



An Aviagen Brand

Indian River Parent Stock
Pocket Guide
Rearing: 0 to 20 Weeks



2019

The Pocket Guide

This Pocket Guide was produced to compliment the **Indian River® Parent Stock Management Handbook**. It should be used for quick and practical reference.

This Pocket Guide is not intended to provide definitive information on every aspect of stock management, but draws attention to important features which, if overlooked, may depress flock performance.

Performance

This Pocket Guide summarizes best practice management for parent stock that receive first light stimulation after 21 weeks (147 days) of age and achieve 5% production at 25 weeks of age. However, poultry production is a global activity and across the world, differing management strategies may need to be adapted for local conditions.

The information within this Pocket Guide cannot wholly protect against performance variations which may occur for a wide variety of reasons. The management techniques covered are considered to be the most appropriate to achieve good performance, consistent with maintaining the health and welfare of the bird.

For further information on the management of Indian River parent stock, please contact your local Indian River representative or visit the Aviagen® website at www.aviagen.com.

www.aviagen.com

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Key Management Timetable

Age (days)	Action
Before chick delivery	<p>All housing and equipment should be cleaned and disinfected and effectiveness of biosecurity operations verified prior to chick placement.</p> <p>Preheat the house at least 24 hours prior to chick arrival.</p> <ul style="list-style-type: none"> • An air temperature of 30°C/86°F (measured at chick height in the area where feed and water are positioned). • A floor temperature of 29-30°C/82-86°F. • A relative humidity (RH) of 60-70%. <p>House set-up should be completed prior to chick arrival.</p> <p>Ensure good biosecurity.</p>
On chick arrival	<p>Achieve optimum environmental temperature.</p> <p>Establish a minimum ventilation rate.</p> <p>Monitor chick behavior to ensure that temperature is satisfactory.</p> <p>Bulk weigh a sample of chicks.</p> <p>Quickly and carefully place chicks in the brooding area. Do not allow chicks to remain in the chick boxes longer than absolutely necessary.</p>
0-7	<p>Develop appetite from good brooding practice.</p> <p>Ensure adequate drinker and feeder space, provide good quality feed and maintain optimum temperatures.</p> <p>Provide 23 hours of light and 1 hour of dark for the first 2 days after placement. Light intensity must be uniformly distributed throughout the brooding area.</p> <p>Use crop fill assessment as an indication of appetite development.</p> <p>Monitor bird behavior and adjust house environment as necessary.</p>

continued...

INDIAN RIVER PS POCKET GUIDE: *Key Management Timetable*

Age (days)	Action
7-14	<p>Achieve target body weights.</p> <p>Obtain body-weight sample. A bulk weighing of birds is required at 7 and 14 days of age.</p> <p>Where possible, provide a constant (8 hour) daylength by 10 days of age.</p> <p>In open-sided houses, daylength will depend on the placement date and the natural daylength patterns.</p> <p>Increasing the number of birds weighed or the frequency of weighing (to 2-3 times a week) during the first 2-3 weeks after placement will be beneficial.</p> <p>If 14-day (2-week) body weights for previous flocks have regularly been below target, a longer daylength can be provided until 21 days (3 weeks) of age to help stimulate feed intake and improve body-weight gain.</p>
14-21	<p>Start recording individual body weights between 14 and 21 days (2 and 3 weeks) of age.</p>
28	<p>Grade males and females.</p> <p>After grading, revise body-weight profiles to ensure that birds achieve target body weights by 63 days (9 weeks).</p>
28-63	<p>Ensure adequate feeder space and feed distribution is achieved.</p> <p>Monitor and record body weight weekly.</p> <p>If necessary, adjust daily feed allocation for the male and female populations to achieve any revised body-weight targets and maintain uniformity.</p>
63	<p>Re-examine graded population weights in relation to the body-weight target. Combine populations that are of similar weight and feed intake.</p> <p>If populations are not following the target profile, a new target body-weight line should be drawn.</p>

continued...

Age (days)	Action
63-105	<p>For populations that are over the target weight a new target line should be drawn so that the birds are brought back to target at 105 days (15 weeks).</p> <p>Populations that are under the target should gradually be brought back to target by 105 days (15 weeks).</p> <p>Ensure correct feeding space and feed distribution is achieved.</p> <p>Monitor and record body weight weekly.</p> <p>If necessary, adjust daily feed amounts for the male and female populations to achieve the target or any revised body-weight targets, and maintain uniformity.</p> <p>The main focus during this period is to correctly control the growth within each graded population.</p> <p>All populations should achieve similar body weights by light stimulation.</p> <p>Monitor and record body weight weekly.</p>
105	<p>Re-examine body weights in relation to target.</p> <p>Underweight birds need to be brought back to target by 147 days (21 weeks).</p> <p>For populations that are over the target weight, a new target line should be drawn parallel to the target.</p> <p>Remove any sexing errors as they are identified.</p> <p>Movement of birds between populations should stop.</p>
105-140	<p>Ensure correct feeding space and feed distribution is achieved.</p> <p>Achieve correct weekly body-weight gains by ensuring the appropriate feed amounts are given.</p> <p>Monitor and record body weight weekly.</p>
126-140	<p>Remove remaining sexing errors.</p> <p>Begin assessment of pin bone spacing.</p>

BIRD HANDLING

It is important that all birds are handled in a calm and correct way at all times. All people handling birds should be experienced and appropriately trained so that they can handle the birds with the care that is appropriate for the purpose, age and sex of the bird.

Stockmanship

Stockmanship is a continuous process that uses all of the stockman's senses to monitor the flock.

Hearing

Listen to the birds' vocalization, breathing and respiratory sounds. Listen to the mechanical sounds of fan bearings and feed augers.

Sight

Observe behaviors such as bird distribution in the house and number of birds feeding, drinking, preening, mating and using nest boxes. Observe the environment such as dust in the air and litter quality. Observe bird health and demeanor such as posture, alertness, eyes and gait.

Smell

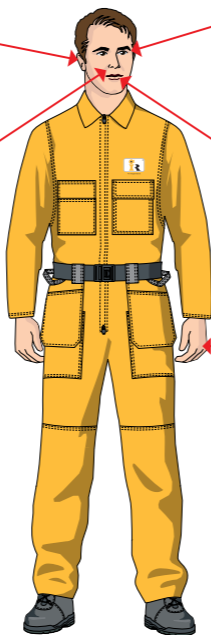
Keep notice of smells in the environment such as ammonia levels. Is the air stale or stuffy?

Taste

Water and feed quality.

Feel

Handle the birds to assess crop fill and check the birds' general condition (breast conformation, vent and feather condition). Take notice of air movement across your skin. Is there a draft? What does the temperature of the house feel like?



These observations will help build a picture for each individual flock/house. **Remember, no two flocks or houses are the same!**

- Compare this 'stock sense' information with actual farm records - are the birds on target?
- Investigate any irregularities and develop an action plan to address any issues.

The Relationship Between Stockmanship and Bird Welfare

Stock sense, combined with the stockman's knowledge, experience and skills in husbandry will produce a rounded technician who will also have personal qualities such as patience, dedication and empathy when working with the birds. The implementation of the *Three Essentials of Stockmanship* will not only bring the birds as close as possible to the ideal state of *The Five Freedoms of Animal Welfare*, it will ensure efficiency and profitability.

The Three Essentials of Stockmanship include:

- Knowledge of animal husbandry.
- Skills in animal husbandry.
- Personal qualities.

The Five Freedoms of Animal Welfare include:

- Freedom from hunger and thirst.
- Freedom from discomfort.
- Freedom from pain, injury and disease.
- Freedom to express normal behavior.
- Freedom from fear and distress.

(Source: Farm Animal Welfare Committee (FAWC) defined as the 'ideal state to strive for').

