Lohmann Brown Classic & Lite

Colony Management Guide

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Colony Management Guide

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Welcome to Lohmann GB Ltd
"Breeding for success….. together!"

The right hen for every house – the right egg for every market. LOHMANN GB continues to, achieve excellent breeding results and has become the UK leader in the supply of laying hens.

Lohmann GB was formed in 2000 in order to market Lohmann laying birds in the UK and Republic of Ireland. The company was originally a partnership between Lohmann Tierzucht and Poultry First Limited in the UK.

In January 2008, the Poultry First share of the company was purchased to form Lohmann GB. The company also bought the farming business of Poultry First so that it could have total responsibility for rearing and managing its own parent stock for hatching egg production. Lohmann GB continues to be an integrated company with strong links between sales and production.

Lohmann Tierzucht, our partner, is the largest Layer Breeder Company in the world and has been successfully breeding layers for distribution worldwide since 1959. The company strategy is to breed layers to meet the specific needs of the market they are supplying. Lohmann Tierzucht provides total support to their global partners and subsidiaries and ensures that the highest standards of husbandry and bird welfare are adhered to.

Lohmann GB currently supplies two breeds:

Lohmann Brown Classic and Lohmann Brown Lite

Lohmann GB supplies highly efficient layers of robust quality, producing high egg mass, outstanding shell quality and colour. All of these attributes contribute to our customer's goal of achieving the optimum level of production with an excellent return on investment.

Lohmann GB Ltd pride themselves on providing the most efficient layer to the market and this is backed up with our UK team of Technical Managers who are there to provide assistance and guidance where needed. All Technical Managers are continually updated on the latest advances in management and breed changes to ensure they provide a 'second to none' service to our customers.

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Introduction

To achieve optimal production results, it is essential to make full use of the Lohmann Brown Classic and Lite layer's performance potential by providing good housing conditions and systematic management.

The aim of this guide is to draw the attention of the practical stockman to the more important points which, if overlooked, may depress flock performance. This guide is not intended to provide definitive information on every aspect of stock management and cannot substitute the regular observation of the birds and assessment of the respective conditions. It does, however, offer a base for efficient management.

In recent decades, advanced methods have greatly improved breeding quality. Lohmann's use of electronic data processing systems and genomics has enabled them to put the theory of selection systematically into practice, thus turning modern quantitative genetics into reality. Lohmann's breeding aims continue to be based on the most efficient production of first quality eggs through good egg numbers, optimum egg weight, good shell strength and colour with excellent feed conversion. In addition, this work has produced a bird with a good temperament, easily managed and adaptable to all types of production systems.

The specifications in this guide are for the United Kingdom and may differ from the version produced for other English speaking countries worldwide.

The data in this manual gives some indication of what can be achieved under good environmental and management conditions. The profile of performance can be altered by management techniques to meet market demands, and can be adversely affected by poor management, disease and many other factors. Figures should not be regarded as guarantees of production but as performance

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Performance Objectives - Classic

Egg Production	**Eggs Per Hen Housed**	
	To 72 weeks	316.1
	To 80 weeks	357.1
	To 90 weeks	404.9
	Average Egg Size	
	To 72 weeks	63.2 g
	To 80 weeks	63.7 g
	To 90 weeks	64.2 g
	Cumulative Egg Mass	
	To 72 weeks	19.98kg
	To 80 weeks	22.91kg
	To 90 weeks	26.01kg
Feed Consumption	Day old to 16 weeks	5.84kg
	Day old to 18 weeks	6.99kg
	19 to 72 weeks/HH	42.66kg
	19 to 80 weeks/HH	48.85kg
	19 to 90 weeks/HH	56.52kg
	Average Feed Intake	110g – 117g/b/d
Bodyweight	16 weeks	1380 g
Liveability	Rearing	97% - 98%
	Laying period - 72 wks	93% - 96%
	Laying period - 80 wks	92% - 95%
	Laying period - 90 wks	91% - 93%

Performance Objectives - Lite

Egg Production	**Eggs Per Hen Housed**	
	To 72 weeks	319.6
	To 80 weeks	362.8
	To 90 weeks	413.7
	Average Egg Size	
	To 72 weeks	61.6 g
	To 80 weeks	62.1 g
	To 90 weeks	62.5 g
	Cumulative Egg Mass	
	To 72 weeks	19.69kg
	To 80 weeks	22.52kg
	To 90 weeks	25.86kg
Feed Consumption	Day old to 16 weeks	5.84kg
	Day old to 18 weeks	6.99kg
	19 to 72 weeks/HH	42.33kg
	19 to 80 weeks/HH	48.47kg
	19 to 90 weeks/HH	56.08kg
	Average Feed Intake	110g – 116g/b/d
Bodyweight	16 weeks	1360 g
Liveability	Rearing	97% - 98%
	Laying period - 72 wks	93% - 96%
	Laying period - 80 wks	92% - 95%
	Laying period - 90 wks	91% - 93%

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Rearing Management

Rearing is an extremely important stage in the bird's life as its bodyweight development and disease status will strongly influence the laying performance of the flock. Rearing sites should be housed with birds of a single age and operate an all-in all-out system. Sheds should be thoroughly washed and disinfected between flocks. They should be well maintained to ensure there is no light or water leakage into the shed and that wild birds and vermin are excluded.

Temperature within the shed must be accurately controlled, ensure the shed and floor are preheated prior to arrival. Pre-heating should aim to achieve a concrete floor temperature of 29^{o}C. For the first 24 hours, the temperature at bird level should ideally be between 33^{o}C and 34^{o}C, with a minimum humidity of 60%. Draughts directly affecting the birds must be avoided.

Chicks will arrive in a temperature controlled lorry, so use an efficient method for unloading to ensure a quick and smooth transfer to feed and water in the sheds. This will also ensure minimal exposure to reduced temperatures.

Fresh supplementary feed and water should be used to ensure a good intake of both within the first few days and topped up regularly.

Adequate feeding and drinking space must be provided. As the flock grows and develops raise the feed and water to maintain a clean and convenient supply of both.

Follow your vaccination programme in accordance with your veterinary recommendations.

If these conditions are provided, together with good quality management, the opportunity for successful rearing and highly productive laying flocks is more easily achieved.

The following figures give "rule-of-thumb" for conditions required in the rearing shed, but these must be allied to careful observation of the birds and action to maintain an ideal environment.

Brooders	1 x 36,000 BTU brooder per 2,500 chicks Temperature at litter 35°C. House temperatures 33°C - 34°C at day 1, reducing gradually to 20°C - 22°C by day 28 - 35.		
Whole House Heating	House temperature 33°C - 34°C at day 1, reducing gradually to 20°C - 22°C by day 28 - 35.		
Stocking Density	Litter Rearing Multi Tier Rearing	20kg/m^2 33kg/m^2 (At Floor Level)	In accordance with The Code of Recommendations For The Welfare of Livestock.
Feeding Space	2.5cm Linear Track or 2cm Circular Feeding		
Drinking Space	Bell drinkers Nipple drinkers	125 birds per bell drinker 0.8cm per Pullet – RSPCA Welfare Standards for Pullets Aug 2016 12.5 Pullets per nipple – RSPCA Welfare Standards for Pullets Aug 2016	
Ventilation	Minimum Maximum	1.5m^3/hr/kg bodyweight 6.0m^3/hr/kg bodyweight	Note: Removing ammonia may be the first limiting factor before this minimum level of ventilation is reached.

