

Assessing crop fill and how to interpret the results

Why assess crop fill?

- Assessment of crop fill at key times after placement is a useful means of determining appetite development and checking that all chicks have found feed and water.
- If adequate crop fill is not achieved, appetite development will be depressed, early growth rate will be compromised, and skeletal development will be below the desired levels, so affecting flock uniformity and production potential.

The procedure for assessing crop fill

Crop fill should be monitored during the first 48 hours, but the first 24 hours are the most critical.

Equipment

1. A catching frame.
2. A pen or pencil.
3. Paper to record crop fill.

Procedure

An initial check 2 hours after placement will indicate if chicks have found feed and water. Subsequent checks at 8, 12, 24, and 48 hours after arrival on farm are required to assess appetite development.

Step 1

Using the catching frame, collect 30-40 chicks in total; approximately 10 chicks at a time from 3-4 different places in the house (or surround where spot brooding is used).

Step 2

Handling each chick with care, gently feel the crop of each chick in the pen using your thumb and forefinger.



Step 3

Record the content of the crop of each chick using the following categories:

- Full, soft, and rounded – Chicks have found feed and water.
- Full but hard with original feed texture felt – Chicks have feed but little or no water.
- Crop empty – Chicks have not found feed or water.

Step 4

Calculate the percentage (%) of chicks in each category by dividing the number of chicks recorded in each category by the total number of chicks assessed and multiplying by 100.

Step 5

Compare your results with the target crop fill assessment guidelines.

Hours after placement	6
Category	No. of chicks in category
Full, soft, and rounded	
Full but hard with original feed texture	
Empty	
Total recorded	35

Table 1. Example of crop fill recording sheet.

Time of crop fill check after placement (hours)	Target crop fill of chicks (% of chicks with full crops)
2	75
8	>80
12	>85
24	>95
48	100

Table 2. Target crop fill assessment guidelines.

Example calculation:

Chicks in category 1 = 30 divided by 35 x 100
= 86% measured at eight hours after placement.

Interpreting results

Crop fill on or above target guidelines.

No action required

Crop fill 5% or more below target guidelines (e.g. 75% or lower at eight hours after placement).

Action required: further investigation of brooding practices

Areas to consider

Environment

- Ensure that houses are pre-heated prior to chick arrival.
- Ensure chick comfort is optimum by monitoring and adjusting if needed:
 - Air temperature at chick height
 - Litter temperature
 - Relative humidity
- Ensure light intensity is at the optimum level in the brooding area.
- Ensure ventilation rates are correct for young chicks.

Feed and water

- Ensure chicks have unrestricted access to feed and water.
- Ensure that at least 90% of the floor area is covered in paper with feed on.
- Replenish feed on paper in small amounts given frequently.
- Ensure supplementary (mini) drinkers are used.

Measuring pin bone spacing

The procedure

Routine measurement of the spacing between the pin (pelvic) bones allows:

- Correct determination of female sexual maturity and when lay is about to begin.
- Correct timing/age of light stimulation to the flock.

Birds must be handled in a calm and correct way by people who have been appropriately trained. Bird welfare must be a priority at all times.

No equipment is required. This is a physical measurement using your fingers. Ideally the same person should measure pin bone spacing from week to week. The term 'finger' is relative to the operator's hand size and so will vary from person to person.

Pin bone spacing should be measured regularly from 15-16 weeks (105-112 days) of age, up to point of lay. Pin bone spacing should ideally be measured every time the house is 'walked', but at a minimum, pin bone spacing should be measured once a week.

Step 1

Slowly and carefully walk through the females and randomly select a bird.

Step 2

Hold the bird by the top of the legs, the right way up.

Step 3

Gently press your finger(s) between the pin bones of the bird.

Step 4

Record how many fingers comfortably fit in the space between the pin bones.

Step 5

Release the bird back onto the floor of the poultry house.

Step 6

Repeat this operation as you slowly walk through the house, recording each time the number of fingers that comfortably fit between the pin bones.

Step 7

A minimum of 20-30 birds per house should be measured each time.

Step 8

Calculate the percentage of birds in each pin bone spacing category: 0, 1, 2 or 3 fingers.



