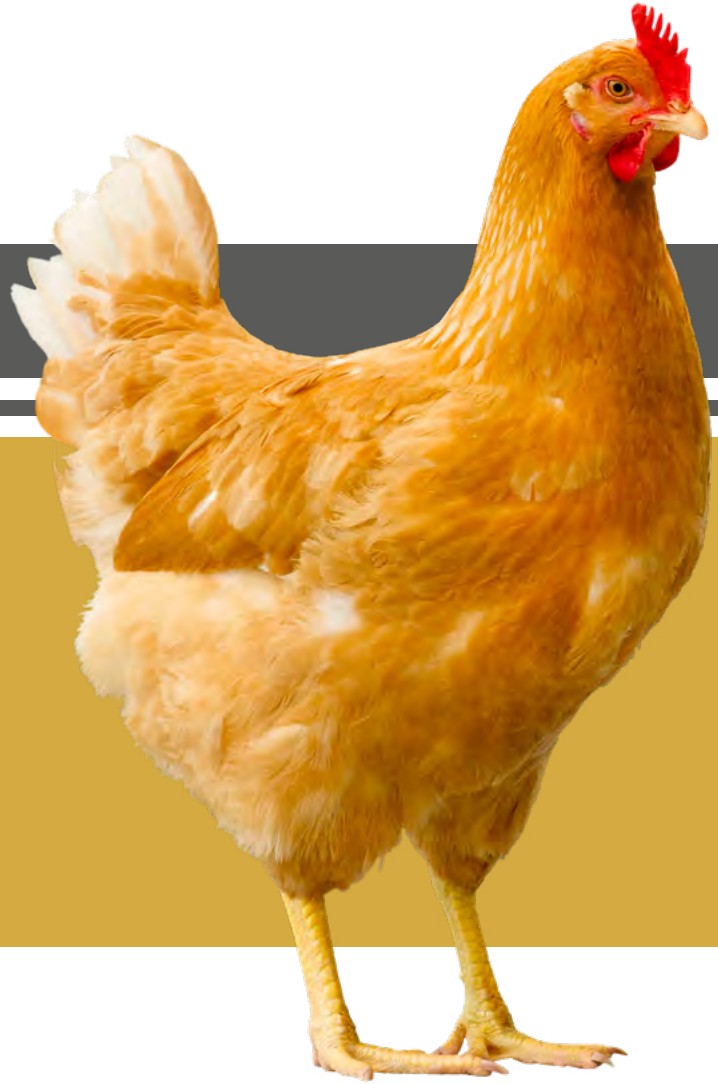
Hubbard
YOUR CHOICE, OUR COMMITMENT

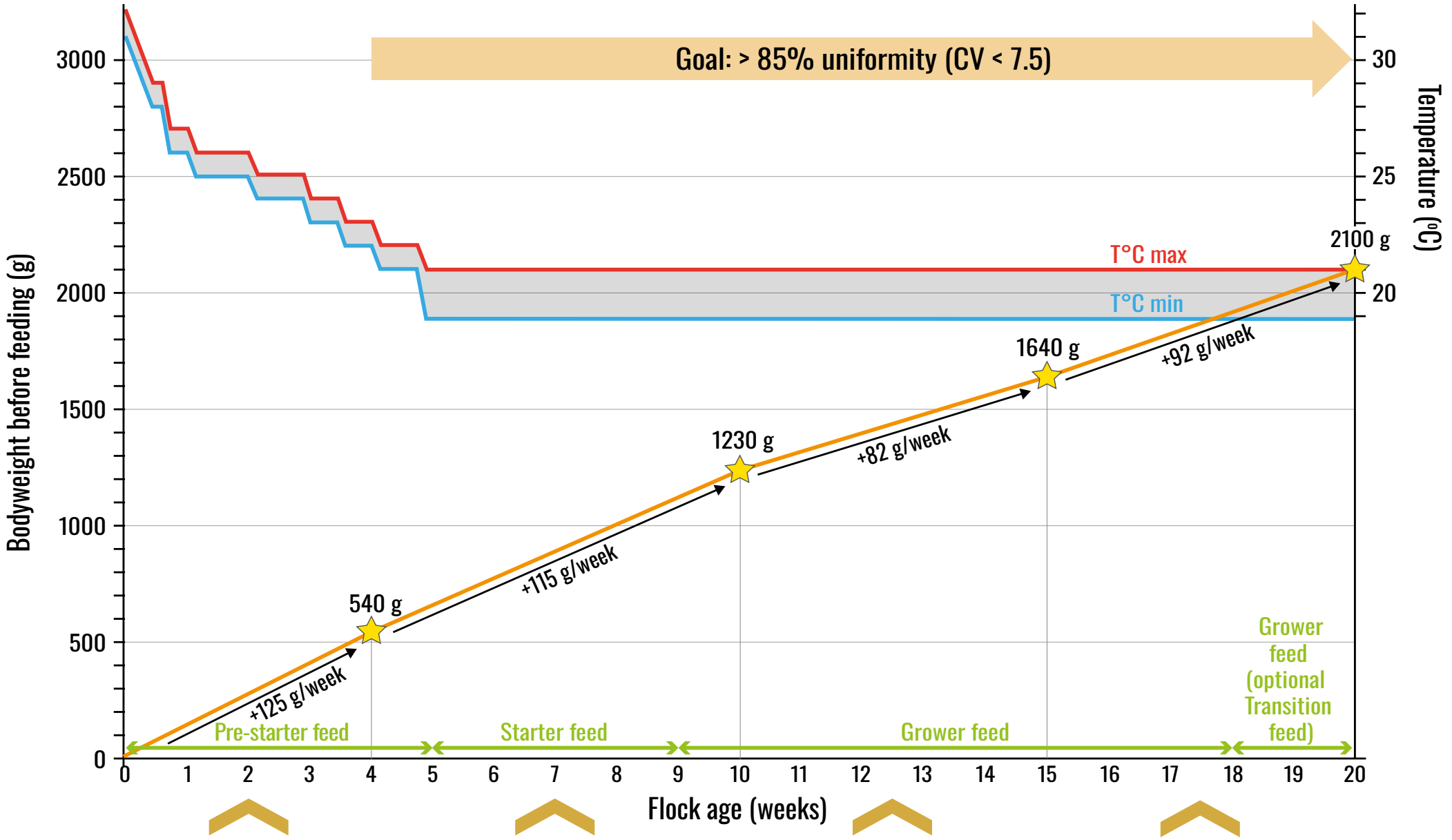
BREEDING FOR YOU SINCE 1921

HUBBARD PREMIUM
the natural choice!



MANAGEMENT GUIDE

REDBRO
PARENT STOCK


Goal: > 85% uniformity (CV < 7.5)
Bodyweight before feeding (g)
Temperature (°C)
Flock age (weeks)
T°C max
T°C min
540 g
1230 g
1640 g
2100 g
+125 g/week
+115 g/week
+82 g/week
+92 g/week
Pre-starter feed
Starter feed
Grower feed
Grower feed (optional Transition feed)
0-4 weeks: Obtain a good start to achieve the bodyweight objectives
5-10 weeks: Develop the skeleton of the birds
11-15 weeks: Control the muscle development
16-20 weeks: Prepare the females for the onset of lay

Successful rearing = more than 80% females within the flock receptive (mature but not too early) at the time of the light stimulation (154 days).

Flock management to be adapted according to the local rearing conditions (house type, climate...).

