Hubbard

YOUR CHOICE, OUR COMMITMENT

PREMIUM

PARENT STOCK

Guide and Nutrient specifications

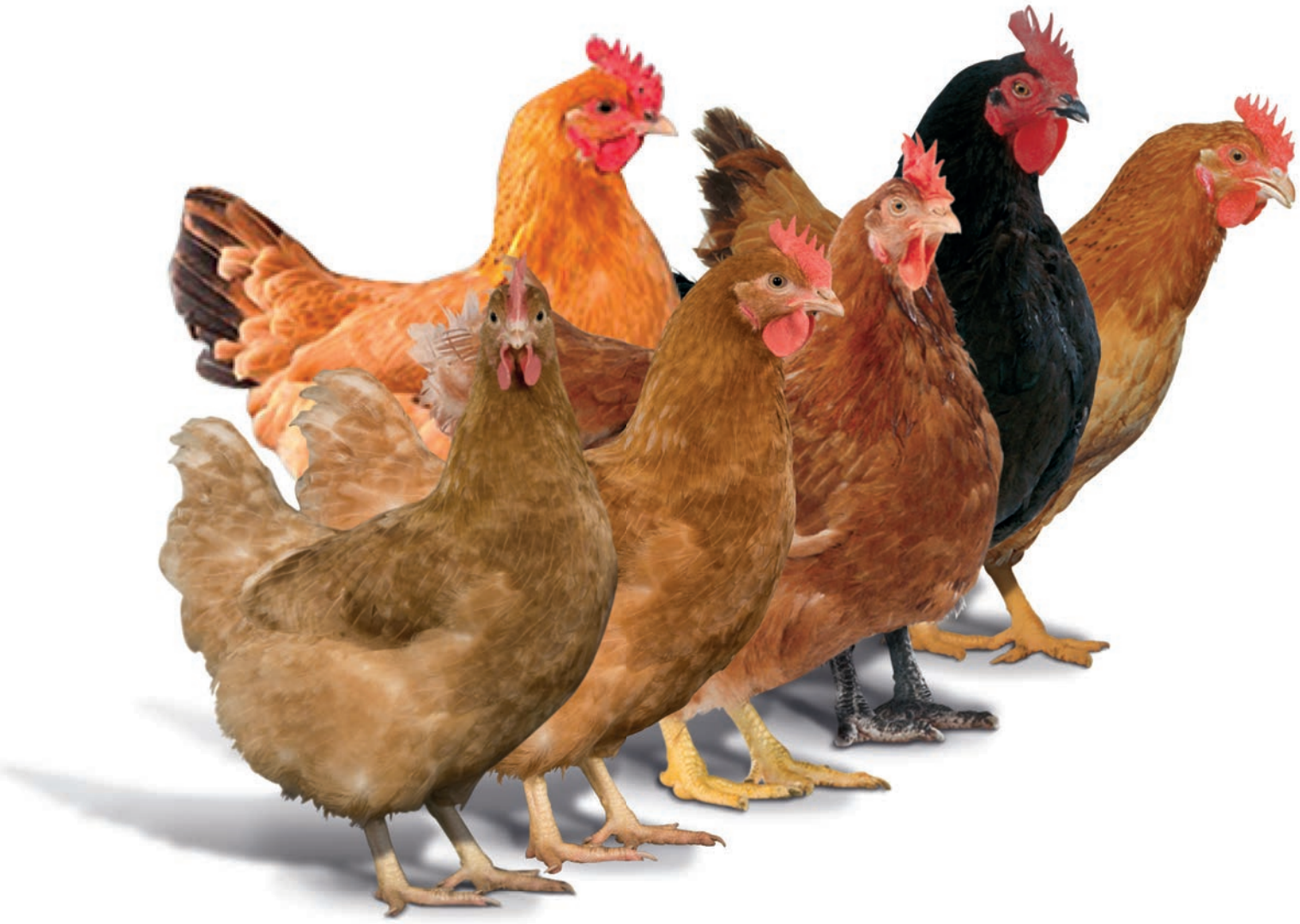


TABLE OF CONTENTS

1. REARING PERIOD (0 - 22 WEEKS)

1.1. OBJECTIVES DURING REARING PERIOD

>> Develop a good frame size by achieving bodyweight objectives before 5 and 10 weeks of age.
>> To develop appetite at the onset of lay.
>> Target flock uniformity above 80%.
>> Monitor sexual maturity during rearing to prevent the onset of lay occurring too early by applying the correct step down lighting programme and controlling growth between 10 weeks of age and the start of production.

1.2. BROODING PERIOD: 0 TO 5 WEEKS OF AGE

KEY POINTS

>> The brooding period is a critical phase to ensure the optimum development of both females and males for the production period after 22 weeks. Therefore, it is important to:

- Use an intermittent step-down lighting programme during the first 4 weeks (16h light at 4 weeks) with a high light intensity (60 lux).
- When permitted under local regulations, the use of an intermittent light programme can help stimulate early feed intake and growth.
- Use good crumble starter feed. Stimulate the appetite during the first 10 days by emptying the feeders at least twice per week.
- Pre-Starter and Starter diets can be used and the ages for each diet will depend on growth rates achieved. It may be necessary to use Pre-Starter to 4 weeks and/or a Starter to 8 weeks to achieve the growth targets.
- Allow sufficient equipment to promote eating and drinking activity (mini-drinkers, feed plates, paper). See Figure 1.
- Place the chicks in a high density during the first 3 days (25-30 birds/m²).

Figure 1: Good brooding conditions

>> **Please consult Hubbard website or your local Hubbard Technical Manager to obtain the Hubbard Brooding Poster for more specific details.**

FEED AND BODYWEIGHT TARGETS (RECORDED BEFORE FEEDING)

>> Close observation of chick growth during the first 2 weeks helps to identify inadequacies in brooding management. Record collective sample weights for the first two weeks and after this record individual weights.
>> The sample size should not be less than 3 - 5% of the flock size or 100 birds from each pen. Take samples from 3 separate places in each pen. Weigh every bird in the catching pen to record data which reflects the flock's true bodyweight.
>> Only bodyweight before feeding (without feed) will show the true physiological development of a bird. All weights shown in the Hubbard Performance Objectives for each type are without feed.
>> For feed intake guidelines, please refer to the relevant Breed Performance Objectives.

Performance Objectives
P6N - REDBRO M - JA57 Ki - JA57 - JA57 K - JA87

TEMPERATURE AND LIGHTING PROGRAMME

>> Ensure the optimum brooding conditions are provided (temperature, humidity, light duration and intensity). A slow step-down light programme (16 hours of light at 4 weeks of age) is recommended to secure the early growth.