Table 1. Example of calculation and results 10 days before first

No. of fingers between pin bones	No. of birds	%
0	1	3
1	2	7
2	24	80
3	3	10

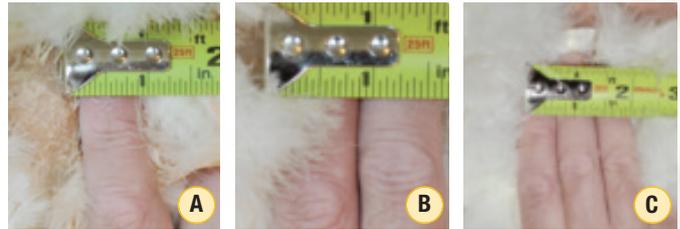
Number of birds sampled = 30
 Number of birds with pin bone spacing of 2 fingers = 24
 Percentage = $24 \div 30 \times 100 = 80\%$

Interpreting results

Age	Pin bone spacing	Approximate distance between pin bones
84-91 days	Closed	-
119 days	1 finger	1.9-2.5cm
21 days before first egg	1 ½ fingers	
10 days before first egg	2-2½ fingers	3.8-4.2cm
Point of lay	3 fingers	5-6cm

Table 2. Changes in pin bone spacing with age.

At any given age, at least 80-85% of the flock should exhibit the same level of pin bone spacing. At 10 days prior to first egg, 80-85% of the flock should have a pin bone spacing of between 2 and 2½ fingers. If, at the specified age, less than 80-85% of the flock have the same pin bone spacing, or if pin bone spacing is not as expected, then further investigation is needed.



Pin bone spacing. A, 1 finger, birds at 119-147 days of age, B, 2 fingers, birds that are 10 days before first egg and C, 3 fingers, birds are at the point of lay.

The use of a ruler in the photographs above is to illustrate the width of normal pin bone spacing with age. The main measurement and interpretation should be based on finger fit rather than actual measured width.

Table 3. Observations and solutions related to pin bone spac-

Observation	Solution
Variation in pin bone spacing between birds of the same age (less than 70% of the flock have the same level of pin bone spacing).	Delay light stimulation until at least 80-85% of the birds have the same pin bone spacing or until 154 days at the latest. This allows the flock more time to reach the same level of pin bone spacing naturally. Revisit grading techniques during the rearing period to improve uniformity of the flock. A flock CV% of <10 will display a less variable pin bone spacing.
Pin bones are closer together than that expected for age. (Birds are less sexually mature than expected for age).	Check body weight for age; adjust feed amounts if body weight is less than recommendations, gradually bring birds back to standard by point of lay and before light stimulation. Delay light stimulation until birds are at correct pin bone spacing for age.
Pin bone spacing is wider than expected for age. (Birds are more sexually mature than expected for age).	Stimulate birds as recommended; persistency may be affected in this case. Check body weight for age, control body weight closer to standard for the next flock. Check house is adequately light proofed (no light leakage) during the rearing period.

Weighing eggs

When used in conjunction with body-weight trends, daily egg weight measurements allow accurate management of bird feed allocation during production. Daily egg weight is a sensitive indicator of the adequacy of bird total nutrient intake. Inadequate nutrient intake will lead to a decrease in egg weight and excessive nutrient intake to an increase in egg weight.

Procedure

Egg weight should be recorded daily from 10% hen day production. A sample of 120-150 eggs should be bulk weighed each day. The equipment you will need includes: a digital or dial type platform scale with a weighing accuracy of $\pm 10g$ and a capacity of 10kg; a pen or pencil; a calculator.

Note: All scales should be calibrated on a regular basis (at the beginning and end of every weighing) to ensure they are weighing accurately and that correct egg weight management is maintained.

Step 1: Eggs to be weighed should be collected at second collection (to avoid using eggs laid the previous day). All small, double-yolk, cracked, and abnormal eggs should be removed before weighing.

Step 2: Place platform scales on a flat level surface.

Step 3: Zero the scales and weigh an empty egg tray or carton.

Step 4: Remove empty tray(s) from the scales and replace with tray(s) filled with eggs.

Step 5: Record the total weight of eggs and tray(s).

Step 6: Calculate the average egg weight. Record egg weight on a standard egg weight chart. The scale of the graph on the chart should be large enough (1g increments) to clearly show daily variation in egg weight.

Example calculation:

$$\frac{\text{Total weight for all eggs weighed} - \text{total weight of egg tray(s)}}{\text{Number of eggs weighed}}$$

$$\text{Average daily egg weight} = \frac{(7,800g - 300g)}{150} = 50g$$

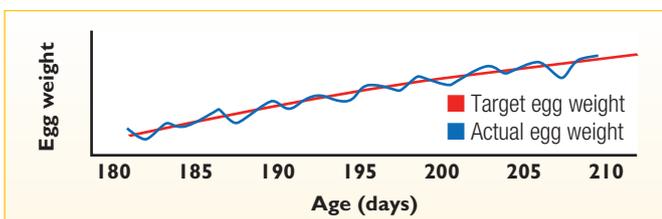
It is important to remember that daily egg weight measurements must be used in conjunction with body weight trends to allow accurate management of bird feed allocation during production.