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Bodyweight Profile – DO to POL

The bodyweight targets on page 8 show the expected growth curve for the Lohmann Brown. In litter rearing, it would be expected that the birds would be ad-lib fed up to 8 - 9 weeks old, thereafter an eat out period can be gradually introduced in the morning after the first feed. This will help ensure a balanced dietary intake and train the flock not to expect a feed during the busy laying period early - mid morning. Development of feed timings, patterns and levels are critical to ensuring correct nutritional intake which will aid in development of the bird and prepare the flock for the laying cycle.

In order to ensure that the birds are progressing satisfactorily, it is essential to monitor the birds' bodyweight throughout the rearing period. The first weights should be taken at 1 week of age and the birds weighed weekly thereafter. A representative sample should be weighed on each occasion, i.e. a minimum of 60 per house. Birds should be penned and all birds in the pen should be weighed.

In addition to bodyweight, the degree of evenness within the flock (the variation in bodyweights around the average weight) is important. Birds in an uneven flock will mature at different times and the flock will show a low flat peak of production. Also birds which mature late will still have good egg laying potential at depletion. There is therefore a potential loss of eggs at both ends of the production cycle.

An example calculation for evenness is shown on page 7. The target for evenness at 16 weeks should be in the region of 80%.

To achieve an evenness of 80% means that 80% of the birds weighed must be within + or - 10% of the average weight.

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Evenness Calculation - Example at 14 weeks of Age

	g	X = One Bird Weight						
	1020							
	1040							
	1060	X						
	1080	X						
	1110	X	X					
▲	1120	X	X	X				
	1140	X	X	X	X			
	1160	X	X	X				
	1180	X	X	X	X			
	1200	X	X	X	X	X		
	1220	X	X	X	X	X		
●	1240	X	X	X	X	X	X	
	1260	X	X	X	X	X	X	
	1280	X	X	X	X	X		
	1300	X	X	X	X			
	1320	X	X	X				
	1340	X	X	X				
▼	1360	X						
	1380	X	X					
	1400	X						
	1420	X						

In the example shown average weight = 1240g
10% of average weight = 124g

The range of weights used to calculate the evenness is:-
Lower weight = 1240 – 124 = 1116g

Upper weight = 1240 + 124 = 1364g

Number of birds weighed = 60
No of birds within + or – 10% of the average weight = 51

Evenness = 51÷60 = 85% within + or – 10% of the average weight.

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Lohmann Bodyweight Targets – Classic and Lite

Age in wks	Classic	Lite
	Target (g)	
1	65	65
2	105	105
3	170	170
4	240	240
5	320	320
6	400	400
7	510	510
8	620	620
9	740	740
10	840	840
11	940	940
12	1040	1040
13	1130	1130
14	1220	1220
15	1300	1300
16	1380	1360
17	1440	1420
18	1500	1480

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Lighting

Lighting, in conjunction with bodyweight, is the main factor influencing the maturity of the bird.

At placement, in order to aid early development and evenness, chicks should be given a minimum of 4 hours darkness per day for the first 4 days, e.g. lights on from 4am to midnight.

During the rearing period for alternative systems the lighting programme should be selected depending on prevailing market conditions and the production objectives for the flock. Example of lighting programmes are shown on page 11.

Early Maturity (Column B, Page 11), this aims to achieve an average egg size smaller than standard using a series of larger increases in the lighting up period, but still commencing with the first increase at 16 to 18 weeks providing the bodyweight is on target.

Standard Maturity (Column A, Page 11), this aims to achieve an average egg size in-line with breed standard using standard increases in the lighting up period, commencing with the first increase at 16 to 18 weeks providing the bodyweight is on target.

Late Maturity (Column C, Page 11), this aims to achieve an average egg size greater than standard, can be controlled by implementing a slow step-down lighting programme in the early stages of rearing.

Field results indicate that avoiding an early light increase, e.g. at 14 or 15 weeks, allows the bird to develop more physically before onset of lay, and results in better persistency of production, and better shell quality in the later stages of lay.

Initially, timing of lights on should be the same as that used on the rearing farm, so this information is needed from the rearer. Day length must **NEVER** be allowed to decrease during the laying period.

A bird of correct bodyweight will start to become sexually mature from approximately 18 weeks, regardless of whether any light increase is given or not. However, in this event, failure to increase day length will restrict the bird's ability to consume adequate nutrition during a period of rapid development. This will result in poor development and possible long term damage to the bird's productive potential as she will use her body resources to substitute the lack of nutrition.

Lohmann GB can give recommendations for suitable diets, in conjunction with your feed supplier.

Whichever lighting programme is followed, the single rule which must always be observed is that no decrease in day length must occur after the onset of lay. Light intensity in the laying house must always be an increase over that in the rearing house, and should be in the range of 20 - 30 lux.

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Lighting Programmes – Classic and Lite

Age in Weeks	Light in Hours				Light Intensity
	A	B	C	D	Lux
Day 1 - 2	20	20	20	20	20 - 40
Day 3 - 6 reducing to:	16	16	16	16	20 - 30
Day 7 - 14 reducing to:	14	14	14	14	10 - 20
2 - 3 weeks reducing to:	10	10	13	8	5 - 10
4	10	10	12	8	5 - 10
5	10	10	11	8	5 - 10
6	10	10	10	8	5 - 10
7	10	10	10	8	5 - 10
8	10	10	10	8	5 - 10
9	10	10	10	8	5 - 10
10	10	10	10	8	5 - 10
11	10	10	10	8	5 - 10
12	10	10	10	8	5 - 10
13	10	10	10	8	5 - 10
14	10	10	10	8	5 - 10
15	10	10	10	8	5 - 10
16	11	12	11	10	5 – 10/20 - 30
17	12	14	12	12	20 - 30
18	13	15	13	14	20 - 30
19	14	15	14	15	20 - 30
20	15	15	15	15	20 - 30
21	15	15	15	15	20 - 30

A = Standard Maturity **B = Rapid Maturity** **C = Delayed Maturity** **D = Colony Rearing**

Use the above programmes in conjunction with page 8.

Step-down to a 10 hour day length is shown to reflect current industry practice. If standard bodyweight and evenness can be achieved using an 8 hour day length, this will not be detrimental to the birds.

It is recommended that colony rearing should follow programme **D**.

Light increases should be implemented in conjunction with bodyweight.