- Develop a good frame size by achieving bodyweight objectives at 4 - 6 weeks. *Ad libitum* feeding during the first 2 weeks and until 3 weeks of age if the 2 weeks bodyweight target is not achieved.
- Monitor sexual maturity to prevent the onset of lay occurring too early:
  - By applying a slow step-down lighting program during the first 10 weeks (to be adapted to the local rearing conditions).
  - By following the bodyweight objectives paying attention to weekly growth around 6 - 8 weeks and 16 - 22 weeks to ensure females are not too heavy.
  - By avoiding disruption to growth and uniformity between 18 - 22 weeks, especially when doing transfer and doing vaccination.
- Provide 5 cm / bird of perch space or 4 m² of platform / 1000 birds from 28 days to train the birds to jump up to the nests.

Dark rearing house: good flock uniformity

- Develop a good appetite to prepare the onset of lay and a good flock uniformity above 85%. Maintain feed clean-up time less than 3 hours.
- All the life of the flock:
  - Assure good distribution of both feed and water.
  - Maintain good litter quality.
  - Maintain proper environment and air quality for a healthy flock.
  - Weigh 3 - 5% of the flock or at least 100 birds per pen per week.

EQUIPMENT AND STOCKING DENSITY DURING REARING	
Stocking density *	7-8 birds/m² (< 7 birds/m² in hot climate)
Brooders	1 for 500 chicks
Watering - round	1 for 80 birds
Watering - nipple	1 for 8-10 birds
Feeding - chain	15 cm/bird (7.5 m/100 birds)
Feeding pans - round	1 for 12 birds
Feeding pans - oval	1 for 13-14 birds
Spin feeder	1 for 1500-1800 birds
Feed distribution time	< 4 minutes

** Stocking density may be subject to local regulations which must be observed at all times.*

Performance Objectives Redbro PS

Nutrition Recommendations

Dark rearing house: good feed distribution

GROWTH: ACHIEVE 5% PRODUCTION NOT BEFORE 23 WEEKS OF AGE

- Avoid disruption to growth and uniformity between 20 - 23 weeks, especially when changing feed type and mixing males.
- Appropriate eating behaviour between first egg and depletion. Check feed distribution on a regular basis. → See Poster ***"Feed distribution"***.
- Ensure weekly growth rate is on target. Weigh 3 - 5% of the flock or at least 100 birds per pen per week.

LIGHT

- From 154 days provide a first increase in daylength of 2 h combined with an increase of the light intensity (60 - 80 lux in dark houses) then + 1 or 2 h light / week until 14 h or 15 h light in dark production house and 15 h light in open-sided production house.
- It is recommended not to exceed 16 h of light duration.

FEED: PROMOTE A GOOD EGG PRODUCTION FROM THE FIRST EGGS.

- Give daily feed increase from 5 - 10% daily production and reach the feed peak no later than 60% daily production.
- Control male access to female feeders by using the correct grill size or chain feeders (45 mm wide x 60 mm high). Consider adding a pipe of 20 - 25 mm width to the top of the grill if a taller grill is used and adjusting pan feeders to the minimum width and height setting.
- When egg weight exceeds 62 g it is recommended to use Breeder II feed.
- Plan feed reduction according to egg production, egg weight, female bodyweight and abdominal fat.

NEST EGGS: PREPARE THE FLOCK PROPERLY TO MAXIMISE NEST LAYING.

- Timely reaction to laying on the floor with corrective action.
  - Frequent collection of floor eggs from the first eggs remains a key practice.
  - The mating ratio will be defined according to the type of males being used and the level of sexual maturity at 20 - 22 weeks. → See Management guide ***"PS males mated with Premium females"***.
- A detailed checklist is available from your local Hubbard Technical Manager.

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Male management guide

Nutrition Recommendations

Hubbard Poster Feed distribution

Hubbard Bulletin Water Quality

Dark production house

- **WATER: MAXIMISE THE FEMALE LIVEABILITY AND THE LITTER QUALITY.**
- Control water quality: pH = 5.5 to 6.8.
- Oxidation Reduction Potential (ORP) or Redox potential > 600 mV with chlorine.
- Chlorine concentration at the end of the pipe = 1 ppm (Acceptable range: 0.5 to 3 ppm).

EQUIPMENT AND STOCKING DENSITY DURING PRODUCTION	
Stocking density	<7.0 females/available m² (excl. egg belt and service room) < 6 birds/available m² in hot climate
Watering - round	1 for 80 females
Watering - nipple	1 for 6 to 10 females (nipple flow 70-100 ml/min*)
Feeding - chain	15 cm feeder space per female/7.5 m length for 100 females**
Feeding pans - round ø 35 cm	1 for 12 females **
Feeding pans - oval	1 for 12-13 females **
Feed distribution time	< 4 minutes
Nests	1 manual nest/4 females 80-90 females/linear meter of automatic nest
Required ventilation	0.6 to 6 m³/kg liveweight/hour
Air Speed	2.5 m/sec up to 3 m/sec in humid and warm climates (tunnel ventilation)
Light intensity	60-80 lux

** Some nipple drinker systems are designed to operate with lower flow rates for breeders so check the manufacturer's recommendations or seek advice from your Hubbard Technical Manager.*

*** Feeding space may be subject to local regulations which must be observed at all times.*

3. REARING PERIOD (0 - 20 WEEKS): HOW TO HAVE A SUCCESSFUL BROODING PERIOD?

The key management practices are shown in our brooding poster. ➔ See Poster ***"Brooding PS"***. A close observation of the chicks during the first two weeks in their environment will make brooding successful (optimal growth and good feed intake) by adjusting light, feed, water, equipment, heat and minimum ventilation.

Check the height and the pressure of the nipples

Good chick distribution in the brooding pen

After 24 h, 96% of the chicks with a full and soft crop

KEY POINTS TO PROMOTE EARLY WATER AND FEED INTAKE

➨ Choose an appropriate density (25 - 30 birds / m²) during the first 3 days. Chicks should never be away more than one meter from a drinker or a feeder.

➨ If permitted by local regulations, use an intermittent lighting programme from day 1 to day 28. Always respect the recommended hours of light below and a minimum of 4 cycles of light / dark per day. Ensure to be present in the house to observe the chick behaviour on the first few times the lights are switched on and off.

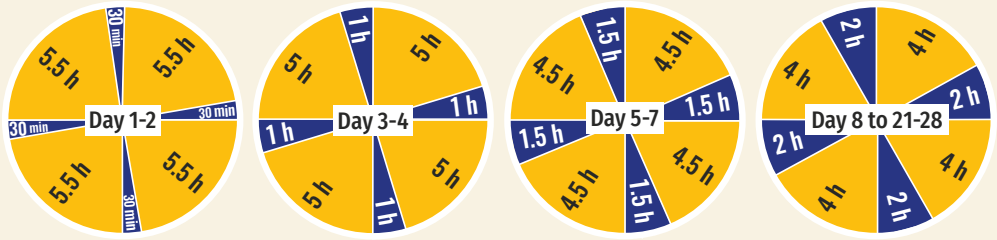
➨ Place chick paper with feed on at least 50% of the surface. Avoid build up of feed dust during the first 14 days by emptying the feeders regularly at least once per day.

➨ Start using a pre-starter diet. The starter diet will depend on growth rates recorded from 7 days of age ➔ See ***"Nutrition Recommendations"***.

➨ Ideal water pH: 5.5 to 6.8 with an ORP higher than 600 mV (with chlorination) or chlorine concentration at the end of the pipe = 1 ppm (acceptable range: 0.5 to 3 ppm). Water at ambient temperature: 24 - 26°C.