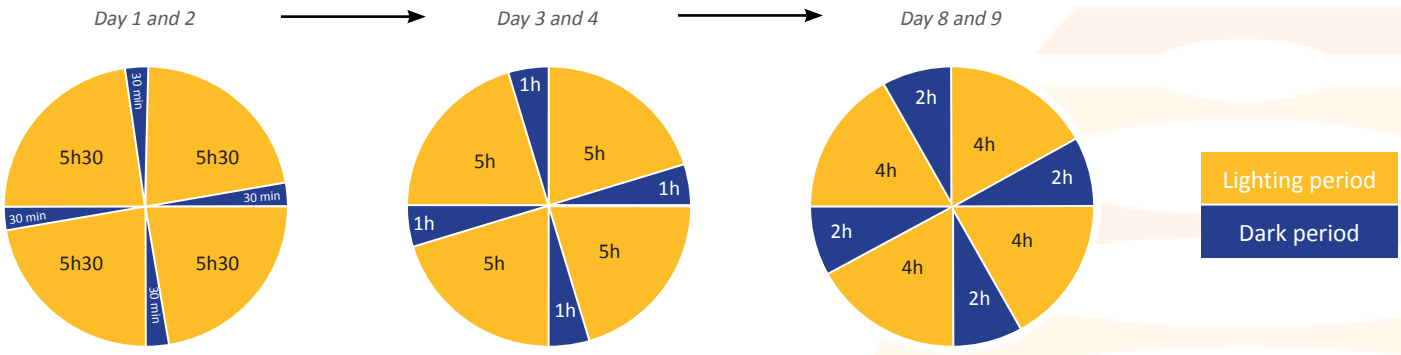
Age (days)	Day length*	Light intensity (lux) **	Dark period ***	Temperature (°C)				Humidity
				Using brooders			Whole house heating	
				Under brooders	Living area	"Cold" area		
0	24 h	60	0	35 - 36	28	22 - 23	31 - 32	50 - 60%
1	22 h		4 x 30 min	35 - 36	28	22 - 23	30 - 31	
2	22 h		4 x 30 min	35 - 36	28	22 - 23	29 - 30	
3	20 h		4 x 1 h	35 - 36	28	22 - 23	28 - 29	
4	20 h		4 x 1 h	32 - 34	28	22 - 23	28 - 29	
5 - 6	18 h		3 x 2 h	32 - 34	27 - 28	22 - 23	26 - 27	
7	18 h		3 x 2 h	28 - 30	25 - 26		26 - 27	
8 - 9	16 h	To be adjusted depending on behaviour	4 x 2 h	28 - 30	25 - 26		25 - 26	
10 - 14	16 h		As required	28 - 30	25 - 26		25 - 26	
15 - 21	16 h			27 - 28	25 - 26		25 - 26	
22 - 28	16 h			As required	25 - 26		25 - 26	
29 - 35	15h30	5 - 10 **			25 - 26		25 - 26	

** Only females in the house.*
*** Light intensity recommendations must respect local regulations if they stipulate higher light intensity.*
**** In a non-dark rearing house and with increasing day length, keep light intensity at 10 - 20 lux. Dark period to be adjusted depending on breed and behaviour.*

Rearing conventional males with females in the same rearing house is not recommended.
If males have to be reared with females, please read the male management section (Page 9).

>> Example of intermittent lighting programme:

- An intermittent lighting programme if permitted by local regulations may promote the eating and drinking behaviour.
- It is recommended to be present in the house to observe the chicks behaviour on the first few times the lights are switched on and off.



EQUIPMENT AND STOCKING DENSITY

>> It is crucial to observe the flock eating behaviour to be sure that both feed and water distribution are correct. Local regulations affecting feed space and stocking density may differ from these and must be respected.

>> **Please read the Quality Feed Distribution Poster for more specific details.**

FEMALES	Temperate climates (18-24°C)	Hot climates (>25°C)
Stocking density	9 – 10 birds/m²	8 birds/m²
Brooders	1 for 500 chicks	1 for 500 chicks
Watering - round	1 for 80 birds	1 for 70 birds
Watering - nipple	1 for 10 birds	1 for 8-10 birds
Feeder space - chain	12 – 14 cm/bird	12 – 14 cm/bird
Feeder space - round pans	1 for 12 – 14 birds	1 for 12 – 14 birds
Feeder space - oval pans	1 for 14 – 16 birds	1 for 14 – 16 birds
Spin feeding	1 spinner for 1500 - 1800 birds (density 8 birds / m²)	1 spinner for 1500 - 1800 birds (density 8 birds / m²)
Feed distribution time	< 4 minutes	< 4 minutes

1.3. REARING PERIOD: 5 TO 10 WEEKS OF AGE

KEY POINTS

>> During this period, maximising growth is very important to achieve 10 weeks bodyweight target and ensure a good carcass development. To meet this objective, it is important to stimulate and maintain appetite:

- Feed intake guidelines are provided to indicate how much feed may be required. The actual amount of feed provided may differ from the guidelines as the primary objective is to ensure the bodyweight objectives are met.
- If permitted then introduce a fractionated 6/7 feeding programme from 35 days of age according to the feed clean-up time which should not be more than 7 hours.
- Then, as soon as possible, change to the 5/7 feeding programme between 7 - 10 weeks of age until the start of lay according to the local regulations. This helps to develop crop capacity and maintain an optimal flock uniformity.
- Be prepared to control feed intake after 8 weeks of age to avoid excess bodyweight gain after 10 weeks of age.

SPIN FEEDING

>> Spin feeders are preferably used from 35 days of age when females are large enough to consume pellets. 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 floor pans or small feeders to complement spin feeders.

>> Ideally, there should be one pen of birds per spin feeder.

>> Avoid pellets over 3mm 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 a slatted 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.

>> For further information see the Technical Bulletin - Spin feeding for Rearing Broiler Breeders.

GRAIN AND GRIT

>> In order to promote strong flock activity and to maintain a good litter quality, it is advisable to give some particles on the litter from 5 weeks of age. It is important that any grit or grain provided meets local zoonoses regulations especially for Salmonella control.

- Insoluble grit (3 - 4 mm diameter): 3 - 5 g / bird / week.
- Scratch grain: 3 g / bird 2 - 3 times a week (cracked maize or whole wheat).

PERCHES AND PLATFORMS

>> Provide 3 cm of perch space/pullet from the 4th week to train the pullets to jump up to the nests and to help prevent floor eggs.