Equipment and Facilities

Objective

To achieve optimal flock welfare and performance by providing the correct stocking density and feeding and drinking space, as well as provide the optimal lighting program throughout the rearing period.

Pages	Contents
10	Stocking Density
11	Feeder Management
12	Drinker Management
13	Introduction to Perches
14	Lighting

Equipment and Facilities

Stocking Density

The following table gives the recommended stocking densities during rear (from 10 days onward).

The range of figures quoted represents the variation in conditions from tropical (lower densities) to temperate (higher densities) climates and are intended as a guide.

Example of increase brooding area.

Age	Birds/m ² (Birds/ft ²)
1-3 days	40 (4.0)
4-6 days	25 (2.5)
7-9 days	10 (1.0)
10 days	Final stocking density

Prior to 10-21 days of age, progressively increase bird floor space allowances until the levels given in the table below are reached.

Rearing 10-105 days (2-15 weeks)	
Males Birds/m ² (ft ² /bird)	Females Birds/m ² (ft ² /bird)
3-4 (2.7-3.6)	4-8 (1.4-2.7)

If stocking density is increased, then ventilation, feeder and drinker space must also be increased appropriately.

Actual stocking density will depend on:

- Local legislation.
- Climate and season.
- Type, system and quality of housing and equipment; particularly ventilation.
- Quality Assurance/certification requirements.

Feeder Management

The following table gives feeder and drinker space from 0-140 days/0-20 weeks.

Ensure there is enough feeding space for the number of birds in the house.

	Feeding Space			
	Male		Female	
Age (days)	Track Feeder cm (in)	Pan Feeder cm (in)	Track Feeder cm (in)	Pan Feeder cm (in)
0-35 days	5 (2)	5 (2)	5 (2)	4 (2)
36-70 days	10 (4)	9 (3.5)	10 (4)	8 (3)
71-140 days	15 (6)	11 (4)	15 (6)	10 (4)

- To ensure easy access, feeders should be 1 m (3.3 ft) apart.
- The distance between pan feeders within a line (from center to center) should be a minimum of 0.75 m (2.5 ft).

Uniform distribution of females around a track feeder when adequate feeder space is given.



Uniform distribution of males around a pan feeder when adequate feeding space is given.



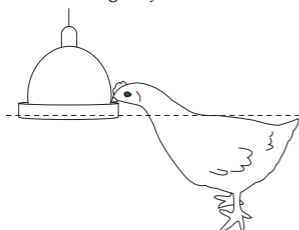
Drinker Management

The recommended drinking space requirements during rear (post-brooding) are given below.

Age	Birds/m ² (Birds/ft ²)
Bell drinkers	1.5 cm (0.6 in)
Nipples	8-12 birds/nipple
Cups	20-30 birds/cup

- Birds should have continual access to fresh, clean, drinkable water.
- The measurement of water consumption by metering is an essential daily management practice.
- Check and adjust drinker height daily.

Correct height of bell drinker.



Correct height of nipple drinker.



- Bleed water lines just prior to chick arrival to ensure water is as fresh as possible.
- At 21°C (69.8°F) ambient temperature water intake ratio is, at a minimum, 1.6:1 (water:feed), depending on drinker type.
- Water temperature should be at 18-21°C (64-70°F).
- Test the water supply regularly for bacteriological and mineral contaminants and take any necessary corrective action.
- Where bacterial loads are high, treatment with chlorination to give 3-5 ppm of free chlorine may be required to reduce bacterial load of drinking systems.

Introduction of Perches

- It is good management practice to install perches during the rearing period in order to train and stimulate females in nesting behavior (avoidance of floor eggs).
- Adhere to local legislation and Codes of Practice, but as a minimum, there should be sufficient numbers of perches to provide 3 cm (1.2 in) per bird or sufficient perch space to allow 20% of the birds to roost.
- Perches should be placed in the females' rearing pens from 28 days of age.
- Installing perches during rear is also a useful management tool for training males in situations where water is positioned on the slats.

Perch systems used for training.



Lighting

The following table gives the recommended lighting program for rearing birds 0-140 days/0-20 weeks.

Age (days)	Daylength* (hours)	Light Intensity†
1	23	80-100 lux (7-9 foot candles) in brooding area. 10-20 lux (1-2 foot candles) in the house.
2	23	
3	19	
4	16	
5	14	
6	12	30-60 lux (3-6 foot candles) in the brooding area. 10-20 lux (1-2 foot candles) in the house.
7	11	
8	10	
9	9	
10-140	8	10-20 lux (1-2 foot candles).

* Constant 8-hour daylengths should be reached by 10 days of age. However, if problems have regularly occurred with early body-weight gain, the reduction to a constant daylength may be more gradual so that 8 hours is not reached until 21 days.

† Average intensity within a house or pen measured at bird-head height. Light intensity should be measured in at least 9 or 10 places and include the corners, under lamps and between lamps. During the dark period (interpreted as night) a light intensity of ≤ 0.4 lux (0.04 foot candles) should be achieved. Ideally, variation in light intensity within the house should not exceed 10% of the mean.

- If reared in open-sided housing, broiler breeders should be allowed to experience whatever changes occur in the natural daylength.
- If birds reared in controlled environment blackout housing are to be transferred into open-sided housing, it may be advantageous to increase daylength in rear to 9-10 hours.
- Ensure males and females are synchronized in terms of sexual maturity by rearing them on the same lighting program.

Chick Placement

Objectives

To provide chicks with a good start, which is essential for the subsequent health, welfare, uniformity and performance of the flock.

To establish the flock from day-old by developing feeding and drinking behavior, and providing the correct environmental and management conditions to adequately meet the requirements of the chick.

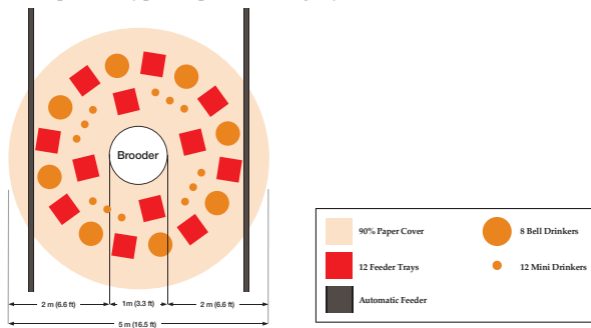
Pages	Contents
15	Farm Preparation for Chick Arrival
17	Brooding Management
21	Chick Start Assessment

Chick Placement

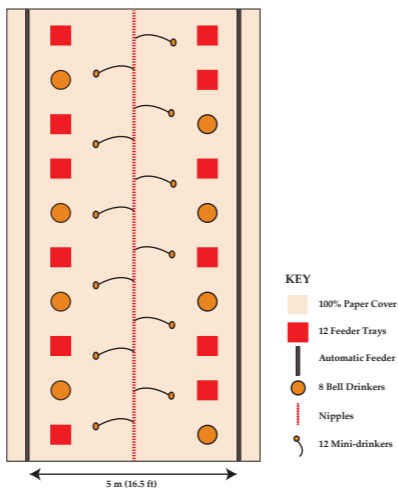
Farm Preparation for Chick Arrival

- Control spread of disease by using single age (all in/all out) housing.
- Houses should be cleaned and disinfected and efficacy tested prior to chick arrival.
- Be prepared - know what is coming and when.
- Plan placements so that chicks from different aged donor flocks can be brooded separately.
- Chick holding and transport environment should be monitored closely to prevent the chicks from becoming chilled or overheated.
- Plan areas for grading.
- Ensure that the correct conditions are achieved at least 24 hours before chick arrival. This may need to be increased depending on environmental conditions.
- At placement, the environmental conditions required are:
 - ➔ An air temperature of 30°C/86°F (measured at chick height in the area where feed and water are positioned).
 - ➔ A floor temperature of 28-30°C (82-86°F).
 - ➔ A RH of 60-70%.
- Litter material should be spread at a depth of:
 - ➔ 2-5 cm (0.8-2 in).
 - ➔ 2-4 cm (0.8-1.5 in) for floor feeding or where litter disposal is an issue.
- Chicks should not have to travel more than 1 m (3.3 ft) to access water for the first 24 hours.
- Chicks should have unobstructed access to both feed and water.
- Position supplementary feeders and drinkers near to the main feeding and drinking systems.