➨ Use of all the floor space by 10 days if brooders are used.

➨ Ensure that the floor temperature is above 29°C / 84°F.



Example of intermittent lighting programme

AGE	Days	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
TEMPERATURE	Under the heaters	35-36				32-34			28-30							
	Living area	28					27-28		25-26							
	Whole house heating	31-32	30-31	29-30	28-29		26-27									
HUMIDITY	%	50-60														
EQUIPMENT	Drinker	1 round drinker for 60 birds; 1 nipple for 8 birds								1 round drinker for 80 birds; 1 nipple for 8-10 birds						
	Feeder	1 feeder/50-70 birds + chick paper (> 50%)								Chain feeder: 6-8 cm/bird; 1 oval pan feeder/14-16 birds; 1 round pan feeder/13-15 birds						
DENSITY	Chicks/m²	25-30				12				7-10						
LIGHTING PROGRAMME	Light duration (h)	24	22		20		18			16						
	Light intensity (lux)	80 (If permitted by local regulations)					60 (If permitted by local regulations)									
FEED	*Ad libitum*	Ad libitum for 2 weeks and until 3 weeks if the 2 weeks bodyweight is not achieved														
	Feed type	Pre-starter crumbles or Mini pellets														

Nutrition Recommendations

Hubbard Poster Brooding PS

3. REARING PERIOD (0 - 20 WEEKS): HOW TO CHOOSE THE OPTIMUM LIGHTING PROGRAMME?

Numerous parameters can affect sexual maturity including: house type, latitude, season, bodyweight curve and uniformity pattern. On page 7 and 8 some examples are provided the general principles to design an optimal lighting programme. Please consult your local Hubbard Technical Manager especially if males have to be housed in the same house as females.

REQUIREMENTS FOR AN OPTIMAL LIGHTING PROGRAMME

- Rearing conventional males (M77 / M99) with females in the same rearing house is not recommended → See ***"PS males mated with Premium females management guide"***.
- For solid-sided houses use light traps on fans and all air inlets (including the minimum ventilation).
- For side-curtain tunnel housing it is advised to darken the houses for the whole life of the flock, using solid black curtains.
- For open-sided traditional houses take care if using dew / shed net to cover the sides at all ages. Ventilation and season should be carefully considered to ensure optimum flock and litter conditions to maintain good footpad condition.

Open-sided rearing house with black curtains

Dark rearing house – light traps on fans and inlets

Dark rearing house with natural light leakage

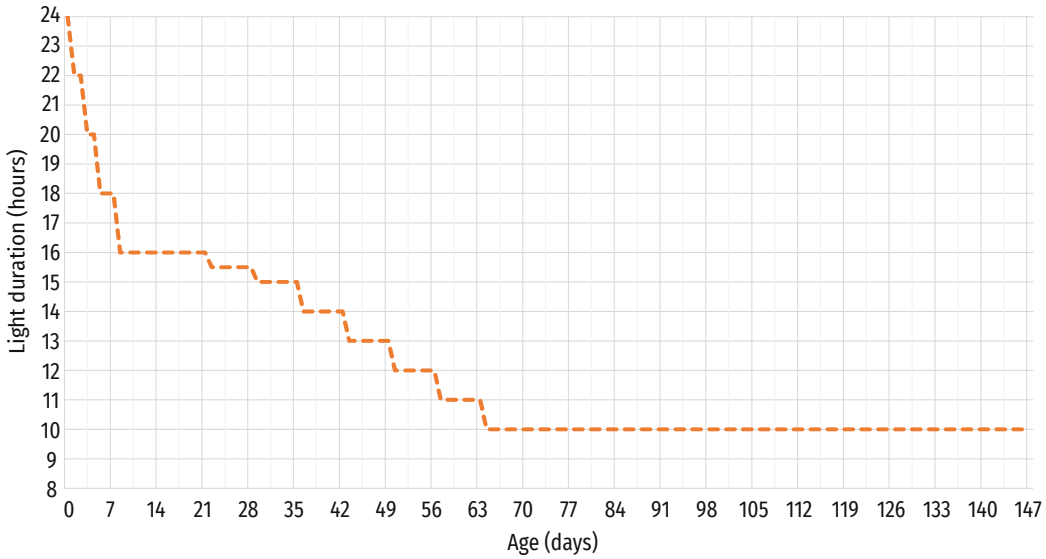
Dark rearing house - no natural light leakage

Case N°1: DARK REARING HOUSE / DARK PRODUCTION HOUSE

TABLE 1: LIGHTING PROGRAMME ACCORDING TO THE BREED

REARING HOUSE	DARK	
PRODUCTION HOUSE	DARK	
Breed	REDBRO	
Flock age	Light duration *	Light intensity *
14-20 d	16 h	40 lux
21-28 d	15 h 30	10 lux
29-35 d	15 h	
36-42 d	14 h	
43-49 d	13 h	
50-56 d	12 h	
57-63 d	11 h	
64-70 d	10 h	
71 d to transfer (126-140 d)	10 h	

** Hours of light and light intensity may both be subject to local regulations.*



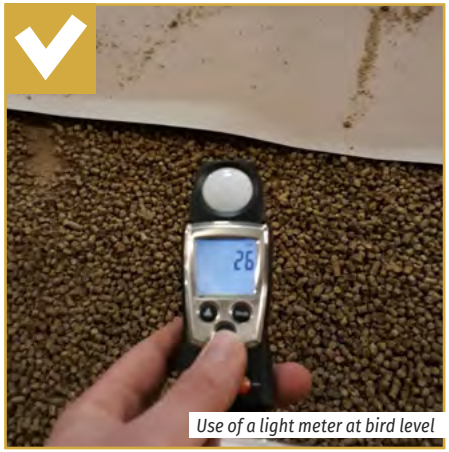
Light duration for REDBRO PS females - Dark production houses

Case N°2: DARK REARING HOUSE / OPEN-SIDED PRODUCTION HOUSE

TABLE 2: LIGHTING PROGRAMME ACCORDING TO THE BREED

REARING HOUSE	DARK		
PRODUCTION HOUSE	OPEN-SIDED		
Breed	REDBRO		
Natural daylength at 21 weeks of age	< 10 h	> 10 h	Light intensity *
Flock age	Light duration *		
14-20 d	16 h	16 h	40 lux
21-28 d	15 h 30	16 h	10 lux
29-35 d	15 h	15 h 30	
36-42 d	14 h	15 h	
43-49 d	13 h	14 h 30	
50-56 d	12 h	14 h	
57-63 d	11 h	13 h	
64-70 d	10 h	12 h	
71 d to transfer	10 h	12 h	
Transfer age	140 d	147 d	

