H&N Brown Management Guide

Management the key to your profit

The H&N genetics and health research staff have worked for many years to produce a layer with excellent production, liveability, feed conversion, shell quality and egg weight. These traits are the primary factors determining profit for the producer. The goal is to achieve the genetic potential that has been bred into the H&N Brown layer.

The purpose of this guide is to outline those management practices that experience has shown are important to attain optimum performance from the H&N Brown under most conditions. Good poultry management is the key to success with H&N Brown layer flocks.

Obtaining optimum performance from each of the birds in the flocks helps produce maximum results. Good flock husbandry requires a little extra effort, but it pays high dividends. Good poultry management is not complicated; it simply requires attention to all of the details of the flock's needs, common sense and proper decision making throughout the flock's lifetime. This guide will aid you in making correct decisions.

Version 6

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Fig 1: **H&N Brown Commercial Layer Performance Specifications**

Live-ability	0 – 16 weeks	96% - 98%	
	16 – 80 weeks	90% - 94%	
Egg Production	**First Cycle**		
	Age at 50% Hen-Day Production		142 – 152 days
	4 week Peak		94% - 95%
	Hen-Housed Performance to 72 weeks		325 - 330 eggs
	Hen-Housed Performance to 80 weeks		360 - 370 eggs
	Period over 90%		26 weeks
	Period over 80%		46 weeks
Feed	**Production Type**	**Period (weeks)**	**Consumption (g/bird/day)**
	FR/Barn/Organic	19 - 80	85 - 126
	Colony	19 - 80	116 - 124
Body Size	**Age (weeks)**	**Weight (g)**	
	18	1480	
	60	1930	
	80	1978	
Egg Weight	**Age (weeks)**	**g/eggs**	**Cumulative Egg Mass (kg)**
	25	45 - 46	1.95
	30	62 - 63	3.99
	35	63 - 64	6.4
	40	64 - 65	9.2
	60	65 - 66	18.2
	80	66 - 67	25.3

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Goals of Management

The goal of management is to produce pullets which, at 16 weeks of age, are properly conditioned to make the transition to excellent layers. Proper condition is defined as:

- 1350g – 1400g average body weight
- Minimum uniformity of 80%
- Healthy and alert

General Preparation

Thoroughly clean equipment and facilities by removing all debris and dust left by the previous flock and by washing with a high pressure washer. Manure should not be stored closer than 300m from the rearing houses and should not be located upwind. Eliminate rodents, wild birds and other vermin. Make any necessary repairs, clean and disinfect water lines and tanks. Feed bins, fill systems and feeders must be emptied, cleaned and disinfected.

Isolation and Sanitation

Isolation and restricted access to the brood/grow area are of prime importance for the control and prevention of poultry disease. The “all-in all-out” brood/grow programme is recommended as it provides an excellent means for isolation and allows for proper clean up in the event of a disease outbreak. Traffic between the brood/grow area and lay houses should be avoided.

An important part of isolation is keeping poultry houses free of outside birds, rodents and other wildlife because they can be a major source of disease causing viruses and parasites. Farm staff should be assigned to one farm and should not go back and forth between rearing and laying farms. Managers inspecting flocks should visit the youngest flock first and the oldest last. A foot bath containing fresh, clean disinfectant should be placed at the entrance to each house. The disinfectant solution needs to be checked at least once a day and changed frequently. Allow only essential personnel in and around the poultry houses. Do not allow drivers from off-farm vehicles to enter any poultry houses.

Humidity

Humidity is an important aspect of successful brooding. The relative humidity (determined with a wet bulb thermometer) should be maintained between 60% and 70%.

Humidity is usually not a problem after 6 weeks of age because it is easier to maintain a satisfactory moisture level lower temperatures and the older, larger bird exhales a considerable amount of moisture into the atmosphere.

Getting Chicks Off to a Good Start

Before the Chicks Arrive:

1. Make sure the correct temperature is being maintained uniformly inside the building.
2. Check the settings of the time clocks and dimmers for the lights.
3. Have automatic feed and water systems checked for proper settings and uniform distribution of feed and water.
4. Trigger nipples and cups to ensure proper working condition and to stimulate drinking by the chicks.
5. Ensure adequate supplementary drinkers are provided.
6. Co-ordinate time of arrival with the hatchery and confirm the number and condition of chicks being delivered.

Electrolytes:

Some producers have found that the addition of electrolytes to the drinking water has improved chick performance. The choice should be made after consulting with a qualified veterinarian who is familiar with local conditions.

Signs of Distress

Be alert to distress signals produced by the chicks. React appropriately to the following chick behaviour:

a) Listless and prostrate chicks which indicates excessive heat.
b) Loud chirping indicates hunger or cold.
c) Grouping (huddling) together indicates excessive cold or drafts.
d) Pasted vents which may indicate excessive heat or cold.

Water

Chicks must have access to plenty of clean, fresh, cool water. This is necessary for flocks to get off to a good start. Water intake must not be restricted under any conditions. Water consumption rises dramatically with increasing ambient temperature as illustrated in Table 1. If sufficient watering space is not available, or if the watering system or supply is insufficient to meet maximum demand, the growth rate and health of the flock will be impaired.