Example of a typical spot brooding layout (1,000 chicks).



Example of a typical whole-house brooding layout (1,000 chicks).



Brooding Management

- Frequently monitor house temperature and RH; adjust where necessary.
- Replenish feed and water regularly during the first 3 days.
- Provide maximum daily feed allocation in small amounts given frequently (i.e., 5-6 times per day) and remove supplementary drinkers completely by 3-4 days of age.
- Expand brooding rings (if used), gradually from 3 days of age and remove brooding rings completely by 5-7 days.
- Open-sourced drinkers should be cleaned out regularly.
- Check feed, water, temperature and RH 1-2 hours after placement and adjust where necessary.

Monitoring Chick Behavior

By far the best indicator of correct brooding temperatures is frequent and careful observation of chick behavior.

Spot brooding behavior



Temperature too high:

- Chicks make no noise
- Chicks pant, head and wings droop
- Chicks away from brooder



Temperature correct:

- Chicks evenly spread
- Noise level signifies contentment



Temperature too low:

- Chicks crowd to brooder
- Chicks noisy, distress-calling



Draft:

- Chicks huddling in one area of the surround

Whole-house brooding

Given the opportunity, birds will congregate in areas where the temperature is closest to their requirements.



Too High

Chicks move away from heat source



Correct

Chicks evenly spread



Too Low

Chicks huddle together

Temperature and Humidity

The following table shows the dry bulb temperatures required to achieve equivalent temperatures at varying RH. Dry bulb temperatures at the ideal RH are colored red.

	Dry Bulb Temperature at RH%				
	Target		Ideal		
Age (days)	Temp °C (°F)	40	50	60	70
Day-old	30.0 (86.0)	36.0 (96.8)	33.2 (91.8)	30.8 (87.4)	29.2 (84.6)
3	28.0 (82.4)	33.7 (92.7)	31.2 (88.2)	28.9 (84.0)	27.3 (81.1)
6	27.0 (80.6)	32.5 (90.5)	29.9 (85.8)	27.7 (81.9)	26.0 (78.8)
9	26.0 (78.8)	31.3 (88.3)	28.6 (83.5)	26.7 (80.1)	25.0 (77.0)
12	25.0 (77.0)	30.2 (86.4)	27.8 (82.0)	25.7 (78.3)	24.0 (75.2)
15	24.0 (75.2)	29.0 (84.2)	26.8 (80.2)	24.8 (76.6)	23.0 (73.4)
18	23.0 (73.4)	27.7 (81.9)	25.5 (77.9)	23.6 (74.5)	21.9 (71.4)
21	22.0 (71.6)	26.9 (80.4)	24.7 (76.5)	22.7 (72.9)	21.3 (70.3)
24	21.0 (69.8)	25.7 (78.3)	23.5 (74.3)	21.7 (71.1)	20.2 (68.4)
27	20.0 (68.0)	24.8 (76.6)	22.7 (72.9)	20.7 (69.3)	19.3 (66.7)

Temperature calculations based on a formula from Dr. Malcolm Mitchell (Scottish Agricultural College).

If behavior indicates that the chicks are too cold or too hot, the house temperature should be adjusted appropriately.

Monitoring humidity and temperature

Temperature and humidity should be monitored at least twice a day for the first 5 days and then daily thereafter. Measurements of temperature and humidity should be taken at chick level.



Chick Start Assessment

Crop Fill

MANAGEMENT FUNDAMENTAL

Crop fill should be assessed and monitored during the first 48 hours, but achieving the correct crop fill in the first 24 hours is the most critical.

PROCEDURE

Crop Fill

1. Collect 30-40 chicks at 3-4 different places in the house (or surround where spot brooding is used).
2. Gently feel the crop of each chick.
 - ➔ Full, soft and rounded - chicks have found feed and water.
 - ➔ Full but hard with original feed texture felt - chicks have feed but little/no water.

The chick on the left has a full, rounded crop while the chick on the right has an empty crop indicating it has not found feed or water.



The following table shows target crop fill assessment guidelines.

Time of Crop Fill Check After Placement	Target Crop Fill (% of Chicks with Full Crops)
2 hours	75
8 hours	>80
12 hours	>85
24 hours	>95
48 hours	100

MANAGEMENT FUNDAMENTAL

If target levels of crop fill are not being achieved then something is preventing the chicks from feeding and drinking, and action must be taken to resolve this.

Vent Temperature

Measuring vent temperature is a good way of determining if environmental conditions are correct for the chicks. In the first 4 to 5 days after hatch, vent temperature should be 39.4 to 40.5°C (103 to 105°F).



PROCEDURE

Vent Temperature

1. Collect at least 10 chicks from at least five different locations in the house. Pay particular attention to hot or cold areas of the house (e.g., walls or under brooders).
2. Gently pick up the chick and hold it so that the vent is exposed.
3. Put the tip of the thermometer onto the bare skin of the vent and record the temperature.

Sample Weighing at Placement

- At placement (day 0), at least three boxes of chicks should be bulk weighed per pen.
- The number of live chicks in each box and the weight of the chick box must be known in order to accurately calculate average chick weight.
- In addition, it is recommended to individually weigh the chicks in 1 box per pen at placement to assess chick uniformity and help determine initial early chick management procedures.

PROCEDURE

Bulk Weighing Chicks at Placement

1. "Zero" scales used for weighing.
2. Weigh an empty chick box with the lid on and record the weight.
3. Count and record the number of chicks in each box.
4. Weigh the box with chicks and lid to obtain the total weight.
5. Subtract the box weight from the total weight.
6. Divide the remaining weight by the number of chicks in the box.
7. Plot average weights on a weight chart.

Monitoring Birds in Rear

Objective

To meet the requirements of male and female parent stock during each stage of rear, and to prepare them for sexual maturity.

Pages	Contents
24	Sample Weighing
25	Assessment of Bird Condition

Monitoring Birds in Rear

Sample Weighing

- Growth and development in a flock are assessed and managed by weighing representative samples of birds and comparing them with target weight for age.
- Sample weighing should start at day-old and continue at least weekly.
- Individual bird weights should be taken from 14-21 days of age for calculation of CV%.
- Weigh birds at the same time each week using the same set of scales.
- Scale accuracy should be checked regularly.
- If sample weighing produces data inconsistent with previous weights or expected gains, weigh a second sample immediately to confirm.

PROCEDURE

Bulk Weighing Chicks at 7 and 14 Days

1. Weigh 2% of the population or 50 birds, whichever is greater.
2. Place an empty bulk weighing container onto the scales and set them to "zero".
3. Place 10-20 birds into the container and record the weight.
4. Empty the chicks from the container back into the main pen population and repeat this step until all birds caught have been weighed.
5. Add all bulk weights together and divide the total weight by the total number of chicks weighed in the pen. Plot this average weight on a weighing chart.

PROCEDURE

Individual Weighing after 14 Days

1. Suspend the scales in a secure place in the weighing pen, and ensure that they are set to “zero” with a shackle for holding birds firmly attached.
2. Using a catching pen, sample at least 2%, or 50 birds per population, whichever is greater.
3. Birds should be sampled from 3 points within the house, away from doors and walls.
4. Calmly and correctly handle each bird, place it on the shackles, wait until it is still, and record the weight from the scale.
5. Release the bird back into the main pen population and repeat the process until ALL BIRDS CAUGHT have been weighed.
6. Plot the average weight on a weight chart.