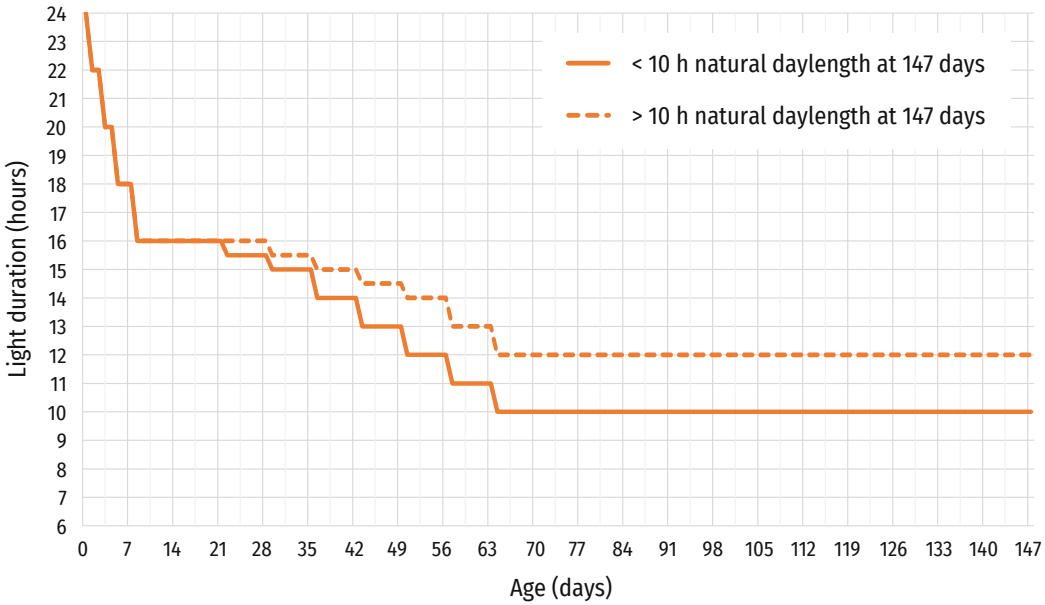
** Hours of light and light intensity may both be subject to local regulations.*



Use of a light meter at bird level

LIGHT INTENSITY MANAGEMENT

- It is essential to provide uniform light at bird level in each pen all along the rearing period.
- The use of an appropriate light meter at bird level brings precision to set the light source at the correct distance from the floor.
- Replace the light source as soon as possible when a bulb is not working properly.
- Remove the dust from the light source when required.



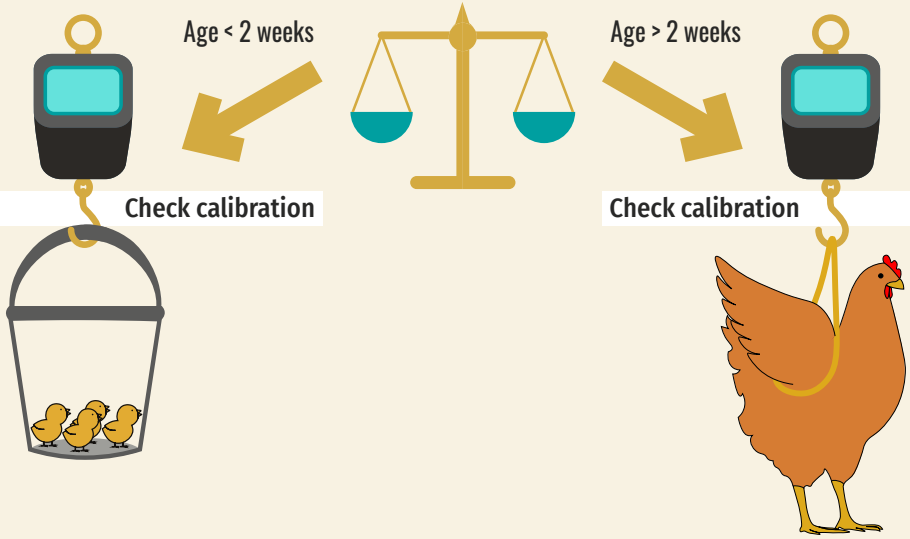
Light duration for REDBRO PS females - Open-sided production houses

Dark rearing house – Good light distribution at bird level

MANUAL WEIGHING

Every week, always the same day: hatch day is the best.

Best before feeding.
After feeding, use a with feed and water bodyweight target.

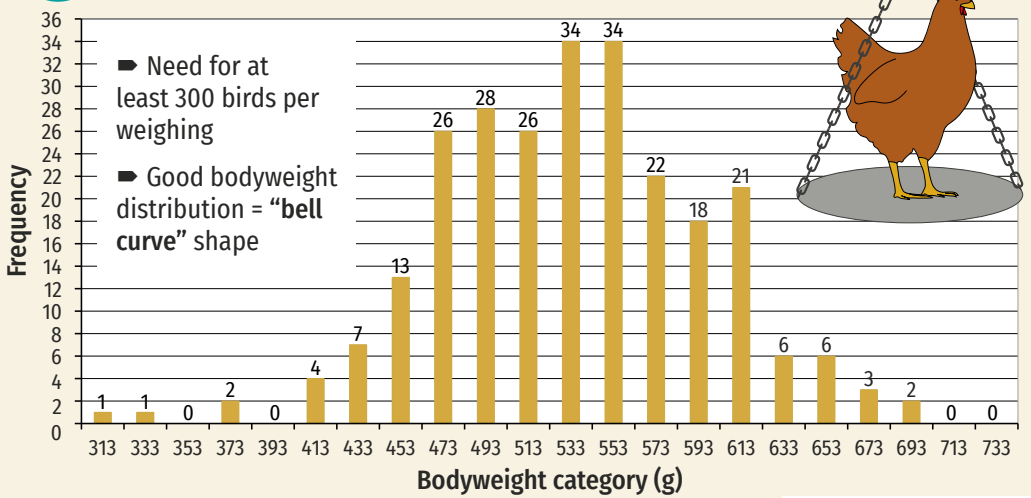


- Take samples from 3 separate places but not too close to the main feed hopper. Always keep the same location. **Sample size: 3 - 5% of the flock size or at least 100 birds per pen.**
- Weigh all the birds of the catching pen.

AUTOMATIC WEIGHING

Every week, always the same day: hatch day is the best.

Best before feeding.
After feeding, use a with feed and water bodyweight target.



Results from an automatic scale

- Ensure to place the scales as soon as possible to maximize the number of birds weighed.
- The lower and upper limits of the bodyweights often need to be adjusted.
- If an unexpected variation of the bodyweight from the objective is observed, it is recommended to re-weigh by hand a new sample.

Analysis of the weekly results for an optimal feed allocation management:

1. The feed allocation per bird should be based on the average bodyweight calculated after weighing.
2. Compare the average bodyweight with the bodyweight target. Plot the average weight on the growth curve to see the trend.
3. Calculate the weekly gain and compare it with the objective mentioned in the Performance Objectives.
4. Adjust feed allocation according to the weekly weight gain achieved and the one targeted for the next week. Please do not strictly follow the feed intake targets as they are only provided as a guideline and consider actual feed increases.

- Be prepared to control feed allocation from 8 weeks of age to avoid excess bodyweight gain after 10 weeks of age.
- Under normal conditions the use of Transition diet is not necessary and only used when bodyweight is below target at 126 days. → See ***"Nutrition Recommendations".***
- If the first eggs are laid before 140 days, please contact your Hubbard Technical Manager.

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Performance Objectives Redbro PS

Nutrition Recommendations

There are two possible indicators to express flock uniformity:

1. The uniformity is defined by the percentage of birds weighing between +/- 10% of the average bodyweight of the flock/pen. ➔ See chart below.
2. The coefficient of Variation (CV) is the variation of bodyweights within the flock (= Standard deviation/average flock bodyweight). The lower the CV%, the more uniform the flock is.

GRADING: OPTIONAL

➨ 7 days: grade or at least isolate the smallest chicks by eye and manage them with special care to achieve target weight by 4 weeks.

➨ 21 - 28 days: if needed grade 100% of the flock and create weight groups, each with at least 85% uniformity (CV < 7.5). ➔ See Bulletin ***"Grading of broiler breeders"***.

➨ 29 - 84 days: aim to maintain or improve flock uniformity by having a close follow up of the feed distribution. ➔ See Poster ***"Quality of feed distribution"***.

