



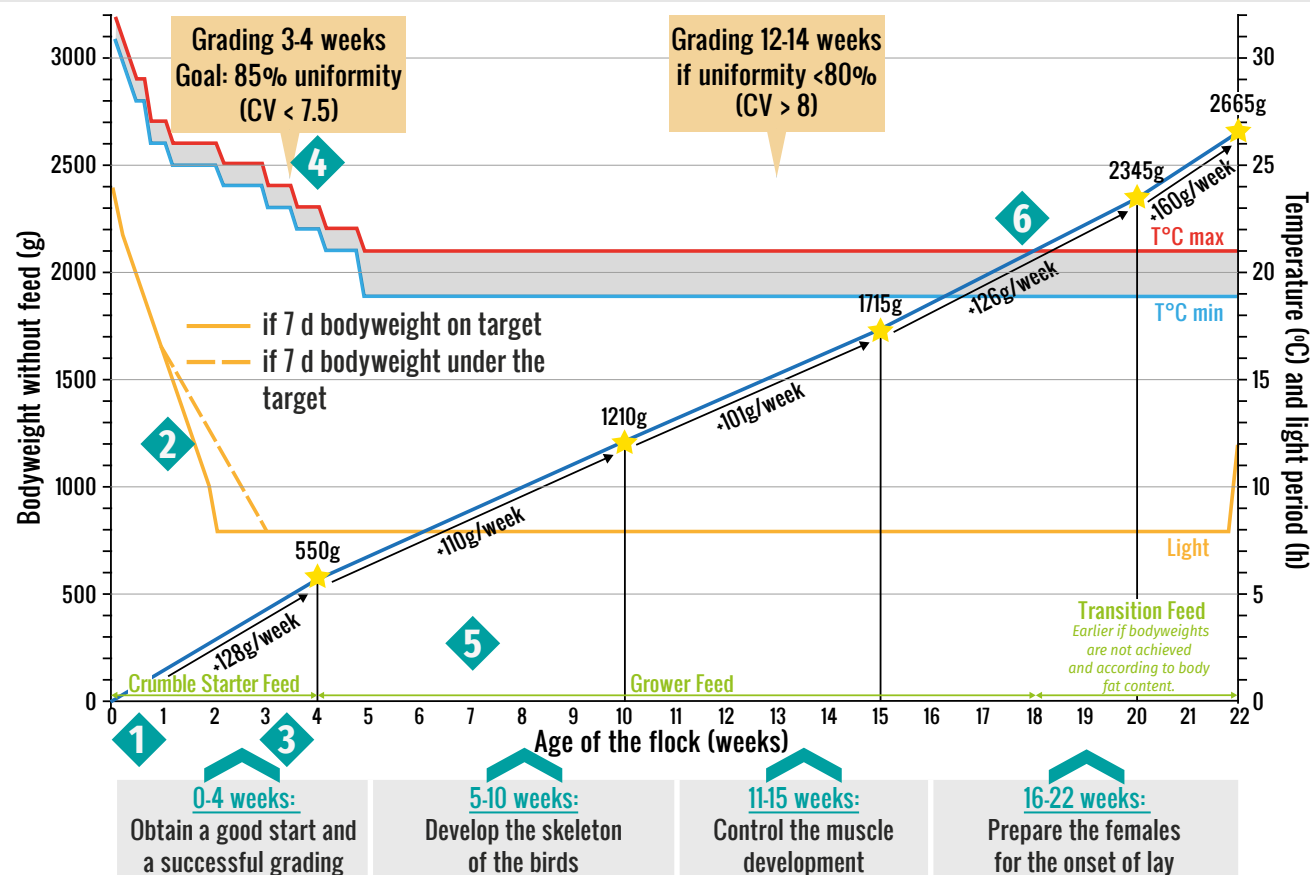
MANAGEMENT GUIDE

PARENT STOCK EFFICIENCY PLUS FEMALE



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1. KEY MESSAGES REARING PERIOD (0-22 WEEKS): EQUIPMENT AND STOCKING DENSITY



EQUIPMENT AND STOCKING DENSITY DURING REARING	Stocking density *	6.0 birds/m ²
	Brooders	1 for 500 chicks
	Watering - bell drinker	1 for 80 birds
	Watering - nipple	1 for 8-10 birds
	Feeding - chain	15 cm/bird (7.5m/100 birds)
	Feeding - round pan	1 for 12 birds
	Feeding - oval pan	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.



Successful rearing = more than 80% females within the flock receptive ("mature") at the time of the light stimulation (154-161 days of age)

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

- 1 Ad libitum feeding during the first 2 weeks and until 3 weeks of age if the 2 weeks bodyweight target is not achieved.
- 2 Combine the reduction of day length and light intensity in the first 2 weeks: 24 h light/60 lux → 8 hours light/5-10 lux.
- 3 Provide 3-5 cm/bird of perch space or 1-2 m² of platform/500 birds from 28 days to train the birds to jump up to the nests.
- 4 Isolate the smallest chicks from 7 days. Grade the whole flock at or before 4 weeks. Within 4 weeks of grading or by 8 weeks at the latest, the pen with the small birds has to reach the 8 weeks bodyweight target

to secure skeletal development which is almost completed at this age.

- 5 Maintain 45-60 minutes eating time;
- 6 Avoid disruption to growth and uniformity between 18-22 weeks, especially when changing feed type and doing vaccination. Assess body conformation and fatness on a regular basis.