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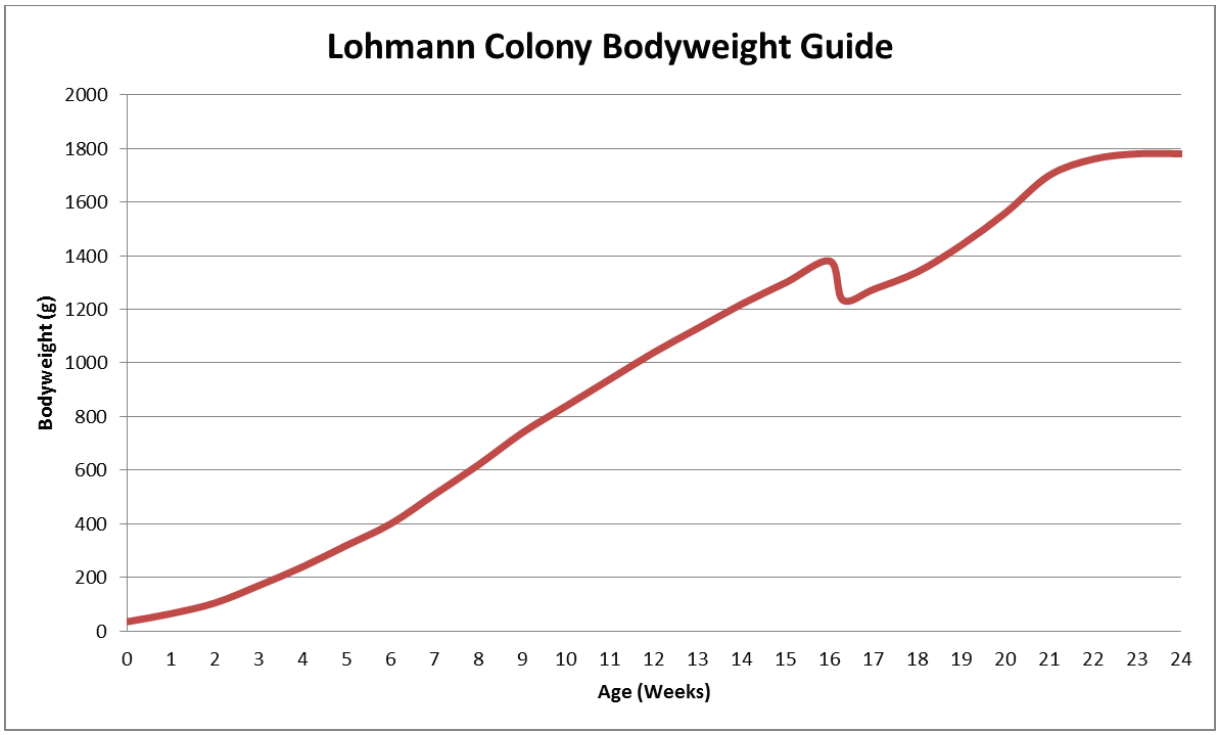
Housing – Laying Period

The Lohmann Brown is a highly productive hybrid and should be transferred to the laying house early enough to avoid stressing the birds as they come into lay. The timing of this will depend on the light stimulation programme used. For birds on the standard maturity light programme, housing should be at 16 weeks.

Where the requirement may be for the flock to lay longer than the normal, for example 72 to 76 weeks the option of delaying the onset of lay will assist in this process. This should be discussed with your Technical Manager in order to plan for the optimum solution.

Pullets can lose up to 10% of their bodyweight at the time of transfer, **principally** through dehydration. It is essential to ensure that birds start drinking soon after being housed. On litter based systems, the stockman should be aware of any birds starting to develop pale combs and losing weight and ensure they have access to water. As a guide, birds should be drinking about 90 litres per 1000 by 48 hours after housing. Due to bodyweight loss at transfer the birds' bodyweight profile can differ from that shown on page 8 and 13. An example of the birds' bodyweight after transfer is shown below. This bodyweight loss should be taken into account when weighing birds between transfer and 21 weeks.



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Bodyweight – POL Onwards

Bodyweights should be monitored weekly after housing on the laying site to ensure that the flock is progressing towards production satisfactorily. Failure to achieve target bodyweights should be addressed promptly by altering management, remember to account for the possible drop in body weights at transfer due to dehydration which can be up to 10%.

A table of the bodyweights for Lohmann Brown Classic and Lite from point of lay to end of lay is shown below.

Bodyweight Targets 16 - 90 Weeks

Age in weeks	Classic	Lite	Age in weeks	Classic	Lite
	Target Weight (g)	Target Weight (g)		Target Weight (g)	Target Weight (g)
16	1380	1360	38	1940	1930
17	1440	1420	40	1950	1940
18	1500	1480	42	1950	1940
19	1600	1560	44	1950	1940
20	1680	1640	46	1950	1940
21	1730	1690	48	1950	1940
22	1760	1730	50	1950	1940
23	1780	1760	52	1950	1940
24	1800	1780	54	1950	1940
25	1810	1795	58	1940	1940
26	1820	1810	62	1920	1920
27	1830	1820	66	1910	1910
28	1840	1830	70	1900	1900
29	1850	1840	74	1900	1890
30	1860	1850	78	1900	1890
32	1880	1870	82	1900	1890
34	1900	1890	86	1900	1890
36	1920	1910	90	1900	1890

Bodyweight – Feed Management

Good quality feed, in terms of structure and raw material content, should be available ad-lib throughout the laying period. In the period between housing and peak production, it is important to match the increasing feed intake of the bird and ensure feed is freely available during feed times. The introduction of a gap between the morning and afternoon feeds, thereby concentrating feeds in the later part of the day, can be used to:

i) Encourage birds to consume the micro-nutrients in the feed.
ii) Avoid distracting the birds from nesting during the laying period.
iii) Increases blood calcium levels later in the day during the period of shell formation.

It is important however to ensure there is no shortage of feed which could lead to nutritional deficiency and result in stress on the bird at a critical period in the production cycle. Nutritional requirements for the Lohmann Brown are shown in the tables on pages 17, 19, 23 and 24.

Bodyweight – House Temperature/Water

A target shed temperature of 18°C - 21°C is recommended. Temperatures below this may result in increased feed consumption at a rate of 1.5% increase in consumption per 1°C drop in temperature. Temperatures above 25°C will have an increasingly adverse effect on egg weight. However, air quality within the shed is also important in avoiding respiratory problems with the birds. On some occasions, depending on environmental conditions, it may be necessary to sacrifice shed temperature in order to achieve sufficient air flow to maintain good air quality for the birds.

Regular inspection of the birds is always essential, particularly in the period after housing, to ensure that all birds make the transition from rearing farm to laying farm successfully, and without any undue stress that will affect their production potential.

Target water consumption for adult hens at 21°C should be 210 litres per 1000 birds

Nutrition in Rear

D/O to POL

A good plane of nutrition will be required to achieve the target bodyweights. The diets recommended are described in this section.