Interpreting results

Normal pattern of daily egg weight

In a flock receiving the correct quantity of feed, egg weight will normally follow the target profile. Some variation around that target should be expected due to sampling variation and environmental influences.

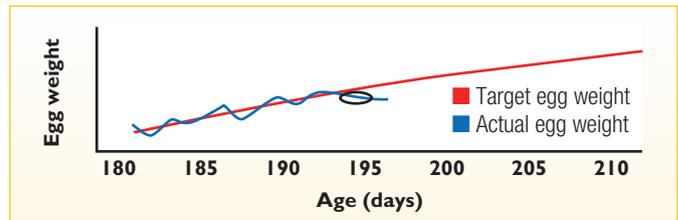
No action is required in this case



Egg weight trends at peak or prior to peak feed allocation

1. Reducing or static egg weight over a 3-4 day period.

Action required: Flock is underfed; feed increases should be brought forward if the birds have not reached peak feed yet, or feed should be increased further if peak feed levels have been reached.



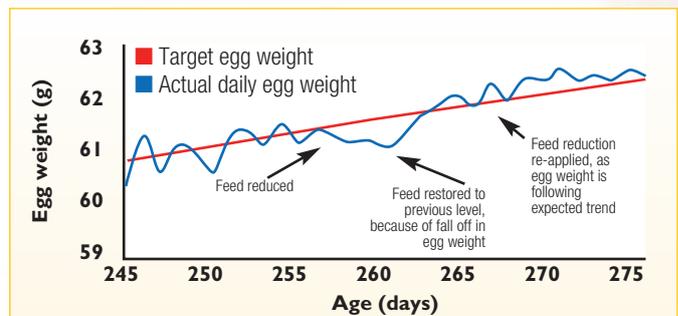
2. Egg weight trend increasing above target over a 3-4 day period as birds are coming into peak production.

No action required: Slowing down or reducing feed increases as birds are coming into peak will have a negative impact on flock egg production levels and should be implemented with extreme care. However, a review of feeding practices should be completed before the next flock.

Egg weight trends post peak

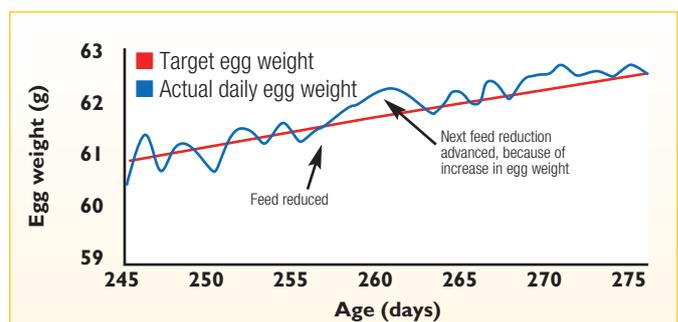
1. Egg weight trend falling away from the expected target over a 3-4 day period.

Action required: Increase feed allocation. A falling egg weight trend may be more obvious where feed has been withdrawn too quickly post peak. Below is an example of re-assessment of feed removal when daily egg weight decreases in a consistent and continuous way by more than expected and feed levels need to be increased again.



2. Egg weight trend higher than expected over a 3-4 day period.

Action required: Advance next feed reduction. Below is an example of re-assessment of feed removal when daily egg weight increases in a consistent and continuous way by more than expected and feed levels need to be reduced again.



Bulk weighing broiler breeders in rear

Routine accurate estimates of average body weight in rear allows:

- Correct feed allocation to a population.
- Correct control of both male and female body weights which will optimise performance at every stage of life.
- Monitoring of brooding procedures.

The procedure

Bird handling

Birds must be handled in a calm and correct way by people who have been appropriately trained. Bird welfare must be a priority at all times.

Equipment

1. A good set of electronic or manual/mechanical dial scales with 10g increments, an accuracy of $\pm 20g$ and a minimum capacity of 10kg. Different types of weighing scales include digital hanging scales setup for bulk weighing chicks in a bucket, floor pan scales for single or multiple box weights and manual dial scales.
 2. A pen or pencil.
 3. Weight recording charts.
 4. Scientific calculator if weighing using manual/mechanical dial scales.
- Note. All scales should be calibrated on a regular basis (at the beginning and end of every weighing) to ensure they are weighing accurately and correct body-weight management is maintained.



Procedure – Day 7 and 14

Step 1: Place an empty bulk weighing container, such as a box or bucket (big enough to hold 10-20 chicks at a time), on scales and 'zero' the scales with the container in place.