All the life of the flock:

- Assure good distribution of both feed and water.
- Maintain good litter quality.
- Meet the environmental and air quality requirements for a healthy flock.
- Weigh 3-5% of the flock and at least 100 birds per pen per week.

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[Bulletin Grading](#)

[Performance Objectives Efficiency Plus PS](#)

[Poster Feed distribution](#)

[Poster Rearing](#)

2. KEY MESSAGES PRODUCTION PERIOD (22-64 WEEKS): EQUIPMENT AND STOCKING DENSITY

LIGHT

► Consider light stimulation only from 154 days and when the females are sexually ready (bodyweight, pelvic opening, fat line). Target: uniformity higher than 80% (CV < 8%) at the time of first stimulation and 80% of the females with a pelvic bone opening of more than 2 fingers (3 cm).

► When the flock is ready, provide a first increase in daylength of 4 hours combined with an increase of the light intensity (to achieve 60-80 lux) then + 1 hour light / week until 14 hours light.

GROWTH

► Avoid disruption to growth and uniformity between 20-25 weeks, especially when changing feed type and mixing males. Ensure weekly growth rate is on target.

FEED

► Appropriate eating behaviour between first egg and depletion. Check feed distribution on a regular basis. → See Poster *“Feed distribution”*.

► Give daily feed increase from 5% daily production and reach the feed peak no later than 70-75% daily production.

► Use a proper grill size (45 mm x 60 mm) or adjust pan feeders to control male access.

► When egg weight exceeds 65 g it is recommended to use Breeder II feed.

► Maintain peak feed until production drops below 85%. Then plan feed reduction according to egg production, egg weight, female bodyweight and abdominal fat. Weigh 3-5% of the flock and at least 100 birds per pen per week.

FLOOR EGGS

► Timely reaction to laying on the floor with corrective action. → See Bulletin *“Floor eggs”*.

► Frequent collection of floor eggs.

► Mixing to ensure 8.5% males of the appropriate sexual maturity at 25 weeks. More than 8.5% males could be risky to maintain good female feathering and low floor eggs %.

WATER

► 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). → Maintain a good litter quality.



Dark laying house-Good uniformity of the light

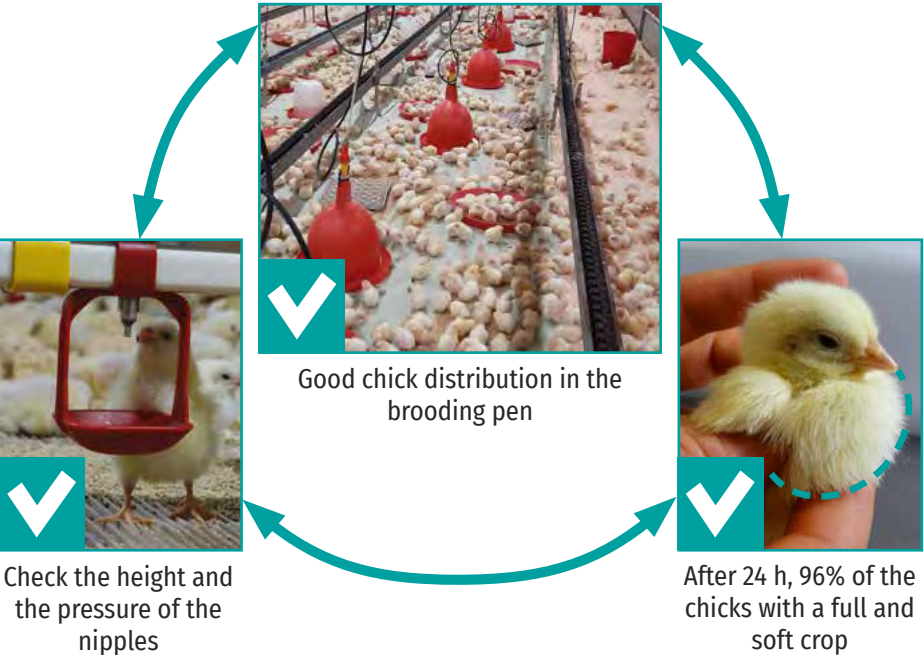
		< 50% slats	> 50% slats
EQUIPMENT AND STOCKING DENSITY DURING PRODUCTION	Stocking density	5.0 females/available m ²	5.5 females/available m ²
	Watering - bell drinker	1 for 80 females	
	Watering - nipple	1 for 6 to 10 females (nipple flow 70-100 ml/min*)	
	Feeding - chain	15 cm feeder space per female/7.5 m length for 100 females	
	Feeding - round pan ø 35 cm	1 for 12 females	
	Feeding - oval pan	1 for 12-13 females	
	Feed distribution time	< 4 minutes	
	Nests	1 manual nest/4 females or 80-90 females/linear meter of automatic nest	
	Ventilation capacity	5 m ³ /kg liveweight/hour	
	Air Speed	2,5 m/sec up 3 m/sec in humid and warm climate (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.

[Performance Objectives Efficiency Plus PS](#)
[Conventional Nutrition Recommendations](#)
[Poster Feed distribution](#)
[Bulletin Water Quality](#)
[Bulletin Fat pad & fleshing](#)
[Bulletin Floor eggs](#)

3. REARING PERIOD (0-22 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 during the first 10 days of the chicks in their environment will make brooding successful by adjusting light, feed, water, equipment, heat and minimum ventilation.