Assessment of Bird Condition

- Handle a representative sample of both males and females weekly during weighing from placement to determine overall flock condition.
- It is also good practice to catch and physically assess individual birds while doing a house walkthrough.
- Assessment of bird physical condition in rear is based primarily on body-weight monitoring and skeletal size (frame size and shank length).
- Monitoring shank length at feeding can give an indication of the uniformity of the flock.



- High variability in shank length is an indication of an uneven flock which should be monitored and investigated further.
- Be aware of the degree of fleshing, general health, alertness, and activity.
- Males should be handled regularly and physical body condition assessed at least weekly during weighing from placement, paying particular attention between 15 weeks of age and the start of production in preparation for sexual maturity.
- Female pin-bone spacing should be monitored regularly from 15 to 16 weeks (105 to 112 days) of age up to point of lay. Ideally this should be done every time the house is walked, but at a minimum it should be done weekly.

Grading to Manage Uniformity

Objective

To sort the flock into 2 or 3 sub-populations of different average weights (physiological state) so that each group can be managed in a way that will result in good whole flock uniformity at point of lay (POL).

Pages	Contents
27	Grading Procedures
28	Grading using CV%
30	Grading using Uniformity
31	Post-grading Practices

Grading to Manage Uniformity

Grading Procedures

Variation within a flock can be measured in two ways:

1. Coefficient of variation (CV%) – this measures the variation (spread) of body weights within the flock; the lower the CV%, the less variable the flock is.
 2. Uniformity (%) – this measures the evenness of body weights within a flock; the higher the uniformity, the less variable a flock is.
- The actual grading procedure will largely depend on the farm/house design and management practices.
 - Ideally, house set-up at placement should account for the need to grade the flock with at least 1 pen left empty at placement.
 - Space allocated for both male and female flocks must be capable of being divided into 2 or 3 pens/populations.
 - Prior to grading, a sample of birds from the population should be weighed and the variation within the flock measured. A minimum sample of 2% of the population (or 50 birds, whichever is greater) should be weighed. If more birds than this are caught, they should all be weighed to avoid selective bias.
 - Flock CV% or uniformity can then be used to determine the grading cut-off points.
 - After grading, it is important to re-weigh a sample of birds from each pen or population (a minimum of 2% or 50 birds, whichever is greater) and establish the average body weight, the variation around that average as measured by CV% or uniformity and number of birds for each pen.
 - After grading, the variation in body weight within the graded populations will have improved. It is essential that stocking density and feeding and drinking space are maintained in line with recommended guidelines in the graded populations.
 - The body weights from graded populations should be plotted against targets and the profiles redrawn where necessary to bring birds back on target by 63 days (9 weeks) of age.
 - Adjustment in feed levels should be based on deviation in body weight from target.

Grading Using CV%

Flock Uniformity CV%	Percentage in Each Population after Grading			
	2 or 3-way grade	Light (%)	Normal (%)	Heavy (%)
10-12	2-way grade	20	≈ 80 (78-82)	0
12-14	3-way grade	22-25	≈ 70 (66-73)	5-9
>14	3-way grade	28-30	≈ 58 (55-60)	12-15

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CV% between
12-14?

Adjustable
Penning?

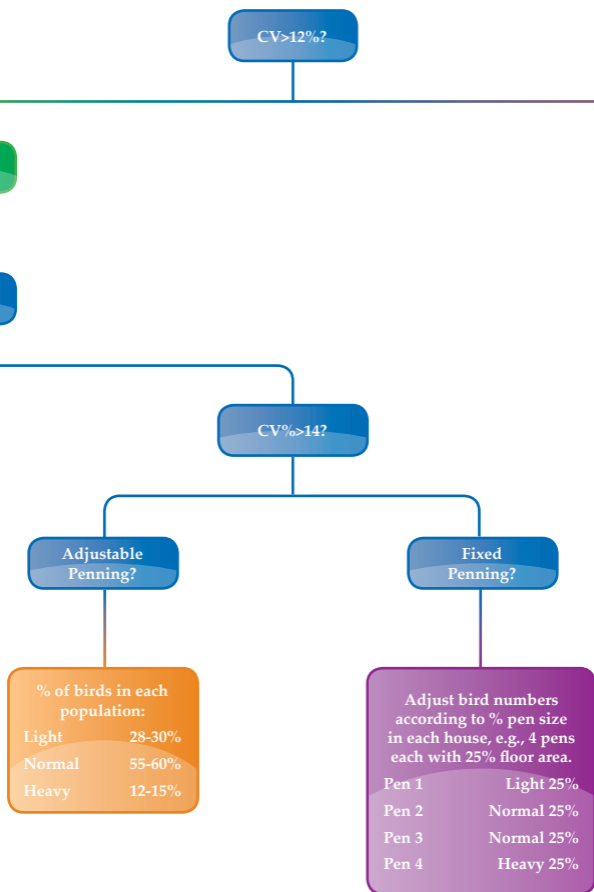
Fixed
Penning?

% of birds in each population:

Light	22-25%
Normal	66-73%
Heavy	5-9%

Adjust bird numbers according to % pen size in each house, e.g., 4 pens each with 25% floor area.

Pen 1	Light 25%
Pen 2	Normal 25%
Pen 3	Normal 25%
Pen 4	Heavy 25%



NO

2- way
Grade

Adjustable
Penning?

% of birds in each
population:

Light 20% (18-28%)

Normal 80% (78-82%)

Heavy 0%

Fixed
Penning?

Adjust bird numbers
according to % pen size
in each house, e.g., 4 pens
each with 25% floor area.