>> Perches are recommended especially when the equipment does not allow any other way of perching (spin feeder, pan feeders).

>> The use of slats as shown in the Figure 2 is a good way to train birds for using slats in production (1-2 m² / 500 birds).

>> The use of electric wires is not recommended in the rearing house.

Figure 2: Example of an elevated platform

LIGHTING PROGRAMME

>> Many factors will influence the design of the lighting programme for Premium Breeders. The most typical lighting programme for Premium females may not be optimal for all environments. Below are some examples to provide the general principles to design a lighting programme for each breed.

>> Please consult your local Hubbard Technical Manager for more assistance.

	Breed	JA57 JA57K - JA57Ki - P6N		JA87 - Redbro M	
	Rearing house	Dark or Non-dark	Non-dark	Dark or Non-dark	Non-dark
	Production house	Dark or Non-dark	Non-dark	Dark or Non-dark	Non-dark
	Natural day length at 20 weeks of age	< 10h	>10h	< 10h	>10h
Age (weeks)	4	16h	16h	15h30	16h
	5	15h30	15h30	15h	15h30
	6	15h	15h	14h	15h
	7	14h30	14h30	13h	14h30
	8	14h	14h	12h	14h
	9	13h	13h30	11h	13h
	10	12h	13h	10h	12h
	11	11h	12h30	10h	12h
	12 – 22	10h	12h	10h	12h

1.4. REARING PERIOD: 10 TO 22 WEEKS OF AGE

FEED MANAGEMENT

>> During this period, **growth contro**l is very important to manage properly the sexual development and avoid an early onset of lay.

- **Controlled small increases in feed intake is the best way to control bodyweight**.
- The use of a grower feed (2,650 kcal/kg) allows the quantity of feed to be increased while promoting physiological appetite with the consumption of a greater volume of feed.
- **Do not introduce a pre-lay feed before 19 weeks of age**. This diet may promote growth and too early sexual maturity.
- If the pullets are too mature, feed control remains the only technique left to delay the development of sexual maturity. In this case, if permitted by local regulations, it is best to apply this before 1-2 % daily production.

TRANSFER TO THE NON DARK PRODUCTION HOUSE

>> If sexual maturity is well managed, transfer can be made at 140 days during decreasing day length and 147 days during increasing day length.

2. PRODUCTION PERIOD (22 - 65 WEEKS)

2.1. OBJECTIVES DURING PRODUCTION PERIOD

>> Achieve 5% production (average of the week's production) at 23 weeks of age.
>> Promote the development of early egg size (50 g) by having a good appetite during onset of lay.
>> Prepare the flock properly to maximise nest laying.
>> Maintain a good appetite for a good persistency of lay (and to reduce the risk of broodiness).
>> Maximise the female liveability.
>> Secure the quality of the mixing between males and females (optimal synchronisation of sexual maturity, sex ratio).

2.2. PRODUCTION PERIOD: 22 TO 40 WEEKS OF AGE

LIGHTING PROGRAMME

>> At light stimulation time (148 - 154 days) in open sided houses, consider a light increase about 1h per week during the period of increasing natural day length and 1 or 2 hours/week in the period of a natural decreasing day length.

>> **The presence of an increasing number of floor eggs collected early in the morning before lights come on is a good indicator of when to increase the day length**.

>> **Do not reduce the light intensity between the rearing house and the production house.**

>> Non-dark / open side house: it is preferable to provide the additional light period in the morning with an intensity of 60-80 lux.

>> If possible, it is better to simulate dawn in the morning and dusk in the evening. This may be required under local regulations.

>> The lighting programme can be adapted depending on the target age to start production and the rearing conditions (climate conditions, house, etc…), with the help of your local Hubbard Technical Manager.

FEEDING FROM 10% TO PEAK PRODUCTION

>> Appetite is very important to ensure a good early egg size and avoid floor eggs during onset of lay.

- Feed increases should be made following a programme of daily feed increases from 10% daily production.
- The objective is to reach the **maximum feed intake by 60% daily production**.
- A coarse mash feed particle size is very important (as shown in the Figures 3, 4, 5).
- Crumble feed presentation is not recommended unless crumble quality is very good and does not create too many fine particles in the feed system.
- 70% of the total calcium level of the feed should be of a 3.5 mm particle size.

Figure 3: Too coarse feed presentation

Figure 4: Good feed presentation

Figure 5: Too fine feed presentation

It is important to ensure feeders are empty for at least 3 hours every day, preferably in the middle of the day (5-6 hours after light on). If this is not the case, whatever the level of feed intake, consider reducing the total amount of feed distributed per day to ensure this empty period is observed. Do not increase the number of times per day feed is distributed.

INCREASE FEED ACCORDING TO THE PRODUCTION PARAMETERS

>> From 10% daily production, the progressive increase of feed particularly energy intake should allow for the correct increases in bodyweight, egg weight and egg production and also help promote a strong appetite before peak egg production.

- Egg production should increase by at least 5 %/day → Calculate and monitor the daily level of egg production.
- Egg weight should regularly increase → Weigh 150 eggs daily and use the onset of lay chart in the Breed Performance Objectives.
- Weight gain should be close to the breed target between 20 and 28 weeks → Weigh the females weekly.

>> **If any of the above factors increase slowly or do not increase (egg weight) this suggests that feed consumption is insufficient to meet the bird's requirements.** Corrective measures should be taken quickly. Check the feed formulation, presentation and distribution.

FEEDING DURING HOT WEATHER TO STIMULATE FEED CONSUMPTION

>> Change to a hot weather feed formulation as shown in the Nutrition Section.
>> Increase the particle size of the feed with 15 % of the particles being bigger than 3mm.
>> Feed the birds as early as possible in the morning.
>> Consider using a night feeding programme using two hours of light in the middle of the dark (sleeping) period when the environmental temperature outside the house is at a minimum.
>> Add vitamin C (500 g/ton of feed or 1 g/ litre of water).