Feed Particle Size and Gut Development

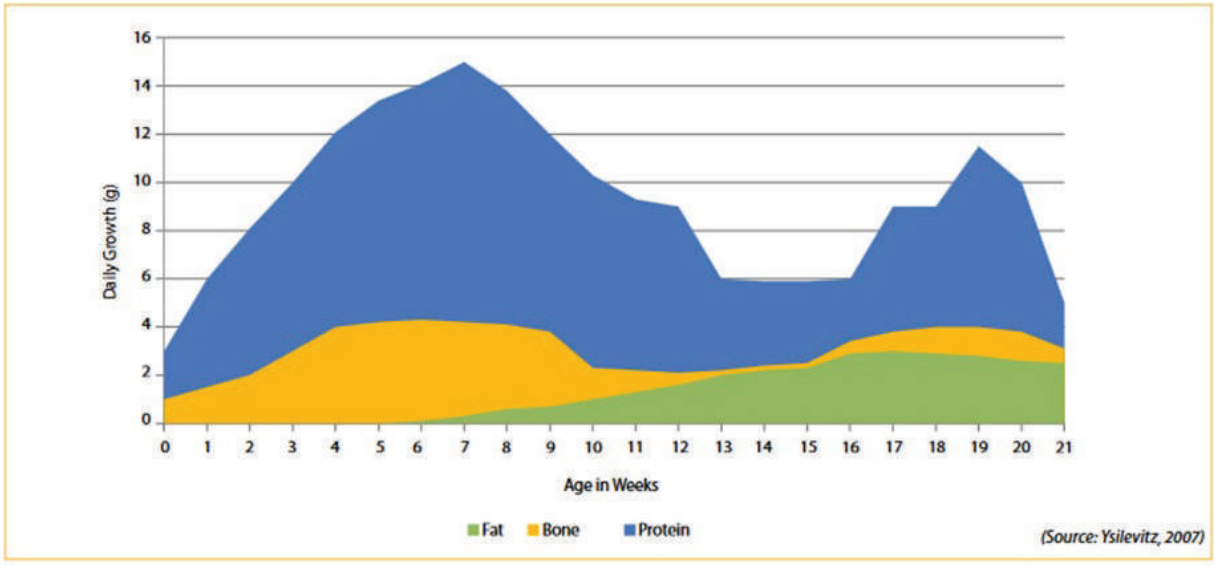
Feed particle size directly influences the gizzard and gut development. Crude particles in the feed stimulate gizzard activity and promote greater gizzard capacity, necessary for efficient digestion. A recommended structure profile, which covers the requirements of the bird, is given on page 17. Use of flint grit from 3 weeks of age is also recommended to aid gizzard development.

For birds in rear a 3 stage feeding programme is adequate consisting of Starter, Grower and Developer. Starter is fed to approximately 3 weeks of age, or when the birds have achieved a minimum bodyweight of 170g. Grower is then fed until birds are 8 weeks of age, or when a minimum bodyweight of 620g is achieved. Developer is fed until transfer to the laying site. It could be considered to keep birds on Developer for the first few days after transfer into the laying house to help with the transition period.

For birds following the Early Maturity programme, using early light stimulation, it is even more important that the target bodyweights at 8 weeks and 14 weeks are achieved. If necessary, Starter and Grower diet may have to be used for longer periods.

Development of Body Tissue

This graph illustrates the pullet's growth in terms of body tissue development. As indicated skeletal frame and muscle mass growth is particularly important in both the first half of the rearing phased and then again during the first few weeks in the laying house.



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Feed Structure

A balanced and nutritious diet during the rearing stage is essential to enable the chick to develop into a mature pullet. Chicks and pullets should be fed a coarse diet of a meal-type consistency. A feed ration that has a structure that is too coarse can lead to selective feeding and an imbalance of nutrient supply, alternatively a diet with an extremely fine consistency reduces the feed intake and can result in a lacking supply of certain nutrients. During the development stages from chick to pullet; the use of different rations will be key to ensuring the nutritional requirements of a developing bird are met.

As the bird progresses into the laying phase of her life, optimal feed structure remains key to ensuring nutritional requirements are met.

Recommended Particle Size Distribution for Starter, Grower, Developer and Layer Feed

Sieve size (mm)	Passing part %	Sieve size interval (mm)	Part of interval %
0.5mm	19	0 - 0.5mm	19
1.0mm	40	0.51 - 1.0mm	21
1.5mm	75	1.01 - 1.5mm	35
2.0mm	90	1.51 - 2.0mm	15
2.5mm	100	> 2.0mm	10*
			100

*Individual particles not bigger than
-3mm in Starter
-5mm in Grower, Developer and Layer Feed

Nutrient levels for these rations are shown in the table on page 19.
Birds on all systems must be fed ad-lib up to 8 weeks as this is a vital period for body frame and immune system development. It should be noted that the metabolism of the bird will change around 8 weeks and the bird's main requirement will then be for energy rather than protein. Gap feeding should be introduced from 10 to 12 weeks of age to encourage crop development, a balanced nutritional intake and to ensure feed is fresh on a daily basis.

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Feed Consumption

Age in weeks	Feed Consumption	
	g/day	Cum. g
1	12	84
2	17	203
3	22	357
4	29	560
5	36	812
6	44	1120
7	51	1477
8	56	1869
9	61	2296
10	65	2751
11	68	3227
12	70	3717
13	72	4221
14	75	4746
15	77	5285
16	79	5838
17	81	6405
18	84	6993

Water Intake

Age (Weeks)	Water Consumption (Feed: Water)
1 – 8	1 : 1.2
8 -18	1 : 1.2 -1.4
from 18	1 : 1.6 - 1.8

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Recommendations for Nutrient Levels during Rear and Early Lay

		Starter	Grower	Developer	Pre-lay
		1 - 3 weeks	4 - 8 weeks	9 - 16 weeks	16 - 17 weeks
Minimum	MJ	12.2	11.9	11.6	11.7
Crude Protein	%	20.2	18.6	14.5	17.5
Methionine	%	0.48	0.38	0.34	0.36
Meth/Cystine	%	0.84	0.73	0.60	0.68
Dig. M/C	%	0.78	0.66	0.53	0.56
Lysine	%	1.15	1.00	0.70	0.85
Dig. Lysine	%	1.05	0.90	0.62	0.70
Tryptophan	%	0.24	0.23	0.17	0.20
Threonine	%	0.72	0.63	0.45	0.60
Calcium	%	1.05	1.00	0.95	2.00
Phosphorous total	%	0.75	0.75	0.75	0.65
Phosphorous avail.	%	0.47	0.45	0.40	0.45
Sodium	%	0.16	0.16	0.16	0.16
Chlorine	%	0.23	0.23	0.23	0.16
Linoleic Acid	%	1.25	1.20	1.00	1.00

Notes:

- If birds have been beak treated Starter can be crumbs, but should have a layer of meal covering the crumbs to allow bird's easy access to feed.
- ME figures above are corrected for Nitrogen.
- Total Phosphorous can be reduced in presence of added Phytase.

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Fibre in Rear

Crude fibre, sometimes described as insoluble NSP (Non-Starch Polysaccharides), may not have nutritional values for poultry, but it does have other benefits for a healthy and stable digestive physiology.

Used in the second half of the rearing period, it can positively influence the development of the digestive tract, the crop size and the appetite of pullets. This is beneficial for young layers, especially at the start of production, when the appetite of the birds is sometimes not sufficient enough to meet their nutrient demands.

The tool has been proven to be very beneficial under varying feeding situations in a lot of countries. This is the reason for the implementation of a minimum recommendation of crude fibre (5 - 6 %) in the developer feed for Lohmann Layers.

Nutrition in Lay

Pre Lay

In the period of early lay, feed consumption is developing. During this period it is important that excess calcium and fibre are curtailed as these will inhibit appetite. Therefore, a tailor made Pre Lay diet is recommended with the nutrient profile in the table on page 19. The calcium level should be fixed to 2%, and the fibre level in the pre-lay diet should not exceed 4%. The Pre Lay ration should be fed for a maximum of 10 days or maximum 1kg per bird, after which a Layer 1 ration should be introduced.

POL to 28 Weeks

Nutritional Concepts after reaching 105g Daily Feed Intake

From this stage on, a phase feeding system should be followed. The basis of feed formulation (% level of nutrients) is daily feed intake which can be influenced by energy level, house temperature, feather quality and feed structure.

