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HUBBARD PREMIUM
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GENERAL NUTRITION RECOMMENDATIONS

PARENT STOCK
PREMIUM MINI FEMALES AND MALES

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INTRODUCTION

This document provides general nutrition recommendations and some practical adaptations to specific situations. The optimum nutritional programme will vary according to local conditions such as:

- ingredients availability and ingredient economics;
- feed intake, climate;
- housing type;
- disease status.

It is very important to remember that growth and egg production are all driven by nutrient intake measured in mg, g or unit of energy per day. The following formula is key to achieving target nutrient intake needed at each stage of rearing or production:

Nutrient intake (g or kcal/d) = Feed Intake (g/d) × Nutrient in the feed (% or kcal)

1. NUTRIENT RECOMMENDATIONS FOR FEMALES: KEY POINTS

Achieving the bodyweight targets at 4 and 6 weeks of age is important for both Premium Mini parent females and for parent males. The use of both Pre-Starter and Starter diets in this period is recommended to ensure this objective is met. If these body weights targets are not achieved or historically have been difficult to achieve then use the Pre-Starter and Starter diets for a longer period. Avoid overfeeding protein after 8 weeks of age where possible especially if bodyweight is on or over target.

- It is normal to feed the Grower diet until 1% production. Transition diet is not normally used as this may risk extra growth before stimulation and too early sexual maturity. Transition diet is only recommended when bodyweights of females are below target at 16–18 weeks of age and extra feed is needed to boost growth.

- Many producers have different Premium breeds but feeding each breed according to its nutritional requirements is logistically not possible either at the farm or due to limitations at the feed mill. For the rearing period, all Premium Mini breeds can be fed the same feed programme. Differences between the requirements for the breeds related to their egg production, body weight and feed intake are more noticeable in the production period. Therefore, to make nutritional recommendations for Premium Mini females, three scenarios have been considered:

  - Scenario 1: Small volumes of Premium Breeder feed is manufactured, logistics in the feed mill, producer has JA57 and JA87 or JA57Ki and Redbro Mini.

    Solution: ALL Mini Breeds use the same Premium Mini feed programme recommendations. These are an adaptation of the JA57 / JA57Ki and JA87 / Redbro Mini recommendations to make the best practical and economic compromise to ensure optimal chick production. Tables 1 to 5 in this guide have been produced on this basis.

  - Scenario 2: Only JA87 or Redbro Mini Parent females are kept.

    Solution: Use specific recommendations in the production period optimised for these breeds – see Table 10.

  - Scenario 3: Only JA57, JA57Ki or P6N Parent females are kept.

    Solution: Use specific recommendations in the production period optimised for these breeds – see Table 11.

- For Redbro Parent females → See the ***"REDBRO Female and Males Nutrition Recommendations Guide"***.

- While it may be possible to use diets designed for Conventional parent females for Premium Mini females in the rearing period, it is best to check their suitability with your Hubbard Technical Specialist. For the production period, breeder diets made for conventional females are unlikely to be suitable for Premium mini females and risk undersupplying nutrients especially amino acids and minerals.

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Management guide Premium Mini PS

Nutrition recommendations REDBRO PS and males

1. NUTRIENT RECOMMENDATIONS FOR FEMALES: FEMALE PARENT STOCK TARGET DAILY NUTRIENT ALLOCATION AT PEAK

Table 1 provides some key data for the critical period at peak production that impacts nutrition during the production period.

➨ Daily nutrient intakes recommended to achieve or exceed the performance objectives at peak daily egg production for the Premium Mini females. ➔ See ***"Performance Objectives"*** for the relevant female breed.

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Performance Objectives JA57Ki PS

Performance Objectives REDBRO MINI PS

Performance Objectives JA57 PS

Performance Objectives JA87 PS

Performance Objectives P6N PS

➨ Data for amino acids are provided as either total or digestible amino acids. The optimal recommended amino acid balance on an ideal protein basis is also shown.