EQUIPMENT AND STOCKING DENSITY

FEMALES	Temperate climates (18-24°C)		Hot climates (>25°C)
	All litter to 20% slats	¾ litter + ¼ slats	
Stocking density	7 birds/available m²	8 birds/available m²	6 birds/available m²
Watering - round	1 for 80 birds		1 for 70 birds
Watering - nipple (flow 90 - 120 ml/min)	1 for 6 to 8 birds		1 for 6 to 8 birds
Feeder space - chain	12 – 14 cm/bird		12 – 14 cm/bird
Feeder space - round pans	1 for 12 – 14 birds		1 for 12 – 14 birds
Feeder space - oval pans	1 for 14 – 16 birds		1 for 14 – 16 birds
Feed distribution time	< 4 minutes		
Nests	1 manual nest /4 birds or 80 – 90 birds / linear meter of automatic nest		
Ventilation capacity	5 m³/kg live weight/hour		8 m³/kg live weight/hour and 2 m/sec air speed
Light intensity	60 – 80 lux		

BROODINESS

>> Risk factors for broodiness include poor feed intake before and immediately after peak egg production causing low nutrient particularly energy intake, high environmental temperature inside the house and the nests and poor management of floor eggs. If broodiness is observed then pay attention to:

- Feed problems (formulation, presentation or feed distribution) combined with insufficient feed intake.
- Management (temperature, ventilation, etc.).
- Nest management: infrequent egg collections and visible belt eggs as shown in the Figure 6.
- Insufficient water consumption.
- Viral diseases and/or parasites.

>> Make daily checks for the presence of non-laying birds from the peak of lay onwards. Isolate broody hens away from nests in a pen with water and feed for one week. **Please refer to The Hubbard Technical Bulletin "Broodiness"**.

Figure 6: Nest management

2.3. PRODUCTION PERIOD: 40 TO 65 WEEKS OF AGE

>> **Maximise persistency of lay by controlling bodyweight and fattening evolution.**
- Nutrient intake particularly energy intake is important to enable birds to maintain good production (rate of egg production, egg weight and bodyweight).

>> **Have the correct egg weight evolution.**
- Egg weight progression from week to week is a good parameter to aid the decision when to reduce feed intake.
- When egg weight exceeds 58g (hot climates/hot season) or 60g (cold climates/cold season), it is recommended to change to breeder II feed.

>> **Minimise floor eggs. Some factors that may negatively influence the number of floor eggs include:**
- Too early onset of lay.
- Lack of appetite/ daily energy intake (feed management, feed presentation, temperature).
- Lack of feeding and drinking space.
- Lack of nest space.
- An unattractive nest (pay attention to the design).

- Too high slats: not higher than 40 cm.
- Too high stocking density.
- Too aggressive males.
- Too low light intensity during this period without natural light.
- Too short light duration.

Floor egg management with frequent collections of floor eggs must be applied as soon as possible after stimulation to prevent a rapid increase in the number of floor eggs at the start of lay. The key is to calculate the percentage of floor eggs as soon as the first eggs are seen. Run the egg belt soon after the first eggs are observed.
For further details please consult the Hubbard Technical Bulletin about floor eggs.

3. HUBBARD MALE MANAGEMENT

>> The Premium females respond quickly to light stimulation. It is therefore necessary to consider any difference in sexual maturity between the sexes, which will depend on the type of male being used:

- Conventional males: M77, M99.
- Intermediate growth males: Color Yield, Redbro, New Hampshire, Tricolor, Redbro Naked Neck, Master Grey, Grey Barred, S88L.
- Slow growth males: I66, G66N, S77, S77N, S88, RIR.

>> Refer to the Performance Objectives for each particular male for the appropriate growth profile.

3.1. EQUIPMENT AND STOCKING DENSITY

STAGE	REARING	PRODUCTION
Density	4 males/m²	
Pan feeders*	1 for 8-10 males	1 for 8-10 males
Linear troughs*	20 cm/male	20 cm/male
Bell drinkers	1 for 80 males	1 for 70 males
Nipple drinkers (90 - 120 ml/min)	1 for 10 males	1 for 8 males
Distribution time	< 4 minutes	< 4 minutes

**Where possible males should be grown using the same type of feeder as they will eat from in production.*

3.2. REARING PERIOD: 3 STEPS:

>> The rearing conditions provided must be determined according to the type of male, type of female and whether males and females are reared together or separately in the same house.

- **It is strongly recommended that males are reared separately from the females.**
- Whatever the situation, step 1 and 2 will be similar for all males. Indeed, for conventional males some strategies can be applied to synchronise both the female and male sexual maturity.

STEP 1: 1 DAY TO 10 WEEKS - GOOD EARLY FRAME DEVELOPMENT

>> Good brooding conditions (temperature, density, feeders, drinkers, brooders).
>> Good frame development (crumble feed for the first 3 weeks).
>> Target > 85% uniformity.

- Grade 100% of the flock between 21- 28 days.
- Use fractionated feeding from 5 weeks of age (5/7) if permitted by local regulations.

>> Recommended lighting programme for males (see table below):

Age (weeks)	Slow or Intermediate Growth males and Premium females in the same rearing house	Conventional males and Premium females in the same rearing house	100% Conventional males in the house
0	24h	24h	24h
1	16h	18h	18h
2	16h	16h	13h
3	16h	14h	8h
4	16h	12h	8h
5	15h30	10h	8h

STEP 2: 10 TO 15 WEEKS – CONSISTENT GROWTH AND GOOD UNIFORMITY

>> Adjust feed allocation to achieve consistent growth according to the target bodyweight.
>> It is important to keep a good uniformity (uniformity > 85%)
- It is important to respect the equipment requirements to avoid any reduction in uniformity.
- Re-grade the flock and separate those with poor fleshing at 12-14 weeks of age.

>> Observe male behaviour.

STEP 3: 15 TO 23 WEEKS – TESTICLE DEVELOPMENT

>> **Growth should not cease in this period** – ensure weekly increases in body weight are maintained to prevent future potential fertility issues.
- For conventional males, a minimum weekly growth between 140 and 160g is required. Adjust feed intake accordingly.

>> It is important to **respect the equipment requirements** to avoid any reduction in uniformity.
>> The lighting programme can be also used to stimulate males before the females to ensure a good synchronisation of sexual maturity of males with the maturity of females (particularly for conventional males).
- **If Conventional males and Premium females are reared in the same house, no light stimulation of males can be applied before 22 weeks of age.**
- **Light intensity may be increased but must be done step by step according to flock behaviour**. From 18 weeks of age, it is possible to increase from 5-10 lux to 20-30 lux and one week after to 40-60 lux.
- **See opposite an example of lighting programme for Conventional males if reared separately from the females.** This example is recommended for dark rearing house, then open sided production house and transfer during winter when natural light is more than 10 hours.

Age (weeks)	Light duration
17	8h
18	10h
19	10h30
20	11h
21 (transfer)	11h
22	11h

3.3. PRODUCTION PERIOD

FROM MIXING TO 26 WEEKS OF AGE

>> This period is crucial to establish a good relationship between males and females.
>> Correct male percentage mixed with the females is necessary to obtain good fertility and male behaviour.
- Never transfer immature males.
- Transfer males a few days before the females if possible.
- Progressive mixing is ideal up to 25 - 26 weeks of age. Remove cull males and keep only 8 - 10% males after 27 weeks, according to the type of males being used.