Optimal crumble starter feed

KEY POINTS

- Chick paper on at least 50% of the surface with feed and avoid build up of feed dust during the first 14 days.
- A daily growth graph for the period 0 - 35 days is available to follow early growth more precisely → See “*Performance Objectives Efficiency Plus PS*”.
- Keep using starter crumbles if bodyweight not on target at 21 days and use grower feed if bodyweight is on target.
- Use of all the floor space by 10 days if brooders are used.
- Ideal pH: 5.5 to 6.8 with an optimal Oxidation Reduction Potential (ORP) or Redox potential 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.

- Grade or at least isolate the smallest birds from 7 days.
- If possible, use an intermittent lighting programme to promote early feed intake from day 1 to day 7 e.g. cycles of 2.30 hours light / 30 mins dark at day 1. Always respect the recommended hours of light below and a minimum of 4 cycles of light / dark per day (if permitted by local regulations).
- The rate of step down of the photoperiod may often be slower (e.g. achieve 8 hours light not earlier than 21 days) in the following cases:
 - For open-sided housing, allow birds to feed in the cooler part of the day. Also use the experience from the previous flocks.
 - When males and females are grown in the same house.
 - When the target weights of the females are not achieved at 7 days.



Poster
Brooding PS

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/13-14 birds *; 1 round pan feeder/12 birds						
DENSITY	Chicks/m²	25-30				12				6-8						
LIGHT PROGRAMME	Light duration (hours)	24		22	21	20	19	18	17	16	15	14	13	12	11-12 **	8-12 **
	Intensity *** (lux)	60								40			20		5-10	
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														

* Feeding space to be adjusted according to the behaviour of the birds.
** In case the target weights of the males and/or females are not achieved at 7 days.
*** If permitted by local regulations.

3. REARING PERIOD (0-22 WEEKS): HOW TO CHOOSE THE OPTIMUM LIGHTING PROGRAMME?

Numerous parameters can affect sexual maturity including: housing type, latitude, season, bodyweight growth curve and uniformity pattern. Hours of light and light intensity may both be subject to local regulations.

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

FLOCK AGE	21 – 154 days
LIGHT DURATION	8 hours
LIGHT INTENSITY	5-10 lux
TRANSFER	140 days

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

FLOCK AGE	21 – 154 days				
NATURAL DAYLENGTH AT 154 DAYS	< 11 hours	12 hours	13 hours	14 hours	15 hours
NUMBER OF HOURS OF ARTIFICIAL LIGHT	8 hours	8 hours	9 hours	10 hours	10 hours
INTENSITY	5-10 lux				
TRANSFER	154 days			161 days	

Case N°3: OPEN SIDED REARING HOUSE/OPEN SIDED PRODUCTION HOUSE

For open-sided housing it is advised darkening the houses during rearing to be achieved by 5 to 6 weeks of age: use of black curtains, light traps on fans and air inlets. Dew/shed net to cover the sides also works, but ventilation and season must be carefully considered to assure optimum flock and litter conditions.

Contact Hubbard Technical Service to design the optimal lighting programme.



Open sided rearing house with black curtains

LIGHT INTENSITY MANAGEMENT

- It is essential to provide uniform light at bird level in each pen all along the rearing period.
- The use of a luxmeter 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 one unit is not working properly.
- Remove the dust from the light source when required.



Dark rearing house – light traps on fans and inlets



Dark rearing house – Poor light uniformity



Dark rearing house – Good light uniformity



Open sided rearing house

3. REARING PERIOD (0-22 WEEKS): HOW TO FOLLOW THE BODYWEIGHT TARGETS?

MANUAL WEIGHING



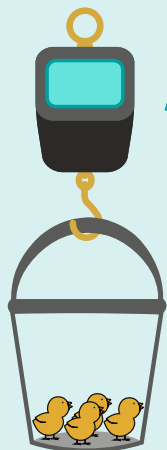
Every week, always the same day: hatch day is the best.



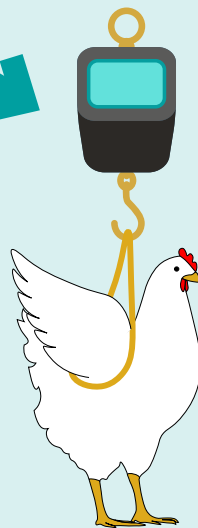
Best before feeding.

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

Age < 2 weeks



Age > 2 weeks



- Check the calibration of the scale before weighing the birds.
- 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 and at least 100 birds per pen.**
- Weigh all the birds of the catching pen.