➨ Minimum target intakes for Calcium and Available Phosphorus. Available Phosphorus is still the most widely used basis for Phosphorus nutrition across the world for breeders. Adapted recommendations for digestible Phosphorus systems are available by contacting Hubbard Nutritionists.

➨ Estimates of the expected Metabolisable Energy (ME) intake per day are shown and are adjusted according to average daily temperature in the house which will affect ME requirements.

➨ CALCULATIONS

- Once the ME content of the Breeder diet is known, it is possible to estimate the expected daily peak feed intake.

  366 kcal (ME intake)/2 750 kcal/kg (ME of the feed) = 133 g feed/d (Feed intake)

- Using the predicted feed intake and the target intakes for all nutrients it is possible to calculate the % of each nutrient needed in the diet. If birds are kept under hot climate conditons, then the additional demands to use energy to dissipate heat may increase ME requirements. The precise amount of energy is not easy to predict.

- In addition, if bodyweight exceeds the target, then the maintenance ME requirement will be increased. As a guide, for each 100 g over the bodyweight target, the ME requirement increases by 10 kcal day or 0.05 MJ/d.

TABLE 1: FEMALE PARENT STOCK TARGET DAILY ALLOCATION AT PEAK

Amino acids (mg/bird/day)			Ideal Protein
	Tot.	Dig.	
Lysine	925	825	100
Methionine	475	425	52
Meth. & Cystine	872	776	94
Valine	892	776	94
Isoleucine	740	645	78
Arginine	1 065	895	108
Tryptophan	240	195	24
Threonine	710	611	74

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- JA57Ki- P6N	kcal	369	356	344	334	330 to 345
	MJ	1.54	1.49	1.44	1.40	1.38 to 1.44
JA87 - Redbro Mini	kcal	391	378	366	356	350–365
	MJ	1.64	1.58	1.53	1.49	1.47 to 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	2 750 kcal/kg	JA57 - P6N - JA57Ki	134	129	125	121	120 to 125
		JA87 - Redbro Mini	142	137	133	129	127 to 133
	2 850 kcal/kg	JA57 - P6N - JA57Ki	129	125	121	117	116 to 121
		JA87 - Redbro Mini	137	133	128	125	123 to 128

1. NUTRIENT RECOMMENDATIONS FOR FEMALES: GENERAL NUTRIENT RECOMMENDATIONS (G/KG PER 1 000 KCAL OF METABOLISABLE ENERGY)

- METABOLISABLE ENERGY
  - The recommendations in this guide are in accordance with the WPSA (1999) ME content of feed ingredients.
  - It is important to note that there are differences between various international databases that describe the ME content of feed ingredients. This causes much discussion and makes direct comparisons of diets or recommendations difficult unless they are made using the same database.
  - Target ME intakes may vary between countries based on many factors so what is optimal in one location may not be the same elsewhere.

Table 2 shows:

- Examples of the ratio of nutrients per 1 000 kcal of ME for all ages.
- The values that can be used to calculate the nutrient content of the diet according to the local choice of ME level. For example, if a ME of 2 800 kcal/kg is the best option for Breeder 1 then the digestible lysine content of the diet can be calculated as:

% Digestible Lysine = (2.47 g dg Lysine/kg × 2 800 kcal/kg)/10 000

- The best way to use this table is as a spreadsheet. Contact your Hubbard Technical Specialist for further information.
- The ME content of each diet is shown as a range. The optimal ME content of the diet used locally will depend on many factors but the limits for this choice are shown for each diet.

Hubbard Nutritionists can help to determine the optimal local ME content of each diet and from this the percentage of other nutrients can be calculated using Table 2.

Some diets shown are optional depending on local factors such as chick growth, egg size, low feed intake etc. These choices are discussed in more detail in later sections.