A minimum fibre level of 5% is recommended from POL onwards.

High levels of production and persistent shell quality can be maintained by ensuring nutrients are fully utilised. This is achieved by adjusting nutrient levels according to changing requirements, particularly crude protein, amino acids, calcium, phosphorous and linoleic acid.

Nutrition: Layer Rations in Relation to Production Output

Layer Phase 1 should be fed to flocks producing **more than 57g daily egg mass**.

It is essential to note that in order to achieve optimum performance from the Lohmann Brown; birds should continue to be fed a Layer 1 ration or Layer 1 Low Lin as along **as the daily egg mass output is greater than 57g**.

With the persistent production of the Lohmann Brown, this may mean continuing to feed Layer 1 well beyond 60 weeks. This is essential to maintain the supply of nutrients to a bird which will produce in excess of 20kg of total egg mass in her lifetime! Should this be the case producers should consult their breed and feed supplier regarding adjustments to calcium and phosphorous levels for maintaining shell stability as previously described.

Calculating Egg Mass

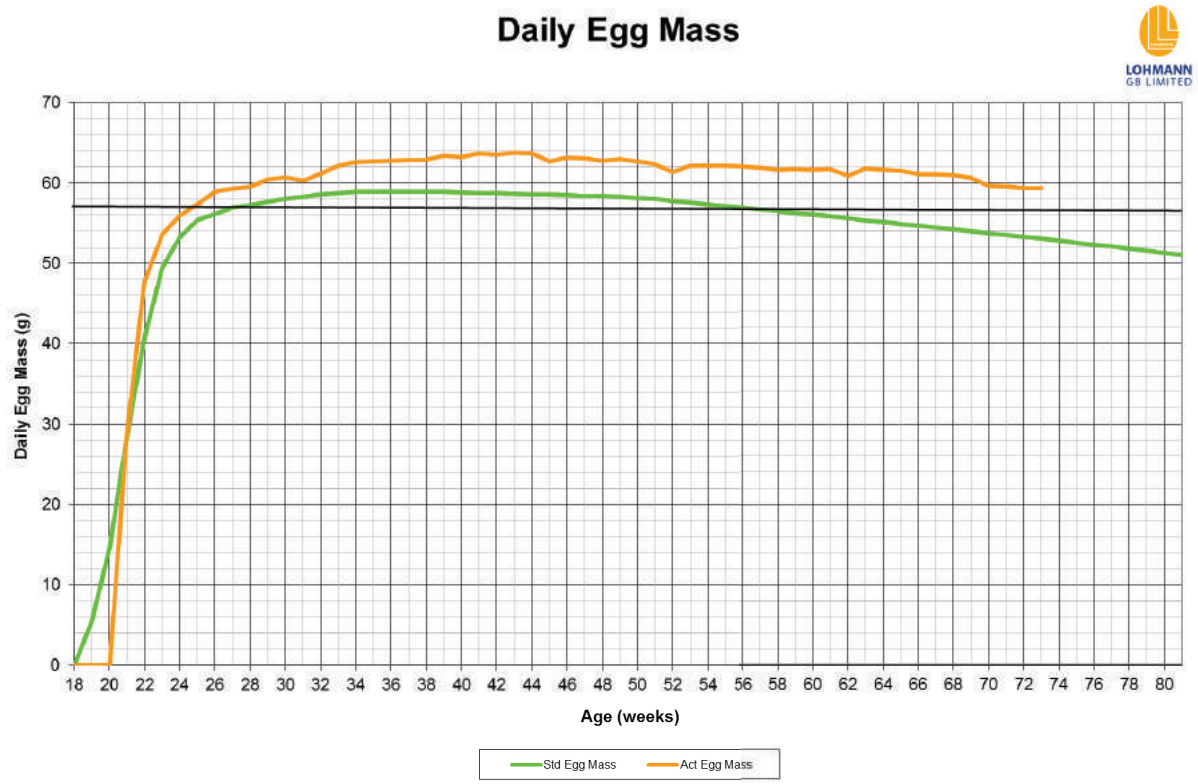
An example of how to calculate daily egg mass output is shown below. Alternatively, your Lohmann Technical Manager will be able to supply you with a simple computer based flock recording system which will automatically calculate the daily egg mass figure for you.

Note: Daily egg mass is calculated by multiplying egg weight by the hen week % production divided by 100.

Example:

Egg Weight	=	65.5g
% HW Production	=	92%
Example Daily Egg Mass	=	65.5 x 92/100 = 60.2g

The graph below shows the potential for egg mass to remain +57g for an extended period.



The figures stated in the following 3 tables apply to feed containing an energy level of 11.7 MJ (2780kcal) per kg of feed at a temperature of 21°C.

Metabolizable Energy (ME) figures given in this guide are corrected for nitrogen

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Layer Phase 1 (Daily Egg Mass of 57g+)

Recommended Nutrient Levels per kg of Feed at different Feed Intake Levels

Nutrient	Requirement	Feed Intake		
	g/hen/day	110g	117g	130g
Crude Protein	18.70	17.00%	15.98%	14.38%
Methionine	0.44	0.40%	0.38%	0.34%
Meth./Cyst.	0.80	0.73%	0.68%	0.62%
Dig. M/C	0.66	0.60%	0.56%	0.51%
Lysine	0.88	0.80%	0.75%	0.68%
Dig. Lysine	0.72	0.65%	0.62%	0.55%
Valine	0.74	0.67%	0.63%	0.57%
Tryptophan	0.18	0.16%	0.15%	0.14%
Threonine	0.61	0.55%	0.52%	0.47%
Calcium	4.10	3.73%	3.50%	3.15%
Phosphor. total	0.60*	0.55%	0.51%	0.46%
Phosphor. avail.	0.42	0.38%	0.36%	0.32%
Sodium	0.18	0.16%	0.15%	0.14%
Chlorine	0.18	0.16%	0.15%	0.14%
Linoleic Acid	2.00	1.82%	1.71%	1.54%

*lower levels acceptable in presence of added Phytase

Layer Phase 2 (by approx. 50 weeks)

Recommended Nutrient Levels per kg of Feed at different Feed Intake Levels

Nutrient	Requirement	Feed Intake		
	g/hen/day	110g	117g	130g
Crude Protein	17.95	16.32%	15.34%	13.81%
Methionine	0.42	0.38%	0.36%	0.32%
Meth./Cyst.	0.77	0.70%	0.66%	0.59%
Dig. M/C	0.63	0.57%	0.54%	0.48%
Lysine	0.84	0.76%	0.72%	0.65%
Dig. Lysine	0.69	0.63%	0.59%	0.53%
Valine	0.71	0.65%	0.61%	0.55%
Tryptophan	0.18	0.16%	0.15%	0.14%
Threonine	0.59	0.54%	0.50%	0.45%
Calcium	4.40	4.00%	3.76%	3.38%
Phosphor. total	0.58*	0.53%	0.50%	0.45%
Phosphor. avail.	0.40	0.36%	0.34%	0.31%
Sodium	0.17	0.15%	0.15%	0.13%
Chlorine	0.17	0.15%	0.15%	0.13%
Linoleic Acid	1.60	1.45%	1.37%	1.23%