>> Careful monitoring of the male bodyweight. Until 26 - 27 weeks the risk of excessive weight gain is high, so:
- Grill size is important to reduce male access to the female feeder (43 x 55 mm). The use of a tube inside the grill could prevent males stealing female feed during the weeks after mixing (see Figure 7).
- Adjust male feed amounts to achieve the bodyweight objectives.
- Weigh males weekly and if uncertain about the body weight progression recorded then repeat weighing two times per week until 30 weeks of age.
- Feed males and females at the same time.
- For track feed systems, the few points on the circuit without grills (corners for instance) should be sealed with covers.
- For feed pan systems, ensure the correct management of the female and male pans is observed.

Figure 7: Tube inside the grill

AFTER 26 WEEKS OF AGE

>> Male bodyweight gain should be consistent from week to week. Maintain bodyweight within the range shown in the Performance Objectives for the type of male. Regularly monitor body condition and adjust feed to maintain the male's body condition.
>> Consider using a low protein male feed to maintain males in good conditions (See Nutrition section page 15).

>> Male observation and handling is crucial to evaluate their condition (see below Figures 8, 9, 10).

Figure 8: M99 breast condition

Figure 9: Good I66 attitude

Figure 10: M99 leg condition

3.4. MALE REPLACEMENT

>> Biosecurity must be considered before doing this, especially in areas with an Avian Influenza risk.
>> Inter-house male replacement does not require importing males from outside. All poor-quality males are taken out and humanely euthanized; then the whole flock is re-mated.
>> To obtain persistent fertility at the end of production, it may be useful to replace 10-30 % of the males with younger ones between 38 and 45 weeks. They should weigh between 3 700 to 4 000 g depending on the type of male, be at least 27 weeks old and should come from a known and sanitary clean source.
>> New males must to be followed properly to avoid any competition with old males.

4. MALE/FEMALE BEHAVIOUR MANAGEMENT

>> In specific cases (high light intensity, high density, poor equipment, overweight males or too many males, heavy females, etc.), males can become aggressive towards the females. This can cause damage (scratches / skin tears) to the females during mating and provoke pecking issues between birds.

>> To prevent this kind of behavior we advise:
- Check the male beaks before mixing and re-tip the sharp beaks if needed under appropriate veterinary supervision.
- Good control of the male bodyweight both in rearing and production period and maintain good uniformity.
- Adjust the male/female mating sex ratio according to flock behavior. Consider male bodyweight, type of male, sexual maturity level.
- White strings can be added inside the house to be sucked by the birds to avoid or control pecking (see Figure 11).

Figure 11: White strings in the production house

5. WATER MANAGEMENT

>> No water control should be implemented during extremely hot weather or medication treatment.
>> Stop water 2 - 3 hours after the end of the feed clean-up. Check the crop before stopping the water. It should be soft.
>> Regularly check the chemical and bacteriological water quality to ensure that water sanitation is working properly.
- Optimal pH should be between 5.5 and 6.8.
- Optimal Redox Potential should be higher than 600mV (in case of chlorination) at the end of the pipe and/or chlorine of 0.25 to 0.5 ppm.

6. NUTRITION

6.1. FEMALE PARENT STOCK DAILY ALLOCATION AT PEAK PRODUCTION

Amino-acids (mg/bird/day)		
	Tot.	Dig.
Lysine*	925	825
Methionine	475	425
Meth. & Cystine	815	725
Valine	805	700
Isoleucine	740	645
Arginine*	1 065	895
Tryptophan	240	195
Threonine	675	580

Ideal Protein
100
52
88
85
78
108
24
70

Minerals (mg/bird/day)		
	Min.	Max.
Calcium	4 000	4 200
Av. Phosphorus	490	540

Metabolisable energy intake (kcal or MJ/bird/day)**						
Temperature	°C	15.0	17.5	20.0	22.5	> 25.0**
	°F	59.0	63.5	68.0	72.5	> 77.0**
JA57 & P6N	kcal	369	356	344	334	344
	MJ	1.54	1.49	1.44	1.40	1.44
JA87 & RBM	kcal	391	378	366	356	366
	MJ	1.64	1.58	1.53	1.49	1.53

Feed intake (g/bird/day)							
Temperature		°C	15.0	17.5	20.0	22.5	> 25.0**
		°F	59.0	63.5	68.0	72.5	> 77.0**
ME level in feed	2750 kcal/kg	JA57 & P6N	134	129	125	121	125
		JA87 & RBM	142	137	133	129	133
	2850 kcal/kg	JA57 & P6N	129	125	121	117	120
		JA87 & RBM	137	133	128	125	129

** The lysine and arginine ratio can be increased to 110% in hot conditions.*
*** At higher temperatures the additional metabolisable energy (ME) demand to dissipate heat will vary according to bodyweight, feed intake, feed composition (surplus protein and oil content), feathering, activity and environmental management.*