Table 1: **Water Consumption of Pullets***

Water Consumed/1000 birds/day		
Age (Week)	21°C (Litres)	32°C (Litres)
2	30	35
4	77	118
6	101	169
8	118	196
10	125	216
12	134	224
14	139	232
16	144	240
18	148	246

*M.O. North and D.D. Bell, Commercial Chicken Production Manual, 4th Ed., 1990, pg. 262.

Feed

An optimal feed is a very homogenous mash feed. If this is not available, crumb is better than a sub-optimal mash for early growth.

Intermittent Lighting Programme in Rearing for Day Old Chicks

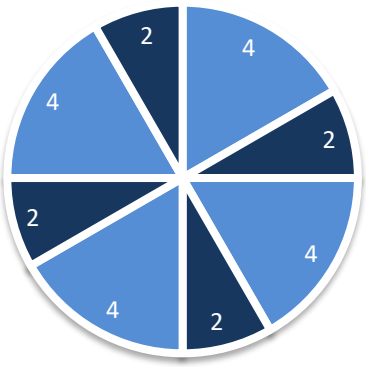
When the day old chicks arrive on the farm, they have been intensively handled in the hatchery and often had a long transport to their final destination. Common practice is to give them 20 – 23 hours light for the first 2 days after arrival, to help them to recover and to provide those chicks enough time to eat and to drink. In practice it can be observed that after arrival and housing some chicks continue to sleep, others are looking for feed and water. The activity of the flock will always be irregular. Especially in this phase, farm staff may have difficulties interpreting the chicks' behaviour and their condition.

There is a practically proved principal in splitting the day into phases of resting and activity using an intermittent lighting programme. The target is to synchronize the chicks' activities.

The farm staff get a better impression on the flock's condition; the birds are pushed by the group's behaviour to search for water and feed.

Therefore, H&N GB advises to give chicks a rest after they arrive at the rearing farm and then start with periods of 4 hours of light and 2 hours of darkness.

Lighting Programme after Arrival



4 hours light
2 hours darkness
4 hours light
2 hours darkness
4 hours light
2 hours darkness
4 hours light
2 hours darkness

This programme can be used for up to 7 to 10 days after arrival. Then switch back to the regular step-down lighting programme.

The usage of the above lighting programme brings about advantages as follows:

- The chicks are resting or sleeping at the same time. That means that the behaviour of the chicks will be synchronized.
- The weak chicks will be stimulated by stronger ones to move as well as to eat and drink.
- The behaviour of the flock is more uniform and assessing the flock condition is easier.
- Improved liveability.

Floor Brooding and Rearing

Brooder

Get the chicks off to a good start by using good quality, clean litter. Have the brooder house ready and start the heating system 24 hours prior to the arrival of the chicks.

Floor Space

Because of today's high energy costs, some egg-type birds in colder climates are being brooded in "half-house brooding". This is done by partitioning the brooder house with a temporary barrier at one-half the length of the house and having all the chicks brooded in the smaller area until supplementary heat can be shut off. The other half of the house is then opened to the chicks. Be sure to provide the floor space recommended.

Feed and Water

Supplementary feeder trays, or feed on chick paper, should be provided within the brooder ring for a few days until all chicks are eating from the regular feed system. Be sure that adequate feeder space is provided. Insoluble grit should be fed if the chicks are on a type of litter (e.g. shavings) that will be eaten by the chicks.

Automatic watering systems vary in their ability to provide adequate water for day old chicks. Almost all systems should be supplemented with water fonts until the chicks are drinking from the regular water system.

Coccidiosis Control

Good litter management will aid in the prevention of an outbreak of coccidiosis. If the birds will go to colonies the use of a coccidiostat for prevention is recommended. If the birds are going to the alternative systems, then a management programme must be used that creates immunity in the birds. Coccidiostats will generally not be used during the lay cycle.

Cage Brooding and Rearing

Water

The proper drinking space (Figure 2) must be provided. Water cups must be full when chicks arrive. For the first few days, the cups or nipples should be checked and triggered several times each day. Too often chicks depend on one cup or nipple for their water supply and when it is not working, dehydration sets in fast. Supplementary drinkers should be provided for the first 10 days.

Figure 2: **Drinker Space Requirements in the Brooding and Growing Periods**

Nipples	1/12.5 pullets
Bell Drinkers	1/125 pullets
Cups	1/20 pullets
Circular Trough Space	0.8 cm per pullet

Feed

Start the day old chicks on crinkled paper or newsprint, laid on the floor. Place it so chicks can walk right up to the feed and water. A small amount of high quality feed placed on the paper floor or feed trays and having the feed trough as full as possible will also help to get the chicks off to a good start. Be sure that there is sufficient feeder space (Figure 3) to assure proper growth and uniformity.

Figure 3: **Feeder Space Requirements in the Brooding and Growing Periods**

Linear Track	2.5cm/bird
Pan Feeders	2.0cm/bird

Temperature

The day before the chicks arrive, heat the building to the temperature specified in this guide (Figure 4).