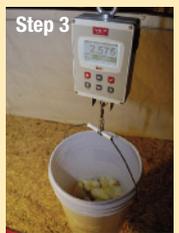
Step 2: Using a catching pen, catch a sample of at least 2% or 50 birds (whichever is greater) per population. Samples should be taken from two different locations, towards the middle of the pen or house, away from doors or the sides of pens.

Step 3: Place 10-20 birds at a time into the weighing container and record the total weight of each full container and the number of chicks. Never put too many chicks in the container, they should not be placed on top of each other.

Step 4: Empty the birds out of the container back into the main pen population and repeat the weighing process until ALL birds in the catching pen have been weighed. This will eliminate selective bias.

Step 5: Add together the weight of all samples weighed and divide by the total number of birds weighed.

Step 6: Plot average chick weight on a weight recording chart and compare to target.



Procedure – Day 0 (Placement)

Weigh at least three boxes of chicks per pen placed.

Step 1: Zero any scales to be used in the weighing operation and weigh an empty chick box with lid on – record the weight of the box.

Step 2: Weigh a box with chicks inside and with lid on, to gain total weight of chicks and box – record weight.

Step 3: Count out the number of chicks weighed in each box – record chick number.

Step 4: Calculate average chick weight.

Step 5: Plot average weight of all chicks weighed on a weight chart and compare to target.



Example calculation:

$$\frac{\text{Total weight of chicks weighed in box}}{\text{Number of chicks in box}}$$

$$\text{Average chick weight} = \frac{3200g}{80} = 40g$$

Interpreting results

If body weights are inconsistent with expected gains or there is a marked $\pm 50g$ deviation from the standard body-weight profile, reweigh the flock to check weighing accuracy using the same procedures as above. A deviation in normal weekly body-weight gain ($\pm 20g$) during the first 14 days that cannot be attributed to weighing error, generally indicates a need to revise farm brooding procedures.

Solutions

If early bodyweight targets are not being achieved it is necessary to:

- Measure, monitor, and react to house brooding conditions:
 - Check houses are pre-warmed for 24 hours prior to chick arrival.
 - Check house air temperature at chick level is 30°C (86°F) at placement.
 - Check house relative humidity is 60-70% for the first 3-5 days.
 - Check house litter temperature is 28-30°C (82-86°F) at placement.
 - Check that chicks have no more than 1m (3.3ft) to travel to an adequate fresh water supply.
 - Check that at least 90% of the brooding area floor is covered with paper and/or trays (one per 100 chicks), and a good quality sieved crumb or mini pellet is fed.
 - Check light intensity in the brooding area is 80-100 lux (8-10ft candles).
 - Check crop fill.
- Remain on starter feed until target body weight is reached.
- Feed a higher nutrient quality starter feed.
- Provide a longer day length up to 21 days (three weeks) of age to help stimulate feed intake and improve bodyweight gain.

Individually weighing broiler breeders in rear – part 1

Routine accurate estimates of average body weight allows:

- Correct feed allocation to a population during rear and production.
- Correct control of both male and female body weights which will optimise performance at every stage of life.
- Recording individual body weights from

14-21 days of age onwards allows CV% and grading populations to be accurately managed.



The procedure

Birds must be handled in a calm and correct way by people who have been appropriately trained.

Bird welfare must be a priority at all times. Birds should be weighed on the same day each week and at the same hour of the day; ideally 4-6 hours after feeding.

Equipment

1. A good set of electronic or manual/mechanical dial scales with 10g increments, an accuracy of $\pm 20g$ and have a minimum capacity of 5kg.
2. A pen or pencil.
3. Weight recording charts.
4. Scientific calculator if weighing using manual/mechanical dial scales.

Note. All scales should be calibrated on a regular basis (at the beginning and end of every weighing) to ensure they are weighing accurately and correct body weight management is maintained.

Example for manual calculation of CV%

$$CV\% = \frac{\text{Standard deviation}}{\text{Average body weight}} \times 100$$

ie. where standard deviation = 0.048kg and average weight = 0.471kg

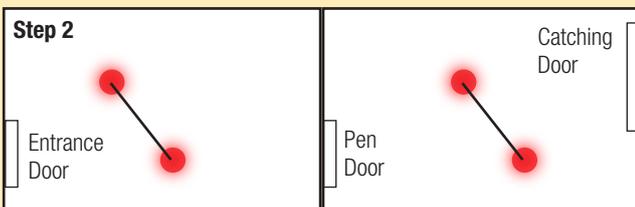
$$CV\% = \frac{0.048\text{kg}}{0.471\text{kg}} \times 100 = 10.2$$

Step 1

Suspend/situate scales in a secure, easily accessible place in the pen where weighing will take place. Set the scales to zero and have a secure shackle to hold birds in place before weighing begins.