6.2. NUTRIENT RECOMMENDATIONS: G/KG PER 1000 KCAL OF METABOLISABLE ENERGY

PHASE		PRE-STARTER **		STARTER **		PULLET		TRANSITION		ONSET OF LAY		BREEDER I		BREEDER II		MALE		OPTIONAL MALE II	
Age fed (days)		0 to 28/35		28/35 to 56/70		56/70 to 133/154		Optional 133 to 1% lay		Optional 1% to 58g egg weight		1%/58g to 60g egg weight		60g egg weight to cull		141 days to cull or 141 to 210 days		211 days to cull	
Suggested ME per kg*	kcal/kg	2 800 - 3 000		2 750 - 2 900		2 400 - 2 900		2 600 - 2 900		2 650 - 2 900		2 650 - 2 900		2 650 - 2 900		2 400 - 2 900		2 800 - 3 000	
	MJ/kg	11.70 - 12.50		11.50 - 12.10		10.00 - 12.10		10.90 - 12.10		11.10 - 12.10		11.10 - 12.10		11.10 - 12.10		10.00 - 12.10		11.7 - 12.60	
Min. amino-acids		Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.
Lysine %		3.80	3.39	3.71	3.32	2.59	2.26	2.62	2.31	2.87	2.55	2.77	2.47	2.71	2.42	1.76	1.52	1.57	1.35
Methionine %		1.60	1.45	1.55	1.40	1.24	1.08	1.25	1.10	1.46	1.32	1.41	1.27	1.37	1.23	0.94	0.82	0.84	0.73
Meth. & Cystine %		2.90	2.58	2.80	2.50	2.16	1.88	2.18	1.92	2.54	2.26	2.43	2.16	2.38	2.12	1.65	1.43	1.47	1.28
Valine %		2.61	2.30	2.55	2.22	2.00	1.70	2.04	1.73	2.45	2.15	2.40	2.09	2.35	2.05	1.48	1.27	1.32	1.13
Isoleucine %		2.55	2.25	2.50	2.21	1.96	1.68	2.00	1.71	2.28	1.98	2.21	1.93	2.16	1.89	1.43	1.23	1.28	1.10
Arginine %		4.00	3.58	3.81	3.42	2.70	2.30	2.70	2.30	3.32	2.82	3.18	2.68	3.11	2.62	1.96	1.74	1.72	1.49
Tryptophan %		0.75	0.64	0.73	0.62	0.61	0.51	0.62	0.52	0.72	0.60	0.71	0.59	0.70	0.58	0.45	0.37	0.40	0.33
Threonine %		2.58	2.25	2.55	2.22	1.85	1.57	1.86	1.58	2.08	1.79	2.01	1.73	1.97	1.70	1.35	1.15	1.21	1.02
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Crude protein %		65.0	69.0	64.0	68.0	54.0	56.0	54.5	56.5	58.0	62.0	57.0	61.0	54.5	59.5	41.5	43.5	36.0	37.5
Calcium %		3.60	3.80	3.60	3.70	3.30	3.50	4.50	5.50	11.60	12.00	11.60	12.00	12.00	12.40	3.30	3.50	3.30	3.50
Av. Phosphorus %		1.60	1.70	1.50	1.60	1.40	1.50	1.40	1.50	1.44	1.50	1.44	1.50	1.29	1.40	1.40	1.50	1.40	1.50
Sodium %		0.60	0.75	0.58	0.70	0.55	0.70	0.55	0.70	0.60	0.70	0.60	0.70	0.60	0.70	0.55	0.75	0.55	0.75
Chloride %		0.60	0.85	0.60	0.80	0.60	0.80	0.60	0.80	0.60	0.80	0.60	0.80	0.60	0.80	0.60	0.80	0.60	0.80

** Metabolisable energy (ME) concentrations will vary according to the ingredients available locally and their cost. To obtain the nutrient percentage inclusion, multiply the factors above by Metabolisable Energy content kcal/kg and divide by 10 000.*
*** The use of Pre-Starter and Starter diet will vary according to early growth rate. Ensuring early growth meets the target is a key objective.*

6.3. EXAMPLE OF DIET SPECIFICATIONS FOR TEMPERATE CLIMATES

PHASE		PRE-STARTER		STARTER		PULLET		TRANSITION		BREEDER I		BREEDER II	
Age (days)		0 to 28		29 to 56		56 to 133d or 1% lay		Optional 133 days to 1% lay		1% to 60g egg weight		60g egg weight to cull	
Suggested ME	kcal/kg	2 850		2 750		2 650		2 700		2 750		2 730	
	MJ/kg	11.90		11.50		10.90		11.20		11.50		11.30	
Min. amino-acids		Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.
Lysine %		1.08	0.97	1.02	0.91	0.69	0.60	0.71	0.62	0.76	0.68	0.74	0.66
Methionine %		0.46	0.41	0.43	0.39	0.33	0.29	0.34	0.30	0.39	0.35	0.37	0.33
Meth. & Cystine %		0.83	0.74	0.77	0.69	0.57	0.50	0.59	0.52	0.67	0.59	0.65	0.58
Valine %		0.74	0.66	0.70	0.61	0.53	0.45	0.55	0.47	0.66	0.57	0.64	0.56
Isoleucine %		0.73	0.64	0.69	0.61	0.52	0.45	0.54	0.46	0.61	0.53	0.59	0.52
Arginine %		1.14	1.02	1.05	0.94	0.72	0.61	0.73	0.62	0.87	0.74	0.85	0.72
Tryptophan %		0.21	0.18	0.20	0.17	0.16	0.14	0.17	0.14	0.20	0.16	0.19	0.16
Threonine %		0.74	0.64	0.70	0.61	0.49	0.42	0.50	0.43	0.55	0.48	0.54	0.46
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Crude protein %		18.5	19.7	17.6	18.7	14.3	14.8	14.7	15.3	15.7	16.8	14.9	16.2
Crude fiber %		2.50	3.50	2.50	3.50	3.50	8.00	3.00	6.00	3.50	6.00	4.00	6.50
Calcium %		1.03	1.08	0.99	1.02	0.87	0.93	1.22	1.49	3.19	3.30	3.28	3.39
Av. Phosphorus %		0.46	0.48	0.41	0.44	0.37	0.40	0.38	0.41	0.40	0.41	0.35	0.38
Sodium %		0.17	0.21	0.16	0.19	0.15	0.19	0.15	0.19	0.17	0.19	0.16	0.19
Chloride %		0.17	0.24	0.17	0.22	0.16	0.21	0.16	0.22	0.17	0.22	0.16	0.22
Potassium %		0.66	0.74	0.63	0.72	0.53	0.69	0.54	0.70	0.61	0.74	0.55	0.71
Crude fat %		3.50	4.00	3.50	4.00	2.50	4.00	3.00	4.00	4.00	7.00	3.00	6.50
Linoleic acid %		1.17	2.00	1.10	2.20	1.01	2.12	1.19	2.70	1.51	2.75	1.23	2.73

Note: these recommendations are designed for situations where a range of Premium females are fed the same diets.