TABLE 2: BREEDER NUTRIENT RECOMMENDATIONS : G/KG PER 1 000 KCAL (MCAL) OF METABOLISABLE ENERGY

PHASE		PRE-STARTER		STARTER		GROWER		TRANSITION		ONSET OF LAY		BREEDER I		BREEDER II*	
Age (days)		0 to 28 d or 35 d		29 or 36 d to 56 or 70 d		57 or 71 d to 126 d or 1% lay		Optional 127 d to 1% lay		Optional 1% lay to 56 g egg weight		1% lay to 60 g egg weight, 280 d or depletion. If use of the onset of lay feed : 56 g egg weight to 280 d or depletion.		Optional 281 d to depletion	
Suggested ME	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	
	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	
	kcal/lb	1 270–1 360		1 250–1 315		1 090–1 315		1 180–1 315		1 200–1 315		1 200–1 315		1 200–1 315	
Min. amino acids		Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.
Lysine		3.80	3.40	3.71	3.32	2.59	2.26	2.62	2.31	2.87	2.55	2.77	2.47	2.71	2.42
Methionine		1.75	1.59	1.55	1.40	1.24	1.08	1.25	1.10	1.46	1.32	1.41	1.27	1.37	1.23
Meth. & Cystine		3.13	2.81	2.80	2.50	2.16	1.88	2.18	1.92	2.54	2.26	2.43	2.16	2.38	2.12
Valine		3.11	2.73	2.55	2.22	2.00	1.70	2.04	1.73	2.45	2.15	2.40	2.09	2.35	2.05
Isoleucine		2.58	2.28	2.50	2.21	1.96	1.68	2.00	1.71	2.28	1.98	2.21	1.93	2.16	1.89
Arginine		4.05	3.65	3.81	3.42	2.70	2.30	2.70	2.30	3.32	2.82	3.18	2.68	3.11	2.62
Tryptophan		0.73	0.63	0.73	0.62	0.61	0.51	0.62	0.52	0.72	0.60	0.71	0.59	0.70	0.58
Threonine		2.65	2.35	2.55	2.22	1.85	1.57	1.86	1.58	2.08	1.79	2.01	1.73	1.97	1.70
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Crude protein		65.00	69.00	64.00	68.00	54.00	56.00	54.50	56.50	58.00	62.00	57.00	61.00	54.50	59.50
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
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
Sodium		0.60	0.70	0.58	0.70	0.55	0.70	0.55	0.70	0.55	0.70	0.55	0.70	0.60	0.70
Chloride		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
Potassium		2.30	2.80	2.30	2.80	2.20	2.80	2.20	2.80	2.20	2.80	2.20	2.80	2.20	2.80
Linoleic acid		4.10	7.00	4.00	8.00	3.80	8.00	4.40	10.00	6.50	10.00	5.50	10.00	4.50	10.00

** It is recommended to change to Breeder II diet before 281 days if the egg weight reaches 58 g (hot climates/hot season) or 60 g (cold climates/cold season).*

TABLE 3: EXAMPLES OF DIET SPECIFICATION FOR TEMPERATE CLIMATES (WHEAT BASED DIETS)

PHASE		PRE-STARTER		STARTER		GROWER		TRANSITION		BREEDER I		BREEDER II*	
Age (days)		0 to 28 d		29 d to 56 d		57 d to 126 d or 1% lay		Optional 127 d to 1% lay		1% lay to 60 g egg weight, 280 d or depletion		Optional 281 d to depletion	
Suggested ME	kcal/kg	2 850		2 750		2 650		2 700		2 750		2 730	
	MJ/kg	11.93		11.51		11.10		11.35		11.51		11.43	
	kcal/lb	1 293		1 248		1 202		1 230		1 248		1 239	
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 %		0.50	0.45	0.43	0.39	0.33	0.29	0.34	0.30	0.39	0.35	0.37	0.33
Meth. & Cystine %		0.89	0.80	0.77	0.69	0.57	0.50	0.59	0.52	0.67	0.59	0.65	0.58
Valine %		0.89	0.78	0.70	0.61	0.53	0.45	0.55	0.47	0.66	0.57	0.64	0.56
Isoleucine %		0.74	0.65	0.69	0.61	0.52	0.45	0.54	0.46	0.61	0.53	0.59	0.52
Arginine %		1.15	1.04	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 %		0.76	0.67	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 %		18.53	19.67	17.60	18.70	14.31	14.84	14.77	15.31	15.68	16.78	14.88	16.24
Crude fibre %		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	0.20	0.16	0.19	0.15	0.19	0.15	0.19	0.15	0.19	0.16	0.19
Chloride %		0.17	0.23	0.17	0.22	0.16	0.21	0.16	0.22	0.17	0.22	0.16	0.22
Potassium %		0.66	0.80	0.63	0.77	0.58	0.74	0.60	0.76	0.61	0.77	0.60	0.76
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	2.71	1.51	2.75	1.23	2.73