Step 2

Catch and pen up a sample of at least 2% or 50 birds per population, whichever is greater. In rear, if the population size is greater than 1000 birds, samples should be taken from two different locations in the pen or house. Samples should be taken from towards the middle of each pen or house avoiding side wall areas and areas close to entrance doors.



- **Sample points should be away from side wall and entrance**

Step 3

Collecting one bird at a time, place its legs into the shackles, wait until the bird is calm and read the weight from the scale (to the nearest 20g for mechanical scales).

Step 4

Record the weight obtained and gently release the weighed bird back into the main pen population. Mechanical scales require manual data records to be kept and data calculations to be made for:

- Total number of birds weighed.
- Weight range.

- Average weight per bird (total weight of all birds \div number of birds weighed).
- Coefficient of Variation (CV%).

Step 5

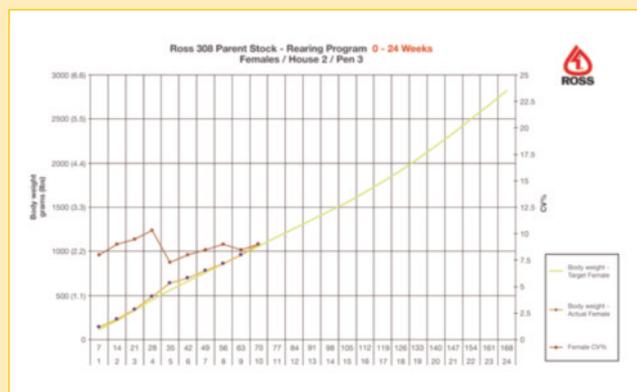
Repeat the weighing process until **ALL** birds in the catching pen have been weighed and recorded. This will eliminate selective bias.

Step 6

Calculate average weight and the Coefficient of Variation (CV%). CV% is usually calculated automatically when using digital scales. If manual scales are used, it will be necessary to calculate the standard deviation using either a scientific calculator or a computer spreadsheet.

Step 7

Average body weight and CV% should be plotted on a body weight for age chart and compared to target. Variation from performance targets will help determine future feed allocations.



Individually weighing broiler breeders in rear – part 2

Interpreting results



A deviation from expected body weight may be due to inaccurate weighing. If an inconsistent body weight is recorded, check that the scales are working correctly and then weigh a second sample of birds immediately as a check before making any changes to feed levels.

Days 14 to 21

A deviation from standard body weight between 14 and 21 days generally indicates:

- A need to revise management of feeder transition (timing and procedures used to change from floor feeding to mechanical feeders).
- A need to revise feed levels; feed levels should be altered accordingly if body weights are above or below target.

Day 28 onward

Weights and CV% at day 28 should be used to grade the population into two or three sub-groups of different average weight.

Each group can then be managed according to weight to minimise flock uniformity at point of lay.

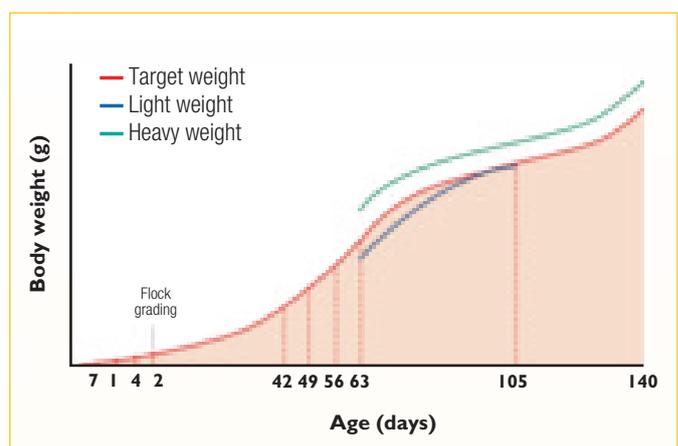
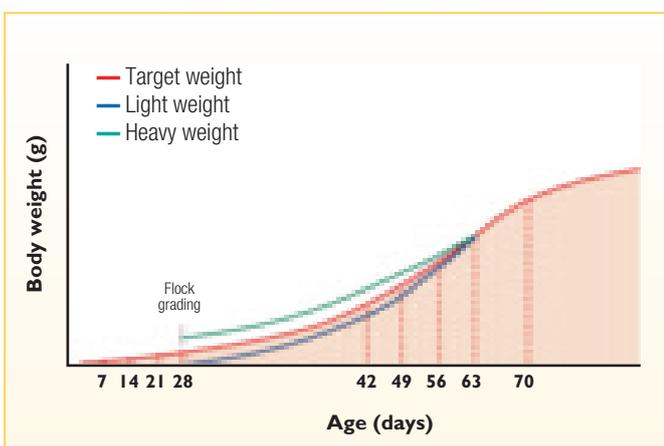
1. Under target weight birds (dark blue line on graphs below).