6.4. EXAMPLE OF DIET SPECIFICATIONS FOR HOT CLIMATES (>25°C) OR WHERE PEAK FEED INTAKE IS < 90% OF TARGET (-10G/D)

PHASE		BREEDER I		BREEDER II		BREEDER I		BREEDER II	
		Wheat based diets with added oil				Maize based diets with added oil			
Age (days)		1% to 60g egg weight		60g egg weight to cull		1% to 60g egg weight		60g egg weight to cull	
Suggested ME	kcal/kg	2 750		2 730		2 850		2 825	
	MJ/kg	11.51		11.43		11.93		11.83	
Min. amino-acids		Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.
Lysine %		0.81	0.72	0.78	0.70	0.84	0.75	0.81	0.72
Methionine %		0.41	0.37	0.40	0.36	0.43	0.38	0.41	0.37
Meth. & Cystine %		0.71	0.63	0.69	0.61	0.73	0.65	0.71	0.63
Valine %		0.70	0.61	0.68	0.59	0.72	0.63	0.70	0.61
Isoleucine %		0.64	0.56	0.63	0.55	0.67	0.58	0.65	0.56
Arginine %		0.93	0.78	0.90	0.76	0.96	0.81	0.93	0.79
Tryptophan %		0.21	0.17	0.20	0.17	0.22	0.18	0.21	0.17
Threonine %		0.59	0.51	0.57	0.49	0.61	0.52	0.59	0.51
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Crude protein %		16.6	17.8	15.8	17.2	17.2	18.4	16.3	17.8
Crude fiber %		3.50	6.00	4.00	6.50	3.63	6.22	4.14	6.73
Calcium %		3.38	3.50	3.47	3.59	3.50	3.63	3.59	3.71
Av. Phosphorus %		0.42	0.44	0.37	0.41	0.44	0.45	0.39	0.42
Sodium %		0.17	0.20	0.17	0.20	0.18	0.21	0.18	0.21
Chloride %		0.17	0.23	0.17	0.23	0.18	0.24	0.18	0.24
Potassium %		0.64	0.79	0.58	0.75	0.66	0.82	0.60	0.78
Crude fat %		4.00	8.00	3.50	7.00	4.15	8.29	3.62	7.24
Linoleic acid %		1.60	2.92	1.30	2.89	1.66	3.02	1.35	2.99

Note: these recommendations are designed for situations where a range of Premium females are fed the same diets.

>> In hot conditions where heat stress reduces feed intake especially at peak production, the objective should be to replace starch energy with lipid (fats and oils) energy to achieve between 13 -15% of energy from lipid energy. Excess protein energy should be minimised too. Increasing other nutrients to adjust for lower feed intake may not improve performance unless energy intake is increased and/or excess heat energy is removed. The table shows modest increases in amino acid and other nutrients in response to lower feed intake. Further increases are unlikely to be economically beneficial and may help increase metabolic heat production and make heat stress effects on feed intake even worse. Increasing added fats and oils may also help palatability of mash based diets.

>> How the objective of more lipid energy is achieved will depend upon the ingredients available and whether the diets are wheat or maize based. Options are shown for lower energy (2750 kcal/kg) wheat based diets and higher energy (2850 kcal/kg) maize based diets. In most cases where temperature regularly exceeds 25°C, the high energy Breeder I and Breeder II options will be preferred. Where diets are wheat based then the most effective way to increase feed intake in lay is by feeding a crumble or pellet but physical quality must be of a consistently high standard. For high energy maize based diets then coarse mash diets are likely to be the best option.

6.5. EXAMPLE OF DIET SPECIFICATIONS FOR JA87 OR REDBRO MINI PARENT STOCK FEMALES

		TEMPERATE CONDITIONS				HOT OR LOW FEED INTAKE CONDITIONS			
PHASE		BREEDER I		BREEDER II		BREEDER I		BREEDER II	
Age (days)		1% to 60g egg weight		60g egg weight to cull		1% to 60g egg weight		60g egg weight to cull	
Suggested ME	kcal/kg	2 750		2 730		2 850		2 825	
	MJ/kg	11.50		11.30		11.93		11.83	
Min. amino-acids		Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.
Lysine %		0.72	0.65	0.70	0.63	0.79	0.71	0.77	0.69
Methionine %		0.37	0.33	0.36	0.32	0.41	0.36	0.39	0.35
Meth. & Cystine %		0.63	0.56	0.62	0.55	0.70	0.62	0.68	0.60
Valine %		0.63	0.55	0.61	0.53	0.69	0.60	0.67	0.58
Isoleucine %		0.58	0.50	0.56	0.49	0.63	0.55	0.61	0.54
Arginine %		0.83	0.70	0.81	0.68	0.91	0.77	0.89	0.75
Tryptophan %		0.19	0.15	0.18	0.15	0.20	0.17	0.20	0.16
Threonine %		0.53	0.45	0.51	0.44	0.58	0.50	0.56	0.48
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Crude protein %		14.9	15.9	14.1	15.4	16.4	17.5	15.5	16.9
Crude fiber %		3.50	6.00	4.00	6.50	3.45	5.91	3.93	6.39
Calcium %		3.19	3.30	3.28	3.39	3.33	3.44	3.41	3.53
Av. Phosphorus %		0.40	0.41	0.35	0.38	0.41	0.43	0.37	0.40
Sodium %		0.17	0.19	0.16	0.19	0.17	0.20	0.17	0.20
Chloride %		0.17	0.22	0.16	0.22	0.17	0.23	0.17	0.23
Potassium %		0.61	0.74	0.55	0.71	0.63	0.77	0.57	0.74
Crude fat %		4.00	7.00	3.00	6.50	3.94	7.88	3.44	6.88
Linoleic acid %		1.51	2.75	1.23	2.73	1.58	2.87	1.28	2.84

6.6. EXAMPLE OF DIET SPECIFICATIONS FOR JA57 OR P6N PARENT STOCK FEMALES

		TEMPERATE CONDITIONS				HOT OR LOW FEED INTAKE CONDITIONS			
PHASE		BREEDER I		BREEDER II		BREEDER I		BREEDER II	
Age (days)		1% to 60g egg weight		60g egg weight to cull		1% to 60g egg weight		60g egg weight to cull	
Suggested ME	kcal/kg	2 750		2 730		2 850		2 825	
	MJ/kg	11.50		11.30		11.93		11.83	
Min. amino-acids		Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.
Lysine %		0.78	0.70	0.76	0.68	0.86	0.77	0.84	0.75
Methionine %		0.40	0.36	0.39	0.35	0.44	0.39	0.42	0.38
Meth. & Cystine %		0.69	0.61	0.67	0.60	0.76	0.67	0.73	0.65
Valine %		0.68	0.59	0.66	0.58	0.75	0.65	0.72	0.63
Isoleucine %		0.62	0.55	0.61	0.53	0.69	0.60	0.67	0.58
Arginine %		0.90	0.76	0.88	0.74	0.99	0.83	0.96	0.81
Tryptophan %		0.20	0.17	0.20	0.16	0.22	0.18	0.22	0.18
Threonine %		0.57	0.49	0.55	0.48	0.63	0.54	0.61	0.52
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Crude protein %		16.1	17.3	15.3	16.7	17.7	19.0	16.8	18.4
Crude fiber %		3.50	6.00	4.00	6.50	3.74	6.40	4.26	6.93
Calcium %		3.19	3.30	3.28	3.39	3.61	3.73	3.70	3.82
Av. Phosphorus %		0.40	0.41	0.35	0.38	0.45	0.47	0.40	0.43
Sodium %		0.17	0.19	0.16	0.19	0.19	0.22	0.19	0.22
Chloride %		0.17	0.22	0.16	0.22	0.19	0.25	0.19	0.25
Potassium %		0.61	0.74	0.55	0.71	0.68	0.84	0.62	0.80
Crude fat %		4.00	7.00	3.00	6.50	4.27	8.54	3.73	7.46
Linoleic acid %		1.51	2.75	1.23	2.73	1.71	3.11	1.39	3.08