AUTOMATIC WEIGHING

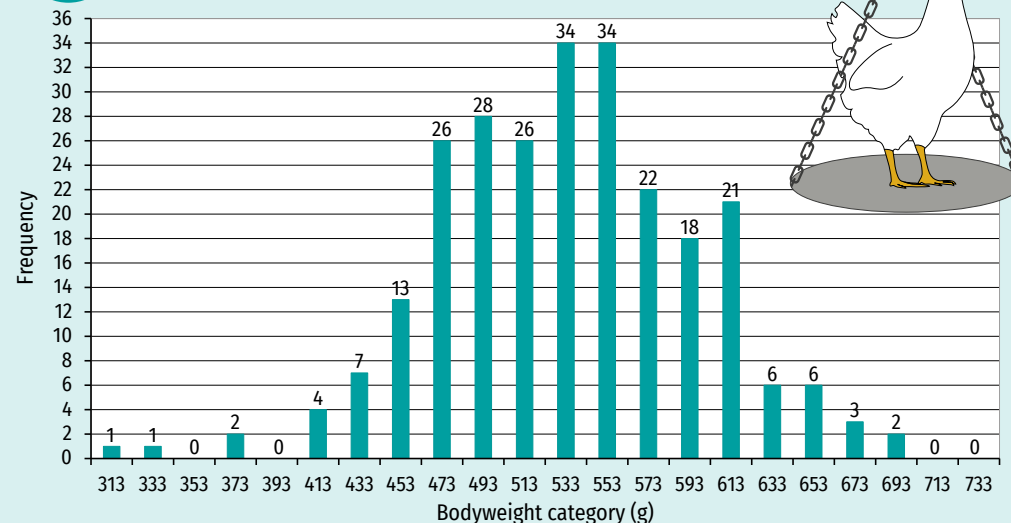


Every week, always the same day: hatch day is the best.



Best before feeding.

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



Results from an automatic scale-Good bodyweight distribution

- Ensure to place the scales as soon as possible to maximise the number of birds weighed.
- Always check the number of birds weighed per pen (at least 300 birds/weighing) and make sure that the bodyweight distribution shows a “bell curve” shape (see figure above). 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.
- Check weekly the calibration of the platform scales.



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

1. In order to define properly the feed allocation per bird, the primary objective is to use the bodyweight average calculated once the weighing has been completed.
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 “*Efficiency Plus PS*”.
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.

3. REARING PERIOD (0-22 WEEKS): HOW TO REACH AND MAINTAIN A GOOD FLOCK UNIFORMITY?

There are two possible indicators to express flock uniformity:

1. 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%, then the flock is more uniform.

GRADING

► 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: 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"*. Poor wing feather quality may be an indication of poor feed distribution or feeder management.



Poor feathering quality



Rearing house design after grading

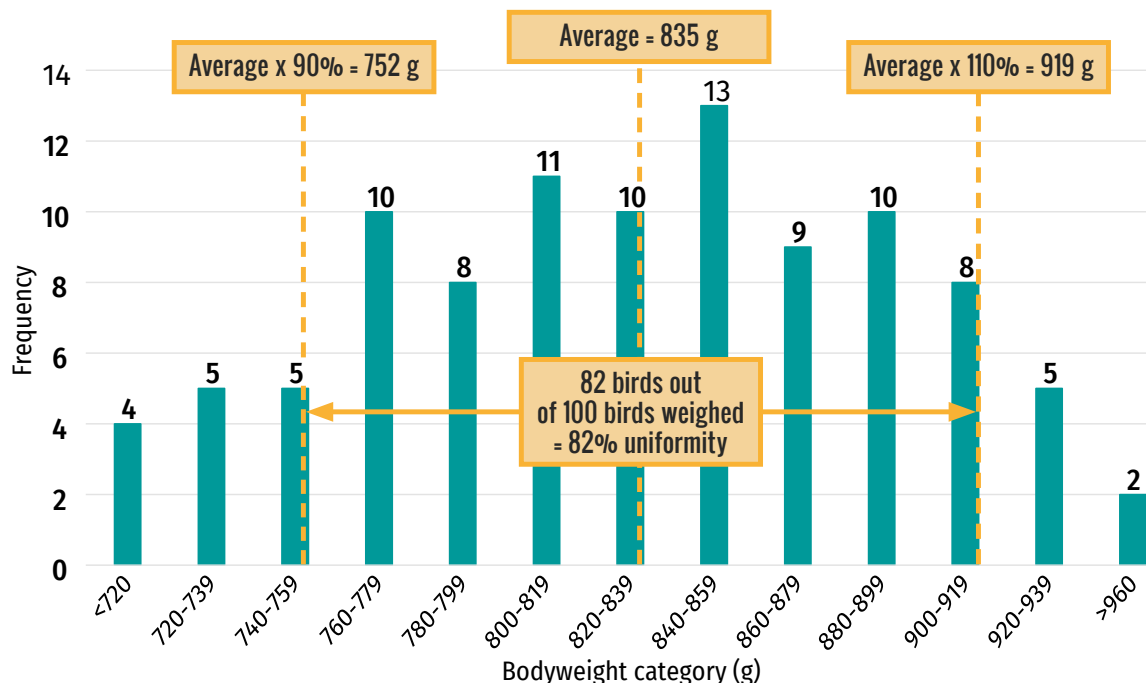
► 84-98 days: if flock uniformity is less than 80% (CV > 8), re-grade the flock to assure that each weight group achieves at least 85% uniformity (CV < 7.5). Have a close bodyweight follow up during the vaccination periods. Anticipate this with extra feed.

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"*.



Results of one manual weighing - % uniformity definition

3. REARING PERIOD (0-22 WEEKS): HOW TO PROMOTE A GOOD BEHAVIOUR AND PROVIDE A GOOD ANIMAL WELFARE?

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

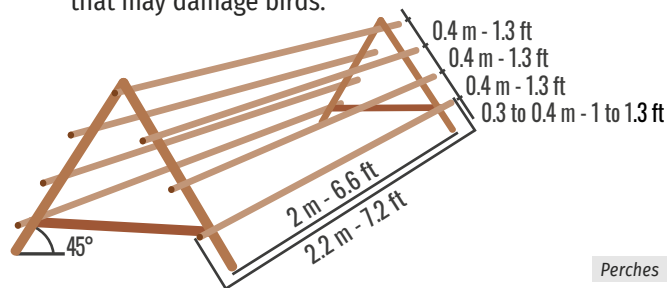
From 28 days, the use of a perching system is strongly recommended to stimulate activity and to train birds to jump onto the slats and manual nests. This helps prevent floor eggs.