Figure 4: **Temperature Requirements in the Brooding and Growing Periods**

Start		
Cage	33°C - 34°C*	After 3 days and depending on chick behaviour reduce 3°C each week until supplementary heat is no longer needed
Floor	34°C - 35°C*	

*At chick level

Light

Be sure sufficient light intensity (10—20 Lux) is provided for the first week so that the chicks can easily locate the feed and water.

Air/Ventilation

Supply sufficient volumes of fresh air to remove dust and undesirable gases. Provide movement of air even on cool days. Adequate ventilation is especially important in hot weather.

Body Temperature of Chicks

There are findings which confirm that the temperature of chicks is between 40°C and 41°C after the moment of full homeothermy. This information can be used in parallel with the behaviour of the housed chicks to adjust house temperatures in an optimal way.

Make sure that you collect samples of chicks in different parts of the house and measure their rectal temperature. Proceed in a way, like you normally would do, when weighing chicks/pullets and check for uniformity. Obtain samples from chicks distributed throughout the house in order to have reliable readings. Collect the information, calculate the average and adjust the house temperatures accordingly to achieve optimal chick temperatures.

Factors which could result in a drop in the body temperature of chicks include the following:

- The distribution of air within the house.
- A low level of humidity in the house (i.e. heat transfer capacity of the air).
- The house was not pre-warmed in time.

Feeding Pullets

The H&N Brown will grow and develop properly on typical feeding programmes and rations. The recommended nutrient levels in Table 2 are necessary to produce a pullet with good skeletal and muscular development. The birds should carry a minimum of fat since excess fat may be detrimental to the performance of the pullets. Birds reared in cages may require a slightly different feeding programme than birds reared on the floor. Pullets in cages get less exercise and are, therefore, generally heavier than floor-reared birds.

Brood/Grow

Four diets (Starter, Grower, Developer and Pre-lay in Table 2) during the brood/grow period are adequate for the H&N Brown. Each diet should be supplemented with vitamins and minerals as indicated in Table 4. Each diet should be fed until the appropriate target weight listed in this guide is achieved. At that point the next diet should be fed.

Table 2: **Recommended Nutrient Density in the Brood/Grow/Pre-lay Diets**

Nutrient	Diet Type			
	Starter* 0 - 3 wk until 0.19 kg BW	**Grower** 4 – 8 wk until 0.72 kg BW	**Developer** 9 – 17 wk until 1.40 kg BW	**Pre-Lay** (optional) 17 wk – 5% prod
Energy (kcal/kg**)	2900	2750 - 2800	2750 - 2800	2750 - 2800
Energy (MJ)	12.00	11.40	11.40	11.40
Protein (%)	20.00	18.50	14.50	17.50
Methionine (%)	0.48	0.40	0.34	0.36
Dig. Methionine	0.39	0.33	0.28	0.29
Meth./Cystine (%)	0.83	0.70	0.60	0.68
Dig. M/C (%)	0.68	0.57	0.50	0.56
Lysine (%)	1.20	1.00	0.65	0.85
Dig. Lysine (%)	0.98	0.82	0.53	0.70
Valin (%)	0.89	0.75	0.53	0.64
Dig. Valin	0.76	0.64	0.46	0.55
Tryptophane (%)	0.23	0.21	0.16	0.20
Dig. Tryptothane (%)	0.19	0.17	0.13	0.16
Threonine (%)	0.80	0.70	0.50	0.60
Dig. Threonine (%)	0.65	0.57	0.40	0.49
Isoleucine (%)	0.83	0.75	0.60	0.74
Dig. Isoleucine (%)	0.68	0.62	0.50	0.61
Calcium (%)	1.05	1.00	0.90	2.00
Phosphorus tot. (%)***	0.75	0.70	0.58	0.65
Phosphorus av. (%)***	0.48	0.45	0.37	0.45
Sodium (%)	0.18	0.17	0.16	0.16
Chloride (%)	0.20	0.19	0.16	0.16
Linoleic Acid (%)	2.00	1.40	1.00	1.00

*Chick Starter should be supplied if the body weight standard cannot be achieved by feeding Grower or the feed intake is expected to be low.

**rounded to nearest to nearest 5 kcal

***without phytase

Correct Use of Pre-lay Feed

Pre-lay feed should be used for a short period of time before a flock starts being supplied with Phase 1 layer feed. This leads to a smooth transition from the Developer feed (low calcium and low nutrient density) to a diet with high calcium and nutrient levels. It helps to avoid the often reduced daily feed intake during early production. Pre-lay feed has proven to be a very good tool in supporting the optimal nutrition of a laying flock.

Typically, Pre-lay feed contains about 2.0% - 2.5% calcium. This is too much for a typical feed for rearing but not enough for a bird starting to produce eggs. From a nutritional point of view, it is therefore considered a compromise and never as "optimal" feed. Nevertheless, it is worthwhile to use Pre-lay feed for a short period of time. Correct use can enhance the uniformity of a pullet flock. It is especially beneficial for flocks with very low uniformity and also aids the development of Ca-metabolism in medullary bones. Since Pre-lay feed is a compromise feed for the short transition period, it cannot supply a bird in full lay sufficiently. Therefore, it cannot be used when feed logistics and correct timing do not work. The wrong way to use Pre-lay feed is to either use it too early and/or too long.