- Where the average body weight for a population/pen is below target body weight by more than 100g gradually bring birds back to target by 63 days.
- Appropriate increases in feed should be given based on the deviation from target body weight.
- If birds remain under target body-weight after 63 days they should be gradually brought back to target profile by 105 days of age.
- If birds still remain below target body-weight (by 100g) at 105 days then they should be gradually brought back to target weight by the time of first light stimulation.

2. Over target weight birds (dark green line on graphs below).

- These are birds that are greater than 100g over the target body weight.
- Re-draw the body weight curve to bring birds gradually back on to target by 63 days of age. Never reduce feed levels; reduce the next feed increment or delay the next feed increase in order to achieve the revised body-weight target.
- **If birds remain over target weight from 63 days onward, then the target should be redrawn parallel to the profile. Do not attempt to bring these birds back to the profile.** Birds should be fed the level of feed to maintain this profile.

Fig. 1. Re-drawing of future body weight targets up to 63 days of age (left) and re-drawing of future body weight profiles when average body



Individually weighing broiler breeder females in production – part 1

Birds should be weighed at least weekly after transfer to the production facility. Routine accurate estimates of average body weight allows:

- Correct feed allocation to a population during production to help manage persistent egg production, egg weight, and body weight.

Bird handling

Birds must be handled in a calm and correct way by people who have been appropriately trained. Bird welfare must be a priority at all times.

Equipment

- A good set of electronic or manual/mechanical dial scales with 10g increments, an accuracy of ±20g and a minimum capacity of 5kg.
- A pen or pencil.
- Weight recording charts.
- Scientific calculator if weighing using manual/mechanical dial scales.

Note: All scales should be calibrated on a regular basis (at the beginning and end of every weighing) to ensure they are weighing accurately and correct body-weight management is maintained.

Procedure

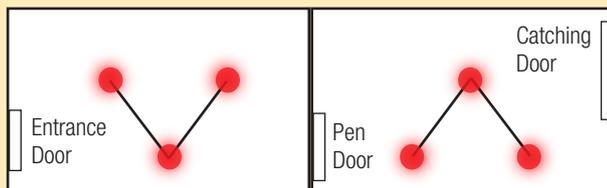
Birds should be weighed on the same day each week and at the same hour of the day; ideally 4-6 hours after feeding.

Step 1

Suspend/situate scales in a secure, easily accessible place in the pen where weighing will take place. Set the scales to zero and have a secure shackle to hold birds in place before weighing begins.

Step 2

Catch and pen up a sample of at least 2% or 50 females per population, whichever is greater. Male sample size should be increased to at least 10% from mating-up. Bird samples should be taken from a minimum of three random locations. Samples should be taken from towards the middle of each pen or house avoiding side wall areas and areas close to entrance doors.



● Bird sample points

Step 3

Collecting one bird at a time, place its legs into the shackles, wait until the bird is calm and read the weight from the scale (to the nearest 20g for mechanical scales).

Step 4

Record the weight obtained and gently release the weighed bird back into the main pen population.

Mechanical dial scales require manual data records to be kept and data calculations to be made for:

- Total number of birds weighed.
- Average weight per bird (total weight of all birds ÷ number of birds weighed).
- Weight range.
- Coefficient of Variation (CV%).

Step 5

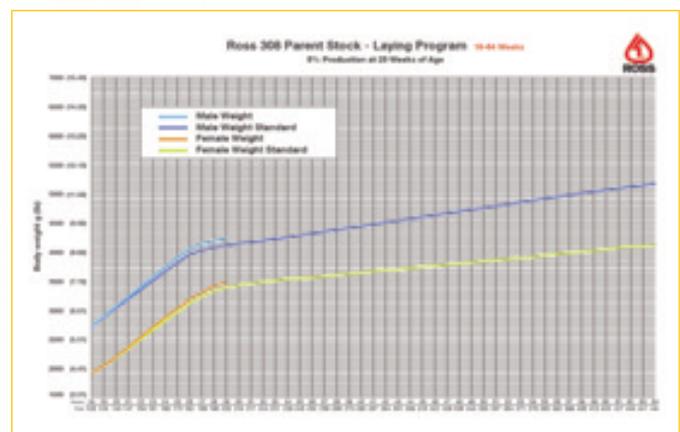
Repeat the weighing process until **ALL** birds in the catching pen have been weighed and recorded. This will eliminate selective bias.