- If the production house is equipped with manual nests:
 1. Provide 3-5 cm of perch space per bird.
 2. Place some manual nests from 12-14 weeks of age.
- If the production house is equipped with automatic nests:
 1. Provide 1-2 m² of platform for 500 birds.
 2. Optimal position of the platform is under the drinking system (see picture below).



Platforms under the drinking system

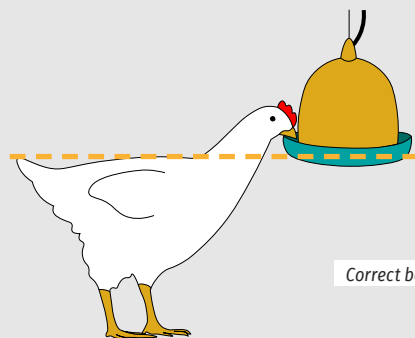
- Platforms and perches should not have sharp edges that may damage birds.



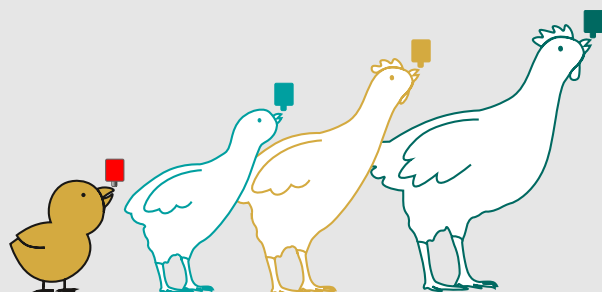
Perches

► WATER MANAGEMENT/WATER QUALITY

- Provide *ad libitum* water during extremely hot weather or medication treatment.
- Control access to water 2-3 hours after the end of the feed clean-up (if permitted by local regulations). The crop should be soft before closing the water.
- 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 pH: 5.5 to 6.8.
 2. Optimal ORP or Redox potential 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).

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



Grit
3-5 mm

► 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, placed on floor.



Example of white ropes



Pecking blocks



Example of alfalfa balls

4. PRODUCTION PERIOD (22-64 WEEKS): HOW TO CHOOSE THE OPTIMUM LIGHTING PROGRAMME?

OBJECTIVE: 5% weekly production at 25 weeks of age.

Method: consider age, bodyweight, fat line, fleshing score and pelvic bone opening from 22 weeks of age onwards to assess the overall trend of flock sexual maturity → See Bulletin *"Fat pad & fleshing"*.

► First light stimulation : use the lighting programme table.

➢ Give the first light stimulation only from 154 days.

➢ If the sexual maturity is poor (less than 80% females with a pelvic bone opening of more than 2 fingers (3 cm), poor fleshing score, small fat line) delay the stimulation according to the table.

➢ If the flock is reared with 12 hours natural light, the preferred option is to choose a programme with two steps of increase in day length for stimulation to reach 15 hours light during production.

➢ The onset of lay should normally start about 2-3 weeks after the first light stimulation.

► Provide the maximum light intensity and at least 13 hours light duration by 10% daily production.

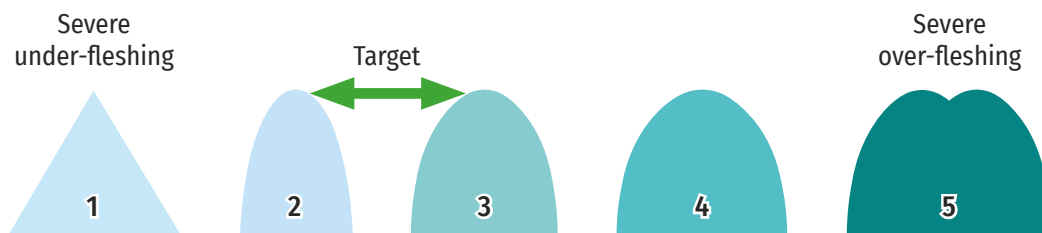
► It is possible to increase an extra hour after 40 weeks but never exceed 16 hours light duration.

► Light intensity management:

➢ Open sided houses: Additional artificial light intensity of a minimum of 80 lux in season and 60 lux out-of-season. Check the light distribution during the night time for open sided houses.

➢ Light-proof houses: 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.

➢ 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.