*lower levels acceptable in presence of added Phytase

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Layer Phase 3 (by approx. 60 weeks)

Recommended Nutrient Levels per kg of Feed at different Feed Intake Levels

Nutrient	Requirement	Feed Intake		
	g/hen/day	110g	117g	130g
Crude Protein	17.02	15.47%	14.55%	13.09%
Methionine	0.40	0.36%	0.34%	0.31%
Meth. /Cyst.	0.73	0.66%	0.62%	0.56%
Dig. M/C	0.60	0.55%	0.51%	0.46%
Lysine	0.80	0.73%	0.68%	0.62%
Dig. Lysine	0.66	0.60%	0.56%	0.51%
Valine	0.67	0.61%	0.57%	0.52%
Tryptophan	0.17	0.15%	0.15%	0.13%
Threonine	0.55	0.50%	0.47%	0.42%
Calcium	4.50	4.09%	3.85%	3.46%
Phosphor. total	0.55*	0.50%	0.47%	0.42%
Phosphor. avail.	0.38	0.35%	0.32%	0.29%
Sodium	0.16	0.15%	0.14%	0.12%
Chlorine	0.16	0.15%	0.14%	0.12%
Linoleic Acid	1.30	1.18%	1.11%	1.00%

*lower levels acceptable in presence of added Phytase

Colony Diets

Colony diets should have a ME level of 11.7MJ/kg and be formulated on feed intake based on the same requirements of other nutrients.

Once the birds have passed the Pre Lay phase, they are able to compensate their higher energy demands by increased feed consumption. Management systems, feather quality and diseases will all affect energy demand.

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Fine and Coarse Limestone in Layer Diets

Bone growth continues up to about 30 weeks of age. Therefore, young hens require calcium both for bone growth and shell formation. Coarse limestone (1.5mm – 3.5mm) has the advantage that it remains in the gizzard and is released overnight, when the highest calcium demand of a laying hen occurs. Due to these circumstances both fine and course sources of limestone should be incorporated in layer diets. The relation between the two should be as shown in the following table.

Continuous Supply of Fine and Coarse Limestone

Recommendation Relation in Feed

Feed Type	Fine Limestone	Coarse Limestone (can be partly replaced by oyster shells)
Layer Phase 1	30%	70%
Layer Phase 2	25%	75%
Layer Phase 3	15%	85%

Should a Layer Phase 1 still be used post 60 weeks due to egg mass production, then, it is recommended that you consult your breed and feed representative to ensure calcium and phosphorus levels are correct for the age of bird.

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Supplements

Supplements ensure the necessary supply of essential vitamins, trace elements and substances such as antioxidants or carotenoids for yolk pigmentation.

Suitable supplementation can compensate for varying contents of raw materials and safeguard the supply of all necessary micronutrients.

Recommended Supplements

Supplements per kg		Starter Feed	Grower/ Developer Feed	Pre-Lay Feed	Layer Feed
Vitamin A	I.U.	10000	8000	10000	10000
Vitamin D_3	I.U.	3000	2000	3000	3000
Vitamin E	mg	10 - 30*	10 - 30*	20 - 60*	10 - 30*
Vitamin K_3	mg	3**	3**	3**	3**
Vitamin B_1	mg	1	1	1	1
Vitamin B_2	mg	6	6	6	4
Vitamin B_6	mg	3	2	3	3
Vitamin B_{12}	mcg	25	20	25	25
Pantothenic Acid	mg	8	7	8	8
Nicotinic Acid	mg	30	30	30	30
Folic Acid	mg	1.0	0.5	1.0	0.5
Biotin	mcg	50	25	50	-
Choline Chloride	mg	100	100	100	50
Antioxidants	mg	100 - 150*	100 - 150*	100 - 150*	100 - 150*
Coccidiostat		as required	as required	-	-
Manganese	mg	100	100	100	100
Zinc	mg	60	60	60	80
Iron	mg	25	25	25	25
Copper	mg	5	5	5	5
Iodine	mg	0.5	0.5	0.5	0.5
Selenium	mg	0.2	0.2	0.2	0.2

*According to fat content

**Doubling with heat treated food

Levels are based on UK (wheat/soya) diets.

Performance Monitoring

Records

Good records constitute an essential aid to management. They are important to:-

1. Show if the flock is performing to expectation.
2. Indicate changes in bird behaviour, e.g. a drop in feed or water consumption that may give early warning of a problem.
3. Give essential background information in the analysis of problems.
4. Give historical information to allow comparison of one flock with another.

Records needed in rearing are:-

- Date housed
- Number housed
- Parent Flock Code
- Mortality by day
- Temperature - daily maximum and minimum
- Water consumption - daily
- Feed consumption - daily
- Lighting programme
- Vaccination programme – including:
  - Date of administration
  - Batch numbers
  - Expiry date
- Bodyweights - weekly from 1 week
- Details of all feed and materials delivered
- Record of all visitors to the farm

Records needed in production are those shown above (bodyweights taken weekly, then every 2 - 4 weeks after 30 weeks) plus the following:-

- Production % - daily
- Seconds % - daily
- Egg weight - daily
- Egg room temperature - daily
- Details of all egg collections from the farm

Feed Sampling

It is important that feed samples are collected from every delivery to site and stored for a minimum of 3 months. They should be stored in a dry container to allow future reference if required.

In the event of an issue with the flock, stored feed samples will allow for rapid and effective testing to be completed if feed quality need to be analysed.

Should testing be required then please speak with your Technical Manager and they can advise on the possible options and courses of action to assess the situation in conjunction with your feed supplier.

Flock Health

Blood monitoring is extremely useful in giving a historical picture of flock health in the event of a production problem. Blood samples taken at 20, 30, 40 and 50 weeks can be stored by your vet. If an investigation becomes necessary, these can be analysed as a batch to give a series of blood titre results through the life of the flock. The results can help to show whether the problem is due to development of disease or not.

Records of all blood sample results, post mortems, etc. for a flock should be carefully stored together. These can be used as an aid to develop the flock management and vaccination programme for subsequent flocks.

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Classic Performance Objectives 19 - 54 Weeks