Use Pre-lay feed for about 10 days with a maximum of 1kg per bird. If birds have to be transferred earlier than 17 weeks of age from rearing to layer farm, do not use a Pre-lay diet in the rearing facility. Instead, use the following guidelines. (Table 3).

Table 3: **Feeding during and after Transfer**

Age at Transfer		Feeding Programme		
		Developer Feed	Followed by	Pre-lay Feed
week	days	kg feed	→	kg feed
15	105	1.0	→	1.0
16	112	0.5	→	1.0
17	119	-	→	1.0
18	126	-	→	0.5
after 18	after 126	Immediately supply layer Phase-1-feed		

Feed Consumption

The data in Table 5 shows expected feed consumption. Of course, these values will differ slightly due to the variation in the feed consumption because of environmental conditions.

Feed Quality

Use only fresh feed that is free from chemical and microbial contaminants. A sample of each load of mixed feed should be taken. Store this sample for 8 weeks and then discard if a laboratory analysis is not necessary.

Table 4: **Recommended Vitamin and Mineral Additions to the Finished Diets**

Supplements per kg Feed		Starter / Grower	Developer	Pre-Lay / Layer
Vitamin A	IU	12000	12000	12000
Vitamin D_3	IU	2000	2000	2500
Vitamin E	IU	20 – 30**	20 – 30**	20 – 30**
Vitamin K_3	mg	3***	3***	3***
Vitamin B_1	mg	1	1	1
Vitamin B_2	mg	6	6	4
Vitamin B_6	mg	3	3	3
Vitamin B_{12}	mcg	15	15	15
Pantothenic Acid	mg	8	8	8
Nicotinic Acid	mg	30	30	30
Folic Acid	mg	1.0	1.0	0.5
Biotin	mcg	50	50	25
Cholin	mg	300	300	400
Antioxydant	mg	100 - 150**	100 - 150**	100 - 150**
Coccidiostat		as required	as required	
Manganese*	mg	100	100	100
Zinc*	mg	60	60	60
Iron	mg	25	25	25
Copper*	mg	5	5	5
Iodine	mg	0.5	0.5	0.5
Selenium*	mg	0.25	0.25	0.25

*so called “organic sources” should be considered with higher bioavailability

**according to fat addition

***double in case of heat treated food

The above values should be reviewed by a nutritionist who is knowledgeable of local conditions (e.g. chemical composition of available ingredients)

Vitamin C is synthesized by poultry normally. This vitamin is not considered as essential, but in some circumstances, like heat stress or hot climate it may be important/beneficial to add 100mg – 200mg/kg complete feed during production period.

Table 5: **Pullet Feed Consumption**

Diet	Week of Life	Daily (g/day)	Cumulative (g/bird)
Starter	1	10	70
	2	16	182
	3	22	336
Grower	4	28	532
	5	34	770
	6	40	1050
	7	46	1372
	8	52	1736
Developer	9	57	2135
	10	61	2562
	11	64	3010
	12	66	3472
	13	67	3941
	14	68	4417
	15	70	4907
	16	72	5411
Pre-Lay	17	74	5929
Layer 1	18	76	6461
	19	85	7056
	20	90	7651

Feeding 0 - 3 Weeks – Starter Period (0 - 21 days)

Research has shown that the H&N Brown will grow properly the first 3 weeks on a Starter feed that meets the nutrient specifications in Table 2.

Feeding Week 4 – Housing (22 - 126 days)

The H&N Brown will develop and mature satisfactorily on a variety of feeding programmes, but our research indicates that a change to a Grower ration at 4 weeks of age and a Developer ration at 9 weeks of age works best in temperate climates. It is essential that the body weight of the H&N Brown is checked weekly. Maintaining the proper body weight during the grow period will help the H&N Brown perform to its genetic potential.

Body Weight

Monitor body weight every week during the 4 to 18 week age range, so that feeding programmes can be altered if required. A representative sample of one percent of the flock, or a minimum of 60 birds taken throughout the house, should be weighed each time flock weights are checked. This should be done by weighing each pullet caught in a catching panel from several areas of the house, or by weighing all birds individually in a cage from several areas of the house. Reweigh the pullets immediately if the average body weight is suspect (e.g. higher or lower than expected).
Check the average weight of the sample against the H&N Brown body weight guide (Table 5a). The growth pattern should roughly follow that shown in Table 5a.

Uniformity

A uniformity value should be calculated after each weighing. The proper procedure for determining flock uniformity is as follows:

1. Calculate the average body weight.
2. Calculate 10% of the average weight of the sample.
3. Add and subtract this figure from the average weight to determine the upper and lower values of the uniformity range.
4. Count the number of birds that fall within the range.
5. Divide this number by the total number weighed and multiply by 100. This equals the percent uniformity.