➨ 84 - 98 days: if flock uniformity is less than 75% (CV > 9), re-grade the flock to assure that each weight group achieves at least 85% uniformity (CV < 7.5). Have a close bodyweight follow up during the vaccination periods. Anticipate this with extra feed.

FEED PROGRAMME

➨ Daily feeding gives successful results in many situations.

➨ If fractionated feeding is considered then please contact your Hubbard Technical Specialist to discuss possible solutions to optimise feed distribution.

➨ Adjust the feed depth in the feeders each time the feed allocation is changed to assure the correct distribution.

➨ Use of a low energy grower feed (< 2650 kcal / kg) is preferred to improve gut health and eating behaviour. If high fibre sources are added to the feed these must be of consistent quality and mycotoxin free. ➔ See Bulletin ***"Dietary fibre"***.

Good feed distribution: chain feeders

SPIN FEEDING

➨ Spin feeders are preferably used from 35 days of age when females are large enough to consume pellets (1 spin feeder per pen). If introduced earlier then special care must be taken to ensure small females are able to consume feed.

- Check growth is not depressed and ensure the target weight at 42 days is achieved.
- Consider extending the use of feed provided on paper or feeders to complement spin feeders.

➨ Avoid pellets over 3.2 mm diameter where possible and cut pellets as short as possible while keeping pellet quality. Ensure small chicks can consume the pellet.

➨ At the end of the rearing period when the birds are transferred to production house, please pay special attention to ensure the birds find their new feeders and drinkers. This may require additional temporary drinkers to be placed on the floor or slats.

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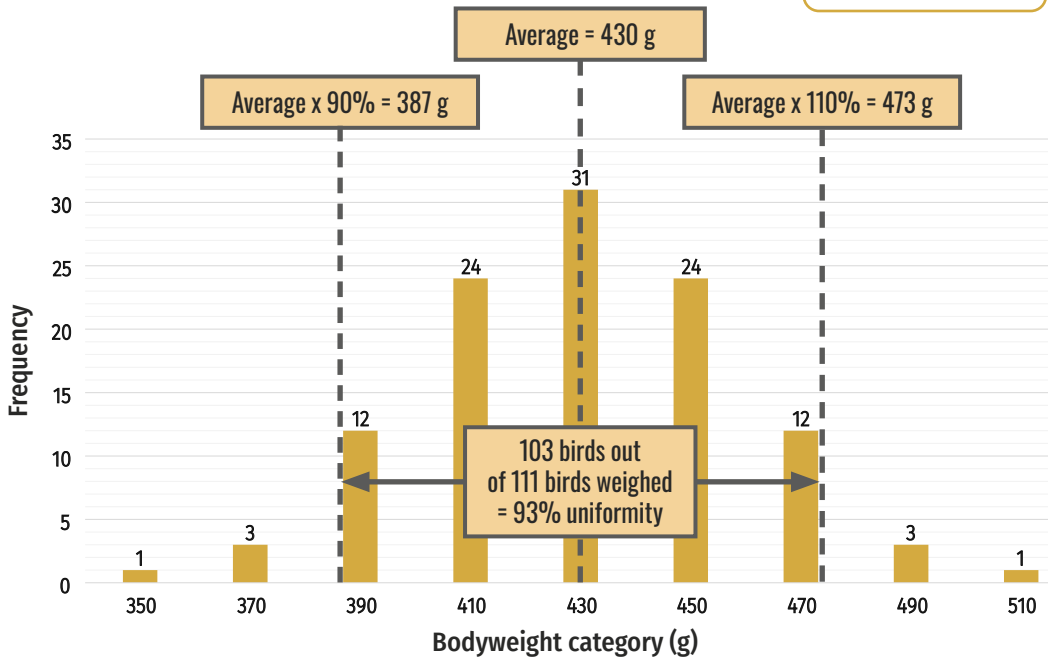
Hubbard Bulletin Dietary fibre

Hubbard Bulletin Grading

Hubbard Poster Feed distribution



Results of one manual weighing - % uniformity definition

For all enrichments it is important to consider the risks to compromise biosecurity, especially from straw or other bales and material brought into the house and also the ease of washing of fixed enrichments like platforms.

PERCHES AND PLATFORMS

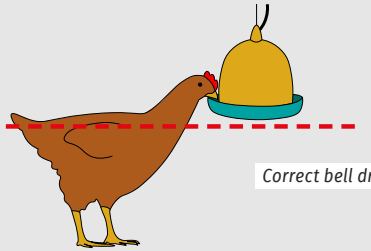
From 28 days, the use of a perching system is strongly recommended to stimulate activity and to train birds to jump onto the slats and manual nests. This helps prevent floor eggs.

- If the production house is equipped with automatic nests:
  1. Provide 4 m² of platform for 1000 birds.
  2. Optimal position of the platform is under the drinking system.
- If the production house is equipped with manual nests:
  1. Provide 5 cm of perch space per bird.
  2. Place some manual nests from 12 - 14 weeks of age.
- Platforms and perches should not have sharp edges that may damage birds.

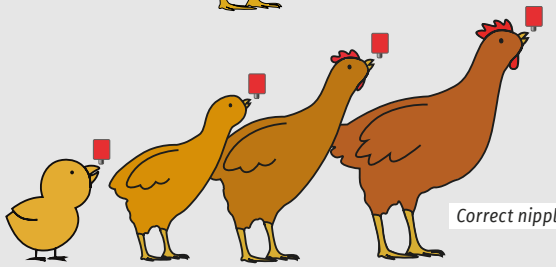
Perches

WATER MANAGEMENT/WATER QUALITY

- With a regular and proper management of drinker height and water flow according to flock age, no controlled access to water should be needed.



Correct bell drinker height



Correct nipple height

- Regularly check the chemical and bacteriological water quality to ensure that water sanitation is working properly.
  1. Optimal water pH: 5.5 to 6.8.
  2. Optimal ORP higher than 600 mV with chlorine.
  3. Chlorine concentration at the end of the pipe: target = 1 ppm (acceptable range: 0.5 to 3 ppm).

Hubbard Bulletin Water Quality

GRIT AND GRAIN: optional.

- Insoluble grit to promote the gizzard development.
  1. ø 2 - 3 mm: 3 - 5 g / bird / week from 5 weeks of age.
  2. ø 3 - 5 mm: 3 - 5 g / bird / week from 10 weeks of age.

- Sanitized scratch grain (cracked maize or whole wheat): 3 g / bird / day 4 - 5 h after feeding from 5 weeks of age.

ENRICHMENT: optional unless required by local regulations.

- White ropes – max 20 cm long – no contact with the litter.
- Wood shaving balls – 1 piece for 500 to 1000 birds, placed on floor.
- Pecking blocks – 1 piece for 500 to 1000 birds – Consider the hardness of the material.
- Alfalfa balls – 1 piece for 500 to 1000 birds, hanged or placed on floor.

Example of white ropes

Example of pecking blocks

Example of pecking blocks

Example of alfalfa balls

The first 10 days after the first egg are very important to achieve good results in terms of total eggs, hatching eggs and nest eggs. Eating behaviour, stocking density, eating/drinking space and ventilation need to be managed properly for a good peak and persistency of lay.

LIGHTING PROGRAMME: the objective is to reach 5% weekly production at 23 weeks of age.