** It is recommended to change to Breeder II diet before 281 days if the egg weight reaches 58 g (hot climates/hot season) or 60 g (cold climates/cold season).*

Table 3 content:

- Example programme of diets to use in a temperate climate where the principal cereal is likely to be wheat and higher ME levels may be expensive to achieve.
- Under normal conditions Breeder I and Breeder II will be the only diets used in the production period.
- Breeder III diet is not recommended for Premium mini parent females at the end of production.

TABLE 4: EXAMPLES OF DIET SPECIFICATION FOR TEMPERATE CLIMATES (MAIZE BASED DIETS)

PHASE		PRE-STARTER		STARTER		GROWER		TRANSITION		BREEDER I		BREEDER II*	
Age (days)		0 to 35 d		36 d to 70 d		71 d to 126 d or 1% lay		Optional 127 d to 1% lay		1% lay to 60 g egg weight, 280 d or depletion		Optional 281 d to depletion	
Suggested ME	kcal/kg	2 850		2 750		2 675		2 775		2 850		2 825	
	MJ/kg	11.93		11.51		11.20		11.50		11.93		11.83	
	kcal/lb	1 293		1 248		1 214		1 259		1 293		1 282	
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	0.73	0.64	0.79	0.70	0.77	0.68
Methionine %		0.46	0.41	0.43	0.39	0.33	0.29	0.35	0.31	0.40	0.36	0.39	0.35
Meth. & Cystine %		0.83	0.74	0.77	0.69	0.58	0.50	0.61	0.53	0.69	0.62	0.67	0.60
Valine %		0.74	0.66	0.70	0.61	0.54	0.45	0.57	0.48	0.68	0.59	0.66	0.58
Isoleucine %		0.73	0.64	0.69	0.61	0.52	0.45	0.55	0.48	0.63	0.55	0.61	0.53
Arginine %		1.14	1.02	1.05	0.94	0.72	0.62	0.80	0.70	0.87	0.77	0.84	0.75
Tryptophan %		0.21	0.18	0.20	0.17	0.16	0.14	0.17	0.14	0.20	0.17	0.20	0.16
Threonine %		0.74	0.64	0.70	0.61	0.49	0.42	0.51	0.44	0.57	0.49	0.56	0.48
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Crude protein %		18.53	19.67	17.60	18.70	14.45	14.98	15.12	15.68	16.25	17.39	15.40	16.81
Crude fibre %		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	0.88	0.94	1.25	1.53	3.31	3.42	3.39	3.50
Av. Phosphorus %		0.46	0.48	0.41	0.44	0.37	0.40	0.39	0.42	0.41	0.43	0.36	0.40
Sodium %		0.17	0.21	0.16	0.19	0.15	0.19	0.15	0.19	0.16	0.20	0.17	0.20
Chloride %		0.17	0.24	0.17	0.22	0.16	0.21	0.17	0.22	0.17	0.23	0.17	0.23
Potassium %		0.66	0.74	0.63	0.72	0.59	0.75	0.61	0.78	0.63	0.80	0.62	0.79
Crude fat %		2.50	4.00	3.00	4.00	2.50	4.00	3.00	6.00	4.00	8.00	3.50	7.00
Linoleic acid %		1.17	2.00	1.10	2.20	1.02	2.14	1.22	2.78	1.57	2.85	1.27	2.83