Example:

1. 95 pullets weighed a total of 86260g
   86260 ÷ 95 = 908g per bird
2. 908 x 10% = 91
3. 908 + 91 = 999 (Upper value)
   908 – 91 = 817 (Lower value)
4. 81 birds weighed within 817 – 999 range
5. 81 ÷ by 95 x 100 = 85% uniformity

Typically

The aim is that 80% or more of the birds weighed should fall within this range at 16 weeks of age. However, the vaccination programme can have a significant effect on this figure and should be taken into account at all stages in rear.

Changing Diets

If the pullets' body weight is in line with the guide for their age then change diets as specified in Tables 2 and 5. If the flock is underweight, postpone the scheduled diet changes (e.g. from Grower to Developer) until the flock reaches it's correct weight for it's age. Measures to increase growth rate may be needed. For example, birds can remain on the Grower diet for a longer period of time to achieve the desired body weight.

Body Weight Gain

If a flock is not reaching target body weights, check the feed and water consumption rate as well as feeder, drinker and floor space. Inadequate cage or floor space can cause a reduction in feed consumption.

Disease may also be an important factor in reduced body weight. If a disease problem is suspected, get an accurate diagnosis of the problem as soon as possible. Maintain temperatures in which the birds will be comfortable, generally 18°C to 24°C, if possible.

Table 5a: **Recommended H&N Brown Body Weight during the Brooding and Growing Periods – UK Only**

Age		Body Weight Guide	Possible Weight After Transfer
Week	Day	Average	
1	7	60	-
2	14	100	-
3	21	170	-
4	28	240	-
5	35	310	-
6	42	380	-
7	49	490	-
8	56	600	-
9	63	720	-
10	70	820	-
11	77	930	-
12	84	1030	-
13	91	1110	-
14	98	1200	1080
15	105	1280	1152
16	112	1350	1215
17	119	1400	1260

Possible loss of body weight in handling and transfer 10% - Guide Only

Vaccination and Disease Prevention

Vaccination programmes vary with the area, disease exposure, strain and virulence of the pathogen involved and must be designed to meet the needs of the particular local conditions. Competent poultry veterinarians should be consulted regularly for revisions of vaccination and medication programmes as well as for disease preventive management practices. Medication practices such as the use of antibiotics and coccidiostats in the feed should also be under the direction of a veterinarian with special training and experience in avian pathology.

General Principles

Some helpful tips for vaccination programmes in any location are:

- **Record the following information for permanent flock records:** The vaccine manufacturer, the serial number, the date of vaccination, method, reaction observed (if any) and any medication currently in use.
- **Vaccinate only healthy chickens.** If the flock is unhealthy or under stress from any cause, delay the vaccination until the flock has recovered.
- **Do not dilute or "cut" the vaccine.** The weakened vaccine may fail to stimulate adequate immune response in the birds. Be sure that vaccines are not out-dated, that they have been stored and handled properly and that all vaccinating equipment has been thoroughly cleaned and dried before storing.
- **For water vaccination, add powdered skim milk** to the water at the rate of 2.4kg/1000 litres or 2.4g/litre before adding the vaccine. This will help to neutralise chlorine, heavy metals, acidity or alkalinity in the water supply which might destroy the virus in the vaccine and reduce potency. When vaccine is to be administered via a proportioner, the quantity of milk must be adjusted to facilitate trouble-free functioning of the proportioner and good distribution of vaccine to all birds.
- **Follow manufacturer's directions** regarding the administration of vaccines. Although many vaccines can be given through the drinking water or by spray, specific recommendations vary among companies. Considerations regarding spray particle size, mixing of vaccines, combining of different vaccines, strains and environmental vaccination constraints are views differently among the various manufacturers. Typically, the vaccine companies are the best source of information regarding their products.
- Avoid the **use of medications and antibiotics** for 3 days preceding and at least 1 week after vaccination, so as not to interfere with the immune response.
- **Depriving the birds of water** for 1 to 2 hours prior to water vaccination will help ensure all birds get exposure to the vaccine. Ideally vaccination should be done in the morning to avoid water deprivation during the warmer parts of the day.

- **Water lines should be drained** prior to water vaccination to ensure uniform distribution of vaccine to all birds. Dyes are commonly added to trace the vaccine through the water system and help mark the birds and access the vaccination process. Dyes are sometimes supplied by the vaccine companies upon request.

Serological Monitoring

Serological data obtained after the bulk of the vaccination programme is complete, and the birds have time to respond (e.g. 20 - 22 weeks), is a good method of evaluating the immune status of a flock prior to production. Such data also serves as an immune status baseline for determining whether a field infection has occurred when production drops are observed. Serological data can give valuable information on the immune titer levels for a number of disease causing agents. Working with a poultry laboratory to set up a profiling system will make better evaluations of vaccination programmes and flock conditions possible.

Growing Cycle Records

Good growing flock records will allow you to instantly evaluate the condition and progress of each flock. Therefore, good record keeping is a very valuable management tool. Figures for mortality, feed consumption and water intake should be recorded daily and summarised weekly. Body weights and body weight uniformity percentages should also be included in the records of each flock.