Pen 1 Light 25%

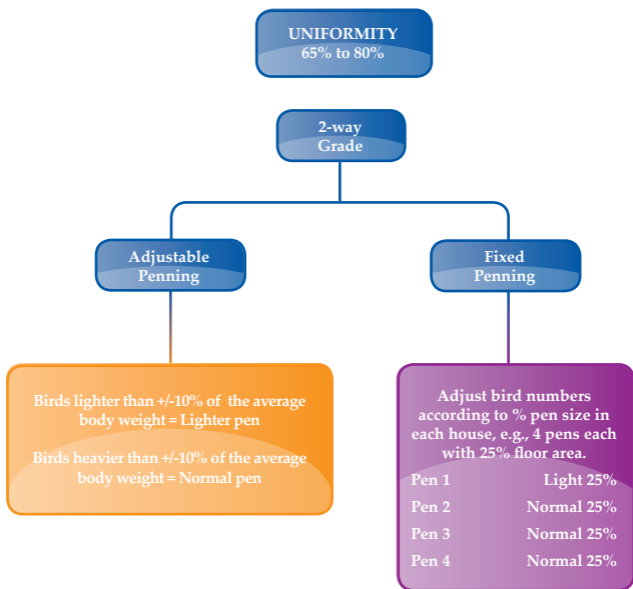
Pen 2 Normal 25%

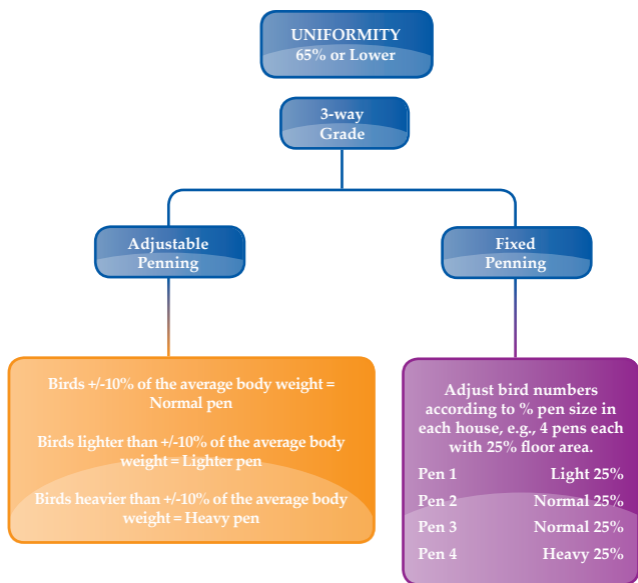
Pen 3 Normal 25%

Pen 4 Normal 25%

Grading Using Uniformity

Uniformity	2 or 3-way Grade
65% - 80%	2-way grade
65% or lower	3-way grade



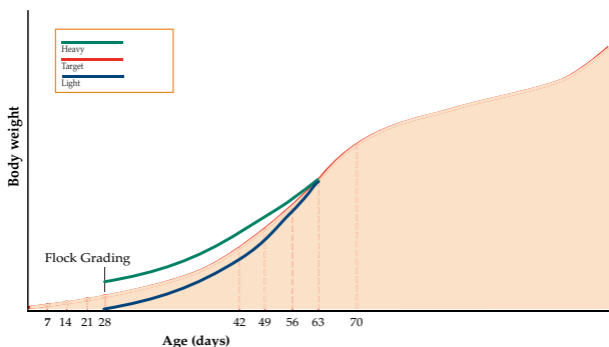


Post-Grading Practices

Flock Management after Grading (Post 28 Days)

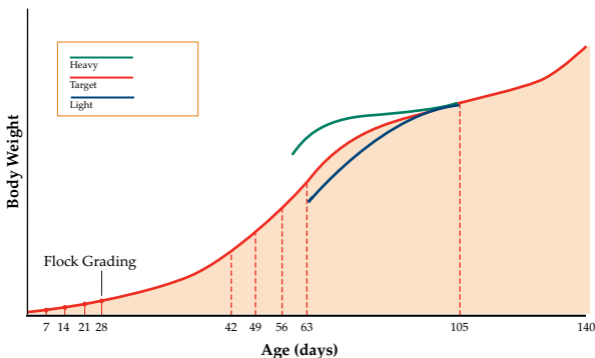
- After grading, the flock must be managed (body weight monitored weekly and feed allocations adjusted accordingly) so that graded populations achieve target weight in a uniform and coordinated manner within the period that skeletal development occurs (i.e., 63 days/9 weeks of age).

Re-drawing of future body-weight targets up to 63 days (9 weeks) of age.



- At 63 days (9 weeks) of age, the weight of the population in relation to targets should be re-assessed.

Re-drawing of future body weight targets when average body weight is below, on target, and above target at 63 days (9 weeks) of age.



MANAGEMENT FUNDAMENTAL

If population sizes in lay are likely to be larger than they were in rear, it is even more important that management after grading ensures birds achieve a common weight by the age of transfer.

- Continue weekly body-weight monitoring.
- Care should be taken before mixing any pens to ensure body weight and feed consumption per bird are similar between pens.

Alleviation of Body Weight Problems

If the average body weight differs from target by +/-100 g (0.22 lb) or more, re-weigh a sample of birds. If the weights are correct, consider the following:

Underweight prior to 105 days:

- Initiate the next feed increase earlier and consider increasing the feed amount if necessary, until body weight is brought gradually back to target.

Overweight prior to 105 days:

- Do not reduce feed levels.
- Reduce the next feed increment, e.g., 2 g (0.07 oz) per bird instead of 4 g (0.14 oz) per bird.
- Delay the next feed increase.
- Check to see if the energy level of the diet is higher than expected.

Key areas of incorrect population management post-grading.

Item	Comment	Actions
Stocking Density	Number of birds per m ² /ft ² per bird. Bird stocking density must remain equal within each graded pen and follow recommendations.	Adjustable pens - Increase or decrease pen area to maintain the recommended stocking density for age.
		Fixed pens - Adjust bird numbers within each pen to maintain the recommended stocking density for age.
Light Intensity	Lux/Foot Candle. Light intensity should be uniformly distributed throughout each pen at bird level and avoid shaded areas.	<p>Ensure all light bulbs are set at an equal and uniform distance from the floor.</p> <p>Ensure all bulbs are in good working order, are clean and emit the same level of intensity.</p> <p>Avoid the use of unidirectional light bulbs (old style LED bulbs or spot lights).</p> <p>Avoid the use of low-intensity (high flicker rate) fluorescent tubes.</p>

Item	Comment	Actions
Feeding Space	Birds per feeder/cm (in) of feeding space per bird.	Available feeding space should be maintained at recommended levels and adjusted for bird age and number throughout the rearing period and into production.
	Pan feeders (loop or straight line)	<p>Ensure adequate distance between feeder pan centers (minimum of 75 cm/2.5 ft).</p> <p>Each graded population should have its own dedicated feeding system where possible to allow accurate feed amounts to be given. If not then the whole house population should be fed to the lowest feed amount per bird (usually the large bird population) and any extra feed needed should be added by hand and evenly distributed between all feeders.</p> <p>Follow recommended feeding space per bird throughout rear.</p> <p>Ensure feed allocation settings per pan (feed volumes) are equal, to allow a uniform distribution of feed throughout the house.</p> <p>Distribute feed in the dark where possible to allow instant access to feeders when lights are turned back on.</p> <p>Adjust number of pans in adjustable penning if bird numbers change.</p> <p>Ensure feeder height is correct and adjusted for age.</p> <p>Ensure feed is distributed within 3 minutes.</p>

Item	Comment	Actions
Feeding Space	Track feeders	<p>Ensure recommended feeding space per bird is maintained throughout the rearing period.</p> <p>For adjustable penning, adjust track length for any changes in bird number per pen.</p> <p>Ensure correct depth of feed to allow uniform feed distribution along whole length of track.</p> <p>Each graded population should have its own dedicated feeding system, where possible, to allow accurate feed amounts to be given. If not then the whole house population should be fed to the lowest feed amount per bird (usually the large bird population) and any extra feed needed should be added by hand and evenly distributed along the available track.</p> <p>Ensure feed is distributed within 3 minutes.</p> <p>Distribute feed in the dark where possible to allow instant access to feeders when the lights are turned back on.</p> <p>Ensure feeder height is correct and adjusted for age.</p>
	Floor/spin/hand feeding	<p>Ensure any spin feeders are calibrated correctly to allow correct amount of feed per bird.</p> <p>Check floor area is covered uniformly with pellets to allow all birds to eat uniformly and that stocking densities within each pen are correct for age of birds.</p> <p>Ensure pellets are of good durability for floor feeding.</p> <p>Ensure litter depth is within recommendations.</p>

Item	Comment	Actions
Drinker Management	Number of birds per drinker (nipple or bell)	<p>All birds should have unrestricted access to water.</p> <p>Recommended number of birds per nipple or round bell drinker should be adhered to throughout the rearing period within each pen.</p> <p>A minimum water-to-feed ratio of 1.6 liters of water to feed should be followed depending on house and external environmental temperatures.</p> <p>If pen sizes need to be adjusted for bird numbers, ensure bell and nipple drinker numbers are adjusted to maintain the correct number birds per drinker.</p> <p>Ensure drinker heights are correct and adjusted for age.</p> <p>Ensure drinker flow rates are correct for age of bird and requirements.</p>
Ventilation	Calculated for body weight and stocking density	<p>Ensure uniform air flow through all pens by using equal number of inlets open per pen and uniform distribution of inlets throughout house.</p> <p>Use correct number of fans for appropriate air volume calculated for biomass in house and pens.</p>

15 Weeks to Transfer

Objective

To ensure a healthy, stable development into maturity with minimal variation in the flock.