Step 6

Calculate average weight and the Coefficient of Variation (CV%). CV% is usually calculated automatically when using digital scales. If manual scales are used, it will be necessary to calculate the standard deviation using either a scientific calculator or a computer spreadsheet.

Step 7

Average body weight and CV% should be plotted on a body weight for age chart and compared to target. Variation from performance targets will help determine future feed allocations.



Example for manual calculation of CV%

$$CV\% = \frac{\text{Standard deviation}}{\text{Av. body weight}} \times 100$$

For example, where standard deviation = 0.248kg and average weight = 2.471kg

$$CV\% = \frac{0.248\text{kg}}{2.471\text{kg}} \times 100 = 10.2$$

Individually weighing broiler breeder females in production – part 2

Interpreting results

A deviation from expected body weight may be due to inaccurate weighing. If an inconsistent body weight is recorded, check that the scales are working correctly and then weigh a second sample of birds immediately as a check before making any changes to feed levels.

Pre-peak

Females must continue to gain weight during early lay and into peak production to maximise egg production and hatchability. A deviation in body weight from standard (either above or below) or sudden change in body weight may indicate incorrect feeding techniques/allocation and this should be investigated. Pre-peak, the difference in feed quantity allocated prior to first egg and the target feed level at peak, allows a feed allocation schedule to be established. Amounts of feed given up to and at peak should not be adjusted on body weight alone, but take into account the following:

- Hen day production.
- Daily egg weight and change in egg weight trend.
- Feed clean-up times.
- Dietary energy density.
- Environmental temperature.
- Bird body condition.

For example:

- If hen day production and egg weight are increasing as expected but body weight is below standard (>100g):
 - Feed increases may be brought forward or daily allocations increased to bring female body weight back towards target, while at the same time supporting egg production traits.

- If body weights are deviating above standard (>100g) and production and egg weight are increasing as expected:
 - Follow recommended feed increases.
 - Do not reduce feed increases; this will have a negative impact on performance.
 - Reducing feed increases in this case will be more likely to affect production levels adversely.
 - For future flocks, investigate pre-production and feeding to peak feed programs.

Post-peak

- Post-peak females must gain body weight close to the recommended target while feed levels are reduced.
- If body weight gain is inadequate, total egg production will be reduced.
- If body weight gain is too rapid, post peak production persistency and fertility will be lowered.
- To ensure production and body weight gain is maintained to optimum levels then feed reductions should be managed by monitoring:
 - Daily (or weekly) body weight and body weight change relative to the target.
 - Daily egg weight and egg weight change relative to the target.
 - Daily changes in feed clean-up time.

The table below provides general guidance as to the normal actions to be taken in a post-peak flock on a feed reduction program where body weight and egg weight trends deviate from target. Birds that have **always** been above or below target should be treated as if they are on target. The body weight target should be redrawn and feed allocation adjusted accordingly.

	Body weight trend	Egg weight trend	Action
Egg production good	Standard	Standard	Maintain feed reduction program
		Below	Delay feed reduction
		Above	Bring forward next feed reduction
	Below	Standard	Unlikely but if seen delay feed reduction
		Below	Delay feed reduction
		Above	Maintain feed reduction program
	Above	Standard	Maintain feed reduction program
		Below	Maintain feed reduction program
		Above	Bring forward next feed reduction
Egg production below standard	Standard	Standard	Maintain feed reduction program
		Below	Delay feed reduction
		Above	Bring forward next feed reduction
	Below	Standard	Delay feed reduction
		Below	Delay feed reduction
		Above	Bring forward next feed reduction
	Above	Standard	Unlikely but if seen bring forward next feed reduction
		Below	Unlikely but if seen delay feed reduction or increase feed
		Above	Bring forward next feed reduction

- Feed clean-up times are important and should also be monitored. If feed clean-up times are increasing, then feed reduction may need to be brought forward. Similarly, if clean-up times are decreasing, then feed reduction should be delayed and possible causes investigated.
- Higher or lower environmental temperatures may require adjustments in feed intake.
- Poor feather cover may require higher feed intake, especially in cold environments.
- Care should be taken if changing breeder diet specifications during production. Any change in feed allocation should be delayed during the change-over period so that feed intake can be properly evaluated on the new diet.
- Female fleshing condition should also be considered. Birds with lower than target fleshing scores should be held on current feed levels or given a feed increase. Likewise birds with higher than target fleshing score should have a more aggressive feed reduction program.

Measuring chain feeder speed

Why measure chain feeder speed?

- Chain feeder speed determines how quickly feed is distributed.
- Feed distribution time is key to achieving and maintaining flock uniformity.
- Feed must be properly and evenly distributed in a timely manner throughout the house so that all birds can eat at the same time.