Evaluation of the fleshing

LIGHTING PROGRAMME TABLE					
REARING HOUSE		DARK			
PRODUCTION HOUSE		OPEN SIDED OR DARK			
Age (weeks)	Age (days)	Pelvic bone opening at 154 days: % of birds with more than 2 fingers (3 cm)			
		More than 80%		Less than 80%	
		Light duration (hours)	Light intensity (lux)	Light duration (hours)	Light intensity (lux)
21	153	8	5-10	8	5-10
22	154	12	60-80	8	
23	161	13		12	60-80
24	168	14		13	
25-64	175-448	14		14	

4. PRODUCTION PERIOD (22-64 WEEKS): HOW TO CHOOSE THE CORRECT FEEDING PROGRAMME?

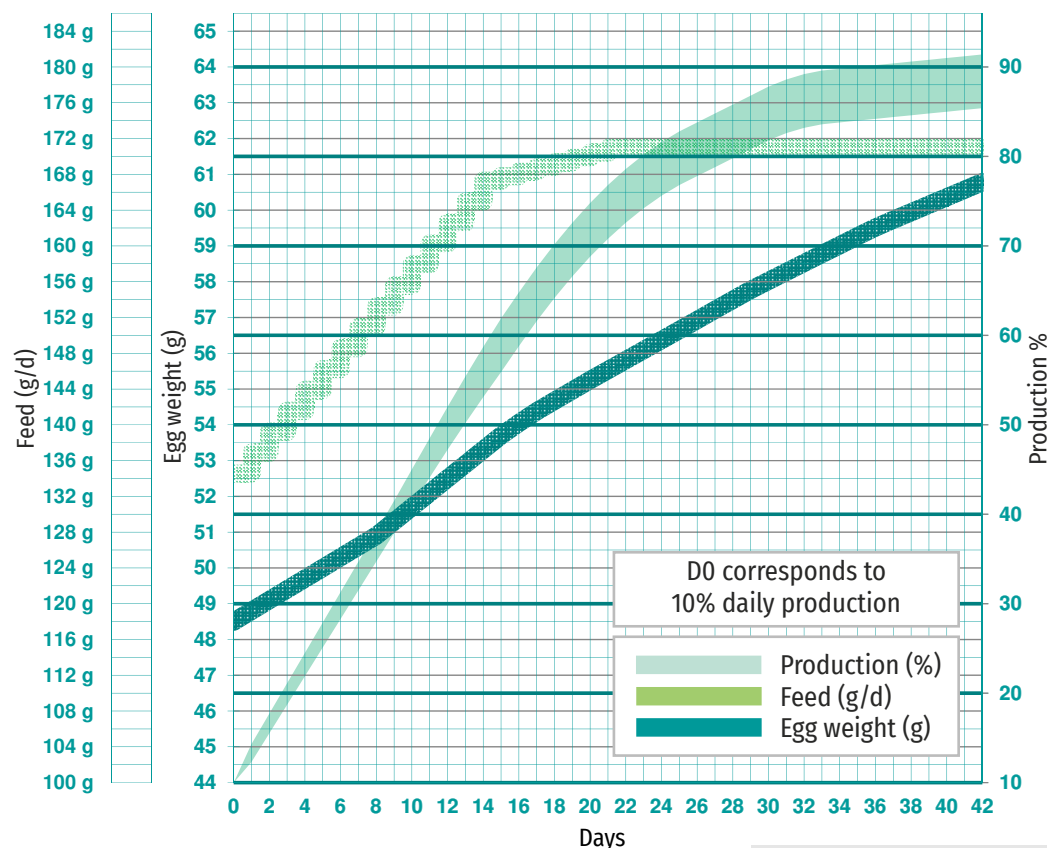
Eating behaviour, stocking density, eating/drinking space and ventilation are critical for a good peak and persistency of lay.

FEED PROGRAMME:

AGE IN DAYS	154	161	168 (first eggs or 1% daily lay)
FEED PROGRAMME	Daily		
FEED TYPE	Transition feed		Breeder I feed
OBJECTIVE	Assure that feed remains evenly distributed into the feed system to maintain a good flock uniformity		

- Flocks transferred from the rearing farm generally 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 from light stimulation to 5% daily production.
- Increase feed according to the production level:
 - Once 5% daily production, feed the flock according to the daily increase in production: + 2-3 g/day. Typical increase in feed is 0.6 g per 1% increase in daily egg production. Reach the maximum feed intake by 70-75% daily production. → See Performance Objectives “Efficiency Plus PS”.
 - On some occasions the onset of lay may be very rapid and it is advised to be well prepared. For example, it can take only 6-7 days from 5% to 50% daily production and 7-8 days from 50% to 80% daily production.
 - Ensure the daily egg weight increase is consistent. The use of the daily onset of lay sheet allows fine tuning for each individual flock. → See right side figure. The Poster “Egg weight management” explains the egg weighing method.
 - Monitor feed clearance time on a daily basis. If feed clearance time is rapid at less than 2 hours and egg weight is not increasing, then be prepared to challenge feed the flock with 2-3 g extra feed per female and monitor the progress. Feed clearance time may be around 3 hours at peak feed but may vary according to feed and environment.
- Bodyweight management:
 - As production increases ensure that bodyweight gain is consistent between 25 and 30 weeks.
 - Excess dietary protein may cause bodyweight or body conformation score to increase and then it will be difficult to manage the balance between nutrient supply for egg production and body maintenance.

- Do not stop increasing daily feed allowance because the bodyweight with feed appears to be higher than the target bodyweight. This is most important if egg production is increasing at or above target. There is a risk of underfeeding and peak of lay could be affected.
- During hot weather (house temperature > 28°C/82°F) to stimulate production and reduce heat stress:
 1. Consider the use of the “onset of lay” feed formula.
 2. Increase the particle size of the feed (mash to crumble or crumble to pellet).
 3. Turn on the lights in the middle of the sleeping period for 1 to 2 hours and give cold water with vitamin C and salicylic acid (if permitted by local regulations).