Pages	Contents
38	Target Weight
39	Transfer
40	Final Selection
41	Sexing Errors

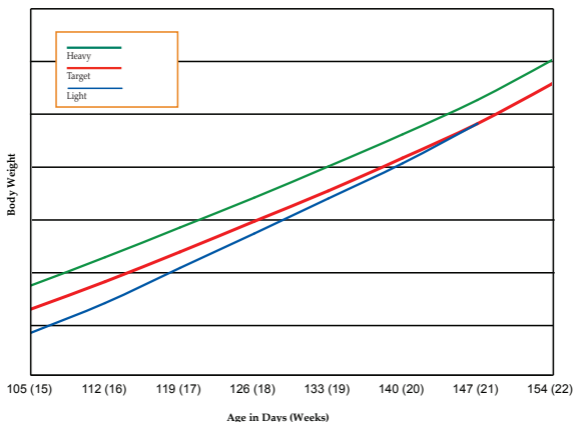
15 Weeks to Transfer

Target Weight

Regular monitoring and recoding of body weight and uniformity are essential management tools during this period.

- Re-draw target body weight if the flock is 100 g (0.22 lb) or more above target weight (overweight) or 100 g (0.22 lb) or more below target weight (underweight) at 15 weeks.
- Grow birds that are underweight to regain target by light stimulation, for overweight birds, set a new target.

Re-drawing of body-weight profiles if females are under or over target weight at 105 days (15 weeks) of age.



Transfer

Day-old to Depletion Facilities

Where there is a change in feeding system between rear and lay, manage this transfer carefully by ensuring that birds can easily find and get access to the new feeders.

Rear and Move Facilities

- For light proof laying facilities transfer should not occur later than 146 days/21 weeks of age.
- For open-sided laying facilities transfer may need to be later than 21 weeks depending on the season.
- Transfer should never be completed before 126 days/18 weeks of age or after 161 days/23 weeks of age, regardless of laying facility type.
- Transfer males at least 24 hours before the females to allow the males to find feeders and drinkers. Increase feed allocation by approximately 50% on the day before and the day of transfer to help compensate for any moving stress.
- Do not feed birds on the morning they are due to be moved.

Final Selection

A mature male/female will have a well-developed comb and wattles that are red in color.

Example of a sexually mature male (on the left) and an immature male (on the right).



Example of a sexually mature female (on the left) and an immature female (on the right).



Sexing Errors

It is good practice to remove sexing errors whenever they are identified during the life of the flock. Ideally, all sexing errors should be removed before mating-up.

Criteria for identifying males and females for the resolution of sexing errors.

Male



Comb and Wattles
105 days (15 weeks)
More developed and redder in males.



Hock Joints
140 days (20 weeks)
Thicker and broader in males. Narrower and smoother in females.

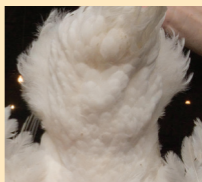


Feathering Around the Neck
140 days (20 weeks)
Long-fringed, spear-shaped feathers in males. Denser, paddle-shaped feathers in females.



Body Shape
140 days (20 weeks)
Males longer and narrower. Females more compact and broader around pelvis.

Female



Ventilation

Objective

To ensure that good welfare and reproductive performance are achieved by maintaining birds under appropriate, and where possible, optimal environmental conditions.

Pages	Contents
42	Ventilation

Ventilation

Open-sided / Natural Ventilation

Natural ventilation requires continuous 24 hour management if the house environment is to be satisfactorily controlled.

- Vary curtain height to achieve optimum airflow.
- Curtains should be fastened to the sidewalls at the bottom and be opened from the top down to minimize drafts and wind flowing directly onto birds.
- Open curtains on both sides of the house to provide cross-ventilation.
- In light wind or wind that changes direction frequently curtains on each side should be opened the same amount.
- If the wind is coming consistently from one side of the building, the curtain on the prevailing side should be opened less than the downwind side to minimize drafts.
- Recirculation fans should be used to supplement and enhance temperature control within the house.
- In hot weather conditions, several steps can be taken to minimize the impact of high temperatures:
 - ➔ Reduce stocking densities.
 - ➔ Ensure adequate roof insulation is in place; spraying water on the roof will help keep it cool (use with caution as this may raise RH levels).
 - ➔ Use circulation fans.

Negative Pressure Ventilation Systems (Controlled Environment Housing)

Achieve Good Airflow and Volume

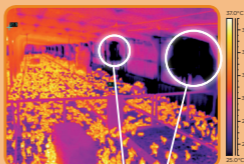


If incoming airflow speed and volume is too low:

- Cold air will drop directly on to the birds/litter.
- Litter will become wet and birds may get chilled.

Ensure House is Tightly Sealed

- Ventilation only works effectively if the house is adequately sealed and there are no air leaks.
- This ensures that airflow speed and volume entering the house are controlled and correct.



Uniform Air Inlet Openings

- Open air inlets must be evenly distributed through the house and be opened equally.
- This will create uniform:
 - volume of airflow
 - speed of airflow
 - direction of airflow
 - distribution of airflow
- At lower ventilation rates close some inlets to force the same volume of air through fewer inlets.



Monitor and Evaluate Regularly

- Monitor house pressure & air speed:
 - For every increase in negative pressure of 3-4 Pa (0.012-0.016 inches of water column) air will travel ~ 1 m (3.3 ft) into the house.
 - Incoming air should be thrown into the center of the house.
- Use smoke tests or cassette tape to confirm if airflow direction and inlet settings are correct.
- **Monitor bird behavior.**
- Complete regular evaluation of:
 - air quality
 - relative humidity
 - signs of condensation
 - dust levels
 - litter quality



PROCEDURE

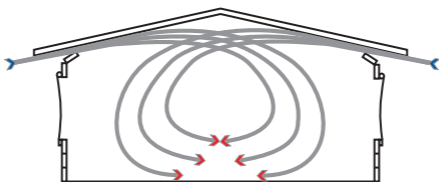
Evaluating Negative Pressure of Controlled Environment Housing

1. Close all doors and inlets in the house.
2. Switch on one 122 cm/127 cm (48 in/50 in) fan, or two 91 cm (36 in) fans.
3. The pressure in the house should not measure less than 37.5 Pa (0.15 inches of water column).

Minimum Ventilation

- It is essential to provide some ventilation to the house regardless of the outside conditions.
- Minimum ventilation is used for young chicks, nighttime or winter ventilation.
- Extraction fans (usually 91 cm [36 in] in size) operating on a cycle timer (on/off) draw air into the house through sidewall or ceiling air inlets.
- It is recommended that a 5 minute cycle timer is used.
- Air inlets should be opened at least 5 cm (2 in) for the airflow into the house to be effective.
- Accurate ventilation settings for the house can be determined by carrying out smoke tests. Alternatively, strips of cassette tape can be hung from the ceiling every 1-1.5 m (3-5 ft) in front of an air inlet up to the apex of the house.

Correct airflow during minimum ventilation.



MANAGEMENT FUNDAMENTAL

Monitor airflow, bird distribution and bird behavior to determine if settings are correct.

Minimum Ventilation Rates

Prior to 7 days, the actual air speed at floor level should be no more than 0.15 m/sec (30 ft/min).

Maximum levels of RH, carbon monoxide, carbon dioxide and ammonia should never be exceeded.

PROCEDURE

Calculating Minimum Ventilation Requirement

1. Determine the average body weight of birds in the house.
2. Select the appropriate ventilation rate for average body weight in the house.
3. Calculate the minimum ventilation requirement.

$$\text{Minimum ventilation requirement (m}^3\text{/hr or ft}^3\text{/min)} = \text{Number of birds in the house} \times \text{Appropriate minimum ventilation requirement}$$

PROCEDURE

Calculating Cycle Timer Settings

1. Calculate the minimum ventilation requirement (m^3/hr or ft^3/min).
2. Calculate the percentage time the fans need to be running.

$$\text{Percentage of time} = \frac{\text{Minimum ventilation requirement}}{\text{Total capacity of fans being used}}$$

Ventilation rates (per bird) for temperatures between -1 and 16°C (30 and 61°F).

Approximate minimum ventilation rates per bird.