Age wks	Cum Mort %	Hen wk Prod %	Eggs/ H.H Cum.	Av.Egg wt. g wk	Av. Egg wt. g Cum	Daily Egg Mass	Egg Mass Cum. kg	Feed Intake g/b/d	Feed/H. H Cum. kg	FCR
19	0.0	12.0	0.8	45.0	45	5.4	0.04	95	-	-
20	0.1	30.0	2.9	48.9	47.7	14.7	0.14	100	1.36	9.72
21	0.2	55.0	6.8	51.8	50.0	28.5	0.34	106	2.10	6.20
22	0.3	75.0	12.0	54.3	51.9	40.7	0.62	109	2.87	4.59
23	0.4	88.0	18.2	56.3	53.4	49.5	0.97	112	3.65	3.76
24	0.5	92.5	24.6	57.6	54.5	53.3	1.34	115	4.45	3.31
25	0.6	94.5	31.2	58.7	55.3	55.4	1.73	117	5.26	3.04
26	0.7	94.5	37.7	59.4	56.1	56.2	2.12	117	6.08	2.86
27	0.8	94.5	44.3	60.2	56.7	56.9	2.51	117	6.89	2.73
28	0.9	94.5	50.9	60.6	57.2	57.2	2.91	117	7.70	2.63
29	1.0	94.5	57.4	61.0	57.6	57.7	3.31	117	8.51	2.56
30	1.0	94.3	64.0	61.5	58.0	58.0	3.71	117	9.32	2.50
31	1.1	94.2	70.5	61.9	58.4	58.3	4.11	117	10.13	2.45
32	1.2	94.1	77.0	62.3	58.7	58.6	4.52	117	10.94	2.40
33	1.3	94.0	83.5	62.5	59.0	58.8	4.92	117	11.75	2.37
34	1.4	93.9	89.9	62.8	59.3	58.9	5.33	117	12.56	2.34
35	1.5	93.7	96.4	62.9	59.5	58.9	5.74	117	1336	2.31
36	1.6	93.5	102.8	63.0	59.7	58.9	6.14	117	14.17	2.29
37	1.7	93.4	109.3	63.1	59.9	58.9	6.55	117	14.97	2.26
38	1.8	93.3	115.7	63.2	60.1	58.9	6.95	117	15.78	2.25
39	1.9	93.2	122.1	63.3	60.3	59.0	7.36	117	16.58	2.23
40	2.0	92.9	128.5	63.4	60.4	58.9	7.76	117	17.38	2.21
41	2.1	92.6	134.8	63.5	60.6	58.8	8.16	117	18.19	2.20
42	2.2	92.4	141.1	63.6	60.7	58.8	8.57	117	18.99	2.19
43	2.3	92.1	147.4	63.7	60.8	58.7	8.97	117	19.79	2.18
44	2.4	91.8	153.7	63.8	61.0	58.6	9.37	117	20.59	2.17
45	2.5	91.6	160.0	63.9	61.1	58.6	9.77	117	21.39	2.16
46	2.6	91.3	166.2	64.0	61.2	58.5	10.17	117	22.18	2.15
47	2.7	91.0	172.4	64.2	61.3	58.4	10.57	117	22.98	2.14
48	2.8	90.8	178.6	64.3	61.4	58.3	10.96	117	23.78	2.14
49	2.9	90.5	184.7	64.4	61.5	58.3	11.36	117	24.57	2.13
50	2.9	90.2	190.9	64.5	61.6	58.2	11.75	117	25.37	2.12
51	3.0	89.8	196.9	64.6	61.7	58.0	12.15	117	26.16	2.12
52	3.1	89.3	203.0	64.7	61.8	57.8	12.54	117	26.96	2.11
53	3.2	88.8	209.0	64.8	61.9	57.6	12.93	117	27.75	2.11
54	3.3	88.3	215.0	64.9	61.9	57.3	13.32	117	28.54	2.10

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Classic Performance Objectives 55 - 90 Weeks

Age wks	Cum Mort %	Hen wk Prod %	Eggs/ H.H Cum.	Av.Egg wt. g wk	Av. Egg wt. g Cum	Daily Egg Mass	Egg Mass Cum. kg	Feed Intake g/b/d	Feed/H.H Cum. kg	FCR
55	3.4	87.9	220.9	65.0	62.0	57.2	13.70	117	29.33	2.10
56	3.5	87.4	226.8	65.1	62.1	56.9	14.09	117	30.12	2.10
57	3.6	86.9	232.7	65.3	62.2	56.7	14.47	117	30.91	2.09
58	3.7	86.4	238.5	65.4	62.3	56.5	14.85	117	31.70	2.09
59	3.8	85.9	244.3	65.5	62.3	56.2	15.23	117	32.49	2.09
60	3.9	85.5	250.1	65.6	62.4	56.1	15.61	117	33.27	2.09
61	4.0	85.0	255.8	65.7	62.5	55.8	15.98	117	34.06	2.09
62	4.1	84.5	261.4	65.8	62.6	55.6	16.36	117	34.85	2.08
63	4.2	84.0	267.1	65.9	62.6	55.4	16.73	117	35.63	2.08
64	4.3	83.5	272.7	66.0	62.7	55.1	17.10	117	36.41	2.08
65	4.4	83.0	278.2	66.1	62.8	54.9	17.46	117	37.20	2.08
66	4.5	82.6	283.8	66.2	62.8	54.7	17.83	117	37.98	2.08
67	4.6	82.1	289.2	66.4	62.9	54.5	18.19	117	38.76	2.08
68	4.7	81.6	294.7	66.5	63.0	54.2	18.56	117	39.54	2.08
69	4.8	81.1	300.1	66.6	63.0	54.0	18.92	117	40.32	2.08
70	4.8	80.6	305.5	66.7	63.1	53.7	19.27	117	41.10	2.08
71	4.9	80.1	310.8	66.8	63.2	53.5	19.63	117	41.88	2.08
72	5.0	79.6	316.1	66.9	63.2	53.3	19.98	117	42.66	2.08
73	5.1	79.2	321.3	67.0	63.3	53.1	20.34	117	43.44	2.08
74	5.2	78.7	326.6	67.1	63.3	52.8	20.69	117	44.21	2.08
75	5.3	78.2	331.7	67.2	63.4	52.6	21.03	117	44.99	2.08
76	5.4	77.7	336.9	67.3	63.5	52.3	21.38	117	45.76	2.08
77	5.5	77.2	342.0	67.5	63.5	52.1	21.73	117	46.54	2.08
78	5.6	76.7	347.1	67.6	63.6	51.8	22.07	117	47.31	2.08
79	5.7	76.2	352.1	67.7	63.6	51.6	22.41	117	48.08	2.08
80	5.8	75.7	357.1	67.8	63.7	51.3	22.75	117	48.85	2.08
81	5.9	75.2	362.0	67.9	63.8	51.1	23.08	117	49.62	2.09
82	6.0	74.7	367.0	68.0	63.8	50.8	23.42	117	50.39	2.09
83	6.1	74.2	371.8	68.1	63.9	50.5	23.75	117	51.16	2.09
84	6.2	73.7	376.7	68.2	63.9	50.3	24.08	117	51.93	2.09
85	6.3	73.2	381.5	68.3	64.0	50.0	24.41	117	52.70	2.09
86	6.4	72.7	386.2	68.4	64.0	49.7	24.73	117	53.47	2.09
87	6.5	72.2	391.0	68.4	64.1	49.4	25.06	117	54.23	2.09
88	6.6	71.7	395.7	68.5	64.1	49.1	25.38	117	55.00	2.10
89	6.7	71.2	400.3	68.5	64.2	48.8	25.70	117	55.76	2.10
90	6.7	70.7	404.9	68.6	64.2	48.5	26.01	117	56.52	2.10

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Lite Performance Objectives 19 - 54 Weeks