- Light duration:
  1. Refer to the Table 3 and 4 to see some examples of lighting programme. Be prepared as the onset of lay should normally start about 1 - 2 weeks after the first light stimulation.
  2. Provide the maximum light intensity and 14 h light by 20% daily production without never exceeding 16 h light duration.
  3. For open-sided houses: please contact your Hubbard Technical Specialist to define how to provide the additional light.
- Light intensity:
  1. Do not reduce the light intensity between the rearing house and the production house. Ensure bright light (60 - 80 lux) in the mating area and a lower light intensity level on the nests.
  2. Rapid increase of light intensity is important with pan feeders so females see feed clearly before feed intake is increased with production.
  3. Ensure that the light distribution is uniform especially during the night time for open-sided houses. If possible, it is better to simulate dawn in the morning and dusk in the evening with a duration of about 15 minutes. This may be required under local regulations.
- Lighting systems:
  1. Make the best choice of light type such as incandescent, energy saver (white or yellow), fluorescent tube, sodium and LED to assure uniform light intensity at bird level.
  2. Good results are usually achieved with typical color temperatures between 2700 - 4000 K. There is no clear evidence that color temperatures above 4000 K give better results.

Good light intensity at bird level

Case N°1: DARK REARING HOUSE / DARK PRODUCTION HOUSE

TABLE 3: LIGHTING PROGRAMME ACCORDING TO THE BREED

REARING HOUSE	DARK	
PRODUCTION HOUSE	DARK	
Breed	REDBRO	
Flock age (d)	Light duration *	Light intensity *
Transfer age	10 h at 126-140 d	10 lux
148 d	10 h	20 lux
154 d	12 h	40 lux
161 d	14 h	60-80 lux
From 168 d	15 h **	60-80 lux

** Hours of light and light intensity may both be subject to local regulations.*
***Provide 15 h light if some floor eggs are observed just before the lights come on.*

Case N°2: DARK REARING HOUSE / OPEN-SIDED PRODUCTION HOUSE

TABLE 4: LIGHTING PROGRAMME ACCORDING TO THE BREED

REARING HOUSE	DARK		
PRODUCTION HOUSE	OPEN-SIDED		
Breed	REDBRO		
Natural daylength at 21 weeks of age	< 10 h	> 10 h	Light intensity *
Flock age (d)	Light duration *		
Transfer age	10 h at 140 d	12 h at 147 d	10 lux
148 d	10 h	12 h	Natural daylight +artificial light (60-80 lux)
154 d	12 h	14 h	
161 d	14 h	15 h **	
From 168 d	15 h **	15 h **	

** Hours of light and light intensity may both be subject to local regulations.*
***Provide 15 h light if some floor eggs are observed just before the lights come on.*

FEED PROGRAMME: Maximising appetite is crucial to ensure a good early egg size and maximising the nest eggs during onset of lay.

- Flocks transferred from the rearing farm could lose bodyweight.
  - Anticipate this with extra feed especially during the vaccination periods and when the feeding system is different in the production house.
  - Give consistent feed increases until the flock reaches 5% daily egg production.
- Increase feed according to the production level:
  - Once 5 - 10% daily production, feed the flock according to the daily increase in production: typically + 3 - 4 g / day. Typical increase in feed is 0.8 - 1 g per 1% increase in daily egg production. Reach the maximum feed intake by 60% daily production. →See ***"Performance Objectives"***.
  - The onset of lay may be very rapid and it is advised to be well prepared. For example, it can take only 14 days from 5% to 80% daily production.
  - Ensure the daily egg weight increase is consistent using the daily onset of lay sheet. The Poster ***"REDBRO PS egg weight management"*** explains the egg weighing method.
  - Monitor feed clearance time at peak feed on a daily basis (around 5 hours) but may vary according to feed and environment.
  - Ensure feeders are empty for at least 3 hours every day, preferably in the middle of the day (around 5 - 6 hours after lights on) as shown in the pictures above. If this is not the case:

Different levels of empty feeders with chain feeders

1. Consider reducing the total amount of feed distributed per day to ensure this empty period is observed during some days.
2. Do not add extra feed distributions during the day during hot weather.

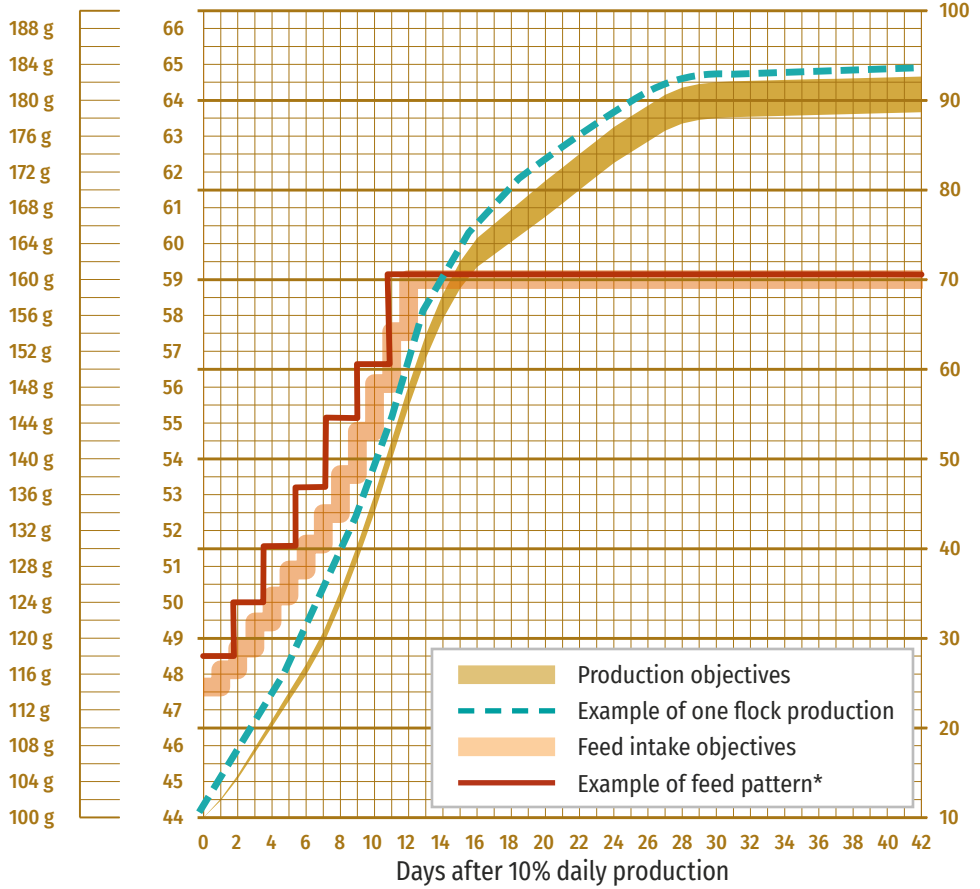
- Risk factors for low appetite or long feed clearance time:
  - Excess dietary protein may cause longer feed clearance time and then it will be difficult to manage the balance between nutrient supply for egg production and body maintenance.
  - During hot weather (house temperature > 28°C / 82°F) to stimulate production and reduce heat stress:

- Options for use when feed intake is below target for example due to hot climate conditions can be considered →***"See "Nutrition Recommendations"***. Further specific advice can be obtained from Hubbard Nutrition Specialists

EXAMPLE OF A GOOD ONSET OF LAY FOR A REDBRO PS FLOCK

- The stimulation of appetite early in production determines the consumption capacity at peak a few days later as shown in the chart below.
- If the daily feed increases have not kept up with the production, the peak feed level and likely also production will be lower.