All results should be graphed. Use of graphs will improve analyses of flock growth and mortality trends. Notes indicating vaccinations, medication, lighting changes and other significant events should be included in your growing records. Always keep in mind that accurate cage and/or pen counts of the number of birds present in the flock are very important.

Lighting Programme to 18 Weeks

Light control is an extremely important aspect of overall growing and laying flock management. By controlling the daily photo period with artificial light, the egg producer can place flocks and bring them into production at the proper age at any time of the year. Proper light management is a valuable tool for the control of sexual maturity, body weight and egg weight.

The H&N Brown will perform under many different lighting programmes and the best one depends on the exact needs of each egg producer (e.g. early eggs, early housing, late housing, egg size demands).

First 2 Weeks

The lighting programme for all flocks in all types of housing is the same for the first 2 weeks. The first 2 days, chicks should be given 20 - 23 hours of light each day and the intensity should be 10 Lux. From day 3 start to reduce the duration of light per day.

Brooding and Growing in Closed Housing (Light Tight)

The intensity should be minimum 5 Lux. Retain this duration until transfer. Light intensity should be as shown in Table 6.

Table 6: **Lighting Programme in the Rearing Period for Increased and Persistent Egg Size**

Age in Weeks	Light in Hours	
	Standard Maturity	Delayed Maturity
Day 1 - 2	24	23 - 18
Day 3 - 6	20	23 - 18
Day 7 - 14	16	18 - 15
3	12	15 - 14
4	10	14 - 13
5	10	13 - 12
6	10	12 - 11
7	10	11 – 10
8	10	12
9	10	11
10	10	10
11	10	10
12	10	10
13	10	10
14	10	10
15	10	10
16	10	10

Please stimulate between 1475g-1500g bird weight

Light Control during Lay

Pullets grown under good light control require a sharp increase in light to stimulate rapid reproductive development. When the flock is a maximum of 18 weeks of age and at the proper body weight, the length of the day needs to be increased by at least 1 hour. Additional light increases should be given on a weekly basis until the day length required is reached.

Use of the intermittent lighting programmes is acceptable for flocks over 40 weeks of age in light tight houses. Giving a dark period between the first artificial light in the morning and natural light will allow maximum performance in open-sided houses. The same is true in the evening when a period of darkness can be allowed before the final artificial light is given. Such a programme should be run in accordance with any quality assurance schemes or welfare standards relevant to the flock.

Lighting Intensity during Lay

Light intensity is an important aspect of a lighting programme. With the proper types of controls, light intensity can be adjusted. Low intensity lights reduce power consumption. Little or no harm will be done if light intensity is increased for short periods of time when farm staff need bright light in the houses. H&N Brown also react very well to the stimulation of the increase in light intensity after transfer. A minimum of 10 Lux for cages/20 Lux for floor housing should be maintained in the laying house. When the flock is moved to the laying house, the light intensity should be at least equal to the light intensity in the brooder house.

Laying Programme

Housing Birds

The “all-in all-out” housing system is recommended because it helps break the disease cycles which so often accompany a continuous multiple age replacement system. Pullets should be moved to thoroughly cleaned and disinfected laying houses before 18 weeks of age.

Temperature Control

Laying hens perform well over a wide range of temperatures. Temperature changes between 21°C and 25°C have a minimal effect on egg production, egg size and shell quality. Feed conversion improves with higher house temperatures, and maximum efficiency is attained in the 21°C and 25°C range. As temperature rises, however, feed consumption decreases, and it is necessary to provide a properly fortified diet to achieve adequate daily nutrient intake in a warm house (see section “Feeding in the Lay Cycle”).

When feed intake decreases and the diet is not adjusted, first egg weight and body weight will decrease, thereafter the egg number. A “midnight feed” can help maintain the feed intake in hot climate situations. For more information contact H&N GB.

In environmentally controlled houses, warm temperatures may be maintained during cold weather by utilising the body heat produced by the birds. Proper management of the ventilation system will conserve heat and eliminate moisture. A proper blending of air intake and exchange rates is needed.

Water Quality

Fresh, clean, potable water must be available at all times for the layers. Adequate consumption must be assured.

Feeding in the Lay Cycle

H&N Brown can achieve their genetic performance potential using many different feeding programmes. However, there are some precautions with regard to the lay diet that should be kept in mind. All layers require a minimum quantity of daily nutrients regardless of their consumption rate, but their actual intake is primarily governed by their energy requirements. Energy requirements are in turn determined by body weight, production rate, egg size, ambient temperature, air movement and feathering.

Feeding at Onset of Production and Through Peak

Following transfer, a Pre-lay diet should be fed until birds reach 5% production. At that point the ration should be changed to a Layer 1 diet as specified in Table 5.

Feeding after Peak

Adjustments in the feed formula for laying hens must be made, depending upon the quantity of feed consumed and rate of lay, to assure adequate nutrient intake for maximum production and egg size. Please see Table 10. Further information is available on request. Nutrient levels of diets can also be provided for various production performance and feed intakes if required. If the rate of lay stays above the laying standard do not change the diet, continue to use the higher density feed.