Average Weight kg (lb)	Ventilation Rate m^3/hr (ft^3/hr)
2.20 (4.85)	1.56 (0.92)
2.40 (5.29)	1.67 (0.98)
2.60 (5.73)	1.77 (1.04)
2.80 (6.17)	1.87 (1.10)
3.00 (6.62)	1.97 (1.16)
3.20 (7.06)	2.07 (1.22)
3.40 (7.50)	2.16 (1.27)
3.60 (7.94)	2.26 (1.33)
3.80 (8.38)	2.35 (1.39)
4.00 (8.82)	2.44 (1.44)
4.20 (9.26)	2.53 (1.49)
4.40 (9.70)	2.62 (1.55)
4.60 (10.14)	2.71 (1.60)
4.80 (10.58)	2.80 (1.65)
5.00 (11.03)	2.89 (1.70)

Air Quality

The main contaminants of air within the house environment are dust, ammonia, carbon dioxide, carbon monoxide, and excess water vapor, and levels of these contaminants must be kept within legal limits at all times.

Effects of common parent stock house air contaminants.

Ammonia	Ideal level <10 ppm. Can be detected by smell at 20 ppm or above. >10 ppm will damage lung surface. >20 ppm will increase susceptibility to respiratory diseases. >25 ppm may reduce growth rate depending upon temperature and age.
Carbon Dioxide	Ideal level <3,000 ppm. >3,500 ppm causes ascites. Carbon dioxide is fatal at high levels.
Carbon Monoxide	Ideal level <10 ppm. >50 ppm affects bird health. Carbon monoxide is fatal at high levels.
Dust	Damage to respiratory tract lining and increased susceptibility to disease. Dust levels within the house should be kept to a minimum.
Humidity	Ideal level 50-60% after brooding. Effects vary with temperature. At >29°C (84.2°F) and >70% relative humidity, growth will be affected. Relative humidity <50% particularly during brooding will affect growth.

Transitional Ventilation

Transitional ventilation is used when the house temperature is above the desired (or set point) temperature, but it is not yet warm enough, or the birds are still not old enough, to use tunnel ventilation.

A general guideline for transitional ventilation is to open enough air inlets so that approximately 40-50% of the tunnel fan capacity is being used.

Tunnel Ventilation

Tunnel ventilation is used to keep the birds feeling cool. The switch from transitional ventilation to tunnel ventilation should occur when the birds need the cooling effect of wind chill. Younger birds that are not fully feathered will feel a greater wind chill than older birds and so are more prone to chilling.

PROCEDURE

Tunnel Ventilation Calculations

1. Determine the fan capacity required for a given air speed.

Required fan capacity = (design air speed) x (cross section area)

Where:

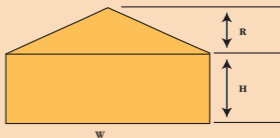
- Design air speed (min).

➤ 2.03 m/sec or 400 ft/min for rearing.

➤ 2.54 m/sec or 500 ft/min for production.

- Cross section area = (0.5 x Width x Roof) + (Width x Height).

➤ Cross section area is the effective area through which the air flows down the length of the house. If there are other major obstructions such as nests in the house, then the area of these obstructions can be subtracted from the total cross section area.



2. Determine the number of fans required:

Number of fans = $\frac{\text{(Required fan capacity)}}{\text{(Fan operating capacity)}}$

Where:

- Fan operating capacity is the capacity at the assumed operating pressure.
- As a guideline for tunnel ventilation with cooling pads, use the fan capacity at an operating pressure of 37.5 Pa (0.15 inches water column).

Evaporative Cooling Systems

- Effectiveness of evaporative cooling systems depends on the RH levels.
- Evaporative cooling adds moisture to the air and increases RH. It is important to operate the system based on RH, as well as dry bulb temperature, to ensure bird welfare.

MANAGEMENT FUNDAMENTAL

If in-house RH levels reach more than 70-80%, turn off the evaporative cooling system.

Spray Cooling (fogger)

- High pressure (water) spray systems should operate at 400-600 psi (28-41 bar), and produce a very fine mist with a droplet size of 10-15 microns.
- Low pressure fogging systems operate at 100-200 psi (7-14 bar), and produce a droplet size greater than 30 microns.
- Fogging lines must be placed near air inlets in order to maximize the speed of evaporation, and additional lines should be placed throughout the house.

Pad Cooling

- In pad cooling systems, cool air is drawn through a water soaked filter (cooling pad) by the tunnel ventilation fans.

$$\text{Required cooling pad area} = \frac{(\text{Tunnel fan capacity})}{(\text{Pad air speed})}$$

- Cooling pad area is the total area required. Half of this area is usually installed on each outside wall of the inlet end of the house.
- Tunnel fan capacity is the actual total operating capacity.
- Expected pad air speeds:
 - ➔ For 100 mm (4 in) thick pad, use 1.27 m/s (250 fpm).
 - ➔ For 150 mm (6 in) thick pad, use 1.91 m/s (375 fpm).

Evaluating Ventilation

Spread/distribution of the birds:

- Are they well spread?
- Are there specific areas of the house that are being avoided?

Bird activity:

- Look along the feeder and drinker lines – is there bird activity at them?
- Birds should be feeding, drinking, and resting. During lay, there should be mating activity and birds using nest boxes.

Nutrition

Objective

To maximize welfare, reproductive potential (of both males and females), and chick quality by supplying a range of balanced diets that meet the requirements of broiler parent stock at all stages of their development and production.

Pages	Contents
52	Nutrition

Nutrition

- Birds respond to daily intakes of nutrients, therefore feeding programs (and feed levels) must relate to dietary nutrient content; especially energy and the nutritional requirements of the bird at a given age.
- Diets need to be regularly sampled and the samples analyzed to ensure that the diet is as it should be.

Feeding Programs

Starter Feed

Starter feed should be fed as a sieved crumb from 0-28 days of age. If body weights at 28 days are consistently below target then feeding the Starter diet for an extra 1-2 weeks may help.

Growing Period

It is important to carefully manage the change in diet from Starter to Grower, ensuring that there is no loss in body-weight gain.

The Grower feed should be fed from approximately 28 days through to 5% production. Feed should be distributed quickly and evenly throughout the house.

Several different feeding strategies can be followed to lead to successful production. For example, if photostimulating birds earlier than 21 weeks of age, it may be beneficial to use 4 diets (rather than 2) during the rearing phase. This will help to ensure that the birds receive adequate nutrients at the correct time in order to achieve an earlier onset of production.

A 4-stage rearing program includes:

- Higher nutrient density Starter diet to support adequate early development - particularly for males.
- Second Starter diet to provide a smoother transition to a lower-specification Grower diet.
- Lower-density Grower diet to allow greater control of body-weight development and increase feed distribution during this period. Although the diet itself has a reduced concentration of nutrients per kg, the recommended feed intakes and increasing feed consumption over this phase of growth will ensure the required increase in daily nutrient supply.
- Pre-breeder diet to provide higher amino acid and protein intake for adequate development of reproductive tissue.

Transition to Sexual Maturity

- Sufficient amino acids and other nutrients are required for the proper development of reproductive tissues.
- Provision of supplemental vitamins in pre-lay and early lay periods will increase body tissue levels before egg production commences and may provide a benefit in early hatchability.