Daily feeding at onset of production

4. PRODUCTION PERIOD (22-64 WEEKS): HOW TO MANAGE FLOOR EGGS?

GENERAL KEY POINTS

TRANSFER INTO THE PRODUCTION HOUSE

Automatic nest/Manual nest

- Transfer birds directly on slats and provide water and feed (if feeders are on the slats).
- After transfer, nest belts can be turned-on twice during the day to familiarise birds with the noise.
- Sex-ratio: 8.5% effective males at 25 weeks.

ONSET OF LAY

- The first 10 days after the first egg are very important to ensure that any floor eggs are removed and that the females develop good nesting behaviour.
- Collect floor eggs at least every hour during the laying time. At the very beginning of lay, this may be 10-12 times per day.
- Provide 14 hours light by 25 weeks of age and 15 hours if some floor eggs are observed just before the lights come on.
- 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.
- Daily feed increase from 5% daily production.
- Fast feed distribution (< 4 minutes) preferably within 30 minutes after lights on.
- Do not feed at the time when most eggs are laid during the day.
- Avoid draughts of cold air or very high air speed inside the nests.
- Ensure bright (60-80 lux) in the mating area and a lower light intensity level on the nests.

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[Bulletin
Floor eggs](#)



MANUAL NEST

- Introduce nests at least 4 weeks before the onset of lay.
- Ensure the correct nest box ratio (4 females/nest).
- Lower the nests close to the litter level to promote nest access.
- 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.
- If egg collections are made at a time when females are laying most of the eggs, avoid disturbing females in the nests.



AUTOMATIC NEST

- Open the nest 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 in the house are switched on to help early laying birds find their way to the nests.
- 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.

* 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.

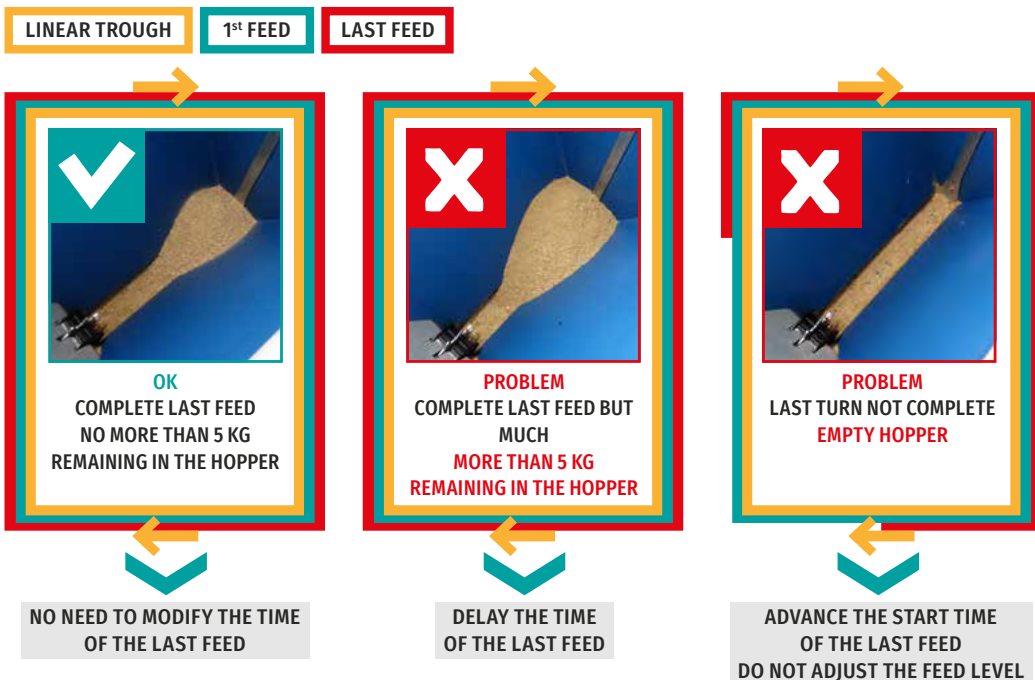
4. PRODUCTION PERIOD (22-64 WEEKS): HOW TO MAXIMIZE THE PERSISTENCY OF LAY?

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

- Control flock bodyweight and uniformity, fleshing and body fat.
- Ensure egg weight is on target. → See Poster *"Egg weight management"*.

➤ FEEDING MANAGEMENT

- Quality of feed distribution:
 1. Ensure an uniform feed level between the feeder lines.
 2. Adjust the time of the last feed turn (see figure below).
 3. Maintain the supplementary feed hoppers until the end of the flock.
- Maintain peak feed until egg production drops below 85%.
- Check the evolution of the egg weight and female growth before reducing the feed intake.
- Reduce 1 g/female per 3% production decrease until depletion time (typically = 1 g/female every 2.5–3 weeks). 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 supplement metabolic requirements.

➤ FEED FORMULA

- Use of Breeder II diet once the egg weight reaches 65 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.
- Under certain conditions, individual flocks may gain more weight after peak than the objective. Please use local experience and also consult with your local Hubbard Technical Manager for more assistance.
- Assess abdominal fat on a regular basis. Fatness should be controlled using Breeder II feed and timely reduction of the feed allocation.
- Assess female feathering on a regular basis.



➤ LIGHTING PROGRAMME

- It is possible to increase an extra hour after 40 weeks, 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 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).

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<p>Hubbard Feed Sieve Tool</p>	<p>Bulletin Water quality</p>
<p>Poster Egg weight management</p>	<p>Poster Feed distribution</p>

5. BIOSECURITY

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.