** It is recommended to change to Breeder II diet before 281 days if the egg weight reaches 58 g (hot climates/hot season) or 60 g (cold climates/cold season).*

Table 4 content:

- Example programme of diets that may be used where maize is the primary cereal and diets are likely to have few other ingredients. Soya may typically be the only major protein source.
- Under these conditions, the optimal ME content of the diet is higher especially in the production period. The higher ME content also may help allow extra oil or fat to be added to the diet to help palatability and reduce heat stress under challenging conditions.
- Breeder III diet is not recommended for Premium mini parent females at the end of production.

TABLE 5: EXAMPLES OF DIET SPECIFICATION FOR HOT CLIMATES (> 25 °C / 78 °F) OR WHERE PEAK FEED INTAKE IS < 90% OF TARGET (- 10 G/D)*

PHASE		WHEAT BASED DIETS WITH ADDED OIL				MAIZE BASED DIETS WITH ADDED OIL			
		BREEDER I		BREEDER II**		BREEDER I		BREEDER II**	
Age (days)		1% lay to 280 d		281 d to depletion		1% lay to 280 d		281 d to depletion	
Suggested ME	kcal/kg	2 750		2 730		2 850		2 825	
	MJ/kg	11.51		11.43		11.93		11.83	
	kcal/lb	1 248		1 239		1 293		1 282	
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 %		16.62	17.78	15.77	17.22	17.22	18.43	16.32	17.82
Crude fibre %		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 %		0.16	0.20	0.17	0.20	0.17	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	0.82	0.64	0.81	0.66	0.85	0.66	0.84
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

** This is a guide and consult your Hubbard Technical Specialist if facing low feed intake for the best solution.*
*** It is recommended to change to Breeder II diet before 281 days if the egg weight reaches 58 g (hot climates/hot season) or 60 g (cold climates/cold season).*

Table 5 shows an example of breeder diets in a programme used in conditions where ME intake per day during production is expected to be low due to for example, high ambient temperature in open sided houses. The assumption here is that low ME intake and therefore low feed intake means nutrient intake will not achieve the targets outlined in Table 1.

- Higher ME diets in production > 2 825 kcal/kg are recommended in situations where environment may reduce energy requirements or reduce energy intake. The objective is to provide a minimum of 10% of the dietary energy as energy from lipid which is more easily achieved in higher energy diets. Higher ME diets also reduce the pressure on volume of feed intake under challenging conditions.
- Compared with Table 3 and 4 for situations where energy intake during egg production is normal then the nutrient contents in Table 5 have been increased. This is to try to ensure that actual nutrient intake will be closer to the target.
- If feed and energy intake are below target, then there is a limit to how much the nutrient content of the diet can be increased. This is especially true for amino acids where an increase of more than 6% in the amino acid : energy ratio is not recommended. This is because a response to increased amino acid intakes is unlikely if energy intake is still limiting egg production and is unlikely to be economically beneficial. In addition, energy used to dispose of excess protein is likely to make heat stress worse.
- Increasing the amount of 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 (2 750 kcal/kg) wheat-based diets and higher energy (2 850 kcal/kg) maize-based diets.
  - In most cases where temperature regularly exceeds 25 °C (78 °F), 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.

TABLE 6: EXAMPLE OF DIET SPECIFICATIONS FOR MALES

PHASE		MALE 1		MALE 2 OPTIONAL	
Age (days)		141 d to depletion or 141 to 210 d		211 d to depletion	
Suggested ME	kcal/kg	2 800		3 000	
	MJ/kg	11.72		12.56	
	kcal/lb	1 270		1 361	
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
		Min.	Max.	Min.	Max.
Crude protein %		11.62	12.18	10.80	11.25
Crude fibre %		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 %		0.62	0.78	0.66	0.84
Crude fat %		3.00	6.50	3.00	6.50
Linoleic acid %		1.12	2.52	1.20	2.70

Performance Objectives M77 PS male mated with Premium females

Performance Objectives M99 PS male mated with Premium females

REARING DIETS

The diets used in the rearing period can be used for both males and the females. In some cases, this may present difficulties in the brooding period or if reared separately which is discussed on page 11.