6.7. EXAMPLE OF DIET SPECIFICATIONS FOR MALES

AMINO-ACIDS					
PHASE		MALE		OPTIONAL MALE II	
Age (days)		141 days to cull or 141 to 210 days		211 days to cull	
Suggested ME	kcal/kg	2 800		3 000	
	MJ/kg	11.72		12.56	
Min. amino-acids		Tot.	Dig.	Tot.	Dig.
Lysine %		0.49	0.42	0.47	0.41
Methionine %		0.26	0.23	0.25	0.22
Meth. & Cystine %		0.46	0.40	0.44	0.38
Valine %		0.42	0.35	0.40	0.34
Isoleucine %		0.40	0.34	0.38	0.33
Arginine %		0.55	0.49	0.52	0.45
Tryptophan %		0.12	0.10	0.12	0.10
Threonine %		0.38	0.32	0.36	0.31

OTHER NUTRIENTS				
PHASE	MALE		OPTIONAL MALE II	
Age (days)	141 days to cull or 141 to 210 days		211 days to cull	
	Min.	Max.	Min.	Max.
Crude protein %	11.6	12.2	10.8	11.3
Crude fiber %	4.00	6.50	4.00	6.50
Calcium %	0.92	0.98	0.99	1.05
Av. Phosphorus %	0.39	0.42	0.42	0.45
Sodium %	0.15	0.21	0.17	0.23
Chloride %	0.17	0.22	0.18	0.24
Potassium %	0.56	0.73	0.60	0.78
Crude fat %	3.00	6.50	3.00	6.50
Linoleic acid %	0.59	2.10	1.20	2.40

>> The Male II diet is optional and is intended where conventional M77 or M99 males are used and body weight is difficult to control after 30 weeks of age. If males are under the body weight target in the period from 24 to 30 weeks of age then do not use this diet. The optional diet is not recommended for Intermediate or Slow growing males.

>> It is advised that you contact your Hubbard Technical Specialist to discuss this option before using this diet.

6.8. ADDED VITAMIN GUIDELINES

Inclusion rates are per kg feed		STANDARD FEED		HEAT TREATED	
		Wheat based	Maize based	Wheat based	Maize based
Vitamin A	IU	12 000	12 000	12 000	12 000
Vitamin D3	IU	3 000	3 000	3 200	3 200
Vitamin E	IU	40 - 100	40 - 100	60 - 100	50 - 100
Vitamin K (menadione)	mg	3	3	5	5
Thiamin B1	mg	3	3	3.5	3.5
Riboflavin B2	mg	12	12	12	12
Pantothenic acid	mg	12	14	14	16
Nicotinic acid	mg	55	55	60	60
Pyridoxine B6	mg	5.5	4.5	6	5
Folic acid B10	mg	2	2	2.5	2.5
Cyanocobalalamin B12	mg	0.03	0.03	0.035	0.035
Biotin Vit. H	mg	0.3	0.25	0.3	0.25
Choline	mg	500	750	500	750

>> These recommendations could be used from day old to the end of the laying period. Or, the vitamin premix level can be reduced by 20 % in the growing stage.

>> Where permitted by local regulations, inclusion levels may be increased by 10% if feed intake is observed or expected to be 10% or more below the target feed intake.

>> Check local regulations for the maximum permitted added amount of each Vitamin especially Vitamin A and D.

6.9. ADDED MINERAL GUIDELINES

MINERAL	In mg
Manganese	100
Iron	50
Iodine	2
Copper	10
Selenium	0.30 – 0.40

>> These recommendations could be used from day old to the end of the laying period. Alternatively, the mineral premix level can be reduced by 20 % in the growing stage.

>> Assumes inorganic and organic mineral sources.

>> Check local regulations for the maximum permitted of all minerals but particularly for zinc and selenium.

6.10. GUIDELINES FOR PHYSICAL QUALITY OF FEED

GUIDELINE FOR CRUMBS				
	>3mm	2 - 3mm	1 - 2mm	<1mm
Good	10%	50%	30%	0
Average	10%	35%	45%	10%
GUIDELINE FOR MASH				
	>3mm	2 - 3 mm	1 - 2 mm	<1mm
Starter	5%	25%	50%	20%
Grower	10%	35%	35%	20%
Breeder	15%	40%	30%	15%
GUIDELINE FOR PELLETS				
	>3mm	2 - 3 mm	1 - 2 mm	<1mm
	>70%			<10%

Figure 12: Hubbard Feed Sieve

>> The percentages show the guideline amount in each category of particle size after sieving with screens of 3, 2 and 1mm such as with a Hubbard feed sieve. It is important for all feeds that the percentage of feed passing through the 1mm screen does not exceed the amounts shown.

>> Where a sieve with a 0.5mm screen is used then for mash feeds no more than 10% of particles should pass through this screen.

>> Please use the Hubbard Feed Sieve Technical Sheet for further information.

OTHER HUBBARD TECHNICAL DOCUMENTS AVAILABLE ONLINE

VISIT OUR WEBSITE FOR MORE DOCUMENTS

www.hubbardbreeders.com

All documents | All generations | All ranges | All products | All subjects | Search

FEMALE PERFORMANCE OBJECTIVES

P6N - REDBRO M
JA57 Ki - JA57 - JA57 K - JA87

MALE PERFORMANCE OBJECTIVES

Slow growth - Intermediate growth - M99 - M77

BREEDER MANUAL

TECHNICAL BULLETINS

INCUBATION GUIDE

TECHNICAL POSTERS

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.

AMERICAS
HUBBARD LLC
1070 MAIN STREET
PIKEVILLE, TN 37367 – U.S.A.
TEL. +1 (423) 447-6224
contact.americas@hubbardbreedersusa.com

EUROPE, MIDDLE EAST, AFRICA
HUBBARD S.A.S.
MAUGUÉRAND
22800 LE FOEIL – FRANCE
TEL. +33 (0)2.96.79.63.70
contact.emea@hubbardbreeders.com

ASIA
HUBBARD S.A.S.
MAUGUÉRAND
22800 LE FOEIL – FRANCE
TEL. +33 (0)2.96.79.63.70
contact.asia@hubbardbreeders.com

V-02-2020 / P-02-2020