Hubbard Poster REDBRO Egg weight management



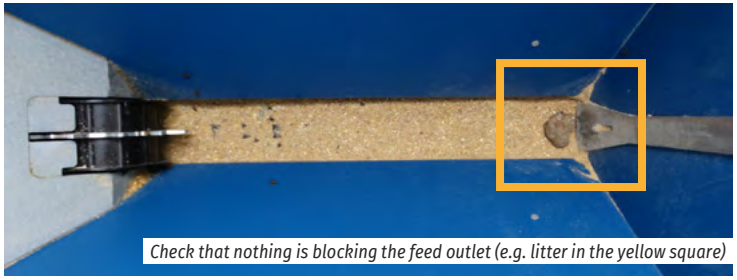
** It is important that feed level stays ahead of the egg production curve.*

QUALITY OF FEED DISTRIBUTION

- Ensure on a daily basis that feed remains evenly distributed into the feed system to maintain a good flock performance (flock uniformity, egg production, egg weight).
  - Ensure a uniform feed level between the feeder lines. Some litter can accumulate and block the feed outlet.
  - Adjust the time of the last feed turn (see right side figure).
  - Fast feed distribution (< 4 minutes).
  - Maintain the supplementary feed hoppers until the end of the flock.

Good uniformity of the feed in the 3 feeder lines

  - Management of pan feeders: distributing the daily feed in one or two meals may require careful attention, particularly by maximising the first feed distribution. If this cannot be achieved:
    1. Add an extra feed distribution, but avoid feeding during the next 5 - 6 hours after lights on, which coincides with the daily peak of egg production.
    2. Keep the feed depth at the maximum setting after transfer so that females can easily see and access the feed in the pans.
- Different methods for the feed distribution: whatever the method chosen the number of times per day feed is distributed should be kept to a minimum (< 4 feed turns).
  - Early feeding method: the first feed turn is given within 30 minutes after lights on.
    1. After transfer, the birds can be fed only in the morning if the feed clearance time is not longer than 6 - 7 hours.
    2. If it takes longer, it is recommended to implement two meals during the day (e.g. 60% in the morning and 40% at least 6 hours after the first feed distribution, to be adjusted according to flock appetite).
  - Late feeding method: the first feed turn is given a few hours after the laying period like for example: 70% of the daily feed amount at noon and 30% in the late afternoon.
  - Night feeding method: when the flock is raised in hot climate, it is possible to use a night feeding programme (supplementary feed):
    1. Applying 2 hours of light starting 2 hours after lights off (resting period).
    2. Feeding times could be adapted depending on the local conditions.



Check that nothing is blocking the feed outlet (e.g. litter in the yellow square)

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Hubbard Poster
Feed distribution

Method to adjust the timing of the last feed turn using a chain feeding system

TABLE 5: ADVANTAGES AND DRAWBACKS OF THE FEED DISTRIBUTIONS METHODS

METHOD	ADVANTAGES	DRAWBACKS
Early feeding	➨ Securing egg shell quality ➨ Good flock activity in the afternoon	➨ Non optimal nesting behavior under challenging conditions
Late feeding	➨ Easier to check the quality of the feed distribution ➨ Improved nesting behavior	➨ Not recommended in hot climate.
Night feeding	➨ Securing the feed intake in hot climate.	➨ Disruption of the egg-laying window.

GENERAL RECOMMENDATIONS FOR NEST LAYING

- Transfer birds directly on slats and provide water and feed (if feeders are on the slats).
- According to the type of males being used, mixing to ensure 7.5 - 9.5% males of the appropriate sexual maturity at 20 - 22 weeks. More than 9.5% males could be risky to maintain a low floor eggs %. → See ***"PS males mated with Premium females management guide".***
- Collect floor eggs at least every hour during the laying time. From very first egg, this may be 10 - 12 times per day.
- Provide a low level of litter after transfer (1 - 3 cm in hot conditions / 4 - 6 cm in cooler conditions). In case of using less than 3 cm, add fresh litter on a regular basis to maintain good litter quality.
  - Place dummy eggs or marked eggs in the nests to attract birds.
  - Avoid draughts of cold air or very high air speed inside the nests.
- Do not feed at the time when most eggs are laid during the day.
- A full checklist on the nesting behavior is available from your local Hubbard Technical Manager.

Male management guide

Good house design and bird distribution

SPECIFICATIONS FOR AUTOMATIC NEST

- Open the nests during the day at least 2 weeks before first egg. It is also possible to open nest flaps until 30% daily production.
- Turn-on lights inside nests one hour before lights on in the house to help early laying birds find their way to the nests.

Slat steps to promote nest access

- Nest belts can be turned-on twice during the day to familiarise birds with the noise.
- If slat height > 40 cm, place steps to help birds jump onto the slats. Slat slope should not exceed 5 - 8°.
- Ensure a correct nest ratio (80 - 90 females / linear meter for colony nests and 4 females per nest for individual nest systems).
- Adequate nipple flow (70 - 100 ml / min) and a correct distance (> 1 m) from the nest to avoid a fence effect in front of the entrance to the nests.
- Using bricks on the slats may help birds distribute more evenly in the nests.

SPECIFICATIONS FOR MANUAL NEST

- Introduce nests at least 4 weeks before the onset of lay.
- Put clean bedding material in the nests to make them attractive.
- Perches must be large enough to allow easy access to both the 1st and 2nd nest level.
- Ensure the correct nest box ratio (4 females / nest).
- If egg collections are made at a time when females are laying most of the eggs, avoid disturbing females in the nests.
- Lower the nests close to the litter level to promote nest access.

Objectives in order to maximise the egg production and the female liveability:

1. Control flock bodyweight, flock uniformity and body fat.
2. Ensure egg weight is on target.

FEEDING MANAGEMENT

- Check the evolution of the egg weight and female growth before reducing the feed intake. If production drops after a feed reduction, reinstate the previous amount.
- Adjust feed allocation for both hot (> 28°C / 82°F) and cold (< 18°C / 64°F) weather to meet metabolic requirements.

FEED FORMULA

- It is recommended to change to Breeder II diet once the egg weight reaches 62 g.
- Check the physical quality of the feed on a regular basis using the Hubbard feed sieve and related Hubbard calculation software. → See ***"Hubbard Feed Sieve Tool"***.

FEMALE CONDITION/BODYWEIGHT CONTROL

- Weekly control of female bodyweight is essential and feed should be immediately adjusted at any time that bodyweight drifts away from the recommended objective.
- Assess abdominal fat on a regular basis. Fatness should be controlled using Breeder II feed and timely management of the feed allocation.
- Assess female feathering on a regular basis.

Good flock condition and bird distribution

LIGHTING PROGRAMME

- It is possible to increase an extra hour after 40 weeks of age, but without exceeding 16 h light duration.

WATER QUALITY

- Regularly check the chemical and bacteriological water quality to ensure that water sanitation is working properly.
- Ideal water pH: 5.5 to 6.8.
- Optimal ORP or Redox potential higher than 600 mV with chlorine (450 mV with chlorine dioxide and 300 mV with peracetic acid or peroxide).
- Chlorination concentration at the end of the pipe: target = 1 ppm (Acceptable range: 0.5 to 3 ppm).

EGG MANAGEMENT:

- Frequent collection of floor and belt eggs to minimise cracked eggs.
- Ensure to provide good litter quality throughout the production period to maintain a high hatching-egg ratio.

