position on the growth curve relative to its target end weight. Upon determination of the flock’s projected ADG, nutrient and lighting adjustments can be modified to help achieve the target end weight.

**Compensatory gain**

Compensatory gain is a period of accelerated growth resulting from growth control imposed during an earlier phase. If feed or light control programs are used, compensatory gains can be realized during the finishing phase. Compensatory gains are greatest when birds are grown to at least 42 days.

**Catching Procedures**

Feed withdrawal should take place 8 to 12 hours before processing to reduce carcass contamination. The purpose of feed withdrawal is to empty the digestive tract, preventing ingesta and/or fecal material from contaminating the carcasses during the evisceration process. When birds are fasted between eight and twelve hours, the intestine is almost completely empty yet strong enough to withstand the evisceration process without rupturing. The effect of feed withdrawal is minimal on live weight. It is important to refer to local legislation for feed withdrawal restrictions. When feed lines are raised, some feed should remain to ensure that no more than the designated period of feed withdrawal has occurred.

**Preparation for catching**

- Water must be available until the start of catching.
- Lighting should be dimmed at the time of catching. If dimming is not feasible, the use of blue or green bulbs will calm birds and reduce activity.
- Remove or raise all equipment that may interfere with the catch crew.
- When processing schedules allow, catching birds at night is recommended, as birds are less active.
- Careful management of the ventilation system is needed during catching to ensure adequate house ventilation.
- If there is time between loads, turn up the lights, replace the water and gently walk the birds.

Welfare considerations should be of utmost importance during catching. Special care should be given to minimize bruising and downgrades. The stockman should be present during the catching operation to ensure that the correct procedures are followed. Dark strip curtains hung over the doors block out light during daytime catching. This allows birds to remain quiet and will facilitate better ventilation. Lightweight curtains can be used to partition the house into smaller pens. This can reduce bird stress and diminish the risk of piling. Birds should be carefully placed in clean crates or modules to a density that complies with manufacturer’s recommendations. These densities should be reduced in summer months.

**Partial Depletion**

If the market dictates thinning or a partial depletion, birds should be caught from the center line of the house out. This limits the risk of birds congregating in one area of the house and helps to minimize temperature gradients within the house. It is of utmost importance that the feed and water be replaced as soon as possible and that adequate ventilation is maintained in the most populated areas of the house. Light intensity should be increased to aid the birds in finding feed and water, and will help them redistribute. Recheck the house one hour after partial depletion to assess the distribution and bird well-being.

**Management Factors Affecting Downgrades**

In addition to managing the health and well being of the flock, the stockman must also consider the quality of the product during processing. The following table demonstrates several possible management factors which affect downgrades. **Mortality Disposal**

The timely disposal of mortality is essential to an effective disease prevention program. A decomposing carcass acts as a vector for disease and attracts pests. Options for disposal vary greatly depending on location and local legislation.

**Incineration**

- A popular means of disposal as it produces a limited amount of waste and does not attract pests. Negative aspects of incineration include emissions, slow turnover rates, cost and odor.
- Locate the incinerator in a place where it will be convenient to use but downwind from the poultry house and local residents.
- An incinerator with an after burner attached should be used to reduce air pollution.
- Make sure that all the dead birds are burned to a white ash.

**Composting**

- Currently advocated as an environmentally friendly alternative yielding a valuable fertilizer product. Composting is management intensive and requires equipment, time and attention to detail.
- Transportation costs associated with the final product may also diminish the attractiveness of this option.

**Rendering**

- Storage options include open-air bins, freezing, preservation by lactic acid fermentation, or acidification.
- A convenient means of disposal with no associated pollution. • Results in value added feed products.
- Transportation or associated storage cost are perhaps a drawback.