PRODUCTION DIETS

It is recommended that males receive a special Male diet as shown in Table 6. In recent years new feeding strategies have been developed for males using high ME male diets with lower protein content. This is to allow males to maintain sufficient ME intake without an increased risk of excess fleshing. One alternative to feeding Male 1 diet only is a 2-stage approach:

- Regular Male 1 diet: to ensure weekly growth to 28–30 weeks of age is on target (using a regular male diet).
- Male 2 diet from 30 weeks of age or later to slow growth to meet the weekly growth targets using feed with lower protein and higher energy content.

The Male 2 diet is optional and is intended for conventional M77 or M99 males and the implementation of such a male diet may be necessary when it is difficult to control fleshing and energy intake needs to be maintained. → See Performance Objectives ***"M77 PS male mated with Premium females"*** & Performance Objectives ***"M99 PS male mated with Premium females"***.

It is advised that you contact your Hubbard Technical Specialist to discuss this option before using the Male 2 diet. The use of the diet is not recommended if:

- male bodyweights are below the bodyweight target in the period from 24 to 30 weeks of age;
- weekly growth is slow and erratic;
- there are other issues affecting feed intake like disease, heat stress or poor feed distribution;
- **the diet is not recommended for Intermediate or Slow Growth Males.**

TABLE 7: ADDED VITAMIN GUIDELINES

Inclusion rates are per kg feed		Rearing	Egg Production and Male Breeders
Vitamin A	IU	12 000	13 000
Vitamin D3	IU	4 000	5 000
Vitamin E	IU	100	130
Vitamin K (menadione)	mg	5.0	7.5
Thiamin B1	mg	4.0	5.0
Riboflavin B2	mg	14	16
Pantothenic acid	mg	15	22
Nicotinic acid	mg	60	65
Pyridoxine B6	mg	6.0	8.0
Folic acid B10	mg	3.0	4.0
Cyanocobalalamin B12	mg	0.040	0.055
Biotin Vit. H	mg	0.30	0.45
Choline	mg	750	750

1. *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.*
2. *Check local regulations for the maximum permitted amount of each vitamin especially Vitamin A and D.*
3. *These recommendations may need to be reviewed if harsh heat treatment conditions are used (> 85 °C for over 5 minutes). Please consult a Hubbard Nutritionist.*

TABLE 8: ADDED MINERAL GUIDELINES

Mineral		Inclusion rates are per kg feed
Manganese	mg	100
Iron	mg	50
Iodine	mg	2
Copper	mg	10
Zinc	mg	100
Selenium	mg	0.30–0.40

1. *Assumes inorganic and organic mineral sources.*
2. *Check local regulations for the maximum permitted level of all minerals but particularly for zinc and selenium.*

4. NUTRITION DURING SOME SPECIFIC PERIODS: ACHIEVING THE 6 WEEK BODYWEIGHT IN MALES AND FEMALES

- In some cases, it may be necessary to rear males and females separately or in separate houses. If the females require the Pre-Starter and Starter diets for a longer period to achieve the body weight targets then this risks the male being overfed protein after 6 weeks especially for M77 and M99 males.
  - In this situation and if logistically possible, then specific male recommendations for the first 6 weeks can be used as shown in Table 9.
  - It is important to ensure the males are following the specific male performance objectives even for conventional males as these are adapted when used with Premium females.
  - Intermediate and Slow growth males are usually fed the same diets as the females in the rearing period.