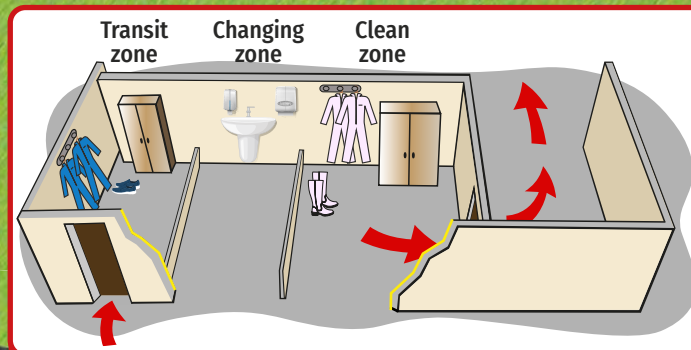
SHED TO SHED ACCESS



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

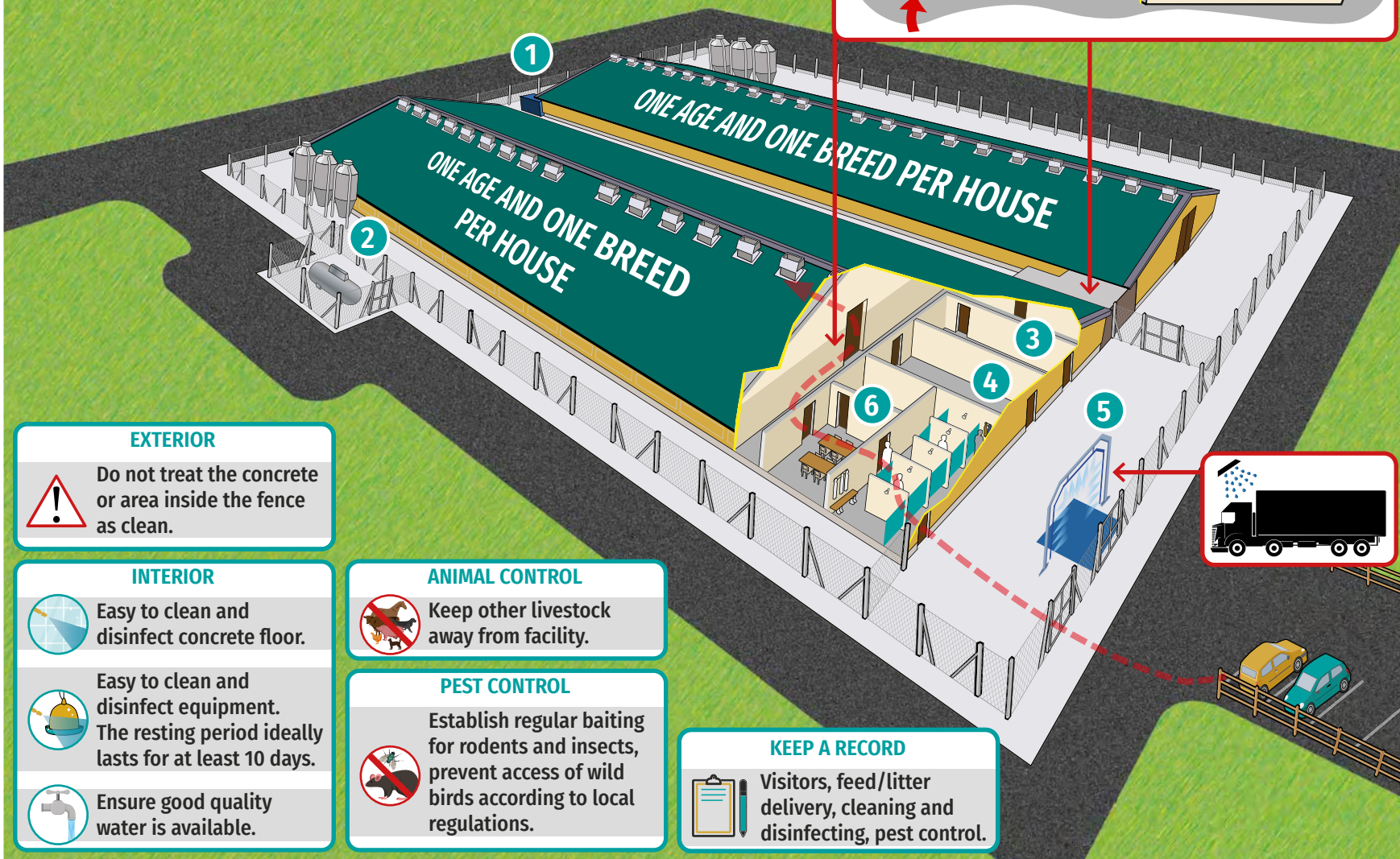


Establish regular baiting for rodents and insects, prevent access of wild birds according to local regulations.

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



The performance data contained in this document was obtained from results and experience from our own research flocks and flocks of our customers. In no way does the data contained in this document constitute a warranty or guarantee of the same performance under different conditions of nutrition, density or physical or biological environment. In particular (but without limitation of foregoing) we do not grant any warranties regarding the fitness for purpose, performance, use, nature or quality of the flocks, nor any warranty regarding compliance with local legislation regarding health, welfare, or other aspects of animal production. Hubbard makes no representation as to the accuracy or completeness of the information contained in this document.



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