Table 10: **Nutrient Levels of Diets for Production above 90% at various Feed intakes to provide the Recommended Daily Nutrient Intake**

G/bird/day	110	115	120
Energy (kcal/kg)	2770	2758	2745
Energy (MJ)	11.6	11.55	11.5
Protein (%)	17.45	16.70	16.00
Calcium (%)	3.73	3.57	3.42
Phosphorus (%)*	0.55	0.52	0.50
Av. Phosphorus (%)*	0.38	0.37	0.35
Sodium (%)	0.16	0.16	0.15
Chlorine (%)	0.16	0.16	0.15
Lysine (%)	0.80	0.76	0.73
Dig. Lysine (%)	0.65	0.63	0.60
Methionine (%)	0.40	0.38	0.37
Dig. Methionine (%)	0.33	0.31	0.30
Met. + Cys. (%)	0.73	0.69	0.67
Dig. Met. + Cys (%)	0.60	0.57	0.55
Arginine (%)	0.83	0.80	0.76
Dig. Arginine (%)	0.68	0.65	0.63
Valine (%)	0.67	0.64	0.62
Dig. Valine (%)	0.57	0.55	0.53
Tryptophane (%)	0.17	0.16	0.15
Dig. Tryptophane (%)	0.14	0.13	0.13
Threonine (%)	0.55	0.53	0.51
Dig. Threonine (%)	0.45	0.43	0.42
Isoleucine (%)	0.63	0.60	0.58
Dig. Isoleucine (%)	0.52	0.50	0.48
Linoleic Acid (%)	1.82	1.74	1.67

*without phytase

Table 11: **Supply of Fine and Coarse Limestone**

Feed Type	Fine Limestone	Coarse Limestone*
Layer Phase 1	35%	65%
Layer Phase 2	30%	70%
Layer Phase 3	25%	75%
Layer Phase 4 + 5	15%	85%

*can be partly replaced by oyster shells

Feed Quality

Always maintain high feed quality. The basics include proper sampling of feed ingredients and mixed feed and the chemical analysis of those samples.

Energy Requirement

The energy requirement of adult laying birds depends upon several factors, such as growth, maintenance, production, feathering and environmental temperatures. Under normal conditions layers eat mainly to satisfy their energy requirement. In order to maintain an optimal laying persistency do not reduce the energy level below 2750 kcal/kg or 11.5 MJ/kg.

Calcium

Laying hens need adequate calcium in their diets for eggshell formation. Layers will have more available calcium if the dietary calcium sources are in two different forms. One form may be finely ground such as limestone. The other should be fed as large particle size such as oyster shell or hen-size limestone. (Table 11).

The bird's system is not as efficient at utilising calcium sources after 40 weeks of age. Also, older flocks produce larger eggs and more calcium is needed to produce a strong shell on these bigger eggs. For these reasons higher levels of calcium should be formulated into the diets as the flock ages.

Available Phosphorus

There is little change in the available phosphorus requirements during the life of the flock. Be careful to provide only the level of available phosphorus intake necessary (about a half gram per bird per day). Too little or too much available phosphorus consumption can lead to shell quality problems. There is considerable research that indicates that available phosphorus intake as low as

350mg at the end of the production cycle will improve shell quality but there is a great risk of accidentally feeding less than 350mg, therefore, this low level is not recommended.

Post-Peak Body Weights, Production and Egg Weight

Body weight change, especially early in lay, is an indicator of proper or improper nutrient intake and should be considered as a part of the feeding programme of the layer. From 18 weeks of age body weights should be taken every 2 weeks and compared to the goals (Table 16). The objective is for continued increases in egg weight and body weight.

If body weight does not increase slightly, production and egg weight may suffer. After a flock is 36 weeks old, the body weight average should be relatively stable with only a very gradual increase. A slight gain in body weight indicates that sufficient nutrients are being consumed for maximum performance.

Excessive gains indicate excess amounts of nutrients. Adjust nutrient intake if excessive weight gain is present. If the body weight average should drop, the cause should be found immediately to avoid losses in production and egg mass.

Performance Guide

Table 16: **Performance of the H&N Brown Layer to 90 weeks of Age under Good Management and Moderate Environment**