Energy

Recommended feeding levels in the **Indian River Parent Stock Performance Objectives** assume a given dietary energy level per kg for starter, grower and laying flocks. Because birds respond to nutrient intake (not nutrient concentration), if diets have feed nutrient levels different from those assumed, then proportional changes in feed allowances must be made. An example of the calculation is given below:

METRIC

$$\begin{aligned} \text{Energy intake} &= 166 \text{ g/bird/day} \times (2,800 \text{ kcal/kg} \div 1000) \\ &= 464.8 \text{ kcal/bird/day} \end{aligned}$$

$$\begin{aligned} \text{Adjusted feed intake} &= 464.8 \text{ kcal/bird/day} \div (2,700 \text{ kcal/kg} \div 1000) \\ &= 172 \text{ g/bird/day} \end{aligned}$$

IMPERIAL

$$\begin{aligned} \text{Energy intake} &= 36.6 \text{ lb/100 birds} \times 1,269 \text{ kcal/lb} \\ &= 46,445.4 \text{ kcal/100 birds} \end{aligned}$$

$$\begin{aligned} \text{Adjusted feed intake} &= 46,445.4 \text{ kcal/100 birds} \div 1,224 \text{ kcal/lb} \\ &= 37.9 \text{ lb/100 birds} \end{aligned}$$

Adjustment of energy (feed) intake must be based largely on observation of the birds' responses in body weight, body condition, feed clean-up time, and egg mass.

Energy contents of successive feeds should not vary widely. Feed changes should be gradual and carefully controlled, especially when changing diets.

Temperature Effect on Energy Requirements

As operating temperature differs from 20°C (68°F), energy intakes should be adjusted pro rata as follows:

- Increased by 0.126 MJ (30 kcal) per bird per day if temperature is decreased by 5°C from 20° to 15°C (68° to 59°F).
- Reduced by 0.105 MJ (25 kcal) per bird per day if temperature is increased by 5°C from 20° to 25°C (68° to 77°F).

When temperatures are above 25°C (77°F) the relationship is not as straight forward. Feed composition, feed amount, and environmental management should be controlled to reduce heat stress.

Feed Management

- Ideally, feed should not remain on the farm for more than a week.
- Feed bins should always remain covered and be in good condition to prevent water entry. Any feed spills should be cleaned up promptly.
- Use a standard weight to check the accuracy of the feed scales daily before use.
- A visual assessment of every feed delivery should be made. The feed should be assessed on its physical quality, color, appearance, and smell. For mash, check that there is good distribution of raw materials throughout the feed.
- Levels of fines should not exceed 10% for pellets/crumbs or 25% for mash. The level of fines within a feed can be measured using a feed shaker sieve.
- Water is an essential ingredient for life and birds should have unlimited access to clean, fresh water at all times when the birds are active.

Trouble Shooting - Vitamin Deficiency

Possible Cause	Problem							
	Egg Production	Fertility	Hatchability	Resistance to Disease	Feathering	Bone Deformities	Leg Weakness	Thin Shell Eggs
Vitamin A	x		x	x	x		x	
Vitamin D3	x		x			x		x
Vitamin E	x	x	x	x				
Vitamin B12	x		x					
Riboflavin			x	x			x	
Niacin					x	x		
Pantothenic Acid			x	x	x			
Choline	x					x		
Vitamin K								
Folic Acid	x		x		x	x		
Thiamin B1								
Pyridoxine B6	x		x					
Biotin	x	x	x		x	x	x	

Health and Biosecurity

Objectives

To achieve hygienic conditions within the poultry house, and to minimize the adverse effects of disease.

To attain optimum performance and bird welfare, and to provide assurance on food safety issues.

Pages	Contents
57	Health and Biosecurity
61	Health Management

Health and Biosecurity

Preventing Diseases Transmitted by Humans

- Minimize the number of visitors and prevent unauthorized access to the farm.
- All people entering the farm should follow a biosecurity procedure. Visit facilities or houses with young birds first before moving to older birds.
- Maintain a record of visitors.
- Workers and visitors should wash and sanitize boots and hands when entering and leaving the poultry house.
- Clean and disinfect tools used in the poultry house.
- It is recommended to only visit one farm per day.

Preventing Diseases Transmitted by Animals

- Place farm on an “all in/all out” placement cycle.
- A minimum downtime of three weeks will reduce contamination on the farm.
- Keep all vegetation cut 15 m (50 ft) away from the buildings to prevent the entry of rodents and wild animals.
- Do not leave equipment, building materials or litter lying around.
- Clean up feed spills as soon as they occur.
- Store litter material in bags or inside a storage building or bin.
- Keep wild birds and other wild animals out of all buildings and maintain an effective rodent control program.
- Use an integrated pest management program including mechanical, biological, and chemical controls.
- Keep other farm animals and pets outside the building and the fenced farm area.

Site Cleaning

MANAGEMENT FUNDAMENTAL

Site cleaning must cover both the interior and exterior of the house, all equipment, external house areas, and the feeding and drinking systems.

PROCEDURE

Site Cleaning

1. Plan.
2. Control insects:
 - Once the flock has been removed, while the house is still warm, spray litter, equipment and surfaces with an insecticide.
 - Spraying with an approved insecticide may also be done two weeks before depletion.
 - A second treatment of insecticide should also occur prior to fumigation.
3. Remove dust.
4. Pre-spray with an approved detergent solution throughout the inside of the house.
5. Remove all equipment.
6. Remove and dispose of litter.
7. Wash using a pressure washer with foam detergent and rinse with hot water.

PROCEDURE

Cleaning Water Systems

1. Drain pipes and header tanks.
2. Flush lines with clean water.
3. Scrub header tanks to remove scale and biofilm deposit and drain to the exterior of the house. If physical cleaning is not possible, cleaning of water lines between flocks may be done using high levels (140 ppm) of chlorine or per-oxygen compounds.
4. Refill the tank with fresh water and add an approved water sanitizer.
5. Run the sanitizer solution through the drinker lines from the header tank, ensuring that there are no air locks.
6. Make up header tank to normal operating level with additional sanitizer and solution at appropriate strength. Replace lid and allow disinfectant to remain for a minimum of 4 hours.
7. Drain and rinse with fresh water.
8. Ensure water lines are flushed completely before birds are allowed to drink.
9. Test water quality routinely for bacterial and mineral contamination and take necessary corrective action based on the test results. Take 58 samples from source, storage tank, and drinker points.

PROCEDURE

Cleaning Feeding Systems

1. Empty, wash, and disinfect all feeding equipment.
2. Empty bulk bins and connecting pipes, and brush out where possible.
3. Clean out and seal all openings.
4. Fumigate wherever possible.

Disinfection

- Disinfection should not take place until the whole building (including the external area) is thoroughly cleaned and all repairs are completed.
- Disinfectants are ineffective in the presence of dirt and organic matter.
- Manufacturers' instructions must be followed at all times.
- Disinfectant should be applied using either a pressure-washer or backpack sprayer.
- Heating houses to high temperatures after sealing can enhance disinfection.
- If using a selective coccidial treatment, this should only be used by suitably trained staff and should be applied to all clean internal surfaces.

Evaluation of Farm Cleaning and Disinfection Efficiency

- Monitor the efficiency and cost of cleaning out and disinfection.
- Complete Salmonella isolations and total viable bacterial counts (TVC).
- Monitoring trends in Salmonella/TVCs will allow continuous improvement in farm hygiene and comparisons to different cleaning and disinfection methods to be made.
- When disinfection has been carried out effectively, the sampling procedure should not isolate any Salmonella species.
- For a detailed description of where to sample, and recommendations of how many samples to take, please consult your Aviagen® veterinarian.

Health Management

- Good management and biosecurity will prevent many poultry diseases.
- Monitor feed and water intake for the first signs of a disease challenge.
- Respond promptly to any signs of a disease challenge by completing post-mortem examinations and contacting an Aviagen veterinarian.
- Vaccination alone cannot prevent flocks from overwhelming disease challenges and poor management.
- Vaccination is most effective when disease challenges are minimized through well designed biosecurity and management programs.
- Base vaccination programs on local disease challenges and availability of vaccine.
- Monitor and control worm burden.
- Salmonella infection via feed is a threat to bird health. Heat treatment and monitoring of raw materials will minimize the risk of contamination.
- Only use antibiotics to treat disease with veterinary supervision.
- Keep records and monitor flock health.



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