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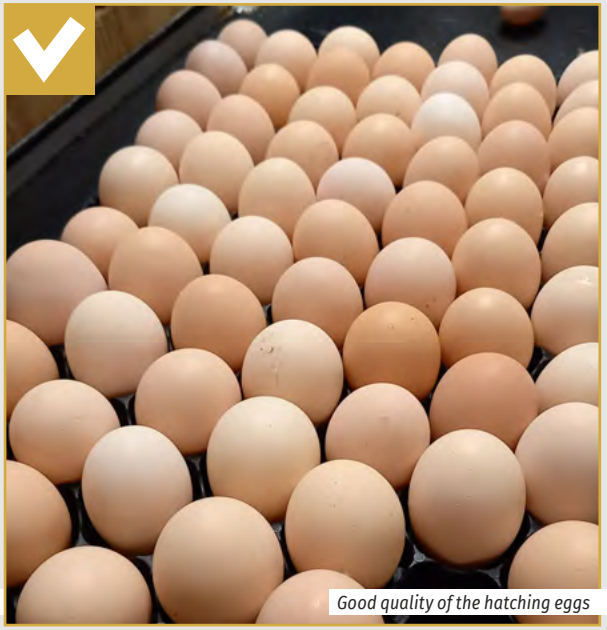
Hubbard Poster REDBRO Egg weight management

Hubbard Feed Sieve Tool

Hubbard Bulletin Water quality

Excellent litter quality



Good quality of the hatching eggs

LITTER MANAGEMENT

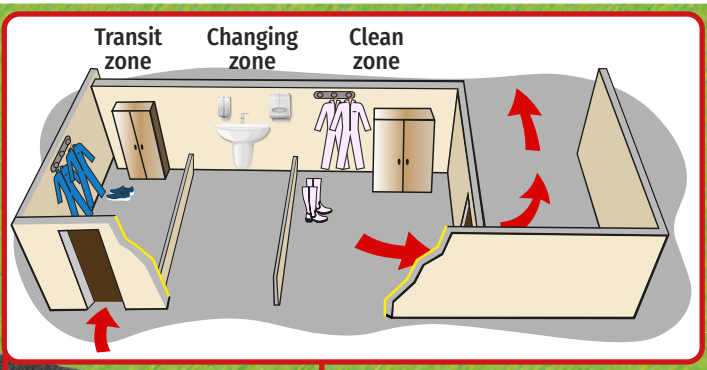
Litter/bedding storage in an adapted biosecure area to maintain the pathogen-free status (inside the house).

No accumulated litter at the end of the cycle.

SHED TO SHED ACCESS

If corridor between the two houses provide three-zone entry.

If no corridor between the houses, provide one shower unit in each house.

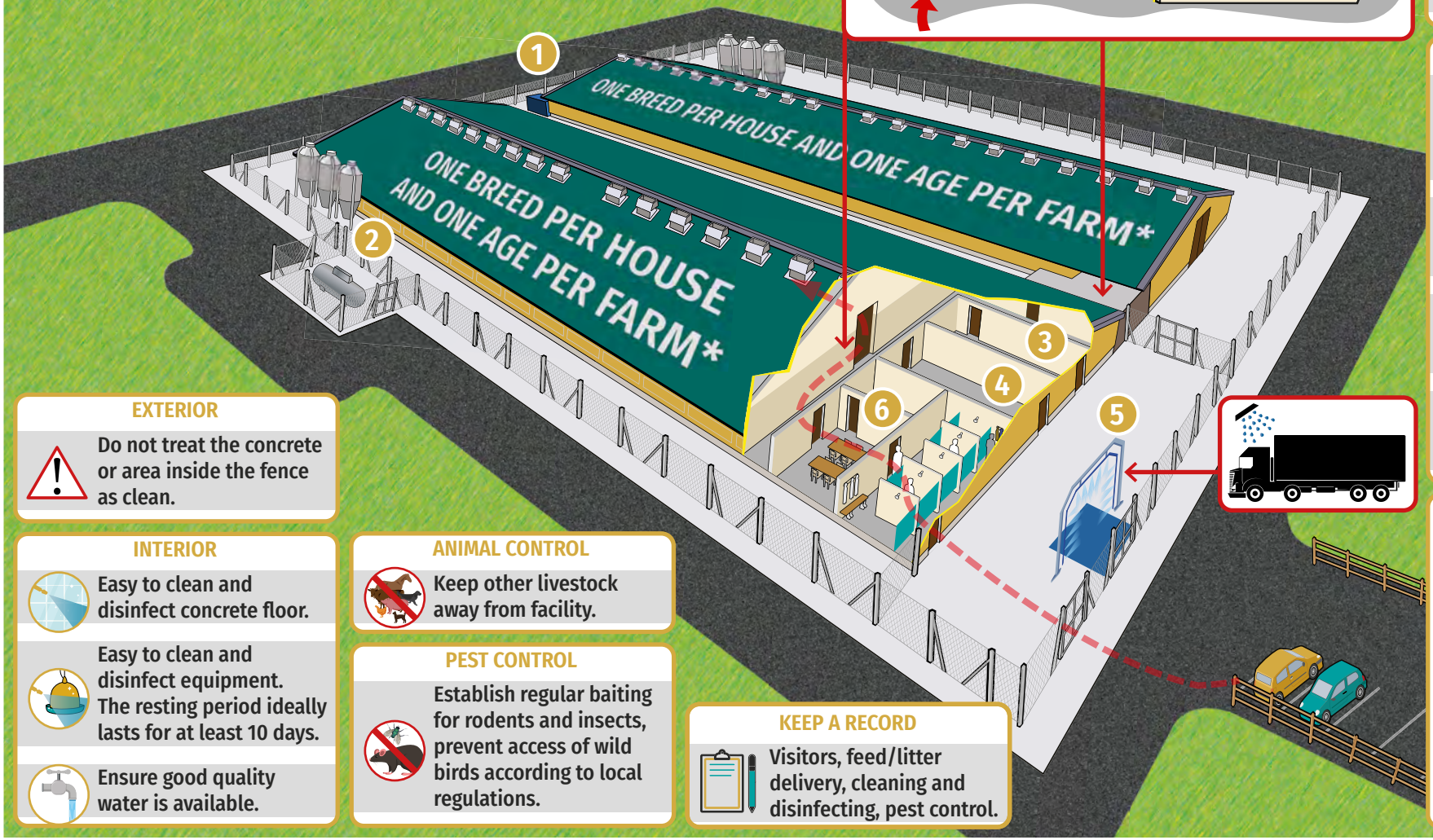


VISITORS

Restrict visitors and adapt quarantine period.

Provide shower facilities.

Provide change of clothes and boots.



VEHICLES

Vehicles must be cleaned prior to entering the farm facility.

DO NOT allow unauthorised vehicles on the farm.

Make sure all feed and gas deliveries stay outside of the fence.

Bags are to be worn on shoes from cars into the shower facilities.

EXTERIOR

Do not treat the concrete or area inside the fence as clean.

INTERIOR

Easy to clean and disinfect concrete floor.

Easy to clean and disinfect equipment. The resting period ideally lasts for at least 10 days.

Ensure good quality water is available.

ANIMAL CONTROL

Keep other livestock away from facility.

PEST CONTROL

Establish regular baiting for rodents and insects, prevent access of wild birds according to local regulations.

KEEP A RECORD

Visitors, feed/litter delivery, cleaning and disinfecting, pest control.

1. Freezer room: disposal of dead birds in a biosecure freezer.
2. Gas tank
3. Fumigation room
4. Egg storage room
5. Vehicle disinfection unit
6. Staff room

→ Go forward principle

** It may be possible to rear different Premium breeds in the same house. Please consult your local Hubbard Technical Manager.*

NOTES

NOTES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