Age (wk)	Liveability %	Hen Day %	Eggs/HH	Egg Weight (g/egg)	Egg Mass (kg)	Body Weight (g)	Feed Cons. (g/bird/day)
16	99.9	0	0	0	0	1350	72
17	99.9	0	0	0	0	1400	74
18	99.9	0	0	0	0	1480	76
19	99.9	0	0	0	0	1560	85
20	99.9	10.0	0.7	45.0	4.8	1640	100
21	99.8	45.0	3.9	48.0	23.0	1720	105
22	99.7	65.6	8.4	51.0	34.8	1745	110
23	99.6	80.7	14.1	53.0	44.0	1750	115
24	99.5	88.9	20.3	54.5	49.8	1750	120
25	99.4	92.5	26.8	56.0	52.7	1760	124
26	99.3	93.6	33.3	57.0	54.8	1770	126
27	99.2	94.3	39.9	58.5	56.6	1780	126
28	99.1	94.7	46.6	60.0	57.8	1790	126
29	99.0	95.0	53.2	61.0	58.9	1800	125
30	98.9	95.3	59.9	62.0	59.6	1820	125
31	98.8	95.4	66.6	62.5	60.1	1840	125
32	98.7	95.4	73.2	63.0	60.4	1850	125
33	98.6	95.3	79.9	63.3	60.7	1855	125
34	98.5	95.1	86.6	63.7	60.8	1860	125
35	98.4	94.9	93.2	63.9	60.9	1865	125
36	98.3	94.7	99.8	64.1	60.9	1870	125
37	98.2	94.5	106.5	64.3	60.9	1875	125
38	98.1	94.3	113.1	64.4	60.8	1880	125
39	98.0	94.1	119.7	64.5	60.8	1885	125
40	97.9	93.8	126.2	64.6	60.6	1890	125
41	97.8	93.5	132.8	64.6	60.5	1891	124
42	97.7	93.2	139.3	64.7	60.3	1892	124
43	97.6	92.8	145.8	64.7	60.1	1893	124
44	97.5	92.5	152.3	64.8	59.9	1894	124
45	97.4	92.2	158.7	64.8	59.8	1895	124
46	97.3	91.9	165.1	64.9	59.6	1896	124
47	97.2	91.5	171.5	64.9	59.5	1897	124
48	97.1	91.9	177.9	65.0	59.2	1898	124
49	97.0	90.6	184.3	65.0	59.0	1899	124
50	96.9	90.2	190.6	65.1	58.8	1900	124
51	96.8	89.9	196.9	65.2	58.7	1907	124
52	96.7	89.5	203.1	65.3	58.5	1909	124

Table 16: **Performance of the H&N Brown Layer to 90 weeks of Age under Good Management and Moderate Environment**

Age (wk)	Liveability %	Hen Day %	Eggs/HH	Egg Weight (g/egg)	Egg Mass (kg)	Body Weight (g)	Feed Cons. (g/bird/day)
53	96.6	89.2	209.4	65.4	58.4	1912	124
54	96.5	88.8	215.6	65.5	58.2	1915	124
55	96.4	88.5	221.8	65.5	58.1	1917	124
56	96.3	88.1	228.0	65.6	57.8	1920	124
57	96.2	87.8	234.1	65.6	57.7	1922	124
58	96.1	87.4	240.2	65.7	57.5	1925	124
59	96.0	87.1	246.3	65.8	57.3	1928	124
60	95.9	86.7	252.4	65.9	57.2	1930	124
61	95.8	86.3	258.4	66.0	57.0	1932	125
62	95.7	85.9	264.4	66.0	56.7	1935	125
63	95.6	85.5	270.4	66.0	56.5	1938	125
64	95.5	85.1	276.4	66.1	56.3	1940	125
65	95.4	84.7	282.3	66.1	56.1	1942	125
66	95.3	84.3	288.2	66.2	55.8	1945	125
67	95.2	83.9	294.1	66.2	55.6	1948	125
68	95.1	83.5	299.9	66.3	55.4	1950	125
69	95.0	83.1	305.7	66.3	55.2	1952	125
70	94.9	82.7	311.5	66.4	55.0	1955	125
71	94.8	82.2	317.3	66.5	54.7	1956	125
72	94.7	81.7	323.0	66.5	54.4	1958	125
73	94.6	81.2	328.7	66.6	54.1	1960	125
74	94.5	80.7	334.3	66.6	53.8	1962	125
75	94.4	80.2	339.9	66.7	53.4	1964	125
76	94.3	79.7	345.5	66.7	53.2	1968	126
77	94.2	79.2	351.1	66.8	53.0	1970	126
78	94.1	78.7	356.6	66.9	52.7	1973	126
79	94.0	78.2	362.1	66.9	52.3	1975	126
80	93.9	77.7	367.5	66.9	52.1	1978	126
81	93.8	77.2	372.9	67.0	51.7	1981	126
82	93.7	76.6	378.3	67.0	51.3	1983	126
83	93.6	76.1	383.6	67.0	51.0	1986	126
84	93.5	75.5	388.9	67.0	50.6	1988	126
85	93.4	75.0	394.1	67.0	50.3	1991	126
86	93.3	74.4	399.3	67.0	49.8	1993	126
87	93.2	73.9	404.5	67.0	49.5	1996	126
88	93.1	73.3	409.6	67.0	49.1	1998	126
89	93.0	72.8	414.7	67.0	48.8	2001	126
90	92.9	72.2	419.8	67.0	48.4	2003	126

Laying Cycle Records

In order to evaluate performance and profitability, detailed laying cycle records are necessary. Daily figures for hen-day production, egg weight, feed and water consumption and mortality are necessary. This information will allow you to calculate very important data including daily egg mass, accumulative egg mass and feed conversion. All results should be graphed. Use of the graphs will improve the analysis of flock performance trends. As with growing records, accurate cage and/or pen counts are very important.

Summary

Sound management practices, based on successful field layer programmes, have been outlined in this guide. Followed carefully, they will help in the attainment of the maximum performance capabilities bred into your H&N Brown.

H&N Brown Management Guide

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Notes