Procedure

Chain feeder speed should be measured at least once a flock, preferably more often, or if there are unexpected changes in feeding behaviour with the flock.

Step 1

Locate the feeder track that is closest to the feed hopper and gearing system that carries feed away from the feed hopper when the chain is running.



Step 2

Remove any male excluder grill from a small area of the track.



Step 3

Tie a piece of the plastic ribbon around a link in the track.



Step 4

Make a mark on the edge of the feeder track using an easily identifiable ink marker at the same point as the ribbon is tied. This is to identify where to start measuring distance from.



Step 5

Manually start the feed track and at the same time start a timer or stopwatch to time one minute. When one minute is complete, stop the feeder track.



Step 6

Using the pen or marker, mark where the ribbon has stopped on the edge of the track.



Step 7

Using the measuring tape, measure the distance between the points marked on the side of the track.



Interpreting results

Incorrect chain feeder speed can lead to:

- Non-uniform feeding;
- A non-uniform flock;
- Reduced flock performance and welfare.

Feed distribution around the entire feeding track should not take more than three minutes. This will be achieved if the chain feeder speed is 30m or 90ft per minute (0.5m/1.5ft per second).

Distance ribbon travelled in one minute	Speed of chain (per second)	Action required
Target (30m/90ft)	0.5m/1.5ft	No adjustment to chain feeder speed required, however feed depth along the length of the track must continue to be monitored. If chain feeder speed is correct but feed depth is not even along the entire track, adjust the feed hopper slider.
>30m/90ft	>0.5m/1.5ft	Monitor feeding closely to reduce effects of feed pile up and overflow; if this happens, reduce chain feeder speed.
<30m/90ft	<0.5m/1.5ft	Increase chain feeder speed and ensure feed is correctly distributed before allowing birds access to feed. Running feeders in the dark may help. Replace/check cogs and gears if possible.

Measuring nipple drinker flow rate

Why measure nipple drinker flow rate?

- To ensure that water supply will meet maximum demands for daily water intake.
- A lower than required water flow rate can cause dehydration, reduce feed intake, body-weight gain and egg production, and if left unchecked will reduce livability.
- A higher than required water flow rate may increase spillage from drinkers causing poorer litter quality and associated foot and leg health and environmental issues. It may also result in reduced water intake as birds may not be able to activate the nipples correctly.

The procedure

Nipple drinker flow rates should be measured on a weekly basis. The first measurement should be taken before chick arrival, then once per week thereafter. However, it is good practice to monitor water intake daily; a sudden change in water intake can be one of the first indications that flow rates may be incorrect and should be measured.

Step 1

Walk to the nipple that is furthest away from the pressure regulator system; this will usually be at the opposite end of the drinker line from the pressure regulator.



Example of pressure regulator.

Step 2

Place the measuring cylinder under the nipple.



Nipple activation block.

Step 3

Start the timer or stopwatch and activate the nipple at the same time to allow water to flow freely into the measuring cylinder (if a nipple activator is not available depress nipple using a finger).



Step 4

When the timer/stopwatch reaches 30 seconds; deactivate the nipple to stop water flowing into the measuring cylinder.



Step 5

Record the number of milliliters (ml) in the measuring cylinder. Multiply this figure by two to get flow rate through the nipple per minute.

Interpreting results

It is important to remember that water flow rate through the nipple should be increased as the birds age to allow an adequate amount of water to be available throughout life.



Recommended flow rates through nipples

Bird age (days)	Flow rate (ml/min)
0-7	20
7-21	60-70
>21	70-100

Remedial action if flow rates are not as recommended

Flow rate	Action required
Less than recommended	<p>Ensure water is turned on.</p> <p>Increase pressure at pressure regulator end of drinker line.</p> <p>Ensure there are no air locks or blockages in lines by depressing nipples to release air until water flows freely or by unscrewing water supply lines.</p> <p>Ensure drinker line is level.</p> <p>Check nipples are not clogged – clean with a recommended product or replace if necessary.</p> <p>Check rubber seals are in place and/or are working correctly. Replace seals if necessary.</p>
Higher than recommended	<p>Reduce pressure at pressure regulator end of drinker line.</p> <p>Ensure there are no air locks or blockages in lines by depressing nipples to release air until water flows freely or by unscrewing water supply lines. **</p> <p>Ensure drinker line is level.</p> <p>Check rubber seals are in place and/or are working correctly. Replace seals if necessary.</p> <p>Ensure purge button is not activated. This button will differ in position depending on the type of nipple system and pressure regulator in use.</p>

** An airlock or blockage may increase as well as decrease water pressure depending on where it occurs in the water line. A blockage towards the end of a line will increase pressure in the nipples prior to its position.