TABLE 9: EXAMPLES OF DIET SPECIFICATION FOR STARTING MALES WHEN MINI FEMALES ARE REARED SEPERATELY

PHASE		PRE-STARTER		STARTER	
Age (days)		0 to 21 d		29 d to 42 d	
Suggested ME	kcal/kg	2 850		2 750	
	MJ/kg	11.93		11.51	
	kcal/lb	1 293		1 248	
Min. amino acids		Tot.	Dig.	Tot.	Dig.
Lysine %		1.08	0.97	0.87	0.78
Methionine %		0.50	0.45	0.36	0.33
Meth. & Cystine %		0.89	0.80	0.65	0.58
Valine %		0.89	0.78	0.60	0.52
Isoleucine %		0.74	0.65	0.58	0.52
Arginine %		1.15	1.04	0.89	0.80
Tryptophan %		0.21	0.18	0.17	0.15
Threonine %		0.76	0.67	0.60	0.52
		Min.	Max.	Min.	Max.
Crude protein %		18.53	19.67	14.96	15.90
Crude fibre %		2.50	3.50	2.50	3.50
Calcium %		1.03	1.08	0.99	1.02
Av. Phosphorus %		0.46	0.48	0.41	0.44
Sodium %		0.17	0.20	0.16	0.19
Chloride %		0.17	0.23	0.17	0.22
Potassium %		0.66	0.80	0.63	0.77
Crude fat %		3.50	4.00	3.50	4.00
Linoleic acid %		1.17	2.00	1.10	2.20

4. NUTRITION DURING SOME SPECIFIC PERIODS: SPECIFIC BREEDER DIETS ACCORDING TO THE BREED - JA87/REDBRO MINI

- Where JA87 or Redbro Mini breeds are used it is possible to adapt the breeder diets to better meet the nutritional requirements of each breed.
- Specific recommendations for JA87 or Redbro Mini are shown in Table 10. These are adapted in each case for temperate conditions or where normal feed intakes are achieved at peak production or for hot conditions or where feed intake is less than expected due to management or other factors.

TABLE 10: EXAMPLES OF DIET SPECIFICATION FOR USE WHERE ONLY JA87 OR REDBRO MINI PARENT FEMALES ARE USED

PHASE		TEMPERATE CONDITIONS				HOT OR LOW FEED INTAKE CONDITIONS			
		BREEDER I		BREEDER II*		BREEDER I		BREEDER II*	
Age (days)		1% lay to 280 d		281 d to depletion		1% lay to 280 d		281 d to depletion	
Suggested ME	kcal/kg	2 750		2 730		2 850		2 825	
	MJ/kg	11.51		11.43		11.93		11.83	
	kcal/lb	1 248		1 239		1 293		1 282	
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 %		14.89	15.94	14.13	15.43	16.36	17.51	15.50	16.93
Crude fibre %		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 %		0.15	0.19	0.16	0.19	0.16	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	0.77	0.60	0.76	0.63	0.80	0.63	0.80
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

** It is recommended to change to Breeder II diet before 281 days if the egg weight reaches 58 g (hot climates/hot season) or 60 g (cold climates/cold season).*

4. NUTRITION DURING SOME SPECIFIC PERIODS: SPECIFIC BREEDER DIETS ACCORDING TO THE BREED - JA57/JA57Ki/P6N

- Where JA57, P6N or JA57Ki breeds are used it is possible to adapt the breeder diets to better meet the nutritional requirements of each breed.
- Specific recommendations for JA57, P6N or JA57Ki are shown in Table 11. These are adapted in each case for temperate conditions or where normal feed intakes are achieved at peak production or for hot conditions or where feed intake is less than expected due to management or other factors.