Age wks	Cum Mort %	Hen wk Prod %	Eggs/ H.H Cum.	Av.Egg wt. g wk	Av. Egg wt. g Cum	Daily Egg Mass	Egg Mass Cum. kg	Feed Intake g/b/d	Feed/H. H Cum. kg	FCR
19	0.0	12.0	0.8	43.0	43	5.2	0.04	95	-	-
20	0.1	30.0	2.9	45.0	44.4	13.5	0.13	100	1.36	10.45
21	0.2	55.0	6.8	48.0	46.5	26.4	0.31	106	2.10	6.67
22	0.3	75.0	12.0	51.0	48.4	38.3	0.58	109	2.87	4.91
23	0.4	88.0	18.2	53.0	50.0	46.6	0.91	112	3.65	4.01
24	0.5	92.5	24.6	54.5	51.2	50.4	1.26	115	4.45	3.52
25	0.6	94.5	31.2	56.0	52.2	52.9	1.63	116	5.26	3.22
26	0.7	94.5	37.7	57.0	53.0	53.9	2.00	116	6.06	3.02
27	0.8	94.5	44.3	58.0	53.8	54.8	2.38	116	6.87	2.87
28	0.9	94.5	50.9	58.5	54.4	55.3	2.77	116	7.67	2.76
29	1.0	94.5	57.4	59.0	54.9	55.8	3.15	116	8.48	2.67
30	1.0	94.5	64.0	59.5	55.4	56.2	3.54	116	9.28	2.60
31	1.1	94.4	70.5	60.0	55.8	56.6	3.93	116	10.08	2.55
32	1.2	94.3	77.0	60.4	56.2	57.0	4.33	116	10.89	2.50
33	1.3	94.2	83.5	60.7	56.5	57.2	4.72	116	11.69	2.46
34	1.4	94.1	90.0	60.9	56.9	57.3	5.12	116	12.49	2.42
35	1.5	93.9	96.5	61.2	57.1	57.5	5.51	116	13.29	2.39
36	1.6	93.7	102.9	61.4	57.4	57.5	5.91	116	14.09	2.36
37	1.7	93.6	109.4	61.6	57.7	57.7	6.31	116	14.88	2.34
38	1.8	93.5	115.8	61.7	57.9	57.7	6.70	116	15.68	2.32
39	1.9	93.4	122.2	61.8	58.1	57.7	7.10	116	16.48	2.30
40	2.0	93.1	128.6	62.0	58.3	57.7	7.49	116	17.27	2.28
41	2.1	92.8	135.0	62.1	58.5	57.6	7.89	116	18.07	2.26
42	2.2	92.6	141.3	62.3	58.6	57.7	8.29	116	18.86	2.25
43	2.3	92.3	147.6	62.4	58.8	57.6	8.68	116	19.66	2.24
44	2.4	92.0	153.9	62.5	58.9	57.5	9.07	116	20.45	2.22
45	2.5	91.9	160.2	62.7	59.1	57.6	9.47	116	21.24	2.21
46	2.6	91.6	166.4	62.8	59.2	57.5	9.86	116	22.03	2.20
47	2.7	91.3	172.7	62.9	59.4	57.4	10.25	116	22.82	2.19
48	2.8	91.1	178.9	63.1	59.5	57.5	10.64	116	23.61	2.19
49	2.9	90.8	185.0	63.2	59.6	57.4	11.03	116	24.40	2.18
50	2.9	90.6	191.2	63.3	59.7	57.4	11.42	116	25.19	2.17
51	3.0	90.4	197.3	63.4	59.8	57.3	11.81	116	25.98	2.16
52	3.1	90.1	203.4	63.6	59.9	57.3	12.20	116	26.76	2.16
53	3.2	89.7	209.5	63.7	60.1	57.1	12.58	116	27.55	2.15
54	3.3	89.4	215.6	63.8	60.2	57.0	12.97	116	28.33	2.15

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Lite Performance Objectives 55 - 90 Weeks

Age wks	Cum Mort %	Hen wk Prod %	Eggs/ H.H Cum.	Av.Egg wt. g wk	Av. Egg wt. g Cum	Daily Egg Mass	Egg Mass Cum. kg	Feed Intake g/b/d	Feed/H. H Cum. kg	FCR
55	3.4	89.1	221.6	63.9	60.3	57.0	13.35	116	29.12	2.14
56	3.5	88.8	227.6	64.0	60.4	56.8	13.74	116	29.90	2.14
57	3.6	88.4	233.5	64.1	60.5	56.7	14.12	116	30.68	2.13
58	3.7	88.1	239.5	64.2	60.5	56.6	14.50	116	31.47	2.13
59	3.8	87.7	245.4	64.3	60.6	56.4	14.88	116	32.25	2.12
60	3.9	87.5	251.3	64.4	60.7	56.3	15.26	116	33.03	2.12
61	4.0	87.1	257.1	64.5	60.8	56.2	15.64	116	33.81	2.12
62	4.1	86.8	263.0	64.6	60.9	56.1	16.01	116	34.59	2.11
63	4.2	86.4	268.8	64.7	61.0	55.9	16.39	116	35.36	2.11
64	4.3	86.1	274.5	64.8	61.1	55.8	16.76	116	36.14	2.11
65	4.4	85.7	280.3	64.8	61.1	55.5	17.13	116	36.92	2.10
66	4.5	85.4	286.0	64.9	61.2	55.5	17.50	116	37.69	2.10
67	4.6	85.1	291.7	64.9	61.3	55.2	17.87	116	38.47	2.10
68	4.7	84.7	297.3	65.0	61.4	55.1	18.24	116	39.24	2.10
69	4.8	84.3	302.9	65.0	61.4	54.8	18.61	116	40.02	2.10
70	4.8	84.0	308.5	65.1	61.5	54.7	18.97	116	40.79	2.10
71	4.9	83.6	314.1	65.1	61.5	54.4	19.33	116	41.56	2.09
72	5.0	83.2	319.6	65.2	61.6	54.3	19.69	116	42.33	2.09
73	5.1	83.0	325.1	65.2	61.7	54.1	20.05	116	43.10	2.09
74	5.2	82.6	330.6	65.3	61.7	53.9	20.41	116	43.87	2.09
75	5.3	82.2	336.1	65.3	61.8	53.7	20.77	116	44.64	2.09
76	5.4	81.8	341.5	65.4	61.9	53.5	21.12	116	45.41	2.09
77	5.5	81.4	346.9	65.4	61.9	53.2	21.47	116	46.18	2.09
78	5.6	81.0	352.2	65.5	62.0	53.1	21.82	116	46.94	2.09
79	5.7	80.7	357.5	65.5	62.0	52.8	22.17	116	47.71	2.09
80	5.8	80.3	362.8	65.6	62.1	52.7	22.52	116	48.47	2.09
81	5.9	79.8	368.1	65.6	62.1	52.3	22.86	116	49.24	2.09
82	6.0	79.3	373.3	65.7	62.2	52.1	23.21	116	50.00	2.09
83	6.1	78.8	378.5	65.7	62.2	51.7	23.55	116	50.76	2.09
84	6.2	78.3	383.7	65.7	62.3	51.4	23.88	116	51.52	2.09
85	6.3	77.8	388.8	65.8	62.3	51.2	24.22	116	52.29	2.09
86	6.4	77.3	393.9	6.58	62.4	50.8	24.55	116	53.05	2.09
87	6.5	76.8	399.0	65.8	62.4	50.5	24.88	116	53.81	2.09
88	6.6	76.3	404.0	65.9	62.4	50.3	25.21	116	54.56	2.09
89	6.7	75.8	409.1	65.9	62.5	49.9	25.54	116	55.32	2.09
90	6.7	75.3	413.7	65.9	62.5	49.6	25.86	116	56.08	2.09

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This guide and all the necessary record cards are available on our website or on USB from your Regional Technical Manager.

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