TABLE 11: EXAMPLES OF DIET SPECIFICATION FOR USE WHERE ONLY JA57, JA57Ki OR P6N PARENT FEMALES ARE USED

PHASE		TEMPERATE CONDITIONS				HOT OR LOW FEED INTAKE CONDITIONS			
		BREEDER I		BREEDER II*		BREEDER I		BREEDER II*	
Age (days)		1% lay to 280 d		281 d to depletion		1% lay to 280 d		281 d to depletion	
Suggested ME	kcal/kg	2 750		2 730		2 850		2 825	
	MJ/kg	11.51		11.43		11.93		11.83	
	kcal/lb	1 248		1 239		1 293		1 282	
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 %		16.15	17.28	15.32	16.73	17.74	18.98	16.81	18.35
Crude fibre %		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 %		0.15	0.19	0.16	0.19	0.17	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	0.77	0.60	0.76	0.68	0.87	0.68	0.86
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

** It is recommended to change to Breeder II diet before 281 days if the egg weight reaches 58 g (hot climates/hot season) or 60 g (cold climates/cold season).*

5. GUIDELINES FOR PHYSICAL QUALITY OF FEED

Providing consistent physical quality of the feed is important at all stages to ensure adequate feeding behaviour. Guidelines are given in the table below for crumbs, mash and pellets.

- Coarse mash is the preferred option for the Grower, Transition, Breeder and male diets.
- The use of a feed sieve to monitor physical feed quality is highly recommended. → See ***"Hubbard Feed Sieve Tool"***.
- The percentages show the guideline amount in each category of particle size after sieving with screens of 3, 2 and 1 mm such as with a Hubbard feed sieve. It is important for all feeds that the percentage of feed passing through the 1 mm screen does not exceed the amounts shown.
- Where a sieve with a 0.5 mm screen is used then for mash feeds no more than 10% of particles should pass through this screen.

Hubbard Feed Sieve Tool

TABLE 12: GUIDELINES FOR PHYSICAL QUALITY OF FEED

CRUMBS	> 3 mm	2–3 mm	1–2 mm	< 1 mm
Starter Good	0%	40%	55%	5%
Starter Average	10%	40%	40%	10%
Grower/Breeder	50%	30%	10%	10%

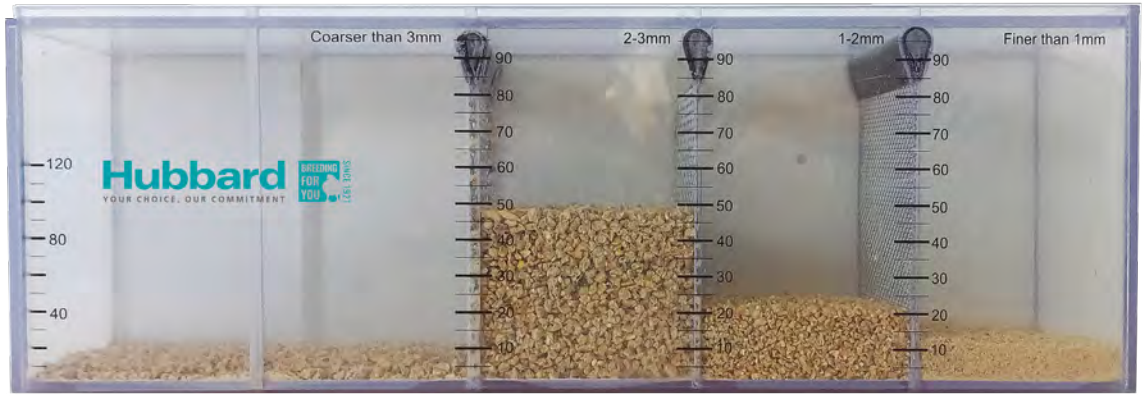
MASH	> 3 mm	2–3 mm	1–2 mm	< 1 mm
Starter	5%	25%	50%	20%
Grower	10%	35%	35%	20%
Breeder	15%	40%	30%	15%

PELLETS	> 3 mm	2–3 mm	1–2 mm	< 1 mm
Grower/Breeder	> 70%	< 10%	< 10%	< 10%

Too coarse feed presentation

Good feed presentation

Too fine feed presentation



Physical quality of the crumble in the feed hopper: correct particle size

Physical quality of the crumble in the chain feeder after one turn: too much fine particles

NOTES

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V-2026-04